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Orbital ATK

August 1, 2016

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WV DEP / DIV OF AIR QUALITY

Mr. Fred Durham, Director
WV Department of Environmental Protection
Division of Air Quality
601 – 57th Street
Charleston, WV 25304

Alliant Techsystems Operations LLC
Allegany Ballistics Laboratory
WVDAQ ID# 057-00011

SUBJECT: R13 Permit to Construct Application

Dear Director Durham:

Orbital ATK – Allegany Ballistics Laboratory hereby submits the enclosed application for the addition of a new rocket motor chamber preparation processing operation We believe the enclosed application contains the appropriate elements as indicated by the DAQ's checklist for the NSR (45CSR13) Application. The permit fee for the application will be $3,500 because it includes products with several HAP constituents. The permit fee has been paid by Visa over the phone and a receipt will be submitted once received. Should you have additional questions regarding this submittal please contact Sue Ellen Foor, Environmental Engineer, at 304-726-5506 or sueellen.foor@orbitalatk.com.

Sincerely,

Michael McGregor
V.P. & Site Manager – ABL Operations
Orbital ATK
Allegany Ballistics Laboratory

Cc: Joe Kreger
WVDEP Division of Air Quality
HC 63, Box 2545
Romney, WV 26757

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WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☒ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☐ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☒ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
Alliant Techsystems Operations LLC

2. Federal Employer ID No. ***(FEIN):***
27-4026908

3. Name of facility *(if different from above):*
Orbital ATK
Allegany Ballistics Laboratory (ABL)

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
Allegany Ballistics Laboratory
210 State Route 956
Rocket Center, WV 26726

5B. Facility's present physical address:
Same as mailing address

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**
- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation:

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**
- If **YES,** please explain: Facility is leased from the Navy and operated by Orbital ATK
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be constructed, **modified,** relocated, administratively updated or temporarily permitted (e.g., coal preparation plant, primary crusher, etc.): Adding a new facility for winding composite rocket motor cases and applying adhesive systems and insulators to the interior of the cases prior to loading them with propellant.

10. North American Industry Classification System **(NAICS)** code for the facility:
336415

11A. DAQ Plant ID No. (for existing facilities only):
057-00011

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R30-05700011-2014 Part 1 (for this process only).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

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Orbital ATK Internal Use Only

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B.**

Turn left off of WV State Route 956 onto plant access road just after crossing bridge into West Virginia.

12.B. New site address (if applicable):	12C. Nearest city or town: Short Gap, WV	12D. County: Mineral
12.E. UTM Northing (KM): 586.5	12F. UTM Easting (KM): 4381.2	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Install a new filament winding and chamber preparation facility for a new rocket motor program. The operations will include spray booths, exhaust hoods, and a machining operation.

14A. Provide the date of anticipated installation or change: – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen:	14B. Date of anticipated Start-Up if a permit is granted: 12/01/16

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day 24 Days Per Week 5 Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved? ☒ **YES** ☐ **NO**

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) .
– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**
– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**
– For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	☐ Storage Tanks

☒ General Emission Unit, specify Spray booths, exhaust hoods

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☒ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☒ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☐ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE Michael M. McGregor *(Please use blue ink)* DATE: 8-1-16 *(Please use blue ink)*

35B. Printed name of signee: Michael McGregor		35C. Title: V.P. & Site Manager – ABL Operations
35D. E-mail: michael.mcgregor@orbitalatk.com	36E. Phone: 304-726-5200	36F. FAX: 304-726-5183
36A. Printed name of contact person (if different from above): Sue Ellen Foor		36B. Title: Env. Engineer
36C. E-mail: sueellen.foor@orbitalatk.com	36D. Phone: 304-726-5506	36E. FAX: 304-726-5562

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- ☒ **Attachment A: Business Certificate**
- ☒ **Attachment B: Map(s)**
- ☒ **Attachment C: Installation and Start Up Schedule**
- ☒ **Attachment D: Regulatory Discussion**
- ☒ **Attachment E: Plot Plan**
- ☒ **Attachment F: Detailed Process Flow Diagram(s)**
- ☒ **Attachment G: Process Description**
- ☒ **Attachment H: Material Safety Data Sheets (MSDS)**
- ☒ **Attachment I: Emission Units Table**
- ☒ **Attachment J: Emission Points Data Summary Sheet**
- ☒ **Attachment K: Fugitive Emissions Data Summary Sheet**
- ☒ **Attachment L: Emissions Unit Data Sheet(s)**
- ☒ **Attachment M: Air Pollution Control Device Sheet(s)**
- ☒ **Attachment N: Supporting Emissions Calculations**
- ☒ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
- ☒ **Attachment P: Public Notice**
- ☐ **Attachment Q: Business Confidential Claims**
- ☐ **Attachment R: Authority Forms**
- ☒ **Attachment S: Title V Permit Revision Information**
- ☒ **Application Fee**

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
- ☐ ***For Title V Administrative Amendments:***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
- ☐ ***For Title V Minor Modifications:***
  - ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
- ☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  - ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  - ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  - ☐ ***EPA has 45 day review period of a draft permit.***

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

ATTACH A

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
ALLIANT TECHSYSTEMS OPERATIONS LLC
210 STATE ROUTE 956
KEYSER, WV 26726-9219

BUSINESS REGISTRATION ACCOUNT NUMBER: **2247-4467**

This certificate is issued on: 06/1/2011

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atL006 v.4
L1238748288

BLDG NO.	DESCRIPTION	LOC
484	SCRAP SHED FOR BLDG 487	4-C
416	POWDER MACHINING COMPLEX	4-B
412	DEICON OVEN/TEFLON SPRAY	4-C
413	LARGE MOTOR CAST/CURE	5-C
414	AIR COMPRESSOR BLDG	5-D
415	SECURITY/GUARD HO	7-C
416	SCRAP SHED	5-C
417	PUMP HOUSE	6-C
418	X-RANGE STOR BLDG	2-B
419	CONTROL/UTILITY FOR B413	5-C
420	CHANGER PREP	6-D
421	CASE INSULANT/NOZZLE MFG	4-C
422	SCRAP SHED (FOR B375)	4-C
423	ELEV BOILER FEEDWTR STOR TK	5-C
424	SITE ONE TREATMENT FAC	5-C
425	COMMUNICATIONS SPLICE BLDG	6-B
426	SEWAGE LIFT STATION	6-C
431	SEWAGE GRINDER STATION	6-C
432	LASER MANUFACTURING BLDG	6-C
434	SCRAP SHED	6-B
435	FILLING STATION (B-7)	5-B
436	UDMH STG TANK (B-7)	5-B
437	UDMH STG TANK (B-7)	5-B
438	FLOW FORMER (MTL PAD)	7-C
439	SLVT STOR SHED FOR RES CMPLX	5-C
440	INFORMATION MANAGEMENT	7-C
441	ASH DWSTN BUILDING	6-C
442	WASTEWATER TREATMENT	4-C
443	DISASSY CTRL BLDG FOR B286	3-B
444	METEOROLOGICAL TOWER	5-D
445	SOLVENT RECOVERY BLDG	4-C
446	PERSONNEL CHANGE FACILITY	4-C
447	WATER ENCHFLOW DEV BLDG	6-C
448	SENATOR BYRD MONUMENT	7-C
449	ADMINISTRATIVE FACILITY	7-C
450	FIBER OPTIC SPLICE BLDG	6-B
451	FIBER OPTIC SPLICE BLDG	3-B
452	FIBER OPTIC SPLICE BLDG	6-B
453	FIBER OPTIC SPLICE BLDG	6-B
454	TPED POLYMER MFG FACILITY	6-D
455	NITROGEN BOTTLE STORAGE	6-C
456	B484 EXHAUST VESSEL STORAGE	6-C
457	AIR COMPRESSOR BUILDING	6-C
458	HAZARDOUS WASTE SHED	3-C
459	MATERIAL STORAGE SHED	3-C
460	HAZARDOUS WASTE SHED	5-C
461	HAZARDOUS WASTE SHED	4-C
462	TRASH COLLECTOR SHED	4-B
463	SALT STORAGE BUILDING	4-B
464	STORAGE SHED (FOR B361)	4-C
467	MISC UTILITY PLANT BLDG	7-D
468	FLAG POLE (BLDG 415)	7-C
469	FLAG POLE (BLDG 415)	7-C
470	FLAG POLE (BLDG 415)	7-C
472	STORAGE BLDG FOR B362	5-B
473	SCRAP SHED FOR B272	5-B
477	STORAGE BLDG FOR B09	5-C
481	CANOPY (B415)	7-C
482	FIBER OPTIC SPLICE BLDG	5-C
483	POTV STOR TANK-288-B88 DAL	2-B
484	POTV STOR TANK-288-B88 DAL	2-B
485	SCRAP SHED	7-C
487	RC BYRD MONUMENT (B242)	2-B
493	UTILITY BLDG FOR B449	7-C
499	UTILITY BLDG (FOR B424)	5-C
494	ED BYRD CONF & LEARNING CTR	7-B
495	FLAMMABLE STORAGE BLDG	6-D
496	FLAMMABLE STORAGE BLDG	7-B
497	FLAMMABLE STORAGE BLDG	7-B
552	POTV STOR TANK-588-B88 DAL	7-A
630	ADMINISTRATION BLDG	7-B
681	FIBER OPTICS SPLICE BLDG	6-B
683	CHILLED WATER SUPPORT	6-B
684	FIRE PUMP HOUSE	6-B
616	BYB DESIGN RESEARCH LAB	4-B
611	TARGET BLDG "G" FOR B318	8-A
612	TARGET BLDG "H" FOR B618	4-A
613	TARGET BLDG "I" FOR BLDG 618	3-A

ALLIANT FUNDED BUILDINGS

BLDG NO.	DESCRIPTION	LOC
639	INGREDIENT DRYING BLDG	8-B
634	AUXILIARY UTILITY BLDG	3-C
637	HEATED SCRAP SHED	6-C
634	INERT STORAGE BLDG	4-C
818	INERT STORAGE BLDG	5-B
814	STORAGE BLDG FOR B363	3-C
815	OIL DRUM STORAGE	8-C
816	DRY AMO STORAGE SHED	7-D
819	RUBBER MFG BLDG	7-D
821	HAZARD WASTE STORAGE SHED	7-D
823	SOLVENT SHED	4-C
824	BARRICADE AT BURN GND	4-D
826	SCRAP SHED AT BLDG 384	4-C
827	SCRAP SHED	4-B
828	SCRAP SHED	4-C
829	SCRAP SHED	4-C
830	STORAGE SHED	5-C
831	BURN GRNDS CTRL BLDG	4-D
832	BURN GRNDS STORAGE BLDG	4-D
833	BURN GRNDS STORAGE BLDG	4-D
836	DUST COLLECTOR BLDG (B381)	4-C
839	BREAK SHACK	7-C
839	BREAK SHACK	7-C
848	BREAK SHACK	8-B
843	SEWAGE LIFT STATION (B844)	8-C
846	BARRICADE FOR BLDG 388	4-B
849	CTRL HOUSE (BLDG 388 & 389)	8-B
858	STEAM PLANT	4-C
882	INLET BLDG	8-A
883	WATER PLANT	8-A
8182	ATK CONST MANAGER TRAILER	7-D
'A'	BURN GRNDS PAN	5-D
'B'	BURN GRNDS PAN	5-D
'C'	BURN GRNDS PAN	5-D
'D'	BURN GRNDS PAN	5-D
'E'	BURN GRNDS PAN	5-D
'F'	BURN GRNDS PAN	5-D
'I'	OIL STORAGE SHED	6-B

BLDG NO.	DESCRIPTION	LOC
2	MACHINE SHOP	5-B
7	VEHICLE MAINTENANCE & ADMIN	5-B
8	CHAMBER PREP/STORAGE/ADMIN	8-B
21	POWDER CASTING BLDG	4-C
43	EXPLOSIVE WEIGHING BLDG	5-B
47	MOTOR FINISHING	4-C
99	NITROCELLULOSE STORAGE	5-C
145	MAINTENANCE BLDG	5-B
146	WELDING SHOP & STL STORES	5-B
148	VEHICLE MAINTENANCE BLDG	5-C
150	BARRICADE (BLDG 213)	4-B
151	DISASSEMBLY HOLD WASH BLDG	4-B
157	FIRE STATION	5-B
158	METAL STORAGE SHED	5-B
164	INSTN BLOCK HOUSE	2-B
167	CHAMBER PREPARATION BLDG	7-D
169	HIGH XPL MAGAZINE, RI	2-B
170	AIR CONDITIONING BLDG	2-B
171	BARRICADE	2-B
172	BARRICADE	3-B
173	HIGH XPL MAGAZINE,	3-B
174	AIR CONDITIONING BLDG	3-B
175	BARRICADE	4-B
178	NON-DESTRUCTIVE TESTING	4-B
181	AREA ADMINISTRATION BLDG	4-B
186	BARRICADE (EARTH)	4-B
192	STANDARDS CALIBRATION LAB	3-B
193	FIRING BAY NO. 2 (X-RANGE)	2-B
194	FIRING BAY NO. 3 (X-RANGE)	2-B
198	STEEL PILE RETAINING WALL	4-B
200	BARRICADE	4-B
211	UTILITY BLDG (FOR B262)	5-B
212	CONT BLDG (FOR B262 & B86)	5-B
213	BATCH TANK BLDG	5-B
214	PHYSICAL STRUCT LAB BLDG	7-D
219	OIL STORAGE BLDG	6-B
224	VEHICLE MAINTENANCE	5-C
225	GEN'L WHSE; RI (QUONSET)	6-C
226	LINEAR CASTING MFG	4-B
227	AIR CONDITIONING BLDG	4-B
229	UTILITY BLDG FOR BLDG 228	4-B
230	GENERAL WHSE; RI (QUONSET)	5-B
231	GENERAL WHSE; RI (QUONSET)	2-B
234	GENERAL WHSE; RI (QUONSET)	6-C
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248	CONTROL BLDG (FOR B375)	4-C
249	UTILITY BLDG (FOR B375)	4-C
256	COMP STRNL SHIP-REC-STORE	7-D
262	INGREDIENT PREP	5-B
271	EXPERIMENTAL TEST BLDG	6-D
272	AREA ADMINISTRATION BLDG	5-C
273	AREA DFCE/LIN CASTING CONT	4-B
274	CHAD BLDG (NEAR BLDG 164)	2-B
275	NO PREP BUILDING	3-C
276	BARRICADE FOR BLDG 275	3-C
277	UTILITY BLDG FOR B275	3-C
283	CONT BLDG FOR B289 & B290	8-B
284	PROCESS RESEARCH MIX BLDG	5-B
298	PROCESS RESEARCH MIX BLDG	5-B
342	SEWAGE LIFT STATION	4-C
346	ADMINISTRATION BLDG	3-C
381	CONTROL HOUSE	3-C
382	MIXING BLDG	3-C
361	WEST CASTING BLDG	4-C
389	UTILITY BLDG	3-C
317	ROCKET CONDITIONING BLDG	3-C
318	BARRICADE FOR BLDG 317	3-C
319	SEWAGE PUMPING STATION	3-C
322	OPEN STORAGE AREA, RI	4-B
324	UTILITY BLDG NEAR B108	4-B
332	CONDITIONING BLDG	3-C
326	UTIL BLDG FOR 260 COMPLEX	5-B
348	CATCH TANK BLDG	6-C
341A	UTILITY BLDG	3-C
344	CENTRAL HEATING PLANT	5-C
356	WELDING WALK	3-C
351	SCRAP SHED (FOR BLDG 276)	3-C
352	SOLVENT/LACQUER PREP	3-C
353	BARRICADE	3-C
354	UTILITY BLDG FOR B352	3-C
355	SCRAP SHED (FOR BLDG 352)	3-C
356	CASTING BLDG	3-B
357	CONTROL HOUSE FOR B356	3-B
358	SCRAP SHED FOR B356	3-C
391	UTILITY BLDG FOR B388	3-B
388	INSPECTION BLDG	4-B
361	ASSEMBLY BLDG	4-C
362	CURE BAYS	3-B
363	R.C.BYRD INSTITUTE	8-B
364	INHIBITING BUILDING	4-C
365	INERT STORAGE BLDG	6-D
366	HAZARDOUS WASTE STORAGE	5-B
368	X-RANGE CHMCRN STORAGE BLDG	2-B
368	PRODUCTION WINDING FAC	7-C
369	B82 CURE PITS BLDG	5-B
370	OIL SPILL CONTAINMENT	2-B
371	OIL SPILL CONTAINMENT	4-C
372	CURE FACILITY	3-B
373	NATL PREPARATION FAC	8-D
374	NITRATING GRINDING FAC	8-D
376	288 GALLON MIX BLDG	4-C
376	METAL FAB COMPLEX	7-C
378	CLASS 1.4 & 1.3 STOR FAC	6-D
380	GENERAL WHSE	6-C
381	BOTTLED GAS STORAGE	6-D
382	CONTROL HOUSE FOR B374	5-B
383	XPL WASTEWATER TREATMENT	5-B
384	LEAD CITRATE BLDG	5-B
385	TOOL STORAGE	7-D
386	IGNITER FABRICATION	5-C
387	IGNITER STORAGE	5-C
387	STORAGE SHED	6-C
389	U.S. FLAG POLE (B388)	6-C
390	WV FLAG POLE (B388)	6-C
391	ATK FLAG POLE (B388)	6-C
392	FINAL ASSEMBLY BLDG	4-B
393	STORAGE SHED FOR BLDG 392	4-B
394	PHYSICAL TESTING LAB	5-C
395	CURE/COND/STORAGE BLDG	5-C
396	5 GAL MIX BLDG	6-C
397	5 GAL MIX BLDG	6-C
398	CTRL/UTIL BLDG FOR 396/397	6-C
399	SCRAP SHED	6-C
400	SUB-SCALE MIX BLDG	6-C
401	TEN POUND MIX BLDG	2-B
402	DISASSY/ASSY/TEST FACILITY	6-B
403	XPL INGREDIENT PREP BLDG	6-C
404	PROPELLANT LAB	6-C
405	MATERIALS LAB	6-C
406	ADHESIVES LAB	6-C
407	DISASSEMBLY COMPLEX	4-C
409	TOOL STORAGE FOR BLDG 407	4-B

DRAWING HISTORY	DATE
THIS DRAWING HAS BEEN ARCHIVED PER 9999 STATUS	

APPROVALS	DATE
DRAFTER DRB	10-15-15
CHECKER	
ENGR	
DES SUPV	
AREA SUPV	
SAFETY	
ENG MGR	

ATK TACTICAL SYSTEMS COMPANY LLC
ALLEGANY BALLISTICS LABORATORY
ALLEGANY STATE ROUTE 956
ROCKET CENTER, WV 26726-3548

ABL ROCKET CENTER, WV

PLANT 1 GENERAL MAP PLAN AND BUILDING LIST

CAGE CODE 70272	SIZE: D
SCALE: 1" = 250.0'	
NEXT ASSEMBLY / USED ON	
BUILDING NO.	DRAWING PKG
BASE	PLT1
CONTRACTOR DRAWING NO.	REV
1-112-AB	-
SHEET 2 OF 4	

PLT-1

INTERPRET THIS DRAWING IN ACCORDANCE WITH DOD-STD-100

$$dgn$$

$$time$$

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ATTACHMENT C

EQUIPMENT INSTALLATION AND START-UP SCHEDULE

Proposed Installation Date	Proposed Start-Up Date	Emissions Unit (Source)	
		ID No.[1]	Source
10/31/16	12/5/16	Z-1S	Mandrel Release Coating Table
11/1/16	12/5/16	Z-2S	Adapter Degreasing Exhaust
3/1/17	5/1/17	Z-3S	BR-127 Primer Booth
3/1/17	5/1/17	Z-4S	Adapter/BR-127 Oven
11/1/16	12/5/16	Z-5S	Interior Degreasing Exhaust
11/1/16	12/5/16	Z-6S	Degreasing Drying Station
10/31/16	12/5/16	Z-7S	Chemlok Mixing Hood
10/31/16	12/5/16	Z-8S	Chemlok Application Booth
10/31/16	12/5/16	Z-9S	Chemlok Drying Station
10/1/16	12/5/16	Z-10S	Insulator Prep Exhaust
10/1/16	12/5/16	Z-11S	Oven for Insulator Drying
2/1/17	3/1/17	Z-12S	Bondliner Mixing Hood
2/1/17	3/1/17	Z-13S	Bondliner Application Booth
2/1/17	3/1/17	Z-14S	Bondliner Drying Station
10/1/16	12/5/16	Z-15S	Case Machining
11/1/16	12/5/16	Z-16S	End Closure Adapter Wiping Station

Orbital ATK Internal Use Only

ATTACHMENT D
REGULATORY DISCUSSION

A description of all state and federal regulations which affect the entire Orbital ATK facility is included in the facility's Title V permits. The chamber preparation equipment addressed in this application will be included in Part 1 of the facility's Title V permit. The following discussions include only regulations which pertain to the operations which are proposed in this permit application.

--Facility Level Applicable Regulations and Compliance Statements:
---WVDAQ Regulation 4 - Objectionable odors are not a normal occurrence. However, facility will comply with applicable prohibition from emitting objectionable odors by taking all reasonable measures to minimize objectionable odors if such a situation occurs.

---WVDAQ Regulation 7 - Facility will comply with applicable opacity limits (Sections 3.1 and 3.2) by maintaining trained opacity observer personnel to notify plant supervision if a non-compliance condition occurs or by calculations.

---WVDAQ Regulation 11 - Facility will comply with all applicable requirements of this regulation as requested by the West Virginia Air Pollution Control Commission during declared air pollution emergency episodes.

---WVDAQ Regulation 22 - Facility will comply with all applicable requirements of this regulation regarding payment of processing fees for permit applications by prompt payment of all applicable fees.

---WVDAQ Regulation 27 - Facility is complying with all applicable requirements of this regulation regarding the prevention and control of discharges of toxic air pollutants (TAPS) by application of technology or operational changes as defined in CO-R27-91-20 issued June 25, 1991 (superceded by CO-R27-99-23-A(91) issued June 14, 1999) (see below for a detailed explanation of the plant's compliance status on CO-R27-91-20). R13-0898B replaced the consent order. The sparging system in the permit is the only significant TAP source remaining on the facility (other sources are lab use).

---WVDAQ Regulation 29 - Facility will comply with all applicable requirements of this regulation regarding any requested submission of air emissions inventory data by timely submission of the required emission inventory.

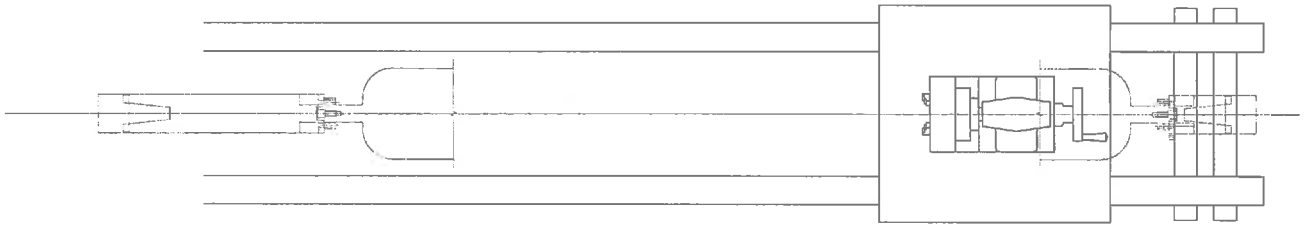
---WVDAQ Regulation 30 - Facility will comply with all applicable requirements of this regulation regarding its Title V Operating Permit.

---WVDAQ Regulation 31 - Facility will comply with all applicable requirements of this regulation regarding confidential information.

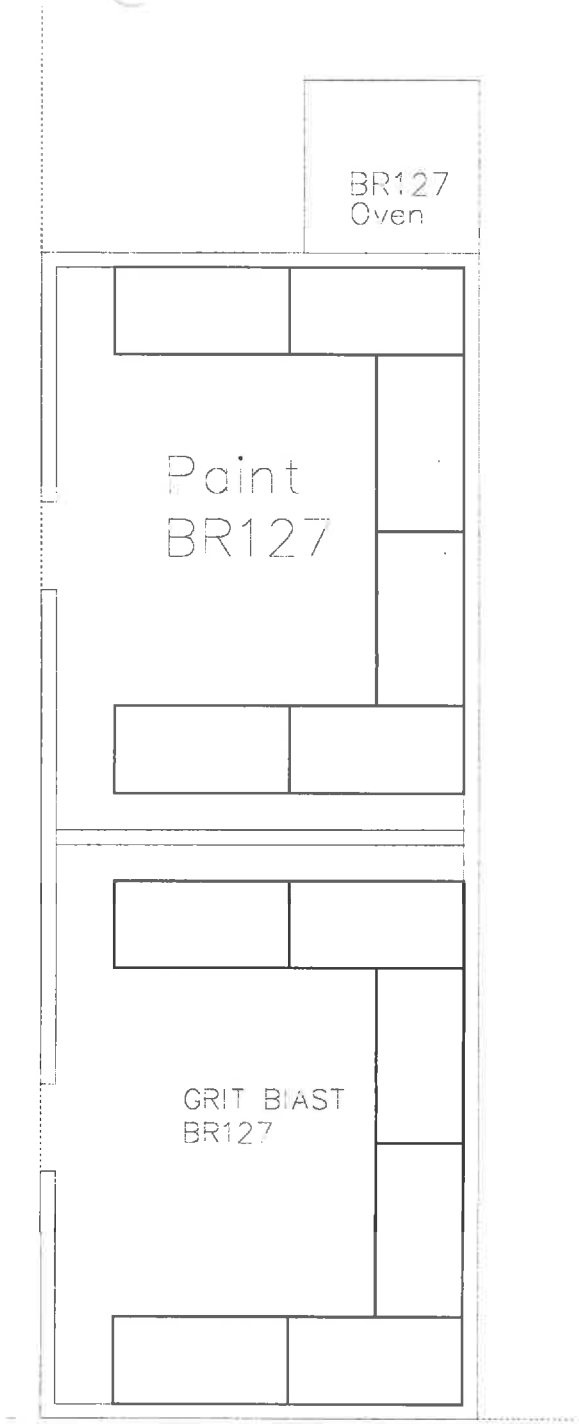
--Existing Permits and Consent Orders:
1. Reg. 13-401 issued 1978. Superceded by 13-0401A issued in 1999. Superceded by 13-0401B issued in May, 2001.

2. Reg. 13-573 issued 1980. Deemed inactive by 13-573A issued in May, 2001.
3. Reg. 13-621 issued 1981. Deemed inactive by 13-621A issued in May, 2001.
4. Reg. 13-898 issued 1986. Superceded by 13-898C issued in May, 2016.
5. Reg. 13-974 issued 1988. Superceded by 13-974A issued in May, 2001. This permit is obsolete and is requested to be cancelled. Boilers under this permit have been shut down, disconnected and replaced by natural gas boilers under Reg. 13-3186 issued August, 2014.
6. Reg. 13-1047 issued 1988. Superceded by 13-1047A issued in July, 2001. Superceded by 13-1047B issued in March, 2002.
7. Reg. 13-1307 issued 1991. Deemed inactive in 1997.
8. Reg. 13-1403 issued 1991. Superceded by 13-1642 issued 1994. Superceded by 13-1694 issued in 1994. Superceded by 13-1694A issued in July, 2001.
9. Reg. 13-1455 issued 1992. Superceded by 13-1455A issued in July, 2001.
10. Reg. 13-1771 issued 1995. Superceded by 13-1771A issued in April, 2003.
11. Reg. 13-1782 issued 1995. Superceded by 13-1782A issued in July, 2001.
12. Reg. 13-1797 issued 1995. Superceded by 13-1797A issued in January, 2002.
13. Reg. 13-1798 issued 1995. Superceded by 13-1798A issued in July, 2001.
14. Reg. 13-2023 issued 1996. Superceded by 13-2023C issued in May, 2014.
15. Reg. 13-2037 issued 1996. Superceded by 13-2037A issued in July, 2001.
16. Reg. 13-2246 issued 1999.
17. Reg. 13-2301 issued 1999. Superceded by 13-2301A issued in July, 2001. Superceded by 13-2606B in April, 2009.
18. Reg. 13-2579A issued in October, 2005.
19. Reg. 13-2606 issued in February, 2005. Superceded by 13-2023C in May, 2014.
20. Reg 13-2680 issued January, 2007 is obsolete and is requested to be cancelled. Program has ended and equipment has been disconnected.
21. Reg. 13-2754 issued August, 2008 is obsolete and is requested to be cancelled. Program has ended and all equipment has been removed from the facility.
22. CO-R6,13,25-99-35A(95) issued January 5, 2000 (Open Burning). (This amended and updated CO-R6,13,25-95-8 issued November 8, 1995).
23. Reg 30-05700014 Part 1 issued April, 2014.
24. Reg. 30-05700014 Part 2 issued June, 2014.
25. Reg. 30-05700014 Part 3 issued July, 2014 and January, 2015.

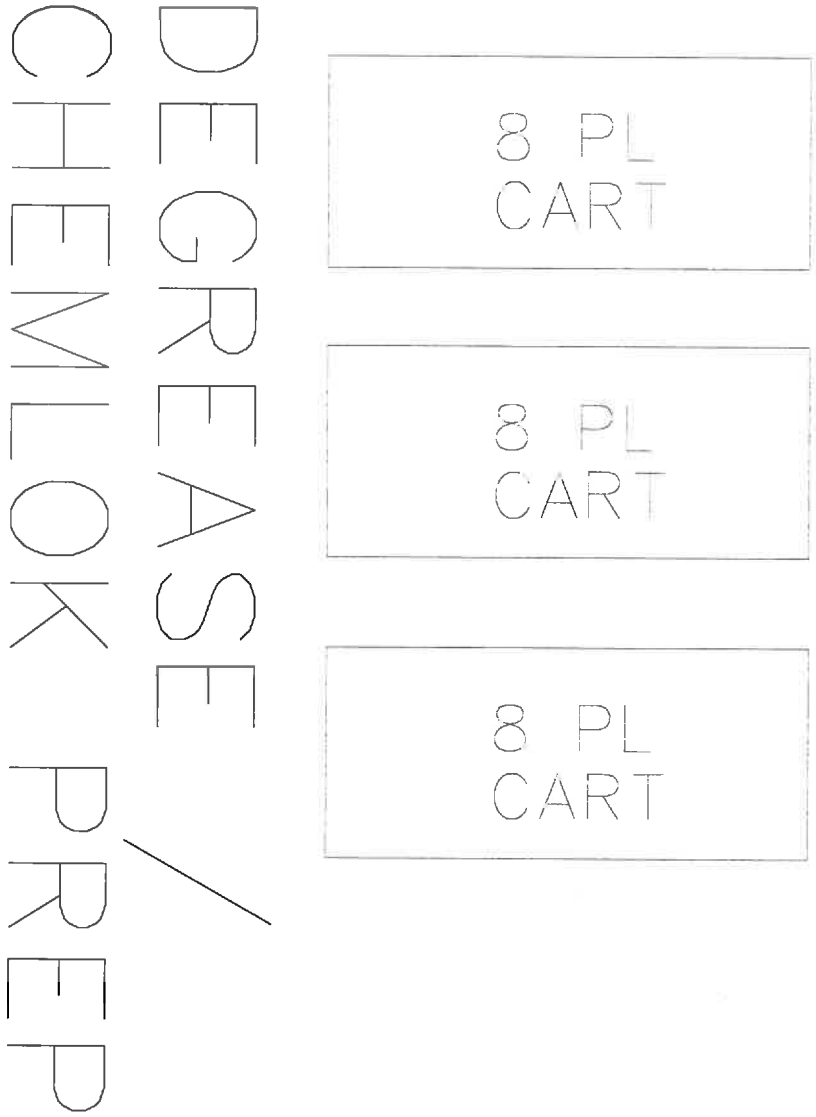
Z-1S (Prior to Point 1 on facility drawing)



MANDREL PREP

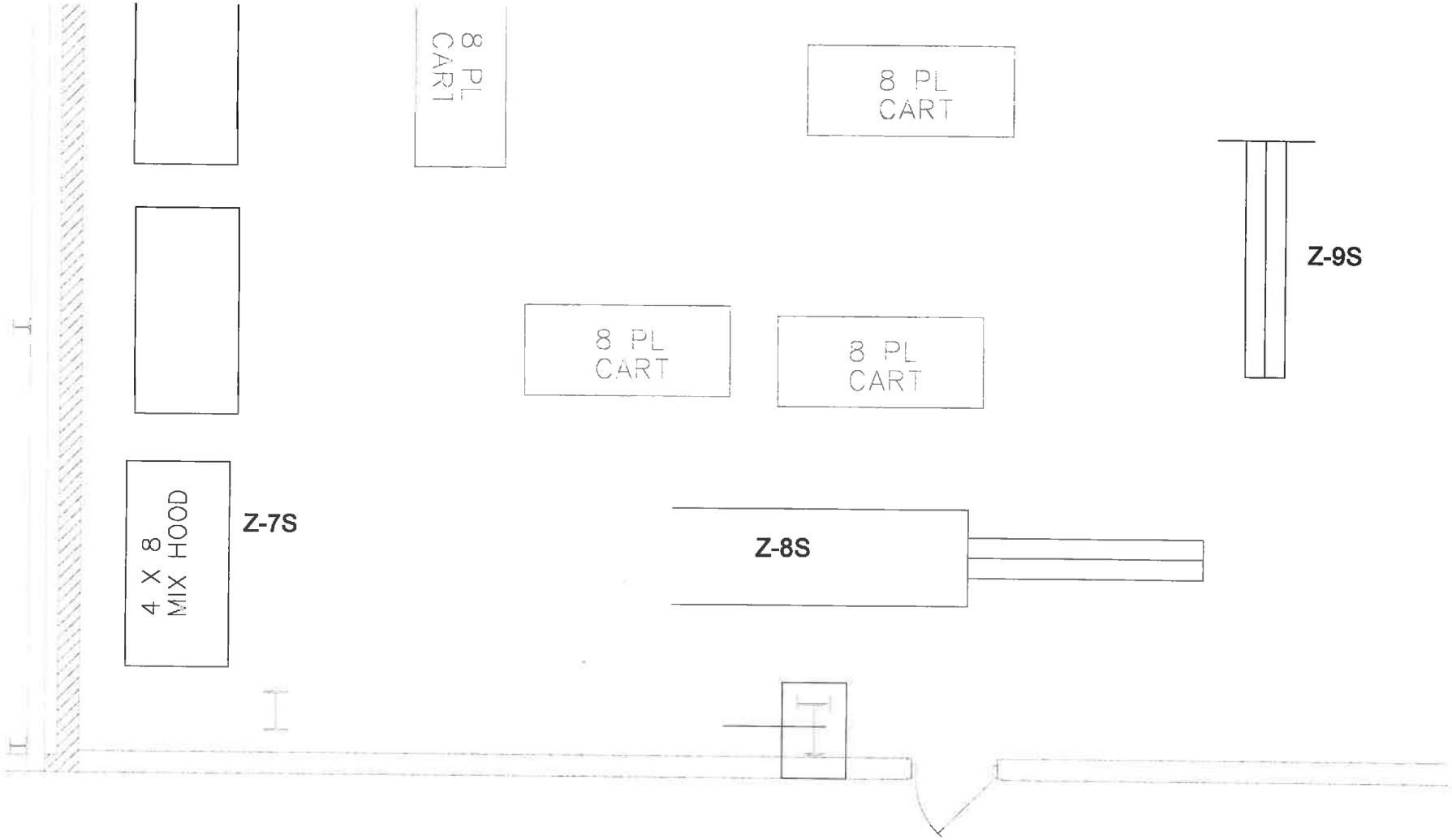


Z-2S, Z-3S, Z-4S
This room is not numbered on facility drawing.
NOTE: Grit blaster would be an internally exhausted unit and is not listed as a permitted emission point.

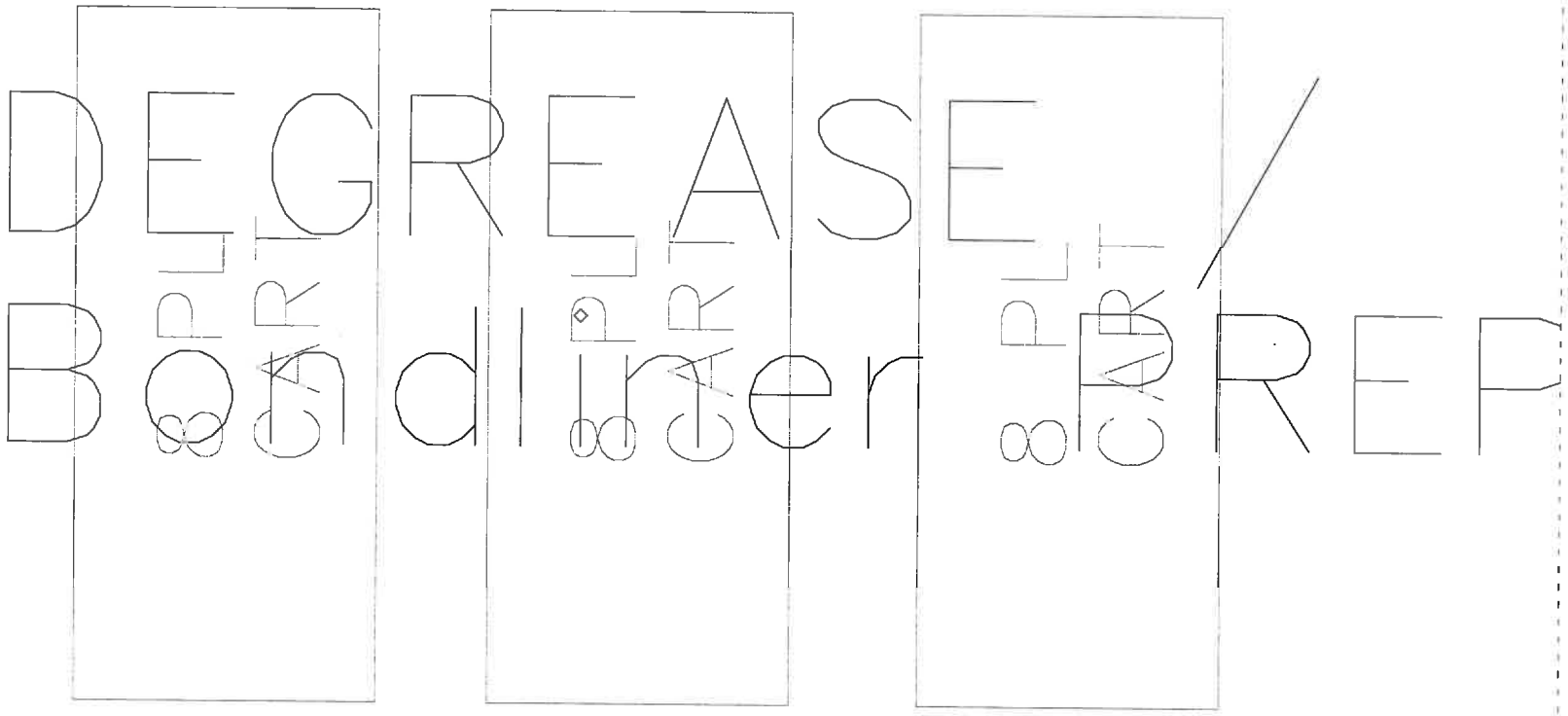


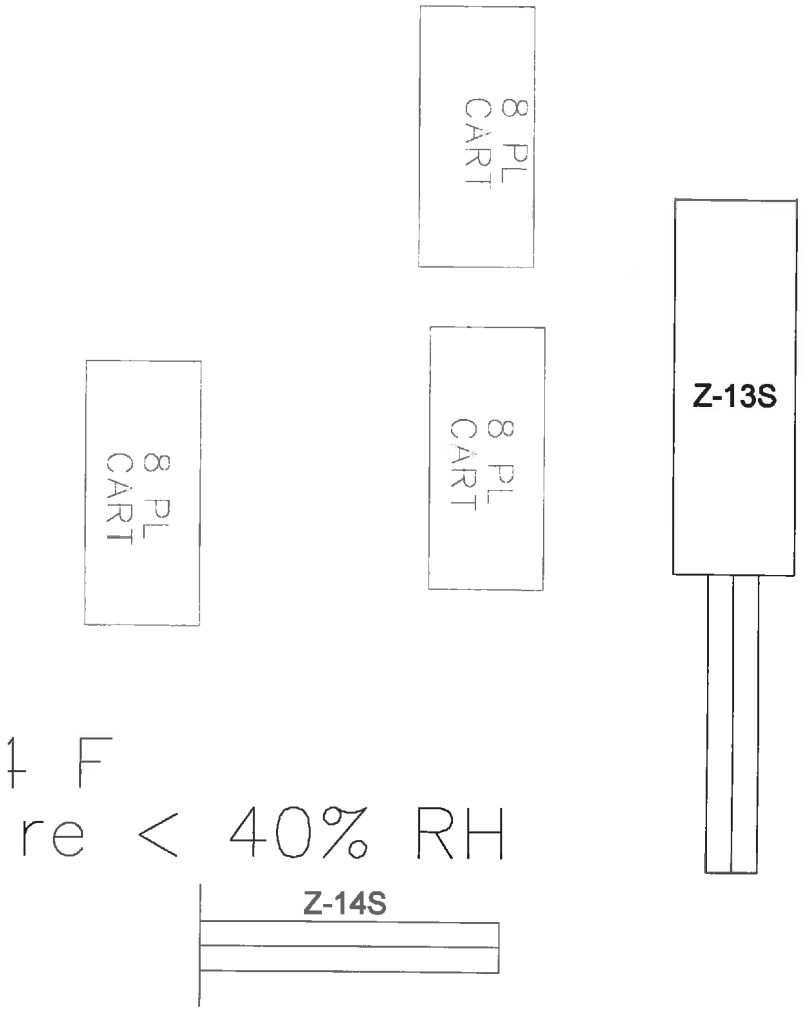
Z-5S and Z-6S
This corresponds to Point 11 on facility drawing.

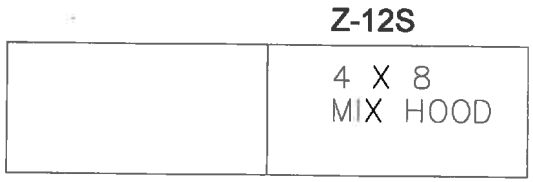
Z-7S, Z-8S and Z-9S
This corresponds to Point 12 on the facility drawing.



Z-10S and Z-11S
This corresponds to Points 24 and 25
on the facility drawing.

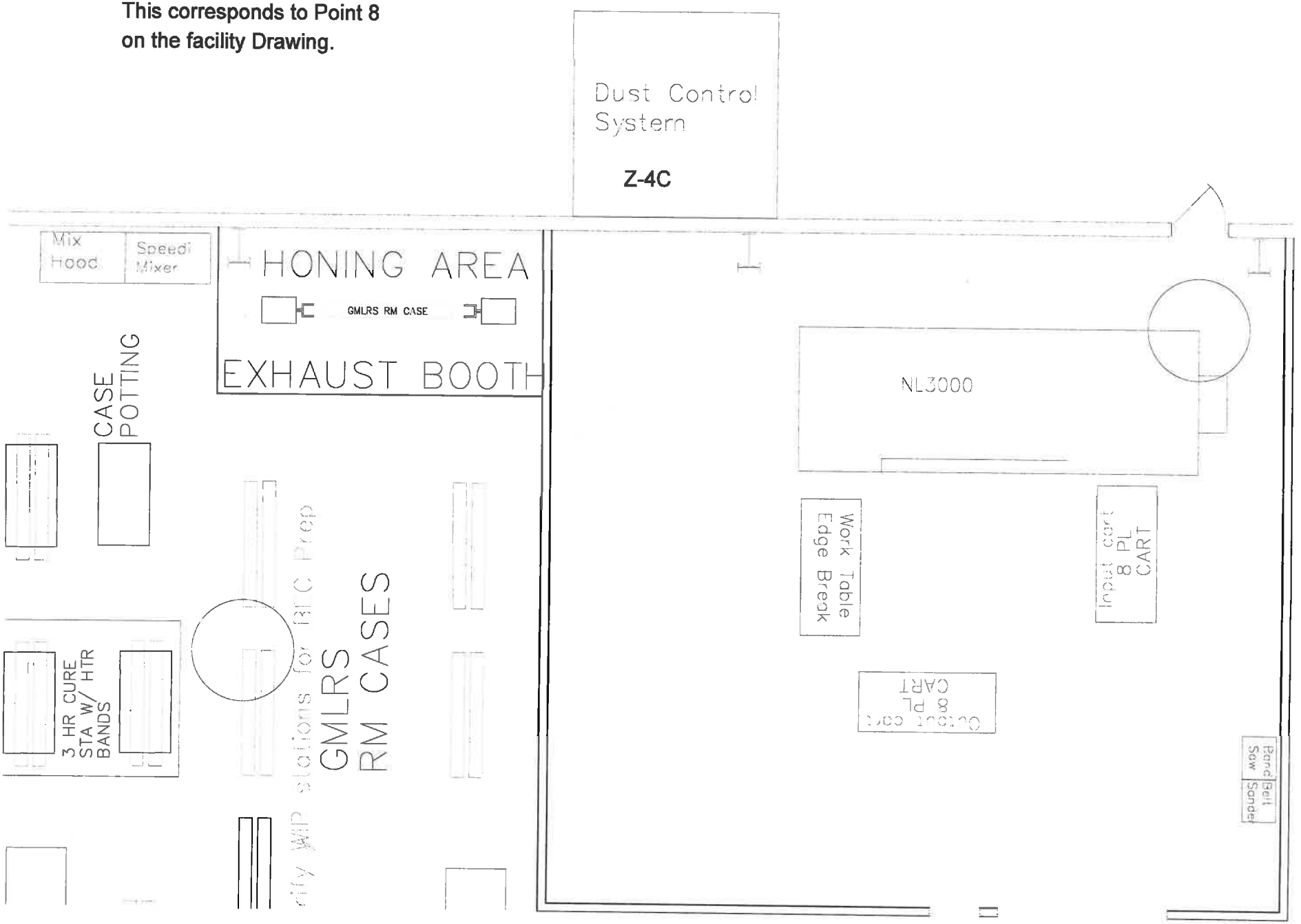






Z-12S, Z-13S, and Z-14S
This corresponds to Point 28 on the facility drawing.

Z-15S
This corresponds to Point 8 on the facility Drawing.



STAIR 2

Dust Control System

MR 130

FE

8'-0"

STAIR 3

OVEN

OVEN

Insulation trim

TOOLING STORAGE

BRIDGE CRANE
12 FOOT MIN HOOK HGT
3 TON CAPACITY

Press table

Lift Table

Pattern Table

Pattern Cutter

Material feed

Material Cart

LAY-UP STATIONS

CASE FIXTURES

AMBIENT CURE STA.

ONE-HOUR CURE STA.

CASE GLAZING

Mix Hood

Speedi Mixer

HONING AREA

EXHAUST BOOTH

CASTING POTTING

SMLRS RM CASES

NL3000

Resin Tote Bin Dock

3 DRAWER CURE OVEN

AMBIENT ROTATION

OVERHEAD CRANE IN BAY
12 FOOT MIN HOOK HGT
3 TON CAPACITY

MANDREL PREP

STIPPER

Out of service Mandrel Storage

Ensure storage capacity for 20 mandrels in the case of Welding shut down. Remainder to be stored in Machines

Free

MRB Cage
20ft. x 11 ft.

8 PL CART

Scale

12 hour Insulation Cure @ Includes temperature Ramp

CRANE

2 PL CART

HYDRAULIC ROOM

CONTROL ROOM

18'-10 3/8"

RR 141

RR 140

ULTRASONIC UT TANK
7 X 4

READY for Insulation

DEGREASE / CHEMLOK PREP

CMM

FREEZER

62-74 F
Moisture < 40% RH

RESIN PRE-MIX AREA

MANDREL PREP

OVEN 650^ F

HOT BOX

276'-5"

Future Business Opportunity ~ 21,500 sqft.

DEGREASE / Bonderizer PREP

OVEN

LAUNDRY

4 X 8 MIX HOOD

Point BR127

ORT BLAST BR127

74'-8 1/8"

Roll up door

Roll up Door

RE-INSTALL ROLL-UP

REMOVE OIL TANKS AND FENCE

REMOVE OIL TANKS AND FENCE

STAIR 1

EL MR 102

PASS ELEV

LOBBY 103

SEC OFF 101

1. Wind
2. Ambient Cure
3. Heated Cure (3 Drawer Oven)
4. Cool Down
5. Stripping
6. Machining
7. CMM Inspect Tube
8. Bonded Enclosure Prep
9. BEC Installation
   a. Tacking 3 hr cure
   b. Potting 10 hr amb cure
   c. Glazing 1hr cure
10. CMM Inspect Case Sub assy
11. Chemlok Degrease
12. Chemlok Spray 205
13. 1 hr amb dry
14. Chemlok Spray 234
15. Weigh Case
16. Insulation Lay-up
17. Insulation Cure
18. Dis-assemble Tooling
19. Insulation Trim
20. Weigh Case
21. Hydro-Test
22. UT- Inspection
23. UT Dry (Oven)
24. Degrease for Bond-Lining
25. Oven Dry (2 hrs)
26. Install Foam Donnut
27. Weigh Case
28. Bond-Lining Application
29. Post Bond Assy./Install Environmental Closures
30. Stage for Shipment to 3040

REV 022616

2/10/16: DELETE WATER SHIELDING AREA
2/26/16: DELETE DEGREASE
2/26/16: DELETE FREEZER AT RESIN PRE-MIX
2/26/16: ADDED 8x8 DOOR FOR MOVEMENT INTO FP AREA
2/26/16: CMM RESIZED TO 6-0 x 14-4 PER QUOTE (PRIOR WAS 12 x 20)
2/26/16: OVENS RESIZED TO 10-2 x 13-5 PER QUOTE (PRIOR WAS 15 x 20)
2/26/16: RESIZED FREEZER FOR 16x16 (PRIOR WAS 9-4 x 13-8)

GRAPHIC SCALE

16' 0 16' 32' 48' 64' 80'

?"= 1'-0"

ATTACHMENT G

GMLRS Overall Process Description

The Guided Multiple Launch Rocket System (GMLRS) is a filament wound, epoxy resin impregnated composite rocket motor casing. The process in Building 256 will encompass winding the cases, curing them in electric ovens, and then preparing the interior surface of the units so that they can later be filled with solid propellant.

The process begins with mandrel preparation *(Z-1S)*, the application of a mold release coating (Frekote 700-NC) to the metal mandrel that is used as a mold for the composite filament winding. The mandrels are placed into the winding machines and the composite filament (Kevlar fiber) is coated with a two-part epoxy resin (an epichlorohydrin Bisphenol A copolymer with amine curatives) and the filament is wound around the mandrel in a specific computer programmed pattern to enhance strength of the cured material. None of the epoxy resin components contain regulated pollutants and the epoxy mixing, winding, and curing operations are not detailed in the emission source information for this application. The SDSs for the resin system are included in the SDS section of the application for information purposes only.

Once the winding process is completed, the mandrels proceed to the ovens where they will continue to rotate at ambient temperature for approximately 48 hours and then go through a several hour heated cure cycle (maximum temperature of 385°F). The cured composite tubes will then be removed from the mandrels. The composite tubes will then undergo a machining process to cut the tubes to length and drill holes for future bonding operations *(Z-15S)*. The machined composite tubes then move to the adapter bonding operation.

Adapters are the metal ends of the rocket motor cases. Adapters to be bonded into the composite tubes must be degreased before further processing. Degreasing is a two-step process that begins with an initial wipe using Acetone followed by a second wipe using Isopropanol (IPA) *(Z-2S)*. After degreasing, the adapters are moved to a spray hood where BR-127 Corrosion Inhibiting Primer is spray applied *(Z-3S)*, then moved to an electric oven to cure *(Z-4S)*.

The inside of the composite tubes are degreased with Acetone and IPA, the ends are honed (hand sanded), and the ends are degreased again with Acetone and IPA to prepare the tube for adapter bonding *(Z-16S)*. The adapters are degreased with Acetone and IPA prior to bonding them into the tube. The adapters are then bonded to the composite tube with Scotch-Weld 2216 epoxy adhesive. A second bonding operation is conducted using EA 9396 adhesive. The bonding adhesives contain negligible quantities of regulated air pollutants.

After adapter bonding, the inside of the tubes are degreased in a two-step process with an initial wipe using Acetone followed by a second wipe using (IPA) *(Z-5S)*. After degreasing the units will dry at ambient temperature *(Z-6S)*.

Once tubes have been degreased and dried, Chemlok 205 Primer will be mixed *(Z-7S or Z-12S)* and applied to the interior surface of the tubes *(Z-8S or Z-13S)*. This primer will be allowed to dry at ambient conditions for an hour *(Drying Station Z-9S or Z-14S*). The process will be repeated using Chemlok 234X NW Adhesive that is mixed *(Z-7S or Z-12S)* applied over the primer to the interior of the tube *(Z-8S or Z-13S)*. The units will then ambient dry for an hour *(Z-9S or Z-14S)*. The adhesive is used to bond a sheet of rubber insulation inside the cases.

After the rubber is installed the units are cured and then they will undergo hydroproof testing. Hydroproof is a test in which the units are filled with water and pressurized to make sure the units are sealed properly. After hydroproof testing the tubes undergo ultrasonic inspection of the tubes and bond joints. After testing, the cases are heat dried to ensure that no water remains in the case or insulation.

After ensuring that the units are dry, the interior has another two-step degreasing process using Acetone followed by IPA *(Z-10S)* and then they are moved to an electric oven to dry completely *(Z11S)*.

The final steps are to mix BL-034 Bondliner *(Z-12S or Z-7S)* and spray apply the BL-034 to the interior of the tubes on the surface of the insulators *(Z-13Sor Z-8S)*. After units are sprayed they are moved to a drying station to allow the material to dry *(Z-14S or Z-9S)*.

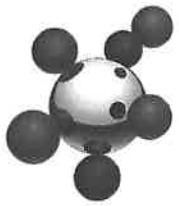
Following the Bondliner application, the units will be sealed for transportation to the mix/cast area. Construction of a mix/cast facility and final assembly facility for the units will be permitted in a separate permit application at a later date and the facility will be located in a different area of the plant.

The GMLRS program has the potential for orders of up to 6,000 units per year at maximum production which would be 2-3 years in the future. The permit application quantities are based on this maximum production rate.

The emission unit data sheets for the Chemlok operations (Z-7, 8, and 9S) and the bondliner operations (Z-12, 13, and 14S) are written to allow both operations to take place in a single set of equipment. This is to allow operational flexibility if either there is inadequate funding for two separate systems initially or a time constraint on getting both systems installed. It would also allow for flexibility if one system is down for maintenance. The emissions were calculated the same for both systems. In the total emissions calculations, only one set of numbers were counted since all three coatings are accounted for in each set of equipment. With both systems installed, the emissions would be broken out between the two systems.

Degreasing
Z-15
Z-25
Z-45
Z-55
9
10
11
12
16

sasol
reaching new frontiers



Acetone

Version1.01 ***Revision Date 26.05.2011***

Material Safety Data Sheet

SECTION 1 Identification of the substance/mixture and of the company/undertaking

Trade name Acetone
Synonyms Acetone, 2-Propanone, Dimethyl ketone, Ketone propane, beta-Ketopropane
Use Industrial use
Company Sasol Chemicals North America LLC
900 Threadneedle, Suite 10
Houston, TX 77079-2990 US

Telephone		
	CHEMTREC North America Transport Emergency (24-hr)	(800) 424-9300
	CHEMTREC World Wide Transport Emergency (24-hr)	(703) 527-3887
	MSDS and Product Information (8:00am-4:30pm CST)	(281) 588-3315
	Sasol LCCC Main Gate Guard	(337) 494-5142

SECTION 2 Hazards identification

Emergency Overview

Danger Highly flammable.
State of matter liquid colourless
Odour pungent

Potential environmental effects

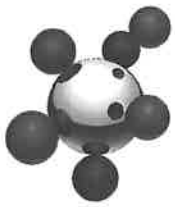
Environmental precautions Should not be released into the environment. Prevent further leakage or spillage if safe to do so.

Ecological information: See chapter 12

Potential health effects

Acute effects

Eyes Causes eye irritation.



Skin Prolonged or repeated contact may dry skin and cause irritation.

Inhalation May cause respiratory tract irritation.

Ingestion Aspiration hazard if swallowed - can enter lungs and cause damage.

Toxicological information: See chapter 11

SECTION 3 Composition/information on ingredients

Components	CAS-No.	Weight percent
acetone; propan-2-one; propanone	67-64-1	*100.00*

Exposure limit(s): See chapter 8
Classification and hazard labelling: See chapter 15

SECTION 4 First aid measures

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Skin contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Wash contaminated clothing before re-use. If skin irritation persists, call a physician.

Inhalation Move to fresh air in case of accidental inhalation of vapours. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

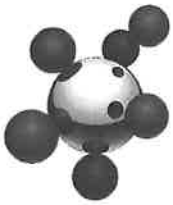
Ingestion If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

SECTION 5 Fire-fighting measures

Flammability

Flash point -20 °C

Autoignition temperature 465 °C



Explosion limits	**Lower explosion limit:** 2.6 %(V) **Upper explosion limit:** 12.8 %(V)
Fire/explosion	Flash back possible over considerable distance.
Hazardous combustion products	Carbon oxides
Suitable extinguishing media	Water spray Alcohol-resistant foam Dry chemical Carbon dioxide (CO2)
Unsuitable extinguishing media	No information available.
Protection measures and instructions	Wear self-contained breathing apparatus and protective suit.
Further information	Cool containers / tanks with water spray.

SECTION 6 Accidental release measures

Personal precautions	Keep people away from and upwind of spill/leak. Remove all sources of ignition. Do not breathe vapours or spray mist.
Environmental precautions	Should not be released into the environment. Prevent further leakage or spillage if safe to do so.
Methods for cleaning up	Soak up with inert absorbent material and dispose of as hazardous waste.

Exposure controls/personal protection: See chapter 8

SECTION 7 Handling and storage

Safe handling advice	Provide sufficient air exchange and/or exhaust in work rooms. Wear personal protective equipment. Take precautionary measures against static discharge. Ensure all equipment is electrically grounded before beginning transfer operations.
Advice on protection against fire and explosion	Keep away from heat and sources of ignition.Use explosion-proof equipment.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

SECTION 8 Exposure controls/personal protection

Engineering measures

Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment

Eyes Safety glasses with side-shields

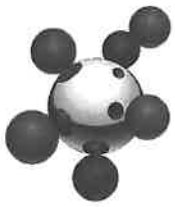
Skin Protective suit Safety shoes

Inhalation In case of insufficient ventilation, wear suitable respiratory equipment.

Hand protection

Hygiene measures Wash hands before breaks and immediately after handling the product.

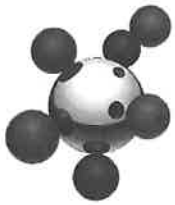
Protective measures Wear suitable protective equipment.



Exposure Guidelines

Components	Exposure limit(s)
ACETONE	US. ACGIH Threshold Limit Values time weighted average 500 ppm US. ACGIH Threshold Limit Values Short term exposure limit 750 ppm US. NIOSH: Pocket Guide to Chemical Hazards Recommended exposure limit (REL): 250 ppm (590 mg/m3) US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) Permissible exposure limit 1,000 ppm (2,400 mg/m3) US. OSHA Table Z-1-A (29 CFR 1910.1000) time weighted average 750 ppm (1,800 mg/m3) US. OSHA Table Z-1-A (29 CFR 1910.1000) Short term exposure limit 1,000 ppm (2,400 mg/m3) US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants Time Weighted Average (TWA) Permissible Exposure Limit (PEL): 500 ppm (1,200 mg/m3) US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants Ceiling Limit Value: 3,000 ppm US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants Short term exposure limit 750 ppm (1,780 mg/m3) EU. Indicative Exposure and Directives relating to the protection of risks related to work exposure to chemical, physical, and biological agents. time weighted average 500 ppm (1,210 mg/m3) US. ACGIH Threshold Limit Values US. NIOSH: Pocket Guide to Chemical Hazards US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) US. OSHA Table Z-1-A (29 CFR 1910.1000) US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) Short-Term ESL: US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) Annual ESL: US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A time weighted average 750 ppm (1,800 mg/m3) US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A Short term exposure limit 1,000 ppm (2,400 mg/m3) US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A EU. Indicative Exposure and Directives relating to the protection of risks related to work exposure to chemical, physical, and biological agents. Listed Listed Listed Listed Listed Listed Listed Listed

PEL=	Permissible Exposure Limits	TWA=	Time Weighted Average (8 hr.)
TLV=	Threshold Limit Value	STEL=	Short Term Exposure Limit (15 min.)
EL=	Excursion Limit	WEEL=	Workplace Environmental Exposure Level



SECTION 9 Physical and chemical properties

State of matter	liquid
Colour	colourless
Odour	pungent
Form	liquid
Boiling point/boiling range	56.2 °C
Flash point	-20 °C
Lower explosion limit	2.6 %(V)
Upper explosion limit	12.8 %(V)
Vapour pressure	307.974 hPa at 25 °C
Solubility(ies)	soluble
Viscosity	0.4 mm2/s
Melting point/range	-95.35 °C
Density	0.79 g/cm3

SECTION 10 Stability and reactivity

Conditions to avoid	Heat, flames and sparks.
Hazardous decomposition products	Carbon oxides
Incompatible products	Strong oxidizing agents Incompatible with acids. Halogenated compounds
Hazardous reactions	Hazardous polymerisation does not occur.

SECTION 11 Toxicological information

Acute oral toxicity Acetone:
LD50 rat: 5,800 mg/kg; literature value

Acute inhalation toxicity Acetone:
LC50 rat: > 20 mg/l; literature value; 4 h

Acute dermal toxicity Acetone:
LD50 rabbit: 20,000 mg/kg; literature value

Skin irritation Acetone:
rabbit: moderately irritating; (literature value)

Eye irritation Acetone:
rabbit: irritating; (literature value)

Acetone:
rabbit: moderately irritating; Draize Test

SECTION 12 Ecological information

Biodegradability Acetone:
100 %; 5 d

Acetone:
89 %; 21 d

Bioaccumulation Acetone:
1

Ecotoxicity effects

Toxicity to fish Acetone:
LC50 Oncorhynchus mykiss (rainbow trout): 5,540 mg/l; 96 h; literature value

Acetone:
LC50 Lepomis macrochirus (Bluegill sunfish): 8,300 mg/l; 96 h; literature value

Acetone:
LC50 Pimephales promelas: 8,120 mg/l; 96 h; literature value

Toxicity to daphnia Acetone:
EC50 Daphnia magna: 10 mg/l; 24 h

Toxicity to algae Acetone:
EC50 Pseudokirchneriella subcapitata: > 100 mg/l; 96 h; literature value

SECTION 13 Disposal considerations

Waste Classification US. EPA Resource Conservation and Recovery Act: (RCRA) D List of Characteristic Hazardous Wastes (40 CFR 261.21-24): D001

Waste from residues / unused products In accordance with local and national regulations.Do not contaminate ponds, waterways or ditches with chemical or used container.The product should not be allowed to enter drains, water courses or the soil.

Uncleaned empty packaging Do not burn, or use a cutting torch on, the empty drum., Triple rinse containers., Can be offered for recycling, re-conditioning or puncture.

Handling and storage: See chapter 7
Exposure controls/personal protection: See chapter 8

SECTION 14 Transport information

DOT/49CFR UN 1090 Acetone, 3, II
IMDG UN 1090 ACETONE, 3, II; EmS F-E, S-D
ICAO/IATA UN 1090 Acetone, 3, II

SECTION 15 Regulatory information

U.S. Federal Classifications:

OSHA Hazards Flammable liquid, Mild eye irritant

SARA 311/312 Fire Hazard, Acute Health Hazard

U.S. Regulated Ingredients:

Hazard information reporting

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

Components	CAS-No.

US. Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Components	CAS-No.
Acetone	67-64-1

US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Components	CAS-No.
Acetone	67-64-1

Acetone

US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Components	CAS-No.
Acetone	67-64-1

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

Components	CAS-No.

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Spill reporting

US. EPA CERCLA Hazardous Substances (40 CFR 302)

Components	CAS-No.	Reportable Quantity
Acetone	67-64-1	5,000 lbs5,000 lbs3 mg/L60 mg/kg3 mg/kg50 mg/L100 lbs5,000 lbs1 lbs

Health

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

Components	CAS-No.
Not listed	

Inventories

EU list of existing chemical substances	All chemical constituents are listed in: EU list of existing chemical substances (See chapter 3)
US TSCA Inventory	All chemical constituents are listed in: US TSCA Inventory (See chapter 3)
Australian Inv. of Chem. Substances AICS	All chemical constituents are listed in: Australian Inv. of Chem. Substances AICS (See chapter 3)
Canadian Domestic Substances List DSL	All chemical constituents are listed in: Canadian Domestic Substances List DSL (See chapter 3)
Jap. Inv. of Exist. & New Chemicals ENCS	All chemical constituents are listed in: Jap. Inv. of Exist. & New Chemicals ENCS (See chapter 3)
Korean Exist. Chemicals List ECL	All chemical constituents are listed in: Korean Exist. Chemicals List ECL (See chapter 3)
Philippines Inv. of Chem. Subst. PICCS	All chemical constituents are listed in: Philippines Inv. of Chem. Subst. PICCS (See chapter 3)
Inv. of Exist. Chem. Substances in China	All chemical constituents are listed in: Inv. of Exist. Chem. Substances in China (See chapter 3)

Other international regulations

Acetone

Version1.01 ***Revision Date 26.05.2011***

WHMIS Classification B2: Flammable liquid
D2B: Toxic Material Causing Other Toxic Effects

SECTION 16 Other information

Hazard Ratings

	Health	Flammability	Reactivity Hazard
HMIS	1	3	0
NFPA	1	3	0

All reasonable efforts were exercised to compile this SDS in accordance with ISO 11014 and ANSIZ400.1.1993. The SDS provides information regarding the health, safety and environmental hazards, at the date of issue, to facilitate the safe receipt, use and handling of the product in the workplace. Since Sasol and its subsidiaries cannot anticipate or control all conditions under which the product may be handled, used and received in the workplace, it remains the obligation of each user, receiver or handler to, prior to usage, review this SDS in the context within which the product will be received, handled or used in the workplace. The user, handler or receiver must ensure that the necessary mitigating measures are in place as regards health and safety. This does not substitute the need or requirement for any relevant risk assessments to be conducted. It further remains the responsibility of the receiver, handler or user to communicate such information to all relevant parties that may be involved in the receipt, use or handling of the product. Although all reasonable efforts were exercised in the compilation of this SDS, Sasol does not expressly warrant the accuracy or assume any liability for the incompleteness of the information contained herein or any advice given. The product is sold and risk passes in accordance with the specific terms and conditions of sale.

The MSDS was created by: B.SHAMASE
The MSDS was approved by: Frans Shai

Adapter Coating
Z-35
Z-45

CYTEC®

SDS: 0000388
Date Prepared: 05/06/2015

SAFETY DATA SHEET

1. IDENTIFICATION

Product Name:	**BR® 127 Corrosion Inhibiting Primer**
Synonyms:	None
Chemical Family:	Epoxy-phenolic resin
Molecular Formula:	Mixture
Molecular Weight:	Mixture
Intended/Recommended Use:	Engineered materials

CYTEC INDUSTRIES INC., FIVE GARRET MOUNTAIN PLAZA, WOODLAND PARK, NEW JERSEY 07424, USA
For Product and all Non-Emergency Information call 1-800/652-6013. Outside the USA and Canada call 1-973/357-3193.

EMERGENCY PHONE (24 hours/day) - For emergency only involving spill, leak, fire, exposure or accident call:
Asia Pacific:
Australia - +61-3-9663-2130 or 1800-033-111
China (PRC) - +86 0532 83889090 (NRCC)
New Guinea - +61-3-9663-2130
New Zealand - +61-3-9663-2130 or 0800-734-607
All Others - +65 3158 1074 (Carechem24 Singapore)
Canada: +1-905-356-8310 (Cytec Welland, Canada plant)
Europe/Africa/Middle East (Carechem24 UK):
Europe, Middle East, Africa, Israel - +44 (0) 1235 239 670
Middle East, Africa (Arabic speaking countries) - +44 (0) 1235 239 671
Latin America:
Brazil - 0800 7077 022 (SUATRANS)
Chile - +56-2-247-3600 (CITUC QUIMICO)
All Others - +52-376-73 74122 (Cytec Atequiza, Mexico plant)
USA: +1-703-527-3887 or 1-800-424-9300 (CHEMTREC #CCN6083)

The ® indicates a Registered Trademark in the United States and the ™ indicates a trademark in the United States. The mark may also be registered, subject of an application for registration, or a trademark in other countries.

2. HAZARDS IDENTIFICATION

GHS Classification
Flammable Liquid Hazard Category 2
Carcinogenicity Hazard Category 1B
Reproductive Toxicant Category 1B
Acute Toxicity (Inhalation) Hazard Category 4
Specific Target Organ Toxicity - Single Exposure Hazard Category 3
Serious Eye Damage / Eye Irritation Hazard Category 2A
Skin Sensitizer Hazard Category 1B
Aquatic Environment Acute Hazard Category 3
Aquatic Environment Chronic Hazard Category 3

LABEL ELEMENTS

COPY

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
May cause cancer
May damage fertility or the unborn child
Harmful if inhaled
May cause drowsiness or dizziness
Causes serious eye irritation
May cause an allergic skin reaction
Harmful to aquatic life with long lasting effects

Precautionary Statements
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Obtain special instructions before use.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Use only outdoors or in a well-ventilated area.
Wash face, hands and any exposed skin thoroughly after handling.
Contaminated work clothing should not be allowed out of the workplace.
Avoid release to the environment.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
In case of fire: Use CO2, dry chemical, or foam for extinction.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If skin irritation or rash occurs: Get medical advice/attention.
Specific treatment (see supplemental first aid instructions on this label).
Wash contaminated clothing before reuse.
Store in a well-ventilated place. Keep cool.
Store locked up.
Store in a well-ventilated place. Keep container tightly closed.
Dispose of contents/container in accordance with local and national regulations.

Hazards Not Otherwise Classified (HNOC), Other Hazards
Polymerization may occur from excessive heat, contamination or exposure to direct sunlight.

3. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS

Component / CAS No.	%	GHS Classification	Carcinogen
Methanol 67-56-1	0.1-1	Flam. Liq. 2 (H225) Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 3 (H331) STOT SE 1 (H370) Skin Irrit. 3 (H316) Eye Irrit. 2B (H320)	-
2-Ethoxyethanol 110-80-5	15-20	Flam. Liq. 3 (H226) Repr. 1B (H360FD) Acute Tox. 4 (H302) Acute Tox. 3 (H331) Skin Irrit. 3 (H316) Eye Irrit. 2B (H320)	-
Epoxy/phenolic resin #3 -	3 - 8	Skin Irrit. 2 (H315) Skin sens. 1B (H317) Aq. Acute 2 (H401) Aq. Chronic 2 (H411)	-
2-Butanone (Methyl ethyl ketone) 78-93-3	60-80	Flam. Liq. 2 (H225) STOT SE 3 (H336) Skin Irrit. 3 (H316) Eye Irrit. 2A (H319)	-
Formaldehyde 50-00-0	<0.06	Carc. 1B (H350) Muta. 2 (H341) Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 3 (H331) Skin Corr. 1B (H314) Eye Dam. 1 (H318) Skin Sens. 1A (H317)	IARC 1 NTP ACGIH A2
Phenolic epoxy resin #1 -	1-4	Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Skin Sens. 1B (H317) Aquatic Acute 2 (H401) Aquatic Chronic 2 (H411)	-
Strontium chromate 7789-06-2	0.5-2.5	Carc. 1B (H350) Acute Tox. 4 (H302) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)	IARC 1 NTP ACGIH A2

The specific chemical identity and/or exact percentage of composition for one or more ingredients has been withheld as a trade secret.

Additional GHS classification or other information may be included in this section but has not been adopted by OSHA. See Section 16 for full text of H phrases.

4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes. Obtain medical attention immediately.

Skin Contact:
Wash immediately with plenty of water and soap. Remove contaminated clothing and shoes without delay. Obtain medical attention. Do not reuse contaminated clothing without laundering. Destroy or thoroughly clean shoes before reuse.

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Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person. If vomiting occurs naturally in a concious person, lean forward to reduce the risk of aspiration. If breathing or the heart has stopped as a result of ingestion, trained personnel should administer artificial respiration or cardio-pulmonary resuscitation.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms. If breathing has stopped, trained personnel should administer artificial respiration. If the heart has stopped, trained personnel should administer cardio-pulmonary resuscitation.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

None known

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS

Not applicable

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires. Water stream may be ineffective.

Extinguishing Media to Avoid:
full water jet

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection).

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is known, wear approved respirator suitable for level of exposure. Where exposure level is not known, wear approved, positive pressure, self-contained respirator. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

Methods For Cleaning Up:
Remove sources of ignition. Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

References to other sections:
See Sections 8 and 13 for additional information.

7. HANDLING AND STORAGE

HANDLING

7. HANDLING AND STORAGE

Precautions: Keep away from heat, sparks and open flame. - No smoking. Keep container tightly closed. Ground/Bond container and receiving equipment. Use explosion-proof electrical, ventilating, lighting and other equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Use only outdoors or in a well-ventilated area. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/clothing and eye/face protection. Avoid release to the environment. Avoid breathing vapors or spray mist.

Special Handling Statements: Containers must be bonded and grounded when pouring or transferring material. If ventilation is inadequate, vapors can spread from open containers of the controlled product and may flashback, causing a fire if they contact an ignition source.

STORAGE

Areas containing this material should have fire safe practices and electrical equipment in accordance with applicable regulations and/or guidelines. Standards are primarily based on the material's flashpoint, but may also take into account properties such as miscibility with water or toxicity. All local and national regulations should be followed.
In the Americas, National Fire Protection Association (NFPA) 30: Flammable and Combustible Liquids Code, is a widely used standard. NFPA 30 establishes storage conditions for the following classes of materials: Class I Flammable Liquids, Flashpoint <37.8 °C. Class II Combustible Liquids, 37.8 °C < Flashpoint <60 °C. Class IIIa Combustible Liquids, 60 °C < Flashpoint < 93 °C. Class IIIb Combustible Liquids, Flashpoint > 93 °C.

Storage Temperature: Store at <=-17.8 °C 0 °F
Reason: Quality.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure when spraying or curing at elevated temperatures.

Respiratory Protection:
Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure. A full facepiece respirator also provides eye and face protection. Cutting, grinding or sanding of parts fabricated after curing may create respirable dust particles. Respiratory protection appropriate for this dust may be required. Refer to components listed above for potential hazardous components in the dust.

Eye Protection:
Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

Skin Protection:
Avoid skin contact. Wear impermeable gloves and suitable protective clothing. Barrier creams may be used in conjunction with the gloves to provide additional skin protection. Since this product is absorbed through the skin, care must be taken to prevent skin contact and contamination of clothing.

Hand Protection:
Wear impermeable gloves. Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility etc) is noticed. Barrier creams may help to protect the exposed areas of the skin, they should however not be applied once exposure has occurred.

Additional Advice:
Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. It is recommended that a shower be taken after completion of workshift especially if significant contact has occurred. Work clothing should then be laundered prior to reuse. Street clothing should be stored separately from work clothing and protective equipment Work clothing and shoes should not be taken home.

Exposure Limit(s)

110-80-5 2-Ethoxyethanol

OSHA (PEL):	200 ppm (TWA) 740 mg/m³ (TWA) (skin)
ACGIH (TLV):	(skin) 5 ppm (TWA)
Other Value:	Not established

50-00-0 Formaldehyde

OSHA (PEL):	0.75 ppm (TWA) 2 ppm (STEL) 2 ppm STEL 15 min 0.5 ppm Action Level 0.75 ppm TWA
ACGIH (TLV):	0.3 ppm (Ceiling)
Other Value:	Not established

67-56-1 Methanol

OSHA (PEL):	200 ppm (TWA) 260 mg/m³ (TWA)
ACGIH (TLV):	250 ppm (STEL) (skin) 200 ppm (TWA)
Other Value:	Not established

7789-06-2 Strontium chromate

OSHA (PEL):	5 µg/m³ (TWA)(as Chromium(VI) compounds) 0.1 mg/m³ (Ceiling)(as Chromates) 5 µg/m³ TWA(as Chromium(VI) compounds) 2.5 µg/m³ Action Level
ACGIH (TLV):	0.0005 mg/m³ as Cr (TWA)
Other Value:	Not established

78-93-3 2-Butanone (Methyl ethyl ketone)

OSHA (PEL):	200 ppm (TWA) 590 mg/m³ (TWA)
ACGIH (TLV):	300 ppm (STEL) 200 ppm (TWA)
Other Value:	Not established

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	colorless to light-yellow or blue-green
Appearance:	volatile liquid
Odor:	moderate sweet
Boiling Point:	80 °C 176 °F
Melting Point:	Not applicable
Vapor Pressure:	86mm Hg
Specific Gravity/Density:	0.88
Vapor Density:	2.88
Percent Volatile (% by wt.):	~90
pH:	Not available
Saturation in Air (% By Vol.):	Not available
Evaporation Rate:	Not available
Solubility in Water:	Slight
Volatile Organic Content:	780 - 800 gm/L
Flash Point:	-2 °C 29 °F Setaflash Closed Cup

9. PHYSICAL AND CHEMICAL PROPERTIES

Flammable Limits (% By Vol):	Lower: 1.8 Upper: 10.0
Autoignition (Self) Temperature:	516 °C 960 °F
Decomposition Temperature:	Not available
Partition coefficient (n-octanol/water):	Not available
Odor Threshold:	Not available
Viscosity (Kinematic):	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions To Avoid:	None known
Polymerization:	May occur
Conditions To Avoid:	Avoid contact with oxidizing agents, free radical initiators, sunlight or ultraviolet light, bases or amines.
Materials To Avoid:	Strong acids
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide (CO) chromium oxides hydrogen chloride Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

PRODUCT TOXICITY INFORMATION

Likely Routes of Exposure: Skin, Eyes, Oral.

ACUTE TOXICITY DATA

oral	rat	Acute LD50	>2000 mg/kg
dermal	rabbit	Acute LD50	>2000 mg/kg
inhalation	rat	Acute LC50 4 hr	~16 mg/l (Vapors)

LOCAL EFFECTS ON SKIN AND EYE

Acute Irritation	skin	No data
Acute Irritation	eye	Irritating

ALLERGIC SENSITIZATION

Sensitization	skin	Sensitizing
Sensitization	respiratory	No data

GENOTOXICITY

Assays for Gene Mutations
Ames Salmonella Assay No data

OTHER INFORMATION
The product toxicity information above has been estimated.
Repeated exposure may cause skin dryness or cracking.

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HAZARDOUS INGREDIENT TOXICITY DATA

Methanol has acute oral (rat) and dermal (rabbit) LD50 values of >5600 mg/kg and 15800 mg/kg, respectively. The 4-hour inhalation exposure LC50 (rat) for methanol vapor is 64,000 ppm (83.78 mg/L). Acute exposure to methanol vapor may cause headache and gastrointestinal irritation. Chronic or extreme inhalation exposure to vapors can cause blurred vision, serious eye damage, central nervous depression and death. Ingestion and inhalation of methanol has caused blindness in humans. Ingestion can also cause harmful effects on the central nervous system and gastrointestinal systems and can lead to death in extreme cases. Absorption of methanol can cause systemic toxicity. It has been reported that chronic skin absorption of methanol has caused ocular disturbances and blindness. Methanol has also been reported to be a teratogen and fetotoxin in laboratory animals and has demonstrated mutagenic activity, in vivo, in mammalian cells. Methanol may cause moderate eye and skin irritation. Literature also reports an oral (rat) LD50 value of 13.0 ml/kg (10g/kg).

2 ethoxy ethanol has acute oral (guinea pig) and dermal (rabbit) LD50 values of 1400 mg/kg and 3720 mg/kg, respectively. The 8-hour inhalation (rat) LC50 is 7.36 mg/l (vapor). Direct contact with this material may cause mild eye and skin irritation. 2-Ethoxy ethanol has been shown to cause fetal malformations (birth defects) and alter male reproductive function in laboratory animals. Ingestion has caused central nervous system effects, swelling in the lungs and delayed kidney and liver problems. In animal studies, inhalation caused gastrointestinal irritation, central nervous system effects, lung edema and congestion and damage to the kidneys and spleen. Chronic exposure caused effects on the blood system, enlargement of the adrenal glands (via ingestion), and a reduction in body weight in laboratory animals. Positive results in in vitro screening tests for mutagenicity have been shown. 2-Ethoxyethanol is a chemical known to the State of California to cause reproductive toxicity.

Epoxy / phenolic#3 resin has acute oral (rat) and dermal (rabbit) LD50 values of >5000 mg/kg and >2000 mg/kg, respectively. Direct contact may cause mild eye irritation. Prolonged or repeated skin contact may cause irritation, and in rare instances, sensitization. This resin has been reported to have tested positive for mutagenicity in the standard Ames screening test as well as in a mouse lymphoma cell point mutation assay.

2-Butanone (MEK) has acute oral (rat) and dermal (rabbit) LD50 values of 2700 mg/kg and 6500 mg/kg, respectively. The acute inhalation (rat) LC50 following a 2-hour exposure is 4000 ppm (8.3 mg/L/4hr). Acute exposure to 2-Butanone (MEK) vapor may cause eye and respiratory tract irritation, central nervous system depression, headache, nausea, dizziness and staggered gait. 2-Butanone (MEK) causes moderate to severe eye and mild to moderate skin irritation upon contact. Chronic exposure to 2-Butanone (MEK) vapor may cause central nervous system depression and sleepiness. In a teratogenicity study, pregnant rats inhaled 0, 400, 1000, or 3000 ppm 2-Butanone for 7 hr/day on days 6 through 15 of gestation. Exposure at these levels did not cause any serious birth defects. A few minor malformations were observed at 3000 ppm. At this level, maternal toxicity, evidenced by decreased weight gain and water intake, was observed. In another teratogenicity study, minor malformations were also observered, however, no signs of maternal toxicity were noted. MEK is reported to have shown positive results in a screening test for mutagenicity using the S. cerevisiae strain of yeast. Absorption of a high dose of MEK caused death in laboratory animals. Human ingestion of MEK has caused central nervous system effects and aspiration has caused sudden death in laboratory animal tests.

Formaldehyde is considered toxic if swallowed, in contact with skin and if inhaled. With acute oral (rat), acute dermal (rabbit) and acute (inhalation) 4-hr (rat-gas) LD/LC50 values of >50 </= 300 mg/kg, >500 </= 1000 mg/kg and >500 </= 2500 ppm mg/L, respectively. When formaldehyde is present in the air at levels exceeding 0.1 ppm, some individuals may experience adverse effects such as watery eyes; burning sensations in the eyes, nose, and throat; coughing; wheezing; nausea; and skin irritation. Some people are very sensitive to formaldehyde, whereas others have no reaction to the same level of exposure. Normal breathing may be seriously impaired at levels above 10 ppm and serious lung damage can occur at levels exceeding 50 ppm. Formaldehyde has been reported to cause pulmonary hypersensitivity in some individuals who were exposed to concentrations known to cause irritation; however, no pulmonary sensitization has been demonstrated in laboratory animal studies. Direct contact with formaldehyde solutions can cause severe eye irritation and corrosion to the skin. Repeated or prolonged exposure to this substance may cause dermal sensitization. Formaldehyde was found to be mutagenic in a number of in vitro genotoxicity tests and positive in certain in vivo screening tests for mutagenicity. Formaldehyde did not cause birth defects in rats inhaling concentrations up to 10 ppm. In an oral gavage study 29 -76 pregnant mice per dose group were exposed to 0, 74, 148, 185 mg/kg bw/day formaldehyde (concentration of applied solution: 0, 0.7, 1.5, 1.8%) once daily at gestation day 6-15 (termination at gestation day 19). Maternal toxicity was obvious at 74 mg/kg bw/day (decreased body weight gain); data on local effects in the gastro-intestinal tract are not available, however, these effects were expected even at the low dose level. No embryo- or fetotoxic effects and no teratogenic effects were reported at any dose level, although 185 mg/kg bw/day resulted in a high mortality rate in pregnant mice. There is no existing data (by any route) that conclusively show adverse reproductive or developmental effects in animals exposed to formaldehyde. The International Agency for Research on Cancer (IARC) has classified formaldehyde as a Group 1 (known) human carcinogen based on epidemiological evidence linking formaldehyde exposure to the occurrence of nasopharyngeal cancer, a rare type of cancer. IARC also found limited evidence of cancer of the nasal cavity and paranasal sinuses and sufficient evidence for an association between formaldehyde and leukemia.

Phenolic epoxy resin #1 has acute oral (rat) and dermal (rabbit) LD50 values of both >2000 mg/kg. A 4-hour inhalation LC50 (rat) value of >700 mg/m^3 has been reported. Prolonged or repeated exposure may cause primary skin irritation and allergic skin reactions in some instances. Mechanical action of this resin may cause eye irritation upon contact. This resin has produced moderate eye irritation in laboratory animals. This resin has been reported to have tested positive for mutagenicity in the standard Ames screening test as well as in a mouse lymphoma cell point mutation assay. The literature reports several cases of asthmatic symptoms developing in workers due to occupational exposure to this resin. Large oral doses of Phenolic epoxy resin #1 have produced central nervous system effects in laboratory animals.

Strontium chromate has an oral (rat) LD50 value of 3118 mg/kg. An LC50 (rat,aerosol, 4h) value range of 0.27-0.051 mg/L has been established. Acute overexposure to inorganic chromates may cause skin irritation. Repeated prolonged exposure to chromates may cause slow-healing skin lesions and allergic reactions. Inhalation of chromate dust or mist may cause corrosion of the nose. Workers exposed to chrome processing operations have an increased incidence of cancer of the lung. Virtually all soluble chromium salts can cause cancer in laboratory animal tests. Strontium chromate tested positive in the Ames test and produced sister chromatid exchanges in CHO cells. Strontium chromate is a hexavalent chromium compound which is known to the State of California to cause cancer. Strontium chromate is classified as Carcinogenic to Humans by the International Agency for Research on Cancer (IARC-1), and a Suspected Human Carcinogen by the ACGIH (A2).

California Proposition 65 Warning (applicable in California only) - This product contains (a) chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

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12. ECOLOGICAL INFORMATION

TOXICITY, PERSISTENCE AND DEGRADABILITY, BIOACCUMULATIVE POTENTIAL, MOBILITY IN SOIL, OTHER ADVERSE EFFECTS

Overall Environmental Toxicity: Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

The ecological assessment for this material is based on an evaluation of its components.

RESULTS OF PBT AND vPvB ASSESSMENT
Not determined

HAZARDOUS INGREDIENT TOXICITY DATA

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
Methanol 67-56-1	Not available	LC50 > 100 mg/L - Pimephales promelas (96h) static LC50 19500 - 20700 mg/L - Oncorhynchus mykiss (96h) flow-through LC50 = 28200 mg/L - Pimephales promelas (96h) flow-through LC50 18 - 20 mL/L - Oncorhynchus mykiss (96h) static LC50 13500 - 17600 mg/L - Lepomis macrochirus (96h) flow-through	Not available
2-Ethoxyethanol 110-80-5	EC50 > 1000 mg/L - Desmodesmus subspicatus (72h)	LC50 > 0.1 mg/L - Pimephales promelas (96h) static LC50 > 10000 mg/L - Lepomis macrochirus (96h) static	EC50 > 10000 mg/L - Daphnia magna (48h)
Epoxy/phenolic resin #3 -	Not available	Not available	Not available
2-Butanone (Methyl ethyl ketone) 78-93-3	Not available	LC50 3130 - 3320 mg/L - Pimephales promelas (96h) flow-through	EC50 > 520 mg/L - Daphnia magna (48h) EC50 = 5091 mg/L - Daphnia magna (48h) EC50 4025 - 6440 mg/L - Daphnia magna (48h) Static
Formaldehyde 50-00-0	EC50 estimated 10-100 mg/L	LC50 estimated 10-100 mg/L	EC50 estimated 10-100 mg/L
Phenolic epoxy resin #1 -	Not available	Not available	Not available
Strontium chromate 7789-06-2	Not available	Not available	Not available

13. DISPOSAL CONSIDERATIONS

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 9 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 3 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. The Company encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. The Company recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. The Company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Dangerous Goods? X
Proper Shipping Name: Flammable liquid, n.o.s
Hazard Class: 3
Packing Group: II
UN/ID Number: UN1993
Transport Label Required: Flammable Liquid
Technical Name (N.O.S.): 2-Butanone, 2-ethoxyethanol

Component / CAS No.	Hazardous Substances / Reportable Quantity of Product (lbs)
2-Ethoxyethanol	5614.823
Strontium chromate	635.7683
2-Butanone (Methyl ethyl ketone)	7009.673

Comments: Hazardous Substances/Reportable Quantities - DOT requirements specific to Hazardous Substances only apply if the quantity in one package equals or exceeds the product reportable quantity.

TRANSPORT CANADA

Dangerous Goods? X
Proper Shipping Name: Flammable liquid, n.o.s
Hazard Class: 3
Packing Group: II
UN Number: UN1993
Transport Label Required: Flammable Liquid
Technical Name (N.O.S.): 2-Butanone, 2-ethoxyethanol

ICAO / IATA

Dangerous Goods? X
Proper Shipping Name: Flammable liquid, n.o.s.
Hazard Class: 3

Packing Group: II
UN Number: UN1993
Transport Label Required: Flammable Liquid
Technical Name (N.O.S.): 2-Butanone, 2-ethoxyethanol

IMO

Dangerous Goods? X
Proper Shipping Name: Flammable liquid, n.o.s.
Hazard Class: 3
UN Number: UN1993
Packing Group: II
Transport Label Required: Flammable Liquid
Technical Name (N.O.S.): 2-Butanone, 2-ethoxyethanol

15. REGULATORY INFORMATION

Inventory Information

United States (USA): All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.
This product contains a chemical substance that is subject to export notification under Section 12 (b) of the Toxic Substances Control Act, 15 U. S. C. 2601 et. seq. (This requirement applies to exports from the United States only,)
This product contains a substance subject to Significant New Use Rule (SNUR) 40 CFR Section 721.10001.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on AICS.

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

Japan: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory.

Philippines: One or more components of this product are NOT included on the Philippine (PICCS) inventory.

Taiwan: One or more components of this product are NOT included on the Taiwan Chemical Substance Inventory (TCSI).

OTHER ENVIRONMENTAL INFORMATION
The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

Component / CAS No.	%	TPQ (lbs)	RQ(lbs)	S313	TSCA 12B
2-Ethoxyethanol 110-80-5	15-20	None	1000	Yes	Yes
Strontium chromate 7789-06-2	0.5-2.5	None	10	Yes	No

Component / CAS No.	%	TPQ (lbs)	RQ(lbs)	S313	TSCA 12B
2-Butanone (Methyl ethyl ketone) 78-93-3	60 - 80	None	5000	No	No
Methanol 67-56-1	0.1-1	None	5000	Yes	No

PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA

- Acute
- Chronic
- Fire

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire: 3 - Liquids and solids that can be ignited under almost all ambient temperature conditions.

Instability: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

Reasons For Issue: Revised Section 3
Revised Section 8
Revised Section 11
Revised Section 14
Revised Section 15
Revised Section 16

Date Prepared: 05/06/2015
Date of last significant revision: 05/06/2015

Component Hazard Phrases

Methanol

H225 - Highly flammable liquid and vapor.
H301 - Toxic if swallowed.
H311 - Toxic in contact with skin.
H316 - Causes mild skin irritation.
H320 - Causes eye irritation.
H331 - Toxic if inhaled.
H370 - Causes damage to organs.

2-Ethoxyethanol

H226 - Flammable liquid and vapor.
H302 - Harmful if swallowed.
H316 - Causes mild skin irritation.
H320 - Causes eye irritation.
H331 - Toxic if inhaled.
H360FD - May damage fertility. May damage the unborn child.

Epoxy/phenolic resin #3

H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H401 - Toxic to aquatic life.
H411 - Toxic to aquatic life with long lasting effects.

2-Butanone (Methyl ethyl ketone)

H225 - Highly flammable liquid and vapor.
H316 - Causes mild skin irritation.
H319 - Causes serious eye irritation.
H336 - May cause drowsiness or dizziness.

Formaldehyde

H301 - Toxic if swallowed.
H311 - Toxic in contact with skin.
H314 - Causes severe skin burns and eye damage.
H317 - May cause an allergic skin reaction.
H318 - Causes serious eye damage.
H331 - Toxic if inhaled.
H341 - Suspected of causing genetic defects.
H350 - May cause cancer.

Phenolic epoxy resin #1

H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H319 - Causes serious eye irritation.
H411 - Toxic to aquatic life with long lasting effects.

Strontium chromate

H302 - Harmful if swallowed.
H350 - May cause cancer.
H400 - Very toxic to aquatic life.
H410 - Very toxic to aquatic life with long lasting effects.

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

COPY

Chemlok Z-7,8,9 5
Z-12, 13, 145

LORD

USA SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name: **CHEMLOK 205**
Product Use/Class: **Adhesive and/or Primer**

LORD Corporation
111 LORD Drive
Cary, NC 27511-7923

Telephone: 814 868-3180
Non-Transportation Emergency: 814 763-2345
Chemtrec 24 Hr Transportation Emergency No.
800 424-9300 (Outside Continental U.S. 703 527-3887)

EFFECTIVE DATE: 03/30/2015

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Flammable liquids Category 2
Acute toxicity Inhalation - Dust and Mist Category 3 - 10.5% of the mixture consists of ingredient(s) of unknown toxicity.
Acute toxicity Inhalation - Vapours Category 4 - 10.6% of the mixture consists of ingredient(s) of unknown toxicity.
Skin corrosion/irritation Category 2
Serious eye damage/eye irritation Category 2A
Germ cell mutagenicity Category 1B
Carcinogenicity Category 2
Reproductive toxicity Category 2
Specific target organ systemic toxicity (single exposure) Category 3
Specific target organ systemic toxicity (single exposure) Category 1 Central nervous system, Kidney, Liver, Respiratory system
Specific target organ systemic toxicity (repeated exposure) Category 2 Ears, Liver, Kidney
Specific target organ systemic toxicity (repeated exposure) Category 1 Nervous system, Body, Respiratory system, Lungs, Central nervous system, Peripheral nervous system
Hazardous to the aquatic environment - acute hazard Category 1
Hazardous to the aquatic environment - chronic hazard Category 1

GHS LABEL ELEMENTS:
Symbol(s)

Signal Word

DANGER

Hazard Statements

Highly flammable liquid and vapor.
Toxic if inhaled.
Causes skin irritation.
Causes serious eye irritation.
May cause genetic defects.
Suspected of causing cancer.
Suspected of damaging fertility or the unborn child.
May cause harm to breast-fed children.
May cause drowsiness or dizziness.
May cause respiratory irritation.

Causes damage to organs.(Central nervous system, Kidney, Liver, Respiratory system)
May cause damage to organs through prolonged or repeated exposure.(Ears, Liver, Kidney)
Causes damage to organs through prolonged or repeated exposure.(Nervous system, Body, Respiratory system, Lungs, Central nervous system, Peripheral nervous system)
Very toxic to aquatic life.
Very toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wear protective gloves/protective clothing/eye protection/face protection.
Use personal protective equipment as required.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.

Response

In case of fire: refer to section 5 of SDS for extinguishing media.
Call a POISON CENTER or doctor/physician.
Specific treatment (see supplemental first aid instructions on this label).
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Collect spillage.

Storage

Store in a well-ventilated place. Keep cool.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

Disposal:

Dispose of contents/container in accordance with waste/disposal laws and regulations of your country or particular locality.

Other Hazards:

This product contains component(s) which have the following warnings; however based on the GHS classification criteria of your country or locale, the product mixture may be outside the respective category(s).

Acute: Vapor harmful; may affect the brain or nervous system causing dizziness, headache or nausea. Possible irritation of the respiratory system can occur causing a variety of symptoms such as dryness of the throat, tightness of the chest, and shortness of breath. May cause central nervous system depression characterized by the following progressive steps: headache, dizziness, staggering gait, confusion, unconsciousness or coma.

Chronic: May affect the gastrointestinal system. May affect the blood and blood-forming organs. Prolonged or repeated contact may result in dermatitis. Ethylbenzene has been classified by IARC as a possible human carcinogen (Group 2B) and reported by NTP to show clear evidence for carcinogenicity in animals. IARC has designated carbon black as Group 2B - inadequate evidence for carcinogenicity in humans, but sufficient evidence in experimental animals. IARC has designated titanium dioxide (TiO_2) as Group 2B – possibly carcinogenic to humans in dust form. However, a number of long term animal studies and human epidemiology studies evaluating TiO_2 and workplace exposure show insufficient evidence for carcinogenic affects. EPA, NTP and OSHA do not designate TiO_2 as a carcinogen and ACGIH designates TiO_2 as A4 - not classifiable as a human carcinogen. TiO_2 is not present in this product as a dust and no airborne exposure is expected during application. IARC has designated Methyl isobutyl

ketone to be in Group 2B - possibly carcinogenic to humans. ACGIH considers Ethyl alcohol to be an A3 carcinogen (confirmed animal carcinogen with unknown relevance in humans).

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Weight % Less Than
Methyl isobutyl ketone	108-10-1	60.0 %
Xylene	1330-20-7	15.0 %
Titanium dioxide	13463-67-7	10.0 %
Ethyl benzene	100-41-4	5.0 %
Methyl ethyl ketone	78-93-3	5.0 %
Propylene glycol monomethylether	107-98-2	5.0 %
Carbon black	1333-86-4	0.9 %
Ethyl alcohol	64-17-5	0.9 %

4. FIRST AID MEASURES

FIRST AID - EYE CONTACT: Flush eyes immediately with large amount of water for at least 15 minutes holding eyelids open while flushing. Get prompt medical attention.

FIRST AID - SKIN CONTACT: Flush contaminated skin with large amounts of water while removing contaminated clothing. Wash affected skin areas with soap and water. Get medical attention if symptoms occur.

FIRST AID - INHALATION: Move person to fresh air. Restore and support continued breathing. If breathing is difficult, give oxygen. Get immediate medical attention.

FIRST AID - INGESTION: If swallowed, do not induce vomiting. Call a physician or poison control center immediately for further instructions. Never give anything by mouth if victim is rapidly losing consciousness, unconscious or convulsing.

5. FIRE-FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA: Carbon Dioxide, Dry Chemical, Foam, Water Fog

SPECIFIC HAZARDS POSSIBLY ARISING FROM THE CHEMICAL: Flammable liquid and vapor. Keep containers tightly closed. Isolate from heat, electrical equipment, sparks, open flame, and other sources of ignition. Closed containers may rupture when exposed to extreme heat. Use water spray to keep fire exposed containers cool. During a fire, irritating and/or toxic gases and particulate may be generated by thermal decomposition or combustion.

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE-FIGHTERS: Wear full firefighting protective clothing, including self-contained breathing apparatus (SCBA). Water spray may be ineffective. If water is used, fog nozzles are preferable.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES: Remove all sources of ignition (flame, hot surfaces, and electrical, static or frictional sparks). Avoid contact. Avoid breathing vapors. Use self-contained breathing equipment.

ENVIRONMENTAL PRECAUTIONS: Do not contaminate bodies of water, waterways, or ditches, with chemical or used container.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANUP: Keep non-essential personnel a safe distance away from the spill area. Notify appropriate authorities if necessary. Avoid contact. Before attempting cleanup, refer to hazard caution information in other sections of the SDS form. Contain and remove with inert absorbent material and non-sparking tools.

7. HANDLING AND STORAGE

HANDLING: Keep closure tight and container upright to prevent leakage.Ground and bond containers when transferring material.Avoid skin and eye contact.Wash thoroughly after handling.Avoid breathing of vapor or spray mists.Do not handle until all safety precautions have been read and understood.Empty containers should not be re-used.Use with adequate ventilation.Because empty containers may retain product residue and flammable vapors, keep away from heat, sparks and flame; do not cut, puncture or weld on or near the empty container.Do not smoke where this product is used or stored.

STORAGE: Do not store or use near heat, sparks, or open flame.Refer to OSHA 29CFR Part 1910.106 "Flammable and Combustible Liquids" for specific storage requirements.Store only in well-ventilated areas.Do not puncture, drag, or slide container.Keep container closed when not in use.

INCOMPATIBILITY: Strong oxidizers, acids, bases, water.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

COMPONENT EXPOSURE LIMIT

Chemical Name	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING	Skin
Methyl isobutyl ketone	50 ppm	75 ppm	410 mg/m3 100 ppm	N.E.	N.A.
Xylene	100 ppm	150 ppm	435 mg/m3 100 ppm	N.E.	N.A.
Titanium dioxide	10 mg/m3	N.E.	15 mg/m3	N.E.	N.A.
Ethyl benzene	20 ppm	N.E.	435 mg/m3 100 ppm	N.E.	N.A.
Methyl ethyl ketone	200 ppm	300 ppm	590 mg/m3 200 ppm	N.E.	N.A.
Propylene glycol monomethylether	100 ppm	150 ppm	N.E.	N.E.	N.A.
Carbon black	3 mg/m3	N.E.	3.5 mg/m3	N.E.	N.A.
Ethyl alcohol	N.E.	1,000 ppm	1,900 mg/m3 1,000 ppm	N.E.	N.A.

N.A. - Not Applicable, N.E. - Not Established, S - Skin Designation

Engineering controls: Sufficient ventilation in pattern and volume should be provided in order to maintain air contaminant levels below recommended exposure limits. Caution: Solvent vapors are heavier than air and collect in lower levels of the work area. Sufficient ventilation (using explosion-proof equipment) should be provided to prevent flammable vapor/air mixtures from accumulating.

PERSONAL PROTECTION MEASURES/EQUIPMENT:

RESPIRATORY PROTECTION: Use a NIOSH approved chemical/mechanical filter respirator designed to remove a combination of particulates and organic vapor if occupational limits are exceeded. For emergency situations, confined space use, or other conditions where exposure limits may be greatly exceeded, use an approved air-supplied respirator. Observe OSHA regulations (29CFR 1910.134) for respirator use.

SKIN PROTECTION: Use neoprene, nitrile, or rubber gloves to prevent skin contact.

EYE PROTECTION: Use safety eyewear including safety glasses with side shields and chemical goggles where splashing may occur.

OTHER PROTECTIVE EQUIPMENT: Use disposable or impervious clothing if work clothing contamination is likely. Remove and wash contaminated clothing before reuse.

HYGIENIC PRACTICES: Wash hands before eating, smoking, or using toilet facility. Do not smoke in any chemical handling or storage area. Food or beverages should not be consumed anywhere this product is handled or stored. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical values, not to be used for specification purposes.

ODOR:	Solvent	**VAPOR PRESSURE:**	N.D.
APPEARANCE:	Gray	**VAPOR DENSITY:**	Heavier than Air
PHYSICAL STATE:	Liquid	**LOWER EXPLOSIVE LIMIT:**	1 %(V)
FLASH POINT:	57 °F, 14 °C Setaflash Closed Cup	**UPPER EXPLOSIVE LIMIT:**	19 %(V)
BOILING RANGE:	80 - 141 °C	**EVAPORATION RATE:**	Faster than n-butyl-acetate.
AUTOIGNITION TEMPERATURE:	N.D.	**DENSITY:**	0.94 g/cm3 - 7.85 lb/gal
DECOMPOSITION TEMPERATURE:	N.D.	**VISCOSITY, DYNAMIC:**	≥85 mPa.s @ 25 °C
ODOR THRESHOLD:	N.D.	**VISCOSITY, KINEMATIC:**	≥90 mm2/s @ 25 °C
SOLUBILITY IN H2O:	Insoluble	**VOLATILE BY WEIGHT:**	75.42 %
pH:	N.A.	**VOLATILE BY VOLUME:**	87.16 %
FREEZE POINT:	N.D.	**VOC CALCULATED:**	5.87 lb/gal, 703 g/l
COEFFICIENT OF WATER/OIL DISTRIBUTION:	N.D.	**METHOD 24:**	6.06 lb/gallon

LEGEND: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

10. STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur under normal conditions.

STABILITY: Product is stable under normal storage conditions.

CONDITIONS TO AVOID: High temperatures. Sources of ignition.

INCOMPATIBILITY: Strong oxidizers, acids, bases, water.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide, chlorine, hydrogen chloride, Phosgene

11. TOXICOLOGICAL INFORMATION

EXPOSURE PATH: Refer to section 2 of this SDS.

SYMPTOMS: Refer to section 2 of this SDS.

TOXICITY MEASURES:

Chemical Name	LD50/LC50
Methyl isobutyl ketone	Oral LD50: Rat 2,080 mg/kg Dermal LD50: Rabbit 3,000 mg/kg Inhalation LC50: Rat 8.2 mg/l /4 h
Xylene	Oral LD50: Rat 3,500 mg/kg Dermal LD50: Rabbit > 1,700 mg/kg Dermal LD50: Rabbit > 4,350 mg/kg Inhalation LC50: Rat 29.08 mg/l /4 h
Titanium dioxide	Oral LD50: Rat > 10,000 mg/kg GHS LC50 (vapour): rat 55 mg/l /
Ethyl benzene	Oral LD50: Rat 3,500 mg/kg Dermal LD50: Rabbit 15,400 mg/kg Inhalation LC50: Rat 17.2 mg/l /4 h
Methyl ethyl ketone	Oral LD50: Rat 2,737 mg/kg Oral LD50: Rat 2,483 mg/kg Dermal LD50: Rabbit 6,480 mg/kg

	Dermal LD50: Rabbit 5,000 mg/kg Inhalation LC50: Rat 11700 ppm/4 h
Propylene glycol monomethylether	Oral LD50: Rat 5,000 mg/kg Dermal LD50: Rabbit 13 g/kg GHS LC50 (vapour): rat 11 mg/l /4 h GHS LC50 (dust and mist): rat 1.5 mg/l /4 h
Carbon black	Oral LD50: Rat > 15,400 mg/kg Dermal LD50: Rabbit > 3 g/kg GHS LC50 (vapour): rat 55 mg/l /4 h
Ethyl alcohol	Oral LD50: Rat 7,060 mg/kg Inhalation LC50: Rat 124.7 mg/l /4 h

Germ cell mutagenicity: Category 1B - May cause genetic defects.
Components contributing to classification: Phenol. Ethyl alcohol.

Carcinogenicity: Category 2 - Suspected of causing cancer.
Components contributing to classification: Methyl isobutyl ketone. Titanium dioxide. Ethyl benzene. Carbon black.

Reproductive toxicity: Category 2 - Suspected of damaging fertility or the unborn child. May cause harm to breast-fed children.
Components contributing to classification: Xylene. Ethyl benzene. Zinc compound. Phenol. Ethyl alcohol. Toluene.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

Chemical Name	Ecotoxicity
Methyl isobutyl ketone	Fish: Pimephales promelas 496 - 514 mg/l96 h flow-through Invertebrates: Daphnia magna 170 mg/l48 h Plants: Pseudokirchneriella subcapitata 400 mg/l96 h
Xylene	Fish: Pimephales promelas 13.4 mg/l96 h flow-through Oncorhynchus mykiss 2.661 - 4.093 mg/l96 h Static Oncorhynchus mykiss 13.5 - 17.3 mg/l96 h Lepomis macrochirus 13.1 - 16.5 mg/l96 h flow-through Lepomis macrochirus 19 mg/l96 h Lepomis macrochirus 7.711 - 9.591 mg/l96 h Static Pimephales promelas 23.53 - 29.97 mg/l96 h Static Cyprinus carpio 780 mg/l96 h semi-static Cyprinus carpio > 780 mg/l96 h Poecilia reticulata 30.26 - 40.75 mg/l96 h Static Invertebrates: water flea 3.82 mg/l48 h Gammarus lacustris 0.6 mg/l48 h
Titanium dioxide	N.D.
Ethyl benzene	Fish: Oncorhynchus mykiss 11.0 - 18.0 mg/l96 h Static Oncorhynchus mykiss 4.2 mg/l96 h semi-static Pimephales promelas 7.55 - 11 mg/l96 h flow-through Lepomis macrochirus 32 mg/l96 h Static Pimephales promelas 9.1 - 15.6 mg/l96 h Static Poecilia reticulata 9.6 mg/l96 h Static Invertebrates: Daphnia magna 1.8 - 2.4 mg/l48 h Plants: Pseudokirchneriella subcapitata 4.6 mg/l72 h Pseudokirchneriella subcapitata > 438 mg/l96 h Pseudokirchneriella subcapitata 2.6 - 11.3 mg/l72 h Static Pseudokirchneriella subcapitata 1.7 - 7.6 mg/l96 h Static
Methyl ethyl ketone	Fish: Pimephales promelas 3,130 - 3,320 mg/l96 h flow-through Invertebrates: Daphnia magna > 520 mg/l48 h Daphnia magna 5,091 mg/l48 h Daphnia magna 4,025 - 6,440 mg/l48 h Static
Propylene glycol monomethylether	Fish: Pimephales promelas 20.8 g/l96 h Static Invertebrates: Daphnia magna 23,300 mg/l48 h
Carbon black	N.D.

Ethyl alcohol	Fish: Pimephales promelas > 100 mg/l96 h Static Pimephales promelas 13,400 - 15,100 mg/l96 h flow-through Invertebrates: Daphnia magna 9,268 - 14,221 mg/l48 h Daphnia magna 2 mg/l48 h Static

PERSISTENCE AND DEGRADABILITY: Not determined for this product.

BIOACCUMULATIVE: Not determined for this product.

MOBILITY IN SOIL: Not determined for this product.

OTHER ADVERSE EFFECTS: Not determined for this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of contents/container in accordance with waste/disposal laws and regulations of your country or particular locality. Disposal should be done in accordance with Federal (40CFR Part 261), state and local environmental control regulations. If waste is determined to be hazardous, use licensed hazardous waste transporter and disposal facility.

14. TRANSPORT INFORMATION

US DOT Road

DOT Proper Shipping Name:	Adhesives
DOT Hazard Class:	3
SECONDARY HAZARD:	None
DOT UN/NA Number:	1133
Packing Group:	II
Emergency Response Guide Number:	128

IATA Cargo

PROPER SHIPPING NAME:	Adhesives
DOT Hazard Class:	3
HAZARD CLASS:	None
UN-NUMBER:	1133
PACKING GROUP:	II
EMS:	3L

IMDG

PROPER SHIPPING NAME:	Adhesives
DOT Hazard Class:	3
HAZARD CLASS:	None
UN-NUMBER:	1133
PACKING GROUP:	II
EMS:	F-E

The listed transportation classification applies to US DOT Road, IATA Cargo, and IMDG non-bulk shipments. It does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors. For the most accurate shipping information, refer to your transportation/compliance department.

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: AS FOLLOWS:

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372.:

Chemical Name	CAS Number	Weight % Less Than
Methyl isobutyl ketone	108-10-1	60.0 %

Xylene	1330-20-7	15.0 %
Ethyl benzene	100-41-4	5.0 %

TOXIC SUBSTANCES CONTROL ACT:

INVENTORY STATUS
The chemical substances in this product are on the TSCA Section 8 Inventory.

EXPORT NOTIFICATION
This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:
NONE

16. OTHER INFORMATION

Under HazCom 2012 it is optional to continue using the HMIS rating system. It is important to ensure employees have been trained to recognize the different numeric ratings associated with the HazCom 2012 and HMIS schemes.

HMIS RATINGS - HEALTH: 2* FLAMMABILITY: 3 PHYSICAL HAZARD: 0
* - Indicates a chronic hazard; see Section 2

Revision: New GHS SDS Format

Effective Date: 03/30/2015

DISCLAIMER

The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state and local laws and regulations.

Chemlok - Z-7,8,9S
Z-12,13,14S

LORD

USA SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name: **CHEMLOK 234X (NW)**
Product Use/Class: **Adhesive**

LORD Corporation
111 LORD Drive
Cary, NC 27511-7923

Telephone: 814 868-3180
Non-Transportation Emergency: 814 763-2345
Chemtrec 24 Hr Transportation Emergency No.
800 424-9300 (Outside Continental U.S. 703 527-3887)

EFFECTIVE DATE: 04/10/2015

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Flammable liquids Category 3
Acute toxicity Dermal Category 4
Skin corrosion/irritation Category 2
Serious eye damage/eye irritation Category 2A
Carcinogenicity Category 2
Reproductive toxicity Category 2
Specific target organ systemic toxicity (single exposure) Category 3
Specific target organ systemic toxicity (single exposure) Category 1 Central nervous system, Kidney, Liver, Respiratory system
Specific target organ systemic toxicity (repeated exposure) Category 2 Ears, Liver, Kidney
Specific target organ systemic toxicity (repeated exposure) Category 1 Nervous system, Respiratory system, Lungs
Hazardous to the aquatic environment - acute hazard Category 2
Hazardous to the aquatic environment - chronic hazard Category 2

GHS LABEL ELEMENTS:

Symbol(s)

Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Harmful in contact with skin.
Causes skin irritation.
Causes serious eye irritation.
Suspected of causing cancer.
Suspected of damaging fertility or the unborn child.
May cause harm to breast-fed children.
May cause drowsiness or dizziness.
May cause respiratory irritation.
Causes damage to organs.(Central nervous system, Kidney, Liver, Respiratory system)
May cause damage to organs through prolonged or repeated exposure.(Ears, Liver, Kidney)
Causes damage to organs through prolonged or repeated exposure.(Nervous system, Respiratory system, Lungs)
Toxic to aquatic life.
Toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wear protective gloves/protective clothing/eye protection/face protection.
Use personal protective equipment as required.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.

Response

In case of fire: refer to section 5 of SDS for extinguishing media.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF exposed: Call a POISON CENTER or doctor/physician.
Specific treatment (see supplemental first aid instructions on this label).
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Collect spillage.

Storage

Store in a well-ventilated place. Keep cool.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

Disposal:

Dispose of contents/container in accordance with waste/disposal laws and regulations of your country or particular locality.

Other Hazards:

This product contains component(s) which have the following warnings; however based on the GHS classification criteria of your country or locale, the product mixture may be outside the respective category(s).

Acute: Vapor harmful; may affect the brain or nervous system causing dizziness, headache or nausea. May cause central nervous system depression characterized by the following progressive steps: headache, dizziness, staggering gait, confusion, unconsciousness or coma. In elevated-temperature applications, product may release vapors that may produce cyanosis in the absence of sufficient ventilation or adequate respiratory protection. Possible irritation of the respiratory system can occur causing a variety of symptoms such as dryness of the throat, tightness of the chest, and shortness of breath. This product contains a residual amount of a chemical substance that may cause an allergic skin and/or respiratory reaction.Harmful if swallowed. Ingestion is not an expected route of entry in industrial or commercial uses.

Chronic: May affect the gastrointestinal system. May affect the blood and blood-forming organs. Prolonged or repeated contact may result in dermatitis. Ethylbenzene has been classified by IARC as a possible human carcinogen (Group 2B) and reported by NTP to show clear evidence for carcinogenicity in animals. IARC has designated carbon black as Group 2B - inadequate evidence for carcinogenicity in humans, but sufficient evidence in experimental animals. The nitrogen substituted aromatic in this product gave positive results for mutagenicity in an Ames Assay study while two other mutagenicity studies proved negative.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Range
Xylene	1330-20-7	65 - 70 %

Ethyl benzene	100-41-4	15 - 20 %
Nitrogen substituted aromatic	PROPRIETARY	1 - 5 %
Carbon black	1333-86-4	1 - 5 %

Any "PROPRIETARY" component(s) in the above table is considered trade secret, thus the specific chemical and its exact concentration is being withheld.

4. FIRST AID MEASURES

FIRST AID - EYE CONTACT: Flush eyes immediately with large amount of water for at least 15 minutes holding eyelids open while flushing. Get prompt medical attention.

FIRST AID - SKIN CONTACT: Flush contaminated skin with large amounts of water while removing contaminated clothing. Wash affected skin areas with soap and water. Get medical attention if symptoms occur.

FIRST AID - INHALATION: Move person to fresh air. Restore and support continued breathing. If breathing is difficult, give oxygen. Get immediate medical attention.

FIRST AID - INGESTION: If swallowed, do not induce vomiting. Call a physician or poison control center immediately for further instructions. Never give anything by mouth if victim is rapidly losing consciousness, unconscious or convulsing.

5. FIRE-FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA: Carbon Dioxide, Dry Chemical, Foam, Water Fog

SPECIFIC HAZARDS POSSIBLY ARISING FROM THE CHEMICAL: Flammable liquid and vapor. Keep containers tightly closed. Isolate from heat, electrical equipment, sparks, open flame, and other sources of ignition. Closed containers may rupture when exposed to extreme heat. Use water spray to keep fire exposed containers cool. During a fire, irritating and/or toxic gases and particulate may be generated by thermal decomposition or combustion.

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE-FIGHTERS: Wear full firefighting protective clothing, including self-contained breathing apparatus (SCBA). Water spray may be ineffective. If water is used, fog nozzles are preferable.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES: Remove all sources of ignition (flame, hot surfaces, and electrical, static or frictional sparks). Avoid contact. Avoid breathing vapors. Use self-contained breathing equipment.

ENVIRONMENTAL PRECAUTIONS: Do not contaminate bodies of water, waterways, or ditches, with chemical or used container.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANUP: Keep non-essential personnel a safe distance away from the spill area. Notify appropriate authorities if necessary. Avoid contact. Before attempting cleanup, refer to hazard caution information in other sections of the SDS form. Contain and remove with inert absorbent material and non-sparking tools.

7. HANDLING AND STORAGE

HANDLING: Keep closure tight and container upright to prevent leakage.Ground and bond containers when transferring material.Avoid skin and eye contact.Wash thoroughly after handling.Avoid breathing of vapor or spray mists.Do not handle until all safety precautions have been read and understood.Empty containers should not be re-used.Use with adequate ventilation.Because empty containers may retain product residue and flammable vapors, keep away from heat, sparks and flame; do not cut, puncture or weld on or near the empty container.Do not smoke where this product is used or stored.

STORAGE: Do not store or use near heat, sparks, or open flame.Refer to OSHA 29CFR Part 1910.106 "Flammable and Combustible Liquids" for specific storage requirements.Store only in well-ventilated areas.Do not puncture, drag, or slide container.Keep container closed when not in use.

INCOMPATIBILITY: Strong oxidizers, acids, bases, water.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

COMPONENT EXPOSURE LIMIT

Chemical Name	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING	Skin
Xylene	100 ppm	150 ppm	435 mg/m3 100 ppm	N.E.	N.A.
Ethyl benzene	20 ppm	N.E.	435 mg/m3 100 ppm	N.E.	N.A.
Nitrogen substituted aromatic	N.E.	N.E.	N.E.	N.E.	N.A.
Carbon black	3 mg/m3	N.E.	3.5 mg/m3	N.E.	N.A.

N.A. - Not Applicable, N.E. - Not Established, S - Skin Designation

Engineering controls: Sufficient ventilation in pattern and volume should be provided in order to maintain air contaminant levels below recommended exposure limits. Caution: Solvent vapors are heavier than air and collect in lower levels of the work area. Sufficient ventilation (using explosion-proof equipment) should be provided to prevent flammable vapor/air mixtures from accumulating.

PERSONAL PROTECTION MEASURES/EQUIPMENT:

RESPIRATORY PROTECTION: Use a NIOSH approved chemical/mechanical filter respirator designed to remove a combination of particulates and organic vapor if occupational limits are exceeded. For emergency situations, confined space use, or other conditions where exposure limits may be greatly exceeded, use an approved air-supplied respirator. Observe OSHA regulations (29CFR 1910.134) for respirator use.

SKIN PROTECTION: Use neoprene, nitrile, or rubber gloves to prevent skin contact.

EYE PROTECTION: Use safety eyewear including safety glasses with side shields and chemical goggles where splashing may occur.

OTHER PROTECTIVE EQUIPMENT: Use disposable or impervious clothing if work clothing contamination is likely. Remove and wash contaminated clothing before reuse.

HYGIENIC PRACTICES: Wash hands before eating, smoking, or using toilet facility. Do not smoke in any chemical handling or storage area. Food or beverages should not be consumed anywhere this product is handled or stored. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical values, not to be used for specification purposes.

ODOR:	Solvent	**VAPOR PRESSURE:**	N.D.
APPEARANCE:	Black	**VAPOR DENSITY:**	Heavier than Air
PHYSICAL STATE:	Liquid	**LOWER EXPLOSIVE LIMIT:**	1 %(V)
FLASH POINT:	86 °F, 30 °C Setaflash Closed Cup	**UPPER EXPLOSIVE LIMIT:**	7 %(V)7 %(V)
BOILING RANGE:	136 - 141 °C	**EVAPORATION RATE:**	Slower than n-butyl-acetate
AUTOIGNITION TEMPERATURE:	N.D.	**DENSITY:**	0.96 g/cm3 - 8.00 lb/gal
DECOMPOSITION TEMPERATURE:	N.D.	**VISCOSITY, DYNAMIC:**	≥400 mPa.s @ 25 °C
ODOR THRESHOLD:	N.D.	**VISCOSITY, KINEMATIC:**	≥417 mm2/s @ 25 °C
SOLUBILITY IN H2O:	Insoluble	**VOLATILE BY WEIGHT:**	82.11 %
pH:	N.A.	**VOLATILE BY VOLUME:**	88.12 %
FREEZE POINT:	N.D.	**VOC CALCULATED:**	6.2 lb/gal, 743 g/l
COEFFICIENT OF WATER/OIL DISTRIBUTION:	N.D.		

LEGEND: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

10. STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur under normal conditions.

STABILITY: Product is stable under normal storage conditions.

CONDITIONS TO AVOID: High temperatures. Sources of ignition.

INCOMPATIBILITY: Strong oxidizers, acids, bases, water.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide, chlorine, hydrogen chloride, Phosgene, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

EXPOSURE PATH: Refer to section 2 of this SDS.

SYMPTOMS: Refer to section 2 of this SDS.

TOXICITY MEASURES:

Chemical Name	LD50/LC50
Xylene	Oral LD50: Rat 3,500 mg/kg Dermal LD50: Rabbit > 1,700 mg/kg Dermal LD50: Rabbit > 4,350 mg/kg Inhalation LC50: Rat 29.08 mg/l /4 h
Ethyl benzene	Oral LD50: Rat 3,500 mg/kg Dermal LD50: Rabbit 15,400 mg/kg Inhalation LC50: Rat 17.2 mg/l /4 h
Nitrogen substituted aromatic	Oral LD50: rat 1,100 mg/kg
Carbon black	Oral LD50: Rat > 15,400 mg/kg Dermal LD50: Rabbit > 3 g/kg GHS LC50 (vapour): rat 55 mg/l /4 h

Germ cell mutagenicity: No classification proposed

Carcinogenicity: Category 2 - Suspected of causing cancer.
Components contributing to classification: Ethyl benzene. Carbon black.

Reproductive toxicity: Category 2 - Suspected of damaging fertility or the unborn child. May cause harm to breast-fed children.
Components contributing to classification: Xylene. Ethyl benzene. Toluene.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

Chemical Name	Ecotoxicity
Xylene	Fish: Pimephales promelas 13.4 mg/l96 h flow-through Oncorhynchus mykiss 2.661 - 4.093 mg/l96 h Static Oncorhynchus mykiss 13.5 - 17.3 mg/l96 h Lepomis macrochirus 13.1 - 16.5 mg/l96 h flow-through Lepomis macrochirus 19 mg/l96 h Lepomis macrochirus 7.711 - 9.591 mg/l96 h Static Pimephales promelas 23.53 - 29.97 mg/l96 h Static Cyprinus carpio 780 mg/l96 h semi-static Cyprinus carpio > 780 mg/l96 h Poecilia reticulata 30.26 - 40.75 mg/l96 h Static Invertebrates: water flea 3.82 mg/l48 h Gammarus lacustris 0.6 mg/l48 h
Ethyl benzene	Fish: Oncorhynchus mykiss 11.0 - 18.0 mg/l96 h Static

	Oncorhynchus mykiss 4.2 mg/l96 h semi-static Pimephales promelas 7.55 - 11 mg/l96 h flow-through Lepomis macrochirus 32 mg/l96 h Static Pimephales promelas 9.1 - 15.6 mg/l96 h Static Poecilia reticulata 9.6 mg/l96 h Static Invertebrates: Daphnia magna 1.8 - 2.4 mg/l48 h Plants: Pseudokirchneriella subcapitata 4.6 mg/l72 h Pseudokirchneriella subcapitata > 438 mg/l96 h Pseudokirchneriella subcapitata 2.6 - 11.3 mg/l72 h Static Pseudokirchneriella subcapitata 1.7 - 7.6 mg/l96 h Static
Nitrogen substituted aromatic	N.D.
Carbon black	N.D.

PERSISTENCE AND DEGRADABILITY: Not determined for this product.

BIOACCUMULATIVE: Not determined for this product.

MOBILITY IN SOIL: Not determined for this product.

OTHER ADVERSE EFFECTS: Not determined for this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of contents/container in accordance with waste/disposal laws and regulations of your country or particular locality. Disposal should be done in accordance with Federal (40CFR Part 261), state and local environmental control regulations. If waste is determined to be hazardous, use licensed hazardous waste transporter and disposal facility.

14. TRANSPORT INFORMATION

US DOT Road

DOT Proper Shipping Name:	Adhesives
DOT Hazard Class:	3
SECONDARY HAZARD:	None
DOT UN/NA Number:	1133
Packing Group:	III
Emergency Response Guide Number:	128

IATA Cargo

PROPER SHIPPING NAME:	Adhesives
DOT Hazard Class:	3
HAZARD CLASS:	None
UN-NUMBER:	1133
PACKING GROUP:	III
EMS:	3L

IMDG

PROPER SHIPPING NAME:	Adhesives
DOT Hazard Class:	3
HAZARD CLASS:	None
UN-NUMBER:	1133
PACKING GROUP:	III
EMS:	F-E

The listed transportation classification applies to US DOT Road, IATA Cargo, and IMDG non-bulk shipments. It does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors. For the most accurate shipping information, refer to your transportation/compliance department.

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: AS FOLLOWS:

SARA SECTION 313
This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372.:

Chemical Name	CAS Number	Weight % Less Than
Xylene	1330-20-7	70.0 %
Ethyl benzene	100-41-4	20.0 %

TOXIC SUBSTANCES CONTROL ACT:

INVENTORY STATUS
The chemical substances in this product are on the TSCA Section 8 Inventory.

EXPORT NOTIFICATION
This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:
NONE

16. OTHER INFORMATION

Under HazCom 2012 it is optional to continue using the HMIS rating system. It is important to ensure employees have been trained to recognize the different numeric ratings associated with the HazCom 2012 and HMIS schemes.

HMIS RATINGS - HEALTH: 2* FLAMMABILITY: 3 PHYSICAL HAZARD: 0
* - Indicates a chronic hazard; see Section 2

Revision: New GHS SDS Format

Effective Date: 04/10/2015

DISCLAIMER

The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state and local laws and regulations.

BL-034 Bondliner ingred.
Z-7.8.95 Z-12.13.145

SAFETY DATA SHEET

1. Identification

Covestro LLC
formerly Bayer MaterialScience LLC
1 Covestro Circle
Pittsburgh, PA 15205
USA

TRANSPORTATION EMERGENCY
CALL CHEMTREC: (800) 424-9300
INTERNATIONAL: (703) 527-3887

NON-TRANSPORTATION
Emergency Phone: Call Chemtrec
Information Phone: (844) 646-0545

Product Name:	DESMODUR N 100
Material Number:	410586
Chemical Family:	Aliphatic Polyisocyanate
Use:	Raw material for coatings, adhesives, sealants, or elastomers in industrial applications
Restrictions on use:	Do-It-Yourself Applications, Medical applications

2. Hazards Identification

GHS Classification

Acute toxicity (Inhalation):	Category 4
Skin sensitisation:	Category 1
Specific target organ toxicity - single exposure:	Category 3 (Respiratory system)

GHS Label Elements

Hazard pictograms:

Signal word: Warning

Hazard statements:
Harmful if inhaled.
May cause an allergic skin reaction.
May cause respiratory irritation.

Precautionary statements:
Prevention:
Avoid breathing dust, mist, gas, vapors or spray.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing must not be allowed out of the workplace.
Wear protective gloves.

Response:
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing.
Call a doctor or emergency medical facility (i.e. 911) if you feel unwell.
If skin irritation or rash occurs: Get medical attention.
Wash contaminated clothing before reuse.
Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Disposal:
Dispose of contents and container in accordance with existing federal, state, and local environmental control laws.

3. Composition/Information on Ingredients

Hazardous Components

Residual diisocyanate monomer content:, < 0.70%, During the following six months, especially if stored at temperatures near the top of the recommended storage temperature range, HDI monomer content may rise to a maximum of:, 1.00%

Weight Percent	Components	CAS-No.	Classification
95 - 100%	Homopolymer of Hexamethylene Diisocyanate	28182-81-2	Acute toxicity Category 4 Inhalation. Skin sensitisation Category 1. Specific target organ toxicity - single exposure Category 3 Respiratory system.
0.1 - 1%	Hexamethylene-1,6-Diisocyanate	822-06-0	Acute toxicity Category 4 Oral. Acute toxicity Category 1 Inhalation. Skin corrosion Category 1. Serious eye damage Category 1. Respiratory sensitisation Category 1. Skin sensitisation Category 1. Specific target organ toxicity - single exposure Category 3 Respiratory system.

The specific chemical identity and/or exact percentage of component(s) have been withheld as a trade secret.

4. First Aid Measures

Most Important Symptom(s)/Effect(s)

Acute: Isocyanate vapors or mist at concentrations above the exposure limits or guidelines can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) with symptoms of runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function

(breathing difficulty). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the exposure limits or guidelines with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the exposure limits or guidelines may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g. fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible.

May cause skin irritation with symptoms of reddening, itching, and swelling. Can cause sensitization. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove.

May cause eye irritation with symptoms of reddening, tearing, stinging, and swelling. May cause temporary corneal injury. Vapor or aerosol may cause irritation with symptoms of burning and tearing.

May cause irritation of the digestive tract; Symptoms may include abdominal pain, nausea, vomiting, and diarrhea.

Delayed: Symptoms affecting the respiratory tract can also occur several hours after overexposure.

Eye Contact
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Use lukewarm water if possible. Use fingers to ensure that eyelids are separated and that the eye is being irrigated. Then remove contact lenses, if easily removable, and continue eye irrigation for not less than 15 minutes. Get medical attention if irritation develops.

Skin Contact
Immediately remove contaminated clothing and shoes. Wash off with soap and water. Use lukewarm water if possible. Wash contaminated clothing before reuse. For severe exposures, immediately get under safety shower and begin rinsing. Get medical attention if irritation develops and persists.

Inhalation
Move to an area free from further exposure. Extreme asthmatic reactions that may occur in sensitized persons can be life threatening. Get medical attention immediately. Administer oxygen or artificial respiration as needed. Asthmatic symptoms may develop and may be immediate or delayed up to several hours.

Ingestion
Do NOT induce vomiting. Wash mouth out with water. Do not give anything by mouth to an unconscious person. Get medical attention.

Notes to Physician
Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation as needed. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: This compound is a skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn. Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the compound. Inhalation: Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material should be removed from further exposure to any diisocyanate.

5. Firefighting Measures

Suitable Extinguishing Media: Dry chemical, Carbon dioxide (CO2), Foam, water spray for large

fires.

Unsuitable Extinguishing Media: High volume water jet

Fire Fighting Procedure
Firefighters should wear NFPA compliant structural firefighting protective equipment, including self-contained breathing apparatus and NFPA compliant helmet, hood, boots and gloves. Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse. During a fire, isocyanate vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. Exposure to heated diisocyanate can be extremely dangerous.

Hazardous Decomposition Products
By Fire and High Heat: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke., Hydrogen cyanide, Isocyanate, Isocyanic Acid, Other undetermined compounds

Unusual Fire/Explosion Hazards
Closed container may forcibly rupture under extreme heat or when contents are contaminated with water (CO2 formed). Use cold-water spray to cool fire-exposed containers to minimize the risk of rupture. Large fires can be extinguished with large volumes of water applied from a safe distance, since reaction between water and hot diisocyanate can be vigorous.

6. Accidental Release Measures

Spill and Leak Procedures
Implement site emergency response plan. Evacuate non-emergency personnel. The magnitude of the evacuation depends upon the quantity released, site conditions, and the ambient temperature. Isolate the area and prevent access of unauthorized personnel. Notify management. Call CHEMTREC at 1-800-424-9300 for assistance and advice.

Wear necessary personal protective equipment (PPE) as specified in the SDS or the site emergency response plan. Ventilate and remove ignition sources. Control the source of the leak. Contain the released material by damming, diking, retaining, or diverting into an appropriate containment area. Absorb or pump off as much of the spilled material as possible. When using absorbent, completely cover the spill area with suitable absorbent material (e.g., vermiculite, kitty litter, Oil-Dri®, etc…). Allow for the absorbent material to absorb the spilled liquid. Shovel the absorbent material into an approved metal container (i.e., 55-gallon salvage drum). Do not fill the container more than 2/3 full to allow for expansion, and do not tighten the lid on the container. Repeat application of absorbent material until all liquid has been removed from the surface.

Decontaminate the spill surface area using a neutralization solution (see list of solutions on the SDS); scrubbing the surface with a broom or brush helps the decontamination solution to penetrate into porous surfaces. Wait at least 15 minutes after first application of the neutralization solution. Cover the area with absorbent material and shovel this into an approved metal container. Check for residual surface contamination using Swype® test kits, available from Colorimetric Laboratories, Inc. (CLI) at 847-803-3737. If the Swype® test pad demonstrates that isocyanate remains on the surface (red color on pad), repeat applications of neutralization solution, with scrubbing, followed by absorbent until the surface is decontaminated (no color change on Swype® pad). Apply lid loosely to metal waste container (do not tighten the lid because carbon dioxide gas and heat can be generated from the neutralization process). With the lid still loosely in place, move the container to an isolated, well-ventilated area to allow release of carbon dioxide. After 72 hours, seal the container, and properly dispose of the waste material and any contaminated equipment (i.e., broom or brush) in accordance with existing federal, state and local regulations.

Additional Spill Procedures/Neutralization

Products or product mixtures that have been shown to be effective neutralization solutions for decontaminating surfaces, tools, or equipment that have been in contact with an isocyanate includes: Products available through industrial suppliers:

- Spartan Chemical Company: 1-800-537-8990:
  - Spartan® ShineLine Emulsifier Plus
  - Spartan® SC-200 Heavy Duty Cleaner
- Colorimetric Laboratories, Inc. (CLI): 1-847-803-3737
  - Isocyanate Decontamination Solution
- Mix equal amounts of the following:
  - Mineral spirits (80%), VM&P Naphtha (15%), and household detergent (5%), and
  - A 50-50 mixture of monoethanolamine and water

In a separate container, blend the two solutions in a 1:1 ratio by volume. Immediately prior to applying this blended neutralization solution onto the contaminated surface area, mix or agitate the container to help ensure uniform mixing of the ingredients.

If the above products are not available, the following products can be obtained through retail outlets:

- ZEP® Commercial Heavy-Duty Floor Stripper
- Greased Lightning® Super Strength Cleaner and Degreaser
- EASY OFF® Grill and Oven Cleaner or EASY OFF® Fume Free Oven Cleaner
- A mixture of 50% Simple Green® Pro HD Heavy-Duty Cleaner and 50% household ammonia
- A mixture of 90% Fantastic® Heavy Duty All Purpose Cleaner and 10% household ammonia.

Note: Always wear proper PPE when cleaning up an isocyanate spill and using a neutralization solution. It may take two or more applications of the neutralization solution to decontaminate the surface. Check for residual surface contamination using a surface wipe method such as the CLI Swype® pad.

7. Handling and Storage

Handling/Storage Precautions
Do not breathe vapors, mists, or dusts. Use adequate ventilation to keep airborne isocyanate levels below the exposure limits. Wear respiratory protection if material is heated, sprayed, used in a confined space, or if the exposure limit is exceeded. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Individuals with lung or breathing problems or prior allergic reactions to isocyanates must not be exposed to vapor or spray mist. Avoid contact with skin and eyes. Wear appropriate eye and skin protection. Wash thoroughly after handling. Do not breathe smoke and gases created by overheating or burning this material. Decomposition products can be highly toxic and irritating. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected.

Storage Period:
6 Months @ 25 °C (77 °F): after receipt of material by customer

Storage Temperature

Minimum:	-34 °C (-29.2 °F)
Maximum:	50 °C (122 °F)

Storage Conditions
Store separate from food products.

Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard 29 CFR 1910.1200.

Substances to Avoid
Water, Amines, Strong bases, Alcohols, Copper alloys

8. Exposure Controls/Personal Protection

Homopolymer of Hexamethylene Diisocyanate (28182-81-2)
Covestro Exposure Limit
Time weighted average 0.5 mg/m3

Covestro Exposure Limit
Short Term Exposure Limit (STEL): 1.0 mg/m3 (15-min)

Hexamethylene-1,6-Diisocyanate (822-06-0)
US. ACGIH Threshold Limit Values
Time weighted average 0.005 ppm

Any component which is listed in section 3 and is not listed in this section does not have a known ACGIH TLV, OSHA PEL or supplier recommended occupational exposure limit.

Industrial Hygiene/Ventilation Measures
Good industrial hygiene practice dictates that worker protection should be achieved through engineering controls, such as ventilation, whenever feasible. When such controls are not feasible to achieve full protection, the use of respirators and other personal protective equipment is mandated. Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination. Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly (i.e. they are released into the work area), it is possible to be exposed to airborne monomeric HDI.

Respiratory Protection
A respirator that is recommended or approved for use in isocyanate-containing environments (air-purifying or fresh air-supplied) may be necessary for spray applications or other situations such as high temperature use which may produce inhalation exposures. A supplied-air respirator (either positive pressure or continuous flow-type) is recommended. Before an air-purifying respirator can be used, air monitoring must be performed to measure airborne concentrations of HDI monomer and HDI polyisocyanate. Specific conditions under which air-purifying respirators can be used are outlined in the following sections. Observe OSHA regulations for respirator use (29 CFR 1910.134). SPRAY APPLICATION: A. Good industrial hygiene practice dictates that when isocyanate-based coatings are spray applied, some form of respiratory protection should be worn. During the spray application of coatings containing this product the use of a supplied-air (either positive pressure or continuous flow-type) respirator is mandatory when ONE OR MORE of the following conditions exists: -the airborne isocyanate concentrations are not known; or -the airborne isocyanate monomer concentrations exceed 0.05 ppm averaged over eight (8) hours (10 times the 8 hour TWA exposure limit); or -the airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits); or -operations are performed in a confined space (See OSHA Confined Space Standard, 29 CFR 1910.146). A properly fitted air-purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing spray paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when ALL of the

following conditions are met: -The airborne isocyanate monomer concentrations are known to be below 0.05 ppm averaged over eight (8) hours (10 times 8 hour TWA exposure limit); and -the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits) and - a NIOSH-certified End of Service Life Indicator or a change schedule based upon objective information or data is used to ensure that cartridges are replaced before the end of their service life. In addition, prefilters should be changed whenever breathing resistance increases due to particulate buildup. NON-SPRAY OPERATIONS: A. During non-spray operations such as mixing, batch-making, brush or roller application, etc., at elevated temperatures (for example, heating of material or application to a hot substrate), it is possible to be exposed to airborne isocyanate vapors. Therefore, when the coatings system will be applied in a non-spray manner, a supplied-air (either positive pressure or continuous flow-type) respirator is mandatory when ONE OR MORE of the following conditions exists: - the airborne isocyanate concentrations are not known; or - the airborne isocyanate monomer concentrations exceed 0.05 ppm averaged over eight (8) hours (10 times the 8 hour TWA exposure limit); or - the airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits); or - operations are performed in a confined space (See OSHA Confined Space Standard, 29 CFR 1910.146). A properly fitted air-purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when ALL of the following conditions are met: -the airborne concentrations of the isocyanate monomer are below 0.05 ppm averaged over eight (8) hours (10 times the 8 hour TWA exposure limit); and - the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m3 averaged over eight (8) hours or 10 mg/m3 averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits) and - a NIOSH-certified End of Service Life Indicator or a change schedule based upon objective information or data is used to ensure that cartridges are replaced before the end of their service life. In addition, prefilters should be changed whenever breathing resistance increases due to particulate buildup.

Hand Protection
Gloves should be worn., Nitrile rubber gloves., Butyl rubber gloves., Neoprene gloves

Eye Protection
When directly handling liquid product, eye protection is required. Examples of eye protection include a chemical safety goggle, or chemical safety goggle in combination with a full face shield when there is a greater risk of splash.

Skin Protection
Avoid all skin contact. Depending on the conditions of use, cover as much of the exposed skin area as possible with appropriate clothing to prevent skin contact., Gloves, long sleeved shirts and pants.

Medical Surveillance
All applicants who are assigned to an isocyanate work area should undergo a pre-placement medical evaluation. A history of eczema or respiratory allergies such as hay fever, are possible reasons for medical exclusion from isocyanate areas. Applicants who have a history of adult asthma should be restricted from work with isocyanates. Applicants with a history of prior isocyanate sensitization should be excluded from further work with isocyanates. A comprehensive annual medical surveillance program should be instituted for all employees who are potentially exposed to diisocyanates. Once a worker has been diagnosed as sensitized to any isocyanate, no further exposure can be permitted. Refer to the Covestro pamphlet (Medical Surveillance Program for Isocyanate Workers) for additional guidance.

Additional Protective Measures
Emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of this product. Follow all label instructions.

9. Physical and Chemical Properties

State of Matter:	liquid
Color:	Clear, Pale yellow
Odor:	almost odourless
Odor Threshold:	No Data Available
pH:	No Data Available
Boiling Point:	@ 1,013 hPa not applicable, decomposition
Flash Point:	ca. 181 °C (357.8 °F) (DIN EN 22719)
Evaporation Rate:	No Data Available
Lower Explosion Limit:	No Data Available
Upper Explosion Limit:	No Data Available
Vapor Pressure:	HDI Polyisocyanate: 9.3 X 10-6 @ 68 F (20 C) mmHg
Vapor Density:	No Data Available
Density:	ca. 1.14 g/cm³ @ 20 °C (68 °F) (DIN EN ISO 2811)
Relative Vapor Density:	No Data Available
Specific Gravity:	No Data Available
Solubility in Water:	Insoluble - Reacts slowly with water to liberate CO2 gas
Partition Coefficient: n-octanol/water:	No Data Available
Auto-ignition Temperature:	ca. 480 °C (896 °F) (DIN 51794)
Decomposition Temperature:	No Data Available
Dynamic Viscosity:	ca. 10,000 mPa.s @ 23 °C (73.4 °F) (DIN EN ISO 3219/A.3)
Kinematic Viscosity:	No Data Available
Bulk Density:	1,138.35 kg/m3
Molecular Weight:	500 Approximate Value, For the polyisocyanate
Pour point:	ca. -10 °C (14 °F) (ISO 3016)
Self Ignition:	not applicable

10. Stability and Reactivity

Hazardous Reactions
Contact with moisture, other materials that react with isocyanates, or temperatures above 350 F (177 C), may cause polymerization

Stability
Stable under normal conditions of use and storage.

Materials to Avoid
Water, Amines, Strong bases, Alcohols, Copper alloys

Conditions to Avoid
Heat, flames and sparks.

Hazardous Decomposition Products
By Fire and High Heat: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke., Hydrogen cyanide, Isocyanate, Isocyanic Acid, Other undetermined compounds

11. Toxicological Information

Likely Routes of Exposure: Skin Contact
Inhalation
Eye Contact

Health Effects and Symptoms

Acute: Isocyanate vapors or mist at concentrations above the exposure limits or guidelines can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) with symptoms of runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing difficulty). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the exposure limits or guidelines with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the exposure limits or guidelines may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g. fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible.

May cause skin irritation with symptoms of reddening, itching, and swelling. Can cause sensitization. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove.

May cause eye irritation with symptoms of reddening, tearing, stinging, and swelling. May cause temporary corneal injury. Vapor or aerosol may cause irritation with symptoms of burning and tearing.

May cause irritation of the digestive tract; Symptoms may include abdominal pain, nausea, vomiting, and diarrhea.

Chronic: As a result of previous repeated overexposures or a single large dose, certain individuals may develop sensitization to isocyanates (asthma or asthma-like symptoms) that may cause them to react to a later exposure to isocyanates at levels well below the exposure limits or guidelines. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Extreme asthmatic reactions can be life threatening. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Sensitization can be permanent.

Prolonged contact with skin can cause reddening, swelling, rash, and, in some cases, skin sensitization. Animal tests and other research indicate that skin contact with isocyanates can play a role in causing isocyanate sensitization and respiratory reaction. This data reinforces the need to prevent direct skin contact with isocyanates.

Prolonged vapor contact with the eyes may cause conjunctivitis.

Delayed: Symptoms affecting the respiratory tract can also occur several hours after overexposure.

Toxicity Data for: DESMODUR N 100

Please find the data available for a similar product.

Toxicity Data for Homopolymer of Hexamethylene Diisocyanate

Toxicity Note

Data is based on a similar product, including residual monomer.

Acute Oral Toxicity

LD50: > 5000 mg/kg (rat, female) (OECD Test Guideline 423)

Acute Inhalation Toxicity
LC50: 0.554 mg/l, 4 h, dust/mist(rat)
The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

Skin Irritation
rabbit, slight irritant

Eye Irritation
rabbit, slight irritant

Sensitization
Skin sensitisation according to Magnusson/Kligmann (maximizing test):: positive (Guinea pig, OECD Test Guideline 406)

Repeated Dose Toxicity
Subchronic inhalation toxicity, rat:

Test concentration - 0,4 ; 3,4 and 21,0 mg aerosol/m³exposure time - 13 weeks(6 hours a day, 5 days a week)3,4 mg/m³ was tolerated without damage (NOEL),21,0 mg/m³ caused increase of lung weight.No evidence of histopathological changes in the upper and central respiratory passages.Unspecific changes in the lower respiratory tract; these are attributed to the product's primary irritation potential.Evidence of damage to organs other than the organs of respiration was not found.

Mutagenicity
Genetic Toxicity in Vitro:
Salmonella/microsome test (Ames test): No indication of mutagenic effects.

Genetic Toxicity in Vivo:
Micronucleus test: negative (Mouse)
negative

Toxicity Data for Hexamethylene-1,6-Diisocyanate
Acute Oral Toxicity
LD50: 746 mg/kg (rat, male) (OECD Test Guideline 401)

LD50: 959 mg/kg (rat, male) (OECD Test Guideline 401)

Acute Inhalation Toxicity
LC50: 0.124 mg/l, 4 h, vapour(rat, male/female) (OECD Test Guideline 403)

Acute Dermal Toxicity
LD50: > 7000 mg/kg (rat, male/female) (OECD Test Guideline 402)

Skin Irritation
rabbit, OECD Test Guideline 404, Corrosive

Eye Irritation
rabbit, OECD Test Guideline 405, Corrosive

Sensitization
dermal: sensitizer (Guinea pig, Maximisation Test (GPMT))
Other isocyanates have been shown to produce dermal and respiratory sensitization in several species

(guinea pigs, mice, rabbits, dogs). In addition, there is some evidence to suggest that cross-sensitization between different types of diisocyanates may occur.

dermal: sensitizer (Human, Case Report)

Respiratory sensitization: sensitizer (Guinea pig)

Repeated Dose Toxicity
2 years, inhalation: NOAEL: < 0.005 ppm, LOAEL: 0.005 ppm, (rat, Male/Female, 6 hrs/day 5 days/week) Irritation to lungs and nasal cavity.

Mutagenicity
Genetic Toxicity in Vitro:
Salmonella/microsome test (Ames test): negative (Salmonella typhimurium, Metabolic Activation: with/without)
Point mutation in mammalian cells (HPRT test): negative (Metabolic Activation: with/without)

Genetic Toxicity in Vivo:
Micronucleus test: negative (Mouse, male/female, Inhalative)
negative

Carcinogenicity
rat, male/female, Inhalative, 2 yrs, 6 hours/day, 5 days/week Did not show carcinogenic effects in animal experiments.

Toxicity to Reproduction/Fertility
Combined Repeated Dose Toxicity Study with the Reproduction/Developmental Toxicity Screening Test, Inhalative, 6 hours/day 7 days/week, (rat, male/female) NOAEL (F2): 0.3 ppm Fertility and developmental toxicity tests did not reveal any effect on reproduction.

Developmental Toxicity/Teratogenicity
Rat, female, inhalation, gestation days 0 - 19, daily, NOAEL (teratogenicity): >0.3 ppm, NOAEL (maternal): < 0.3 ppm No Teratogenic effects observed at doses tested.
No fetotoxicity observed at doses tested.

Neurological Effects
Rats exposed by inhalation, 6 hours/day, for approximately 3 weeks, to concentrations as high as 0.3 ppm showed no neurobehavioral effects or damage to nerve tissues.

Carcinogenicity:

No carcinogenic substances as defined by IARC, NTP and/or OSHA

12. Ecological Information

Ecological Data for: DESMODUR N 100

Please find the data available for a similar product.

Ecological Data for Homopolymer of Hexamethylene Diisocyanate
Biodegradation
1 %, Exposure time: 28 d, i.e. not readily degradable

Acute and Prolonged Toxicity to Fish
LC50: > 100 mg/l (Danio rerio (zebra fish), 96 h)

Acute Toxicity to Aquatic Invertebrates
EC50: > 100 mg/l (Daphnia magna (Water flea), 48 h)

Toxicity to Aquatic Plants
ErC50: > 100 mg/l, (scenedesmus subspicatus, 72 h)

Toxicity to Microorganisms
EC50: > 100 mg/l, (activated sludge, 3 h)

Additional Ecotoxicological Remarks
Data is based on a similar product, including residual monomer.

Ecological Data for Hexamethylene-1,6-Diisocyanate
Biodegradation
aerobic, 42 %, Exposure time: 28 d, i.e. not readily degradable

Bioaccumulation
value calculated, 57.6 BCF
An accumulation in aquatic organisms is not to be expected.

value calculated, 3.2 BCF
An accumulation in aquatic organisms is not to be expected. Studies of hydrolysis products.

Acute and Prolonged Toxicity to Fish
LC0: >= 82.8 mg/l (Danio rerio (zebra fish), 96 h)

Acute Toxicity to Aquatic Invertebrates
EC0: >= 89.1 mg/l (Daphnia magna (Water flea), 48 h)

Toxicity to Aquatic Plants
ErC50: > 77.4 mg/l, (Desmodesmus subspicatus (Green algae), 72 h)

Toxicity to Microorganisms
EC50: 842 mg/l, (activated sludge, 3 h)

13. Disposal Considerations

Waste Disposal Method
Waste disposal should be in accordance with existing federal, state and local environmental control laws. Incineration is the preferred method.

Empty Container Precautions
Empty containers retain product residue; observe all precautions for product. Do not heat or cut empty container with electric or gas torch because highly toxic vapors and gases are formed. Do not reuse without thorough commercial cleaning and reconditioning. If container is to be disposed, ensure all product residues are removed prior to disposal.

14. Transportation Information

Land transport (DOT)

Proper Shipping Name:	Other regulated substances, liquid, n.o.s. (contains Hexamethylene-1,6-Diisocyanate)
Hazard Class or Division:	9

UN/NA Number: NA3082
Packaging Group: III
Hazard Label(s): Class 9

RSPA/DOT Regulated Components:
Hexamethylene-1,6-Diisocyanate

Reportable Quantity: 9074 kg (20005 lb)

Sea transport (IMDG)
Non-Regulated

Air transport (ICAO/IATA)
Non-Regulated

Additional Transportation Information
When in individual containers of less than the Product RQ, this material ships as non-regulated.

15. Regulatory Information

United States Federal Regulations
US. Toxic Substances Control Act: Listed on the TSCA Inventory.

No substances are subject to TSCA 12(b) export notification requirements.

US. EPA CERCLA Hazardous Substances (40 CFR 302) Components:
None

SARA Section 311/312 Hazard Categories:
Acute Health Hazard

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A) Components:
None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required Components:
None

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):
Under RCRA, it is the responsibility of the person who generates a solid waste, as defined in 40 CFR 261.2, to determine if that waste is a hazardous waste.

State Right-To-Know Information
The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the SDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

Weight percent	Components	CAS-No.
>=95%	Homopolymer of Hexamethylene Diisocyanate	28182-81-2

0.1 - 1%	Hexamethylene-1,6-Diisocyanate	822-06-0

New Jersey Environmental Hazardous Substances List and/or New Jersey RTK Special Hazardous Substances Lists:

Weight percent	Components	CAS-No.
0.1 - 1%	Hexamethylene-1,6-Diisocyanate	822-06-0

California Prop. 65:
To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

Based on information provided by our suppliers, this product is considered "DRC Conflict Free" as defined by the SEC Conflict Minerals Final Rule (Release No. 34-67716; File No. S7-40-10; Date: 2012-08-22).

16. Other Information

The method of hazard communication for Covestro LLC is comprised of Product Labels and Safety Data Sheets.

The handling of products containing reactive HDI polyisocyanate/prepolymer and/or monomeric HDI requires appropriate protective measures referred to in this SDS. These products are therefore recommended only for use in industrial or trade (commercial) applications. They are not suitable for use in Do-It-Yourself applications.

Contact:	Product Safety Department
Telephone:	(412) 413-2835
SDS Number:	112000013664
Version Date:	10/14/2015
SDS Version:	2.1

This information is furnished without warranty, express or implied. This information is believed to be accurate to the best knowledge of Covestro LLC. The information in this SDS relates only to the specific material designated herein. Covestro LLC assumes no legal responsibility for use of or reliance upon the information in this SDS.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

BL-034 Bondliner Ingred.
Z-7,8,9S Z-12,13,14S

Fisher Scientific

Part of Thermo Fisher Scientific

Material Safety Data Sheet

Creation Date 13-Oct-2009 **Revision Date** 09-May-2012 **Revision Number** 3

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Ethyl acetate

Cat No. BP1125-1; BP1125-4; E124-4; E124-20; E124RS-200; E145-1; E145-4; E145-4LC; E145-20; E145-200; E145-500; E145FB-19; E145FB-50; E145FB-115; E145FB-200; E145POP-50; E145POPB-50; E145RB-19; E145RB-50; E145RB-115; E145RB-200; E145RS-28; E145RS-50; E145RS-115; E145S-4; E145SK-4; E145SK-4LC; E145SS-28; E145SS-50; E145SS-115; E145SS-200; E145SS-1350; E189-4; E191-4; E195-4; E195N1-19; E195N2-19; E195RS-50; E195RS-115; E195RS-200; E195SK-1; E195SK-4; E195SS-19; E195SS-50; E195SS-115; E196-4; E196-4LC; E196RS-28; E196RS-115; E196SK-4; E196SS-28; E196SS-50; E196SS-115; E196SS-200

Synonyms Acetic acid ethyl ester (Sequencing/NF/Certified ACS/Spectranalyzed/Pesticide/HPLC/Optima)

Recommended Use Laboratory chemicals

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview

Highly flammable. Irritating to eyes. Vapors may cause drowsiness and dizziness. Repeated exposure may cause skin dryness or cracking. May cause central nervous system effects. May cause skin and respiratory tract irritation. May be harmful by inhalation, in contact with skin and if swallowed.

Appearance Colorless **Physical State** Liquid **odor** sweet

Target Organs Skin, Respiratory system, Eyes, Central nervous system (CNS)

Potential Health Effects

Acute Effects

Principle Routes of Exposure

Eyes	Irritating to eyes.
Skin	May cause irritation. May be harmful in contact with skin. Repeated exposure may cause skin dryness or cracking.
Inhalation	Inhalation may cause central nervous system effects. May cause irritation of respiratory tract. May be harmful if inhaled.
Ingestion	May be harmful if swallowed. May cause central nervous system effects. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic Effects Repeated exposure may cause skin dryness or cracking. May cause adverse liver effects.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions Preexisting eye disorders. Skin disorders.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Haz/Non-haz

Component	CAS-No	Weight %
Ethylacetate	141-78-6	>95

4. FIRST AID MEASURES

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.

Ingestion Do not induce vomiting. Obtain medical attention.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point -4°C / 24.8°F

Method No information available.

Autoignition Temperature 427°C / 800.6°F

Explosion Limits

Upper 11.5 vol %

Lower 2.0 vol %

Suitable Extinguishing Media CO_2, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media Water may be ineffective

Hazardous Combustion Products No information available.

Sensitivity to mechanical impact	No information available.
Sensitivity to static discharge	No information available.

Specific Hazards Arising from the Chemical
Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA	Health 1	Flammability 3	Instability 0	Physical hazards N/A

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges.
Environmental Precautions	Should not be released into the environment.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Provide adequate ventilation.

7. HANDLING AND STORAGE

Handling	Use only under a chemical fume hood. Use explosion-proof equipment. Wear personal protective equipment. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Take precautionary measures against static discharges.
Storage	Flammables area. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures

Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Ethylacetate	TWA: 400 ppm	(Vacated) TWA: 400 ppm (Vacated) TWA: 1400 mg/m³ TWA: 400 ppm TWA: 1400 mg/m³	IDLH: 2000 ppm TWA: 400 ppm TWA: 1400 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Ethylacetate	TWA: 400 ppm TWA: 1440 mg/m³	TWA: 400 ppm TWA: 1400 mg/m³	TWA: 400 ppm

NIOSH IDLH: *Immediately Dangerous to Life or Health*

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Colorless
odor	sweet
Odor Threshold	No information available.
pH	No information available.
Vapor Pressure	103 mbar @ 20°C
Vapor Density	3.04 (Air = 1.0)
Viscosity	0.45 cP @ 20 °C
Boiling Point/Range	75 - 78°C / 167 - 171.5°F
Melting Point/Range	-83.5°C / -118.3°F
Decomposition temperature	No information available.
Flash Point	-4°C / 24.8°F
Evaporation Rate	(Butyl Acetate = 1.0)
Specific Gravity	0.902
Solubility	Slightly soluble in water
log Pow	No data available
Molecular Weight	88.11
Molecular Formula	C4 H8 O2

10. STABILITY AND REACTIVITY

Stability Moisture sensitive.

Conditions to Avoid	Incompatible products. Heat, flames and sparks. Exposure to moist air or water. Exposure to light. Exposure to air.
Incompatible Materials	Strong oxidizing agents, Strong acids, Strong bases
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO_2)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions .	None under normal processing..

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information See actual entry in RTECS for complete information.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethylacetate	5620 mg/kg (Rat)	18000 mg/kg (Rabbit) 20 mL/kg (Rabbit)	Not listed

Irritation	Irritating to eyes
Toxicologically Synergistic Products	No information available.

Chronic Toxicity

Carcinogenicity	There are no known carcinogenic chemicals in this product
Sensitization	No information available.
Mutagenic Effects	Mutagenic effects have occurred in experimental animals.
Reproductive Effects	No information available..
Developmental Effects	No information available..
Teratogenicity	No information available..
Other Adverse Effects	See actual entry in RTECS for complete information.
Endocrine Disruptor Information	No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ethylacetate	EC50 = 3300 mg/L/48h	Gold orfe: LC50: 270 mg/L/48h	EC50 = 1180 mg/L 5 min EC50 = 1500 mg/L 15 min EC50 = 5870 mg/L 15 min EC50 = 7400 mg/L 2 h	EC50 = 717 mg/L/48h

Persistence and Degradability Readily biodegradable.

Bioaccumulation/ Accumulation No information available

Mobility

Component	log Pow
Ethylacetate	0.6

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Ethylacetate - 141-78-6	U112	-

14. TRANSPORT INFORMATION

DOT

UN-No	UN1173
Proper Shipping Name	ETHYL ACETATE
Hazard Class	3
Packing Group	II

TDG

UN-No	UN1173
Proper Shipping Name	ETHYL ACETATE
Hazard Class	3
Packing Group	II

IATA

UN-No	UN1173
Proper Shipping Name	ETHYL ACETATE
Hazard Class	3
Packing Group	II

IMDG/IMO

UN-No	UN1173
Proper Shipping Name	ETHYL ACETATE
Hazard Class	3
Packing Group	II

14. TRANSPORT INFORMATION

15. REGULATORY INFORMATION

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	CHINA	KECL
Ethylacetate	X	X	-	205-500-4	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313
Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act
Not applicable

Clean Air Act
Not applicable

OSHA
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Ethylacetate	5000 lb	-

California Proposition 65
This product does not contain any Proposition 65 chemicals.

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethylacetate	X	X	X	-	X

U.S. Department of Transportation
Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
B2 Flammable liquid

16. OTHER INFORMATION

Prepared By Regulatory Affairs

16. OTHER INFORMATION

Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 13-Oct-2009

Print Date 09-May-2012

Revision Summary (M)SDS sections updated 1 3

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of MSDS

Mandrel / Mold Release
Z-15

Safety Data Sheet

Revision Number: 006.0

Issue date: 08/01/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: FREKOTE® 700-NC™ RELEASING INTERFACE PART NO. 38425
Product type: Mold Release
Restriction of Use: None identified
Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

IDH number: 548990
Item number: 38425
Region: United States
Contact Information:
Telephone: (860) 571-5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

Contains one or more components for which a Toxic Substances Control Act (TSCA) Low Volume Exemption (LVE) applies. See Section 15.

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW	
DANGER:	FLAMMABLE LIQUID AND VAPOR. MAY BE FATAL IF SWALLOWED AND ENTERS AIRWAYS. CAUSES SKIN IRRITATION. CAUSES SERIOUS EYE IRRITATION. MAY CAUSE DROWSINESS OR DIZZINESS.

HAZARD CLASS	HAZARD CATEGORY
FLAMMABLE LIQUID	3
SKIN IRRITATION	2
EYE IRRITATION	2A
SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE	3
ASPIRATION HAZARD	1

PICTOGRAM(S)

Precautionary Statements

Prevention: Keep away from heat,sparks, open flames, hot surfaces - no smoking. Keep container tightly closed. No release into water. Use explosion-proof equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Avoid breathing vapors, mist, or spray. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves, eye protection, and face protection.

Response: IF SWALLOWED: Immediately call a physician or poison control center. If on skin (or hair): Take off immediately all contaminated clothing. IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to remove. Continue rinsing. Call a poison control center or physician if you feel unwell. Do NOT induce vomiting. If skin irritation occurs: Get medical attention. If eye irritation persists: Get medical attention. Take off contaminated clothing. In case of fire: Use foam, dry chemical or carbon dioxide to extinguish.

Storage:	Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.
Disposal:	Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Dibutyl ether	142-96-1	10 - 30
Naphtha, hydrotreated heavy; (petroleum)	64742-48-9	60 - 100
Alkanes, C7-10-iso-	90622-56-3	1 - 5
Octane	111-65-9	1 - 5

* Exact percentage is a trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Skin contact: Remove contaminated clothing and footwear. Immediately flush skin with plenty of water (using soap, if available). If symptoms develop and persist, get medical attention. Wash clothing before reuse.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get immediate medical attention.

Ingestion: Keep individual calm. Do not induce vomiting: contains petroleum distillates and/or aromatic solvents. Never give anything by mouth to an unconscious person. Get immediate medical attention. If vomiting occurs, prevent aspiration by keeping the patient's head below the knees.

Symptoms: See Section 11.

Notes to physician: This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity when deciding whether to induce vomiting.

5. FIRE FIGHTING MEASURES

Extinguishing media: Water spray (fog), foam, dry chemical or carbon dioxide. Do not use high volume water jet.

Special firefighting procedures: Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear. In case of fire, keep containers cool with water spray. Keep personnel upwind of fire.

Unusual fire or explosion hazards: Vapors may form explosive mixtures with air. Do not handle or store near an open flame, heat or other sources of ignition. Hydrocarbon solvents are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering or pumping at high flow rates. If this charge reaches a significantly high level, sparks can form that may ignite vapors of flammable liquids.

Hazardous combustion products: Oxides of carbon. Irritating organic vapours. Acrid smoke and fumes. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow product to enter sewer or waterways. Prevent further leakage or spillage if safe to do so. Advise authorities if product has entered or may enter sewers, water sources or extensive land areas. This product is insoluble in water and will float on surface.

Clean-up methods: Remove all sources of ignition. Ventilate area. Wear suitable protective clothing, gloves and eye/face protection. Keep upwind of the spilled material and isolate exposure. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Store in a partly filled, closed container until disposal.

7. HANDLING AND STORAGE

Handling: During use and until all vapors are gone: Keep area ventilated - do not smoke; extinguish all flames, pilot lights, and heaters; turn off stoves, electrical tools and appliances, and any other sources of ignition. Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Make sure containers are properly grounded before use or transfer of material. For operations where eye or face contact could occur, provide safety shower and eyewash fountain.

Storage: For safe storage, store at or below 48.8 °C (119.8 °F)
Keep in a cool, well ventilated area away from heat, sparks and open flame.
Keep container tightly closed until ready for use.

For information on product shelf life contact Henkel Customer Service at (800) 243-4874.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Dibutyl ether	None	None	None	None
Naphtha, hydrotreated heavy; (petroleum)	None	None	None	196 ppm TWA
Alkanes, C7-10-iso-	None	None	None	None
Octane	300 ppm TWA	500 ppm (2,350 mg/m3) PEL	None	None

Engineering controls: Use explosion-proof mechanical ventilation and local exhaust to control contaminants to within their occupational exposure limits during the use of this product.

Respiratory protection: Use a NIOSH approved air-purifying respirator if the potential to exceed established exposure limits exists.

Eye/face protection: Safety goggles or safety glasses with side shields. Full face protection should be used if the potential for splashing or spraying of product exists. Safety showers and eye wash stations should be available.

Skin protection: Use chemical resistant, impermeable clothing including gloves and either an apron or body suit to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Colorless
Odor:	Mild, Solvent
Odor threshold:	Not available.
pH:	Not available.
Vapor pressure:	Not available.
Boiling point/range:	> 112 °C (> 233.6 °F) (1,013 hPa)
Melting point/ range:	Not determined
Specific gravity:	0.754
Vapor density:	Heavier than air.
Flash point:	31 °C (87.8 °F) Tagliabue closed cup
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	> 200 °C (> 392°F) (value for solvent)
Evaporation rate:	Slower than ether.
Solubility in water:	Slight
Partition coefficient (n-octanol/water):	Not available.
VOC content:	754 g/l of coating
Viscosity:	Not available.
Decomposition temperature:	Not available.

10. STABILITY AND REACTIVITY

Stability:	Risk of ignition.Stable under normal conditions of storage and use.
Hazardous reactions:	Will not occur.
Hazardous decomposition products:	Oxides of carbon. Traces of Ammonia. Hydrocarbons.
Incompatible materials:	Strong oxidizing agents. Humid air. Water.
Reactivity:	Not available.
Conditions to avoid:	Avoid static discharge. Vapors may form explosive mixtures with air. Spray mist may be flammable at temperatures below the flash point. Keep away from open flames, hot surfaces and sources of ignition. Fire or intense heat may cause violent rupture of packages. Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure:	Skin, Inhalation, Eyes, Ingestion

Potential Health Effects/Symptoms

Inhalation: Vapors and mists will irritate nose and throat and possibly eyes. High vapor concentrations (greater than approximately 1000 ppm) may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

Skin contact: Causes skin irritation. Solvent action can dry and defat the skin, causing the skin to crack, leading to dermatitis.

Eye contact: Causes serious eye irritation.

Ingestion: This product may be fatal if it is swallowed. Aspiration may occur during swallowing or vomiting, resulting in lung damage. Central nervous system depression, including dizziness, drowsiness, fatigue, nausea, headache, unconsciousness.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Dibutyl ether	None	Irritant, Central nervous system, Cardiac, Kidney, Gastrointestinal, Mutagen
Naphtha, hydrotreated heavy; (petroleum)	None	Irritant
Alkanes, C7-10-iso-	None	Central nervous system, Irritant, Lung, Cardiac
Octane	Inhalation LC50 (RAT, 4 h) = 118 mg/l	Central nervous system, Irritant, Lung

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Dibutyl ether	No	No	No
Naphtha, hydrotreated heavy; (petroleum)	No	No	No
Alkanes, C7-10-iso-	No	No	No
Octane	No	No	No

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of according to Federal, State and local governmental regulations.

Hazardous waste number: D001: Ignitable.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Resin solution
Hazard class or division: 3
Identification number: UN 1866
Packing group: III

International Air Transportation (ICAO/IATA)

Proper shipping name: Resin solution
Hazard class or division: 3
Identification number: UN 1866
Packing group: III

Water Transportation (IMO/IMDG)

Proper shipping name:	RESIN SOLUTION (Octane)
Hazard class or division:	3
Identification number:	UN 1866
Packing group:	III
Marine pollutant:	Octane

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act inventory.
TSCA 12 (b) Export Notification:	None above reporting de minimis
CERCLA/SARA Section 302 EHS:	None above reporting de minimis
CERCLA/SARA Section 311/312:	Fire, Immediate Health, Delayed Health
CERCLA/SARA Section 313:	None above reporting de minimis
CERCLA Reportable quantity:	Dibutyl ether (CAS# 142-96-1) 100 lbs. (45.4 kg) Octane (CAS# 111-65-9) 100 lbs. (45.4 kg)
California Proposition 65:	No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDSL Status:	One or more components are not listed on, and are not exempt from listing on either the Domestic Substances List or the Non-Domestic Substances List.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: New Safety Data Sheet format.

Prepared by: Catherine Birnler, Regulatory Affairs Specialist

Issue date: 08/01/2014

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Degreasing
E-2, 5, 6, 10, 11, 165

ASHLAND
SAFETY DATA SHEET

Revision Date: 02/25/2010
Print Date: 7/6/2011
MSDS Number: R0001444
Version: 1.11

ISOPROPANOL 99%
20286

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Ashland P.O. Box 2219 Columbus, OH 43216	Regulatory Information Number Telephone Emergency telephone	1-800-325-3751 614-790-3333 1-800-ASHLAND (1-800-274-5263)

Product name ISOPROPANOL 99%

Product code 20286
Product Use Description No data

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance: liquid,, colourless

WARNING! FLAMMABLE LIQUID AND VAPOR. MAY AFFECT THE CENTRAL NERVOUS SYSTEM CAUSING DIZZINESS, HEADACHE OR NAUSEA. MAY BE HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE EYE IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY THE SKIN AND CAUSE IRRITATION AND BURNS.

Potential Health Effects

Exposure routes
Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

Eye contact
Can cause eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes.

Skin contact
May cause mild skin irritation. Prolonged or repeated contact may dry the skin. Symptoms may include redness, burning, drying and cracking of skin, and skin burns. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Ingestion

Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. This material can get into the lungs during swallowing or vomiting. This results in lung inflammation and other lung injury. Exposure causes severe irritation of the gastrointestinal tract.

Inhalation

Breathing of vapor or mist is possible. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable (see Section 8.).

Aggravated Medical Condition

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material:, Skin, lung (for example, asthma-like conditions), kidney

Symptoms

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:, stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), Lowered blood pressure, mild, temporary changes in the liver, effects on heart rate, respiratory depression (slowing of the breathing rate), Lack of coordination, confusion, lung edema (fluid buildup in the lung tissue), kidney damage, coma

Target Organs

Exposure to this material (or a component) has been found to cause kidney damage in male rats. The mechanism by which this toxicity occurs is specific to the male rat and the kidney effects are not expected to occur in humans., Breathing isopropanol vapors has caused damage to the lining of the middle ear in experimental animals. The relevance of this finding to humans is uncertain., Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals:, mild, reversible liver effects

Carcinogenicity

Based on the available information, this material cannot be classified with regard to carcinogenicity. This material is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA).

Reproductive hazard

This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Components	CAS-No.	Concentration
ISOPROPANOL	67-63-0	<=100%

4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation

If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen. If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

Notes to physician

Hazards: This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity (See Section 2 - Swallowing) when deciding whether to induce vomiting. Administration of high doses of isopropanol in combination with known hepatotoxic chemicals resulted in enhanced liver toxicity in experimental animals.

Treatment: No information available.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Dry chemical, Alcohol-resistant foam, Carbon dioxide (CO2)

Hazardous combustion products

carbon dioxide and carbon monoxide

Precautions for fire-fighting

Material is volatile and readily gives off vapors which may travel along the ground or be moved by ventilation and ignited by pilot lights, flames, sparks, heaters, smoking, electric motors, static discharge or other ignition sources at locations near the material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA). Water may be ineffective for extinguishment unless used under favorable conditions by experienced fire fighters. Use water spray to cool fire exposed containers and structures until fire is out if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

NFPA Flammable and Combustible Liquids Classification

Flammable Liquid Class IB

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

For personal protection see section 8. Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source. Prevent from entering drains, sewers, streams or other bodies of water. Prevent from spreading. If runoff occurs, notify authorities as required. Pump or vacuum transfer spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent, soil and other materials to containers for disposal.

Environmental precautions

No data

Methods for cleaning up

Per good environmental management practices, prevent run-off to sewers, streams and other bodies of water. Stop spill at the source. Cover sewer grates and dike the spill. Absorb spilled material on to absorbents. Shovel materials into container. Close container tightly and dispose of properly. Absorb liquid on vermiculite, floor absorbent or other absorbent material.

7. HANDLING AND STORAGE

Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Static ignition hazard can result from handling and use. Electrically bond and ground all containers, personnel and equipment before transfer or use of material. Special precautions may be necessary to dissipate static electricity for non-conductive containers. Use proper bonding and grounding during product transfer as described in National Fire Protection Association document NFPA 77. Warning. Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions.

Storage

Small quantities of peroxides may form on prolonged storage. Exposure to light and/or air significantly increases the rate of peroxide formation. If evaporated to a residue, the mixture of peroxides and isopropanol may explode when exposed to heat or shock.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

ISOPROPANOL		67-63-0
NIOSH	Recommended exposure limit (REL):	400 ppm
NIOSH	Recommended exposure limit (REL):	980 mg/m3
NIOSH	Short term exposure limit	500 ppm
NIOSH	Short term exposure limit	1,225 mg/m3
OSHA Z1	Permissible exposure limit	400 ppm
OSHA Z1	Permissible exposure limit	980 mg/m3
ACGIH	time weighted average	200 ppm
ACGIH	Short term exposure limit	400 ppm

General advice

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

Exposure controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

Eye protection

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.

Skin and body protection

Wear resistant gloves such as:
Nitrile rubber
To prevent repeated or prolonged skin contact, wear impervious clothing and boots.

Respiratory protection

If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines), a NIOSH-approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH respirators (negative pressure type) under specified conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	liquid
Form	liquid
Colour	colourless
Odour	pleasant
Boiling point/boiling range	82.50 °C @ 101.32 kPa
Melting point/range	-127.3 °F / -88.5 °C
pH	No data
Flash point	12.00 °C Closed Cup
Evaporation rate	7.70 (Ethyl Ether)
Lower explosion limit/Upper explosion limit	2.5 %(V) / 12 %(V)
Vapour pressure	6.052 kPa @ 25 °C
Vapour density	2.1 (AIR=1)

Density	0.789 g/cm3 @ 60 °F / 16 °C 6.65 lb/gal @ 60.1 °F / 15.6 °C
Solubility	soluble in water
Partition coefficient: n-octanol/water	No data
log Pow	0.05
Autoignition temperature	750 °F / 399 °C

10. STABILITY AND REACTIVITY

Stability
Stable.

Conditions to avoid
Heat, flames and sparks.

Incompatible products
Acids, Aldehydes, alkalis, Amines, Ethylene oxide, halogenated hydrocarbons, halogens, isocyanates, Strong acids, Strong oxidizing agents, Do not use with aluminum equipment at temperatures above 120 degrees F.

Hazardous decomposition products
carbon dioxide and carbon monoxide

Hazardous reactions
Product will not undergo hazardous polymerization.

Thermal decomposition
No data

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	:	LD 50 Rat: 4,700 - 5,800 mg/kg
Acute inhalation toxicity	:	LC 50 Rat: 16000 ppm, 4 h
Acute dermal toxicity	:	LD 50 Rabbit: 5,030 - 7,900 mg/kg

12. ECOLOGICAL INFORMATION

Biodegradability
ISOPROPANOL : no data available

Bioaccumulation
ISOPROPANOL : no data available

Ecotoxicity effects

Toxicity to fish
ISOPROPANOL : 96 h LC 50 Fathead minnow (Pimephales promelas): 5,770.00 - 7,450.00 mg/L
Method: Flow through
Mortality

Toxicity to daphnia and other aquatic invertebrates.
ISOPROPANOL : 24 h static test LC 50 Water flea (Daphnia magna): > 10,000.00 mg/L
Method: Static
Mortality

Toxicity to algae
ISOPROPANOL : no data available

Toxicity to bacteria
ISOPROPANOL : no data available

Biochemical Oxygen Demand (BOD)
ISOPROPANOL : no data available

Chemical Oxygen Demand (COD)
ISOPROPANOL : no data available

Additional ecological information
ISOPROPANOL : no data available

13. DISPOSAL CONSIDERATIONS

Waste disposal methods

Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution's Environmental Services Group at 800-637-7922.

14. TRANSPORT INFORMATION

REGULATION

ID NUMBER	PROPER SHIPPING NAME	*HAZARD CLASS	SUBSIDIARY HAZARDS	PACKING GROUP	MARINE POLLUTANT / LTD. QTY.
U.S. DOT - ROAD					
UN 1219	Isopropanol	3		II	
U.S. DOT - RAIL					
UN 1219	Isopropanol	3		II	
U.S. DOT - INLAND WATERWAYS					
UN 1219	Isopropanol	3		II	
TRANSPORT CANADA - ROAD					
UN 1219	ISOPROPANOL	3		II	
TRANSPORT CANADA - RAIL					
UN 1219	ISOPROPANOL	3		II	
TRANSPORT CANADA - INLAND WATERWAYS					
UN 1219	ISOPROPANOL	3		II	
INTERNATIONAL MARITIME DANGEROUS GOODS					
UN 1219	ISOPROPANOL	3		II	
INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO					
UN 1219	Isopropanol	3		II	
INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER					
UN 1219	Isopropanol	3		II	

MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND WASTES

UN	1219	ISOPROPANOL	3	II

***ORM = ORM-D, CBL = COMBUSTIBLE LIQUID**

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

15. REGULATORY INFORMATION

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

SARA Hazard Classification
Fire Hazard
Acute Health Hazard

New Jersey RTK Label Information

ISOPROPANOL	67-63-0

Pennsylvania RTK Label Information

ISOPROPANOL	67-63-0

Notification status

Australia. Industrial Chemical (Notification and Assessment) Act	y (positive listing)
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	y (positive listing)
China. Inventory of Existing Chemical Substances	y (positive listing)
Japan. Kashin-Hou Law List	y (positive listing)
Japan. Industrial Safety & Health Law (ISHL) List	y (positive listing)
US. Toxic Substances Control Act	y (positive listing)
EU. EINECS	y (positive listing)
Korea. Toxic Chemical Control Law (TCCL) List	y (positive listing)
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	y (positive listing)
New Zealand. Inventory of Chemicals (NZIoC), as published	y (positive listing)

by ERMA New Zealand	
Switzerland. Consolidated Inventory	y (positive listing)

	HMIS	NFPA
Health	1	1
Flammability	3	3
Physical hazards	--	
Instability		0
Specific Hazard	--	--

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This MSDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).

Chem lo k Cleanup
2-8 or 135

ASHLAND
SAFETY DATA SHEET

Revision Date: 02/19/2007
Print Date: 7/3/2007
MSDS Number: R0000017
Version: 1.1

MEK (METHYL ETHYL KETONE)
20019
#0010

(1)
2406

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

this date

Ashland P.O. Box 2219 Columbus, OH 43216	Regulatory Information Number Telephone Emergency telephone number	1-800-325-3751 614-790-3333 1-800-ASHLAND (1-800-274-5263)

Product name	MEK (METHYL ETHYL KETONE)
Product code	20019
Product Use Description	No data

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance: liquid, characteristic, Colorless

WARNING! Flammable Liquid, Toxic by inhalation, Moderate skin irritant, Moderate eye irritant.

Potential Health Effects

Routes of exposure
Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

Eye contact
Can cause eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes.

Skin contact
Can cause skin irritation. Prolonged or repeated contact may dry the skin. Symptoms may include redness, burning, and drying and cracking of skin, burns and other skin damage. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Ingestion
Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. This material can get into the lungs during swallowing or vomiting. This results in lung inflammation and other lung injury.

Inhalation

Breathing of vapor or mist is possible. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable (see Section 8.).

Aggravated Medical Condition

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material:, skin, lung (for example, asthma-like conditions)

Symptoms

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:, stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness)

Target Organs

Based on animal studies, exposure to methyl ethyl ketone (MEK) increases the onset of peripheral neuropathy caused by exposure to methyl butyl ketone (MBK), and/or n-hexane, and/or ethyl butylketone. MEK alone has not been shown to cause peripheral neuropathy., Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals:, mild, reversible liver effects, mild, reversible kidney effects

Carcinogenicity

Based on the available information, this material cannot be classified with regard to carcinogenicity., This material is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA).

Reproductive hazard.

This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

Other information

No data

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS-No.	Concentration
METHYL ETHYL KETONE	78-93-3	<=100%

4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin

Remove contaminated clothing. Flush exposed area with large amounts of water. If skin is damaged, seek immediate medical attention. If skin is not damaged and symptoms persist, seek medical attention. Launder clothing before reuse.

Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation

If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

Notes to physician

Hazards: This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity (See Section 2 - Swallowing) when deciding whether to induce vomiting.

Treatment: No information available.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

foam, water spray, carbon dioxide (CO2), dry chemical

Hazardous combustion products

May form:, carbon dioxide and carbon monoxide

Precautions for fire-fighting

Material is volatile and readily gives off vapors which may travel along the ground or be moved by ventilation and ignited by pilot lights, flames, sparks, heaters, smoking, electric motors, static discharge or other ignition sources at locations near the material handling point.Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

Flammability Class for Flammable Liquids

Flammable Liquid Class IBFlammable Liquid Class IB

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

For personal protection see section 8. Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source. Prevent from entering drains, sewers, streams or other bodies of water. Prevent from spreading. If runoff occurs, notify authorities as required. Pump or vacuum transfer spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent, soil and other materials to containers for disposal.

Environmental precautions

Prevent run-off to sewers, streams or other bodies of water. If run-off occurs, notify proper authorities as required, that a spill has occurred.

Methods for cleaning up

Absorb liquid on vermiculite, floor absorbent or other absorbent material.

7. HANDLING AND STORAGE

Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Static ignition hazard can result from handling and use. Electrically bond and ground all containers, personnel and equipment before transfer or use of material. Special precautions may be necessary to dissipate static electricity for non-conductive containers. Use proper bonding and grounding during product transfer as described in National Fire Protection Association document NFPA 77.

Storage

Store in a cool, dry, ventilated area, away from incompatible substances. Do not store near extreme heat, open flame, or sources of ignition.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

METHYL ETHYL KETONE		78-93-3
ACGIH	time weighted average	200 ppm
ACGIH	Short term exposure limit	300 ppm
NIOSH	Recommended exposure limit (REL):	200 ppm
NIOSH	Recommended exposure limit (REL):	590 mg/m3
NIOSH	Short term exposure limit	300 ppm
NIOSH	Short term exposure limit	885 mg/m3
OSHA Z1	Permissible exposure limit	200 ppm
OSHA Z1	Permissible exposure limit	590 mg/m3

General advice

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

Exposure controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

Eye protection

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.

Skin and body protection

Wear resistant gloves (consult your safety equipment supplier).
To prevent repeated or prolonged skin contact, wear impervious clothing and boots.

Respiratory protection

If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines), a NIOSH-approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH respirators (negative pressure type) under specified conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	liquid
Form	No data
Colour	Colorless
Odour	characteristic, pleasant, acetone-like
Boiling point/range	175.3 °F / 79.6 °C
Melting point/range	-123 °F / -86 °C
pH	No data
Flash point	16 °F / -9 °C Closed Cup
Evaporation rate	5.70 N-Butyl Acetate
Explosion limits	1.8 %(V) 10 %(V)
Vapour pressure	12.13212 kPa @ 77 °F / 25 °C
Vapour density	2.41
Density	0.806 g/cm3 @ 68.00 °F / 20.00 °C 6.71 lb/gal @ 68 °F / 20 °C
Solubility	partly soluble in water
Partition coefficient (n-octanol/water)	No data
Autoignition temperature	759 °F / 404 °C

10. STABILITY AND REACTIVITY

Stability

Stable.

Conditions to avoid

None known.

Incompatible products

Avoid contact with:, copper, copper alloys, strong alkalis, strong oxidizing agents

Hazardous decomposition products

May form:, carbon dioxide and carbon monoxide

Hazardous reactions

Product will not undergo hazardous polymerization.

Thermal decomposition

No data

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity

METHYL ETHYL KETONE	LD 50 Mouse: 670 mg/kg LD 50 Rat: 2,300 - 3,500 mg/kg

Acute inhalation toxicity

METHYL ETHYL KETONE	LC 50 Rat: 11,700 mg/l, 4 h

Acute dermal toxicity

METHYL ETHYL KETONE	LD 50 Rabbit: 5 g/kg

12. ECOLOGICAL INFORMATION

Aquatic toxicity

Acute and Prolonged Toxicity to Fish
No data

Acute Toxicity to Aquatic Invertebrates
No data

Environmental fate and pathways
No data

13. DISPOSAL CONSIDERATIONS

Waste disposal methods

Destroy by incineration in accordance with applicable regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-637-7922.

14. TRANSPORT INFORMATION

IMDG:
UN1193, METHYL ETHYL KETONE 3, II
IATA_P:
UN1193, Methyl ethyl ketone 3, II
IATA_C:
UN1193, Methyl ethyl ketone 3, II
CFR_ROAD:
UN1193, Methyl ethyl ketone 3, II
CFR_RAIL:
UN1193, Methyl ethyl ketone 3, II
CFR_INWTR:
UN1193, Methyl ethyl ketone 3, II
IMDG_INWTR:
UN1193, METHYL ETHYL KETONE 3, II
IMDG_ROAD:
UN1193, METHYL ETHYL KETONE 3, II
IMDG_RAIL:
UN1193, METHYL ETHYL KETONE 3, II

Dangerous goods descriptions may not reflect package size, quantity, end-use or region-specific exceptions that can be applied to shipments. Consult shipping documents for material-specific descriptions.

15. REGULATORY INFORMATION

California Prop. 65
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

Additional regulations
US. Toxic Substances Control Act (TSCA) Section 8(d) Health & Safety Data Reporting (40 CFR 716, Subpt B)
US. Toxic Substances Control Act (TSCA) Section 8(d) Health & Safety Data Reporting (40 CFR 716, Subpt B)
US. Toxic Substances Control Act (TSCA) Section 8(d) Health & Safety Data Reporting (40 CFR 716, Subpt B)
US. OSHA Hazard Communication Standard: On One of the Floor Lists of the OSHA HCS (29 CFR 1910.1200).
US. High Production Volume Chemicals

US. Toxic Substances Control Act (TSCA) Section 4 - Master Testing List

US. Drug Enforcement Administration (DEA) Listed Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2))
US. Drug Enforcement Administration (DEA) Listed Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2))
US. Drug Enforcement Administration (DEA) Listed Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2))
US. Drug Enforcement Administration (DEA) Listed Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2))
US. Drug Enforcement Administration (DEA) Listed Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2))
US. Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))
US. Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))
OECD. Program to investigate the potential hazards of high production volume further work.
OECD. Program to investigate the potential hazards of high production volume further work.

SARA 313 Component(s)

OSHA Hazards

Flammable Liquid
Toxic by inhalation
Moderate skin irritant
Moderate eye irritant

	Health	Flammability	Reactivity	Other
HMIS	1*	3	0	
NFPA	1	3	0	

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

This MSDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).

BL-034 Bond Liner Ingred.
Z-7,8,9S Z-12,13,14S

ACROS ORGANICS

Material Safety Data Sheet
Rhodamine B Base

MSDS# 37474

Section 1 - Chemical Product and Company Identification

MSDS Name:	Rhodamine B Base
Catalog Numbers:	AC215230000, AC215230250
Synonyms:	C.I. 45170.1; Solvent Red 49
Company Identification:	Acros Organics BVBA Janssen Pharmaceuticalaan 3a 2440 Geel, Belgium
Company Identification: (USA)	Acros Organics One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	800-ACROS-01
For information in Europe, call:	+32 14 57 52 11
Emergency Number, Europe:	+32 14 57 52 99
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300
CHEMTREC Phone Number, Europe:	703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#:	509-34-2
Chemical Name:	Rhodamine B base
%:	100
EINECS#:	208-096-8

Hazard Symbols: XN

Risk Phrases: 22 40

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Harmful if swallowed. Causes eye and skin irritation. Causes digestive and respiratory tract irritation. Target Organs: None.

Potential Health Effects

Eye:	May cause eye irritation.
Skin:	May cause skin irritation.
Ingestion:	Harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation:	May cause respiratory tract irritation.
Chronic:	No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation develops, get medical aid.

Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Autoignition Temperature: Not available

Flash Point: Not available

Explosion Limits: Lower: Not available

Explosion Limits: Upper: Not available

NFPA Rating: health: 2; flammability: 0; instability: 0;

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Use only in a chemical fume hood.

Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Rhodamine B base	none listed	none listed	none listed

OSHA Vacated PELs: Rhodamine B base: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Color: light purple
Odor: Not available
pH: Not available
Vapor Pressure: Not available
Vapor Density: 15.24
Evaporation Rate: Not available
Viscosity: Not available
Boiling Point: Not available
Freezing/Melting Point: Not available
Decomposition Temperature: Not available
Solubility in water: Not available
Specific Gravity/Density:
Molecular Formula: C28H30N2O3
Molecular Weight: 442.55

Section 10 - Stability and Reactivity

Chemical Stability:	Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid:	Incompatible materials, excess heat, strong oxidants.
Incompatibilities with Other Materials	Not available
Hazardous Decomposition Products	Nitrogen oxides, carbon monoxide, carbon dioxide.
Hazardous Polymerization	Has not been reported.

Section 11 - Toxicological Information

RTECS#:	CAS# 509-34-2: None listed
LD50/LC50:	RTECS: Not available. Other: Oral, rat:
Carcinogenicity:	Rhodamine B base - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Section 12 - Ecological Information

Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:
Canada TDG
Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN

Risk Phrases:

R 22 Harmful if swallowed.

R 40 Limited evidence of a carcinogenic effect.

Safety Phrases:

S 36/37 Wear suitable protective clothing and gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 509-34-2: 2

Canada

CAS# 509-34-2 is listed on Canada's DSL List

Canadian WHMIS Classifications: D1B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 509-34-2 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 509-34-2 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 5/11/1998

Revision #5 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

BL-034 Bond liner Ingred
Z-7,8,95 Z-12,13,145

Poly bd® R-45M
Safety Data Sheet

Section 1: Identification

1.1. Product identifier

Product form	: Substance
Substance name	: Poly bd® R-45M
Chemical name	: 1,3-Butadiene, homopolymer, hydroxy-terminated
CAS No	: 69102-90-5

1.2. Recommended use of the chemical and restrictions on use

No additional information available

1.3. Details of the supplier of the safety data sheet

Total Petrochemicals & Refining USA, Inc.
Cray Valley Division
P O Box 674411
Houston,TX 77267-4411

For non-emergency product information:
Phone: 713-483-5000 or 1-877-871-2709
Email: product.stewardship@total.com

1.4. Emergency telephone number

Emergency number	: CHEMTREC: 1-800-424-9300 (Toll Free USA & Canada) / 703-527-3887 (Multiple languages) Total Petrochemicals & Refining USA, Inc.: 1-800-322-3462 (Language: English only)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Not classified

2.2. Label elements

GHS-US labeling

Hazard statements (GHS-US)	: **This material has no classified hazards under 29 CFR 1910.1200.**
Precautionary statements (GHS-US)	: Precautionary statement not required.

2.3. Hazards not otherwise classified

Other hazards not contributing to the classification	: Contact with skin or eyes with hot material may cause serious thermal burns to skin or eyes. Vapors formed when material is processed at high temperatures may be irritating to the eyes and upper respiratory tract.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

Section 3: Composition/information on ingredients

3.1. Substance

Chemical name	: 1,3-Butadiene, homopolymer, hydroxy-terminated
CAS No	: 69102-90-5

3.2. Mixture

Not applicable

Section 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation	: Remove to fresh air and keep at rest in a position comfortable for breathing.

First-aid measures after skin contact	: Wash with plenty of soap and water. If irritation persists, consult a doctor. Heated Material: For serious burns from heated material, get medical attention. In case of skin contact, immediately immerse in or flush with clean, cold water.
First-aid measures after eye contact	: Rinse cautiously with water for several minutes. Obtain medical attention if pain, blinking, tears or redness persist.
First-aid measures after ingestion	: Rinse mouth out with water. If necessary seek medical advice.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Not expected to present a significant hazard under anticipated conditions of normal use.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide. Foam. Dry chemical.

5.2. Special hazards arising from the chemical

Fire hazard	: Heat from fire can generate flammable vapor. When mixed with air and exposed to ignition source, can burn in open air or explode if confined.
Explosion hazard	: May form flammable/explosive vapor-air mixture.
Hazardous decomposition products in case of fire	: Carbon oxides (CO, CO2). Toxic fumes. 1,3-butadiene. Other hydrocarbons.

5.3. Advice for firefighters

Firefighting instructions	: Fight fire from safe distance and protected location. Avoid direct personal contact with liquid even after fire is out to prevent potentially serious burns. Use water spray or fog for cooling exposed containers. Apply aqueous extinguishing media carefully to prevent frothing/steam explosion. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. Prevent fire-fighting water from entering environment.
Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Complete protective clothing. Self-contained breathing apparatus.
Other information	: Fires are typically very smoky.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Emergency procedures for non-emergency personnel	: Ensure adequate ventilation. Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures for emergency responders	: No additional requirement.

6.2. Methods and material for containment and cleaning up

For containment	: Take up liquid spill into absorbent material, e.g.: sand, earth, vermiculite. Keep recovered product for subsequent disposal.
Methods for cleaning up	: Wash away residue with large amounts of water. Gather the product and place it in a spare container that has been suitably labeled.

6.3. Reference to other sections

See section 8. Exposure controls and personal protection.

Section 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	: Ensure good ventilation of the work station. Wear personal protective equipment. Avoid contact with elevated temperature or molten product to prevent burns. Use only non-sparking tools. Steam drum heaters are recommended. If heating is necessary for drummed product, loosen or remove bung or lid before warming/heating product to avoid overpressurization in the drum. Eliminate all ignition sources if safe to do so.
Hygiene measures	: Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	: Electrical equipment should conform to the National Electric Code. Containers which are opened should be properly resealed and kept upright to prevent leakage.
Storage conditions	: Keep container tightly closed. Store in a dry, cool area.
Maximum storage period	: 2 year(s)
Storage temperature	: < 87 °C

Section 8: Exposure controls/personal protection

8.1. Occupational Exposure Limits

No additional information available

8.2. Exposure controls

Appropriate engineering controls	: Ensure good ventilation of the work station.
Hand protection	: Protective gloves.
Eye protection	: Safety glasses.
Skin and body protection	: Wear suitable protective clothing.
Respiratory protection	: In case of insufficient ventilation, wear suitable respiratory equipment.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Viscous.
Color	: Clear to light yellow.
Odor	: No data available
Odor threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: > 300 °C
Flash point	: > 205 °C Cleveland open cup (COC)
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: No data available
Relative vapor density at 20 °C	: No data available
Relative density	: 0.9
Solubility	: Water: practically insoluble
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: ~ 5000 mPa.s
Explosive limits	: No data available

9.2. Other information

No additional information available

Section 10: Stability and reactivity

10.1. Reactivity

No dangerous reactions known under normal conditions of use.

10.2. Chemical stability

Stable under use and storage conditions as recommended in section 7.

10.3. Possibility of hazardous reactions

Cracks into gaseous and liquid products above 426 °C. Decomposes by polymerization above 204 °C. Once initiated, the reaction generates enough heat to continue spontaneously.

10.4. Conditions to avoid

Heat. Direct sunlight. High temperature.

10.5. Incompatible materials

Strong oxidizing agents. Strong reducing agents. Strong acids. Free radical initiators/peroxides.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified
Based on available data, the classification criteria are not met

Poly bd® R-45M (69102-90-5)	
LD50 oral rat	> 34600 mg/kg

Skin corrosion/irritation : Not classified
Based on available data, the classification criteria are not met
Practically non-irritating
(rabbit)

Serious eye damage/irritation : Not classified
Based on available data, the classification criteria are not met
Slight eye irritant (rabbit)

Respiratory or skin sensitization : Not classified
Based on available data, the classification criteria are not met
Does not cause cutaneous sensitization for guinea-pigs

Germ cell mutagenicity : Not classified
Lack of data

Carcinogenicity : Not classified
Lack of data

Reproductive toxicity : Not classified
Lack of data

Specific target organ toxicity (single exposure) : Not classified
Lack of data

Specific target organ toxicity (repeated exposure) : Not classified
Lack of data

Aspiration hazard : Not classified
Lack of data

Other information : Likely route of exposure: ingestion, skin and eye.

Section 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

Section 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Transfer to a safe disposal area in accordance with federal, state, and local regulations.

Section 14: Transport information

Not a DOT controlled material

Additional information

Transport by sea (IMDG)

Not an IMDG controlled material

Air transport (IATA)

Not an IATA controlled material

Section 15: Regulatory information

15.1. US Federal regulations

Poly bd® R-45M
TSCA
All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

SARA 313
This product contains no chemicals in excess of the applicable de minimis concentration that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 (Table 372.65).

SARA Section 311/312 Hazard Classes	Not applicable
Export Control Statement:	This product and technical data related to this product are export controlled by the United States (US) Government. Exportation/international shipments of this product are subject to licensing by the US Government. Export, reexport or other diversion, either in the original form or after being incorporated in an intermediate process into other end-items, is STRICTLY PROHIBITED unless expressly authorized by the cognizant agency of the US Government. If you plan to export this material in some form, please contact Total Petrochemicals & Refining USA, Inc. for more information.
Export Control Classification Number (ECCN):	ITAR 5(e)

15.2. International regulations

CANADA

No additional information available

National inventories

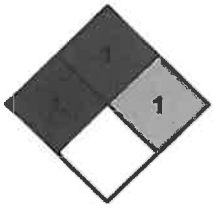
1,3-Butadiene, homopolymer, hydroxy-terminated (69102-90-5)
Listed on the AICS (the Australian Inventory of Chemical Substances)
Listed on the Canadian DSL (Domestic Substances List) inventory.
Listed on the China Inventory of Existing Chemical Substances (IECSC)
Listed on the Japanese ENCS (Existing & New Chemicals Substances) inventory.
Listed on the Korean ECL (Existing Chemical List) inventory.
Listed on New Zealand - Inventory of Chemicals (NZIoC)
Listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS)

15.3. US State regulations

California Proposition 65 - This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer and/or reproductive toxicity, not limited to any that may be listed below.

Section 16: Other information

NFPA health hazard	: 1
NFPA fire hazard	: 1
NFPA reactivity	: 1



HMIS III Rating

Health	: 1
Flammability	: 1
Physical Hazard	: 1
Personal Protection	: See section 8 of SDS

MSDS ID: POLY_BD_R45M

SDS Template - TOTAL SDS US (GHS HazCom 2012) TPRI Version 1.02

The information contained in this Safety Data Sheet (SDS) is believed by Total Petrochemicals & Refining USA, Inc. (TPRI) to be accurate on the date issued. However, materials may present unknown hazards and should be used with caution. Final determination of suitability and use of any material is the sole responsibility of the user. Neither TPRI nor any of its subsidiaries or affiliated companies assumes any liability whatsoever for the accuracy or completeness of the information contained herein or reliance thereto. If the material is repackaged, the user is responsible and must ensure that proper health, safety and other necessary information is included with the material and/or on the container. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING THE MATERIALS OR THE INFORMATION CONTAINED IN THIS SDS. ALTERATION OF THIS DOCUMENT IS STRICTLY PROHIBITED.

End Closure Adapter Bonding
Z-165

Safety Data Sheet

Revision Number: 003.1

Issue date: 10/09/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: LOCTITE EA 9396 AERO PART A QT known as EA 9396 PART A QT
IDH number: 937083
Product type: Adhesive for the Aerospace Industry
Item number: AA9280016
Restriction of Use: None identified
Region: United States

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

Contact Information:
Telephone: (860) 571-5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING: CAUSES SKIN IRRITATION.
MAY CAUSE AN ALLERGIC SKIN REACTION.
CAUSES SERIOUS EYE IRRITATION.
MAY CAUSE DROWSINESS OR DIZZINESS.

HAZARD CLASS	HAZARD CATEGORY
SKIN IRRITATION	2
EYE IRRITATION	2A
SKIN SENSITIZATION	1
SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE	3

PICTOGRAM(S)

Precautionary Statements

Prevention: Avoid breathing vapors, mist, or spray. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Wear eye and face protection. Wear protective gloves.

Response: IF ON SKIN: Wash with plenty of soap and water. IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to remove. Continue rinsing. Call a poison control center or physician if you feel unwell. If skin irritation or rash occurs: Get medical attention. If eye irritation persists: Get medical attention. Take off contaminated clothing.

Storage: Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal: Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Polyfunctional epoxy resin	Proprietary	30 - 60
Epoxy resin	Proprietary	30 - 60
Modified epoxy resin	Unknown	10 - 30

* Exact percentage is a trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If symptoms develop and persist, get medical attention.

Skin contact: Remove contaminated clothing and footwear. Wash with soap and water. If a person feels unwell or symptoms of skin irritation appear, consult a physician.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Check for and remove any contact lenses. Get medical attention.

Ingestion: Do not induce vomiting. Get medical attention.

Symptoms: See Section 11.

5. FIRE FIGHTING MEASURES

Extinguishing media: Water spray (fog), foam, dry chemical or carbon dioxide.

Special firefighting procedures: Wear protective equipment. Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.

Unusual fire or explosion hazards: May liberate large quantities of dense, foul-smelling smoke which may contain unidentified toxic gasses.

Hazardous combustion products: Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons. Oxides of nitrogen.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up. Do not allow product to enter sewer or waterways.

Clean-up methods: Absorb spill with inert material. Shovel material into appropriate container for disposal. Dispose of according to Federal, State and local governmental regulations.

7. HANDLING AND STORAGE

Handling: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid breathing vapors or mists of this product. Do not take internally.

Storage: Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Polyfunctional epoxy resin	None	None	None	None
Epoxy resin	None	None	None	None
Modified epoxy resin	None	None	None	None

Engineering controls: Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.

Respiratory protection: If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.

Eye/face protection: Safety goggles or safety glasses with side shields.

Skin protection: Wear impervious gloves for prolonged contact. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Paste
Color:	Blue
Odor:	Mild
Odor threshold:	Not available.
pH:	Neutral
Vapor pressure:	Nil
Boiling point/range:	Not determined
Melting point/ range:	Not determined
Specific gravity:	0.98
Vapor density:	> 1
Flash point:	> 93 °C (> 199.4 °F)
Flammable/Explosive limits - lower:	Not determined
Flammable/Explosive limits - upper:	Not determined
Autoignition temperature:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Not miscible or difficult to mix
Partition coefficient (n-octanol/water):	Not determined
VOC content:	< 10 g/l Estimated
Viscosity:	Not available.
Decomposition temperature:	Not available.

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions of storage and use.

Hazardous reactions: May occur.

Hazardous decomposition products: Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons. Oxides of nitrogen. Hydrocarbons.

Incompatible materials: This product may react with strong acids or oxidizing agents.

Reactivity: Not available.

Conditions to avoid: Keep away from heat, ignition sources and incompatible materials. Avoid mixing resin (Part A) and curing agent (Part B) unless you plan to use immediately. Failure to observe these precautions may result in excessive heat build-up causing an exotherm.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure: Skin, Inhalation, Eyes

Potential Health Effects/Symptoms

Inhalation: May cause respiratory tract irritation.
Skin contact: This product may cause irritation to the skin. May cause allergic skin reaction.
Eye contact: This product may cause irritation to the eyes.
Ingestion: Ingestion of this product may cause nausea, vomiting and diarrhea.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Polyfunctional epoxy resin	None	Allergen, Blood, Central nervous system, Gastrointestinal, Irritant, Kidney, Liver, Mutagen, Nervous System
Epoxy resin	None	Allergen, Irritant
Modified epoxy resin	None	No Data

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Polyfunctional epoxy resin	No	No	No
Epoxy resin	No	No	No
Modified epoxy resin	No	No	No

12. ECOLOGICAL INFORMATION

Ecological information: Toxic to aquatic organisms

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of according to Federal, State and local governmental regulations.

Hazardous waste number: Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)
Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Tetraglycidyl diaminodiphenylmethane, Bisphenol-A Epichlorhydrin resin)
Hazard class or division: 9
Identification number: UN 3082
Packing group: III

Water Transportation (IMO/IMDG)

Proper shipping name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Tetraglycidyl diaminodiphenylmethane, Bisphenol-A Epichlorhydrin resin)
Hazard class or division:	9
Identification number:	UN 3082
Packing group:	III
Marine pollutant:	Tetraglycidyl diaminodiphenylmethane, Bisphenol-A Epichlorhydrin resin

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification:	None above reporting de minimis
CERCLA/SARA Section 302 EHS:	None above reporting de minimis
CERCLA/SARA Section 311/312:	Immediate Health, Delayed Health
CERCLA/SARA Section 313:	None above reporting de minimis
California Proposition 65:	This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada Regulatory Information

CEPA DSL/NDSL Status:	One or more components are not listed on, and are not exempt from listing on either the Domestic Substances List or the Non-Domestic Substances List.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: New Material Safety Data Sheet format.

Prepared by: Mark Mau, Regulatory Affairs Specialist

Issue date: 10/09/2014

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End Closure Adapter Bonding
Z-165

Safety Data Sheet

Revision Number: 003.0

Issue date: 08/06/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: **LOCTITE EA 9396 AERO PART B 8OZ known as EA 9396 PART B 8OZ**
IDH number: 937084
Product type: Adhesive for the Aerospace Industry
Item number: AB9280014
Restriction of Use: None identified
Region: United States
Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067
Contact information:
Telephone: (860) 571-5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER: HARMFUL IN CONTACT WITH SKIN.
CAUSES SEVERE SKIN BURNS AND EYE DAMAGE.
MAY CAUSE AN ALLERGIC SKIN REACTION.

HAZARD CLASS	HAZARD CATEGORY
ACUTE TOXICITY DERMAL	4
SKIN CORROSION	1B
SERIOUS EYE DAMAGE	1
SKIN SENSITIZATION	1

PICTOGRAM(S)

Precautionary Statements

Prevention: Do not breathe vapors, mist, or spray. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves, eye protection, and face protection.

Response: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to remove. Continue rinsing. Immediately call a poison control center or physician. If skin irritation or rash occurs: Get medical attention. Wash contaminated clothing before reuse.

Storage: Store locked up.

Disposal: Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Tetraethylene pentamine	112-57-2	30 - 60
Substituted piperazine	Proprietary	30 - 60
Polyamine	Proprietary	5 - 10
Triethylenetetramine	112-24-3	1 - 5

* Exact percentage is a trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation: If inhaled, immediately remove the affected person to fresh air. If symptoms develop and persist, get medical attention. If breathing is difficult, give oxygen. If not breathing, give artificial respiration.

Skin contact: Remove contaminated clothing and footwear. Immediately wash skin thoroughly with soap and water. If symptoms develop and persist, get medical attention.

Eye contact: In case of contact with the eyes, rinse immediately with plenty of water for 15 minutes, and seek immediate medical attention.

Ingestion: Get immediate medical attention. Do not induce vomiting.

Symptoms: See Section 11.

Notes to physician: Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

Extinguishing media: Water spray (fog), foam, dry chemical or carbon dioxide.

Special firefighting procedures: Wear full protective clothing. Wear self-contained breathing apparatus.

Unusual fire or explosion hazards: Closed containers may rupture (due to build up of pressure) when exposed to extreme heat.

Hazardous combustion products: Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons. Oxides of nitrogen.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up. Do not allow product to enter sewer or waterways.

Clean-up methods: Absorb spill with inert material. Shovel material into appropriate container for disposal. Dispose of according to Federal, State and local governmental regulations.

7. HANDLING AND STORAGE

Handling: Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. For the Part A plus Part B adhesive mixture, follow curing schedule as recommended in product literature. Do not heat Part B at temperatures greater than 100 °C (212 °F). This material may self-react at higher temperatures and cause an exotherm. The exotherm has the potential for release of excessive energy and toxic gasses. Empty containers retain product residue, so obey hazard warnings and handle empty containers as if they were full. Do not cut, grind, weld, or drill on or near this container.

Storage: Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Tetraethylene pentamine	None	None	(SKIN) Aerosol. 1 ppm (5 mg/m3) TWA Aerosol. (Skin sensitizer)	None
Substituted piperazine	None	None	None	None
Polyamine	None	None	None	None
Triethylenetetramine	None	None	1 ppm (6 mg/m3) TWA (SKIN)	None

Engineering controls: Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.

Respiratory protection: If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.

Eye/face protection: Safety goggles or safety glasses with side shields.

Skin protection: Wear impervious gloves for prolonged contact. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Orange-red
Odor:	Ammoniacal
Odor threshold:	Not available.
pH:	Not applicable
Vapor pressure:	< 0.1 mm hg (20 °C (68°F))
Boiling point/range:	340 °C (644°F)
Melting point/ range:	Not determined
Specific gravity:	1.0
Vapor density:	8.6
Flash point:	> 93 °C (> 199.4 °F) ; Estimated
Flammable/Explosive limits - lower:	Not determined
Flammable/Explosive limits - upper:	Not determined
Autoignition temperature:	Not determined
Evaporation rate:	Not determined
Solubility in water:	fully soluble
Partition coefficient (n-octanol/water):	Not determined
VOC content:	< 10 g/l per SCAQMD Rule 1124 [EPA Test Method 24/304-91] (estimated)

Viscosity: Not available.
Decomposition temperature: Not available.

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.

Hazardous reactions: May occur.

Hazardous decomposition products: Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons. Oxides of nitrogen.

Incompatible materials: Keep away from strong oxidizing agents, strong Lewis or mineral acids.

Reactivity: Not available.

Conditions to avoid: Avoid mixing resin (Part A) and curing agent (Part B) unless you plan to use immediately. Do not heat mixed adhesive unless curing surfaces to be bonded. Failure to observe these precautions may result in excessive heat build-up causing an exotherm.

11. TOXICOLOGICAL INFORMATION

Product toxicity data: Henkel is not aware of any toxicity data on the specific mixture of chemical components contained in this product.

Relevant routes of exposure: Skin, Inhalation, Eyes, Ingestion

Potential Health Effects/Symptoms

Inhalation: Mists, vapors or liquid may cause severe irritation or burns.
Skin contact: This product is severely irritating to the skin and may cause burns. May cause allergic skin reaction. May be harmful if absorbed through skin.
Eye contact: This product is severely irritating to the eyes and may cause irreversible damage including burns and blindness. May cause corneal injury.
Ingestion: May cause burns of mouth and throat if swallowed.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Tetraethylene pentamine	Oral LD50 (RAT) = 3.99 g/kg Oral LD50 (RAT) = 2.1 g/kg Dermal LD50 (RABBIT) = 0.66 g/kg	Irritant, Mutagen, Allergen
Substituted piperazine	None	No Records
Polyamine	None	Irritant, Allergen
Triethylenetetramine	None	Allergen, Corrosive, Developmental, Irritant, Mutagen

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Tetraethylene pentamine	No	No	No
Substituted piperazine	No	No	No
Polyamine	No	No	No
Triethylenetetramine	No	No	No

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal:	Dispose of according to Federal, State and local governmental regulations.
Hazardous waste number:	Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name:	Amines, liquid, corrosive, n.o.**s.** (Tetraethylene pentamine, Substituted piperazine)
Hazard class or division:	8
Identification number:	UN 2735
Packing group:	III

International Air Transportation (ICAO/IATA)

Proper shipping name:	Amines, liquid, corrosive, n.o.**s.** (Tetraethylene pentamine, Substituted piperazine)
Hazard class or division:	8
Identification number:	UN 2735
Packing group:	III

Water Transportation (IMO/IMDG)

Proper shipping name:	AMINES, LIQUID, CORROSIVE, N.O.S. (Tetraethylene pentamine, Substituted piperazine)
Hazard class or division:	8
Identification number:	UN 2735
Packing group:	III
Marine pollutant:	Tetraethylene pentamine

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification:	None above reporting de minimis
CERCLA/SARA Section 302 EHS:	None above reporting de minimis
CERCLA/SARA Section 311/312:	Immediate Health, Delayed Health
CERCLA/SARA Section 313:	None above reporting de minimis
California Proposition 65:	No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDSL Status:	All components are listed on or are exempt from listing on the Canadian Domestic Substances List.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: This Material Safety Data Sheet contains changes from the previous version in Section(s): 1,2,6,10

Prepared by:	Mark Mau, Regulatory Affairs Specialist
Issue date:	08/06/2014

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End Closure Adapter Bonding
Z-165

Safety Data Sheet

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SECTION 1: Identification

1.1. Product identifier
3M™ Scotch-Weld™ Epoxy Adhesive EC-2216, Gray, Part A

Product Identification Numbers
62-2217-8540-5

1.2. Recommended use and restrictions on use

Recommended use
part A of 2 part adhesive

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Aerospace Aircraft Maintenance Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number
1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification
Serious Eye Damage/Irritation: Category 1.
Skin Corrosion/Irritation: Category 2.
Skin Sensitizer: Category 1A.
Reproductive Toxicity: Category 1B.

2.2. Label elements
Signal word
Danger

Symbols
Corrosion | Exclamation mark | Health Hazard |

Pictograms

Hazard Statements
Causes serious eye damage.
Causes skin irritation.
May cause an allergic skin reaction.
May damage fertility or the unborn child.

Precautionary Statements

Prevention:
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing dust/fume/gas/mist/vapors/spray.
Wear protective gloves and eye/face protection.
Wash thoroughly after handling.
Contaminated work clothing must not be allowed out of the workplace.

Response:
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF ON SKIN: Wash with plenty of soap and water.
Immediately call a POISON CENTER or doctor/physician.
If skin irritation or rash occurs: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
IF exposed or concerned: Get medical advice/attention.

Storage:
Store locked up.

Disposal:
Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

Notes to Physician
Not applicable

2.3. Hazards not otherwise classified
None.

61% of the mixture consists of ingredients of unknown acute oral toxicity.
61% of the mixture consists of ingredients of unknown acute dermal toxicity.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
ALIPHATIC POLYMER DIAMINE	68911-25-1	40 - 70 Trade Secret *
KAOLIN	1332-58-7	30 - 60
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	4246-51-9	7 - 13 Trade Secret *
TOLUENE	108-88-3	< 0.75 Trade Secret *

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact:
Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

Eye Contact:
Immediately flush with large amounts of water for at least 15 minutes. Remove contact lenses if easy to do. Continue rinsing. Immediately get medical attention.

If Swallowed:
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required
Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media
In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.

5.2. Special hazards arising from the substance or mixture
None inherent in this product.

Hazardous Decomposition or By-Products

Substance	Condition
Amine Compounds	During Combustion
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Oxides of Nitrogen	During Combustion
Toxic Vapor, Gas, Particulate	During Combustion

5.3. Special protective actions for fire-fighters
No unusual fire or explosion hazards are anticipated.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions
Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up
Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid skin contact with hot material. Avoid breathing of dust created by cutting, sanding, grinding or machining. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.) Use personal protective equipment (gloves, respirators, etc.) as required.

7.2. Conditions for safe storage including any incompatibilities
Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
TOLUENE	108-88-3	Amer Conf of Gov. Indust. Hyg.	TWA:20 ppm	
TOLUENE	108-88-3	Chemical Manufacturer Rec Guid	STEL:75 ppm	Skin Notation
TOLUENE	108-88-3	US Dept of Labor - OSHA	TWA:200 ppm;CEIL:300 ppm	
KAOLIN	1332-58-7	Amer Conf of Gov. Indust. Hyg.	TWA(respirable fraction):2 mg/m3	

Amer Conf of Gov. Indust. Hyg. : American Conference of Governmental Industrial Hygienists
American Indust. Hygiene Assoc : American Industrial Hygiene Association
Chemical Manufacturer Rec Guid : Chemical Manufacturer's Recommended Guidelines
US Dept of Labor - OSHA : United States Department of Labor - Occupational Safety and Health Administration
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls
Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure

Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Full Face Shield
Indirect Vented Goggles

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing.
Gloves made from the following material(s) are recommended: Nitrile Rubber
Polymer laminate

Select and use body protection to prevent contact based on the results of an exposure assessment. The following protective clothing material(s) are recommended: Boot covers - Disposable
Apron – Nitrile
Apron - polymer laminate

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
Half facepiece or full facepiece air-purifying respirator suitable for organic vapors and particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

Thermal hazards
Wear heat insulating gloves when handling hot material to prevent thermal burns.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form:	Liquid
Odor, Color, Grade:	Gray; pungent odor.
Odor threshold	*No Data Available*
pH	*No Data Available*
Melting point	*Not Applicable*
Boiling Point	>=306 °F
Evaporation rate	*No Data Available*
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
Vapor Pressure	<=27 psia [@ 131 °F]
Vapor Density	*No Data Available*
Specific Gravity	1.26 [*Ref Std:* WATER=1]
Solubility in Water	Nil
Solubility- non-water	*No Data Available*

Partition coefficient: n-octanol/ water	*No Data Available*
Autoignition temperature	*No Data Available*
Decomposition temperature	*No Data Available*
Viscosity	40,000 - 80,000 centipoise
Volatile Organic Compounds	Approximately 43 g/l [*Test Method:* tested per EPA method 24A]
VOC Less H2O & Exempt Solvents	Approximately 32 g/l [*Test Method:* tested per EPA method 24A]

SECTION 10: Stability and reactivity

10.1. Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4. Conditions to avoid
Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature reaction (exothem) with production of intense heat and smoke.

10.5. Incompatible materials
Strong oxidizing agents

10.6. Hazardous decomposition products

Substance	Condition
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:
Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Skin Contact:

Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, dryness, cracking, blistering, and pain.
Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Eye Contact:
Corrosive (Eye Burns): Signs/symptoms may include cloudy appearance of the cornea, chemical burns, severe pain, tearing, ulcerations, significantly impaired vision or complete loss of vision.

Ingestion:
Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Reproductive/Developmental Toxicity:
Contains a chemical or chemicals which can cause birth defects or other reproductive harm.

Additional Information:
Persons previously sensitized to amines may develop a cross-sensitization reaction to certain other amines.

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE > 5,000 mg/kg
Overall product	Ingestion		No data available; calculated ATE > 5,000 mg/kg
ALIPHATIC POLYMER DIAMINE			Data not available or insufficient for classification
KAOLIN	Dermal		LD50 estimated to be > 5,000 mg/kg
KAOLIN	Ingestion	Human	LD50 > 15,000 mg/kg
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	Dermal	Rabbit	LD50 2,500 mg/kg
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	Ingestion	Rat	LD50 3,160 mg/kg
TOLUENE	Dermal	Rat	LD50 12,000 mg/kg
TOLUENE	Inhalation-Vapor (4 hours)	Rat	LC50 30 mg/l
TOLUENE	Ingestion	Rat	LD50 2,600 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
ALIPHATIC POLYMER DIAMINE	Rabbit	Irritant
KAOLIN		No significant irritation
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	Rabbit	Corrosive
TOLUENE	Rabbit	Irritant

Serious Eye Damage/Irritation

Name	Species	Value
ALIPHATIC POLYMER DIAMINE	similar health hazards	Corrosive
KAOLIN		No significant irritation
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	similar health hazards	Corrosive
TOLUENE	Rabbit	Moderate irritant

Skin Sensitization

Name	Species	Value
ALIPHATIC POLYMER DIAMINE	Guinea pig	Sensitizing
KAOLIN		Data not available or insufficient for classification
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL		Data not available or insufficient for classification
TOLUENE	Guinea	Not sensitizing

	pig	

Respiratory Sensitization

Name	Species	Value
ALIPHATIC POLYMER DIAMINE		Data not available or insufficient for classification
KAOLIN		Data not available or insufficient for classification
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL		Data not available or insufficient for classification
TOLUENE		Data not available or insufficient for classification

Germ Cell Mutagenicity

Name	Route	Value
ALIPHATIC POLYMER DIAMINE		Data not available or insufficient for classification
KAOLIN		Data not available or insufficient for classification
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL		Data not available or insufficient for classification
TOLUENE	In Vitro	Not mutagenic
TOLUENE	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
ALIPHATIC POLYMER DIAMINE			Data not available or insufficient for classification
KAOLIN	Inhalation	Multiple animal species	Not carcinogenic
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL			Data not available or insufficient for classification
TOLUENE	Dermal	Mouse	Some positive data exist, but the data are not sufficient for classification
TOLUENE	Ingestion	Rat	Some positive data exist, but the data are not sufficient for classification
TOLUENE	Inhalation	Mouse	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
ALIPHATIC POLYMER DIAMINE		Data not available or insufficient for classification			
KAOLIN		Data not available or insufficient for classification			
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL		Data not available or insufficient for classification			
TOLUENE	Inhalation	Some positive female reproductive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
TOLUENE	Inhalation	Some positive male reproductive data exist, but the data are not sufficient for classification	Rat	NOAEL 2.3 mg/l	1 generation
TOLUENE	Ingestion	Toxic to development	Rat	LOAEL 520 mg/kg/day	during gestation
TOLUENE	Inhalation	Toxic to development	Human	NOAEL Not available	poisoning and/or abuse

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
ALIPHATIC POLYMER DIAMINE			Data not available or insufficient for classification			
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	
TOLUENE	Inhalation	central nervous	May cause drowsiness or	Human	NOAEL Not	

		system depression	dizziness		available	
TOLUENE	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	
TOLUENE	Inhalation	immune system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 0.004 mg/l	3 hours
TOLUENE	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	poisoning and/or abuse

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
ALIPHATIC POLYMER DIAMINE			Data not available or insufficient for classification			
KAOLIN	Inhalation	pneumoconiosis	Causes damage to organs through prolonged or repeated exposure	Human	NOAEL NA	occupational exposure
KAOLIN	Inhalation	pulmonary fibrosis	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL			Data not available or insufficient for classification			
TOLUENE	Inhalation	auditory system | nervous system | eyes | olfactory system	Causes damage to organs through prolonged or repeated exposure	Human	NOAEL Not available	poisoning and/or abuse
TOLUENE	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 2.3 mg/l	15 months
TOLUENE	Inhalation	heart | liver | kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 11.3 mg/l	15 weeks
TOLUENE	Inhalation	endocrine system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1.1 mg/l	4 weeks
TOLUENE	Inhalation	immune system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL Not available	20 days
TOLUENE	Inhalation	bone, teeth, nails, and/or hair	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 1.1 mg/l	8 weeks
TOLUENE	Inhalation	hematopoietic system | vascular system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
TOLUENE	Ingestion	nervous system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 625 mg/kg/day	13 weeks
TOLUENE	Ingestion	heart	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 2,500 mg/kg/day	13 weeks
TOLUENE	Ingestion	liver | kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Multiple animal species	NOAEL 2,500 mg/kg/day	13 weeks
TOLUENE	Ingestion	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 600 mg/kg/day	14 days
TOLUENE	Ingestion	endocrine system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 105 mg/kg/day	28 days
TOLUENE	Ingestion	immune system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 105 mg/kg/day	4 weeks

Aspiration Hazard

Name	Value

ALIPHATIC POLYMER DIAMINE	Not an aspiration hazard
KAOLIN	Not an aspiration hazard
BIS(3-AMINOPROPYL) ETHER OF DIETHYLENE GLYCOL	Not an aspiration hazard
TOLUENE	Aspiration hazard

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

Ecotoxicological information

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations

13.1. Disposal methods
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of completely cured (or polymerized) material in a permitted industrial waste facility. As a disposal alternative, incinerate uncured product in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

EPA Hazardous Waste Number (RCRA): D018 (Benzene)

SECTION 14: Transport Information

Not regulated per U.S. DOT, IATA or IMO.

These transportation classifications are provided as a customer service. ***As the shipper YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging.*** *3M transportation classifications are based on product formulation, packaging, 3M policies and 3M understanding of applicable current regulations. 3M does not guarantee the accuracy of this classification information. This information applies only to transportation classification and* ***not*** ***the packaging, labeling, or marking requirements.*** *The original 3M package is certified for U.S. ground shipment only. If you are shipping by air or ocean, the package may not meet applicable regulatory requirements.*

SECTION 15: Regulatory information

15.1. US Federal Regulations
Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - Yes Delayed Hazard - Yes

15.2. State Regulations
Contact 3M for more information.

California Proposition 65

Ingredient	C.A.S. No.	Classification
TOLUENE	108-88-3	Female reproductive toxin
TOLUENE	108-88-3	Developmental Toxin

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

15.3. Chemical Inventories
The components of this product are in compliance with the chemical notification requirements of TSCA.

Contact 3M for more information.

15.4. International Regulations
Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification
Health: 3 **Flammability:** 1 **Instability:** 1 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Document Group:	10-9143-8	**Version Number:**	33.00
Issue Date:	01/16/14	**Supercedes Date:**	01/18/12

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3M USA SDSs are available at www.3M.com

End Closure Adapter Bonding
2-165

3M

Safety Data Sheet

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Document Group:	10-9142-0	**Version Number:**	30.01
Issue Date:	05/14/15	**Supercedes Date:**	01/16/14

SECTION 1: Identification

1.1. Product identifier
3M™ Scotch-Weld™ Epoxy Adhesive EC-2216 B/A Gray, Part B

Product Identification Numbers
62-2216-8540-7

1.2. Recommended use and restrictions on use

Recommended use
Part B of 2-part adhesive

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Aerospace and Commercial Transportation Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number
1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification
Serious Eye Damage/Irritation: Category 2B.
Skin Sensitizer: Category 1.

2.2. Label elements
Signal word
Warning

Symbols
Exclamation mark |

Pictograms

Hazard Statements
Causes eye irritation.
May cause an allergic skin reaction.

Precautionary Statements

Prevention:
Avoid breathing dust/fume/gas/mist/vapors/spray.
Wear protective gloves.
Wash thoroughly after handling.
Contaminated work clothing must not be allowed out of the workplace.

Response:
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF ON SKIN: Wash with plenty of soap and water.
If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.

Disposal:
Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

2.3. Hazards not otherwise classified
None.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
EPOXY RESIN	25068-38-6	50 - 80 Trade Secret *
KAOLIN	1332-58-7	20 - 30 Trade Secret *
TITANIUM DIOXIDE	13463-67-7	0.1 - 0.6 Trade Secret *

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact:
Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

Eye Contact:

Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If Swallowed:
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required
Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media
In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.

5.2. Special hazards arising from the substance or mixture
None inherent in this product.

Hazardous Decomposition or By-Products

Substance	Condition
Aldehydes	During Combustion
Hydrocarbons	During Combustion
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Ketones	During Combustion
Toxic Vapor, Gas, Particulate	During Combustion

5.3. Special protective actions for fire-fighters
No special protective actions for fire-fighters are anticipated.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions
Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up
Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid skin contact with hot material. Avoid breathing of dust created by cutting, sanding, grinding or machining. Avoid breathing dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Wash contaminated clothing before reuse. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.)

7.2. Conditions for safe storage including any incompatibilities
Store away from acids. Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits
If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
KAOLIN	1332-58-7	ACGIH	TWA(respirable fraction):2 mg/m3	A4: Not class. as human carcin
KAOLIN, TOTAL DUST	1332-58-7	OSHA	TWA(as total dust):15 mg/m3;TWA(respirable fraction):5 mg/m3	
TITANIUM DIOXIDE	13463-67-7	ACGIH	TWA:10 mg/m3	A4: Not class. as human carcin
TITANIUM DIOXIDE	13463-67-7	CMRG	TWA(as respirable dust):5 mg/m3	
TITANIUM DIOXIDE	13463-67-7	OSHA	TWA(as total dust):15 mg/m3	

ACGIH : American Conference of Governmental Industrial Hygienists
AIHA : American Industrial Hygiene Association
CMRG : Chemical Manufacturer's Recommended Guidelines
OSHA : United States Department of Labor - Occupational Safety and Health Administration
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls
Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment. Provide appropriate local exhaust when product is heated. Provide appropriate local exhaust ventilation for cutting, grinding, sanding or machining.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Full Face Shield
Indirect Vented Goggles

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the

substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity.
Gloves made from the following material(s) are recommended: Polymer laminate

If this product is used in a manner that presents a higher potential for exposure (eg. spraying, high splash potential etc.), then use of protective coveralls may be necessary. Select and use body protection to prevent contact based on the results of an exposure assessment. The following protective clothing material(s) are recommended: Apron - polymer laminate

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
Half facepiece or full facepiece air-purifying respirator suitable for organic vapors and particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

Thermal hazards
Wear heat insulating gloves when handling hot material to prevent thermal burns.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form:	Liquid
Odor, Color, Grade:	Off-white; very slight epoxy odor.
Odor threshold	*No Data Available*
pH	*Not Applicable*
Melting point	*No Data Available*
Boiling Point	>=500 °F
Flash Point	>=480 °F [*Test Method:* Closed Cup]
Evaporation rate	*Not Applicable*
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
Vapor Pressure	<=27 psia [@ 131 °F]
Vapor Density	*No Data Available*
Specific Gravity	1.33 [*Ref Std:* WATER=1]
Solubility in Water	Nil
Solubility- non-water	*No Data Available*
Partition coefficient: n-octanol/ water	*No Data Available*
Autoignition temperature	*No Data Available*
Decomposition temperature	*No Data Available*
Viscosity	75,000 - 150,000 centipoise
Volatile Organic Compounds	0.8 g/l [*Test Method:* tested per EPA method 24A]
Percent volatile	0.06 % weight [*Test Method:* Tested per ASTM protocol]
VOC Less H2O & Exempt Solvents	0.8 g/l [*Test Method:* tested per EPA method 24A]

SECTION 10: Stability and reactivity

10.1. Reactivity
This material is considered to be non reactive under normal use conditions.

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4. Conditions to avoid
Heat is generated during cure. Do not cure a mass larger than 50 grams in a confined space to prevent a premature exothermic reaction with production of intense heat and smoke.

10.5. Incompatible materials
Strong acids
Strong oxidizing agents

10.6. Hazardous decomposition products

Substance	Condition
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:
Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Skin Contact:
Mild Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, and dryness. Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Eye Contact:
Moderate Eye Irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Ingestion:
Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Carcinogenicity:

Ingredient	CAS No.	Class Description	Regulation
TITANIUM DIOXIDE	13463-67-7	Grp. 2B: Possible human carc.	International Agency for Research on Cancer

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or

the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Ingestion		No data available; calculated ATE > 5,000 mg/kg
EPOXY RESIN	Dermal	Rat	LD50 > 1,600 mg/kg
EPOXY RESIN	Ingestion	Rat	LD50 > 1,000 mg/kg
KAOLIN	Dermal		LD50 estimated to be > 5,000 mg/kg
KAOLIN	Ingestion	Human	LD50 > 15,000 mg/kg
TITANIUM DIOXIDE	Dermal	Rabbit	LD50 > 10,000 mg/kg
TITANIUM DIOXIDE	Inhalation-Dust/Mist (4 hours)	Rat	LC50 > 6.82 mg/l
TITANIUM DIOXIDE	Ingestion	Rat	LD50 > 10,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
EPOXY RESIN	Rabbit	Mild irritant
KAOLIN	Professional judgement	No significant irritation
TITANIUM DIOXIDE	Rabbit	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
EPOXY RESIN	Rabbit	Moderate irritant
KAOLIN	Professional judgement	No significant irritation
TITANIUM DIOXIDE	Rabbit	No significant irritation

Skin Sensitization

Name	Species	Value
EPOXY RESIN	Human and animal	Sensitizing
TITANIUM DIOXIDE	Human and animal	Not sensitizing

Respiratory Sensitization

Name	Species	Value
EPOXY RESIN	Human	Some positive data exist, but the data are not sufficient for classification

Germ Cell Mutagenicity

Name	Route	Value
EPOXY RESIN	In vivo	Not mutagenic
EPOXY RESIN	In Vitro	Some positive data exist, but the data are not sufficient for classification
TITANIUM DIOXIDE	In Vitro	Not mutagenic
TITANIUM DIOXIDE	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
EPOXY RESIN	Dermal	Mouse	Some positive data exist, but the data are not sufficient for classification

KAOLIN	Inhalation	Multiple animal species	Not carcinogenic
TITANIUM DIOXIDE	Ingestion	Multiple animal species	Not carcinogenic
TITANIUM DIOXIDE	Inhalation	Rat	Carcinogenic

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
EPOXY RESIN	Ingestion	Not toxic to female reproduction	Rat	NOAEL 750 mg/kg/day	2 generation
EPOXY RESIN	Ingestion	Not toxic to male reproduction	Rat	NOAEL 750 mg/kg/day	2 generation
EPOXY RESIN	Dermal	Not toxic to development	Rabbit	NOAEL 300 mg/kg/day	during organogenesis
EPOXY RESIN	Ingestion	Not toxic to development	Rat	NOAEL 750 mg/kg/day	2 generation

Target Organ(s)

Specific Target Organ Toxicity - single exposure
For the component/components, either no data are currently available or the data are not sufficient for classification.

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
EPOXY RESIN	Dermal	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	2 years
EPOXY RESIN	Dermal	nervous system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	13 weeks
EPOXY RESIN	Ingestion	auditory system | heart | endocrine system | hematopoietic system | liver | eyes | kidney and/or bladder	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
KAOLIN	Inhalation	pneumoconiosis	Causes damage to organs through prolonged or repeated exposure	Human	NOAEL NA	occupational exposure
KAOLIN	Inhalation	pulmonary fibrosis	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	
TITANIUM DIOXIDE	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 0,010 mg/l	2 years
TITANIUM DIOXIDE	Inhalation	pulmonary fibrosis	All data are negative	Human	NOAEL Not available	occupational exposure

Aspiration Hazard
For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

Ecotoxicological information

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations

13.1. Disposal methods
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of completely cured (or polymerized) material in a permitted industrial waste facility. As a disposal alternative, incinerate uncured product in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. If no other disposal options are available, waste product that has been completely cured or polymerized may be placed in a landfill properly designed for industrial waste. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14: Transport Information

Not regulated per U.S. DOT, IATA or IMO.

*These transportation classifications are provided as a customer service. **As the shipper YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging.** 3M transportation classifications are based on product formulation, packaging, 3M policies and 3M understanding of applicable current regulations. 3M does not guarantee the accuracy of this classification information. This information applies only to transportation classification and **not the packaging, labeling, or marking requirements.** The original 3M package is certified for U.S. ground shipment only. If you are shipping by air or ocean, the package may not meet applicable regulatory requirements.*

SECTION 15: Regulatory information

15.1. US Federal Regulations
Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - Yes Delayed Hazard - No

15.2. State Regulations
Contact 3M for more information.

15.3. Chemical Inventories
The components of this product are in compliance with the chemical notification requirements of TSCA.

Contact 3M for more information.

15.4. International Regulations
Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification
Health: 2 **Flammability:** 1 **Instability:** 1 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Document Group:	10-9142-0	**Version Number:**	30.01
Issue Date:	05/14/15	**Supercedes Date:**	01/16/14

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NEW CHEMICAL OR MATERIAL AUTHORIZATION FORM
Form n°

ZODIAC AEROSPACE

Requestor

PRODUCT DESCRIPTION

Product identification
(You must provide the Safety Data Sheet (SDS) for chemicals and Technical Data Sheets (TDS) for Materials)

Commercial name: 3M Scotch Weld Epoxy Adhesive EC-2216, Gray Part B
Manufacturer: 3M
Supplier (if different from the manufacturer) :
Revision date of the SDS:
Import constraints: ☐ *If yes specify:*
Type of chemical or material: Epoxy Adhesive
Example: glue, varnish, surface treatment, solvent, alloy, plastic...

Product testing ☐ Customer requirement ☑ Production ☑ Facility maintenance & repair ☐
Substitution plan ☐ Name of potentially substituted product (in case of test for product substitution):

Use
Area of use: Lav Door work area
Process:
Estimation of the quantity used per month (lbs): 2 Qt
Maximum quantity stored (lbs): 4 QT
Storage area: Flam Cabinet

Tests
Area of tests:
Description:
Quantity estimated:
Storage area:
Duration of the tests:

Planned transfer on another site ☐ Future location of use *(if concerned)* :

Name: Candice Clement	Department, Function: Buyer	Date: 5/11/16	Visa:

Safety-Environment

AUTHORIZATION

☐ *Case 1 : Refused*

Chemical or material with a substance of the lists below (regardless of the concentration or the percentage of presence):

Criteria		CAS number and/or substance(s) name(s):
Annex XIV of REACH	☐	
Recommendation for Annex XIV inclusion	☐	
Candidate List of REACH	☐	
Annex XVII of REACH if the restriction concerns the BU	☐	
CMR - Category 1A or 1B	☐	
Registry of intention Candidate List of REACH	☐	
Forbidden by the local, state or federal regulations	☐	

☑ *Case 2: Authorized, No data available to date to prohibit or discourage the use of the chemical or material following the documents available*

☐ *Case 3 : Authorized with restrictions*

Chemical or material with a substance of the lists below (regardless of the concentration or the percentage of presence):

Criteria		CAS number and/or substance(s) name(s):
CMR - Category 2	☐	
Restricted by the local, state or federal regulations	☐	
CORAP list	☐	

Chemical or material labelled GHS09 = "hazardous for the environment" ☐
CAS number and/or substance(s) name(s):
To be included in the substitution plan ☐
Material used in an Electrical and Electronic Equipment and non compliant with RoHS ☐
The use of the chemical will have a major negative impact on the Workplace Risk Assessment (WRI becomes significant) ☐

STORAGE/HANDLING CONDITIONS

Modifications needed to the area of use (ventilation, floor coverings, flammable storage cabinets, temperature control...) • *For reminder: engineering controls are required prior to Personal Protective Equipment*

Handling requirements: ☐

Modifications needed to the storage area (secondary containment, spill kit, flammable storage cabinets, warning signs, temperature control, ventilation controls, compatibility rules between chemicals, maximum storage allowed...):

Specific waste management controls needed (containers, handling procedures, waste characterization, profiling...) :

Comments / General Information: Neoprene or rubber gloves; splash goggles; Apron

Name: Curtis Johnson	Department, Function: H&SE Manager	Date: 5/11/2016	Visa:

☑ In case of transfert — Name of the EHS leader (of the receiving site in case of transfer): Same as above

Distributed to:

Exception granted by the VP (or equivalent) of the BU:

The chapter "storage/handling conditions" must be completed

Authorized: ☐ Refused : ☐
Comments :

Name:	Function:	Date:	Visa:

Comp. Winding

SAFETY DATA SHEET

HUNTSMAN
Enriching lives through innovation

ARALDITE® CY 179 US

Section 1. Identification

GHS product identifier	:	**ARALDITE® CY 179 US**
Product code	:	00054392
Other means of identification	:	Not available.
Product type	:	Liquid.
Material uses	:	Component used for the manufacture of electrical insulation parts
Supplier's details	:	Huntsman Advanced Materials Americas LLC P.O. Box 4980 The Woodlands, TX 77387 Non-Emergency phone: (800) 257-5547
e-mail address of person responsible for this SDS	:	MSDS@huntsman.com
Emergency telephone number (24h/7day)	:	Chemtrec: (800) 424-9300 or (703) 527-3887

Section 2. Hazards identification

OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	:	SKIN SENSITIZATION - Category 1 AQUATIC HAZARD (ACUTE) - Category 3

GHS label elements

Hazard pictograms :

Signal word	:	Warning
Hazard statements	:	May cause an allergic skin reaction. Harmful to aquatic life.
Precautionary statements	:	Wear protective gloves: > 8 hours (breakthrough time): Ethyl Vinyl Alcohol Laminate (EVAL), butyl rubber. Avoid release to the environment. Avoid breathing vapor. Contaminated work clothing should not be allowed out of the workplace. IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. Dispose of contents and container in accordance with all local, regional, national and international regulations.
Other hazards which do not result in classification	:	None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
epoxy carboxylate	60 - 100	2386-87-0

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : May cause an allergic skin reaction.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Section 4. First aid measures

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : No specific treatment. Treat symptomatically. Call medical doctor or poison control center immediately if large quantities have been ingested.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Flash point : Closed cup: >150°C (>302°F) [DIN 51758 EN 22719 (Pensky-Martens Closed Cup)]

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
Carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Section 6. Accidental release measures

Methods and materials for containment and cleaning up : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Avoid release to the environment. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store between the following temperatures: 2 to 40°C (35.6 to 104°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

Eye/face protection	:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
Hand protection	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): Ethyl Vinyl Alcohol Laminate (EVAL), butyl rubber
Body protection	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Thermal hazards	:	Not available.

Section 9. Physical and chemical properties

Appearance

Physical state	:	Liquid.		
Color	:	Colorless.		
Odor	:	Slight		
Odor threshold	:	Not available.		
pH	:	7 [Conc. (% w/w): 50%]		
Melting point/Freezing point	:	Not available.		
Boiling/condensation point	:	>170°C (>338°F)		
Flash point	:	Closed cup: >150°C (>302°F) [DIN 51758 EN 22719 (Pensky-Martens Closed Cup)]		
Evaporation rate	:	Not available.		
Flammability (solid, gas)	:	Not available.		
Lower and upper explosive (flammable) limits	:	Not available.		
Vapor pressure	:	<0.0001 kPa (<0.00075 mm Hg) [room temperature]		
Vapor density	:	Not available.		
Relative density	:	Not available.		
Solubility in water	:	practically insoluble		
Water Solubility Result	:	0.5 g/l	20	deg C
Partition coefficient: n-octanol/water	:	Not available.		
Auto-ignition temperature	:	Not available.		
Decomposition temperature	:	>200°C (>392°F)		

Section 9. Physical and chemical properties

Density : 1.14 g/cm³ [20°C (68°F)]

Viscosity : Dynamic (room temperature): 250 to 450 mPa·s (250 to 450 cP)

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Test	Endpoint	Species	Result
epoxy carboxylate	OECD 402 Acute Dermal Toxicity	LD50 Dermal	Rat - Male, Female	>2000 mg/kg
	OECD 401 Acute Oral Toxicity	LD50 Oral	Rat - Male, Female	5000 mg/kg

Irritation/Corrosion

Product/ingredient name	Test	Species	Result
epoxy carboxylate	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin - Non-irritant.
	OECD 405 Acute Eye Irritation/ Corrosion	Rabbit	Eyes - Non-irritant.

Conclusion/Summary

Skin : epoxy carboxylate — Non-irritating to the skin.

Eyes : epoxy carboxylate — Non-irritating to the eyes.

Respiratory : epoxy carboxylate — No additional information.

Sensitization

Product/ingredient name	Test	Route of exposure	Species	Result
epoxy carboxylate	OECD 406 Skin Sensitization	skin	Guinea pig	Sensitizing

Mutagenicity

Section 11. Toxicological information

Product/ingredient name	Test	Result
epoxy carboxylate	Experiment: In vitro Subject: Bacteria Cell: Somatic Metabolic activation: +/-	Positive
	Experiment: In vitro Subject: Mammalian-Animal Cell: Somatic Metabolic activation: +/-	Positive
	Experiment: In vivo Subject: Mammalian-Animal Cell: Somatic	Negative
	Experiment: In vivo Subject: Mammalian-Animal Cell: Somatic	Negative

Conclusion/Summary :

epoxy carboxylate — The weight of the scientific evidence indicates that this material is non-genotoxic.

Carcinogenicity

Not available.

Reproductive toxicity

Conclusion/Summary :

epoxy carboxylate — No known significant effects or critical hazards.

Teratogenicity

Product/ingredient name	Test	Species	Result/Result type
epoxy carboxylate	OECD 414 Prenatal Developmental Toxicity Study	Rat - Female	Negative - Oral

Conclusion/Summary :

epoxy carboxylate — No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Section 11. Toxicological information

Skin contact : May cause an allergic skin reaction.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Product/ingredient name	Test	Endpoint	Species	Result
epoxy carboxylate	OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents	Sub-chronic NOEL Oral	Rat - Male, Female	5 mg/kg/d

General : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	5000 mg/kg

Other information : Not available.

Further information : Mixtures of Bisphenol A, Bisphenol F or Novolac epoxy resins and this cycloaliphatic epoxy resin may exhibit a possible risk of skin cancer under conditions of long-term skin contact. The single components however do not have this adverse effect (potentiation).

Section 12. Ecological information

Toxicity

Product/ingredient name	Test	Endpoint		Exposure	Species	Result	
epoxy carboxylate	OECD 209 Activated Sludge, Respiration Inhibition Test	Acute	EC50	3 hours Static	Bacteria	>2000	mg/kg
	OECD 202 *Daphnia* sp. Acute Immobilisation Test	Acute	EC50	48 hours Static	Daphnia	40	mg/l
	OECD 201 Alga, Growth Inhibition Test	Acute	EbC50 (biomass)	72 hours Static	Algae	90	mg/l
	OECD 203 Fish, Acute Toxicity Test	Acute	LC50	96 hours Flow-through	Fish	24	mg/l
	OECD 201 Alga, Growth Inhibition Test	Chronic	NOECr	72 hours Static	Algae	30	mg/l
ARALDITE CY 179 US	-	Acute	LC0	96 hours	Fish	32	mg/l
	-	Acute	LC50	96 hours	Fish	42	mg/l

Persistence and degradability

Product/ingredient name	Test	Period	Result
epoxy carboxylate	OECD 301B Ready Biodegradability - CO_2 Evolution Test	28 days	71 %

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
epoxy carboxylate	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
epoxy carboxylate	1.34	-	low

Mobility in soil

Not available.

Other adverse effects : No known significant effects or critical hazards.

Other ecological information

BOD5 : Not determined.

COD : Not determined.

TOC : Not determined.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14. Transport information

Proper shipping name

DOT : Not regulated.

TDG : Not regulated.

IMDG : Not regulated.

IATA : Not regulated.

Regulatory information	UN number	Classes	PG*	Label	Additional information
DOT Classification	Not regulated.	-	-		-
TDG Classification	Not regulated.	-	-		-
IMDG Classification	Not regulated.	-	-		-
IATA Classification	Not regulated.	-	-		-

PG* : Packing group

Section 15. Regulatory information

Safety, health and environmental regulations specific for the product

United States Regulations

TSCA 8(b) inventory : All components are listed or exempted.

TSCA 5(a)2 final significant new use rule (SNUR) : No ingredients listed.

Section 15. Regulatory information

TSCA 5(e) substance consent order : No ingredients listed.

TSCA 12(b) export notification : No ingredients listed.

SARA 311/312 : Immediate (acute) health hazard

Clean Air Act - Ozone Depleting Substances (ODS) : This product does not contain nor is it manufactured with ozone depleting substances.

SARA 313 : No ingredients listed.

CERCLA Hazardous substances : No ingredients listed.

State regulations

PENNSYLVANIA - RTK : No ingredients listed.

California Prop 65 : This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

Canadian regulations

CEPA DSL : All components are listed or exempted.

WHMIS Classes : Class D-2B: Material causing other toxic effects (Toxic).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Brazil Regulations

Classification system used : **Norma ABNT-NBR 14725-2:2012**

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.) :

Section 16. Other information

The customer is responsible for determining the PPE code for this material.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

National Fire Protection Association (U.S.A.) :

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THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED

Section 16. Other information

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Comp. Winding

SAFETY DATA SHEET

HUNTSMAN
Enriching lives through innovation

ARALDITE® MY 0510 US

Version	Revision Date:	SDS Number:	Date of last issue: -
1.0	09/10/2015	400001007701	Date of first issue: 09/10/2015

SECTION 1. IDENTIFICATION

Product name : ARALDITE® MY 0510 US

Manufacturer or supplier's details

Company name of supplier : Huntsman Advanced Materials Americas LLC
Address : P.O. Box 4980
The Woodlands,
TX 77387
United States of America
Telephone : Non-Emergency: (800) 257-5547

E-mail address of person responsible for the SDS : MSDS@huntsman.com

Emergency telephone : Chemtrec: (800) 424-9300 or (703) 527-3887

Recommended use of the chemical and restrictions on use

Recommended use : Adhesives and/or sealants

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2

Eye irritation : Category 2A

Skin sensitization : Category 1

Germ cell mutagenicity : Category 2

Acute aquatic toxicity : Category 2

Chronic aquatic toxicity : Category 2

GHS Label element

Hazard pictograms :

Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.

H341 Suspected of causing genetic defects.
H411 Toxic to aquatic life with long lasting effects.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P272 Contaminated work clothing must not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P391 Collect spillage.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous ingredients

Chemical Name	CAS-No.	Concentration (%)
p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline	5026-74-4	95 - 100

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this material safety data sheet to the doctor in attendance.

Do not leave the victim unattended.

If inhaled	:	If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.
In case of skin contact	:	If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Induce vomiting immediately and call a physician. Keep respiratory tract clear. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.
Most important symptoms and effects, both acute and delayed	:	None known.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	No data is available on the product itself.
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	No data is available on the product itself.
Specific extinguishing methods	:	No data is available on the product itself.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions,	:	Use personal protective equipment.

protective equipment and emergency procedures

Environmental precautions : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Advice on safe handling : Do not breathe vapors/dust.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Dispose of rinse water in accordance with local and national regulations.
Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

Materials to avoid : Strong acids

Strong bases

Strong oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

Hazardous components without workplace control parameters

Ingredients	CAS-No.
5026-74-4	TRIGLYCIDY

	L-P-AMINOPHENOL

Personal protective equipment

Respiratory protection : In the case of vapor formation use a respirator with an approved filter.

Hand protection
Material : butyl-rubber
Break through time : > 8 h

Solvent-resistant gloves (butyl-rubber)
Nitrile rubber
10 - 480 min

Neoprene gloves

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles.

Skin and body protection : impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures : When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : No data is available on the product itself.

Odor : slight

Odor Threshold : No data is available on the product itself.

pH : No data is available on the product itself.

Melting point : -39 °C
Method: OECD Test Guideline 102

: Method: OECD Test Guideline 103

Flash point : 228 °C
Method: Flash-Point, closed cup

Evaporation rate : No data is available on the product itself.

Flammability (solid, gas) : No data is available on the product itself.

Upper explosion limit	:	No data is available on the product itself.
Lower explosion limit	:	No data is available on the product itself.
Vapor pressure	:	(20 °C) Method: OECD Test Guideline 104 (25 °C) Method: OECD Test Guideline 104
Relative vapor density	:	No data is available on the product itself.
Relative density	:	1.22 (20 °C) Method: OECD Test Guideline 109
Density	:	1.205 - 1.225 g/cm3 (25 °C)
Solubility(ies)		
Water solubility	:	3.34 g/l (20 °C) Method: OECD Test Guideline 105
Solubility in other solvents	:	No data is available on the product itself.
Partition coefficient: n-octanol/water	:	log Pow: 0.87 (25 °C) pH: 7
Autoignition temperature	:	410 °C Method: Auto-Ignition Temperature (Liquids and Gases)
Decomposition temperature	:	> 200 °C
Viscosity		
Viscosity, kinematic	:	840.6 mm2/s (20 °C) Method: OECD Test Guideline 114 138.9 mm2/s (40 °C) Method: OECD Test Guideline 114
Self-Accelerating decomposition temperature (SADT)	:	No data is available on the product itself.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No decomposition if stored and applied as directed.
Chemical stability	:	No decomposition if stored and applied as directed.
Possibility of hazardous reactions	:	No decomposition if stored and applied as directed.
Conditions to avoid	:	No data available

Hazardous decomposition products	:	Carbon oxides Nitrogen oxides (NOx) Burning produces obnoxious and toxic fumes.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	:	No data is available on the product itself.

Acute toxicity

Acute oral toxicity - Product	:	LD50 (Rat, male and female): 1,037 mg/kg Method: OECD Test Guideline 401 LD50 (Mouse, male and female): 1,413 mg/kg Method: OECD Test Guideline 401
Acute inhalation toxicity	:	No data available
Acute dermal toxicity - Product	:	LD50 (Rat, male and female): > 4,000 mg/kg Method: OECD Test Guideline 402
Acute toxicity (other routes of administration)	:	No data available

Skin corrosion/irritation

Product:

Species: Rabbit
Assessment: Irritant
Method: OPPTS 870.2500
Result: Irritating to skin.

Remarks: May cause skin irritation and/or dermatitis.

Serious eye damage/eye irritation

Product:

Species: Rabbit
Result: Irritation to eyes, reversing after 7 to 21 days.
Assessment: Mild eye irritant
Method: Acute Eye Irritation

Remarks: Vapors may cause irritation to the eyes, respiratory system and the skin.

Respiratory or skin sensitization

Product:

Routes of exposure: Skin
Species: Guinea pig

Result: Causes sensitization.

Remarks: Causes sensitization.

Assessment: No data available

Germ cell mutagenicity

Product:

Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: positive

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 480
Result: positive

Metabolic activation: negative
Method: OECD Test Guideline 471
Result: positive

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Genotoxicity in vivo : No data available

Carcinogenicity

No data available

Carcinogenicity - Assessment : No data available

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Effects on fertility : No data available

Effects on fetal development : No data available

Reproductive toxicity - Assessment : No data available

STOT-single exposure
No data available

STOT-repeated exposure
No data available

Repeated dose toxicity
No data available

Repeated dose toxicity - Assessment : No data available

Aspiration toxicity
No data available

Experience with human exposure
General Information: No data available

Inhalation: No data available

Skin contact: No data available

Eye contact: No data available

Ingestion: No data available

Toxicology, Metabolism, Distribution
No data available

Neurological effects
No data available

Further information

Product:
Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Toxicity to fish - Product : LC50 (Cyprinus carpio (Carp)): 4.2 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates	:	No data available
Toxicity to algae - Product	:	ErC50 (Selenastrum capricornutum (green algae)): 13 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	No data available
Toxicity to fish (Chronic toxicity)	:	No data available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) - Product	:	NOEC (Daphnia magna (Water flea)): 0.42 mg/l Exposure time: 21 d Test Type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	No data available
Toxicity to bacteria	:	No data available
Toxicity to soil dwelling organisms	:	No data available
Plant toxicity	:	No data available
Sediment toxicity	:	No data available
Toxicity to terrestrial organisms	:	No data available
Ecotoxicology Assessment Acute aquatic toxicity	:	No data available
Chronic aquatic toxicity	:	No data available
Toxicity Data on Soil	:	No data available
Other organisms relevant to the environment	:	No data available

Further information:
No data available

Persistence and degradability

Biodegradability - Product	:	Inoculum: activated sludge Concentration: 3.2 mg/l Result: Not readily biodegradable. Biodegradation: 3.4 % Exposure time: 29 d

Method: OECD Test Guideline 301B

Biochemical Oxygen Demand (BOD)	:	No data available
Chemical Oxygen Demand (COD)	:	No data available
BOD/COD	:	No data available
ThOD	:	No data available
BOD/ThOD	:	No data available
Dissolved organic carbon (DOC)	:	No data available
Physico-chemical removability	:	No data available
Stability in water	:	No data available
Photodegradation	:	No data available
Impact on Sewage Treatment	:	No data available

Bioaccumulative potential

Bioaccumulation	:	No data available
Partition coefficient: n-octanol/water - Product	:	log Pow: 0.87 (25 °C) pH: 7

Mobility in soil

Mobility	:	No data available
Distribution among environmental compartments - Product	:	Koc: 84. Method: OECD Test Guideline 121
Stability in soil	:	No data available

Other adverse effects

Environmental fate and pathways	:	No data available
Results of PBT and vPvB assessment	:	No data available
Endocrine disrupting potential	:	No data available
Adsorbed organic bound halogens (AOX)	:	No data available

Hazardous to the ozone layer

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
Additional ecological information - Product	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic to aquatic life with long lasting effects.
Global warming potential (GWP)	:	No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (TRIGLYCIDYL-P-AMINOPHENOL)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964

IMDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,

		N.O.S. (TRIGLYCIDYL-P-AMINOPHENOL)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Domestic regulation

DOT Classification

UN/ID/NA number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TRIGLYCIDYL-P-AMINOPHENOL)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(TRIGLYCIDYL-P-AMINOPHENOL)

SECTION 15. REGULATORY INFORMATION

TSCA - 5(a) Significant New Use Rule List of Chemicals : Not relevant

EPCRA - Emergency Planning and Community Right-to-Know

SARA 311/312 Hazards : Acute Health Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Pennsylvania Right To Know

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline	5026-74-4	90 - 100 %

California Prop 65 WARNING! This product contains a chemical known in the State of California to cause cancer.

1-chloro-2,3-epoxypropane	106-89-8

WARNING: This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

1-chloro-2,3-epoxypropane 106-89-8

The ingredients of this product are reported in the following inventories:

CH INV	:	The mixture contains substances listed on the Swiss Inventory
	:	1-chloro-2,3-epoxypropane
TSCA	:	On TSCA Inventory
DSL	:	All components of this product are on the Canadian DSL.
AICS	:	On the inventory, or in compliance with the inventory
NZIoC	:	Not in compliance with the inventory
	:	p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline
ENCS	:	On the inventory, or in compliance with the inventory
ISHL	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory

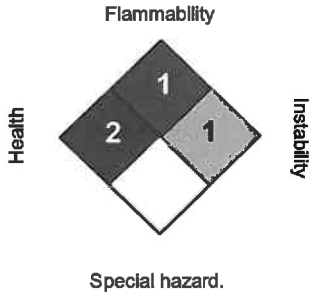
Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	2
FLAMMABILITY	1
PHYSICAL HAZARD	1

0 = not significant, 1 =Slight,

2 = Moderate, 3 = High

4 = Extreme, * = Chronic

Revision Date : 09/10/2015

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE

SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE. THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.

Comp. Winding

SAFETY DATA SHEET

Prepared in accordance with the United States Hazard Communication Standard: 29 CFR 1910.1200 (2012) **Revision date:** 15-May-2015

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product name: CAB-O-SIL® Untreated Fumed Silica

Product code: M5

Synonyms: Silicon Dioxide, Synthetic Amorphous Silica, Pyrogenic (Fumed) Amorphous Silica

This SDS is valid for the following grades: CAB-O-SIL® Fumed Silica:. L-50, L-60, L-90, LM-130, LM-150, M-5, M-5K, PTG, MS-55, H-5, H-7D, HS-5, EH-5, LM-130D, LM-150D, M-7D, MS-75D, S-17D, HP-60, M-8D, EL-1000, EL-2000, MS-35, H300, EL-90, EL-100, ELM-150, HK-7KD, HK-9D, HK-9KD, ENERSIL™ 2010, 2020, 2030.

Recommended use: Various, Rheological control, Flow agent, Anti-caking agent, Anti-blocking agent, Anti-settling agent, Spray aid, Thickening agent, Carrier, Viscosity control agent, Glossing or matting agent, Chemical intermediate, Stabilization agent, Filler, Reinforcing agent in: Coatings, Adhesives and/or sealants, Silicone elastomer, Rubber products, Suspension, Dispersion, Batteries, Cosmetics, Inks and toners, Paints, Hygiene and sanitary products, Other

Restrictions on use: Not Applicable.

Supplier:

Cabot Corporation
4400 North Point Parkway
Suite 200
Alpharetta, Georgia 30022
United States
Tel: +1 678 297 1300

Cabot Corporation
157 Concord Road
Billerica, MA 01821
UNITED STATES
Tel: 1-978-663-3455
Fax: 1-978-670-6955

Emergency Telephone Number: 24H/7d service
Canada: CANUTEC 1-613-996-6666
US: CHEMTREC 1-800-424-9300 or 1-703-527-3887
Germany: CHEMTREC 0800-181-7059
UK: CHEMTREC: (+44)-870-8200418
CHEMTREC China: 4001-204937
International CHEMTREC: +1 703-741-5970 or +1-703-527-3887

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status: This chemical is not considered hazardous by the United States 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Label Elements

Pictogram: None
Signal Word: None

Hazard statements: None

Precautionary Statements: None

Hazards not otherwise classified (HNOC)

None.

Potential health effects

Principle Routes of Exposure: Inhalation, Skin Contact, Eye contact

Eye Contact: May cause mechanical irritation. Avoid contact with eyes.

Skin Contact: May cause mechanical irritation and skin drying. Avoid contact with skin. No cases of sensitization in humans have been reported.

Inhalation: Dust may be irritating to respiratory tract. Provide appropriate exhaust ventilation at machinery and at places where dust can be generated. See also Section 8.

Ingestion: Adverse health effects are not expected. See Section 11.

Carcinogenicity: Does not contain any substances greater than 0.1% listed by IARC (International Agency for Research on Cancer), NTP (National Toxicology Program), OSHA (Occupational Safety and Health Administration), ACGIH (American Conference for Governmental Industrial Hygienists) or EU (European Union). See also Section 11.

Target Organ Effects: Lungs, See Section 11

Medical Conditions Aggravated by Exposure: Asthma, Respiratory disorder

Potential Environmental Effects: None known. See Section 12.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: Silicon Dioxide, Synthetic Amorphous Silica, Pyrogenic (Fumed) Amorphous Silica.

Chemical name	CAS No	weight-%	Trade secret
Synthetic Amorphous, Pyrogenic Silica	112945-52-5	> 99.9	-

*Regulatory information is found under the general silica: CAS RN 7631-86-9, EINECS RN 231-545-4
The hyphen (-) means "not applicable"

4. FIRST AID MEASURES

FIRST AID MEASURES

Skin Contact	Wash thoroughly with soap and water. Seek medical attention if symptoms develop.
Eye contact	Flush eyes immediately with large amounts of water for 15 minutes. Seek medical attention if symptoms develop.
Inhalation	If cough, shortness of breath or other breathing problems occur, move to fresh air. Seek medical attention if symptoms persist. If necessary, restore normal breathing through standard first aid measures.
Ingestion	Do not induce vomiting. If conscious, give several glasses of water. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

Symptoms:	The most important known symptoms and effects are described in Section 2 and/or in Section 11.

Indication of any immediate medical attention and special treatment needed

Note to physicians:	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:	Silica is non-combustible, therefore no extinguishing media needs to be identified.
Unsuitable Extinguishing Media:	None.
Specific hazards arising from the chemical:	None.
Hazardous combustion products:	None.
Protective equipment and precautions for firefighters:	Wear suitable protective equipment. In the event of fire, wear self-contained breathing apparatus.
Risk of Dust Explosion:	Not Applicable

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions:	Avoid dust formation. Ensure adequate ventilation. Use personal protective equipment. See also Section 8.
For emergency responders:	Use personal protection recommended in Section 8.

Environmental Precautions:

Environmental Precautions:	Contain spilled product on land, if possible. Local authorities should be advised if significant spillages cannot be contained.

Methods and material for containment and cleaning up

Methods for containment: Prevent further leakage or spillage if safe to do so.

Methods for cleaning up: Clean up promptly by vacuum. Use of a vacuum with high efficiency particulate air (HEPA) filtration is recommended. Do not create a dust cloud by using a brush or compressed air. Pick up and transfer to properly labelled containers. See Section 13.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling: Avoid contact with skin and eyes. Avoid dust formation. Do not breathe dust. Provide appropriate exhaust ventilation at machinery and at places where dust can be generated. Do not create a dust cloud by using a brush or compressed air.

Take precautionary measures against static discharges. All metal parts of the mixing and processing equipment must be earthed/grounded. Ensure all equipment is electrically earthed/grounded before beginning transfer operations. Fine dust is capable of penetrating electrical equipment and may cause electrical shorts.

Conditions for safe storage, including any incompatibilities

Storage Conditions: Keep containers tightly closed in a dry and well-ventilated place. Do not store together with volatile chemicals as they may be adsorbed onto product. Store at ambient conditions. Keep in properly labeled containers.

Incompatible materials: None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure guidelines: The table below is a summary. Please see the specific legislation for complete information.

Amorphous Silica, The regulatory exposure limits are found under the general silica, CAS RN 7631-86-9:	Australia:	2 mg/m³, TWA, Respirable
	Austria MAK	4 mg/m³, TWA, Inhalable fraction
	Finland:	5 mg/m³
	Germany TRGS 900:	4 mg/m³, TWA, Inhalable fraction
	India:	10 mg/m³, TWA
	Ireland:	2.4 mg/m³, TWA, Respirable dust
	Norway:	1.5 mg/m³, TWA, Respirable dust
	Switzerland:	4 mg/m³, TWA
	UK WEL:	6 mg/m³, TWA, Inhalable fraction
		2.4 mg/m³, TWA, Respirable fraction
	US OSHA PEL:	6mg/m³ (54 FR2701)

Dust, or Particulates Not Otherwise Specified:	Belgium:	10 mg/m³, TWA, Inhalable 3 mg/m³ TWA, Respirable
	China:	8 mg/m³, TWA 10 mg/m³, STEL
	France:	10 mg/m³, TWA Inhalable dust 5 mg/m³, TWA Respirable dust
	Italy:	10 mg/m³, TWA, Inhalable 3 mg/m³, TWA, Respirable
	Malaysia:	10 mg/m³, TWA, Inhalable 3 mg/m³, TWA, Respirable
	Spain:	10 mg/m³, VLA, Inhalable 3 mg/m³, VLA, Respirable
	US ACGIH - PNOS:	10 mg/m³, TWA, Inhalable 3 mg/m³, TWA, Respirable
	US OSHA - PEL:	15 mg/m³, TWA, Total dust 5 mg/m³, TWA, Respirable

NOTE:

In its facilities globally, Cabot Corporation manages silica to the Germany TRGS 900 occupational exposure limit of 4 mg/m³, TWA, Inhalable fraction

MAK: Maximale Arbeitsplatzkonzentration (Maximum Workplace Concentration)
PEL: Permissible Exposure Limit
PNOS: Particulate Not Otherwise Specified
STEL: Short Term Exposure Limit
TRGS: Technische Regeln für Gefahrstoffe (Technical Rule for Hazardous Materials)
TWA: Time Weighted Average
US ACGIH: United States American Conference of Governmental Industrial Hygienists
US OSHA: United States Occupational Safety and Health Administration
VLA: Valore Límite Ambientales (Environmental Limit Value)
WEL: Workplace Exposure Limit

Engineering Controls: Ensure adequate ventilation to maintain exposures below occupational limits. Provide appropriate local exhaust ventilation at machinery and at places where dust can be generated.

Personal protective equipment [PPE]

Respiratory Protection: Approved respirator may be necessary if local exhaust ventilation is not adequate.

Hand Protection: Wear protective gloves to prevent skin drying. Use protective barrier cream before handling the product. Wash hands and other exposed skin with mild soap and water.

Eye/face Protection: Wear eye/face protection. Wear safety glasses with side shields (or goggles).

Skin and Body Protection: Wear suitable protective clothing. Wash clothing daily. Work clothing should not be allowed out of the workplace.

Other: Handle in accordance with good industrial hygiene and safety practice. Emergency eyewash and safety shower should be located nearby.

Environmental exposure controls: In accordance with all local legislation and permit requirements as applicable for dusts.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid	**Odor:**	None.
Appearance:	Powder	**Odor threshold:**	Not Applicable
Color:	White		

Property	Values	Remarks • Method
pH:	3.6-4.5	In-house testing
Melting point/freezing point:	1700 °C	NIOSH Pocket Guide to Chemical Hazards
Boiling point / boiling range:	2230 °C	NIOSH Pocket Guide to Chemical Hazards
Evaporation Rate:		Not Applicable
Vapor pressure:		Not Applicable
Vapor Density:		Not Applicable
Density:	2.2 g/cm3	@ 20 °C
Bulk Density:	30 - 150 kg/m³	DIN/ISO 787:11
Specific Gravity at 20°C:	2.2	
Water solubility:	Slightly soluble	According to OECD 105
Solubility(ies):		No information available
Partition Coefficient (n-octanol/water):		Not Applicable
Decomposition temperature:		Not Applicable
Viscosity:		Not Applicable
Kinematic viscosity:		Not Applicable
Dynamic viscosity:		Not Applicable
Oxidizing Properties:		No oxidizing properties
Softening point:		Not Applicable
VOC content (%):		Not Applicable
% Volatile (by Volume):		Not Applicable
% Volatile (by Weight):		Not Applicable
Surface Tension:		Not Applicable
Explosive properties:		Non-explosible
Flash Point:		Not combustible
Flammability (solid, gas):		Not flammable. Product resists ignition and does not promote flame spread
Flammability Limit in Air:		Not Applicable
Explosion Limits in Air - Upper (g/m³):		Not Applicable
Explosion Limits in Air - Lower (g/m³):		Not Applicable
Autoignition Temperature:		Not Applicable
Minimum Ignition Temperature:		Not Applicable

Minimum Ignition Energy:	Not Applicable
Ignition Energy:	Not Applicable
Maximum Absolute Explosion Pressure:	Not Applicable
Maximum Rate of Pressure Rise:	Not Applicable
Burn Velocity:	Not combustible
Kst Value:	Not Applicable
Dust Explosion Classification:	Not Applicable

End point is listed "not applicable" due to the inherent properties of the substance
"No information available" indicates testing has not been performed

10. STABILITY AND REACTIVITY

Reactivity: Not reactive. Substance is an inert inorganic solid.

Stability: Stable under recommended handling and storage conditions.

Possibility of hazardous reactions: None under normal processing.

Hazardous polymerization: Hazardous polymerization does not occur.

Conditions to avoid: None known.

Incompatible materials: None known.

Explosion data Will not cause dust explosion. See also Section 9.

Sensitivity to Mechanical Impact: None.

Sensitivity to Static Discharge: This material is an inorganic dust and will not create nor support conditions that would result in a dust explosion or fire. Take precautionary measures against static discharges. Avoid dust formation. All metal parts of the mixing and processing equipment must be earthed/grounded. Ensure all equipment is electrically earthed/grounded before beginning transfer operations.

Hazardous decomposition products: None known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50: LD50/oral/rat = > 5000 mg/kg. No deaths occurred and no signs of toxicity were seen during the observation periods after single oral administration of silica(OECD 401).

Inhalation LC50: Due to the product's physical characteristics, no suitable testing procedure is available

Dermal LD50: LD50/dermal/rabbit = > 2000 mg/kg. Very slight transient erythema in one animal. No signs of systemic or organ toxicity (OECD 402).

Skin corrosion/irritation: Primary irritation index = 0/8 @ 24 hr. Not classified as an irritant (OECD 404)

Serious eye damage/eye irritation: Draize score 1.0/110 @ 24 hr. Not classified as an irritant in rabbit studies (OECD 405). High dust concentrations may cause mechanical irritation.

Sensitization:	No experimental animal data are available. No cases of sensitization in humans have been reported.
Mutagenicity:	Not mutagenic in Ames test. Negative in the unscheduled DNA synthesis assay. Negative in the chromosome aberration test in Chinese hamster ovary (CHO) cells.
Carcinogenicity:	No evidence of carcinogenicity was observed in multiple animal species following repeated oral or inhalation exposure to amorphous silica. Similarly, epidemiology studies show no evidence of carcinogenicity in workers who manufacture amorphous silica.
Reproductive Toxicity:	No effects on reproductive organs or fetal development have been reported in animal toxicity studies.
STOT - single exposure:	Based on available data, specific target organ toxicity is not expected after single oral, single inhalation, or single dermal exposure.
STOT - repeated exposure:	Repeated dose toxicity: oral (rat), 2 weeks to 6 months, no significant treatment-related adverse effects at doses of up to 8% silica in the diet. Repeated dose toxicity: inhalation (rat), 13 weeks, Lowest Observed Effect Level (LOEL) = 1.3 mg/m^3 based on mild reversible effects in the lungs. Repeated dose toxicity: inhalation (rat), 90 days, LOEL = 1 mg/m^3 based on reversible effects in the lungs and effects in the nasal cavity. Based on available data, a STOT-RE classification is not warranted.
Aspiration Hazard:	Based on industrial experience and available data, no aspiration hazard is expected.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity:	Fish (Brachydanio rerio) LC50 (96 h): > 10,000 mg/l; (Method: OECD 203) No acute toxicity to Daphnia with EL and EL$_{50}$ ranging from >1000 to 10,000 mg/L (OECD 202)

ENVIRONMENTAL FATE

Persistence and degradability	The methods for determining biodegradability are not applicable to inorganic substances
Bioaccumulation	Not expected due to physicochemical properties of the substance.
Mobility:	Not expected to migrate.
Distribution to Environmental Compartments:	No information available.
Other adverse effects:	No information available.

13. DISPOSAL CONSIDERATIONS

Disclaimer: Information in this section pertains to the product as shipped in its intended composition as described in Section 3 of this MSDS. Contamination or processing may change waste characteristics and requirements. Regulations may also apply to empty containers, liners or rinsate. State/provincial and local regulations may be different from federal regulations.

RCRA: Unused product is not a hazardous waste under U.S. RCRA, 40 CFR 261.

Disposal considerations: Dispose in accordance with applicable legislations.

14. TRANSPORT INFORMATION

DOT

UN/ID no	Not regulated
Proper Shipping Name	Not regulated
Hazard Class	Not regulated
Packing group	Not regulated

ICAO (air)

UN/ID no	Not regulated
Proper Shipping Name	Not regulated
Hazard Class	Not regulated
Packing group	Not regulated

IATA

UN/ID no	Not regulated
Proper Shipping Name	Not regulated
Hazard Class	Not regulated
Packing group	Not regulated

IMDG

UN/ID no	Not regulated
Proper Shipping Name	Not regulated
Hazard Class	Not regulated
Packing group	Not regulated

RID

UN/ID no	Not regulated
Proper Shipping Name	Not regulated
Hazard Class	Not regulated
Packing group	Not regulated

ADR

UN/ID no	Not regulated
Proper Shipping Name	Not regulated

Hazard Class	Not regulated
Packing group	Not regulated

15. REGULATORY INFORMATION

**Regulatory information is found under the general silica: CAS RN 7631-86-9, EINECS RN 231-545-4.*

Hazard Classification

United States - OSHA (29 CFR 1910.1200): Not Hazardous
Mexico - NOM-018-STPS-2000: Not hazardous
Canada - WHMIS Classification (CPR, SOR/88-66): Not controlled
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the M/SDS contains all the information required by the Controlled Products Regulations.

Chemical name	WHMIS - Ingredient Disclosure
Synthetic Amorphous, Pyrogenic Silica 112945-52-5	General silica CAS RN 7631-86-9, is listed

International Inventories

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory	Complies
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List	Complies
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances	Complies
ENCS - Japan Existing and New Chemical Substances	Complies
IECSC - China Inventory of Existing Chemical Substances	Complies
KECL - Korean Existing and Evaluated Chemical Substances	Complies
PICCS - Philippines Inventory of Chemicals and Chemical Substances	Complies
AICS - Australian Inventory of Chemical Substances	Complies
NZIoC - New Zealand Inventory of Chemicals	Complies
TCSI - Taiwan Chemical Substance Inventory	Complies

US Federal Regulations

TSCA Section 12(b) Export Regulations:
This product does not contain any components that are subject to TSCA 12(b) Export Notification

SARA Section 302 (40 CFR 355) Extremely Hazardous Substances:
No components are listed as extremely hazardous substances under SARA Section 302.

SARA 311/312 Hazard Categories

Acute Health Hazard	NO
Chronic Health Hazard	NO
Fire hazard	NO
Sudden release of pressure hazard	NO
Reactive Hazard	NO

SARA Section 313 (40 CFR 372) Toxics Release Inventory
Does not contain any of the substances identified under Section 313 as toxic chemicals in excess of the de minimis concentrations necessary to be subject to the supplier notification requirements.

Clean Air Act Amendments of 1990 (CAA, Section 112, 40 CFR 82):
This product does not contain any components listed as a Hazardous Air Pollutant, Flammable Substance, Toxic Substance, or Class 1 or 2 Ozone Depletor

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania	Louisiana:
Silica 7631-86-9	X	X	X	

16. OTHER INFORMATION

Pharmaceutical Use:
Not recommended

References:
NIOSH Pocket Guide to Chemical Hazards, September 2005. "Silica, amorphous". DHHS (NIOSH) Publication No. 2005-149. National Technical Information Service, Springfield, VA. p. 277

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Prepared by: Cabot Corporation - Safety, Health and Environmental Affairs
Revision date: 15-May-2015

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End of Safety Data Sheet

Comp. Winding

HEXION

SAFETY DATA SHEET

FOR INDUSTRIAL USE ONLY

EPON™ Resin 826

Section 1. Product and company identification

GHS product identifier : EPON™ Resin 826
MSDS Number : K122A
Product type : Epoxy Resin

Manufacturer/Supplier/Importer : Hexion Inc.
180 East Broad Street
Columbus, Ohio
43215 USA

Contact person : 4information@hexion.com

Telephone : For additional health and safety or regulatory information, call 1 888 443 9466.

Emergency telephone number : For Emergency Medical Assistance
Call Health & Safety Information Services
1-866-303-6949

For Emergency Transportation Information
CHEMTREC US Domestic (800) 424-9300
CHEMTREC International (703) 527-3887
CANUTEC CA Domestic (613) 996-6666

Section 2. Hazards identification

Classification of the substance or mixture : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
SKIN SENSITIZATION - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) [Respiratory tract irritation] - Category 3

GHS label elements

Hazard pictograms :

Signal word : Warning
Hazard statements : H315 Causes skin irritation.
H319 Causes serious eye irritation.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.

Precautionary statements

General	:	Not applicable.
Prevention	:	Wear protective gloves. Wear eye or face protection. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace.
Response	:	**IF INHALED:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. **IF ON SKIN:** Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. **IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
Storage	:	Store locked up.
Disposal	:	Dispose of contents and container in accordance with all local, regional, national and international regulations.
Other hazards which do not result in classification	:	None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	% by weight	CAS number
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	100	25068-38-6

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.
Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
Inhalation	:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	:	Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	:	Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	:	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	:	No specific treatment.
Protection of first aid personnel	:	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	None known.
Specific hazards arising from the chemical	:	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal	:	Decomposition products may include the following materials:

decomposition products		carbon oxidesDecomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds
Special protective actions for fire-fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	:	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and material for containment and cleaning up

Small spill	:	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	:	Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13 of SDS). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 of SDS for emergency contact information and section 13 of SDS for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see section 8 of SDS). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10 of SDS) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Viscous liquid.
Color : Clear.

Odor : Not available
Odor threshold : Not available
pH : Not available
Melting point/ Freezing point : Not available
Boiling point : 260 °C (500.00 °F)

Flash point : Pensky-Martens Closed Cup: 249 °C (480.20 °F) (ASTM D 93)

Burning time : Not available
Burning rate : Not available
Evaporation rate : Not available
Flammability (solid, gas) : Not available
Lower and upper explosive (flammable) limits : **Lower:** Not available **Upper:** Not available
Vapor pressure : 0.03 mbar @ 77 °C (170.60 °F)

Vapor density : Not available
Relative density : 1.17

Solubility	:	Not available
Solubility in water	:	Negligible
Partition coefficient: n-octanol/water	:	Not available
Auto-ignition temperature	:	Not available
Decomposition temperature	:	Not available
SADT	:	Not available
Viscosity	:	**Dynamic:** Not available **Kinematic:** Not available

Other information

No additional information.

Section 10. Stability and reactivity

Reactivity	:	Stable under normal conditions.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Strong oxidizer,Strong oxidizer,
Incompatible materials	:	Reactive or incompatible with the following materials: oxidizing materials strong acids, strong alkalis,
Hazardous decomposition products	:	Decomposition products may include the following materials:, carbon oxidesUnder normal conditions of storage and use, hazardous decomposition products should not be produced.
Other hazards		Reacts with considerable heat release with some curing agents.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer				
	LD50 Oral	Rat	11,400 mg/kg	-
	LD50 Dermal	Rat	2,000 mg/kg	-

Conclusion/Summary : Not available

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
4,4'-Isopropylidenediphenol-	Skin -	Rabbit	1.5 - 2		-

Epichlorohydrin Copolymer	Erythema/Eschar 404 Acute Dermal Irritation/Corrosion				
	Skin - Edema 404 Acute Dermal Irritation/Corrosion	Rabbit	1.0 - 1.5		-
	eyes - - 405 Acute Eye Irritation/Corrosion	Rabbit	0		-
	eyes - Redness of the conjunctiva e	Rabbit	0.7		-
	Skin - Moderate irritant	Rabbit		24 hrs	-
	Skin - Severe irritant	Rabbit		24 hrs	-
	eyes - Mild irritant	Rabbit			-

Conclusion/Summary

Skin : Not available

eyes : Not available

Respiratory : Not available

Sensitization

Conclusion/Summary

Skin : Not available

Respiratory : Not available

Mutagenicity

Conclusion/Summary : Not available

Carcinogenicity

Conclusion/Summary : Not available

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	-	-	-	-	-	-

Remarks:	No adverse reproductive effects were observed in an O.E.C.D. Test Guideline no. 416 GLP two-generation rat oral gavage study conducted up to a high dose level of 750 mg/kg/day that resulted in adult body weight decrements.

Conclusion/Summary : Not available

Teratogenicity

Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	Category 3		Respiratory tract irritation

Specific target organ toxicity (repeated exposure)
Not available

Aspiration hazard
Not available

Information on the likely routes of exposure : Not available

Potential acute health effects

Eye contact : Causes serious eye irritation.
Inhalation : May cause respiratory irritation.
Skin contact : Causes skin irritation. May cause an allergic skin reaction.
Ingestion : Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available
Potential delayed effects : Not available

Long term exposure

Potential immediate effects : Not available
Potential delayed effects : Not available

Potential chronic health effects

Conclusion/Summary : Not available

General : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
reaction product: bisphenol-A-(epichlorhydrin); epoxy resin (number average molecular weight ≤ 700)			
	Acute LC50 1.3 mg/l - 203 Fish, Acute Toxicity Test	Fish - Fish	96 h
	Acute EC50 2.1 mg/l - 202 Daphnia sp. Acute Immobilization Test and Reproduction Test	Aquatic invertebrates. Water flea	48 h
	.Acute NOEC 0.3 mg/l - 211 Daphnia Magna Reproduction Test	Aquatic invertebrates. Water flea	21 d
	Acute LC50 > 11 mg/l -	Aquatic plants - Algae	72 h

Conclusion/Summary : Not available

Persistence/degradability

Conclusion/Summary : Not available

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	2.64 - 3.78	3 - 31 31.00	low

Mobility in soil

Soil/water partition coefficient (KOC) : Not available

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR		Non-regulated		
TDG		Non-regulated		
IMO/IMDG	3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (LIQUID EPOXY RESIN)	Class 9 III	
IATA (Cargo)	3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (LIQUID EPOXY RESIN)	Class 9 III	

*PG : Packing group

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.'

Section 15. Regulatory information

United States

HCS Classification : Irritating material
Sensitizing material
Target organ effects

U.S. Federal regulations : **United States - TSCA 12(b) - Chemical export notification:** None required.
United States - TSCA 5(a)2 - Final significant new use rules: Not listed
United States - TSCA 5(a)2 - Proposed significant new use rules: Not listed
United States - TSCA 5(e) - Substances consent order: Not listed
SARA 302 Extremely Hazardous Substances: None required.
SARA 302/304/311/312 hazardous chemicals: None required.

California Prop. 65: : WARNING: This product contains less than 0.1% of a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Oxirane, 2-(phenoxymethyl)-	Yes.	No.	5 µg/day	No.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : None required.

CEPA Toxic substances : None required.

International regulations

International lists : **Australia inventory (AICS):** All components are listed or exempted.
Canada inventory: All components are listed or exempted.
Japan inventory: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
New Zealand Inventory (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
United States inventory (TSCA 8b): All components are listed or exempted.
Taiwan inventory (CSNN): All components are listed or exempted.

Section 16. Other information

Hazardous Material Information System III (U.S.A.) :

Health	*	2
Flammability		1
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.
The customer is responsible for determining the PPE code for this material.

Full text of abbreviated H statements : Not applicable.

History

Date of printing : 06/23/2016
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Date of previous issue : 02/01/2015
Version : 26.0
Prepared by : Product Safety Stewardship
Key to abbreviations :
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail
UN = United Nations
References : Not available

Notice to reader

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Composite Winding

ALBEMARLE®

ETHACURE® 100 Curing Agent; DETDA
Material Safety Data Sheet

Revision Date: 18-Feb-2013
Supersedes 19-Oct-2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	ETHACURE® 100 Curing Agent; DETDA
Chemical Name	Diethylmethylbenzenediamine
Chemical Family	Aromatic diamine
Formula	(C2H5)2(CH3)C6H(NH2)2
General function	Curing chemical
1.4. Emergency Telephone Numbers	+1-225-344-7147
For Non-Emergency	800-535-3030

	NFPA	HMIS
Health	2	2
Flammability	1	1
Physical Hazards	0	0

2. HAZARDS IDENTIFICATION

Warning

Emergency Overview

Harmful if swallowed
Harmful in contact with skin
Irritating to eyes
May cause allergic skin reaction
May cause pancreatic effects based on animal data
Possible Cancer Hazard

Potential Health Effects

Eyes	Irritating to eyes.
Skin	Harmful in contact with skin.
Inhalation	Not expected to be a route of exposure - due to low volatility of DETDA at room temperature
Ingestion	Harmful if swallowed.

See Section 11 for additional Toxicological information.

Occupational Exposure Limit See Section 8

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
Benzenediamine,ar,ar-diethyl-ar-methyl-	68479-98-1	>95

4. FIRST AID MEASURES

Eye contact	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact	Remove contaminated clothing and shoes. After contact with skin, wash immediately with plenty of water. Wash clothing before reuse. Seek medical advice.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, apply artificial respiration. Seek medical advice
Ingestion	Clean mouth with water and afterwards drink plenty of water. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Seek immediate medical attention/advice.
Notes to Physician	Treat symptomatically

5. FIRE-FIGHTING MEASURES

Combustion/explosion hazards	In case of fire and/or explosion do not breathe fumes.
Suitable extinguishing media	Carbon dioxide, dry chemicals, foam, water spray (mist).
Hazardous Combustion Products	Oxides of carbon and nitrogen.
Protective Equipment and Precautions for Firefighters	Wear self-contained breathing apparatus and protective suit. Do not breathe smoke or vapors.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Wear suitable gloves and eye/face protection.
Environmental precautions	Contain any spill with dikes or absorbents to prevent migration and entry into sewers or streams. May require excavation of contaminated soil.
Methods for Cleaning up	Take up small spills with dry chemical absorbent. Large spills may be taken up with pump or vacuum and finished off with dry chemical absorbent.

7. HANDLING AND STORAGE

Handling	Do not breathe vapours or spray mist. Mechanical ventilation is recommended. Local exhaust is needed at source of vapours.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. To maintain quality: Keep away from heat. Keep away from direct sunlight

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls	Ensure adequate ventilation, especially in confined areas.
Personal Protective Equipment:	
Eye/face Protection	During line breaks and other possible pressurized systems, chemical goggles and/or a face shield should be employed. In applications of low risk and NOT involving pressure, safety glasses with shide shields should be worn
Skin Protection	DERMAL PROTECTION: Dermal exposure is considered the primary route of exposure. BODY: A protective apron or suit such as polyethene tyvek or equivalent should be used to minimize exposure from splashes.
Hand protection	Gloves resistant to chemical permeation.
Respiratory protection	Approved organic vapor respirator when exposed to vapors from heated material. Approved supplied-air respirator, in case of emergency.

9. PHYSICAL AND CHEMICAL PROPERTIES

Flash point	169°C / 336(PMCC)
Flammable limits (LEL, UEL)	No data available
Form	Liquid
Vapor pressure	0.000971 Pa(25°C)
Color	Clear. Yellow.
Relative density	1.02 g/ml(20°C)
Odor	Pungent.
Vapor density	6,2
pH	Not applicable
Water Solubility	1% (20°C)
Initial boiling point and boiling range	308.3°C(1013 hPa)
Melting point/freezing point	Not applicable
Viscosity, dynamic	286 mPa.s(20°C)
Viscosity, kinematic	No data available
Partition Coefficient (log Pow)	1.16(25 °C)
Flammability (solid, gas)	Not applicable
Oxidizing Properties	None
Explosive Properties	None

10. STABILITY AND REACTIVITY

Stability	Stable.
Conditions to Avoid	Exposure to air.
Materials to avoid	Strong acids. Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides. Nitrogen oxides (NOx).
Hazardous Polymerization	None under normal processing.

11. TOXICOLOGICAL INFORMATION

Health and hazardous information

Acute toxicity	
LD50 Oral:	**Rat Oral LD50:738 mg/kg**
LD50 Dermal:	**Rabbit Dermal LD50:>2000 mg/kg**
Skin contact	Harmful if absorbed through skin.
Eye contact	Irritant.
Skin sensitization	Not expected to be a sensitizer.
Mutagenic Effects	In vitro mutagenicity test : Not genotoxic in bacteria and mammalian cell systems. In vivo mutagenicity tests: Mouse micronucleus test : negative.
Reproductive Effects	No effect on reproductive organs in repeated does studies in rats.
Target Organ Effects	Pancreas
Chronic Effects	A two year feeding study in rats showed DETDA cause effects in the pancreas, liver, thyroid and eyes. An increase in the number of tumors in the liver and thyroid of male rats and in the liver and possibly mammary gland of female rats was found.
Carcinogenic effects	A two-year feeding study on rats did not reveal adverse health effects.: Did not show carcinogenic effects in animal experiments (weight of evidence approach).
Signs and Symptoms of Overexposure	No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity	Very toxic to aquatic organisms
LC50	LC50/48h/Fish :200mg/L
LC50	LC50/48h/daphnia :0.5mg/L
EC50	EC50/72h/algae :104mg/L
EC50	EC10/72h/algae : 54mg/L
Ecotoxicity effects	Very toxic to aquatic organisms
Persistence/Degradability	Not readily biodegradable. Photodegradation T1/2 Air 1.484 hour
Bioaccumulation/ Accumulation	No information available
Mobility in Environmental Media	The substance is expected to partition primarily to soil and water. Koc = .?1 (QSAR estimate). Henry's law constant = .?2 (20 °C) (QSAR estimate). Hazardous to the ozone layer: Not Applicable
Other adverse effects	No information available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method	Dispose in a safe manner in accordance with local/national regulations. Absorb and incinerate.

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name	NOT REGULATED FOR TRANSPORTATION
Hazard Class	Not regulated
UN No.	Not regulated
Packing Group	Not regulated
Description	Not regulated

IMDG/IMO

IMO Class	9
Packing Group	III
UN-No	3082
IMO Labelling and Marking	9 + Marine Pollutant Marking
Proper Shipping Name	Environmentally hazardous substance liquid,N.O.S. (Diethyltoluenediamine)
EmS	F-A , S-F
Marpol - Annex II	Not determined
Marpol - Annex III	Marine Pollutant
Transport Description	UN 3082 Environmentally hazardous substance liquid,N.O.S. (Diethyltoluenediamine), 9, III, Marine pollutant

IATA/ICAO

IATA/ICAO Class	9
Packing Group	III
UN-No	3082
IATA/ICAO Labelling/Marking	9 + 'Environmentally hazardous substance' mark
Passenger Aircraft	Maximum net quantity per package: 450 L
Cargo aircraft only	Maximum net quantity per package: 450 L
Proper shipping name	Environmentally hazardous substance liquid,N.O.S. (Diethyltoluenediamine)
Transport Description	UN 3082 Environmentally hazardous substance liquid,N.O.S. (Diethyltoluenediamine), 9, III

15. REGULATORY INFORMATION

International Inventories	TSCA	DSL	NDSL	AICS	EINECS	ELINCS	ENCS	KECL	PICCS	CHINA	NZIoC
ETHACURE® 100 Curing Agent; DETDA	X	X	-	X	X	-	-	X	X	X	X

(X) Complies (-) Does not Comply

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

SARA 311/312 Hazardous Categorization

Chronic Health Hazard	Yes
Acute Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Reportable and Threshold Planning Quantities
The following components have RQs and/or TPQs under SARA and/or CERCLA

State Regulations
This product contains the following chemicals regulated in the states listed below.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazards
D2A Very toxic materials
D2B Toxic materials

16. OTHER INFORMATION

Prepared By

Health & Environment Department
Albemarle Corporation

FOR ADDITIONAL NONEMERGENCY PRODUCT INFORMATION, CONTACT:

HEALTH AND ENVIRONMENT DEPARTMENT
ALBEMARLE CORPORATION
451 FLORIDA ST.
BATON ROUGE, LA. 70801
(800) 535-3030

Revision Date: 18-Feb-2013
Revision Number: 7

The information contained herein is accurate to the best of our knowledge. The Company makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances.

Comp. Winding

Safety Data Sheet

According to Regulation (EU) No. 1907/2006, Annex II, According to Regulation (EU) No. 1272/2008, Amended by REGULATION (EU) No 453/2010

Meta Phenylene Diamine

SDS Record Number: CSSS-TCO-010-100301

Printing date: 07/12/2010 **Version 1.1** **Revision date: 25/02/2014**

1 Identification of the substance and of the company/undertaking

1.1 Product identifier:

Identification on the label/Trade name:	Meta Phenylene Diamine
Additional identification:	Meta Phenylene Diamine
Identification of the product:	CAS#108-45-2; EC#203-584-7
Index Number:	612-147-00-3
REACH registration No.:	Confidential

1.2 Relevant identified uses of the substance and uses advised against:

1.2.1 Identified uses:

Used in engineering polymers, aramid fibers, thermoplastics, dyes, medical, epoxy resin and polyurethane areas.

1.2.2 Uses advised against:

Not available.

1.3 Details of the supplier of the safety data sheet:

Supplier(Only representative):	Chemical Inspection & Regulation Service Limited
Supplier(Manufacturer):	Zhejiang Amino-Chem Co., Ltd.
Address:	Zhejiang Hangzhou Gulf Fine Chemical Zone
Contact person(E-mail):	Peipei Jiang
Telephone:	+86-21-50306558-124
Fax:	+86-21-50306881

1.4 Emergency telephone Number:

+353 41 980 6916

Available outside office hours? YES [ ] NO [X]

2 Hazards Identification

2.1 Classification of the substance

2.1.1 Classification:

The substance is classified as following according to 67/548/EEC and REGULATION (EC) No 1272/2008:

EU CLP 1272/2008	
Hazard classes/Hazard categories	Hazard statement
AcuteTox.3*	H301
AcuteTox.3*	H311
AcuteTox.3*	H331
Eye Irrit.2	H319
Skin Sens.1	H317
Aquatic Acute 1	H400
Aquatic Chronic 1	H410
Muta.2	H341

For full text of H- phrases: see section 2.2.

67/548/EEC	
Hazards characteristics	R-Phrases

T	R23/24/25
Xi	R36
Xi	R43
N	R50/53
Muta.Cat.3	R68

For full text of R- phrases: see section 16.

2.1.2 The most important adverse effects

2.1.2.1 The most important adverse physicochemical effects:

Not available.

2.1.2.2 The most important adverse human health effects:

Toxic by inhalation, in contact with skin and if swallowed.
Irritating to eyes.
May cause sensitization by skin contact.
Possible risk of irreversible effects.

2.1.2.3 The most important adverse environmental effects:

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2.2 label elements

Hazard Pictograms:

Signal Word(S): Danger

Hazard Statement:
H301: Toxic if swallowed.
H311: Toxic in contact with skin.
H331: Toxic if inhaled.
H319: Causes serious eye irritation.
H317: May cause an allergic skin reaction.
H410: Very toxic to aquatic life with long lasting effects.
H341: Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).

Precautionary Statement:
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
P264Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P281: Use personal protective equipment as required.
P301 + P310 IF SWALLOWED: Immediately call a POISON CEN-TER or doctor/physician.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313: IF exposed or concerned: Get medical advice/attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P337 + P313: If eye irritation persists: Get medical advice/attention.
P311 Call a POISON CENTER or doctor/physician.
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
P330 Rinse mouth.

P361 Remove/Take off immediately all contaminated clothing.
P363 Wash contaminated clothing before reuse.
P391: Collect spillage.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/container to local/regional/national/ international regulation (to be specified).

2.3 Other hazards

Not available (PBT,vPvB, Substance is an endocrine disruptor etc.)

3 Composition/information on ingredients

Substance/Mixture: Substance

Ingredient(s):

Chemical Name	Registration No.	CAS No.	EC No.	Concentration
m-PDA	Confidential	108-45-2	203-584-7	99.5%
p-PDA	N/A	106-50-3	203-404-7	0.2%
o-PDA	N/A	95-54-5	202-430-6	0.2%
Water	N/A	-	-	0.1%

4 First aid measures

4.1 Description of first aid measures:

In all cases of doubt, or when symptoms persist, seek medical attention.

4.1.1 In case of inhalation:

Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

4.1.2 In case of skin contact:

Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

4.1.3 In case of eyes contact:

Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

4.1.4 In case of ingestion:

Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

4.2 Most important symptoms and effects, both acute and delayed

Toxic if swallowed. Toxic in contact with skin. Causes serious eye irritation. May cause an allergic skin reaction. Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).

4.3 Indication of any immediate medical attention and special treatment needed

If skin irritation or rash occurs, get medical advice/attention.

5 Fire-Fighting measures

5.1 Extinguishing media:

Suitable extinguishing media: Dry chemical, water spray, chemical foam, alcohol-resistant foam.

Unsuitable extinguishing media: Not available.

5.2 Special hazards arising from the substance or mixture

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May polymerize explosively when involved in a fire. Contact with metals may evolve flammable hydrogen gas.

5.3 Advice for fire-fighters:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

6.1.1 For non-emergency personnel:

Remove ignition sources. Provide adequate ventilation. Avoid inhalation of vapor or dust. Avoid skin and eye contact.

6.1.2 For emergency responders:

Wear an appropriate NIOSH/MSHA approved respirator.

6.2 Environmental Precautions:

Avoid disposing into drainage/sewer system or directly into the aquatic environment.

6.3 Methods for Containment and Cleaning up:

Vacuum or sweep up material and place into a suitable disposal container.

6.4 Reference to other sections:

See Section 7 for information on safe handling.
See section 8 for information on personal protection equipment.
See Section 13 for information on disposal.

6.5 Additional information:

Don't use a brush or compressed air for cleaning surfaces or clothing.
Clear spills immediately.

7 Handling and storage

7.1 Precautions for safe handling:

7.1.1 Protective measures:

Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Use only in a chemical fume hood.

7.1.2 Advice on general occupational hygiene:

Use only in a well-ventilated area. Do not get on skin or in eyes. Do not ingest or inhale. Discard contaminated shoes. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry place. Store in a tightly closed container. Store under nitrogen.

7.3 Specific end use(s):

Not applicable.

8 Exposure control/personal protection

8.1 Control parameters:

8.1.1 Occupational exposure limits: Not available.

8.1.2 Additional exposure limits under the conditions of use: Not available.

8.1.3 DNEL/DMEL and PNEC-Values: Not available.

8.2 Exposure controls

8.2.1Appropriate engineering controls:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Use a flame proof exhaust ventilation system.

8.2.2 Individual protection measures, such as personal protective equipment:

Eye/face protection	Tightly fitting safety goggles and face shield EN166.
Hand protection	Chemical resistant gloves meeting EN374. Chloroprene and butyl rubber may be suitable glove material.
Body protection	Wear chemical resistant apron and boots EN465.
Respiratory protection	Wear an NIOSH approved respirator or gas filter for gases/vapours of organic compounds conforming with EN141.
Thermal hazards	Wear suitable protective clothing to prevent heat.

8.2.3 Environmental exposure controls:
Avoid discharge into the environment. This material and its container must be disposed of as hazardous waste.
According to local regulations, Federal and official regulations.

9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	Molten
Colour:	Grey brown
Odour:	Not available
Odour threshold:	Not available
pH:	9.2
Melting point/range (°C):	63°C
Boiling point/range (°C) :	282-284°C
Flash point (°C) :	138°C (280°F)
Evaporation rate:	Not applicable
Flammability (solid, gas);	Not flammable
Ignition temperature (°C) :	Not determined
Upper/lower flammability/explosive limits:	Not determined
Vapour pressure (20°C) :	0.08kpa
Vapour density:	3.7 (Air = 1)
Relative Density (25°C):	1.14 at 15°C ; 1.10at 75°C
Bulk density :	3.7 g/cm3
Water solubility (g/l) at 20°C :	35.1at 25°C Dissolve tiny in cool water
n-Octanol/Water (log Po/w) :	Not applicable
Auto-ignition temperature:	560°C (1040°F)
Decomposition temperature:	Not available

Viscosity, dynamic (mPa s) :	Not available
Explosive properties:	Not available
Oxidising properties:	Not applicable

9.2. Other information:

Fat solubility(solvent– oil to be specified) etc:	Not available
Bulk density:	Not available
Surface tension:	Not available
Dissociation constant in water(pKa):	Not available
Oxidation-reduction Potential:	Not available

10 Stability and reactivity

10.1 Reactivity:

The substance is stable under normal storage and handling conditions.

10.2 Chemical stability:

Darkens on exposure to light and air. Air sensitive.

10.3 Possibility of hazardous reactions:

Under normal conditions, not hazardous reactions will occur.

10.4 Conditions to avoid:

Incompatible materials, exposure to air.

10.5 Incompatible materials:

Strong oxidizing agents, acids, acid chlorides, acid anhydrides, chloroformates.

10.6 Hazardous decomposition products:

Nitrogen oxides, carbon monoxide, carbon dioxide.

11 Toxicological information

11.1 Toxicokinetics, metabolism and distribution

Non-human toxikological data:	Not available
Method:	Not available
Dosis:	Not available
Routes of administration:	Not available
Results:	Not available
Absorption:	Not available
Distribution:	Not available
Metabolism:	Not available
Excretion:	Not available

11.2 Information on toxicological effects

Acute toxicity:

LD50(Oral, Rat):	650mg/kg
LD50(Oral Rabbit):	Not available

LD50(Inhalation, Rat):	Not available
Skin corrosion/Irritation:	Cause allergic skin reaction
Serious eye damage/irritation:	Causes eye irritation
Respiratory or skin sensitization:	Not classified
Germ cell mutagenicity:	Suspected of causing genetic defects.
Carcinogenicity:	No information found
reproductive toxicity:	Not classified
STOT- single exposure:	Not classified
STOT-repeated exposure:	Not classified
Aspiration hazard:	Not classified

12 Ecological information

Toxicity:

Acute toxicity		*Time*	*Species*	*Method*	*Evaluation*	*Remarks*
LC50	N/A	96h	Fish	OECD 203	N/A	N/A
LC50	N/A	48h	Daphnia	OECD 202	N/A	N/A
EC50	N/A	96h	Algae	OECD 201	N/A	N/A

Persistence and degradability:	Not available.
Bioaccumulative potential:	Not bioaccumulative.
Mobility in soil:	Not available.
Results of PBT&vPvB assessment:	Not PBT or vPvB substance.
Other adverse effects:	Not applicable.

13 Disposal considerations

13.1 Waste treatment methods

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification. Federal, local or national regulations for proper disposal.

13.2 Product / Packaging disposal:

Disposal must be made according to official regulations.

14 Transport information

	Land transport (ADR/RID)	*Sea transport (IMDG)*	*Air transport (ICAO/IATA)*
UN-Number:	UN1673	UN1673	UN1673
UN Proper shipping name:	PHENYLENEDIAMINES (M-)	PHENYLENEDIAMINES (M-)	PHENYLENEDIAMINES (M-)
Transport hazard Class:	6.1	6.1	6.1
Packaging group:	III	III	III
Environmental hazards:	Not regulated	Not regulated	Not regulated
Special precautions for user:	See section 2.2	See section 2.2	See section 2.2

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	IBC08	IBC08	IBC08

15 Regulation information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant information regarding authorization: Not applicable.
Relevant information regarding restriction: Not applicable.
Other EU regulations: Employment restrictions concerning young person must be observed. For use only by technically qualified individuals.
Other National regulations: Not applicable
Chemical Safety Assessment has been carried out? YES [ ] NO [X]

16 Other information

16.1 Indication of changes Version 1.1 Amended by EU No 453/2010

16.2 Relevant R- phrases (number and full text):

R23/24/25: Toxic by inhalation, in contact with skin and if swallowed.

R36: Irritating to eyes.

R43: May cause sensitization by skin contact.

R68: Possible risk of irreversible effects.

R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

16.3 Training instructions:

Not applicable.

16.4 Further Information:

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

16.5 Notice to reader:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgment of suitability of this information to ensure proper use and protect the health and safety of employees.

This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
Z-1S	Fugitive	Mandrel Release Coating Table	2016	N/A	Installation	
Z-2S	Fugitive	Adapter Degreasing Table	2016	N/A	Installation	
Z-3S	Z-3E	BR-127 Primer Booth	2017	2 gal/hr	Installation	Z-1C
Z-4S	Z-4E	Adapter/BR-127 Oven	2017	N/A	Installation	
Z-5S	Z-5E	Interior Degreasing Exhaust	2016	N/A	Installation	
Z-6S	Z-6E	Degreasing Drying Station	2016	N/A	Installation	
Z-7S	Z-7E	Chemlok Mixing Hood	2016	N/A	Installation	
Z-8S	Z-8E	Chemlok Application Booth	2016	1 gal/hr	Installation	Z-2C
Z-9S	Z-9E	Chemlok Drying Station	2016	N/A	Installation	
Z-10S	Z-10E	Insulator Prep Exhaust	2016	N/A	Installation	
Z-11S	Z-11E	Oven for Insulator Drying	2016	N/A	Installation	
Z-12S	Z-12E	Bondliner Mixing Hood	2017	N/A	Installation	
Z-13S	Z-13E	Bondliner Application Booth	2017	1 gal/hr	Installation	Z-3C
Z-14S	Z-14E	Bondliner Drying Station	2017	N/A	Installation	
Z-15S	Z-15E	Case Machining	2016	2 units/hr	Installation	Z-4C
Z-16S	Fugitive	End Closure Adapter Wiping Station	2016	N/A	Installation	

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
Z-1S	Fugitive	Mandrel Release Coating Table	2016	N/A	Installation	
Z-2S	Fugitive	Adapter Degreasing Table	2016	N/A	Installation	
Z-3S	Z-3E	BR-127 Primer Booth	2017	2 gal/hr	Installation	Z-1C
Z-4S	Z-4E	Adapter/BR-127 Oven	2017	N/A	Installation	
Z-5S	Z-5E	Interior Degreasing Exhaust	2016	N/A	Installation	
Z-6S	Z-6E	Degreasing Drying Station	2016	N/A	Installation	
Z-7S	Z-7E	Chemlok Mixing Hood	2016	N/A	Installation	
Z-8S	Z-8E	Chemlok Application Booth	2016	1 gal/hr	Installation	Z-2C
Z-9S	Z-9E	Chemlok Drying Station	2016	N/A	Installation	
Z-10S	Z-10E	Insulator Prep Exhaust	2016	N/A	Installation	
Z-11S	Z-11E	Oven for Insulator Drying	2016	N/A	Installation	
Z-12S	Z-12E	Bondliner Mixing Hood	2017	N/A	Installation	
Z-13S	Z-13E	Bondliner Application Booth	2017	1 gal/hr	Installation	Z-3C
Z-14S	Z-14E	Bondliner Drying Station	2017	N/A	Installation	
Z-15S	Z-15E	Case Machining	2016	2 units/hr	Installation	Z-4C
Z-16S	Fugitive	End Closure Adapter Wiping Station	2016	N/A	Installation	

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
Z-3E	Horizonal stack	Z-3S	BR-127 Primer Booth	Z-1C	Fabric or Paper Filter	2 hr / day	520	**VOC**	**3.53**	**1836**	**3.53**	**1836**	Vapor	MB	
								2-Ethoxyethanol	0.618	321	0.618	321			
								MEK	2.471	1285	2.471	1285			
								Methanol	0.0353	19	0.0353	19			
								Formaldehyde	0.002	1.04	0.002	1.04			
								PM	**0.039**	**20**	**0.02**	**10**	Solid		
								Strontium chromate	0.098	51	0.0049	2.6			
Z-4E	Horizonal stack	Z-4S	BR-127 Drying Oven			2 hr / day	520	**VOC**	**0.19**	**97**	**0.19**	**97**	Vapor	MB	
								2-Ethoxyethanol	0.033	17	0.033	17			
								MEK	0.133	69	0.133	69			
								Methanol	0.002	1.04	0.002	1.04			
								Formaldehyde	0.0001	0.05	0.0001	0.05			
Z-5E	Horizonal stack	Z-5S	Interior Degreasing Exhaust			2 hr / day	520	VOC-Isopropanol	**9.38**	**4878**	**9.38**	**4878**	Vapor	MB	1,671
Z-6E	Horizonal stack	Z-6S	Degreasing Drying Station			2 hr / day	520	VOC-Isopropanol	**0.99**	**257**	**0.99**	**257**	Vapor	MB	176

Z-7E	Horizonal stack	Z-7S	Chemlok Bondline Mixing Hood			3 hr / day (1 hr per batch)	780 260	**Chemlok 205**								
								VOC	**0.24**	**62**	**0.24**	**62**	Vapor	MB	24
								MEK	0.106	28	0.106	28			30
								Ethyl benzene	0.009	3	0.009	3			22
								MIBK	0.100	26	0.100	26			21
								Xylene	0.025	7	0.025	7			20
								Chemlok 234X							
								VOC	**0.33**	**85**	**0.33**	**85**			30
								Ethyl benzene	0.033	9	0.033	9			28
								Toluene	0.181	47	0.181	47			32
								Xylene	0.116	30	0.116	30			28
								Bondliner							
								Ethyl acetate	**0.23**	**59**	**0.23**	**59**			8
								Max VOC/hr	***0.33***	***86***	***0.33***	***86***			
								Total VOC		***206***		***206***			

Z-8E	Horizonal stack	Z-8E	Chemlok Bondline Spray Booth	Z-2C	Fabric or Paper Filter	9 hr / day 2 hr for Chem 205 2 hr for Chem 234X 2 hr for BL 1 hr for each cleanup cycle (2 toluene and 1 MEK)	2,860 520 520 520 260x2 260x1	**Chemlok 205**								
								VOC	**2.81**	**1459**	**2.81**	**1459**	Vapor	MB	204
								MEK	1.245	648	1.245	648			250
								Ethyl benzene	0.098	51	0.098	51			170
								MIBK	1.175	611	1.175	611			180
								Xylene	0.292	152	0.292	152			169
								PM	**0.537**	**279**	**0.027**	**14**	Solid		
								Chemlok 234X							
								VOC	**3.37**	**1752**	**3.37**	**1752**	Vapor		220
								Ethyl benzene	0.338	176	0.338	176			204
								Toluene	1.851	963	1.851	963			235
								Xylene	1.182	615	1.182	615			204
								PM	**0.097**	**51**	**0.005**	**3**	Solid		
								Bondliner							
								Ethyl acetate	**3.78**	**1963**	**3.78**	**1963**	Vapor		91
								Cleanup							
								Toluene	**3.63**	**1890**	**3.63**	**1890**	Vapor		461
								MEK	**3.36**	**874**	**3.36**	**874**			724
								Max VOC/hr	***3.78***	***1963***	***3.78***	***1963***			
								Total VOC		***7938***		***7938***			
								Max PM/hr	***0.537***	***279***	***0.027***	***14***			
								Total PM		***330***		***17***			

Z-9E	Horizonal stack	Z-9S	Chemlok Bondline Drying Station			6 hr / day 2 hr per coating	1,560 520	**Chemlok 205**								
								VOC	**0.148**	**77**	**0.148**	**77**	Vapor	MB	11
								MEK	0.066	35	0.066	35			13
								Ethyl benzene	0.005	3	0.005	3			9
								MIBK	0.062	33	0.062	33			10
								Xylene	0.015	8	0.015	8			9
								Chemlok 234X							
								VOC	**0.177**	**92**	**0.1778**	**92**			12
								Ethyl benzene	0.018	10	0.018	10			11
								Toluene	0.097	51	0.097	51			12
								Xylene	0.015	8	0.015	8			3
								Bondliner							
								Ethyl acetate	**0.199**	**103**	**0.199**	**103**			5
								Max VOC/hr	***0.199***	***103***	***0.199***	***103***			
								Total VOC		***272***		***272***			
Z-10E	Horizonal stack	Z-10S	Insulator Prep Exhaust			2 hr / day	520	VOC-Isopropanol	**9.38**	**4878**	**9.38**	**4878**	Vapor	MB	1,671
Z-11E	Horizonal stack	Z-11S	Insulator Drying Oven			2 hr / day	520	VOC-Isopropanol	**0.99**	**257**	**0.99**	**257**	Vapor	MB	176

Z-12E	Horizonal stack	Z-12S	Bondline Chemlok Mixing Hood			3 hr / day (1 hr per batch)	780 260	**Chemlok 205**									
								VOC	**0.24**	**62**	**0.24**	**62**	Vapor	MB	24
								MEK	0.106	28	0.106	28			30
								Ethyl benzene	0.009	3	0.009	3			22
								MIBK	0.100	26	0.100	26			21
								Xylene	0.025	7	0.025	7			20
								Chemlok 234X							
								VOC	**0.33**	**85**	**0.33**	**85**			30
								Ethyl benzene	0.033	9	0.033	9			28
								Toluene	0.181	47	0.181	47			32
								Xylene	0.116	30	0.116	30			28
								Bondliner							
								Ethyl acetate	**0.23**	**59**	**0.23**	**59**			8
								Max VOC/hr	***0.33***	***86***	***0.33***	***86***			
								Total VOC		***206***		***206***			

Z-13E	Horizonal stack	Z-13S	Bondline Chemlok Spray Booth	Z-3C	Fabric or Paper Filter	9 hr / day 2 hr for Chem 205 2 hr for Chem 234X 2 hr for BL 1 hr for each cleanup cycle	2,860 520 520 520 260x3	**Chemlok 205**									
								VOC	**2.81**	**1459**	**2.81**	**1459**	Vapor	MB	204
								MEK	1.245	648	1.245	648			250
								Ethyl benzene	0.098	51	0.098	51			170
								MIBK	1.175	611	1.175	611			180
								Xylene	0.292	152	0.292	152			169
								PM	**0.537**	**279**	**0.027**	**14**	Solid		
								Chemlok 234X							
								VOC	**3.37**	**1752**	**3.37**	**1752**	Vapor		220
								Ethyl benzene	0.338	176	0.338	176			204
								Toluene	1.851	963	1.851	963			235
								Xylene	1.182	615	1.182	615			204
								PM	**0.097**	**51**	**0.005**	**3**	Solid		
								Bondliner							
								Ethyl acetate	**3.78**	**1963**	**3.78**	**1963**	Vapor		91
								Cleanup							
								Toluene	**3.63**	**1890**	**3.63**	**1890**	Vapor		461
								MEK	**3.36**	**874**	**3.36**	**874**			724
								Max VOC/hr	***3.78***	***1963***	***3.78***	***1963***			
								Total VOC		***7938***		***7938***			
								Max PM/hr	***0.537***	***279***	***0.027***	***14***			
								Total PM		***330***		***17***			

Z-14E	Horizonal stack	Z-14S	Bondline Chemlok Drying Station			3 hr / day (1 hr per batch)	780 260	**Chemlok 205**								
								VOC	**0.148**	**77**	**0.148**	**77**	Vapor	MB	11	
								MEK	0.066	35	0.066	35			13	
								Ethyl benzene	0.005	3	0.005	3			9	
								MIBK	0.062	33	0.062	33			10	
								Xylene	0.015	8	0.015	8			9	
								Chemlok 234X								
								VOC	**0.177**	**92**	**0.1778**	**92**			12	
								Ethyl benzene	0.018	10	0.018	10			11	
								Toluene	0.097	51	0.097	51			12	
								Xylene	0.015	8	0.015	8			3	
								Bondliner								
								Ethyl acetate	**0.199**	**103**	**0.199**	**103**			5	
								Max VOC/hr	***0.199***	***103***	***0.199***	***103***				
								Total VOC		***272***		***272***				
Z-15E	Horizonal stack	Z-15S	Case Machining	Z-4C	Cyclone Dust Collector	24 hr / day	6,240	PM	0.6	3744	0.06	375				

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
Z-3E	2	Ambient	5600	40	672.16	20	143758.17	2249.18
Z-4E	0.5	385	650	55	672.16	20	143758.17	2249.18
Z-5E	0.5	Ambient	600	51	672.16	20	143758.17	2249.18
Z-6E	0.5	Ambient	600	51	672.16	20	143758.17	2249.18
Z-7E	0.83	Ambient	720	22	672.16	20	143758.17	2249.18
Z-8E	0.5	Ambient	1000	85	672.16	20	143758.17	2249.18
Z-9E	0.5	Ambient	1000	85	672.16	20	143758.17	2249.18
Z-10E	0.5	Ambient	600	51	672.16	20	143758.17	2249.18
Z-11E	0.5	350	650	55	672.16	20	143758.17	2249.18
Z-12E	0.83	Ambient	720	22	672.16	20	143758.17	2249.18
Z-13E	0.5	Ambient	1000	85	672.16	20	143758.17	2249.18
Z-14E	0.5	Ambient	1000	85	672.16	20	143758.17	2249.18
Z-15E	1.08	Ambient	3600	40	672.16	20	143758.17	2249.18

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☐ Yes ☒ No ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☐ Yes ☒ No ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☐ Yes ☒ No ☐ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☒ Yes ☐ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	Not Applicable					
Unpaved Haul Roads	Not Applicable					
Storage Pile Emissions	Not Applicable					
Loading/Unloading Operations	Not Applicable					
Wastewater Treatment Evaporation & Operations	Not Applicable					
Equipment Leaks	Not Applicable					
General Clean-up VOC Emissions	Not Applicable					
Other	Z-1S – VOC (Frekote 700NC) Z-2S – VOC (IPA) Z-2S – VOC (MEK) Z-16S – VOC (IPA) TOTAL VOC	4.06 2.47 1.26 2.47	3164 1284 656 1284 6388	4.06 2.47 1.26 2.47	3164 1284 656 1284 6388	MB

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-1S (Fugitive Emissions)

1. Name or type and model of proposed affected source:

   Mandrel Release Coating Application Table

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   4.06 lbs per hour of Frekote 700-NC mold release agent to winding mandrels for 8 cases per shift. Mold release agent is applied to mandrels prior to winding cases using fiberglass fiber and epoxy resin. A maximum of 8 cases would be wound per shift with winding occurring 3 shifts a day for a total of 24 cases wound per day.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   Case winding takes 6-8 hours per case with 24 units being wound in a 24 hour period.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	3	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	4.06	lb/hr	4.74	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of winds each shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

BUILDING 256 - GMLRS
PERMIT R13-????
MANDREL COATING RECORD (Z-1E)

DATE	FREKOTE 700-NC # of mandrels coated Daily	FREKOTE 700-NC # of mandrels coated YTD (6240)	FREKOTE 700-NC volume of coating (ounces) Daily	FREKOTE 700-NC volume of coating (ounces) YTD (64,370)	Application Time (hours)	Application Time YTD	** Pounds Daily	** Pounds YTD (3,045)	** Pounds/Hr
12/31/2016	6	6	61.8	61.8	1	1	3.04	3.04	3.04
1/1/2017	8	14	82.4	144.2	1	2	7.09	10.12	7.09
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!
		14		144.2		2		10.12	#DIV/0!

Frekote used per mand 10.3 ounces
**Environmental group use only - this column will not be on the production floor record sheet

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-2S (Fugitive Emissions)

1. Name or type and model of proposed affected source:

   Adapter Degreasing Table

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   2.47 lbs per hour of isopropyl alcohol (IPA) used to degrease adapter pieces (24/hr) prior to applying corrosion inhibitor.
   1.26 lbs per hour of methyl ethyl ketone (MEK) used as a wipe check on adapters after corrosion inhibitor has been applied and cured.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   24 adapter pieces degreased ready for application of corrosion inhibitor. 48 pieces would be processed per day.

   24 adapters with cured corrosion inhibitor. 48 pieces would be processed per day.

   2 hours per day alloted to degreasing operation and 2 hours for cure checks.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	4	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	2.47	lb/hr	2.88	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of adapters degreased and the number of adapters wipe tested to check for complete coating cure. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

BUILDING 256 - GMLRS
PERMIT R13-????
ADAPTER DEGREASING RECORD (Z-2E)

DATE	DEGREASING (IPA) # of adapters degreased Daily	DEGREASING (IPA) # of adapters degreased YTD (12,480)	DEGREASING (IPA) Volume (ounces) Daily	DEGREASING (IPA) Volume (ounces) YTD (24,960)	Processing Time (hours)	Processing Time YTD	** Pounds Daily	** Pounds YTD (3,045)	** Pounds/Hr
12/31/2016	48	48	96	96	2	2	4.94	4.94	2.47
1/1/2017	48	96	96	192	2	4	4.94	9.87	2.47
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!
		96		192		4		9.87	#DIV/0!

IPA per adapter 2 oz
MEK per adapter 1 oz
**Environmental group use only - this column will not be on the production floor record sheet

BUILDING 256 - GMLRS
PERMIT R13-????
ADAPTER CURE CHECK RECORD (Z-2E)

DATE	CURE CHECKS (MEK) # adapters cure checked Daily	CURE CHECKS (MEK) # adapters cure checked YTD (12,480)	CURE CHECKS (MEK) Volume (ounces) Daily	CURE CHECKS (MEK) Volume (ounces) YTD (12,480)	Processing Time (hours)	Processing Time YTD	** Pounds Daily	** Pounds YTD (3,045)	** Pounds/Hr
12/31/2016	48	48	48	48	2	2	2.52	2.52	1.26
1/1/2017	48	96	48	96	2	4	2.52	5.05	1.26
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
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		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!
		96		96		4		5.05	#DIV/0!

IPA per adapter
MEK per adapter
**Environmental group use only - this column will not be on the production floor record sheet

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-3S (Z-3E)

1. Name or type and model of proposed affected source:

   BR-127 Primer Application Booth - Pittsburgh Spray Booth

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   3.53 lbs of BR-127 Corrosion Inhibiting Primer used to coat 24 adapters per hour. Estimate that 95% of coating emissions will be lost from application booth and remaining 5% will be lost from the curing oven.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   24 inhibitor coated adapters per hour. 48 adapters will be coated per shift.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	2	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}	0.392	lb/hr	0.457	grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	3.53	lb/hr	4.12	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
	Formaldehyde	0.002	lb/hr	0.0023	grains/ACF
	Methanol	0.035	lb/hr	0.041	grains/ACF
	Strontium chromate	0.0098	lb/hr	0.0114	grains/ACF
			lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of adapters coated each shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	If testing is required by the Director, it will be conducted using the required EPA methods.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

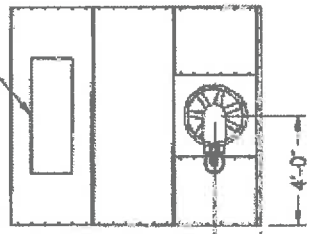
Z-35 (BR-127 Primer Booth)

NOTE
1. BOOTH IS FABRICATED FROM UNPAINTED 18 GA. GALVANIZED SHEET STEEL, PRE-PUNCHED AND COMPANION FLANGED FOR BOLT TOGETHER ASSEMBLY.

FAN & MOTOR DATA		
DIA.	CFM @ .25" S.P.	MOTOR HP
24"	5800	2.0

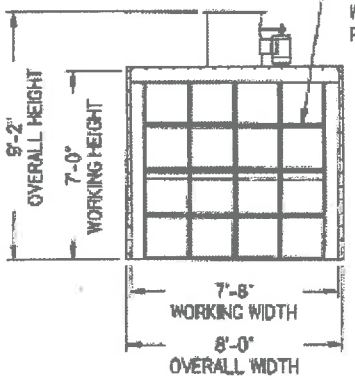
TYPE	ENCLOSURE	PHASE	VOLTAGE
T1S	TEFC	1	DUAL-VOLT
T3S	TEFC	3	575
T3T	TEFC	3	THRU-VOLT
T1D	EXPL PROOF	1	DUAL-VOLT
T3S	EXPL PROOF	3	575
T3T	EXPL PROOF	3	THRU-VOLT

(1) 48" 4 TUBE DUAL VOLTAGE CLASS I DIV. 2 INSIDE ACCESS FLUORESCENT LIGHT FIXTURES (WITH TUBES)

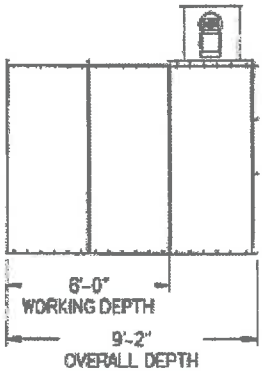


PLAN VIEW

(16) 20 x 20 EXHAUST FILTERS W/ (1) GRID & 4 RUBBER TIPS PER FILTER CELL.

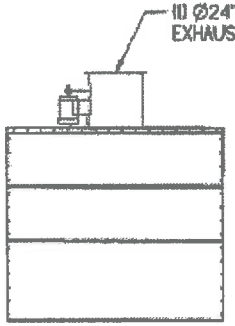


FRONT ELEVATION



SIDE ELEVATION

(1) Ø24" TUBE AXIAL EXHAUST UNIT



BACK ELEVATION

GLOBAL FINISHING SOLUTIONS™

CONCEPT REVISION

REV	DESCR	BY

CONTROL REVISION

REV	DATE	BY

PROJECT

CUSTOMER

for

DESCRIPTION
FPG-676,100
INDUSTRIAL BOOTH

APPROVED BY

SCALE	DATE
NTS	
DRAWN BY	REVIEWED BY
dquick	

WORK ORDER NUMBER

DRAWING NUMBER
-01

SHEET
1 OF 6

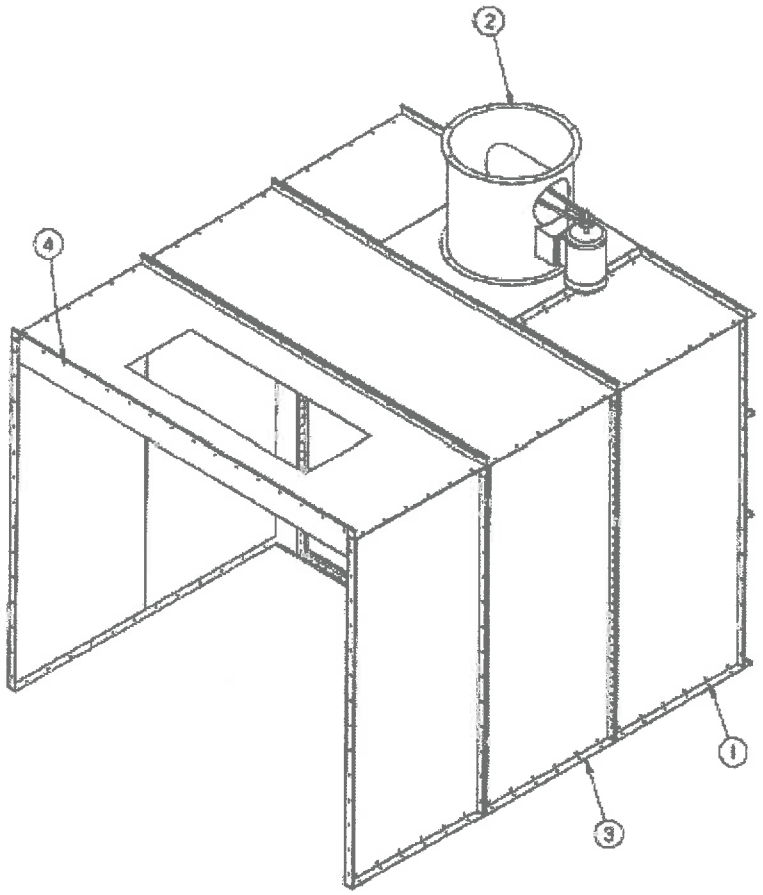
REVISED 03/15/2007

Z-35 (BR-127 Primer Booth)

#	U	D	Sled	Item	Qty	Part Number	Description	Material
				1	1	FPGEE-0007-24	EXHAUST CHAMBER 7'-8" Ig. x 7' H	
				2	1	FAN-24VP-02000	24" EXHAUST FAN	
				3	1	FPGVD-0007DS	WORKING DEPTH 6'-8" W x 7' H	
				4	1	FC-104-0920	FIRE CURTAIN 92"	18 GA

INSPECTED AND INVENTORIED BY _____

PACKED BY _____



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CONCEPT REVISION

REV	DATE	BY

CONTROL REVISION

REV	DATE	BY

PROJECT

CUSTOMER

DESCRIPTION

FPG-876.100
INDUSTRIAL BOOTH

APPROVED BY

SCALE: NTS

DATE:

DRAWN BY: dezick

REVIEWED BY:

WORK ORDER NUMBER

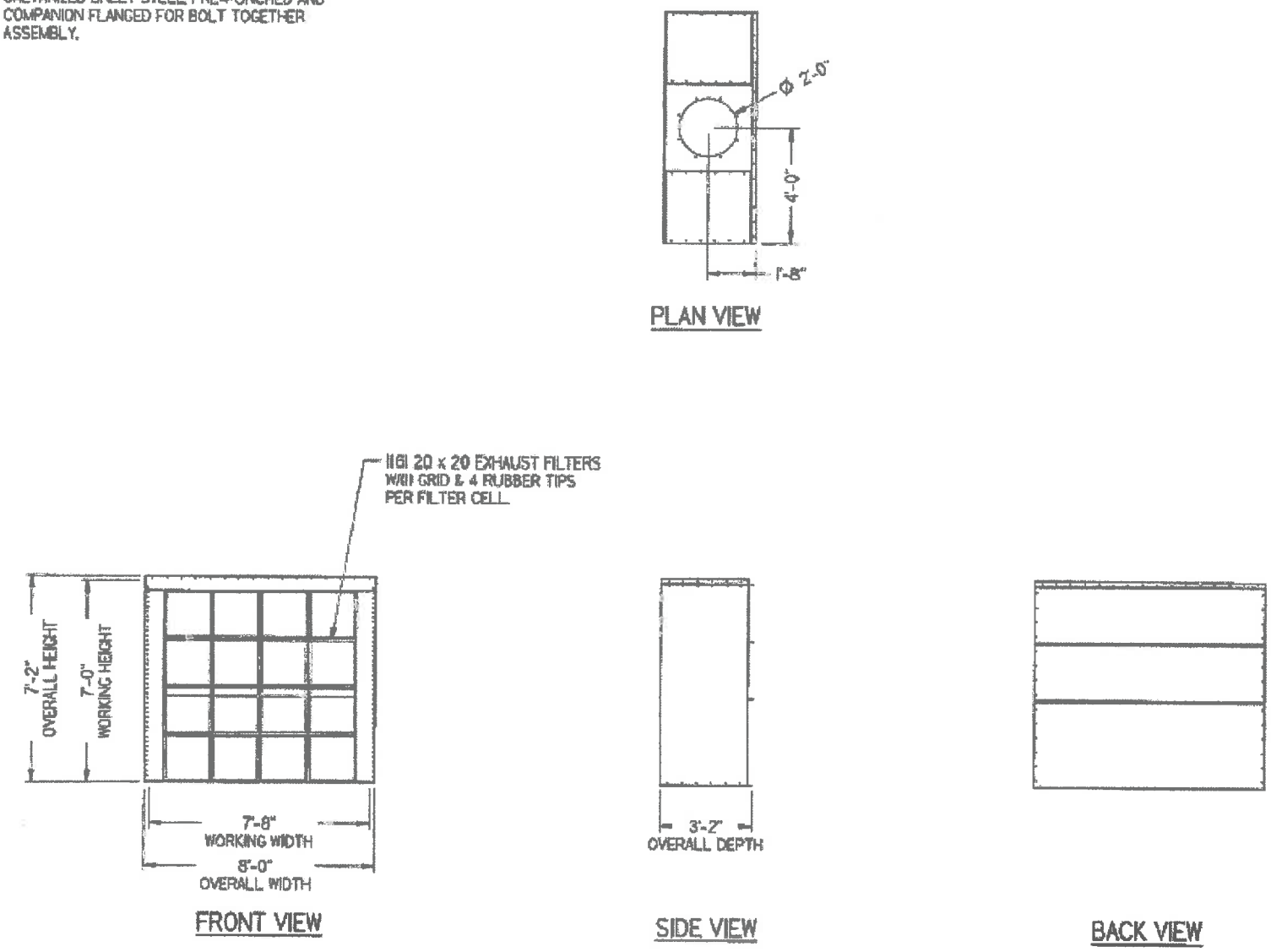
DRAWING NUMBER: -02

SHEET 2 OF 6

REVISED 03/15/2007

Z-35 (BR-127 Primer Booth)

NOTE
1. CHAMBER IS FABRICATED FROM UNPAINTED 18 GA. GALVANIZED SHEET STEEL; PRE-PUNCHED AND COMPANION FLANGED FOR BOLT TOGETHER ASSEMBLY.



GLOBAL FINISHING SOLUTIONS™

CONCEPT REVISION

CONTROL REVISION

PROJECT

CUSTOMER

DESCRIPTION
FPGEX-0807-24
EXHAUST CHAMBER

APPROVED BY

NTS	DATE
DRAWN BY dquick	REVIEWED BY

WORK ORDER NUMBER

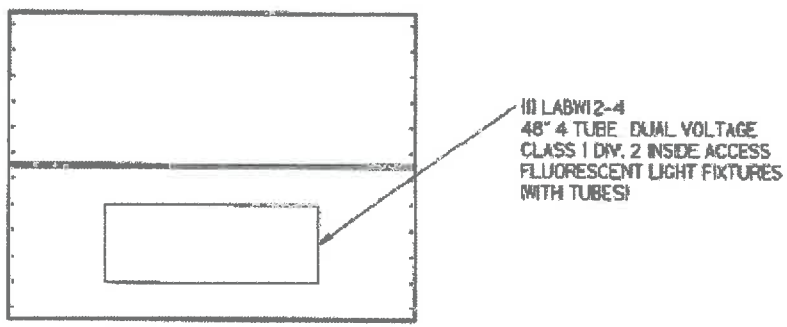
DRAWING NUMBER -03

SHEET 3 OF 6

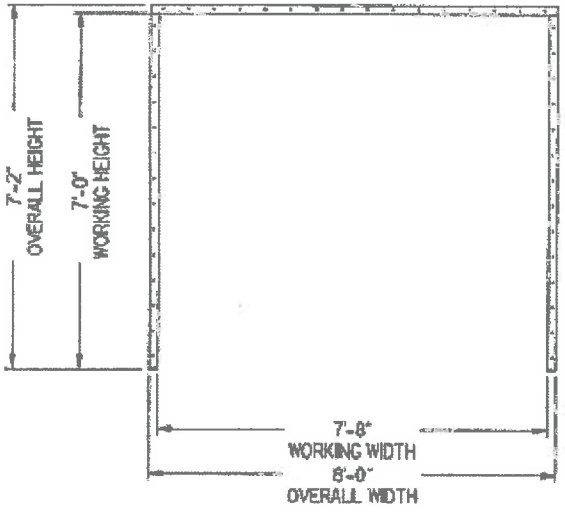
REVISED 03/15/2007

NOTE
1. BOOTH IS FABRICATED FROM UNPAINTED 18 GA. GALVANIZED SHEET STEEL; PRE-PUNCHED AND COMPANION FLANGED FOR BOLT TOGETHER ASSEMBLY.

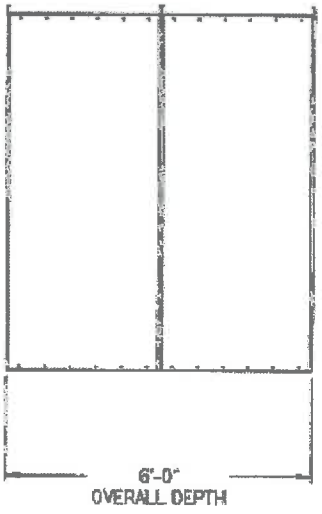
Z-38 (BR-127 Primer Booth



PLAN VIEW



FRONT ELEVATION



SIDE ELEVATION

GLOBAL FINISHING SOLUTIONS™

CONCEPT REVISION

CONTROL REVISION

PROJECT

CUSTOMER

DESCRIPTION
FPGWD-080706
LAYOUT

APPROVED BY

SCALE: NTS

DRAWN BY: dm.bck

REVIEWED BY

WORK ORDER NUMBER

DRAWING NUMBER
-05

SHEET
5 OF 6

REVISED 03/15/2007

BUILDING 256 - GMLRS
PERMIT R13-????
BR-127 PRIMER SPRAY RECORD (Z-3E) AND OVEN (Z-4E)

DATE	BR-127 PRIMER # of adapters sprayed Daily	BR-127 PRIMER # of adapters sprayed YTD (6,240)	BR-127 PRIMER Volume sprayed (ounces) Daily	BR-127 PRIMER Volume sprayed (ounces) YTD (37,440)	Application Time (hours)	Application Time YTD
12/31/2016	48	48	144	144	2	2
1/1/2017	48	96	144	288	2	4
		96		288		4
		96		288		4
		96		288		4
		96		288		4
		96		288		4
		96		288		4
		96		288		4
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		96		288		4
		96		288		4
		96		288		4
		96		288		4
		96		288		4
		96		288		4

BR-127 used is 3 oz per adapter
**Environmental group use only - this column will not be on the production floor record sheet

BUILDING 256 - GMLRS
PERMIT R13-????
BR-127 PRIMER SPRAY RECORD (Z-3E) AND OVEN (Z-4E)

**	**	**		**	**	
Total Pounds Daily	Pounds VOC from Spraying Daily	Pounds VOC from Spraying YTD (1,836)	Pounds VOC from Spraying Lbs/Hr	Pounds HAP VOC from Spraying Daily	Pounds HAP VOC from Spraying YTD (22)	Pounds HAP VOC from Spraying Lbs/Hr
8.26	7.06	7.06	3.53	0.083	0.083	0.042
8.26	7.06	14.12	3.53	0.083	0.17	0.042
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!
0.00	0.00	14.12	#DIV/0!	0.000	0.17	#DIV/0!

Lbs VOC sprayed = lbs * 90% VOC * 95% loss from spraying
Lbs HAP VOC sprayed = lbs * 1.06% VOC * 95% loss from spraying
Lbs PM sprayed = lbs * 10% PM * 0.05 for overspray and filter
Lbs HAP PM sprayed = lbs * 2.5% PM * 0.05 for overspray and filter
Lbs VOC oven = lbs * 90% VOC * 5% loss from drying oven

BUILDING 256 - GMLRS
PERMIT R13-????
BR-127 PRIMER SPRAY RECORD (Z-3E) AND OVEN (Z-4E)

**	**		**	**	
Pounds PM from Spraying Daily	Pounds PM from Spraying YTD (10)	Pounds PM from Spraying Lbs/Hr	Pounds HAP PM from Spraying Daily	Pounds HAP PM from Spraying YTD (3)	Pounds HAP PM from Spraying Lbs/Hr
0.041	0.041	0.021	0.010	0.010	0.005
0.041	0.083	0.021	0.010	0.021	0.005
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!
0.000	0.083	#DIV/0!	0.000	0.021	#DIV/0!

BUILDING 256 - GMLRS
PERMIT R13-????
BR-127 PRIMER SPRAY RECORD (Z-3E) AND OVEN (Z-4E)

**	**	**
Pounds VOC from Oven Daily	Pounds VOC from Oven YTD (97)	Pounds VOC from Oven Lbs/Hr
0.37	0.372	0.186
0.37	0.743	0.186
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
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0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!
0.00	0.743	#DIV/0!

FILTER CHECK RECORD

Building #: 256 - GMLRS

Bay or Booth #: BR-127 (Z-3E) / Chemlok (Z-8E) / Bondliner (Z-13E) Spray Booths

Supervisor:

Spray Booth Filter Checks		
Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Spray Booth Filter Checks		
Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

The only blocks that are not required to be completed for each daily check are those for comments.

Alliant Techsystems Internal Use Only

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-4S (Z-4E)

1. Name or type and model of proposed affected source:

   BR-127 Primer Curing Oven (manf. TBD)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   0.37 lbs of BR-127 Corrosion Inhibiting Primer used to coat 24 adapters per hour. Estimate that 95% of coating emissions will be lost from application booth and remaining 5% will be lost from the curing oven.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   24 inhibitor coated adapters per hour. 48 adapters will be coated per shift.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	2	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	0.19	lb/hr	0.22	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of adapters coated each shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.
Identification Number (as assigned on *Equipment List Form*): Z-5S (Z-5E)

1. Name or type and model of proposed affected source:

Interior Degreasing Exhaust for Chemlok (manufacturer TBD)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

9.38 lbs of isopropyl alcohol (IPA) used to degrease the interior of 24 rocket motor cases per hour. Estimate that 95% of degreasing emissions will be lost from the degreasing exhaust and remaining 5% will be lost from the Degreasing Drying Station for Chemlok.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

24 rocket motor cases ready to have Chemlok applied to the interior surface of the cases.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	2	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	9.38	lb/hr	10.94	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of rocket motor cases degreased each shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

BUILDING 256 - GMLRS
PERMIT R13-????
INTERIOR DEGREASING (Z-5E) AND DRYING RECORD (Z-6E)

DATE	DEGREASING (IPA) # of tubes degreased Daily	DEGREASING (IPA) # of tubes degreased YTD (6,240)	DEGREASING (IPA) Volume (ounces) Daily	DEGREASING (IPA) Volume (ounces) YTD (780)	Processing Time (hours)	Processing Time YTD	IPA (Lbs) Daily
12/31/2016	24	24	384	384	2	2	18.75
1/1/2017	24	48	384	768	2	4	18.75
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00

3 gallons of IPA used per lot of 24 units (16 oz/unit)

**Environmental group use only - this column will not be on the production floor record sheet

BUILDING 256 - GMLRS
PERMIT R13-????
INTERIOR DEGREASING (Z-5E) AND DRYING RECORD (Z-6E)

Exhaust		Drying Station		
IPA (Lbs) YTD (4878)	IPA (Lbs) Lbs/Hr	IPA (Lbs) Daily	IPA (Lbs) YTD (257)	IPA (Lbs) Lbs/Hr
18.75	9.38	0.99	0.99	0.49
37.51	9.38	0.99	1.97	0.49
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-6S (Z-6E)

1. Name or type and model of proposed affected source:

   Interior Degreasing Drying Station (manufacturer TBD)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   0.49 lbs of isopropyl alcohol (IPA) used to degrease the interior of 24 rocket motor cases per 2 hour. This rate is based on an estimate that 95% of degreasing emissions will be lost from the degreasing exhaust and remaining 5% will be lost from the Drying Station.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   12 rocket motor cases ready to have Chemlok applied to the interior surface of the cases after degreasing.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	2	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.49 (degrease)	lb/hr	0.57 grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of rocket motor cases degreased each shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-7S (Z-7E)

1. Name or type and model of proposed affected source:

   Chemlok Mixing Hood / Bondliner Mixing Hood - LabConco Basic 47
   (The intent is to have 2 separate hoods for Chemlok and bondliner mixing. However, we would like to permit the mixing hood to accommodate both Chemlok and bondliner mixing in the event that we only have a single hood installed prior to startup as well as a backup in case one or the other would be down for maintenance for any reason.)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   0.55 lbs of VOC from the operations of weighing out and mixing Chemlok with thinning solvent to prepare for Chemlok application to the interior surfaces of rocket motor cases. ~ 4 gallons of material are mixed per lot of 24 units sprayed each shift. There are 2 separate mixing operations for Chemlok 205/MEK (1.88 gal) and Chemlok 234X/Toluene (2.34 gal). It is estimated that there will be about a 2% emission loss during this process. Each mixing operation will be completed in less than 1 hour per shift.

   0.23 lbs of VOC from the operations of weighing out and mixing bonliner ingredients to prepare for bondliner application to the interior insulator surfaces of rocket motor cases. ~ 2 gallon of bondliner is mixed per lot of 24 units sprayed each shift. It is estimated that there will be about a 2% emission loss during this process. Each mixing operation will be completed in less than 1 hour per shift.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   1.88 gallons of Chemlok 205/MEK mixture.
   2.34 gallons of Chemlok 234X/Toluene mixture.

   1.8 gallons of bondliner mixture.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	3	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_x		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	0.24 (Chemlok 205) 0.33 (Chemlok 234X) 0.23 (bondliner)	lb/hr	0.28 0.385 0.268	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
	Ethyl benzene	0.009 (Chemlok 205) 0.033(Chemlok 234X)	lb/hr	0.011 0.039	grains/ACF
	MIBK	0.100 (Chemlok 205)	lb/hr	0.117	grains/ACF
	Toluene	0.181 (Chemlok 234X)	lb/hr	0.211	grains/ACF
	Xylene	0.025 (Chemlok 205) 0.116 (Chemlok 234X)	lb/hr	0.029 0.135	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of batches mixed per shift with batch weights. The daily number of batches shall be added to a spreadsheet with emission rates per lot to determine emissions per year. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Chemlok Mixing Hood (Z-7S)

BUILDING 256 - GMLRS
PERMIT R13-????
CHEMLOK 205/234X BATCH RECORD (Z-7E or 7-12E)

DATE	CHEMLOK 205 (1.88 gal batch)				CHEMLOK 234X (2.34 gal batch)			
	# of batches mixed		Volume (gallons)		# of batches mixed		Volume (gallons)	
	Daily	YTD (260)	Daily	YTD (489)	Daily	YTD (260)	Daily	YTD (608)
12/31/2016	1	1	1.88	1.88	1	1	2.34	2.34
1/1/2017	1	2	1.88	3.76	1	2	2.34	4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68
		2		3.76		2		4.68

**Environmental group use only - this column will not be on the production floor record sheet

BUILDING 256 - GMLRS
PERMIT R13-????
CHEMLOK 205/234X BATCH RECORD (Z-7E)

**		***		***	
Annual Pounds Mixed		Annual Pounds VOC Emitted		Annual Pounds HAP VOC Emitted	
Chemlok 205 (3,629)	Chemlok 234X (4,645)	Chemlok 205 (62)	Chemlok 234X (85)	Chemlok 205 (28)	Chemlok 234X (85)
13.96	17.87	0.24	0.33	0.002	0.006
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013
27.91	35.73	0.56	0.71	0.004	0.013

**Annual VOC emitted = lbs mixed * %VOC (84.6/91.1%) * 2% loss from mix hood
***Annual HAP VOC emitted = lbs mixed * % HAP VOC (39.1/91.1%) * 2% loss from mix hood

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-8S (Z-8E)

1. Name or type and model of proposed affected source:

Chemlok Application Booth / Bondliner Application Booth - Pillar M-1740 Spray System
(The intent is to have 2 separate booths for Chemlok and bondliner application. However, we would like to permit the application booth to accommodate both Chemlok and bondliner spraying in the event that we only have a single booth installed prior to startup as well as a backup in case one or the other would be down for maintenance for any reason.)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

The Chemlok Application Booth will be used twice per shift for a 3 hour period each time. The first application is Chemlok 205/MEK at a rate of 0.893 gallons per lot or approx 0.4465 gallon/hr. The second application is Chemlok 234X/Toluene at a rate of 0.969 gallons per lot or approx 0.4845 gallon/hr. Each spray cycle coats the interior surface of 24 units with the adhesive primer mixture in a 2 hour period. It is estimated that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Chemlok Drying Station. In addition, two 1 hour periods per shift will be used to clean the coating equipment lines and spray pots after each Chemlok process using MEK for the Chemlok 205 and Toluene for the Chemlok 234X. It is estimated that there will be a loss of about 0.5 gallons of each solvent during cleanup (3.36 and 3.63 lbs respectively).

See Section 5 for continuation of Bondliner information.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

12 units coated with the Chemlok 205 mixture or 12 units coated with the Chemlok 234X mixture.

12 units coated with the bondliner mixture.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

Section 5 - Not applicable.

Continuation of Section 3 for bondliner:
The Bondliner Application Booth will be used each shift for a 3 hour period. Bondliner mixture is applied at a rate of 1.27 gallons per lot or approx 0.635 gallon/hr. The spray cycle coats the interior insulated surface of 24 units with the bondliner mixture in a 2 hour period. It is estimated that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Chemlok Drying Station. In addition, a 1 hour period per shift will be used to clean the coating equipment lines and spray pots after the spray process using toluene. It is estimated that there will be a loss of about 0.5 gallons of toluene during cleanup (3.63 lbs).

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	9	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}	0.268 (Chemlok 205) 0.049 (Chemlok 234X)	lb/hr	0.313 0.057	grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	2.81/3.37/3.78 (205/234X/BL) 3.36 / 3.63 / 3.63(cleanup)	lb/hr	3.28 / 3.93 / 4.41 3.92 / 4.24 / 4.24	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
	Ethyl benzene	0.098 (Chemlok 205) 0.338 (Chemlok 234X)	lb/hr	0.114 0.394	grains/ACF
	MIBK	1.175 (Chemlok 205)	lb/hr	1.371	grains/ACF
	Toluene	1.851 (Chemlok 234X)	lb/hr	2.16	grains/ACF
	Xylene	0.292 (Chemlok 205) 1.182 (Chemlok 234X)	lb/hr	0.341 1.379	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of units coated per shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per lot to determine actual emissions per hour. Emissions will be broken into spray booth and drying station portions. The daily cleanup solvents shall be recorded for each spray application. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	If testing is required by the Director, it will be conducted using the required EPA methods.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

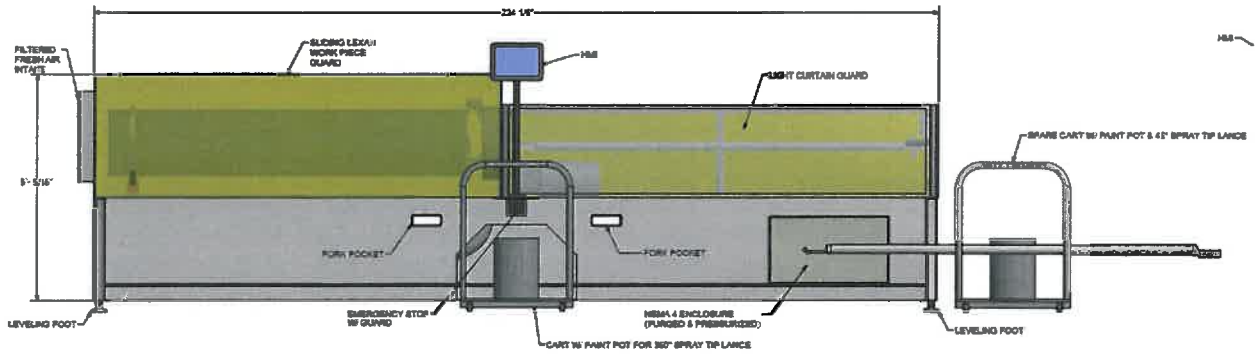
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

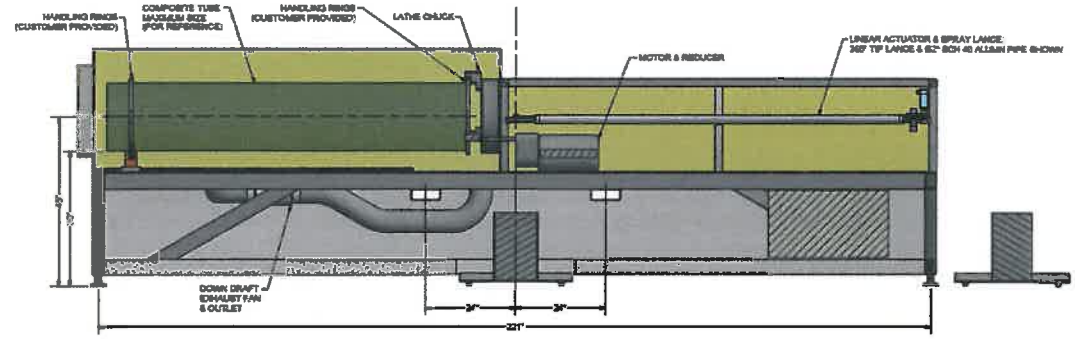
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

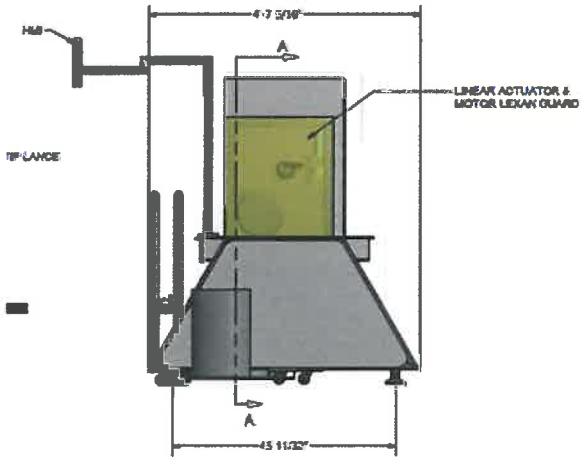
TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Chemlok Application Booth (Z-8S)







P/N: ATK SPRAY LANCE CONCEPT

BUILDING [illegible] - GMLRS
PERMIT R13-????
DAILY SPRAY BOOTH LOGSHEET

CHEMLOK 205 SPRAY BOOTH (Z-8E OR Z-13E) AND DRYING STATION (Z-9E OR Z-14E)

DATE	COATING*	START TIME	END TIME	# OF UNITS SPRAYED*	HOURS OPERATED	GRAMS SPRAYED PER UNIT	SPRAY BOOTH TOTALS			DRYING STATION TOTALS		
							TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)
12/31/2016	Chemlok 205 Gun Test	8:00 AM	8:05 AM	1	1	135	0.28	0.28	0.28	0.015	0.015	0.015
12/31/2016	Chemlok 205 Units	8:10 AM	10:00 AM	24	1.833	126	6.33	3.46	6.33	0.333	0.182	0.333
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
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							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
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							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
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							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
				25	2.833	261						

***Include the gun test quantity which is run with each lot.**
**Environmental group use only - this column will not be on the production floor record sheet

Coating*	Grams
Chemlok 205 Gun Test	135
Chemlok 205 Units	126

Spray booth total = number of units sprayed * grams / 453.6 grams/lb * 95% from spray loss
Drying station total = number of units sprayed * grams / 453.6 grams/lb * 5% from spray loss
Spray booth VOC total = Spray booth total * 84.6% VOC
Drying station VOC total = Drying station total * 84.6% VOC
Spray booth PM total = Spray booth total * 15.4% PM * 0.05 overspray and efficiency
Spray booth HAP VOC total = Spray booth total * 39.1% HAP VOC
Drying station HAP VOC total = Drying station total * 39.1% HAPVOC

BUILDING 256 - GMLRS
PERMIT R13-????
DAILY SPRAY BOOTH LOGSHEET

CI CHEMLOK 205 SPRAY BOOTH (Z-8E OR Z-13E) AND DRYING STATION (Z-9E OR Z-14E)

		SPRAY BOOTH VOC EMISSIONS			SPRAY BOOTH PM EMISSIONS			DRYING STATION VOC EMISSIONS		
DATE	COATING*	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)
12/31/2016	Chemlok 205 Gun Test	0.24	0.24	0.24	0.0022	0.0022	0.0022	0.013	0.013	0.013
12/31/2016	Chemlok 205 Units	5.36	2.92	5.36	0.0488	0.0266	0.0488	0.282	0.154	0.282
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
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		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
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		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000

***Include the gun test quantity w**
****Environmental group use onl**

Coating*

Chemlok 205 Gun Test
Chemlok 205 Units

CI

DATE	COATING*	SPRAY BOOTH HAP EMISSIONS			DRYING STATION HAP EMISSIONS		
		TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)
12/31/2016	Chemlok 205 Gun Test	0.11	0.11	0.11	0.006	0.006	0.006
12/31/2016	Chemlok 205 Units	2.48	1.35	2.48	0.130	0.071	0.130
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000

***Include the gun test quantity w**

******Environmental group use onl

Coating*

Coating*
Chemlok 205 Gun Test
Chemlok 205 Units

BUILDING [illegible] - GMLRS
PERMIT R13-????
DAILY SPRAY BOOTH LOGSHEET

CHEMLOK 234X SPRAY BOOTH (Z-8E OR Z-13E) AND DRYING STATION (Z-9E OR Z-14E)

DATE	COATING*	START TIME	END TIME	# OF UNITS SPRAYED*	HOURS OPERATED	GRAMS SPRAYED PER UNIT	SPRAY BOOTH TOTALS			DRYING STATION TOTALS		
							TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)
12/31/2016	Chemlok 234X Gun Test	8:00 AM	8:05 AM	1	1	150	0.31	0.31	0.31	0.017	0.017	0.017
12/31/2016	Chemlok 234X Units	8:10 AM	10:00 AM	24	1.833	140	7.04	3.84	7.04	0.370	0.202	0.370
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
				25	2.833	290						

***Include the gun test quantity which is run with each lot.**
**Environmental group use only - this column will not be on the production floor record sheet

Coating*	Grams
Chemlok 234X Gun Test	150
Chemlok 234X Units	140

Spray booth total = number of units sprayed * grams / 453.6 grams/lb * 95% from spray loss
Drying station total = number of units sprayed * grams / 453.6 grams/lb * 5% from spray loss
Spray booth VOC total = Spray booth total * 91.1% VOC
Drying station VOC total = Drying station total * 91.1% VOC
Spray booth PM total = Spray booth total * 2.5% PM * 0.05 overspray and efficiency
VOC and HAP VOC are the same for Chemlok 234X

BUILDING 256 - GMLRS
PERMIT R13-????
DAILY SPRAY BOOTH LOGSHEET

CH CHEMLOK 234X SPRAY BOOTH (Z-8E OR Z-13E) AND DRYING STATION (Z-9E OR Z-14E)

		SPRAY BOOTH VOC EMISSIONS			SPRAY BOOTH PM EMISSIONS			DRYING STATION VOC EMISSIONS		
DATE	COATING*	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)
12/31/2016	Chemlok 234X Gun Test	0.29	0.29	0.29	0.0004	0.0004	0.0004	0.015	0.015	0.015
12/31/2016	Chemlok 234X Units	6.41	3.50	6.41	0.0088	0.0048	0.0088	0.337	0.184	0.337
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000

***Include the gun test quantity w**
****Environmental group use onl**

Coating*

Chemlok 234X Gun Test
Chemlok 234X Units

BUILDING 256 - GMLRS
PERMIT R13-????
SPRAY CLEANUP (Z-8E OR Z-13E)

DATE	COATING	TOLUENE gallons used		MEK gallons used		TOLUENE Pounds Emitted		MEK Pounds Emitted	
		Daily	YTD (12,480)	Daily	YTD (12,480)	Daily	YTD (1,890)	Daily	YTD (875)
12/31/2016	Chemlok 205		0	2	2	0.00	0.00	3.64	3.64
12/31/2016	Chemlok 234X	2	2		2	3.37	3.37	0.00	3.64
12/31/2016	BL-034	2	4		2	3.37	6.73	0.00	3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64
			4		2		6.73		3.64

Chemlok 205 is cleaned up using 2 gallons of MEK. Estimate 25% is emitted and 75% is collected in waste drum.
Chemlok 234X and BL-034 Bondliner are cleaned up using 2 gallons of toluene. Estimate 25% is emitted and 75% is collected in waste drum.
**Environmental group use only - this column will not be on the production floor record sheet

FILTER CHECK RECORD

Building #: 256 - GMLRS

Bay or Booth #: BR-127 (Z-3E) / Chemlok (Z-8E) / Bondliner (Z-13E) Spray Booths

Supervisor:

Spray Booth Filter Checks		
Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Spray Booth Filter Checks		
Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

The only blocks that are not required to be completed for each daily check are those for comments.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-9S (Z-9E)

1. Name or type and model of proposed affected source:

Chemlok Drying Station / Bondliner Drying Station - Pillar M-1740 Spray System
(The intent is to have 2 separate drying stations for Chemlok and bondliner application. However, we would like to permit the drying stations to accommodate both Chemlok and bondliner drying in the event that we only have a single station installed prior to startup as well as a backup in case one or the other would be down for maintenance for any reason.)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

The Chemlok Drying Station will be used twice per shift for a 2 hour period each time for drying of Chemlok. The first time will be drying time for Chemlok 205/MEK at a rate of 0.047 gallons per lot or approx 0.0235 gallon/hr. The second time will be drying time for Chemlok 234X/Toluene at a rate of 0.051 gallons per lot or approx 0.0255 gallon/hr. This rate is based on an estimate that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Chemlok Drying Station.

The Bondliner Drying Station will be used each shift for a 2 hour period. This will be drying time for the Bondliner at a rate of 0.0335 gallons per lot or approx 0.0175 gallon/hr. It is estimated that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Bondliner Drying Station.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

12 dried units coated with the Chemlok 205 mixture or 12 dried units coated with the Chemlok 234X mixture.

12 dried units coated with the Bondliner mixture.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	6	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.15 (Chemlok 205) 0.18 (Chemlok 234X) 0.199 (Bondliner)	lb/hr	0.175 0.21 0.232 grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	Ethyl benzene	0.005 (Chemlok 205) 0.018 (Chemlok 234X)	lb/hr	0.006 0.021 grains/ACF
	MIBK	0.062 (Chemlok 205)	lb/hr	0.072 grains/ACF
	Toluene	0.097 (Chemlok 234X)	lb/hr	0.113 grains/ACF
	Xylene	0.015 (Chemlok 205) 0.062 (Chemlok 234X)	lb/hr	0.018 0.072 grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of units coated per shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per lot to determine actual emissions per hour. Emissions will be broken into spray booth and drying station portions. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

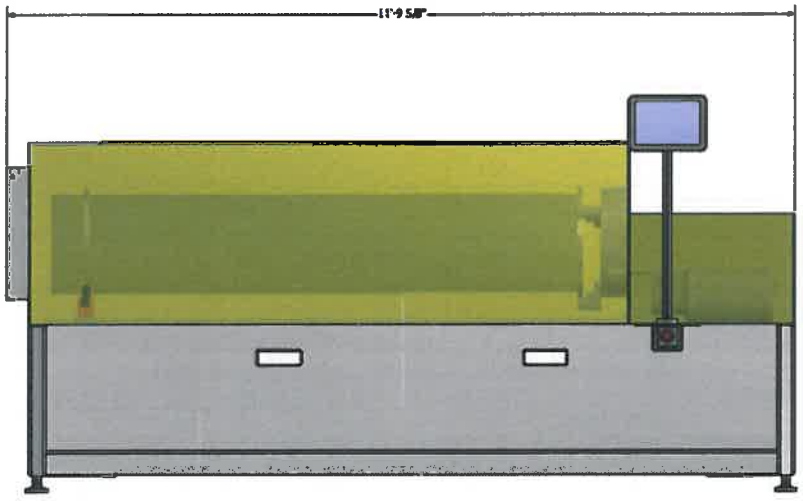
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

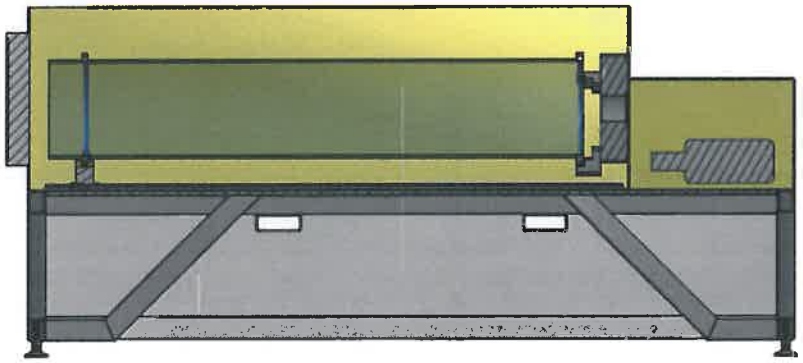
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

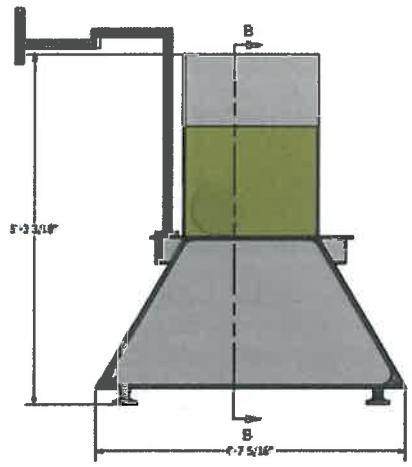
10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

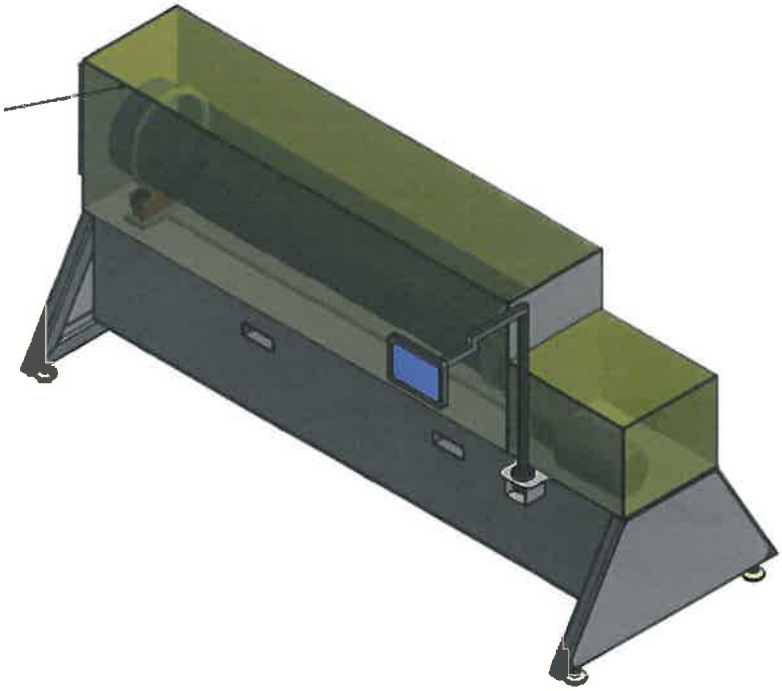
Chemlok Drying Station (Z-9S)





Chemlok Drying Station (Z-9S)





Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-10S (Z-10E)

1. Name or type and model of proposed affected source:

   Insulator Preparation Exhaust (manufacturer TBD)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   2.85 gallons of isopropyl alcohol (IPA) used to degrease the insulator in the interior of 24 rocket motor cases in a 2 hour period (1.425 gallons per hour). This is based on an estimate that 95% of degreasing emissions will be lost from the degreasing exhaust and remaining 5% will be lost from the Insulator Drying Oven.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   12 insulated rocket motor cases ready to have bond liner material applied to the interior of the cases.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	2	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	9.38	lb/hr	10.94	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of rocket motor cases degreased each shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions will be broken into degreasing drying portions. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

BUILDING 256 - GMLRS
PERMIT R13-????
INSULATOR DEGREASING (Z-10E) AND DRYING OVEN (Z-11E)

DATE	DEGREASING (IPA) # of tubes degreased Daily	DEGREASING (IPA) # of tubes degreased YTD (6,240)	DEGREASING (IPA) Volume (ounces) Daily	DEGREASING (IPA) Volume (ounces) YTD (780)	Processing Time (hours)	Processing Time YTD	IPA (Lbs) Daily
12/31/2016	24	24	384	384	2	2	18.75
1/1/2017	24	48	384	768	2	4	18.75
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00
		48		768		4	0.00

3 gallons of IPA used per lot of 24 units (16 oz/unit)

**Environmental group use only - this column will not be on the production floor record sheet

BUILDING 256 - GMLRS
PERMIT R13-????
INSULATOR DEGREASING (Z-10E) AND DRYING OVEN (Z-11E)

Exhaust		Drying Station		
IPA (Lbs) YTD (4878)	IPA (Lbs) Lbs/Hr	IPA (Lbs) Daily	IPA (Lbs) YTD (257)	IPA (Lbs) Lbs/Hr
18.75	9.38	0.99	0.99	0.49
37.51	9.38	0.99	1.97	0.49
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!
37.51	#DIV/0!	0.00	1.97	#DIV/0!

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-11S (Z-11E)

1. Name or type and model of proposed affected source:

   Insulator Drying Oven - Grieve Model MTC 8128-500

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   0.99 lbs of IPA used to degrease 12 insulated cases per hour. Estimate that 95% of coating emissions will be lost from degreasing exhaust and remaining 5% will be lost from the drying oven. Insulators must be dried at 140 F to ensure that no IPA remains absorbed in the insulator. This ensures that bond liner applied to the insulator will coat and cure correctly.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   12 insulated cases ready for application of bond liner per hour. 24 cases will be dried per shift.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	2	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	0.99	lb/hr	1.155	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF
			lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING
None.

RECORDKEEPING
A daily record shall be kept of the number of units degreased each shift.
The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour.
Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits.
Records shall be maintained for a period of at least 5 years and shall be available upon request.

REPORTING
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.

TESTING
None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

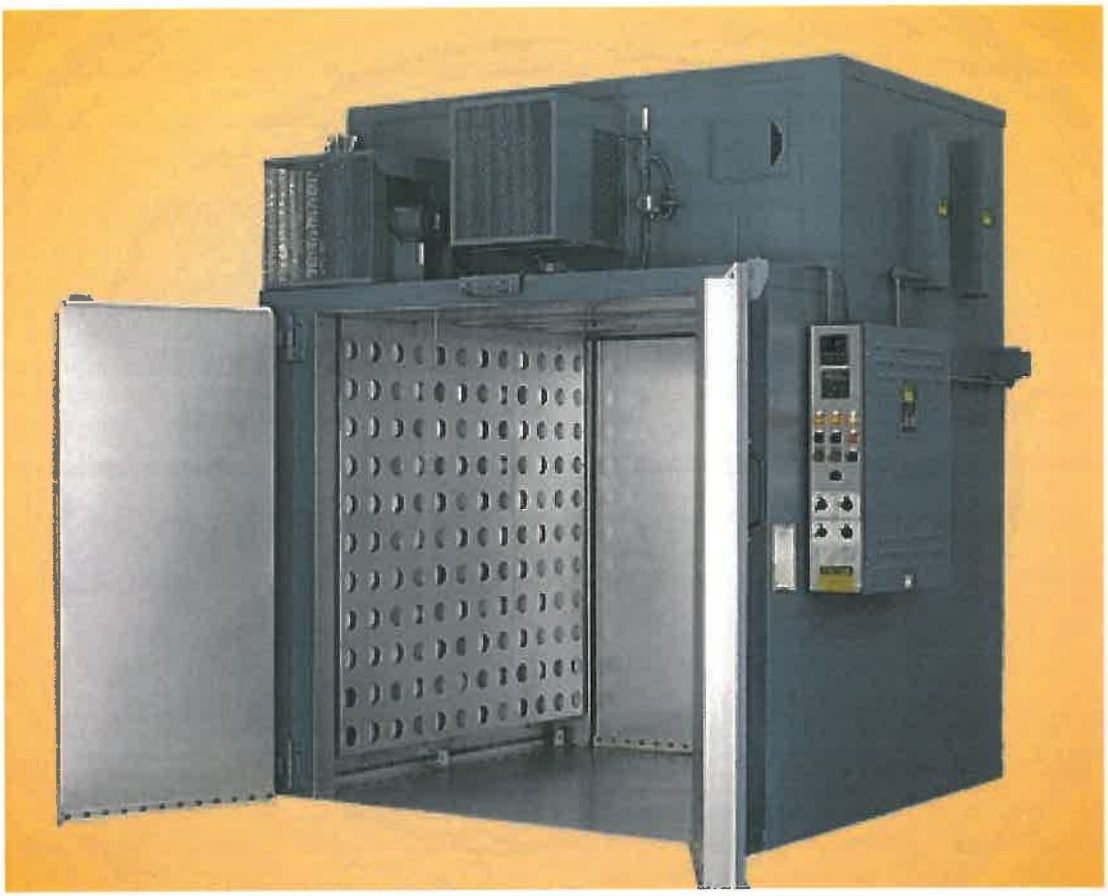
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Insulator Drying Oven (Z-11S)



Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-12S (Z-12E)

1. Name or type and model of proposed affected source:

   Bondliner Mixing Hood / Chemlok Mixing Hood - LabConco Basic 47
   (The intent is to have 2 separate hoods for Chemlok and bondliner mixing. However, we would like to permit the mixing hood to accommodate both Chemlok and bondliner mixing in the event that we only have a single hood installed prior to startup as well as a backup in case one or the other would be down for maintenance for any reason.)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   0.23 lbs of VOC from the operations of weighing out and mixing bonliner ingredients to prepare for bondliner application to the interior insulator surfaces of rocket motor cases. ~ 2 gallon of bondliner is mixed per lot of 24 units sprayed each shift. It is estimated that there will be about a 2% emission loss during this process. Each mixing operation will be completed in less than 1 hour per shift.

   0.55 lbs of VOC from the operations of weighing out and mixing Chemlok with thinning solvent to prepare for Chemlok application to the interior surfaces of rocket motor cases. ~ 4 gallons of material are mixed per lot of 24 units sprayed each shift. There are 2 separate mixing operations for Chemlok 205/MEK (1.88 gal) and Chemlok 234X/Toluene (2.34 gal). It is estimated that there will be about a 2% emission loss during this process. Each mixing operation will be completed in less than 1 hour per shift.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   1.8 gallons of bondliner to be applied to a lot of 24 rocket motor cases.

   1.88 gallons of Chemlok 205/MEK mixture.
   2.34 gallons of Chemlok 234X/Toluene mixture.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	3	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}		lb/hr		grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	0.23 (Bondliner) 0.24 (Chemlok 205) 0.33 (Chemlok 234X)	lb/hr	0.268 0.28 0.385	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
	Ethyl benzene	0.009 (Chemlok 205) 0.033 (Chemlok 234X)	lb/hr	0.011 0.039	grains/ACF
	MIBK	0.100 (Chemlok 205)	lb/hr	0.117	grains/ACF
	Toluene	0.181 (Chemlok 234X)	lb/hr	0.211	grains/ACF
	Xylene	0.025 (Chemlok 205) 0.116 (Chemlok 234X)	lb/hr	0.029 0.135	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of batches mixed per shift with batch weights. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per lot to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Bondliner Mixing Hood (Z-12S)

BUILDING 256 - GMLRS
PERMIT R13-????
BL-034 BONDLINER BATCH RECORD (Z-7E or Z-12E)

DATE	BL-034 BONDLINER (0.9 gal batch)				**	***
	# of batches mixed		Volume (gallons)		Annual Pounds Mixed	Annual Pounds VOC Emitted
	Daily	YTD (520)	Daily	YTD (468)	YTD (3,660)	YTD (62)
12/31/2016	2	2	1.8	1.8	14.08	0.23
1/1/2017	2	4	1.8	3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45
		4		3.6	28.15	0.45

**Environmental group use only - this column will not be on the production floor record sheet
***Annual VOC emitted = lbs mixed * 79.99% VOC * 2% loss from mix hood

BUILDING 256 - GMLRS
PERMIT R13-????
DAILY SPRAY BOOTH LOGSHEET

BL-034 BONDLINER SPRAY BOOTH (Z-8E OR Z-13E) AND DRYING STATION (Z-9E OR Z-14E)

DATE	COATING*	START TIME	END TIME	# OF UNITS SPRAYED*	HOURS OPERATED	GRAMS SPRAYED PER UNIT	SPRAY BOOTH TOTALS TOTAL (lb/spray)	SPRAY BOOTH TOTALS AVE HOURLY (lb/hr)	SPRAY BOOTH TOTALS YTD (lbs)	DRYING STATION TOTALS TOTAL (lb/spray)	DRYING STATION TOTALS AVE HOURLY (lb/hr)	DRYING STATION TOTALS YTD (lbs)
12/31/2016	BL-034 Gun Test	8:00 AM	8:05 AM	1	1	9.3	0.02	0.02	0.02	0.001	0.001	0.001
12/31/2016	BL-034 Units	8:10 AM	10:00 AM	24	1.833	178.2	8.96	4.89	8.96	0.471	0.257	0.471
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
							0.00	#DIV/0!	0.00	0.000	#DIV/0!	0.000
				25	2.833	187.5						

***Include the gun test quantity which is run with each lot.**
**Environmental group use only - this column will not be on the production floor record sheet

Coating*	Grams
BL-034 Gun Test	9.3
BL-034 Units	178.2

Spray booth total = number of units sprayed * grams / 453.6 grams/lb * 95% from spray loss
Drying station total = number of units sprayed * grams / 453.6 grams/lb * 5% from spray loss
Spray booth VOC total = Spray booth total * 79.99% VOC
Drying station VOC total = Drying station total * 79.99% VOC
Spray booth PM total = Spray booth total * 0% PM * 0.05 overspray and efficiency
BL-034 contains no HAPs

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-13S (Z-13E)

1. Name or type and model of proposed affected source:

Bondliner Application Booth / Chemlok Application Booth - Pillar M-1740 Spray System
(The intent is to have 2 separate booths for Chemlok and bondliner application. However, we would like to permit the application booth to accommodate both Chemlok and bondliner spraying in the event that we only have a single booth installed prior to startup as well as a backup in case one or the other would be down for maintenance for any reason.)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

The Bondliner Application Booth will be used each shift for a 3 hour period. Bondliner mixture is applied at a rate of 1.27 gallons per lot or approx 0.635 gallon/hr. The spray cycle coats the interior insulated surface of 24 units with the bondliner mixture in a 2 hour period. It is estimated that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Chemlok Drying Station. In addition, a 1 hour period per shift will be used to clean the coating equipment lines and spray pots after the spray process using toluene. It is estimated that there will be a loss of about 0.5 gallons of toluene during cleanup (3.63 lbs).

See Section 5 for continuation of Chemlok information.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

12 units coated with the bondliner mixture.

12 units coated with the Chemlok 205 mixture or 12 units coated with the Chemlok 234X mixture.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

Section 5 - Not applicable.

Continuation of Section 3 for Chemlok:

The Chemlok Application Booth will be used twice per shift for a 3 hour period each time. The first application is Chemlok 205/MEK at a rate of 0.893 gallons per lot or approx 0.4465 gallon/hr. The second application is Chemlok 234X/Toluene at a rate of 0.969 gallons per lot or approx 0.4845 gallon/hr. Each spray cycle coats the interior surface of 24 units with the adhesive primer mixture in a 2 hour period. It is estimated that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Chemlok Drying Station. In addition, two 1 hour periods per shift will be used to clean the coating equipment lines and spray pots after each Chemlok process using MEK for the Chemlok 205 and Toluene for the Chemlok 234X. It is estimated that there will be a loss of about 0.5 gallons of each solvent during cleanup (3.36 and 3.63 lbs respectively).

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	9	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr		grains/ACF
b.	SO_2		lb/hr		grains/ACF
c.	CO		lb/hr		grains/ACF
d.	PM_{10}	0.268 (Chemlok 205) 0.049 (Chemlok 234X)	lb/hr	0.313 0.057	grains/ACF
e.	Hydrocarbons		lb/hr		grains/ACF
f.	VOCs	3.78/2.81/3.37 (BL/205/234X) 3.63 / 3.36 / 3.63(cleanup)	lb/hr	4.41 / 3.28 / 3.93 4.24 / 3.92 / 4.24	grains/ACF
g.	Pb		lb/hr		grains/ACF
h.	Specify other(s)				
	Ethyl benzene	0.098 (Chemlok 205) 0.338 (Chemlok 234X)	lb/hr	0.114 0.394	grains/ACF
	MIBK	1.175 (Chemlok 205)	lb/hr	1.371	grains/ACF
	Toluene	1.851 (Chemlok 234X)	lb/hr	2.16	grains/ACF
	Xylene	0.292 (Chemlok 205) 1.182 (Chemlok 234X)	lb/hr	0.341 1.379	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of units coated per shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per lot to determine actual emissions per hour. Emissions will be broken into spray booth and drying station portions. The daily cleanup solvents shall be recorded for each spray application. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	If testing is required by the Director, it will be conducted using the required EPA methods.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

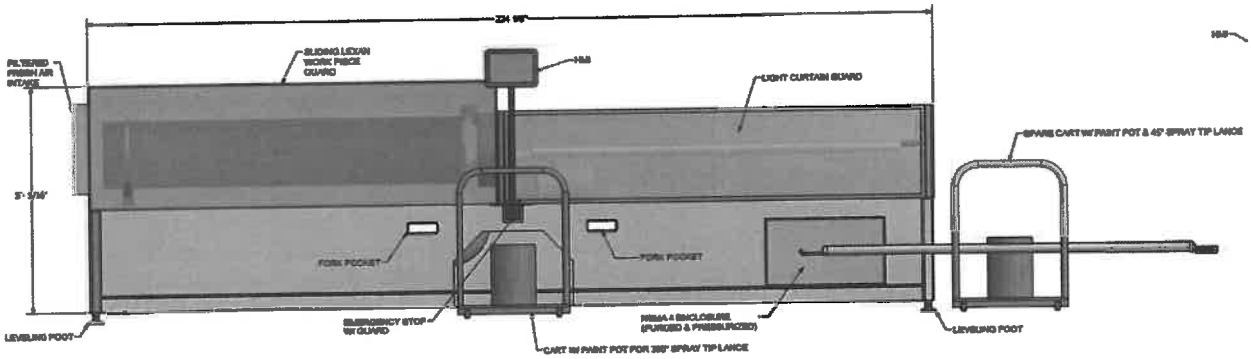
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

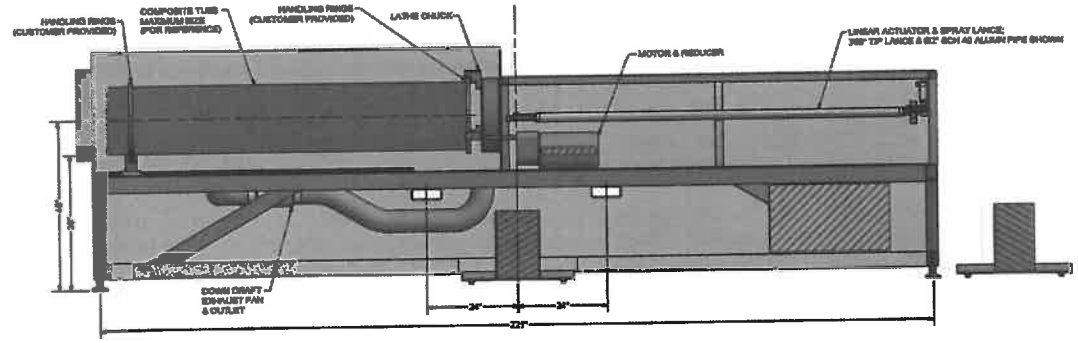
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

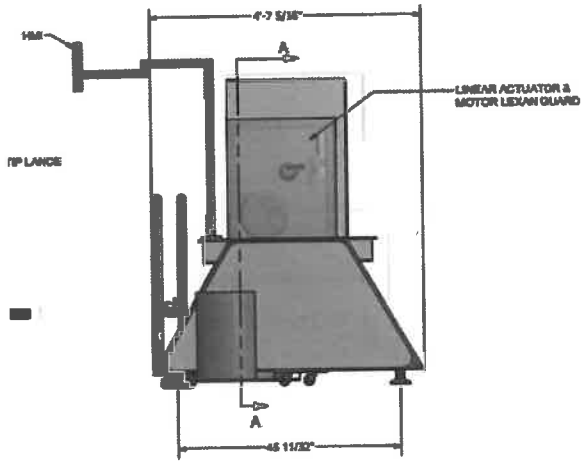
TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Bondliner Application Booth (Z-13S)







P/N: ATK SPRAY LANCE CONCEPT

BUILDING 256 - GMLRS
PERMIT R13-????
DAILY SPRAY BOOTH LOGSHEET

BL-0: BL-034 BONDLINER SPRAY BOOTH (Z-8E OR Z-13E) AND DRYING STATION (Z-9E OR Z-14E)

		SPRAY BOOTH VOC EMISSIONS			SPRAY BOOTH PM EMISSIONS			DRYING STATION VOC EMISSIONS		
DATE	COATING*	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)	TOTAL (lb/spray)	AVE HOURLY (lb/hr)	YTD (lbs)
12/31/2016	BL-034 Gun Test	0.02	0.02	0.02	0.0000	0.0000	0.0000	0.001	0.001	0.001
12/31/2016	BL-034 Units	7.16	3.91	7.16	0.0000	0.0000	0.0000	0.377	0.206	0.377
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
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		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000
		0.00	#DIV/0!	0.00	0.0000	#DIV/0!	0.0000	0.000	#DIV/0!	0.000

*Include the gun test quantity w
**Environmental group use onl

Coating*
BL-034 Gun Test
BL-034 Units

FILTER CHECK RECORD

Building #: 256 - GMLRS

Bay or Booth #: BR-127 (Z-3E) / Chemlok (Z-8E) / Bondliner (Z-13E) Spray Booths

Supervisor:

Spray Booth Filter Checks		
Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Spray Booth Filter Checks		
Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

Date		
	Yes	No
Manometer Reading Okay?		
Filters Overloaded?		
Filters Properly Seated?		
Holes in filters?		
Comments		
Badge No.		
Filters Changed?		
Date		
Comments		

The only blocks that are not required to be completed for each daily check are those for comments.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-14S (Z-14E)

1. Name or type and model of proposed affected source:

Bondliner Drying Station / Chemlok Drying Station - Pillar M-1740 Spray System
The intent is to have 2 separate drying stations for Chemlok and bondliner application. However, we would like to permit the drying stations to accommodate both Chemlok and bondliner drying in the event that we only have a single station installed prior to startup as well as a backup in case one or the other would be down for maintenance for any reason.)

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

The Bondliner Drying Station will be used each shift for a 2 hour period. This will be drying time for the Bondliner at a rate of 0.0335 gallons per lot or approx 0.0175 gallon/hr. It is estimated that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Bondliner Drying Station.

The Chemlok Drying Station will be used twice per shift for a 2 hour period each time for drying of Chemlok. The first time will be drying time for Chemlok 205/MEK at a rate of 0.047 gallons per lot or approx 0.0235 gallon/hr. The second time will be drying time for Chemlok 234X/Toluene at a rate of 0.051 gallons per lot or approx 0.0255 gallon/hr. This rate is based on an estimate that 95% of emissions will be lost from the application booth and the remaining 5% will be emitted from the Chemlok Drying Station.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

12 dried units coated with the Bondliner mixture.

12 dried units coated with the Chemlok 205 mixture or 12 dried units coated with the Chemlok 234X mixture.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	6	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.199 (Bondliner) 0.15 (Chemlok 205) 0.18 (Chemlok 234X)	lb/hr	0.232 0.175 0.21 grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	Ethyl benzene	0.006 (Chemlok 205) 0.019 (Chemlok 234X)	lb/hr	0.007 0.022 grains/ACF
	MIBK	0.073 (Chemlok 205)	lb/hr	0.085 grains/ACF
	Toluene	0.107 (Chemlok 234X)	lb/hr	0.125 grains/ACF
	Xylene	0.018 (Chemlok 205) 0.068 (Chemlok 234X)	lb/hr	0.021 0.079 grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of units coated per shift. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per lot to determine actual emissions per hour. Emissions will be broken into spray booth and drying station portions. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

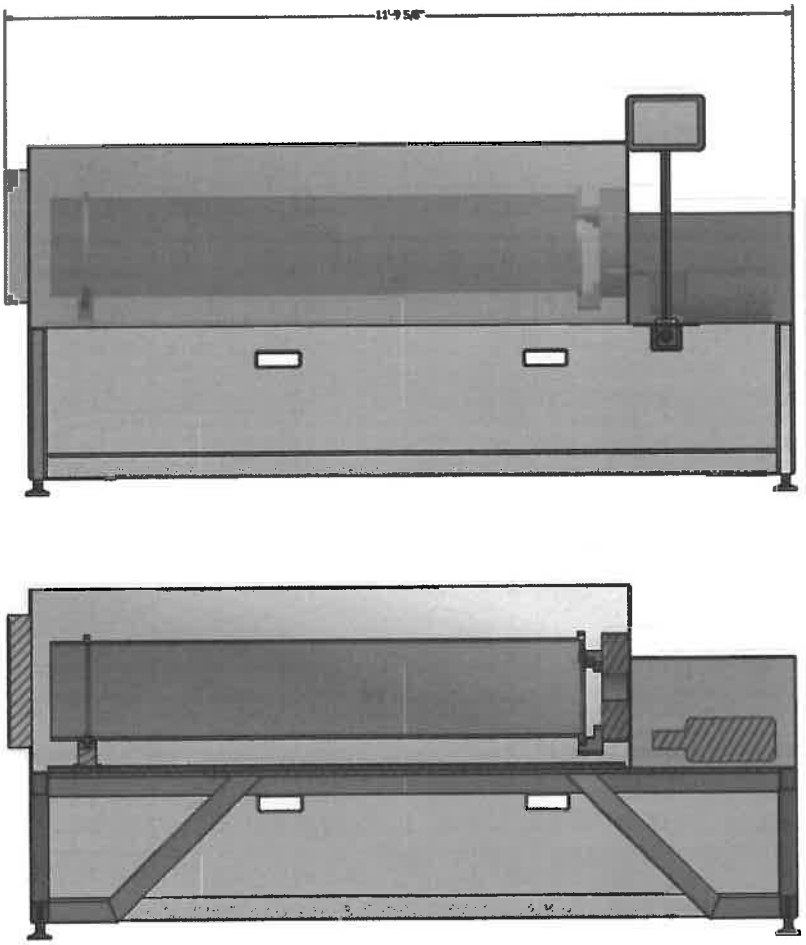
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

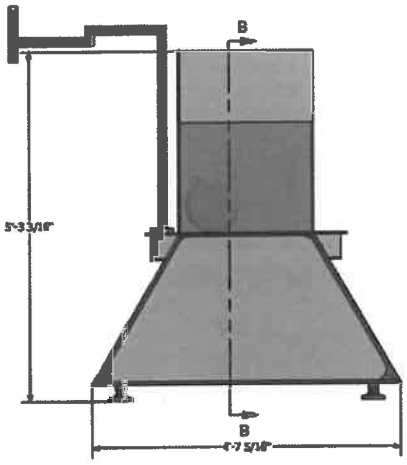
TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

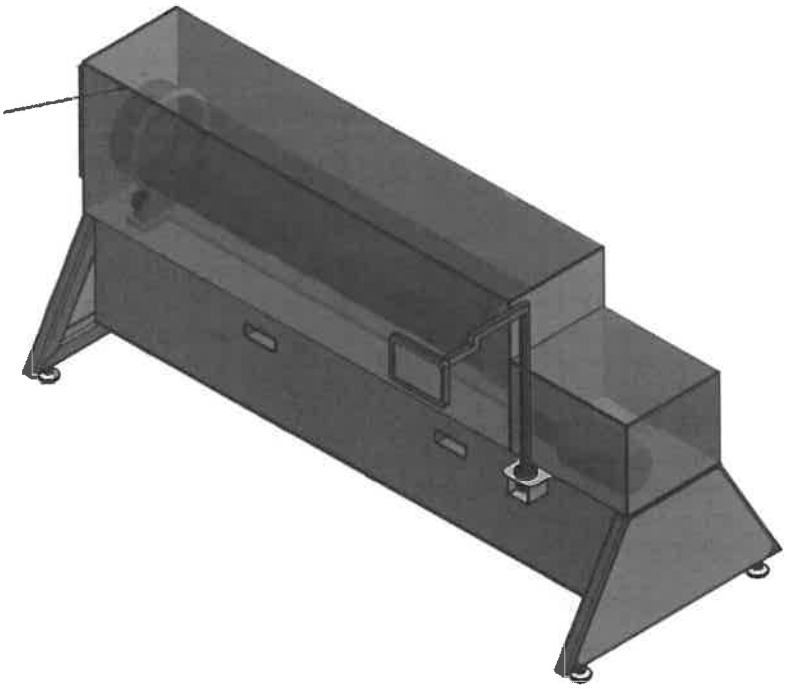
10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Bondliner Drying Station (Z-14S)



Bondliner Drying Station (Z-14S)





Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-15S (Z-15E)

1. Name or type and model of proposed affected source:

Doosan PUMA 3100 ULY Machining Center
14" Delta Band Saw Model 28-400 with 18 tpi metal cutting blade. or equivalent
Powermmatic Belt Sander Model 31A or equivalent
Honing Operation

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

Not more than 2 Kevlar Composite Tubes approximately 84" long x 9-1/8" OD x 1/8" wall.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

For each Composite Tube processed, the System will yield the following Kevlar composite Components approx 9-1/8" Dia, with 1/8" wall. Tube 74" Long, Sample Ring 1/2" Long, Inspection Ring 2" long, Four Samples 1"x 1/2" waste Drop, and approximately 5 cubic inches of Kevlar Composite dust. The volume of dust produced by each piece of equipment discharging into the collection system described in Attachment M is estimated as follows: Doosan Puma 3100 ULY: 4 cubic inches, Band Saw: 0.03 cubic Inches, Belt Sander: 0.05 cubic inches, Honing Operation: 0.8 cubic inches. Total dust emissions per hour into the dust collector are not anticipated to exceed 10 cubic inches.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

None

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

None

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

None

(c) Theoretical combustion air requirement (ACF/unit of fuel):

None @ None °F and None psia.

(d) Percent excess air: N/A

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

N/A

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

N/A

(g) Proposed maximum design heat input: N/A $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:				
@	°F and			psia
a. NO_X	N/A	lb/hr	N/A	grains/ACF
b. SO_2	N/A	lb/hr	N/A	grains/ACF
c. CO	N/A	lb/hr	N/A	grains/ACF
d. PM_{10}	0.6	lb/hr	0.7	grains/ACF
e. Hydrocarbons	N/A	lb/hr	N/A	grains/ACF
f. VOCs	N/A	lb/hr	N/A	grains/ACF
g. Pb	N/A	lb/hr	N/A	grains/ACF
h. Specify other(s)				
N/A	N/A	lb/hr	N/A	grains/ACF
N/A	N/A	lb/hr	N/A	grains/ACF
N/A	N/A	lb/hr	N/A	grains/ACF
N/A	N/A	lb/hr	N/A	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
Continuous monitoring of Pressure drop across after-Filter utilizing manometer integrated with strobe alarm. Proper functionality of manometer and strobe to be verified on regular PM schedule TBD.	A daily record shall be kept of the number of units machined each shift. The daily numbers shall be added to a spreadsheet with emission rates per part to determine actual emissions per year. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

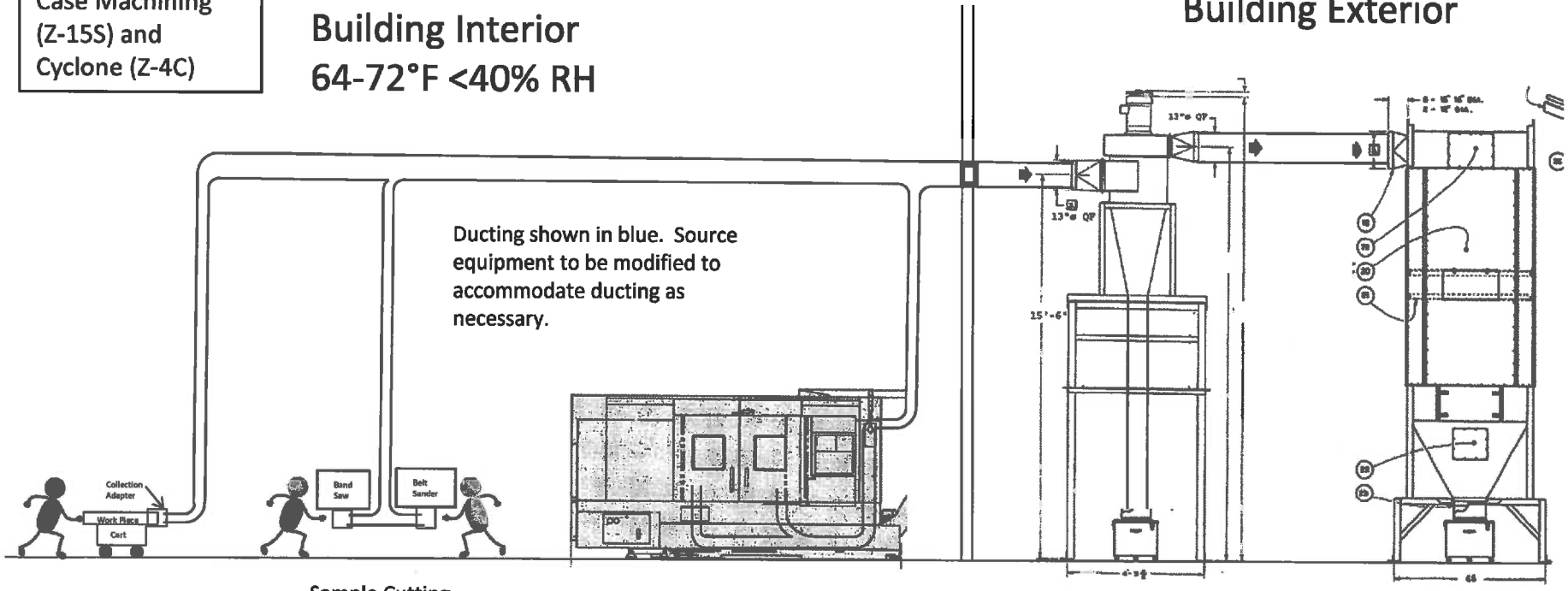
TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

Case Machining (Z-15S) and Cyclone (Z-4C)

Building Interior
64-72°F <40% RH

Building Exterior



Honing Operation | Sample Cutting | Machining Center | Cyclone | Afterfilter

Collection Point	Flow Rate (CFM)	Est. Vent size (in.)	Est. Face Velocity (FPM)	Estimated Hood Collection Efficiency
Machining Center Headstock	550	4x9	2,200	85%
Machining Center Tailstock	550	4x9	2,200	85%
Honing Operation	1,350	16" Dia	966	95%
Band Saw	75	3" dia	1,500	90%
Belt Sander	75	3" dia	1,500	90%

	Cyclone	After filter
Inlet Height	186"	199"
Exhaust Height	199"	Varies across 612 sq. ft. with large particle discharge into 20 gal. drum
Inlet Diameter	13"	13"
Outlet Diameter	13"	Through 612 sq. ft. filter tubes
HP	15	1/2
Filtration	Centrifugal to Drum	612 sq. ft. napped polypropylene sateen filter tubes preloaded with Cabosil.

BUILDING 256 - GMLRS
PERMIT R13-????
CASE MACHINING RECORD (Z-1E)

DATE	SHIFT	UNITS MACHINED Daily	UNITS MACHINED YTD (64,370)	Machining Time (hours)	Machining Time YTD	** Pounds Daily	** Pounds YTD (3,045)
12/31/2016	2	6	6	3	3	0.18	0.18
12/31/2016	3	6	12	3	6	0.18	0.36
1/1/2017	1	4	16	2	8	0.12	0.48
			16		8		0.48
			16		8		0.48
			16		8		0.48
			16		8		0.48
			16		8		0.48
			16		8		0.48
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			16		8		0.48
			16		8		0.48
			16		8		0.48

Machining is estimated to release 0.06 lb/hr from cyclone.
**Environmental group use only - this column will not be on the production floor record sheet

VISIBLE EMISSION CHECK

Building #: 256 - GMLRS

Source: Case Machining (Z-15E)

Supervisor:

Visible Emissions		Visible Emissions	
Date		Date	
Start Time		Start Time	
Stop Time		Stop Time	
Badge No.		Badge No.	
Emissions	Yes No	Emissions	Yes No
Comments		Comments	
Filters Changed?		Filters Changed?	
Date		Date	
Comments		Comments	

Date		Date	
Start Time		Start Time	
Stop Time		Stop Time	
Badge No.		Badge No.	
Emissions	Yes No	Emissions	Yes No
Comments		Comments	
Filters Changed?		Filters Changed?	
Date		Date	
Comments		Comments	

Date		Date	
Start Time		Start Time	
Stop Time		Stop Time	
Badge No.		Badge No.	
Emissions	Yes No	Emissions	Yes No
Comments		Comments	
Filters Changed?		Filters Changed?	
Date		Date	
Comments		Comments	

Date		Date	
Start Time		Start Time	
Stop Time		Stop Time	
Badge No.		Badge No.	
Emissions	Yes No	Emissions	Yes No
Comments		Comments	
Filters Changed?		Filters Changed?	
Date		Date	
Comments		Comments	

The only blocks that are not required to be completed for each VE observation are those for comments.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): Z-16S (Fugitive Emissions)

1. Name or type and model of proposed affected source:

Bonded End Closure Adapter Wiping Table

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

2.46 lbs per hour of isopropyl alcohol (IPA) used to degrease adapter pieces (end closures) and tubes (24/hr) prior to applying adhesive for bonding.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

24 tubes with end closures installed

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

Not applicable.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Not applicable.

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	2	Days/Week	5	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 68 °F and 14.7 psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	2.46	lb/hr	2.87 grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
None.	A daily record shall be kept of the number of adapters wiped for bonding end closures. The daily numbers and the hours of processing time shall be added to a spreadsheet with emission rates per part to determine actual emissions per hour. Emissions shall be calculated on a rolling 12 month calendar to ensure compliance with the annual emission limits. Records shall be maintained for a period of at least 5 years and shall be available upon request.
REPORTING	**TESTING**
Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year per.	None.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

BUILDING 256 - GMLRS
PERMIT R13-????
ADAPTER END CLOSURE DEGREASING AND BONDING (Z-16E)

DATE	DEGREASING (IPA) # of tubes degreased Daily	DEGREASING (IPA) # of tubes degreased YTD (6,240)	DEGREASING (IPA) Volume (ounces) Daily	DEGREASING (IPA) Volume (ounces) YTD (195)	Processing Time (hours)	Processing Time YTD	** Pounds Daily	** Pounds YTD (1,284)	** Pounds/Hr
12/31/2016	24	24	96	96	2	2	4.94	4.94	2.47
1/1/2017	24	48	96	192	2	4	4.94	9.87	2.47
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!
		48		192		4	0.00	9.87	#DIV/0!

0.75 gallons of IPA used per lot of 24 units (4 oz/unit)

**Environmental group use only - this column will not be on the production floor record sheet

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): Z-1C (Z-3S)

Equipment Information

1. Manufacturer: Global Finishing Solutions Model No. GFS Wave	2. Control Device Name: GFS Wave Filter Type: Single-stage filtration media
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: 90%	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 5600 SCFM	10. Capacity: 5600 SCFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Spray pot pressure is expected to be ~25 psi. The face velocity on the booth will be maintained at a level of at least 100 fpm at the face of the booth. A manometer will be installed to measure the pressure drop across the filter bank to determine when the filters need to be changed.	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. Filters will be collected in a cubic yard box with other rags and paint contaminated materials to be shipped to a licensed hazardous waste TSDF for treatment.	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☒ Yes	☐ No
Are metals present?	☒ Yes	☐ No

15. Inlet Emission stream parameters:	Maximum	Typical
Pressure (mmHg):	Ambient	Ambient
Heat Content (BTU/scf):	NA	NA
Oxygen Content (%):	NA	NA
Moisture Content (%):	NA	NA
Relative Humidity (%):	NA	40

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor ☒ Particulate (type): ☐ Other	
17. Inlet gas velocity: NA ft/sec	18. Pollutant specific gravity: NA
19. Gas flow into the collector: 5600 ACF @ Ambient °F and 14.7 PSIA	20. Gas stream temperature: Inlet: Ambient °F Outlet: Ambient °F
21. Gas flow rate: Design Maximum: 5600 ACFM Average Expected: 5600 ACFM	22. Particulate Grain Loading in grains/scf: Inlet: 0.457 Outlet: 0.002

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant lb/hr	IN Pollutant grains/acf	Emission Capture Efficiency %	OUT Pollutant lb/hr	OUT Pollutant grains/acf	Control Efficiency %
A PM	0.392	0.457	99.5	0.039	.046	90
B						
C						
D						
E						

24. Dimensions of stack: NA Height 20 ft. Diameter 2 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table: Particulate Size Range (microns)	Particle Size Distribution at Inlet to Collector: Weight % for Size Range	Fraction Efficiency of Collector: Weight % for Size Range
0 – 2	Overspray (Particle size distribution is not known)	See attachment
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): None

28. Describe the collection material disposal system:

Filters will be collected in a cubic yard box with other rags and paint contaminated materials to be shipped to a licensed hazardous waste TSDF for treatment.

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet?

30. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING: A manometer will be installed on the booth to check the pressure drop across the filters and set points will be marked to indicate adequate draw through the systems. Operating procedures shall include language that requires the manometer be checked prior to use to ensure that the system is running at adequate draw and the checks to be recorded.	RECORDKEEPING: Filters will be checked daily prior to spraying operations. Manometer and filter checks will be recorded each day and records will be maintained for five years.
REPORTING: Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year.	TESTING: If testing is required by the Director, it will be conducted using the required EPA methods.

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
90%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
90%

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
None specified

PAINT ARRESTANCE FILTER TEST REPORT

Spray Removal Efficiency & Paint Holding Capacity

Tested for:	**Global Finishing Solutions**
Filter Mfr.:	**Global Finishing Solutions**
Filter Name:	**Bottom**
Report#./Test#	**R 703 T 803**
Report Date:	**March 20, 2007**

*** Filter Supplied by requesting company**

Test Information

FILTER DESCRIPTION:

3/4" poly. waves front on 1 1/4" poly. backing, white

PAINT DESCRIPTION:

High-Solids Permaclad (Sherwin Williams Permaclad 2400

PAINT SPRAY METHOD:

Conventional Air Gun at 40 PSI

SPRAY FEED RATE:

134 gr./min. **130** cc./min.

AIR VELOCITY:

150 FPM

Test Results

INITIAL PRESSURE DROP of Clean Test Filter

0.16 in. water

FINAL PRESSURE DROP of Loaded Test Filter

0.50 in. water

WEIGHT GAON on TEST FILTER & TEST FRAME TROUGH

2820 grams

PAINT HOLDING CAPACITY of TEST FILTER

2650 grams = **5.8** lbs.

PAINT RUN-OFF

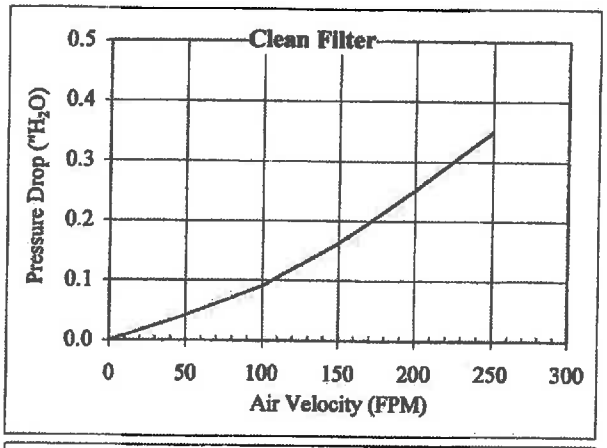
170 grams

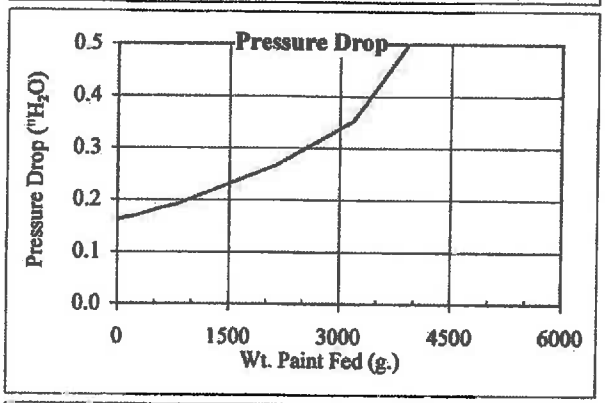
WEIGHT GAIN on FINAL FILTER

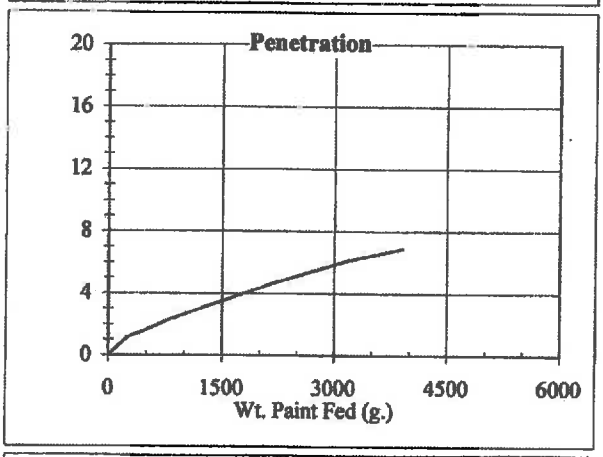
6.9 grams = **PENETRATION**

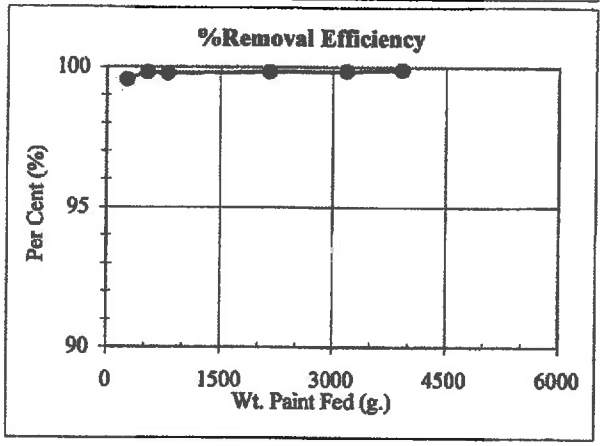
AVERAGE REMOVAL EFFICIENCY of TEST FILTER

99.76 %









Test Engineer: Todd Kruger

Supervising Engineer: K. C. Kwok, Ph.D.

PAINT ARRESTANCE FILTER TEST REPORT

Spray Removal Efficiency & Paint Holding Capacity

Tested for:	**Global Finishing Solutions**
Filter Mfr.:	**Global Finishing Solutions**
Filter Name:	**TOP**
Report#./Test#	**R 702 T 802**
Report Date:	**March 20, 2007**

*** Filter Supplied by requesting company**

Test Information

FILTER DESCRIPTION:

3/4" poly. waves front on 1 1/4" poly. backing, white

PAINT DESCRIPTION:

High-Solids Permaclad (Sherwin Williams Permaclad 2400

PAINT SPRAY METHOD:

Conventional Air Gun at 40 PSI

SPRAY FEED RATE:

134 gr./min. **130** cc./min.

AIR VELOCITY:

150 FPM

Test Results

INITIAL PRESSURE DROP of Clean Test Filter

0.08 in. water

FINAL PRESSURE DROP of Loaded Test Filter

0.50 in. water

WEIGHT GAON on TEST FILTER & TEST FRAME TROUGH

4160 grams

PAINT HOLDING CAPACITY of TEST FILTER

3714 grams = **8.2** lbs.

PAINT RUN-OFF

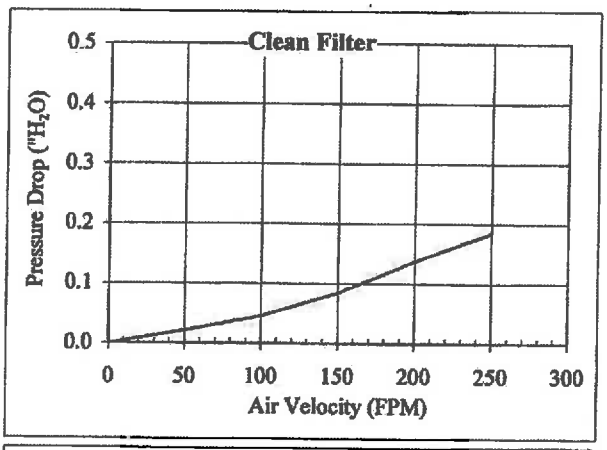
446 grams

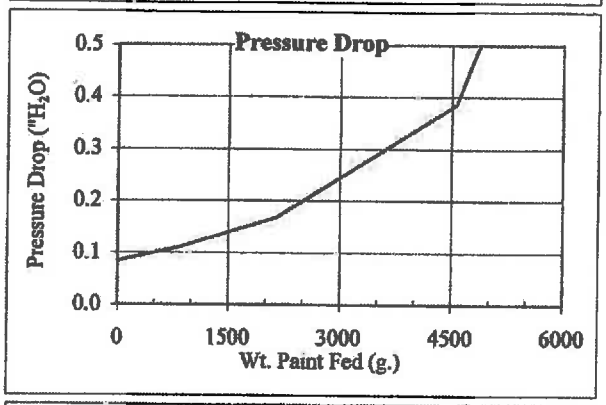
WEIGHT GAIN on FINAL FILTER

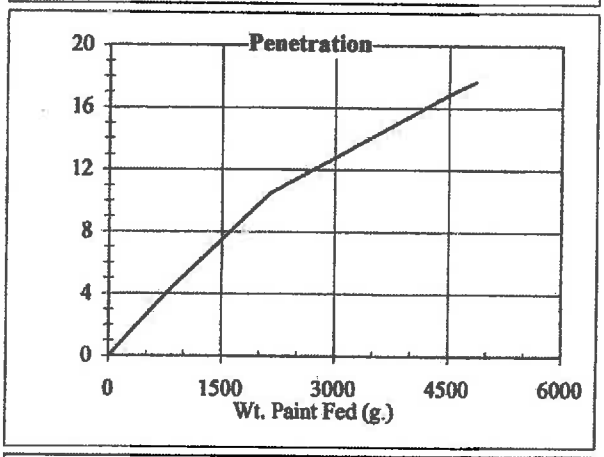
17.7 grams = **PENETRATION**

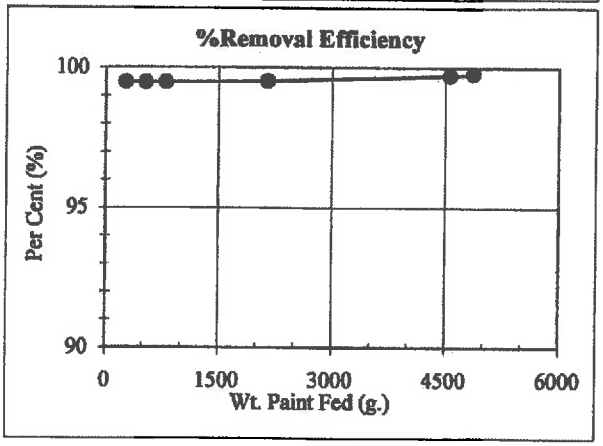
AVERAGE REMOVAL EFFICIENCY of TEST FILTER

99.58 %









Test Engineer: Todd Kruger

Supervising Engineer: K. C. Kwok, Ph.D.

GLOBAL FINISHING SOLUTIONS

GFS Wave®

The most versatile single-stage filtration media made for paint booths has been improved! **GFS WAVE®** exhaust filter accommodates all coatings including waterborne and a wide array of spray applications, from clear to high solids.

BETTER TEST RESULTS

Removal Efficiency:
99.94%

Holding Capacity:
4.4 lbs

GFS WAVE® MEDIA FEATURES

Minimize particulate emission

The convoluted surface is designed for maximum surface area & exceptional depth loading

Accommodates all paints and a wide array of spray applications — from clear coats to high solids

Clean exhaust air stream. Exhaust chamber, ductwork and fan are protected from a wide range of coating materials (low penetration)

Material complies with the requirements of UL 900, NFPA-33 and OSHA

Available in standard and custom cut sizes

The "Waves" capture and retain overspray, reducing run-off for less booth floor cleanup and quicker, more efficient filter changes.

GLOBALFINISHING.COM

800-848-8738 • filters@globalfinishing.com

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): Z-2C (Z-8S)

Equipment Information

1. Manufacturer: Pillar Model No. N/A	2. Control Device Name: GFS Wave Filter Type: Single-stage filtration media
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: 90%	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 1000 SCFM	10. Capacity: 1000
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Differential Pressure Sensor	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. Filters will be collected in a cubic yard box with other rags and paint contaminated materials to be shipped to a licensed hazardous waste TSDF for treatment.	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☒ Yes	☐ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	Maximum	Typical
Pressure (mmHg):		760
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		
Relative Humidity (%):		40

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor ☒ Particulate (type): ☐ Other	
17. Inlet gas velocity: 9000 ft/sec	18. Pollutant specific gravity:
19. Gas flow into the collector: ACF @ 68 °F and 14.9 PSIA	20. Gas stream temperature: Inlet: 70 °F Outlet: 70 °F
21. Gas flow rate: Design Maximum: 1000 ACFM Average Expected: 1000 ACFM	22. Particulate Grain Loading in grains/scf: Inlet: 0.268 Outlet: 0.031

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant lb/hr	IN Pollutant grains/acf	Emission Capture Efficiency %	OUT Pollutant lb/hr	OUT Pollutant grains/acf	Control Efficiency %
A Chemlok 205	0.268	0.313	99.5	0.027	0.315	90
B Chemlok 234	0.049	0.057	99.5	0.005	0.006	90
C BL-034	Neglible	Neglible	N/A	N/A	N/A	N/A
D						
E						

24. Dimensions of stack: Height 20 ft. Diameter 1 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table: Particulate Size Range (microns)	Particle Size Distribution at Inlet to Collector Weight % for Size Range	Fraction Efficiency of Collector Weight % for Size Range
0 – 2	Overspray particles size not known	See filter info attached
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

None.

28. Describe the collection material disposal system:

Filters will be collected in a cubic yard box with other rags and paint contaminated materials to be shipped to a licensed hazardous waste TSDF for treatment.

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet? None

30. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING: A manometer will be installed on the booth to check the pressure drop across the filters and set points will be marked to indicate adequate draw through the systems. Operating procedures shall include language that requires the manometer be checked prior to use to ensure that the system is running at adequate draw and the checks to be recorded.	RECORDKEEPING: Filters will be checked daily prior to spraying operations. Manometer and filter checks will be recorded each day and records will be maintained for five years.
REPORTING: Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year.	TESTING: If testing is required by the Director, it will be conducted using the required EPA methods.

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
90%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
90%

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
None specified.

PAINT ARRESTANCE FILTER TEST REPORT

Spray Removal Efficiency & Paint Holding Capacity

Tested for:	**Global Finishing Solutions**
Filter Mfr.:	**Global Finishing Solutions**
Filter Name:	**TOP**
Report#./Test#	**R 702 T 802**
Report Date:	**March 20, 2007**

*** Filter Supplied by requesting company**

Test Information

FILTER DESCRIPTION:

3/4" poly. waves front on 1 1/4" poly. backing, white

PAINT DESCRIPTION:

High-Solids Permaclad (Sherwin Williams Permaclad 2400

PAINT SPRAY METHOD:

Conventional Air Gun at 40 PSI

SPRAY FEED RATE:

134 gr./min. **130** cc./min.

AIR VELOCITY:

150 FPM

Test Results

INITIAL PRESSURE DROP of Clean Test Filter

0.08 in. water

FINAL PRESSURE DROP of Loaded Test Filter

0.50 in. water

WEIGHT GAON on TEST FILTER & TEST FRAME TROUGH

4160 grams

PAINT HOLDING CAPACITY of TEST FILTER

3714 grams = **8.2** lbs.

PAINT RUN-OFF

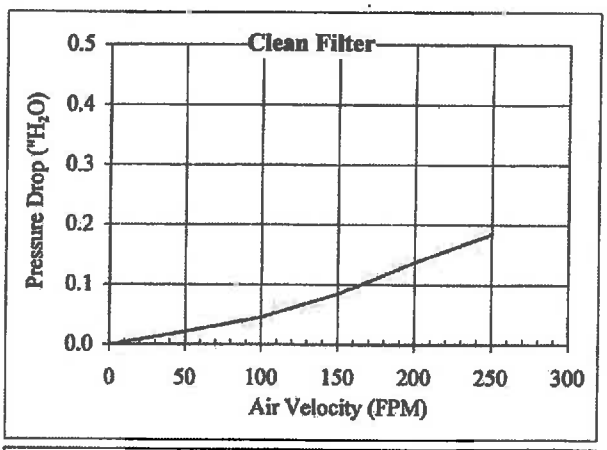
446 grams

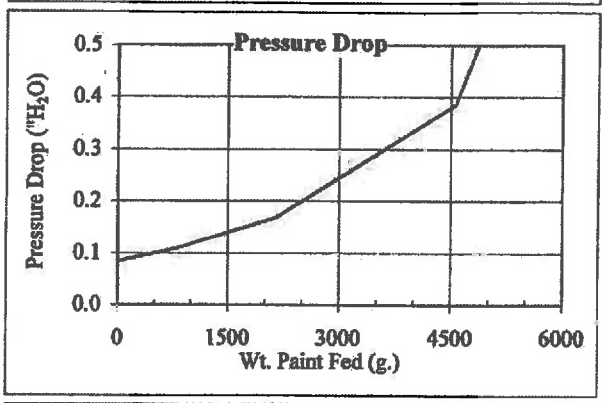
WEIGHT GAIN on FINAL FILTER

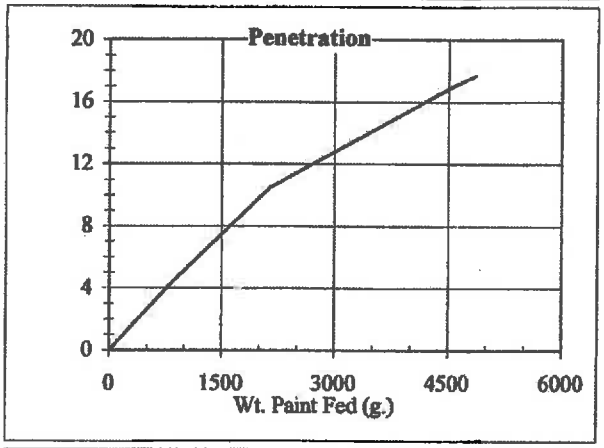
17.7 grams = **PENETRATION**

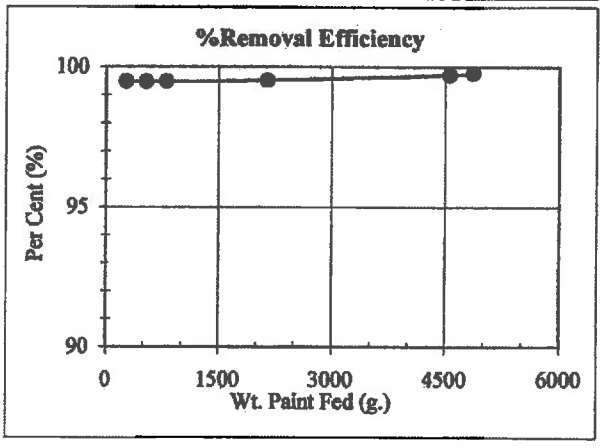
AVERAGE REMOVAL EFFICIENCY of TEST FILTER

99.58 %









Test Engineer: Todd Kruger

Supervising Engineer: K. C. Kwok, Ph.D.

PAINT ARRESTANCE FILTER TEST REPORT

Spray Removal Efficiency & Paint Holding Capacity

Tested for:	**Global Finishing Solutions**
Filter Mfr.:	**Global Finishing Solutions**
Filter Name:	**Bottom**
Report#./Test#	**R 703 T 803**
Report Date:	**March 20, 2007**

*** Filter Supplied by requesting company**

Test Information

FILTER DESCRIPTION:

3/4" poly. waves front on 1 1/4" poly. backing, white

PAINT DESCRIPTION:

High-Solids Permaclad (Sherwin Williams Permaclad 2400

PAINT SPRAY METHOD:

Conventional Air Gun at 40 PSI

SPRAY FEED RATE:

134 gr./min. **130** cc./min.

AIR VELOCITY:

150 FPM

Test Results

INITIAL PRESSURE DROP of Clean Test Filter

0.16 in. water

FINAL PRESSURE DROP of Loaded Test Filter

0.50 in. water

WEIGHT GAON on TEST FILTER & TEST FRAME TROUGH

2820 grams

PAINT HOLDING CAPACITY of TEST FILTER

2650 grams = **5.8** lbs.

PAINT RUN-OFF

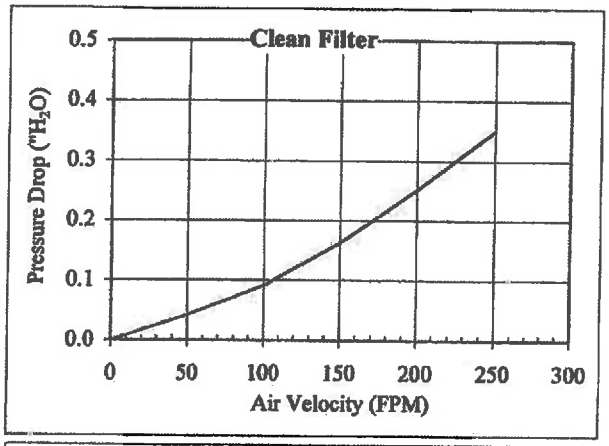
170 grams

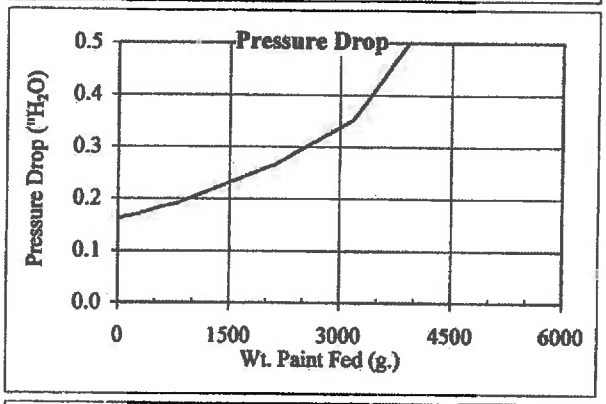
WEIGHT GAIN on FINAL FILTER

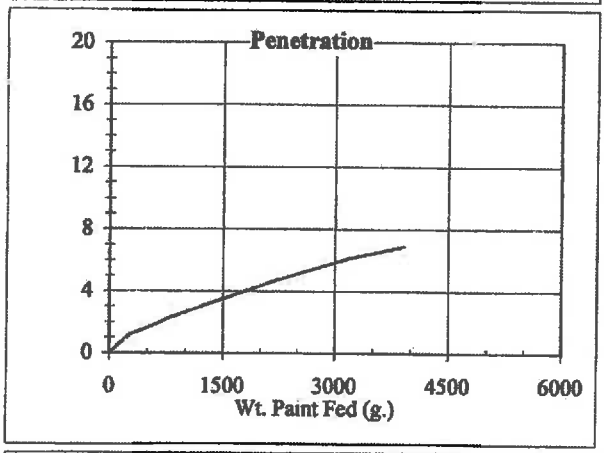
6.9 grams = **PENETRATION**

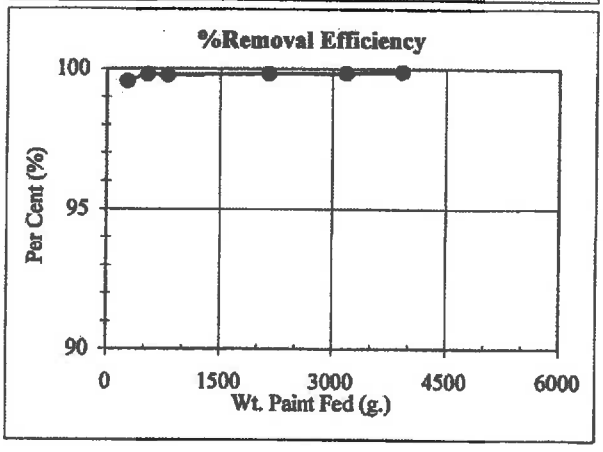
AVERAGE REMOVAL EFFICIENCY of TEST FILTER

99.76 %









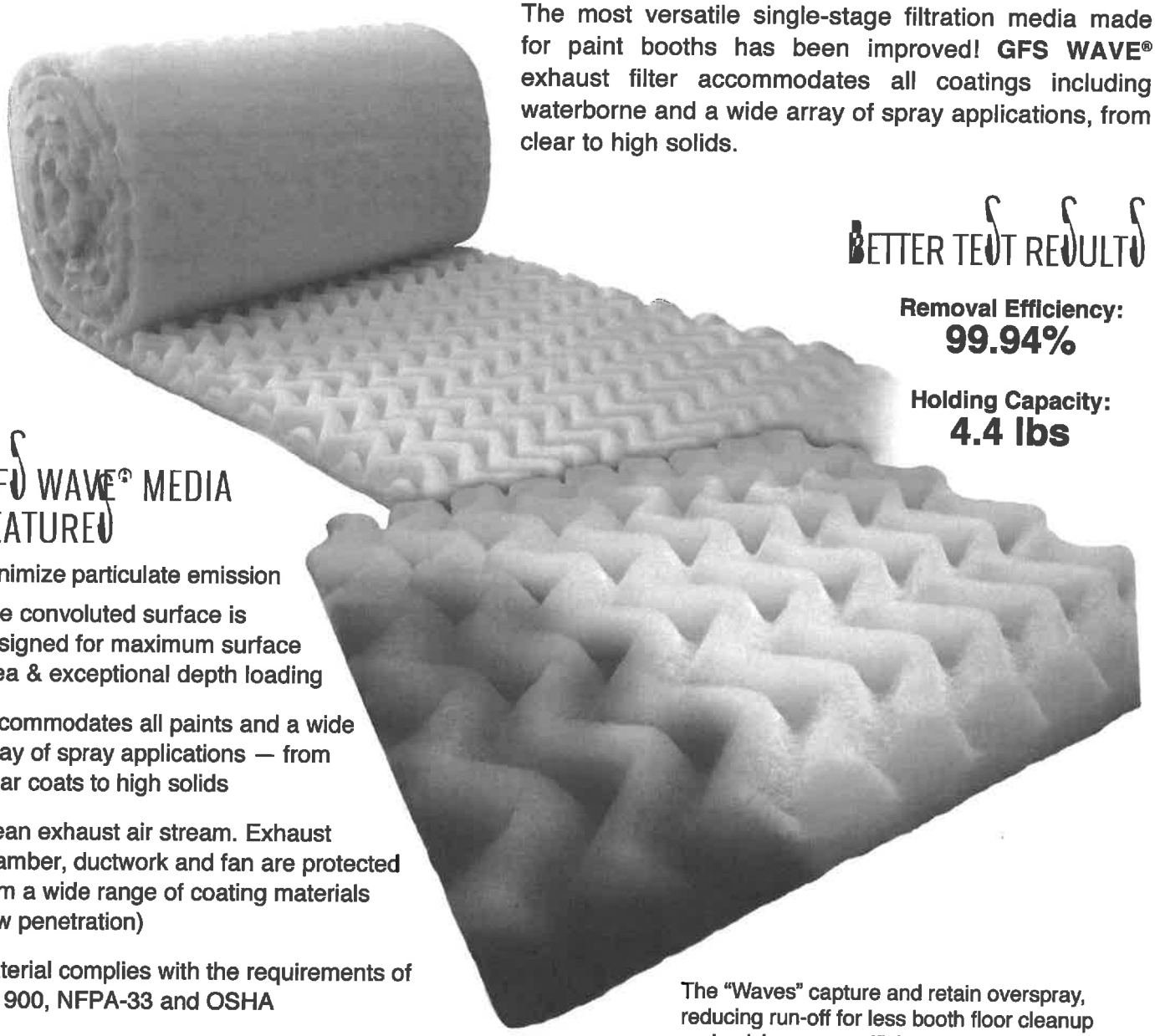
Test Engineer: Todd Kruger

Supervising Engineer: K. C. Kwok, Ph.D.

GLOBAL FINISHING SOLUTIONS

GFS Wave®

The most versatile single-stage filtration media made for paint booths has been improved! **GFS WAVE®** exhaust filter accommodates all coatings including waterborne and a wide array of spray applications, from clear to high solids.



BETTER TEST RESULTS

Removal Efficiency:
99.94%

Holding Capacity:
4.4 lbs

GFS WAVE® MEDIA FEATURES

Minimize particulate emission

The convoluted surface is designed for maximum surface area & exceptional depth loading

Accommodates all paints and a wide array of spray applications — from clear coats to high solids

Clean exhaust air stream. Exhaust chamber, ductwork and fan are protected from a wide range of coating materials (low penetration)

Material complies with the requirements of UL 900, NFPA-33 and OSHA

Available in standard and custom cut sizes

The "Waves" capture and retain overspray, reducing run-off for less booth floor cleanup and quicker, more efficient filter changes.

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Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): Z-3C (Z-13S)

Equipment Information

1. Manufacturer: Pillar Model No. N/A	2. Control Device Name: GFS Wave Filter Type: Single-stage filtration media
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: 90%	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 1000 SCFM	10. Capacity: 1000
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Differential Pressure Sensor	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. Filters will be collected in a cubic yard box with other rags and paint contaminated materials to be shipped to a licensed hazardous waste TSDF for treatment.	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☒ Yes	☐ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	Maximum	Typical
Pressure (mmHg):		760
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		
Relative Humidity (%):		40

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor ☒ Particulate (type): ☐ Other	
17. Inlet gas velocity: 9000 ft/sec	18. Pollutant specific gravity:
19. Gas flow into the collector: ACF @ 68 °F and 14.9 PSIA	20. Gas stream temperature: Inlet: 70 °F Outlet: 70 °F
21. Gas flow rate: Design Maximum: 1000 ACFM Average Expected: 1000 ACFM	22. Particulate Grain Loading in grains/scf: Inlet: 0.268 Outlet: 0.031

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant		Emission Capture Efficiency %	OUT Pollutant		Control Efficiency %
	lb/hr	grains/acf		lb/hr	grains/acf	
A Chemlok 205	0.268	0.313	99.5	0.027	0.315	90
B Chemlok 234	0.049	0.057	99.5	0.005	0.006	90
C BL-034	Neglible	Neglible	N/A	N/A	N/A	N/A
D						
E						

24. Dimensions of stack: Height 20 ft. Diameter 1 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2	Overspray particles size not known	See filter info attached
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

None.

28. Describe the collection material disposal system:

Filters will be collected in a cubic yard box with other rags and paint contaminated materials to be shipped to a licensed hazardous waste TSDF for treatment.

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet? None

30. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING: A manometer will be installed on the booth to check the pressure drop across the filters and set points will be marked to indicate adequate draw through the systems. Operating procedures shall include language that requires the manometer be checked prior to use to ensure that the system is running at adequate draw and the checks to be recorded.	RECORDKEEPING: Filters will be checked daily prior to spraying operations. Manometer and filter checks will be recorded each day and records will be maintained for five years.
REPORTING: Emissions from this process shall be reported annually as part of the annual emissions inventory submitted by April 1 of each year.	TESTING: If testing is required by the Director, it will be conducted using the required EPA methods.

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
90%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
90%

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
None specified.

PAINT ARRESTANCE FILTER TEST REPORT

Spray Removal Efficiency & Paint Holding Capacity

Tested for:	**Global Finishing Solutions**
Filter Mfr.:	**Global Finishing Solutions**
Filter Name:	**TOP**
Report#./Test#	**R 702 T 802**
Report Date:	**March 20, 2007**

*** Filter Supplied by requesting company**

Test Information

FILTER DESCRIPTION:

3/4" poly. waves front on 1 1/4" poly. backing, white

PAINT DESCRIPTION:

High-Solids Permaclad (Sherwin Williams Permaclad 2400

PAINT SPRAY METHOD:

Conventional Air Gun at 40 PSI

SPRAY FEED RATE:

134 gr./min. **130** cc./min.

AIR VELOCITY:

150 FPM

Test Results

INITIAL PRESSURE DROP of Clean Test Filter

0.08 in. water

FINAL PRESSURE DROP of Loaded Test Filter

0.50 in. water

WEIGHT GAON on TEST FILTER & TEST FRAME TROUGH

4160 grams

PAINT HOLDING CAPACITY of TEST FILTER

3714 grams = **8.2** lbs.

PAINT RUN-OFF

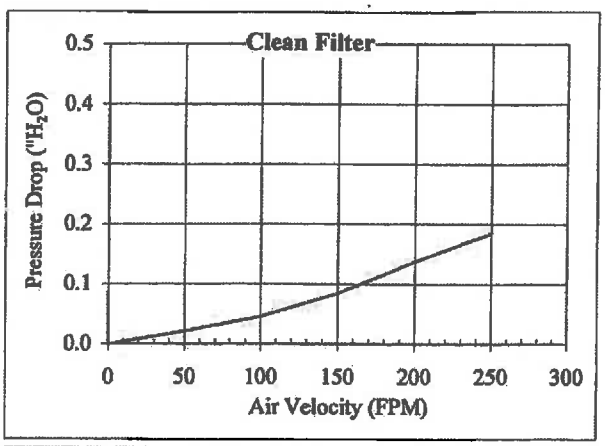
446 grams

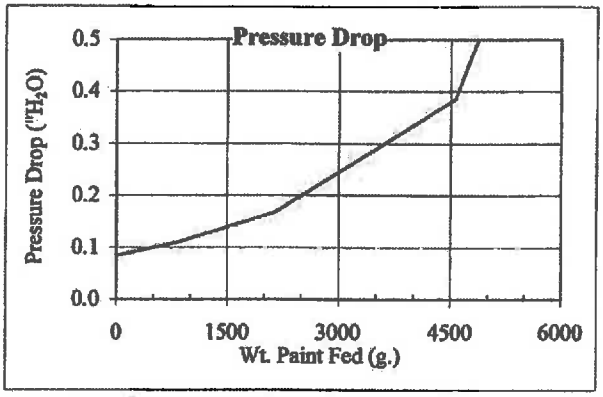
WEIGHT GAIN on FINAL FILTER

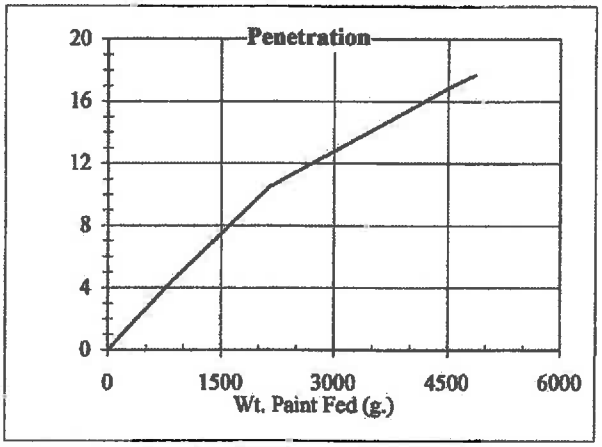
17.7 grams = **PENETRATION**

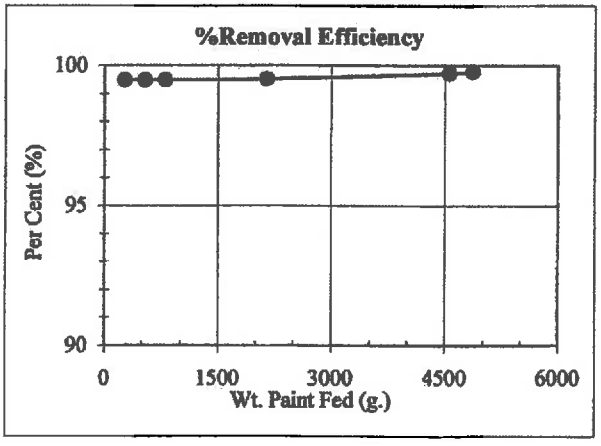
AVERAGE REMOVAL EFFICIENCY of TEST FILTER

99.58 %









Test Engineer: Todd Kruger

Supervising Engineer: K. C. Kwok, Ph.D.

PAINT ARRESTANCE FILTER TEST REPORT

Spray Removal Efficiency & Paint Holding Capacity

Tested for:	**Global Finishing Solutions**
Filter Mfr.:	**Global Finishing Solutions**
Filter Name:	**Bottom**
Report#./Test#	**R 703 T 803**
Report Date:	**March 20, 2007**

*** Filter Supplied by requesting company**

Test Information

FILTER DESCRIPTION:

3/4" poly. waves front on 1 1/4" poly. backing, white

PAINT DESCRIPTION:

High-Solids Permaclad (Sherwin Williams Permaclad 2400

PAINT SPRAY METHOD:

Conventional Air Gun at 40 PSI

SPRAY FEED RATE:

134 gr./min. **130** cc./min.

AIR VELOCITY:

150 FPM

Test Results

INITIAL PRESSURE DROP of Clean Test Filter

0.16 in. water

FINAL PRESSURE DROP of Loaded Test Filter

0.50 in. water

WEIGHT GAON on TEST FILTER & TEST FRAME TROUGH

2820 grams

PAINT HOLDING CAPACITY of TEST FILTER

2650 grams = **5.8** lbs.

PAINT RUN-OFF

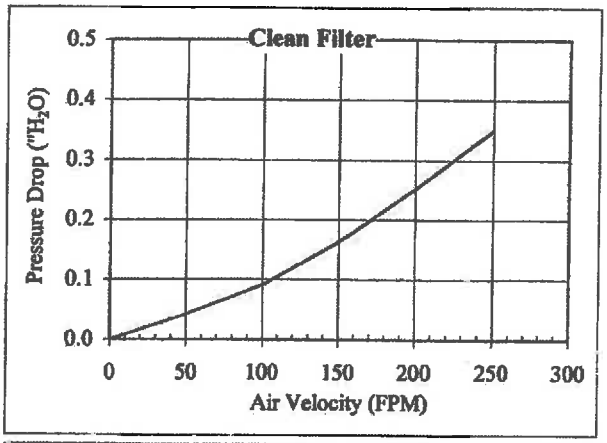
170 grams

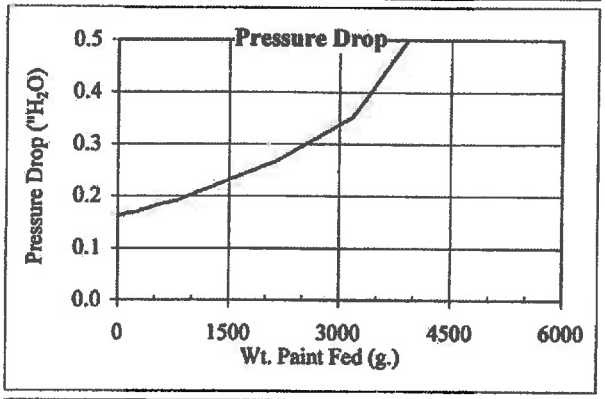
WEIGHT GAIN on FINAL FILTER

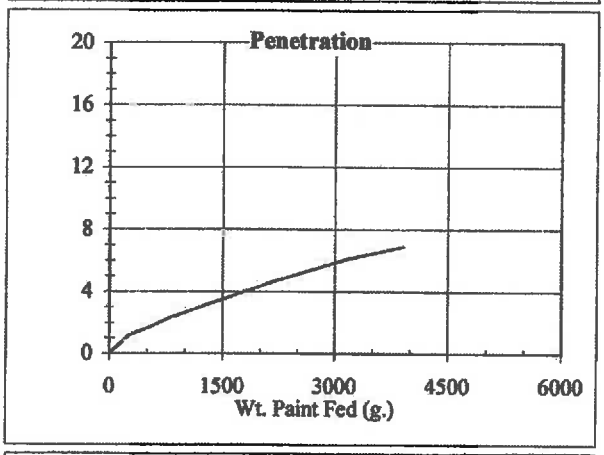
6.9 grams = **PENETRATION**

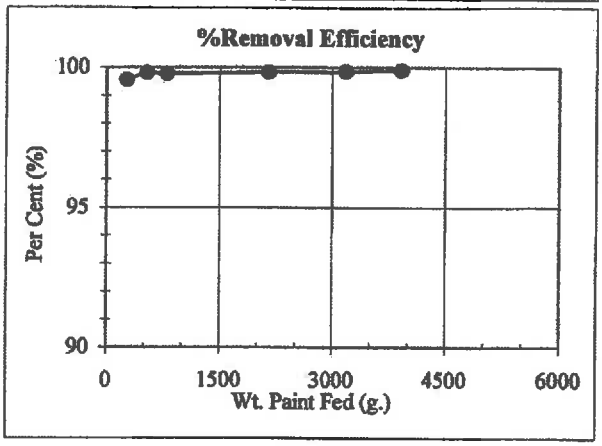
AVERAGE REMOVAL EFFICIENCY of TEST FILTER

99.76 %









Test Engineer: Todd Kruger

Supervising Engineer: K. C. Kwok, Ph.D.

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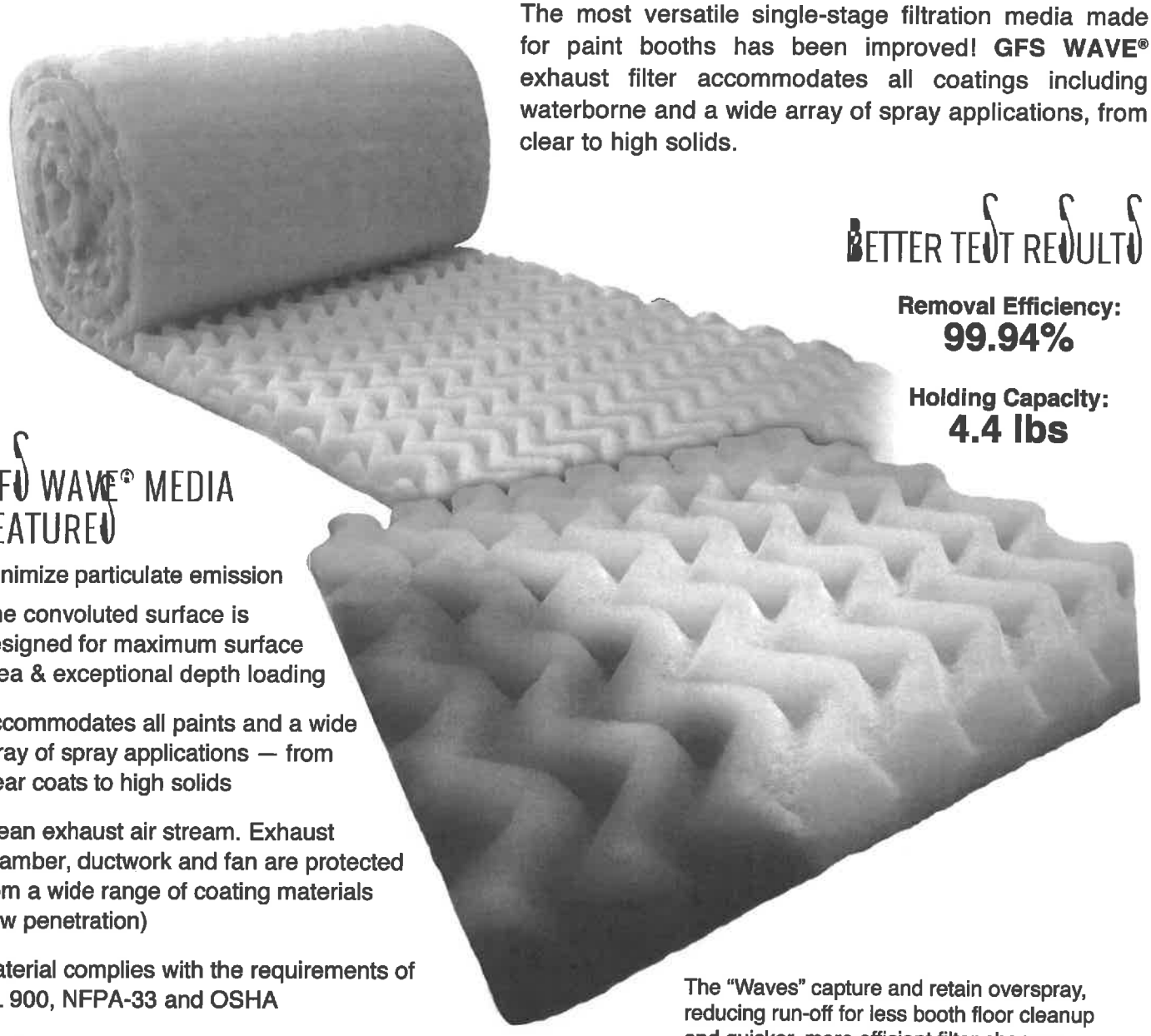
GFS Wave®

The most versatile single-stage filtration media made for paint booths has been improved! **GFS WAVE®** exhaust filter accommodates all coatings including waterborne and a wide array of spray applications, from clear to high solids.



BETTER TEST RESULTS

Removal Efficiency:
99.94%

Holding Capacity:
4.4 lbs

GFS WAVE® MEDIA FEATURES

Minimize particulate emission

The convoluted surface is designed for maximum surface area & exceptional depth loading

Accommodates all paints and a wide array of spray applications — from clear coats to high solids

Clean exhaust air stream. Exhaust chamber, ductwork and fan are protected from a wide range of coating materials (low penetration)

Material complies with the requirements of UL 900, NFPA-33 and OSHA

Available in standard and custom cut sizes

The "Waves" capture and retain overspray, reducing run-off for less booth floor cleanup and quicker, more efficient filter changes.

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Attachment M
Air Pollution Control Device Sheet
(MECHANICAL COLLECTOR-CYCLONE)

Control Device ID No. (must match Emission Units Table): Z-4C (Z-15S)

Equipment Information

1. Manufacturer: Aget Manufacturing Company

   Model No. 30SN100-PL-SP

2. Method: ☐ Wet ☒ Dry
   ☐ Single-stage
   ☐ Multiple: number
   ☐ In series: number

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. Provide a diagram of the proposed simple cyclone or multicyclone system with examples of the parameters identified below:

5. Simple cyclone system (show units):

Major cylinder diameter:		in.
Major cylinder length:		in.
Cone length:		in.
Gas outlet diameter:	13	in.
Gas outlet length:		in.
Gas inlet height:	186	in.
Gas inlet weight:		in.
Dust outlet diameter:		in.
Pressure drop across the cyclone:		in. H_2O

Describe the collected dust discharge valves and system: No discharge Valves

6. Multicyclone system (show units):

Major cylinder diameter:	N/A	in.
Major cylinder length:	N/A	in.
Cone length:	N/A	in.
Gas outlet diameter:	N/A	in.
Gas outlet length:	N/A	in.
Gas inlet height:	N/A	in.
Gas inlet weight:	N/A	in.
Dust outlet diameter:	N/A	in.
Pressure drop across the system:	N/A	in. H_2O
Number of tubes:	N/A	
Tube diameter:	N/A	in.
Tube length:	N/A	in.

Describe the collected dust discharge valves and system: N/A

7. More than one cyclone:
   Number of cyclones: 1
   Arrangement: ☐ Parallel ☐ Series
   Pressure drop across the system: TBD in. H_2O

8. On a separate sheet answer the following questions for each cyclone and attach:

Major cylinder diameter:	in.	Gas inlet weight:	in.
Major cylinder length:	in.	Dust outlet diameter:	in.
Cone length:	in.	Pressure drop across the system:	in. H_2O
Gas outlet diameter:	in.	Number of tubes:	
Gas outlet length:	in.	Tube diameter:	in.

Describe the collected dust discharge valves and systems:
Cyclone Air discharges into an Afterfilter utilizing 13.5 lb. napped Polypropylene Sateen Filters with Cabosil preload.

9. Guaranteed collection efficiency:
   Minimum: 80 %

10. Efficiency of cyclone:
    At design maximum: %
    At average Operation: %

11. Method of handling material removed:
    Large particulate falls into 20 gallon Drums integrated with the Cyclone, and Afterfilter. Drums to be emptied daily. Filters to be changed out when excessive pressure drop detected.

Gas Stream Characteristics

12. Particle characteristics (for particulate matter):
    Type of material: Kevlar-Carbon Fiber Composite
    Particle density: 0.057 pounds per cubic inch
    Emission rate at collector outlet: lb/hr
    grains/ACF
    Particulate matter inlet rate to device: 0.6 lb/hr
    0.01grains/ACF

13. Total flow rate:
    Design maximum: 3800 acfm
    Average expected: 3600 acfm

14. Gas Stream Temperature:
    Inlet: AMB. °F
    Outlet: AMB. °F

15. Gas flow rate into collector: 3600 acfm at Ambient °F and Atmospheric PSIA

16. Viscosity of gas stream at the above temperature and pressure: .003 lb/sec-ft

17. Inlet gas velocity: Varies by collection point from15-40 ft/sec

18. Particulate Grain Loading in grains/scf:
    Inlet:
    Outlet:

19. Supply a curve showing particulate collection efficiency versus gas volume from 25 to 100 percent of design rating of collector.

Particulate Distribution

20. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	**Weight % for Size Range**	**Weight % for Size Range**
0 – 2	0.81	99.93
2 – 4	1.35	100
4 – 6	2.42	100
6 – 8	3.44	100
8 – 10	4.28	100
10 – 12	4.92	100
12 – 16	5.79	100
16 – 20	6.33	100
20 – 30	7.02	100
30 – 40	7.34	100
40 – 50	7.56	100
50 – 60	7.74	100
60 – 70	7.89	100
70 – 80	8.02	100
80 – 90	8.12	100
90 – 100	8.20	100
>100	8.77	100

21. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
None

22. Describe the collection material disposal system:
Waste material collected in drums to be emtied daily into trash container. (nonhazardous Waste)

23. Have you included ***Mechanical Collector (Cyclone) Control Device*** in the Emissions Points Data Summary Sheet?

24. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
Continous monitoring of Pressure drop across after-Filter utilizing manometer integrated with strobe alarm. proper functionality of manometer and strobe to be verified on regular PM schedule TBD.	
REPORTING:	TESTING:

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

25. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
Estimated @ 85% for entire system. Most Losses are anticipated in the Machining center where 80% of the particulate matter is generated. Machining particles may be slung out of the range of their intended capture hood. The machine enclosure will likely contain stray particulate matter, forcing it to accumulate on flat surfaces near the bottom of the machine where it can be removed during end of shift clean-up. The Honing operation is expected to be nearly 100% efficient as the surface of the work piece is effectively internal to the Ducting system.

26. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
99.99%

27. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
N/A

Attachment N

Emission Totals by Source

Emission Unit ID		Emission Point ID	Material	Gallons Emitted per Lot	lb/gal	VOCw%	VOC HAP%	PM%	PM HAP%
Z-1S	Mandrel Release Coating	Fugitive	Frekote 700-NC	1.934	6.29	100%	0.00%	0%	0.0%
Z-2S	Adapter Degreasing Table	Fugitive	IPA	0.75	6.58	100%	0%	0%	0%
Z-2S	Adapter Degreasing Table	Fugitive	MEK	0.375	6.73	100%	0%	0%	0%
Z-3S	BR-127 Primer Booth	Z-3E	BR-127	1.06875	7.34	90%	1.06%	10%	2.5%
Z-4S	Adapter/BR-127 Oven	Z-4E	BR-127	0.05625	7.34	90%	1.06%	10%	2.5%
Z-5S	Interior Degreasing Exhaust (Chemlok)	Z-5E	IPA	2.85	6.58	100%	0%	0%	0%
Z-6S	Degreasing Drying Station (Chemlok)	Z-6E	IPA	0.15	6.58	100%	0%	0%	0%
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 205 mix	0.0376	7.42	84.6%	39.1%	15.4%	0%
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 234X mix	0.0468	7.63	91.1%	91.1%	2.5%	0.0%
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 205 mix	0.893	7.42	84.6%	39.1%	15.4%	0%
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 234X mix	0.969	7.63	91.1%	91.1%	2.5%	0.0%
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	MEK	0.5	6.73	100%	0%	0%	0%
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	Toluene	0.5	7.27	100%	100%	0%	0%
Z-9S	Chemlok Drying station	Z-9E	Chemlok 205 mix	0.047	7.42	84.6%	39.1%	15.4%	0%
Z-9S	Chemlok Drying station	Z-9E	Chemlok 234X mix	0.051	7.63	91.1%	91.1%	2.5%	0.0%
Z-10S	Insulator Prep Exhaust	Z-10E	IPA	2.85	6.58	100%	0%	0%	0%
Z-11S	Insulator Drying Oven	Z-11E	IPA	0.15	6.58	100%	0%	0%	0%
Z-12S	Bondliner Mixing Hood	Z-12E	Mix	0.036	7.82	79.99%	0%	0.01%	0%
Z-13S	Bondliner Application Booth	Z-13E	BL-004	1.2065	7.82	79.99%	0%	0.01%	0%
Z-13S	Bondliner Application Booth (Cleanup)	Z-13E	Toluene	0.5	7.27	100%	100%	0%	0%
Z-14S	Bondliner Drying Station	Z-14E	BL-004	0.0635	7.82	79.99%	0%	0.01%	0%
Z-15S	Case Machining	Z-15E	PM						
Z-16S	Exhaust for End Closure Adapter Wipe	Fugitive	IPA	0.75	6.58	100.00%	0%	0.00%	0%

Emission Totals by Source

Estimate losses from drying stations will be about 5% of total emissions with remaining bulk of emissions from the primary source (degreasing area, chemlok booth, bondliner booth)

Estimate approximately 2% loss of VOCs from mix hood to be calculated at year end based on the number of batches mixed.

*PM emissions include an overspray factor of 50% with 90% filter efficiency.

		ACETONE EMISSIONS						
Z-1S	Mandrel Cleaning	Acetone	0.125	6.61	0%	0%	0%	0%
Z-2S	Adapter Degreasing Table	Acetone	1.875	6.61	0%	0%	0%	0%
Z-5S	Interior Degreasing Exhaust (Chemlok)	Acetone	2.85	6.61	0%	0%	0%	0%
Z-6S	Degreasing Drying Station (Chemlok)	Acetone	0.15	6.61	0%	0%	0%	0%
Z-10S	Insulator Prep Exhaust	Acetone	0.5	6.61	0%	0%	0%	0%
Z-10S	Interior Degreasing Exhaust (BL-004)	Acetone	2.85	6.61	0%	0%	0%	0%
Z-11S	Degreasing Drying Station (BL-004)	Acetone	0.15	6.61	0%	0%	0%	0%
Z-16S	End Closure Adapter Bonding	Acetone	1.875	6.61	0%	0%	0%	0%

Emission Totals by Source

					Emissions Per Lot of 24 Units			
Emission Unit ID		Emission Point ID	Material	Gallons Emitted per Lot	lb VOC emitted	lb HAP VOC emitted	lb PM emitted*	lb HAP PM emitted*
Z-1S	Mandrel Release Coating	Fugitive	Frekote 700-NC	1.934	12.17	0.00	0.00	0.00
Z-2S	Adapter Degreasing Table	Fugitive	IPA	0.75	4.94	0.00	0.00	0.00
Z-2S	Adapter Degreasing Table	Fugitive	MEK	0.375	2.52	0.00	0.00	0.00
Z-3S	BR-127 Primer Booth	Z-3E	BR-127	1.06875	7.06	0.08	0.039	0.0098
Z-4S	Adapter/BR-127 Oven	Z-4E	BR-127	0.05625	0.37	0.004	0.000	0.000
Z-5S	Interior Degreasing Exhaust (Chemlok)	Z-5E	IPA	2.85	18.76	0.00	0.00	0.00
Z-6S	Degreasing Drying Station (Chemlok)	Z-6E	IPA	0.15	0.99	0.00	0.00	0.00
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 205 mix	0.0376	0.24	0.11	0.00	0.00
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 234X mix	0.0468	0.33	0.33	0.00	0.00
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 205 mix	0.893	5.61	2.59	0.05	0.00
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 234X mix	0.969	6.74	6.74	0.01	0.00
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	MEK	0.5	3.36	0.00	0.00	0.00
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	Toluene	0.5	3.63	3.63	0.00	0.00
Z-9S	Chemlok Drying station	Z-9E	Chemlok 205 mix	0.047	0.30	0.14	0.00	0.00
Z-9S	Chemlok Drying station	Z-9E	Chemlok 234X mix	0.051	0.35	0.35	0.00	0.00
Z-10S	Insulator Prep Exhaust	Z-10E	IPA	2.85	18.76	0.00	0.00	0.00
Z-11S	Insulator Drying Oven	Z-11E	IPA	0.15	0.99	0.00	0.00	0.00
Z-12S	Bondliner Mixing Hood	Z-12E	Mix	0.036	0.23	0.00	0.00	0.00
Z-13S	Bondliner Application Booth	Z-13E	BL-004	1.2065	7.55	0.00	0.00	0.00
Z-13S	Bondliner Application Booth (Cleanup)	Z-13E	Toluene	0.5	3.63	3.63	0.00	0.00
Z-14S	Bondliner Drying Station	Z-14E	BL-004	0.0635	0.40	0.00	0.00	0.00
Z-15S	Case Machining	Z-15E	PM					
Z-16S	Exhaust for End Closure Adapter Wipe	Fugitive	IPA	0.75	4.94	0.00	0.00	0.00
					103.86	17.61	0.10	0.01

Emission Totals by Source

						Emissions Per Hour			
Emission Unit ID		Emission Point ID	Material	Gallons Emitted per Lot	Hours Per Lot	lb VOC emitted	lb HAP VOC emitted	lb PM emitted*	lb HAP PM emitted*
Z-1S	Mandrel Release Coating	Fugitive	Frekote 700-NC	1.934	3	4.06	0.00	0.00	0.00
Z-2S	Adapter Degreasing Table	Fugitive	IPA	0.75	2	2.47	0.00	0.00	0.00
Z-2S	Adapter Degreasing Table	Fugitive	MEK	0.375	2	1.26	0.00	0.00	0.00
Z-3S	BR-127 Primer Booth	Z-3E	BR-127	1.06875	2	3.53	0.04	0.020	0.0049
Z-4S	Adapter/BR-127 Oven	Z-4E	BR-127	0.05625	2	0.19	0.00	0.00	0.00
Z-5S	Interior Degreasing Exhaust (Chemlok)	Z-5E	IPA	2.85	2	9.38	0.00	0.00	0.00
Z-6S	Degreasing Drying Station (Chemlok)	Z-6E	IPA	0.15	2	0.49	0.00	0.00	0.00
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 205 mix	0.0376	1	0.24	0.11	0.00	0.00
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 234X mix	0.0468	1	0.33	0.33	0.00	0.00
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 205 mix	0.893	2	2.81	1.30	0.027	0.00
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 234X mix	0.969	2	3.37	3.37	0.005	0.00
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	MEK	0.5	1	3.36	0.00	0.00	0.00
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	Toluene	0.5	1	3.63	3.63	0.00	0.00
Z-9S	Chemlok Drying station	Z-9E	Chemlok 205 mix	0.047	2	0.148	0.068	0.00	0.00
Z-9S	Chemlok Drying station	Z-9E	Chemlok 234X mix	0.051	2	0.177	0.177	0.00	0.00
Z-10S	Insulator Prep Exhaust	Z-10E	IPA	2.85	2	9.38	0.00	0.00	0.00
Z-11S	Insulator Drying Oven	Z-11E	IPA	0.15	2	0.49	0.00	0.00	0.00
Z-12S	Bondliner Mixing Hood	Z-12E	Mix	0.036	1	0.23	0.00	0.00	0.00
Z-13S	Bondliner Application Booth	Z-13E	BL-004	1.2065	2	3.78	0.00	0.00	0.00
Z-13S	Bondliner Application Booth (Cleanup)	Z-13E	Toluene	0.5	1	3.63	3.63	0.00	0.00
Z-14S	Bondliner Drying Station	Z-14E	BL-004	0.0635	2	0.199	0.00	0.00	0.00
Z-15S	Case Machining	Z-15E	PM		24			0.06	
Z-16S	Exhaust for End Closure Adapter Wipe	Fugitive	IPA	0.75	2	2.469	0.00	0.00	0.00
						55.61	12.66	0.11	0.00

Emission Totals by Source

Emission Unit ID		Emission Point ID	Material	Gallons Emitted per Lot	Max Lots Per Year	Emissions Per Year			
						lb VOC emitted	lb HAP VOC emitted	lb PM emitted*	lb HAP PM emitted*
Z-1S	Mandrel Release Coating	Fugitive	Frekote 700-NC	1.934	260.00	3163.56	0.00	0.00	0.00
Z-2S	Adapter Degreasing Table	Fugitive	IPA	0.75	260.00	1283.77	0.00	0.00	0.00
Z-2S	Adapter Degreasing Table	Fugitive	MEK	0.375	260.00	655.71	0.00	0.00	0.00
Z-3S	BR-127 Primer Booth	Z-3E	BR-127	1.06875	260.00	1836.32	21.63	10.20	2.55
Z-4S	Adapter/BR-127 Oven	Z-4E	BR-127	0.05625	260.00	96.65	1.14	0.00	0.00
Z-5S	Interior Degreasing Exhaust (Chemlok)	Z-5E	IPA	2.85	260.00	4878.31	0.00	0.00	0.00
Z-6S	Degreasing Drying Station (Chemlok)	Z-6E	IPA	0.15	260.00	256.75	0.00	0.00	0.00
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 205 mix	0.0376	260.00	61.43	28.39	0.00	0.00
Z-7S	Chemlok Mixing Hood	Z-7E	Chemlok 234X mix	0.0468	260.00	84.59	84.59	0.00	0.00
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 205 mix	0.893	260.00	1458.91	674.15	13.94	0.00
Z-8S	Chemlok Application Booth	Z-8E	Chemlok 234X mix	0.969	260.00	1751.54	1751.54	2.53	0.00
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	MEK	0.5	260.00	874.28	0.00	0.00	0.00
Z-8S	Chemlok Application Booth (Cleanup)	Z-8E	Toluene	0.5	260.00	944.79	944.79	0.00	0.00
Z-9S	Chemlok Drying station	Z-9E	Chemlok 205 mix	0.047	260.00	76.78	35.48	0.00	0.00
Z-9S	Chemlok Drying station	Z-9E	Chemlok 234X mix	0.051	260.00	92.19	92.19	0.00	0.00
Z-10S	Insulator Prep Exhaust	Z-10E	IPA	2.85	260.00	4878.31	0.00	0.00	0.00
Z-11S	Insulator Drying Oven	Z-11E	IPA	0.15	260.00	256.75	0.00	0.00	0.00
Z-12S	Bondliner Mixing Hood	Z-12E	Mix	0.036	260.00	58.58	0.00	0.00	0.00
Z-13S	Bondliner Application Booth	Z-13E	BL-004	1.2065	260.00	1963.11	0.00	0.01	0.00
Z-13S	Bondliner Application Booth (Cleanup)	Z-13E	Toluene	0.5	260.00	944.79	944.79	0.00	0.00
Z-14S	Bondliner Drying Station	Z-14E	BL-004	0.0635	260.00	103.32	0.00	0.00	0.00
Z-15S	Case Machining	Z-15E	PM		260.00			374.40	
Z-16S	Exhaust for End Closure Adapter Wipe	Fugitive	IPA	0.75	260.00	1283.77	0.00	0.00	0.00
						27004.22	4578.68	401.08	2.55
						13.50	2.29	0.201	0.0013

Z-1S: Mandrel Release Coating Table

Material	SDS	g/cm3	lb/gal	VOCw%	VOC HAP%	PM%	PM HAP%	Usage for 1 Case (grams)	Usage for 1 Case (cc)	Usage for 1 Case (oz)	1 Lot (oz)	1 Lot (gallons)	Amount Mixed/Used (Gallons)	Amount for 6000 Units (oz)	gal	Total Lbs	Lbs VOC
Frekote 700-NC	997	0.754	6.29	100%	0.00%	0%	0.0%	230	305.04	10.3	247.6	1.934	1.934	64370.93	502.90	3163.92	3163.92
Acetone	34	0.792	6.61	0%	0%	0%	0%			12.0	288.0	2.25	2.25	74880	585.00	3865.94	0.00

Frekote 700-NC			MW
Dibutyl ether	142-96-1	20%	130.23
Naphtha, hydrotreated heavy	64742-48-9	74%	
Alkanes, C7-10-iso-	90622-56-3	3%	
Octane	111-65-9	3%	

Z-2S: Adapter Degreasing Table; Z-3S: BR-127 Primer Booth; Z-4S: Adapter/BR-127 Primer Oven

Material	SDS	g/cm3	lb/gal	VOCw%	VOC HAP%	PM%	PM HAP%	Usage for 1 Case (grams)	Usage for 1 Case (cc)	Usage for 1 Case (oz)	1 Lot (oz)	1 Lot (gallons)	Amount Mixed/Used (Gallons)	Amount for 12000 Units (oz)	gal	lb
BR-127 Primer	310	0.88	7.34	90%	1.06%	10%	2.5%			6.0	144.0	1.125	1.125	37440	292.50	2147.75
Acetone	34	0.792	6.61	0%	0%	0%	0%			10.0	240.0	1.875	1.875	124800	975.00	6443.24
Isopropyl Alcohol	49	0.789	6.58	100%	0%	0%	0%			2.0	96.0	0.75	0.75	24960	195.00	1283.77
MEK	10	0.806	6.73	100%	0%	0%	0%			1	48.0	0.375	0.375	12480	97.50	655.71

From Mark White

I just received a message from H&W who has been spraying the BR127 on our GMLRS adapters. They said they have been using 3 ounces per part which equates to 6 ounces per rocket motor. Our max expected rate is 6000 motors / year or 281.25 gallons of BR127 per year.

		Z-3S lb/hr HAP VOC	Z-3S lb/hr HAP PM
Formaldehyde	0.06%	0.002	
Methanol	1.0%	0.035	
Strontium chromate	2.5%		0.0098
		0.037	0.0098

BR-127		MW	
Methanol	1%	32.04	0.3204
2-Ethoxyethanol	17.5%	90.12	15.771
MEK	70%	72.11	50.477
Formaldehyde	0.06%	30.03	0.018018
Strontium chromate	2.50%	203.614	5.09035
			71.68

Z-5S: Interior Degreasing Exhaust; Z-6S: Interior Degreasing Drying Station
Z-7S: Chemlok Mixing Hood; Z-8S Chemlok Spray Booth; Z-9S: Chemlok Drying Station

Material	SDS #	g/cm3	lb/gal	VOCw%	VOC HAP%	PM%	PM HAP%	Usage for 1 Case (grams)	Usage for 1 Case (cc)	Usage for 1 Case (oz)	1 Lot (oz)	1 Lot (gallons)	Amount Mixed/Used (Gallons)	Amount exhaust	Total Lbs Mixed	Total Lbs Exhausted	Lbs VOC	Lbs PM	Amount Waste Drum
Acetone	34	0.792	6.61	0%	0%	0%	0%			16.0	384	3	4	3		5154.59	0.00	0.00	1
Isopropyl Alcohol	49	0.789	6.58	100%	0%	0%	0%			16.0	384	3	4	3		5135.06	5135.06	0.00	1
Chemlok 205 primer (5:3) 15 sputum Cups	284	0.94	7.84	75.42%	62.58%	24.6%	0%			6.25	150	1.17							
MEK 9 Sputum Cups	10	0.806	6.73	100%	0%	0%	0%			3.75	90	0.70							
As mixed Chemlok 205 Primer		0.8898	7.4241	84.6%	39.1%	15.4%	0%			10	240	1.88	1.88	0.94	3480.03	1810.66	1532.49	278.16	0.94
Gun test 35-45 grams per 10 seconds								135	151.7	5.13	5.1	0.04							
First Coat Spray (12-14 seconds)								63	70.81	2.39	57.5	0.45							
Second Coat Spray (12-14 Seconds)								63	70.81	2.39	57.5	0.45							
Cleanup with MEK (Chemlok 205)	10	0.806	6.73	100%	0%	0%	0%			10.67	256.0	2.00	2	0.5		874.28	874.28	0.00	1.5
Chemlok 234X NW adhesive 15 sputum Cups	2568	0.959	8.00	82.1%	82.1%	5%	0%			6.25	150	1.17							
Toluene (1:1) 15 sputum Cups	3	0.871	7.27	100%	100%	0%	0%			6.25	150	1.17							
As mixed Chemlok 234X Primer		0.9150	7.6348	91.1%	91.1%	2.5%	0.0%			12.5	300	2.34	2.34	1.01	4473.49	2011.84	1831.98	50.30	1.33
Gun test 40-50 grams per 10 seconds								150	163.9	5.54	5.5	0.04							
First Coat Spray (12-14 seconds)								70	76.50	2.59	62.1	0.49							
Second Coat Spray (12-14 Seconds)								70	76.50	2.59	62.1	0.49							
Cleanup with Toluene (Chemlok 234)	3	0.871	7.27	100%	100%	0%	0%			10.67	256	2.00	2	0.5		944.79	944.79	0.00	1.5

Totals identified in wipe cleaning tables

Degreasing with acetone and IPA - 24 units degreased in 2 hours each for acetone and IPA
Chemlok 205 - 24 units over 2 hours, 1 hour cleanup followed by Chemlok 234X - 24 units over 2 hours with 1 hour cleanu

VOC and HAP content for mixtures (from Chemlok Mix tab)

Chemlok 205 (as mixed)	
Ethyl benzene	3.5%
MIBK	41.8%
Xylene	10.4%
MEK	44.3%
Chemlok 234X (as mixed)	
Ethyl benzene	10.02%
Xylene	35.07%
Toluene	54.91%

Molecular weights

Chemlok 205 (as mixed)		88.57
Ethyl benzene	106.17	3.70
MIBK	100.16	41.84
Xylene	106.16	11.09
MEK	72.11	31.95
Chemlok 234X (as mixed)		98.46
Ethyl benzene	106.17	10.64
Xylene	106.16	37.23
Toluene	92.14	50.60
IPA	60.10	

Z-10S: Insulator Prep Exhaust

Material	SDS	g/cm3	lb/gal	VOCw%	VOC HAP%	PM%	PM HAP%	Usage for 1 Case (grams)	Usage for 1 Case (cc)	Usage for 1 Case (oz)	1 Lot (oz)	1 Lot (gallons)	Amount Mixed/Used (Gallons)	Amount exhaust	Total Lbs Mixed	Total Lbs Exhausted	Lbs VOC
Acetone	34	0.792	6.61	0%	0%	0%	0%			2.7	64.0	0.5	0.5				

Z-10S: Insulator Prep Exhaust; Z-11S Oven for Insulator Drying
Z-12S: Bondliner Mixing Booth; Z-13S: Bondliner Spray Booth; Z-14S: Bondliner Drying Station

Material	SDS	g/cm3	lb/gal	VOCw%	VOC HAP%	PM%	PM HAP%	Grams per Bondliner mix 2 mixes per Lot)	Usage for 1 Case (grams)	Usage for 1 Case (cc)	Usage for 1 Case (oz)	1 Lot (oz)	1 Lot (gallons)	Amount Mixed/Used (Gallons)	Amount exhaust	Amount Waste Drum	Amount for 6000 Units (oz)	gal	lbs
Acetone	34	0.792	6.61	0%	0%	0%	0%				16	384	3	4	3	1	99840	780	5154.6
Isopropyl Alcohol	49	0.789	6.58	100%	0%	0%	0%				16	384	3	4	3	1	99840	780	5135.1
Mix BL-034	2193	0.938	7.82	79.99%	0%	0.01%	0%	3200					1.80	1.80	1.27	0.54			
Rhodamine B Dye 0.01%	331	1.25	10.43	0%	0%	100%	0%	0.32											
Ethyl Acetate 79.99%	108	0.902	7.53	100%	0%	0%	0%	2559.68											
Hydroxyl-Terminated Polybutadiene 5%	315	0.9	7.51	0%	0%	0%	0%	160											
Desmodur N-100 15%	201	1.14	9.51	0%	0%	0%	0%	480											
Gun test 10-16 grams per 30 seconds									9.3	9.95	0.34	8.1	0.06				2100.57	16.41	128.4
First Coat Spray (167 inches 1 inch per second)									89.1	94.99	3.21	77.1	0.60				20045.4	156.60	1225.2
Second Coat Spray (167 inches 1 inch per second)									89.1	94.99	3.21	77.1	0.60				20045.4	156.60	1225.2
Cleanup with Toluene	3	0.871	7.27	100%	100%	0%	0%				2.67	64	0.5	2	0.5	1.5	16640	130	944.8

1 lot = 24 motors

Ingredient % from Chemlok Mix Ratios tab

Molecular weight	%	Ingred MW	Mix MW
Rhodamine B Dye	0.01%	442.55	0.0443
Ethyl Acetate	79.99%	88.11	70.479
Hydroxyl-Terminated Polybutadiene	5%	2400	120
Desmodur N-100	15%	500	75
			265.52

Max production is 24 units per day, but bondlining will complete 24 units in a single 8 hour shift with only 1 shift per day bondlined

Chemlok 234X (82.1% VOCw as listed in Section 9)			82.1%
Ethyl benzene (20% or less)	20%	22.2%	18.2%
Xylene (70% or less)	70%	77.8%	63.9%
	90%	100.0%	

To determine Ethyl benzene and xylene amounts

Add amounts together and determine % of each in total

Use the calculated % and multiple by the VOC% of the material

Chemlok 234X / Toluene is mixed 1:1

	50%	50% Mixture			Z-8S lb/hr HAP	Z-9S lb/hr HAP	Z-7S lb/hr HAP
Ethyl benzene	18.2%		9.1%	10.02%	0.34	0.018	0.055
Xylene	63.9%		31.9%	35.07%	1.18	0.062	0.193
Toluene		100%	50.0%	54.91%	1.85	0.097	
			91.1%	100.00%	3.37	0.177	0.248

Chemlok 205 (75.42% VOCw as listed in Section 9)			75.42%
Ethyl benzene	5%	6.25%	4.7%
MIBK	60%	75.00%	56.6%
Xylene	15%	18.75%	14.1%
	80%	100%	

Chemlok 205 / MEK mixed 5:3 2.81 lb/hr VOC emissions

	62.5%	37.5% Mixture			Z-8S lb/hr HAP	Z-9S lb/hr HAP	Z-7S lb/hr HAP	
Ethyl benzene	4.7%		2.9%	3.5%	0.08	0.004	0.019	0.074
MIBK	56.6%		35.4%	41.8%	0.99	0.052	0.230	0.230
Xylene	14.1%		8.8%	10.4%	0.25	0.013	0.057	0.2503
MEK		100%	37.5%	44.3%	**1.32**	**0.070**	0.306	
			84.6%	100.0%				0.55

Emission Concentrations for Attachment J

	Material	MW	lb/hr	acfm	ppm
Z-1E	Frekote	Fugitive			
Z-2E	IPA	Fugitive			
Z-3E	BR-127	71.677	3.53		#DIV/0!
Z-3E	BR-127 (Ethoxyethanol)	15.771	0.618		#DIV/0!
Z-3E	BR-127 (MEK)	50.477	2.471		#DIV/0!
Z-3E	BR-127 (Methanol)	0.320	0.0353		#DIV/0!
Z-3E	BR-127 (Formaldehyde)	0.018	0.002		#DIV/0!
Z-3E	BR-127 (Strontium chromate)	5.090	0.0049		#DIV/0!
Z-4E	BR-127	71.677	0.19		#DIV/0!
Z-4E	BR-127 (Ethoxyethanol)	15.771	0.033		#DIV/0!
Z-4E	BR-127 (MEK)	50.477	0.133		#DIV/0!
Z-4E	BR-127 (Methanol)	0.320	0.002		#DIV/0!
Z-4E	BR-127 (Formaldehyde)	0.018	0.0001		#DIV/0!
Z-5E	IPA	60.1	9.38	600	1671
Z-6E	IPA	60.1	0.99	600	176
Z-7E/Z-12E	Chemlok 205 Mixed	88.57	0.24	720	24
Z-7E/Z-12E	Chemlok 205 (MEK)	31.95	0.106	720	30
Z-7E/Z-12E	Chemlok 205 (Ethyl benzene)	3.70	0.009	720	22
Z-7E/Z-12E	Chemlok 205 (MIBK)	41.84	0.1	720	21
Z-7E/Z-12E	Chemlok 205 (Xylene)	11.09	0.025	720	20
Z-7E/Z-12E	Chemlok 234X Mixed	98.46	0.33	720	30
Z-7E/Z-12E	Chemlok 234X (Ethyl benzene)	10.64	0.033	720	28
Z-7E/Z-12E	Chemlok 234X (Toluene)	50.60	0.181	720	32
Z-7E/Z-12E	Chemlok 234X (Xylene)	37.23	0.116	720	28
Z-7E/Z-12E	BL-034 BL Mixed	265.52	0.23	720	8
Z-8E/Z-13E	Chemlok 205 Mixed	88.57	2.81	1000	204
Z-8E/Z-13E	Chemlok 205 (MEK)	31.95	1.245	1000	250
Z-8E/Z-13E	Chemlok 205 (Ethyl benzene)	3.70	0.098	1000	170
Z-8E/Z-13E	Chemlok 205 (MIBK)	41.84	1.175	1000	180
Z-8E/Z-13E	Chemlok 205 (Xylene)	11.09	0.292	1000	169
Z-8E/Z-13E	Chemlok 234X Mixed	98.46	3.37	1000	220
Z-8E/Z-13E	Chemlok 234X (Ethyl benzene)	10.64	0.338	1000	204
Z-8E/Z-13E	Chemlok 234X (Toluene)	50.60	1.851	1000	235
Z-8E/Z-13E	Chemlok 234X (Xylene)	37.23	1.182	1000	204
Z-8E/Z-13E	BL-034 BL Mixed	265.52	3.78	1000	91
Z-8E/Z-13E	Toluene Cleanup	50.60	3.63	1000	461
Z-8E/Z-13E	MEK Cleanup	31.95	3.60	1000	724
Z-9E/Z-14E	Chemlok 205 Mixed	88.57	0.148	1000	11
Z-9E/Z-14E	Chemlok 205 (MEK)	31.95	0.066	1000	13
Z-9E/Z-14E	Chemlok 205 (Ethyl benzene)	3.70	0.005	1000	9
Z-9E/Z-14E	Chemlok 205 (MIBK)	41.84	0.062	1000	10
Z-9E/Z-14E	Chemlok 205 (Xylene)	11.09	0.015	1000	9
Z-9E/Z-14E	Chemlok 234X Mixed	98.46	0.177	1000	12
Z-9E/Z-14E	Chemlok 234X (Ethyl benzene)	10.64	0.018	1000	11
Z-9E/Z-14E	Chemlok 234X (Toluene)	50.60	0.097	1000	12
Z-9E/Z-14E	Chemlok 234X (Xylene)	37.23	0.015	1000	3
Z-9E/Z-14E	BL-034 BL Mixed	265.52	0.199	1000	5
Z-10E	IPA	60.1	9.38	600	1671
Z-11E	IPA	60.1	0.99	650	163
Z-15E	PM				
Z-16E	IPA	Fugitive			

Lb/hr = Cgas x MW x dscfm x constant (1.557e-7)

ATTACHMENT O
MONITORING, RECORDKEEPING, REPORTING AND TESTING PLAN

Monitoring

Z-3S (Z-1C); Z-8S (Z-2C); and Z-13S (Z-3C)
Each of these units are spray booths with filters for control of particulate matter (PM). Manometers or differential pressure gauges will be installed on each of these units to check the pressure drop across the filters and set points will be marked to indicate adequate draw through the systems. Operating procedures for each piece of equipment will include language that require the manometers or gauges be checked prior to use to ensure that the system is running at adequate draw and the checks to be recorded.

Z-15S (Z-4C) – Cyclone for Case Machining
The system will utilize a manometer with an integrated strobe alarm and will continuously monitor the pressure drop across after-filter. The manometer and alarm will be added to the regular Preventative Maintenance on an at least annual basis, or more often if advised by the manufacturer.

Recordkeeping

Engineering estimates from development motors are available for units that will be manufactured. The most efficient way to track emissions is tracking the number of units processed at each emission source and calculating emissions based on known emission rates multiplied by the number of units processed each day. We are proposing recordkeeping per the table below for each source. Record forms have been generated for each source and are attached to this plan. The GMLRS program will be using a production software system called Solumina. The program is an electronic system that replaces hard copy operating procedures and hand written records for production. The forms that are attached indicate what data must be tracked, but the daily production floor input may be into the Solumina system rather than hand written sheets. Reports will be run on a monthly basis to allow for emissions calculations at the end of each month. Monthly totals will be rolled up into 12 month rolling totals for each emission point.

Manometers (or differential pressure gauges) will be checked to ensure adequate air flow on units Z-3S, Z-8S, or Z-13S each day prior to use and the checks shall be recorded as part of the Daily Filter Check Records.

Daily Filter Checks will be made to ensure that filters are in place and in good condition prior to any spray operations in Z-3S, Z-8S, or Z-13S. These will be completed to ensure compliance with visible emission requirements. See form in attached Record Forms file.

The Cyclone (Z-4C) and its associated alarm system shall have preventative maintenance conducted at least annually and records shall be maintained.

For operations such as hand application of mold releases, degreasing, and wipe cleaning, processing hours have been estimated based on program development of single units. Actual hours may be higher or lower than what is estimated in the permit application.

Records to be Maintained

Emission Source ID	Emission Point ID	Records
Z-1S	Z-1E	Daily records of the number of winds made and hours of application of Frekote 700-NC.
Z-2S	Z-2E	Daily records of number of adapters degreased and wipe checked and hours of processing time.
Z-3S	Z-3E	Daily records of number of adapters coated and hours of processing time. Emissions are split 95% / 5% between spray booth and oven. Daily manometer and filter checks to ensure that filters are in place and in good condition prior to spray operations.
Z-4S	Z-4E	Daily records of number of adapters coated and hours of processing time. Emissions are split 95% / 5% between spray booth and oven.
Z-5S	Z-5E	Daily records of number of cases degreased and hours of processing time. Emissions are split 95% / 5% between exhaust and drying station.
Z-6S	Z-6E	Daily records of number of cases degreased and hours of processing time. Emissions are split 95% / 5% between exhaust and drying station.
Z-7S	Z-7E	Daily records of batches mixed with batch weights.
Z-8S	Z-8E	Daily records of number of cases sprayed and hours of processing time. Emissions are split 95% / 5% between spray booth and drying station. Daily manometer and filter checks to ensure that filters are in place and in good condition prior to spray operations.
Z-9S	Z-9E	Daily records of number of cases sprayed and hours of processing time. Emissions are split 95% / 5% between spray booth and drying station.
Z-10S	Z-10E	Daily records of number of cases degreased and hours of processing time. Emissions are split 95% / 5% between exhaust and drying station.
Z-11S	Z-11E	Daily records of number of cases degreased and hours of processing time. Emissions are split 95% / 5% between exhaust and drying station.
Z-12S	Z-12E	Daily records of batches mixed with batch weights.
Z-13S	Z-13E	Daily records of number of cases sprayed and hours of processing time. Emissions are split 95% / 5% between spray booth and drying station. Daily manometer and filter checks to ensure that filters are in place and in good condition prior to spray operations.
Z-14S	Z-14E	Daily records of number of cases sprayed and hours of processing time. Emissions are split 95% / 5% between spray booth and drying station.
Z-15S	Z-15E	Daily records of the number of cases machined. Daily manometer checks for the cyclone.
Z-16S	Z-16E	Daily records of number of adapters degreased and wipe checked and hours of processing time.

Reporting
Emissions from all emission points associated with this permit will be included in the Annual Emissions Inventory submitted by April 1 of each year.

Testing
None.

Proposed Emission Limits Table

Emission Point ID	Pollutant	Annual Emissions (lb/yr)
Z-1E	VOC	3164
Z-2E	VOC	1940
Z-3E	VOC	1836
	PM	10
Z-4E	VOC	97
Z-5E	VOC	4878
Z-6E	VOC	257
Z-7E / Z-12E	VOC	206
Z-8E / Z-13E	VOC	7938
	PM	17
Z-9E / Z-14E	VOC	272
Z-10E	VOC	4878
Z-11E	VOC	257
Z-15E	PM	125
Z-16E	VOC	1284
TOTAL	**VOC**	**27,007**
	PM	**152**

The hours of operation for mold release application, wipe cleaning and degreasing operations are based on engineering estimates from single units during program development and are subject to increase or decrease based on actual, multi-unit production methods. Therefore, we are requesting that no specific hourly limits be set in the permit, but rather use annual totals only. If hourly limits are required, we are requesting that they be set 50% higher than those listed in the application in case processing times for hand operations are significantly faster than development numbers have shown.

August 1, 2016

Mineral Daily News-Tribune
21 Shamrock Dr.
Keyser, WV 26726

Attn: Sandy Canfield

Sandy,

Please run the enclosed legal notice for 30 days as required by the WV Division of Air Quality and forward a copy of the affidavit of publication to me. If possible, could you please expedite its printing?

Thank you.

Sincerely,

Sue Ellen Foor

Sue Ellen Foor
Environmental Engineer
ATK
210 State Route 956
Rocket Center, WV 26726

`LegalAd for Bldg 256 GMLRS.doc

Orbital ATK

August 1, 2016

Notice is given that Alliant Techsytems LLC – ABL Operations (a division of Orbital ATK Inc.) has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit to add a new composite winding and rocket motor chamber preparation operation to its facility located on 210 State Route, near Keyser in Mineral County, West Virginia. The latitude and longitude coordinates are: 39.561degress latitude, -78.833 degrees longitude.

The applicant estimates that the increased potential change to discharge the following Regulated Air Pollutants will be:
Volatile Organic Compounds (VOC) – 13.5 TPY
Hazardous Air Pollutant (HAP) –2.37 TPY
Particulate Matter (PM) – 2.05 TPY (Uncontrolled) or 0.20 TPY (Controlled)

Startup of operation is planned to begin on or about the 5th day of December, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, West Virginia, 25304, for a period of 30 days calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.
Dated this the 18th day of July, 2016.

By: Orbital ATK Inc.
Alliant Techsystems LLC – ABL Operations
Michael McGregor
V.P. & Site Mgr. – ABL Operations
210 State Route 956
Rocket Center, West Virginia 26726-3548

LegalAd for GMLRS Cham Prep.doc

Attachment S

Title V Permit Revision Information

1. New Applicable Requirements Summary	
Mark all applicable requirements associated with the changes involved with this permit revision:	
☐ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☒ NESHAP (45CSR15)	☐ Nonattainment NSR (45CSR19)
☐ Section 111 NSPS (Subpart(s)_____)	☐ Section 112(d) MACT standards (Subpart(s)_____)
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☒ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ Compliance Assurance Monitoring (40CFR64) (1)
☐ NO_x Budget Trading Program Non-EGUs (45CSR1)	☐ NO_x Budget Trading Program EGUs (45CSR26)

(1) If this box is checked, please include **Compliance Assurance Monitoring (CAM) Form(s)** for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why **Compliance Assurance Monitoring** is not applicable:

There are no CAM requirements associated with this process.

2. Non Applicability Determinations

List all requirements, which the source has determined not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and a rationale for the determination.

45CSR21– Regulation to Prevent and Control Air Pollution from the Emission of Volatile Organic Compounds. The facility is not located in a county that is currently subject to 45CSR21, and is therefore currently exempt from this regulation.

40CFR63, Subpart GG, Section 63.745 – National Emission Standards for Aerospace Manufacturing Operations. The painting operations at this facility are exempted from Section 63.745 Primer and Topcoat operations because Specialty Coatings (definition per 63. 742) are used for all painting operations. Specialty Coating applications are covered by Control Technology Guidelines (CTG) EPA-453/R-97-004 enacted under 45CSR21 for RACT control of VOCs. However, the facility is not located in an area that is subject to 45CSR21, and is therefore, not subject to any CTG guidelines for Specialty Coating application.

40CFR63, Subpart PPP – National Emission Standards for Polyether Polyol Production. The facility manufactures Terathane Polyethylene Glycol Block Copolymer (TPEG), which is a Polyether Polyol. However, the operation is exempted from this MACT because there are no HAPs used or generated during the manufacturing operation.

40CFR63, Subpart GGGGG – National Emission Standards for Site Remediation. The facility currently has one site under remediation for groundwater contamination. This site is a Superfund site and is thus exempt from the MACT requirements. The facility also has a second site, which will begin remediation as part of a RCRA corrective action program within the next year. This second site would also be exempted since it is being conducted under a RCRA corrective action permit. In addition, neither site would generate emissions of more than 1 megagram per year of HAPs.

40CFR63, Subpart PPPPP – National Emission Standards for Hazardous Air Pollutants from Engine Test Sells/Stands (05/27/03)- This rule applies to the X-Range Static Rocket Motor Firing facility (Group 00Q). However, per 40CFR63.9290(b) & (d)(2) it is exempt from the requirements of this Subpart due to facility was existing source on May 14, 2002 (partially modified in summer of 2002, Source Q-3S) and also, it is used exclusively for rocket motors testing.

40CFR63, Subpart WWWWW – National Emission Standards for Reinforced Plastic Composites Manufacturing. the facility manufactures composite based rocket motor chambers and aircraft components. However, the facility is exempt from this MACT because none of the resin or fiber systems used, contain HAPs.

☒ **Permit Shield Requested** *(not applicable to Minor Modifications)*

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

3. Suggested Title V Draft Permit Language

Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision? ☐ Yes ☒ No If Yes, describe the changes below.

Also, please provide **Suggested Title V Draft Permit language** for the proposed Title V Permit revision (including all applicable requirements associated with the permit revision and any associated monitoring /recordkeeping/ reporting requirements), OR attach a marked up pages of current Title V Permit. Please include appropriate citations (Permit or Consent Order number, condition number and/or rule citation (e.g. 45CSR§7-4.1)) for those requirements being added / revised.

See Attachment O –

4. Active NSR Permits/Permit Determinations/Consent Orders Associated With This Permit Revision		
Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
None		
	/ /	
	/ /	

5. Inactive NSR Permits/Obsolete Permit or Consent Orders Conditions Associated With This Revision		
Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
R13-2754	8/15/08	Permit needs cancelled. All equipment has been removed from the facility.
	/ /	
	/ /	

6. Change in Potential Emissions	
Pollutant	Change in Potential Emissions (+ or -), TPY
VOC	13.5 TPY
HAP	2.37 TPY
PM	2.05 TPY

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

7. Certification For Use Of Minor Modification Procedures ***(Required Only for Minor Modification Requests)***

Note:	*This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:*

i. Proposed changes do not violate any applicable requirement;

ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;

iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis;

iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act;

v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19;

vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification;

Notwithstanding subparagraph 45CSR§30-6.5.a.1.A. (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under 45CSR30.

Pursuant to 45CSR§30-6.5.a.2.C., the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 45CSR§30-6.5.a.1.A. The use of Minor permit modification procedures are hereby requested for processing of this application.

(Signed):	Robert M. McGregor *(Please use blue ink)*	Date:	8 / 6 / 15 *(Please use blue ink)*
Named (typed):	*Michael McGregor*	Title:	*V.P. & Site Manager – ABL Operations*

Note: Please check if the following included (if applicable):

☐	Compliance Assurance Monitoring Form(s)
☒	Suggested Title V Draft Permit Language (See Attachment O)

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

August 2, 2016

Alliant Techsystems Operations LLC
Allegany Ballistics Laboratory
WVDAQ ID# 057-00011

SUBJECT: R13 Permit to Construct Application

I contacted the WVDEP number for electronic (credit card) payments to pay this application fee on August 2, 2016. I gave them the information associated with the permit application and the fee will be paid once a permit number has been assigned to the application. At that time I will forward a copy of the invoice for the payment to the permit writer.

Should you have additional questions regarding this fee please contact me at 304-726-5506 or sueellen.foor@orbitalatk.com.

Sincerely,

Sue Ellen Foor

Sue Ellen Foor
Environmental Engineer
Orbital ATK
Allegany Ballistics Laboratory

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