

**CLASS II ADMINISTRATIVE
UPDATE APPLICATION FOR
PERMITS R13-0882J AND MINOR
MODIFICATION TO R30-03900001**

REDACTED APPLICATION

Prepared for:

Optima Belle, LLC
901 W. DuPont Avenue
Belle, West Virginia 25015

Prepared by:

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Project No. 0101-14-0162-010

July 2016

POTESTA

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Attachments Not Applicable to this Application: Attachment K and R.

SECTION I - III

GENERAL APPLICANT INFORMATION



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): Optima Belle, LLC		2. Federal Employer ID No. (FEIN): 465403006	
3. Name of facility (if different from above): Optima Belle Plant		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: 901 W. DuPont Avenue Belle, West Virginia 25015		5B. Facility's present physical address: 901 W. DuPont Avenue Belle, West Virginia 25015	
6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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: NA			
8. Does the applicant own, lease, have an option to buy or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO ⇨ If YES, please explain: The site is owned and operated by the applicant. ⇨ 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.): Chemical Manufacturing		10. North American Industry Classification System (NAICS) code for the facility: 325199	
11A. DAQ Plant ID No. (for existing facilities only): 039-00663		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): R13-0882J, R30-03900001	

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

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**.

I-64 to Belle exit, then Rt. 60 East to Belle exit, turn right onto DuPont Avenue, travel approximately 500 feet and the plant entrance is on the left.

12.B. New site address (if applicable): Same	12C. Nearest city or town: Belle	12D. County: Kanawha
12.E. UTM Northing (KM): 4,232.60	12F. UTM Easting (KM): 451.90	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
The facility proposes to install a double cone dryer, two (2) reactors, and a condenser to manufacture three (3) new products: T2960, SR-1000, and Catofin.

14A. Provide the date of anticipated installation or change: August 1, 2016 ⇒ If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: NA	14B. Date of anticipated Start-Up if a permit is granted: August 26, 2016
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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 7 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:

<input type="checkbox"/> Bulk Liquid Transfer Operations	<input type="checkbox"/> Haul Road Emissions	<input type="checkbox"/> Quarry
<input type="checkbox"/> Chemical Processes	<input type="checkbox"/> Hot Mix Asphalt Plant	<input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities
<input type="checkbox"/> Concrete Batch Plant	<input type="checkbox"/> Incinerator	<input type="checkbox"/> Storage Tanks
<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger	

General Emission Unit, specify: T2960 production, SR-1000 production, and Catofin production

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

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

<input type="checkbox"/> Absorption Systems	<input checked="" type="checkbox"/> Baghouse	<input type="checkbox"/> Flare
<input type="checkbox"/> Adsorption Systems	<input type="checkbox"/> Condenser	<input type="checkbox"/> Mechanical Collector
<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input type="checkbox"/> 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:

<input type="checkbox"/> Authority of Corporation or Other Business Entity	<input type="checkbox"/> Authority of Partnership
<input type="checkbox"/> Authority of Governmental Agency	<input type="checkbox"/> 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.

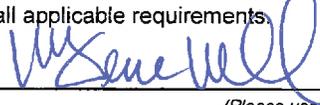
35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

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  DATE: 7/15/16
(Please use blue ink) (Please use blue ink)

35B. Printed name of signee: K. Gene Williams		35C. Title: President
35D. E-mail: gwilliams@optimachem.com	36E. Phone: (912) 384-6330	36F. FAX: Use email
36A. Printed name of contact person (if different from above): James Hook		36B. Title: EHS&S Manager
36C. E-mail: jhook@optimachem.com	36D. Phone: (304) 949-7162	36E. FAX: Use email

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

ATTACHMENT A
BUSINESS CERTIFICATE

**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

ISSUED TO:
**OPTIMA BELLE LLC
901 W DUPONT AVE
BELLE, WV 25015-1555**

BUSINESS REGISTRATION ACCOUNT NUMBER: 2298-1773

This certificate is issued on: **05/8/2015**

*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

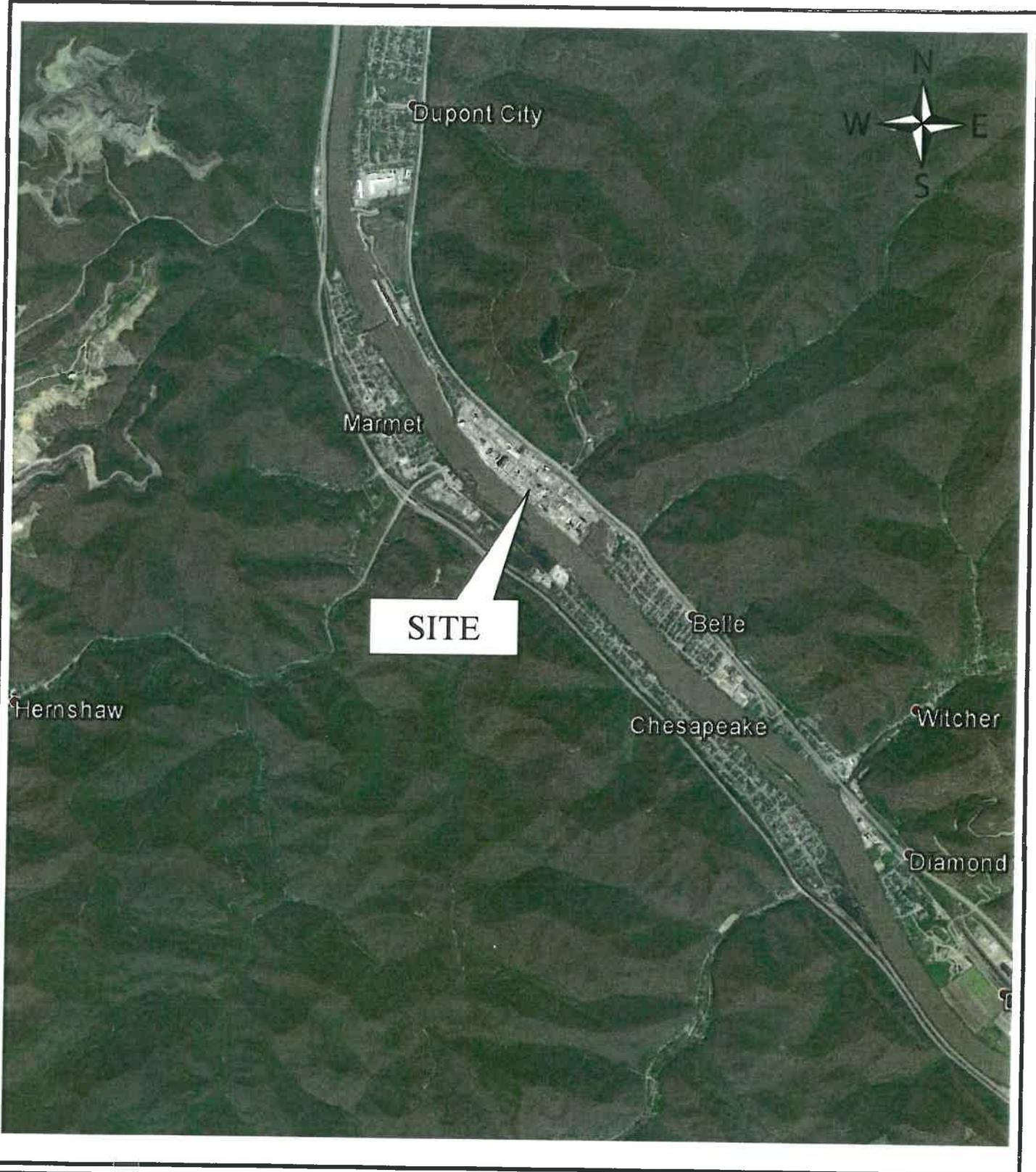
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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.

ATTACHMENT B

AREA MAP



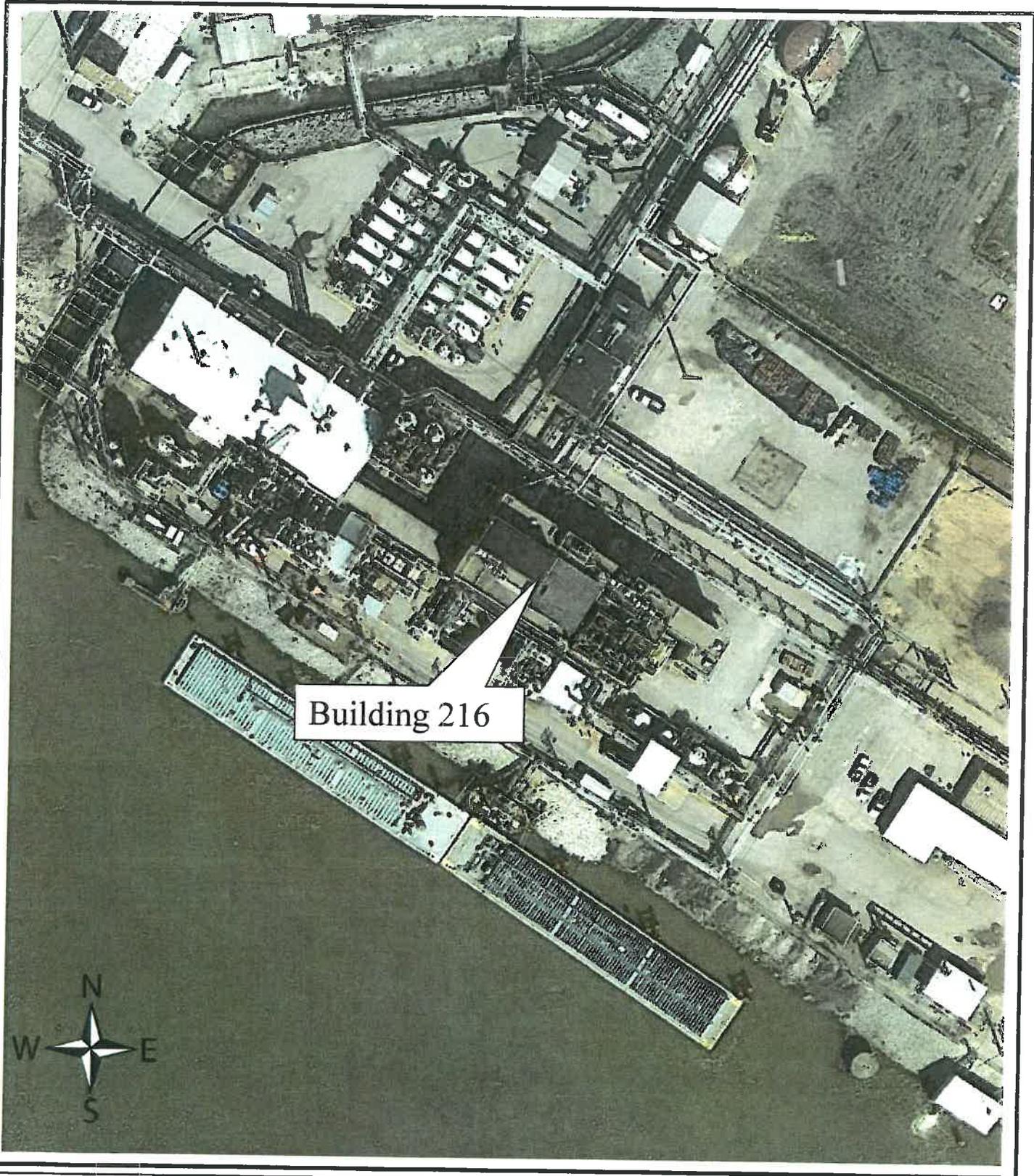
DATE: June 2016

PROJECT NO. 0101-14-0162

MAPPING FOR VISUAL REPRESENTATION ONLY

SITE LOCATION MAP 1 of 2
OPTIMA BELLE, LLC
BELLE, KANAWHA COUNTY, WV

NOT TO SCALE



Building 216



DATE: June 2016

PROJECT NO. 0101-14-0162

MAPPING FOR VISUAL REPRESENTATION ONLY

SITE LOCATION MAP 2 of 2
OPTIMA BELLE, LLC
BELLE, KANAWHA COUNTY, WV

NOT TO SCALE

ATTACHMENT C
INSTALLATION AND START UP SCHEDULE

ATTACHMENT C
SCHEDULE OF INSTALLATION

Optima Belle, LLC anticipates installation and startup of operations to begin on August 26, 2016 and after approval of the permit. Actions which are not considered construction under 45CSR13, Section 5 may proceed prior to issuance of the revised permit.

ATTACHMENT D
REGULATORY DISCUSSION

ATTACHMENT D

REGULATORY DISCUSSION

The addition of the Double Cone Dryer, Reactor 7, Reactor 7 Condenser, and Reactor 9 and manufacturing/process of T2960, SR-1000, and Catofin does not modify the regulatory basis for the permit. New equipment will utilize existing, permitted control devices except for charge and drum-out of the Double Cone Dryer which will vent to a new dust collector. SR-1000 will also utilize an existing tank and tank loading.

ATTACHMENT E

PLOT PLAN

REDACTED

**Information Claimed Confidential by
Optima Belle, LLC June 20, 2016**

ATTACHMENT F
DETAILED PROCESS FLOW DIAGRAM

REDACTED

Information claimed confidential by
Optima Belle, LLC June 20, 2016.

ATTACHMENT G
PROCESS DESCRIPTION

ATTACHMENT G

Optima Belle, LLC

Process Description

Catofin

Catofin 310, a powdery catalyst, is mixed with ascorbic acid and water to regenerate it. The resulting mixture is then dried, packaged, and sent off-site to be reused in various industrial applications.

[REDACTED]

[REDACTED]

SR-1000

SR-1000, a proprietary product, is brought on-site to dry and remove toluene with the process equipment identified in this permit application. SR-1000 is used to generate catalysts.

[REDACTED]

[REDACTED]

[REDACTED]

T2960

T2960 is a solid powdered catalyst, is produced from the reaction of a precursor catalyst and tetraethyl orthosilicate. Once reacted, the product is dried and packaged for use in other processes off-site.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

ATTACHMENT H
MATERIAL SAFETY DATA SHEETS (MSDS)

Material Safety Data Sheet

Version 4.1

Revision Date 02/12/2011

Print Date 05/25/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Acetone

Product Number : 179973

Brand : Sigma-Aldrich

Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION**Emergency Overview****OSHA Hazards**

Flammable liquid, Target Organ Effect, Irritant

Target Organs

Liver, Kidney

GHS Classification

Flammable liquids (Category 2)

Skin Irritation (Category 3)

Eye Irritation (Category 2A)

Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225

Highly flammable liquid and vapour.

H316

Causes mild skin irritation.

H319

Causes serious eye irritation.

H336

May cause drowsiness or dizziness.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P305 + P351 + P338

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:

2

Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

NFPA Rating
Health hazard: 2
Fire: 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₃H₆O
Molecular Weight : 58.08 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Acetone			
67-64-1	200-662-2	606-001-00-8	-

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

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

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability

Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
Acetone	67-64-1	TWA	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Hematologic effects Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.			
		STEL	750 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Hematologic effects Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.			
		TWA	750 ppm 1,800 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	The acetone STEL does not apply to the cellulose acetate fiber industry. It is in effect for all other sectors.			
		STEL	1,000 ppm 2,400 mg/m ³	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	The acetone STEL does not apply to the cellulose acetate fiber industry. It is in effect for all other sectors.			
		TWA	1,000 ppm 2,400 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m ³ is approximate.			
		TWA	250 ppm	USA. NIOSH Recommended Exposure Limits

590 mg/m³

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Impervious clothing, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -94 °C (-137 °F) - lit.
Boiling point	56 °C (133 °F) at 1,013 hPa (760 mmHg) - lit.
Flash point	-17.0 °C (1.4 °F) - closed cup
Ignition temperature	465 °C (869 °F)
Autoignition temperature	465.0 °C (869.0 °F)
Lower explosion limit	2 %(V)
Upper explosion limit	13 %(V)
Vapour pressure	533.3 hPa (400.0 mmHg) at 39.5 °C (103.1 °F) 245.3 hPa (184.0 mmHg) at 20.0 °C (68.0 °F)
Density	0.791 g/cm ³ at 25 °C (77 °F)
Water solubility	completely miscible
Partition coefficient: n-octanol/water	log Pow: -0.24
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid

Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid

Bases, Oxidizing agents, Reducing agents, Acetone reacts violently with phosphorous oxychloride.

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

LD50 Oral - rat - 5,800 mg/kg

Remarks: Behavioral: Altered sleep time (including change in righting reflex). Behavioral: Tremor.

Inhalation LC50

LC50 Inhalation - rat - 8 h - 50,100 mg/m³

Dermal LD50

LD50 Dermal - guinea pig - 7,426 mg/kg

Other information on acute toxicity

no data available

Skin corrosion/irritation

Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - rabbit - Eye irritation - 24 h

Respiratory or skin sensitization

Chronic exposure may cause dermatitis.

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

00001954

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: AL3150000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 5,540.00 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 13,500.00 mg/l - 48 h

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 1090 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ACETONE
Marine pollutant: No

IATA

UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone

15. REGULATORY INFORMATION**OSHA Hazards**

Flammable liquid, Target Organ Effect, Irritant

SARA 302 Components

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

SARA 313 Components

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.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Acetone	67-64-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Acetone	67-64-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Acetone	67-64-1	2007-03-01

California Prop. 65 Components

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

16. OTHER INFORMATION**Further Information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data SheetVersion 3.0
Revision Date 07/15/2007
Print Date 02/03/2010**1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : **Aluminum oxide**

Product Number : A6139
Brand : Sigma-Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Alumina
Aluminium oxide

Formula : Al₂O₃
Molecular Weight : 101.96 g/mol

CAS-No.	EC-No.	Index-No.	Concentration [%]
Aluminium oxide			
1344-28-1	215-691-6	-	-

3. HAZARDS IDENTIFICATION**Emergency Overview****OSHA Hazards**

Delayed target organ effects

Target Organs

Lungs, Bone

HMIS Classification

Health Hazard: 0

Chronic Health Hazard: *

Flammability: 0

Physical hazards: 0

NFPA Rating

Health Hazard: 0

Fire: 0

Reactivity Hazard: 0

Potential Health Effects

Inhalation
Skin
Eyes
Ingestion

May be harmful if inhaled. May cause respiratory tract irritation.
May be harmful if absorbed through skin. May cause skin irritation.
May cause eye irritation.
May be harmful if swallowed.

4. FIRST AID MEASURES

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point no data available

Ignition temperature no data available

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Further information

The product itself does not burn. Do not use halocarbon extinguishers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid dust formation.

Environmental precautions

No special environmental precautions required.

Methods for cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Provide appropriate exhaust ventilation at places where dust is formed.

Storage

Keep container tightly closed in a dry and well-ventilated place.

Light sensitive.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Aluminium oxide	1344-28-1	TWA	10 mg/m ³	1996-05-18	US. American Conference of Governmental and Industrial Hygienists

Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004: Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)

Remarks	The value is for total dust containing no asbestos and < 1% crystalline silica. 1996 Adoption Refers to Appendix A -- Carcinogens.				
		TWA	5 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	5 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	15 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.
		TWA	5 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.

Personal protective equipment

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Safety glasses

Hygiene measures

General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form solid

Colour no data available

Safety data

pH 9.4 - 10.1 at 20 °C (68 °F)
Melting point 2,038 °C (3,700 °F)
Boiling point 2,980 °C (5,396 °F)
Flash point no data available
Ignition temperature no data available
Lower explosion limit no data available
Upper explosion limit no data available
Vapour pressure 1 hPa (1 mmHg) at 2,158 °C (3,916 °F)
Density 4.000 g/cm³
Water solubility insoluble

10. STABILITY AND REACTIVITY

Storage stability

Stable under recommended storage conditions.

Conditions to avoid

Exposure to moisture.

Materials to avoid

Strong acids, Strong bases, Chlorine trifluoride, Ethylene oxide, Halogenated hydrocarbon, Oxygen difluoride, Sodium nitrate, Vinyl compounds

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.
Aluminum oxide

11. TOXICOLOGICAL INFORMATION

Acute toxicity

no data available

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Signs and Symptoms of Exposure

Cough, chest pain, Difficulty in breathing, Gastrointestinal disturbance

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.

**Ingestion
Target Organs**

May be harmful if swallowed.
Lungs, Bone,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

no data available

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards

Delayed target organ effects

TSCA Status

On TSCA Inventory

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components

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

SARA 313 Components

Aluminium oxide

CAS-No.
1344-28-1

Revision Date
1987-01-01

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

Aluminium oxide

CAS-No.
1344-28-1

Revision Date
1987-01-01

Pennsylvania Right To Know Components

Aluminium oxide

CAS-No.
1344-28-1

Revision Date
1987-01-01

New Jersey Right To Know Components

Aluminium oxide

CAS-No.
1344-28-1

Revision Date
1987-01-01

California Prop. 65 Components

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

16. OTHER INFORMATION

Further information

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SAFETY DATA SHEET



Colonial Chemical Solutions, Inc.

SECTION 1 · COMPANY AND PRODUCT IDENTIFICATION

PRODUCT

Product Name: ASCORBIC ACID
Control Number: 00052
Product Description: Inorganic Acid

COMPANY IDENTIFICATION

Supplier: COLONIAL CHEMICAL SOLUTIONS, INC.
916 West Lathrop Avenue
Savannah, Georgia 31415

24 Hour Emergency Telephone: (800)-424-9300 CHEMTREC
General Information: (912) 236-1331

SECTION 2 · HAZARDS IDENTIFICATION

GHS Classification:

[Health]

[Environmental]

[Physical]

Combustible Dust

GHS Label elements, including precautionary statements

Pictograms

Signal Word: Warning

Hazard statement(s)

May form combustible dust concentrations in air

Precautionary statement(s)

none

SECTION 3 · COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS Number	%WT
Ascorbic Acid	50-81-7	100

SECTION 4 · FIRST AID MEASURES

FIRST AID PROCEDURES:

Eye Contact: Flush eyes with plenty of water for at least 15 minutes. Seek medical attention.

Skin Contact: Wash with soap and water. Seek medical attention if irritation develops and persists.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration.

Seek medical attention if symptoms appear.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Rinse mouth with water. Seek medical attention if symptoms appear.

SAFETY DATA SHEET



Colonial Chemical Solutions, Inc.

SECTION 5 · FIRE FIGHTING MEASURES

Suitable Extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Hazardous combustion products: Oxides of carbon.

Fire Fighting Procedures: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Unusual Fire and Explosion Hazards: No unusual condition of data available.

SECTION 6 · ACCIDENTAL RELEASE and DISPOSAL MEASURES

Spills: Provide adequate ventilation. Avoid dust formation. Avoid breathing vapors, mist or gas. Suitable protective clothing should be worn. Shut off or plug source of spill. Small spills: sweep up and collect into suitable container.

Large Spills: Dike spill area to contain liquid. Salvage as much re-useable liquid as possible into a suitable container. Contain spillage, then sweep up and shovel into a suitable container for disposal according to regulations

SECTION 7 · STORAGE AND HANDLING

Handling: Further processing of solid materials may result in the formation of combustible dusts. Do not breathe dust or aerosols. Keep container closed and tightly sealed when not in use. Avoid contact with skin and eyes.

Storage: Store in a cool, dry, ventilated area, away from incompatible substances. Store only in approved properly labeled containers. Avoid moisture sources.

SECTION 8 · EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls: Provide explosion-proof ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits indicated below.

Exposure Limits: Ascorbic Acid No ACGIH or OSHA published data

Personal Protective Equipment (PPE):

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

Skin: If prolonged or repeated skin contact is likely, wear appropriate protective gloves.

Clothing: Selection of protective clothing depends on work conditions, potential exposure conditions and may include gloves, boots, suits and other protective items.

Respirators: Where adequate ventilation is not available an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of OSHA Respiratory Protection Standard, 29 CFR 1920.134. In confined areas, use a self-contained breathing apparatus.

SECTION 9 · PHYSICAL AND CHEMICAL PROPERTIES

Flash Point: Non-combustible

Autoignition Temperature: No available Data

Boiling Point: Decomposes

Melting Point/Freezing Point: 374 - 381 °F

Vapor Pressure: No data available

Vapor Density (Air-1): No data available

Odor/Appearance: Crystalline with no odor

Flammability Limits: Not applicable

Specific Gravity: No data available

Volatile %: N/A

Evaporation Rate (Water=1): N/A

pH: 1.0 - 2.5

Solubility in Water: completely soluble

SAFETY DATA SHEET



Colonial Chemical Solutions, Inc.

SECTION 10 · STABILITY AND REACTIVITY

Chemical Stability: Stable under normal use and temperature conditions.

Conditions to Avoid: Keep away from moisture and water.

Incompatible Materials: Strong oxidizing agents and Strong bases

Hazardous Polymerization: Will not occur.

SECTION 11 · TOXICOLOGICAL INFORMATION

Signs and Symptoms of Overexposure:

Skin: Contact can cause redness and irritation. Severity depends on the amount and duration of exposure.

Eyes: Dust is irritating to the eyes. Contact will cause stinging and tearing.

Inhalation: Excessive inhalation of high concentrations may be harmful. Dust can irritate the throat and lungs.

Ingestion: If swallowed this material may irritate the mucous membranes of the mouth throat and esophagus. Aspiration of this material into the lungs may result in damage or death.

Acute oral toxicity:

Ascorbic Acid: LD50 Oral - Rat - 11,900 mg/kg

Acute inhalation toxicity:

Ascorbic Acid: LD50 rat: No available Data

Acute dermal toxicity:

Ascorbic Acid: LD50 rabbit: No available Data

SECTION 12 · ECOLOGICAL INFORMATION

Aquatic Toxicity: No available Data

Bio-accumulative potential: This product is readily biodegradable.

Mobility: No available Data

SECTION 13 · DISPOSAL CONSIDERATIONS

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.

SECTION 14 · TRANSPORTATION

U.S. DEPARTMENT OF TRANSPORTATION (Road or Rail):

Proper Shipping Name: Not a DOT Controlled Material

Hazard Class

UN Number:

Packaging Group:

SAFETY DATA SHEET



Colonial Chemical Solutions, Inc.

SECTION 15 · REGULATORY INFORMATION

US FEDERAL REGULATIONS

Comprehensive Environmental Response and Liability Act (CERCLA)

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302. The reportable quantity (RQ) for this material has not been established.

Toxic Substance Control Act (TSCA): All components of this product are listed on the TSCA inventory list.

SARA Section 311/312 (40 CFR 370) Hazard Categories:

Acute Health Hazard

SARA Section 313 (40 CFR 372) Hazard Categories: 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 Water Act: This product contains no chemicals that are listed under the CWA.

Clean Air Act: This product contains no chemicals that are listed under the CAA.

California Prop 65: This product contains no chemicals known by the State of California to cause cancer, birth defects or other reproductive harm.

SECTION 16 · OTHER INFORMATION

MSDS Revision Date: September 2014

National Fire Protection Association (NFPA) Ratings: This information is intended solely for the use of individuals trained in the NFPA system.

Health: 0

Flammability: 0

Reactivity: 0

The information above is believed to be accurate and represents the best information currently available to us. However, Colonial Chemical Solutions makes no warranty of merchantability 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 Colonial 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 Colonial has been advised of the possibility of such damages. The vendor assumes no responsibility for injury or damages resulting from the inappropriate alteration or manipulation of this MSDS and its contents from that originally submitted by Colonial.

SAFETY DATA SHEET

CLARIANT

Catofin® 330

Page 1

Substance key: SCI05292015

Revision Date: 00/00/0000

Version : 0 - 0 / 0

Date of printing :05/29/2015

SECTION 1. IDENTIFICATION

Identification of the company:	Clariant Corporation 4000 Monroe Road Charlotte, NC, 28205 Telephone No.: +1 704-331-7000
Information of the substance/preparation:	Product Stewardship 1-704-331-7710
Emergency tel. number:	+1 800-424-9300(CHEMTREC)

Trade name: Catofin® 330

Primary product use: Catalyst
Product and process orientated Research and development

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) : Category 4

Eye irritation : Category 2B

Specific target organ toxicity
- single exposure : Category 1

Specific target organ toxicity
- single exposure : Category 3 (Respiratory system)

Specific target organ toxicity
- repeated exposure : Category 2 (Lungs)

GHS Label element

Hazard pictograms :



Signal word : Danger

Hazard statements : H302 Harmful if swallowed.
H320 Causes eye irritation.
H335 May cause respiratory irritation.
H370 Causes damage to organs.
H373 May cause damage to organs (Lungs) through prolonged or repeated exposure.

Precautionary statements : **Prevention:**

SAFETY DATA SHEET

CLARIANT

Catofin® 330

Page 2

Substance key: SCI05292015

Revision Date: 00/00/0000

Version : 0 - 0 / 0

Date of printing :05/29/2015

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.

Response:

P301 + P312 + P330 IF SWALLOWED: Call a POISON

CENTER or doctor/ physician if you feel unwell. Rinse mouth.

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P307 + P311 IF exposed: Call a POISON CENTER or doctor/ physician.

P337 + P313 If eye irritation persists: Get medical advice/ attention.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

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

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
Methanol	67-56-1	< 5
Aluminium oxide	1344-28-1	70 - 95
C.I. Pigment Green 17	1308-38-9	10 - 25

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

SECTION 4. FIRST AID MEASURES

- If inhaled : INHALATION: If exposed to excessive levels of dust or fumes, remove to fresh air and get medical attention. Get medical attention if cough and other symptoms develop.
- In case of skin contact : Before washing use a dry brush to remove dust from skin. Wash area with mild soap and copious amounts of water. Call a physician if irritation develops or persists.
- In case of eye contact : Do not rub affected area. Rinse immediately with plenty of lukewarm water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

SAFETY DATA SHEET

CLARIANT

Catofin® 330

Page 3

Substance key: SCI05292015

Revision Date: 00/00/0000

Version : 0 - 0 / 0

Date of printing : 05/29/2015

- If swallowed : Do NOT induce vomiting.
Call your local Poison Control Center (In the U.S. call 1-800-222-1222).
- Most important symptoms and effects, both acute and delayed : The possible symptoms known are those derived from the labelling (see section 2).
No additional symptoms are known.
- Notes to physician : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : High volume water jet
- Specific hazards during firefighting : In case of fire hazardous decomposition products may be produced such as:
Chromium oxides

None known.
- Further information : Wear full protective clothing and NIOSH/MSHA-approved positive pressure, self-contained breathing apparatus.
- Special protective equipment for firefighters : Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Wearing appropriate personal protective equipment, contain spill and collect into a suitable container.
Minimize airborne particulates.
Keep container tightly closed.
Material should be swept up or vacuumed, using ventilation to control the level of airborne dust. Avoid using compressed air or any method that creates airborne dust. If cleanup may create airborne dust, personnel should wear eye, skin, and respiratory protection.
Do not use compressed air for cleaning purposes.
Refer to Section 8 for more information.

SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : Avoid contact with skin.

SAFETY DATA SHEET

CLARIANT

Catofin® 330

Page 4

Substance key: SCI05292015

Revision Date: 00/00/0000

Version : 0 - 0 / 0

Date of printing :05/29/2015

Avoid contact with eyes.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Minimize dust generation and accumulation.

Technical : Store in a cool, dry, well-ventilated area away from
measures/Precautions incompatible substances.
Keep container tightly closed and dry.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Methanol	67-56-1	TWA	200 ppm	ACGIH
		Further information: Headache, Nausea, Dizziness, Eye damage, Substances for which there is a Biological Exposure Index or Indices (see BEI® section), Danger of cutaneous absorption		
		STEL	250 ppm	ACGIH
		Further information: Headache, Nausea, Dizziness, Eye damage, Substances for which there is a Biological Exposure Index or Indices (see BEI® section), Danger of cutaneous absorption		
		TWA	200 ppm 260 mg/m3	NIOSH REL
		Further information: Potential for dermal absorption		
		ST	250 ppm 325 mg/m3	NIOSH REL
		Further information: Potential for dermal absorption		
		TWA	200 ppm 260 mg/m3	OSHA Z-1
		Further information: The value in mg/m3 is approximate.		
		TWA	200 ppm 260 mg/m3	OSHA P0
		Further information: Skin notation		
		STEL	250 ppm 325 mg/m3	OSHA P0
		Further information: Skin notation		
Aluminium oxide	1344-28-1	TWA (total dust)	15 mg/m3	OSHA Z-1
		TWA (respirable fraction)	5 mg/m3	OSHA Z-1
		TWA (Total)	10 mg/m3	OSHA P0
		TWA (Respirable fraction)	5 mg/m3	OSHA P0
		TWA (Respirable fraction)	1 mg/m3	ACGIH

SAFETY DATA SHEET

CLARIANT

Catofin® 330

Page 5

Substance key: SCI05292015

Revision Date: 00/00/0000

Version : 0 - 0 / 0

Date of printing :05/29/2015

	Further information: Lower Respiratory Tract irritation, Pneumoconiosis, Neurotoxicity, Not classifiable as a human carcinogen, varies			
C.I. Pigment Green 17	1308-38-9	TWA	0.5 mg/m3 (chromium)	OSHA Z-1
		TWA	1 mg/m3	OSHA Z-1
		TWA	0.5 mg/m3 (chromium)	ACGIH
	Further information: Upper Respiratory Tract irritation, Skin irritation, Not classifiable as a human carcinogen, varies			
		TWA	1 mg/m3	OSHA P0
		TWA	0.5 mg/m3 (chromium)	NIOSH REL
	Further information: Chromium(III) compounds include soluble chromic salts., See Appendix C			
		TWA	1 mg/m3 (chromium)	OSHA Z-1

Engineering measures : Use ventilation adequate to keep exposures below recommended exposure limits. See the safety datasheet.

Personal protective equipment

Respiratory protection : Wear NIOSH approved particulate filtering respirator rated N, R, or P95 or 100 or equivalent in the absence of proper environmental control. Type of respirator depends on level of exposure.

Hand protection
Remarks

: Impervious rubber such as neoprene, nitrile, natural rubber, butyl rubber, PVC, or teflon. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection : Follow facility guidelines in the absence of dusts.
Tightly fitting safety goggles

Skin and body protection : Wear protective clothing, including long sleeves and gloves, to prevent skin contact.
Thoroughly wash clothing before reuse.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Solid form

Colour : green

SAFETY DATA SHEET

CLARIANT

Catofin® 330

Page 6

Substance key: SCI05292015

Revision Date: 00/00/0000

Version : 0 - 0 / 0

Date of printing :05/29/2015

Odour	: none
Odour Threshold	: not available
pH	: not determined
Melting point	: 2,432 °C
Boiling point	: 4,000 °C
Flash point	: does not flash
Evaporation rate	: Non-Volatile
Upper explosion limit	: Not applicable
Lower explosion limit	: Not applicable
Vapour pressure	: Not applicable
Relative vapour density	: not determined
Density	: not determined
Bulk density	: not determined
Solubility(ies) Water solubility	: insoluble
Partition coefficient: n- octanol/water	: no data available
Auto-ignition temperature	: not determined
Decomposition temperature	: no data available
Viscosity Viscosity, dynamic	: Not applicable
Viscosity, kinematic	: Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No dangerous reaction known under conditions of normal use.
Chemical stability	: Stable
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use. Stable
Conditions to avoid	: None known.

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Hazardous decomposition products : No decomposition if stored and applied as directed.

SECTION 11. TOXICOLOGICAL INFORMATION**Information on likely routes of exposure**

Eye contact
Skin contact
Ingestion
Inhalation

Acute toxicity**Product:**

Acute oral toxicity : Acute toxicity estimate: 2,000 mg/kg
Method: Calculation method

Acute inhalation toxicity : Acute toxicity estimate: > 10 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Calculation method

Acute dermal toxicity : Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method

Components:**Methanol:**

Acute oral toxicity : LD50 (Rat, male and female): 1,187 - 2,769 mg/kg
Method: BASF test
GLP: no

Acute inhalation toxicity : LC50 (Rat, male and female): 87.5 mg/l
Exposure time: 6 h
Method: BASF test
GLP: no

Aluminium oxide:

Acute oral toxicity : LD50 (Rat, male and female): > 10,000 mg/kg
Method: OECD Test Guideline 401
GLP: No information available.

Acute inhalation toxicity : LC50 (Rat, male and female): > 2.3 mg/l
Exposure time: 4 h
Method: OECD Test Guideline 403
GLP: yes

Acute dermal toxicity : Remarks: Not applicable

C.I. Pigment Green 17:

Acute inhalation toxicity : LC50 (Rat): > 5.41 mg/l
Exposure time: 4 h
Method: OECD Test Guideline 403

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Skin corrosion/irritation

Product:

Remarks: not tested.

Components:

Methanol:

Species: Rabbit
Exposure time: <= 20 h
Method: BASF test
Result: No skin irritation
GLP: no

Aluminium oxide:

Species: Rabbit
Exposure time: 24 h
Method: OECD Test Guideline 404
Result: No skin irritation
GLP: No information available.

C.I. Pigment Green 17:

Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation

Product:

Remarks: not tested.

Components:

Methanol:

Species: rabbit eye
Result: non-irritant
Method: BASF test
GLP: no

Aluminium oxide:

Species: rabbit eye
Result: No eye irritation
Method: FDA guideline
GLP: No information available.

C.I. Pigment Green 17:

Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

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Respiratory or skin sensitisation**Product:**

Remarks: not tested.

Components:**Methanol:**

Test Type: Guinea pig maximization test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.
GLP: no

Aluminium oxide:

Test Type: Draize Test
Exposure routes: Dermal
Species: Guinea pig
Method: Draize Test
Result: non-sensitizing
GLP: no

Test Type: Respiratory system
Exposure routes: inhalation (dust/mist/fume)
Species: Mouse
Method: Other
Result: non-sensitizing
GLP: no

C.I. Pigment Green 17:

Species: Guinea pig
Method: OECD Test Guideline 406
Result: non-sensitizing

Germ cell mutagenicity**Components:****Methanol:**

Genotoxicity in vitro

- : Test Type: Ames test
Species: Salmonella typhimurium
Concentration: 5 - 5000 µg/plate
Metabolic activation: with and without
Method: OECD Test Guideline 471
Result: negative
GLP: No information available.
- : Test Type: HGPRT assay
Species: Chinese hamster lung cells
Concentration: 15,8 - 63,3 mg/ml
Metabolic activation: with and without
Method: OECD Test Guideline 476
Result: negative
GLP: No information available.

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- Genotoxicity in vivo : Test Type: Chromosome aberration test in vitro
Species: Chinese hamster lung cells
Concentration: 40 mg/ml
Metabolic activation: without
Method: Other
Result: negative
GLP: No information available.
- Genotoxicity in vivo : Test Type: Chromosome Aberration Test
Species: Mouse (male)
Strain: C57BL/6 x DBA/2
Cell type: Erythrocyten
Application Route: Inhalation
Exposure time: 5 d, 6 h/day
Dose: 1,04 - 5,3 mg/l
Method: OECD Test Guideline 474
Result: negative
GLP: No information available.
- Germ cell mutagenicity - Assessment : It is concluded that the product is not mutagenic based on evaluation of several mutagenicity tests.
- Aluminium oxide:**
Genotoxicity in vitro : Test Type: In vitro gene mutation study in mammalian cells
Species: mouse lymphoma cells
Concentration: 6,1 - 780 µg/ml
Metabolic activation: with and without
Method: OECD Test Guideline 476
Result: negative
GLP: yes
Remarks: By analogy with a product of similar composition
- Genotoxicity in vivo : Test Type: Chromosome Aberration Test
Species: Rat (female)
Strain: wistar
Cell type: Bone marrow cells
Application Route: oral (gavage)
Exposure time: Single exposure
Dose: 500 - 1000 - 2000 mg/kg
Method: OECD Test Guideline 475
Result: positive
GLP: No information available.
- Test Type: Micronucleus test
Species: Rat (female)
Strain: wistar
Cell type: Bone marrow cells
Application Route: oral (gavage)
Exposure time: Single exposure
Dose: 500 - 1000 - 2000 mg/kg
Method: OECD Test Guideline 474
Result: positive

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GLP: No information available.

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

Carcinogenicity

Components:

Methanol:

Carcinogenicity - Assessment : Not classifiable as a human carcinogen.

Aluminium oxide:

Carcinogenicity - Assessment : Carcinogenicity classification not possible from current data.

IARC Not listed

OSHA Not listed

NTP Not listed

Reproductive toxicity

Components:

Methanol:

Effects on fertility :
Test Type: Two generation study
Species: Rat
Sex: male and female
Dose: 0,013 - 0,13 - 1,3 mg/l
Exposure time: F0<=108d, F1<=153d, F2<=56d
Frequency of Treatment: ca. 20 h/day
Sprague-Dawley
NOAEL: 1.3 mg/l,
F1: 0.13 mg/l,
F2: 0.13 mg/l,
Method: OECD Test Guideline 416
GLP: No information available.

Effects on foetal development : Species: Rat
Application Route: Inhalation
Exposure time: gestation day 7-17
Dose: 0,27 - 1,33 - 6,65 mg/l
Group: yes
1.33 mg/l
1.33 mg/l
Number of exposures: 22,7 h/day
Method: OECD Test Guideline 414
GLP: No information available.
Species: Rat
Application Route: oral (gavage)
Exposure time: one time day 10 of gestation

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Dose: 1027 - 2054 - 4108 mg/kg
Group: yes
no NOAEL defined
2,054 mg/kg
Number of exposures: single treatment
Method: OECD Test Guideline 414
GLP: No information available.

Reproductive toxicity - Assessment : No reproductive toxicity to be expected.
No teratogenic effects to be expected.

Aluminium oxide:
Effects on fertility

: Species: Rat
Sex: male and female
Dose: 57 - 189 - 567 mg/kg
Frequency of Treatment: daily
Sprague-Dawley
Test period: 1 a
Group: yes
NOAEL: ca. 567 mg/kg,
F1: ca. 57 mg/kg,
Method: Other
GLP: yes
Remarks: By analogy with a product of similar composition

Effects on foetal development

: Species: Rat
Application Route: oral (gavage)
Exposure time: gestation day 6 to 15
Dose: 126 - 251 - 503 mg/kg
Group: yes
503 mg/kg
> 100 mg/kg
Number of exposures: twice daily
Method: OECD Test Guideline 414
GLP: No information available.
Remarks: By analogy with a product of similar composition

Reproductive toxicity - Assessment : Classification as "toxic for reproduction" is not justifiable.
No teratogenic effects to be expected.

STOT - single exposure

Components:

Methanol:

Assessment: Causes damage to organs.

Aluminium oxide:

Assessment: The substance or mixture is not classified as specific target organ toxicant, single exposure.

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STOT - repeated exposure

Components:

Methanol:

Assessment: The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aluminium oxide:

Assessment: The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Components:

Methanol:

Species: Monkey, male
LOAEL: 2,340 mg/kg
Application Route: oral (gavage)
Exposure time: 3 d
Number of exposures: daily
Dose: 2340 mg/kg
Group: yes
Method: Other
GLP: No information available.

Species: Rat, male and female
Application Route: Inhalation
Exposure time: 4 w
Number of exposures: 6 h/d, 5 d/wk
Dose: 0,663 - 2,65 - 6,63 mg/l
Group: yes
Method: OECD Test Guideline 412
GLP: No information available.

Species: Rat, male and female
Application Route: Inhalation
Exposure time: 12 m
Number of exposures: 20 h/day
Dose: 0,013 - 0,13 - 1,3 mg/l
Group: yes
Method: OECD Test Guideline 453
GLP: No information available.

Application Route: Skin contact
Remarks: not tested.

Aluminium oxide:

Species: Rat, male and female
NOAEL: 57 mg/kg
Application Route: Drinking water
Exposure time: 1 a
Number of exposures: continuously
Dose: 57 - 189 - 567 mg/kg

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Group: yes
Method: OECD Test Guideline 426
GLP: yes
Remarks: By analogy with a product of similar composition

Species: Rat
Application Route: Inhalation
Exposure time: 6 m
Number of exposures: 6 hr/day; 5 days a week
Dose: 15-30-50-70-100 mg/m³
Method: OECD Test Guideline 413
GLP: No information available.

Application Route: Skin contact
Remarks: The study is not necessary from a scientific perspective.

C.I. Pigment Green 17:

Species: Rat
NOAEL: 2,000 mg/kg
Application Route: Oral

Species: Rat
Application Route: Inhalation

Aspiration toxicity

Components:

Methanol:
No aspiration toxicity classification

Aluminium oxide:
No aspiration toxicity classification

Experience with human exposure

Product:

General Information : The possible symptoms known are those derived from the labelling (see section 2).

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Methanol:
Toxicity to fish : LC50 (Lepomis macrochirus (Bluegill sunfish)): 15,400 mg/l
Exposure time: 96 h
Test Type: flow-through test
Analytical monitoring: yes
Method: EPA
GLP: No information available.

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- Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 18,260 mg/l
 Exposure time: 96 h
 Test Type: semi-static test
 Analytical monitoring: no data available
 Method: OECD Test Guideline 202
 GLP: No information available.
 Remarks: The details of the toxic effect relate to the nominal concentration.
- Toxicity to algae : EC50 (*Pseudokirchneriella subcapitata* (microalgae)): ca. 22,000 mg/l
 End point: Growth rate
 Exposure time: 96 h
 Test Type: static test
 Analytical monitoring: no data available
 Method: OECD Test Guideline 201
 GLP: No information available.
- Toxicity to fish (Chronic toxicity) : NOEC (*Pimephales promelas* (fathead minnow)): 446.7 mg/l
 Exposure time: 28 d
 End point: Reproduction rate
 Method: Other
 GLP: no
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (*Daphnia magna* (Water flea)): 208 mg/l
 Exposure time: 21 d
 End point: Reproduction rate
 Method: calculated
 GLP: no
- Toxicity to bacteria : EC50 (activated sludge): > 1,000 mg/l
 End point: Growth rate
 Exposure time: 3 h
 Test Type: aquatic
 Analytical monitoring: yes
 Method: OECD Test Guideline 209
 GLP: No information available.
- Toxicity to soil dwelling organisms : Test Type: filter paper
 LC50 (*Eisenia fetida* (earthworms)): > 1 mg/cm2
 Exposure time: 48 h
 End point: mortality
 Method: OECD Test Guideline 207
 GLP: No information available.
- Plant toxicity : IC50 (*Lactuca sativa* (lettuce)): ca. 41,000 mg/l
 Exposure time: 3 d
 End point: emergence
 Analytical monitoring: no data available
 Method: Other
 GLP: no
- Sediment toxicity : Remarks: Not applicable

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- Toxicity to terrestrial organisms : Remarks: Not applicable
- Aluminium oxide:**
- Toxicity to fish : NOEC (Salmo trutta (brown trout)): > 0.072 mg/l
Exposure time: 96 h
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 203
GLP: yes
- Toxicity to daphnia and other aquatic invertebrates : NOEC (Daphnia magna (Water flea)): > 0.071 mg/l
Exposure time: 48 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes
- Toxicity to algae : NOEC (Pseudokirchneriella subcapitata (green algae)): >= 0.052 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes
- EC50 (Pseudokirchneriella subcapitata (green algae)): 1.05 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes
Remarks: By analogy with a product of similar composition
- Toxicity to fish (Chronic toxicity) : NOEC (Pimephales promelas (fathead minnow)): 56.48 mg/l
Exposure time: 7 d
Test Type: semi-static test
Analytical monitoring: yes
Method: Other
GLP: yes
Remarks: By analogy with a product of similar composition
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.076 mg/l
Exposure time: 21 d
End point: Reproduction rate
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 211
GLP: yes

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Remarks: By analogy with a product of similar composition

Toxicity to bacteria : GLP:
Remarks: Not applicable

Toxicity to soil dwelling organisms : Remarks: Not applicable

Plant toxicity : Remarks: Not applicable

Sediment toxicity : Remarks: Not applicable

Toxicity to terrestrial organisms : Remarks: Not applicable

C.I. Pigment Green 17:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 10,000 mg/l
Test Type: static test
Method: ISO 7346/1

Toxicity to algae : (Desmodesmus subspicatus (green algae)): 0.47 mg/l
Method: OECD Test Guideline 201

Persistence and degradability

Components:

Methanol:

Biodegradability : aerobic
Inoculum: activated sludge, domestic, non-adapted
Concentration: 3 - 10 mg/l
BOD in % of theoretical OD
Result: Readily biodegradable
Biodegradation: 95 %
Exposure time: 20 d
Method: Closed Bottle test
GLP: no

aerobic
Inoculum: activated sludge, domestic, non-adapted
Concentration: 4 - 200 g/l
BOD in % of theoretical OD
Result: Readily biodegradable
Biodegradation: 82.7 %
Exposure time: 5 d
Method: Respirometertest
GLP: no

Photodegradation : Rate constant: 9.32E-13 cm³/s
Rate constant: 50 % Degradation half life: 17.2 d
Method: other (measured)
GLP: no

Aluminium oxide:

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Biodegradability : Remarks: Not applicable

Bioaccumulative potential

Components:

Methanol:

Bioaccumulation : Species: Leuciscus idus (Golden orfe)
Bioconcentration factor (BCF): < 10
Exposure time: 72 h
Method: Other
GLP: No information available.

Partition coefficient: n-octanol/water : log Pow: -0.77

Aluminium oxide:

Bioaccumulation : Remarks: Not applicable

C.I. Pigment Green 17:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Mobility in soil

Components:

Methanol:

Distribution among environmental compartments : Adsorption/Soil
Medium: water - soil
Koc: 1Method: other (calculated)

Aluminium oxide:

Distribution among environmental compartments : Remarks: Not applicable

C.I. Pigment Green 17:

Distribution among environmental compartments : Remarks: no data available

Other adverse effects

Product:

Additional ecological information : May cause long lasting harmful effects to aquatic life.
Do not allow to enter ground water, waterways or waste water.

Components:

Methanol:

Environmental fate and pathways : not available

Results of PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

Additional ecological : Do not allow to enter ground water, waterways or waste water.

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information

Components:

Aluminium oxide:

Environmental fate and pathways : not available

Results of PBT and vPvB assessment : Remarks: Not applicable

Additional ecological information : Do not allow to enter ground water, waterways or waste water.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

RCRA - Resource Conservation and Recovery Authorization Act : A solid waste containing chromium (such as chromium oxide) may or may not become characterized as a hazardous waste when subjected to the toxicant extraction procedure listed in 40CFR261.24. If so characterized, it must be managed as a hazardous waste.

Waste Code : D007

Waste from residues : Dispose of this product in accordance with all applicable local, state, and federal regulations. This material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use, contamination or removal processes may change waste management options. State and local disposal regulations may differ from federal disposal regulations.

SECTION 14. TRANSPORT INFORMATION

DOT : not restricted

IATA : not restricted

IMDG : not restricted

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)

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Methanol	67-56-1	5000	*
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*: Calculated RQ exceeds reasonably attainable upper limit.

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

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

SARA 313 : This product contains the chemical or chemicals listed below which are subject to the supplier notification requirements of Section 313 of the Superfund Amendments and Reauthorization Act of 1986 ("SARA") and the requirements of 40 CFR Part 372:

Chromium (III) compound	Not Assigned	25 %
Chromium	7440-47-3	17 %
Methanol	67-56-1	5 %

Clean Water Act

Contains the following Priority Pollutant(s) at concentrations greater than 0.1%: chromium

The components of this product are reported in the following inventories:

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.

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

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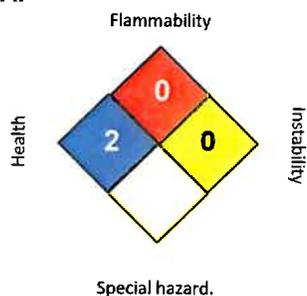
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NFPA:



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This information is supplied under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, and is offered in good faith based on data available to us that we believe to be true and accurate. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable to the material. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate for that use. No warranty, express or implied, is made regarding the accuracy of this data, the hazards connected with the use of the material, or the results to be obtained from the use thereof. We assume no responsibility for damage or injury from the use of the product described herein. Data provided here are typical and not intended for use as product specifications.

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SECTION 1. IDENTIFICATION

Identification of the company:	Clariant Corporation 4000 Monroe Road Charlotte, NC, 28205 Telephone No.: +1 704-331-7000
Information of the substance/preparation:	Product Stewardship 1-704-331-7710
Emergency tel. number:	+1 800-424-9300(CHEMTREC)

Trade name: Catofin® 331

Primary product use: Catalyst
Product and process orientated Research and development

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Eye irritation : Category 2B

Specific target organ toxicity - single exposure : Category 3 (Respiratory system)

Specific target organ toxicity - repeated exposure : Category 2 (Lungs)

GHS Label element

Hazard pictograms :



Signal word : Warning

Hazard statements : H320 Causes eye irritation.
H335 May cause respiratory irritation.
H373 May cause damage to organs (Lungs) through prolonged or repeated exposure.

Precautionary statements : **Prevention:**
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
Response:
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.

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P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P314 Get medical advice/ attention if you feel unwell.

P337 + P313 If eye irritation persists: Get medical advice/ attention.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

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

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
Aluminium oxide	1344-28-1	70 - 95
C.I. Pigment Green 17	1308-38-9	10 - 25

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

SECTION 4. FIRST AID MEASURES

- If inhaled : INHALATION: If exposed to excessive levels of dust or fumes, remove to fresh air and get medical attention. Get medical attention if cough and other symptoms develop.
- In case of skin contact : Before washing use a dry brush to remove dust from skin. Wash area with mild soap and copious amounts of water. Call a physician if irritation develops or persists.
- In case of eye contact : Do not rub affected area. Rinse immediately with plenty of lukewarm water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
- If swallowed : Do NOT induce vomiting. Call your local Poison Control Center (In the U.S. call 1-800-222-1222).
- Most important symptoms and effects, both acute and delayed : The possible symptoms known are those derived from the labelling (see section 2). No additional symptoms are known.
- Notes to physician : Treat symptomatically.

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SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : High volume water jet
- Specific hazards during firefighting : In case of fire hazardous decomposition products may be produced such as:
Chromium oxides

None known.
- Further information : Wear full protective clothing and NIOSH/MSHA-approved positive pressure, self-contained breathing apparatus.
- Special protective equipment for firefighters : Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Wearing appropriate personal protective equipment, contain spill and collect into a suitable container.
Minimize airborne particulates.
Keep container tightly closed.
Material should be swept up or vacuumed, using ventilation to control the level of airborne dust. Avoid using compressed air or any method that creates airborne dust. If cleanup may create airborne dust, personnel should wear eye, skin, and respiratory protection.
Do not use compressed air for cleaning purposes.
Refer to Section 8 for more information.

SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : Avoid contact with skin.
Avoid contact with eyes.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Minimize dust generation and accumulation.
- Technical measures/Precautions : Store in a cool, dry, well-ventilated area away from incompatible substances.
Keep container tightly closed and dry.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

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Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Aluminium oxide	1344-28-1	TWA (total dust)	15 mg/m ³	OSHA Z-1
		TWA (respirable fraction)	5 mg/m ³	OSHA Z-1
		TWA (Total)	10 mg/m ³	OSHA P0
		TWA (Respirable fraction)	5 mg/m ³	OSHA P0
		TWA (Respirable fraction)	1 mg/m ³	ACGIH
	Further information: Lower Respiratory Tract irritation, Pneumoconiosis, Neurotoxicity, Not classifiable as a human carcinogen, varies			
C.I. Pigment Green 17	1308-38-9	TWA	0.5 mg/m ³ (chromium)	OSHA Z-1
		TWA	1 mg/m ³	OSHA Z-1
		TWA	0.5 mg/m ³ (chromium)	ACGIH
	Further information: Upper Respiratory Tract irritation, Skin irritation, Not classifiable as a human carcinogen, varies			
		TWA	1 mg/m ³	OSHA P0
		TWA	0.5 mg/m ³ (chromium)	NIOSH REL
	Further information: Chromium(III) compounds include soluble chromic salts., See Appendix C			
		TWA	1 mg/m ³ (chromium)	OSHA Z-1

Engineering measures : Use ventilation adequate to keep exposures below recommended exposure limits. See the safety datasheet.

Personal protective equipment

Respiratory protection : Wear NIOSH approved particulate filtering respirator rated N, R, or P95 or 100 or equivalent in the absence of proper environmental control. Type of respirator depends on level of exposure.

Hand protection
Remarks

: Impervious rubber such as neoprene, nitrile, natural rubber, butyl rubber, PVC, or teflon. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

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- Eye protection : Follow facility guidelines in the absence of dusts.
Tightly fitting safety goggles
- Skin and body protection : Wear protective clothing, including long sleeves and gloves,
to prevent skin contact.
Thoroughly wash clothing before reuse.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Solid form
- Colour : green
- Odour : none
- Odour Threshold : not available
- pH : not determined
- Melting point : 2,432 °C
- Boiling point : 4,000 °C
- Flash point : does not flash
- Evaporation rate : Non-Volatile
- Upper explosion limit : Not applicable
- Lower explosion limit : Not applicable
- Vapour pressure :
Not applicable
- Relative vapour density : not determined
- Density : not determined
- Bulk density : not determined
- Solubility(ies)
Water solubility : insoluble
- Partition coefficient: n-
octanol/water : no data available
- Auto-ignition temperature : not determined
- Decomposition temperature : no data available

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Viscosity
Viscosity, dynamic : Not applicable
Viscosity, kinematic : Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No dangerous reaction known under conditions of normal use.
Chemical stability : Stable
Possibility of hazardous reactions : No dangerous reaction known under conditions of normal use.
Stable
Conditions to avoid : None known.
Hazardous decomposition products : No decomposition if stored and applied as directed.

SECTION 11. TOXICOLOGICAL INFORMATION**Information on likely routes of exposure**

Eye contact
Skin contact
Ingestion
Inhalation

Acute toxicity**Product:**

Acute oral toxicity : Acute toxicity estimate: 2,000 mg/kg
Method: Calculation method
Acute inhalation toxicity : Acute toxicity estimate: > 10 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Calculation method
Acute dermal toxicity : Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method

Components:**Aluminium oxide:**

Acute oral toxicity : LD50 (Rat, male and female): > 10,000 mg/kg
Method: OECD Test Guideline 401
GLP: No information available.
Acute inhalation toxicity : LC50 (Rat, male and female): > 2.3 mg/l
Exposure time: 4 h
Method: OECD Test Guideline 403
GLP: yes

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Acute dermal toxicity : Remarks: Not applicable

C.I. Pigment Green 17:

Acute inhalation toxicity : LC50 (Rat): > 5.41 mg/l
Exposure time: 4 h
Method: OECD Test Guideline 403

Skin corrosion/irritation

Product:

Remarks: not tested.

Components:

Aluminium oxide:

Species: Rabbit
Exposure time: 24 h
Method: OECD Test Guideline 404
Result: No skin irritation
GLP: No information available.

C.I. Pigment Green 17:

Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation

Product:

Remarks: not tested.

Components:

Aluminium oxide:

Species: rabbit eye
Result: No eye irritation
Method: FDA guideline
GLP: No information available.

C.I. Pigment Green 17:

Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Respiratory or skin sensitisation

Product:

Remarks: not tested.

Components:

Aluminium oxide:

Test Type: Draize Test

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Exposure routes: Dermal
Species: Guinea pig
Method: Draize Test
Result: non-sensitizing
GLP: no

Test Type: Respiratory system
Exposure routes: inhalation (dust/mist/fume)
Species: Mouse
Method: Other
Result: non-sensitizing
GLP: no

C.I. Pigment Green 17:

Species: Guinea pig
Method: OECD Test Guideline 406
Result: non-sensitizing

Germ cell mutagenicity

Components:

Aluminium oxide:

Genotoxicity in vitro

: Test Type: In vitro gene mutation study in mammalian cells
Species: mouse lymphoma cells
Concentration: 6,1 - 780 µg/ml
Metabolic activation: with and without
Method: OECD Test Guideline 476
Result: negative
GLP: yes
Remarks: By analogy with a product of similar composition

Genotoxicity in vivo

: Test Type: Chromosome Aberration Test
Species: Rat (female)
Strain: wistar
Cell type: Bone marrow cells
Application Route: oral (gavage)
Exposure time: Single exposure
Dose: 500 - 1000 - 2000 mg/kg
Method: OECD Test Guideline 475
Result: positive
GLP: No information available.

Test Type: Micronucleus test
Species: Rat (female)
Strain: wistar
Cell type: Bone marrow cells
Application Route: oral (gavage)
Exposure time: Single exposure
Dose: 500 - 1000 - 2000 mg/kg
Method: OECD Test Guideline 474
Result: positive
GLP: No information available.

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Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

Carcinogenicity

Components:

Aluminium oxide:

Carcinogenicity - Assessment : Carcinogenicity classification not possible from current data.

IARC Not listed

OSHA Not listed

NTP Not listed

Reproductive toxicity

Components:

Aluminium oxide:

Effects on fertility :
Species: Rat
Sex: male and female
Dose: 57 - 189 - 567 mg/kg
Frequency of Treatment: daily
Sprague-Dawley
Test period: 1 a
Group: yes
NOAEL: ca. 567 mg/kg,
F1: ca. 57 mg/kg,
Method: Other
GLP: yes
Remarks: By analogy with a product of similar composition

Effects on foetal development : Species: Rat
Application Route: oral (gavage)
Exposure time: gestation day 6 to 15
Dose: 126 - 251 - 503 mg/kg
Group: yes
503 mg/kg
> 100 mg/kg
Number of exposures: twice daily
Method: OECD Test Guideline 414
GLP: No information available.
Remarks: By analogy with a product of similar composition

Reproductive toxicity - Assessment : Classification as "toxic for reproduction" is not justifiable.
No teratogenic effects to be expected.

STOT - single exposure

Components:

Aluminium oxide:

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Assessment: The substance or mixture is not classified as specific target organ toxicant, single exposure.

STOT - repeated exposure

Components:

Aluminium oxide:

Assessment: The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Components:

Aluminium oxide:

Species: Rat, male and female

NOAEL: 57 mg/kg

Application Route: Drinking water

Exposure time: 1 a

Number of exposures: continuously

Dose: 57 - 189 - 567 mg/kg

Group: yes

Method: OECD Test Guideline 426

GLP: yes

Remarks: By analogy with a product of similar composition

Species: Rat

Application Route: Inhalation

Exposure time: 6 m

Number of exposures: 6 hr/day; 5 days a week

Dose: 15-30-50-70-100 mg/m³

Method: OECD Test Guideline 413

GLP: No information available.

Application Route: Skin contact

Remarks: The study is not necessary from a scientific perspective.

C.I. Pigment Green 17:

Species: Rat

NOAEL: 2,000 mg/kg

Application Route: Oral

Species: Rat

Application Route: Inhalation

Aspiration toxicity

Components:

Aluminium oxide:

No aspiration toxicity classification

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Experience with human exposure**Product:**

General Information : The possible symptoms known are those derived from the labelling (see section 2).

SECTION 12. ECOLOGICAL INFORMATION**Ecotoxicity****Components:****Aluminium oxide:**

- Toxicity to fish : NOEC (*Salmo trutta* (brown trout)): > 0.072 mg/l
Exposure time: 96 h
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 203
GLP: yes
- Toxicity to daphnia and other aquatic invertebrates : NOEC (*Daphnia magna* (Water flea)): > 0.071 mg/l
Exposure time: 48 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes
- Toxicity to algae : NOEC (*Pseudokirchneriella subcapitata* (green algae)): >= 0.052 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes
- EC50 (*Pseudokirchneriella subcapitata* (green algae)): 1.05 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes
Remarks: By analogy with a product of similar composition
- Toxicity to fish (Chronic toxicity) : NOEC (*Pimephales promelas* (fathead minnow)): 56.48 mg/l
Exposure time: 7 d
Test Type: semi-static test
Analytical monitoring: yes
Method: Other
GLP: yes
Remarks: By analogy with a product of similar composition

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Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.076 mg/l
Exposure time: 21 d
End point: Reproduction rate
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 211
GLP: yes
Remarks: By analogy with a product of similar composition

Toxicity to bacteria : GLP:
Remarks: Not applicable

Toxicity to soil dwelling organisms : Remarks: Not applicable

Plant toxicity : Remarks: Not applicable

Sediment toxicity : Remarks: Not applicable

Toxicity to terrestrial organisms : Remarks: Not applicable

C.I. Pigment Green 17:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 10,000 mg/l
Test Type: static test
Method: ISO 7346/1

Toxicity to algae : (Desmodesmus subspicatus (green algae)): 0.47 mg/l
Method: OECD Test Guideline 201

Persistence and degradability

Components:

Aluminium oxide:

Biodegradability : Remarks: Not applicable

Bioaccumulative potential

Components:

Aluminium oxide:

Bioaccumulation : Remarks: Not applicable

C.I. Pigment Green 17:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Mobility in soil

Components:

Aluminium oxide:

Distribution among environmental compartments : Remarks: Not applicable

C.I. Pigment Green 17:

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Distribution among environmental compartments : Remarks: no data available

Other adverse effects

Product:

Additional ecological information : May cause long lasting harmful effects to aquatic life.
Do not allow to enter ground water, waterways or waste water.

Components:

Aluminium oxide:

Environmental fate and pathways : not available

Results of PBT and vPvB assessment : Remarks: Not applicable

Additional ecological information : Do not allow to enter ground water, waterways or waste water.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

RCRA - Resource Conservation and Recovery Authorization Act : A solid waste containing chromium (such as chromium oxide) may or may not become characterized as a hazardous waste when subjected to the toxicant extraction procedure listed in 40CFR261.24. If so characterized, it must be managed as a hazardous waste.

Waste Code : D007

Waste from residues : Dispose of this product in accordance with all applicable local, state, and federal regulations. This material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use, contamination or removal processes may change waste management options. State and local disposal regulations may differ from federal disposal regulations.

SECTION 14. TRANSPORT INFORMATION

DOT : not restricted

IATA : not restricted

IMDG : not restricted

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SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

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

SARA 313 : This product contains the chemical or chemicals listed below which are subject to the supplier notification requirements of Section 313 of the Superfund Amendments and Reauthorization Act of 1986 ("SARA") and the requirements of 40 CFR Part 372:

Chromium (III) compound	Not Assigned	25 %
Chromium	7440-47-3	17 %

Clean Water Act

Contains the following Priority Pollutant(s) at concentrations greater than 0.1%: chromium

The components of this product are reported in the following inventories:

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.

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

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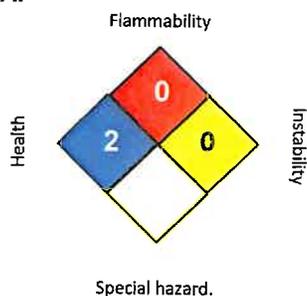
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NFPA:



Revision Date : 00/00/0000

This information is supplied under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, and is offered in good faith based on data available to us that we believe to be true and accurate. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable to the material. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate for that use. No warranty, express or implied, is made regarding the accuracy of this data, the hazards connected with the use of the material, or the results to be obtained from the use thereof. We assume no responsibility for damage or injury from the use of the product described herein. Data provided here are typical and not intended for use as product specifications.

US / US

ORDER NO:JA423844

MATERIAL SAFETY DATA SHEET
CUST:OPTIMA CHEMICALS INC

MSDS NO:UZC00111
VERSION:001 02/18/10

Product Name: Isopropyl Alcohol

MSDS Number: UZC00111

Effective Date: 10/15/2008

Issued By: 008360

Material Safety Data Sheet

Product Name: Isopropanol, Anhydrous

Issue Date: 10/15/2008

1. Product Company Identification
Isopropanol, Anhydrous

Distributor:
UNIVAR USA, INC.
17425 NE Union Hill Road
Redmond WA 98052
425-889-3400
Chemtrec: 1-800-424-9300

2. Hazards Identification

Emergency Overview

Color: Colorless

Physical State: Liquid

Odor: Alcohol

Hazards of product:

WARNING! Flammable liquid and vapor. Causes eye irritation. Harmful if inhaled. May be harmful if swallowed. Aspiration hazard. Can enter lungs and cause damage. Vapor explosion hazard. Vapors may travel a long distance; ignition and/or flash back may occur. Isolate area. Keep upwind of spill. Stay out of low areas. Warn public of downwind explosion hazard. Eliminate ignition sources.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause pain disproportionate to the level of irritation to eye tissues. May cause moderate eye irritation. May cause moderate corneal injury. Vapor may cause eye irritation experienced as mild discomfort and redness. Vapor may cause lacrimation (tears).

Skin Contact: Prolonged exposure not likely to cause significant skin irritation. May cause drying and flaking of the skin.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation: With good ventilation, single exposure is not likely to be hazardous. In poorly ventilated areas, vapors or mists may accumulate and cause respiratory irritation. Prolonged excessive exposure may cause adverse effects. Excessive exposure (400 ppm) to isopropanol may cause eye, nose and throat irritation. Incoordination, confusion, hypotension, hypothermia, circulatory collapse, respiratory arrest and death may follow a longer duration or higher levels. Observations in animals include middle ear lining damage upon exposure to vapors of isopropanol. However, the relevance of this to humans is unknown

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. May cause central nervous system depression. May cause nausea and vomiting. Signs and symptoms of excessive exposure may include: Facial flushing. Low blood pressure. Irregular heartbeats.

Aspiration hazard: Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

Effects of Repeated Exposure: In animals, effects have been reported on the following organs: Liver. Kidney. Kidney effects have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans. Observations in animals include: Lethargy.

Birth Defects/Developmental Effects: Isopropanol has been toxic to the fetus in laboratory animals at doses toxic to the mother.

3. Composition Information

Component	CAS #	Amount
Isopropanol	67-63-0	100.0 %

4. First-aid measures

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Notes to Physician: Maintain adequate ventilation and oxygenation of the patient. The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Hemodialysis may be of benefit if substantial amounts have been ingested and the patient is showing signs of intoxication. Consider hemodialysis for patients with persistent hypotension or coma unresponsive to standard therapy (isopropanol levels >400 - 500 mg/dl). (Goldfrank 1998, King et al, 1970). No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

Medical Conditions Aggravated by Exposure: Skin contact may aggravate preexisting dermatitis.

Emergency Personnel Protection: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection) If potential for exposure exists refer to Section 8 for specific personal protective equipment.

5. Fire Fighting Measures

Extinguishing Media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. Straight or direct water streams may not be effective to extinguish fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Use caution and test if material is burning before entering area. Material burns with invisible flame.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Unusual Fire and Explosion Hazards: Container may vent and/or rupture due to fire. When product is stored in closed containers, a flammable atmosphere can develop. Electrically ground and bond all equipment. Flammable mixtures of this product are readily ignited even by static discharge. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Contain spilled material if possible. Collect in suitable and properly labeled containers. Apply vapor suppression foams until spill can be cleaned up. Ground and bond all containers and handling equipment. Pump with explosion-proof equipment. If available, use foam to smother or suppress. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Isolate area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Keep upwind of spill. Keep personnel out of low areas. For large spills, warn public of downwind explosion hazard. Keep unnecessary and unprotected personnel from entering the area. No smoking in area. Ventilate area of leak or spill. Vapor explosion hazard. Keep out of sewers. Keep personnel out of confined or poorly ventilated areas. Only trained and properly protected personnel must be involved in clean-up operations. Confined space entry procedures must be followed before entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Keep away from heat, sparks and flame. Avoid contact with eyes. Avoid breathing vapor. Do not swallow. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Do not enter confined spaces unless adequately ventilated. Never use air pressure for transferring product. No smoking, open flames or sources of ignition in handling and storage area. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Ignition sources can include and are not limited to pilot lights, flames, smoking, sparks, heaters, electrical equipment, and static discharges. Electrically bond and ground all containers and equipment before transfer or use of material. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Avoid direct sunlight. Peroxides can form if this product is stored in contact with air. Peroxides can be explosive. Minimize sources of ignition, such as static build-up, heat, spark or flame.

Shelf life: Use within 24 Months

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Isopropanol	OSHA Table	PEL	980 mg/m3 400 ppm
	Z-1		
	ACGIH	TWA	200 ppm
	ACGIH	STEL	400 ppm

Personal Protection

Eye/Face Protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Examples of acceptable glove barrier materials include: Polyvinyl alcohol ("PVA"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply. The following should be effective types of air-purifying respirators: Organic vapor cartridge.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Physical State	Liquid
Color	Colorless
Odor	Alcohol
Flash Point - Closed Cup	12 deg C (54 deg F) Tag Closed Cup ASTM D56
Flammable Limits In Air	Lower: 2.0 %(V) Literature Upper: 12.0 %(V) Literature
Autoignition Temperature	399 deg C (750 deg F)
Vapor Pressure	33 mmHg @ 20 deg C Literature
Boiling Point (760 mmHg)	82 deg C (180 deg F) Literature .
Vapor Density (air = 1)	2.1 Literature
Specific Gravity (H2O = 1)	0.787 20 deg C/20 deg C Literature
Liquid Density	0.785 g/cm3 @ 20 deg C Literature
Freezing Point	-89 deg C (-128 deg F) Literature
Melting Point	No test data available
Solubility in Water (by weight)	100 % @ 20 deg C Literature
pH	No test data available
Decomposition Temperature	No test data available
Dynamic Viscosity	2.4 cPs @ 20 deg C
Kinematic Viscosity	No test data available

10. Stability and Reactivity

Stability/Instability

Thermally stable at typical use temperatures.

Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose. Avoid static discharge.

Incompatible Materials: Avoid contact with: Aldehydes. Halogenated organics. Halogens. Strong acids. Strong oxidizers.

Hazardous Polymerization
Will not occur.

Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity

Ingestion

LD50, Rat 4,700 - 5,800 mg/kg

Approximate. Lethal Dose, Human 100 ml

Skin Absorption

LD50, Rabbit 13,000 mg/kg

Inhalation

LC50, 8 h, Vapor, Rat, female 19,000 ppm

Sensitization**Skin**

Did not demonstrate the potential for contact allergy in mice.

Repeated Dose Toxicity

In animals, effects have been reported on the following organs: Liver. Kidney. Kidney effects have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans. Observations in animals include: Lethargy.

Chronic Toxicity and Carcinogenicity

Did not cause cancer in laboratory animals.

Developmental Toxicity

Isopropanol has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive Toxicity

In animal studies, did not interfere with reproduction.

Genetic Toxicology

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information**ENVIRONMENTAL FATE**

Data for Component: Isopropanol

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50). Henry's Law Constant (H): 3.38E-6 - 8.07E-6 atm*m3/mole; 25 deg C Estimated Partition coefficient, n-octanol/water (log Pow): 0.05 Measured Partition coefficient, soil organic carbon/water (Koc): 1.1 Estimated

Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
7.26E-12 cm ³ /s	1.472 d	Estimated

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
95 %	21 d	OECD 301E Test

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
20 - 72 %	78 - 86 %		

Chemical Oxygen Demand: 2.09 mg/mg

Theoretical Oxygen Demand: 2.40 mg/mg

ORDER NO:JA423844

MATERIAL SAFETY DATA SHEET
CUST:OPTIMA CHEMICALS INC

MSDS NO:UZC00111
VERSION:001 02/18/10

ECOTOXICITY

Data for Component: Isopropanol

Material is practically non-toxic to aquatic organisms on an acute basis
(LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, fathead minnow (*Pimephales promelas*), flow-through, 96 h:
9,640 - 10,400 mg/L

Aquatic Invertebrate Acute Toxicity

EC50, water flea *Daphnia magna*, 48 h, immobilization: 7,550 - 13,299 mg/L

Aquatic Plant Toxicity

EC50, alga *Scenedesmus* sp., Growth rate inhibition, 72 h: > 1,000 mg/L

Toxicity to Micro-organisms

EC50; activated sludge, respiration inhibition: > 1,000 mg/L

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. Transport Information

DOT Non-Bulk

Proper Shipping Name: ISOPROPANOL

Hazard Class: 3 ID Number: UN1219 Packing Group: PG II

DOT Bulk

Proper Shipping Name: ISOPROPANOL

Hazard Class: 3 ID Number: UN1219 Packing Group: PG II

IMDG

Proper Shipping Name: ISOPROPANOL

Hazard Class: 3 ID Number: UN1219 Packing Group: PG II

EMS Number: F-E,S-D

Marine pollutant.: No

ICAO/IATA

Proper Shipping Name: ISOPROPANOL

Hazard Class: 3 ID Number: UN1219 Packing Group: PG II

Cargo Packing Instruction: 307

Passenger Packing Instruction: 305

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	Yes
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component	CAS #	Amount
Isopropanol	67-63-0	<= 99.99 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List: The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Isopropanol	67-63-0	<= 99.99 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103

This product contains the following substances which are subject to CERCLA Section 103 reporting requirements and which are listed in 40 CFR 302.4.

Component	CAS #	Amount
Isopropanol	67-63-0	<= 99.99 %
Propanol	71-23-8	<= 0.015 %
Isopropyl ether	108-20-3	<= 0.002 %

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California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

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.

Toxic Substances Control Act (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	3	0

Recommended Uses and Restrictions

Industrial solvent for cleaner and coating formulations. Chemical additive.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

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Material Safety Data Sheet

Version: 1.2
08/28/2007

SR1000 150F POLYTRIMETHYLHYDROSILYLSILICATE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufactured By: Waterford Plant
260 Hudson River Rd
Waterford NY 12188

Revised: 08/28/2007

Preparer: PRODUCT STEWARDSHIP COMPLIANCE AND STANDARDS
CHEMTREC 1-800-424-9300

Chemical Family/Use:
Formula: Silicone resin

HMIS

Flammability: 0 Reactivity: 0 Health: 1

NFPA

Flammability: 0 Reactivity: 0 Health: 1

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Attention! This material is not considered hazardous by the OSHA Hazard Communication Standard 29 CFR 1910.1200

Form: Solid Color: White

POTENTIAL HEALTH EFFECTS

INGESTION

No adverse effects are expected under normal conditions of use.

SKIN

No adverse effects are expected under normal conditions of use.

INHALATION

No adverse effects are expected under normal conditions of use.

EYES

No adverse effects are expected under normal conditions of use.

MEDICAL CONDITIONS AGGRAVATED

None known.

SUBCHRONIC (TARGET ORGAN)

None known.

CHRONIC EFFECTS / CARCINOGENICITY

This product or one of its ingredients present at 0.1% or more is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, or OSHA.

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Material Safety Data Sheet

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08/28/2007

SR1000 150F POLYTRIMETHYLHYDROSILYLSILICATE

ROUTES OF EXPOSURE

No anticipated routes of exposure

3. COMPOSITION / INFORMATION ON INGREDIENTS

PRODUCT COMPOSITION	CAS REG NO.	WGT. %
---------------------	-------------	--------

A. HAZARDOUS

B. NON-HAZARDOUS

MQ RESIN

56275-01-5

> 90 %

4. FIRST AID MEASURES

INGESTION

Do not induce vomiting. If victim is conscious, give 1-3 glasses of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if irritation persists.

SKIN

Wash off with soap and water. Obtain medical attention if irritation persists.

INHALATION

If inhaled, remove to fresh air. If not breathing give artificial respiration using a barrier device. If breathing is difficult give oxygen. Get medical attention.

EYES

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

NOTE TO PHYSICIAN

Treatment is symptomatic and supportive.

5. FIRE-FIGHTING MEASURES

FLASH POINT:	None.
FLAMMABLE LIMITS IN AIR - LOWER (%):	No data available
FLAMMABLE LIMITS IN AIR - UPPER (%):	No data available
SENSITIVITY TO MECHANICAL IMPACT:	No

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SENSITIVITY TO STATIC DISCHARGE

Sensitivity to static discharge is not expected.

EXTINGUISHING MEDIA

All standard extinguishing agents are suitable.

SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus with full face mask and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Wipe, scrape or soak up in an inert material and put in a container for disposal. Wash walking surfaces with detergent and water to reduce slipping hazard.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with skin and eyes. Keep away from children. Attention: Not for injection into humans. May generate formaldehyde at temperatures greater than 150 C (300 F). See Section 10 of MSDS for details.

STORAGE

Store away from heat, sources of ignition, and incompatibles. Keep container closed.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

Eyewash stations; Showers; Ventilation and other forms of engineering controls are preferred for controlling exposures. Respiratory protection may be needed for non-routine or emergency situations.

RESPIRATORY PROTECTION

If exposure limits are exceeded or respiratory irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Supplied air respirators may be required for non-routine or emergency situations. Respiratory protection must be provided in accordance with OSHA regulations (see 29CFR 1910.134).

PROTECTIVE GLOVES

Impermeable or chemical resistant gloves.

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EYE AND FACE PROTECTION

Safety glasses

OTHER PROTECTIVE EQUIPMENT

Wear suitable protective clothing and eye/face protection.

Exposure Guidelines

Component	CAS RN	Source	Value
-----------	--------	--------	-------

Absence of values indicates none found

PEL - OSHA Permissible Exposure Limit; TLV - ACGIH Threshold Limit Value; TWA - Time Weighted Average

OSHA revoked the Final Rule Limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (68 FR 35338).

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT - C & F:	No data available
VAPOR DENSITY (AIR=1):	No data available
FREEZING POINT:	ca. 30 °C; 86 °F
MELTING POINT:	ca. 30 °C; 86 °F
PHYSICAL STATE:	Solid
COLOR:	White
EVAPORATION RATE (BUTYL ACETATE=1):	Negligible
ACID / ALKALINITY (MEQ/G):	No data available
SOLUBILITY IN WATER (20 C):	Insoluble
SOLUBILITY IN ORGANIC SOLVENT (STATE SOLVENT):	Insoluble

10. STABILITY AND REACTIVITY

STABILITY

Stable

HAZARDOUS POLYMERIZATION

Will not occur

HAZARDOUS THERMAL DECOMPOSITION / COMBUSTION PRODUCTS

Carbon dioxide (CO₂); Carbon monoxide; Silicon dioxide; Formaldehyde; May generate formaldehyde at temperatures greater than 150 C (300 F). See Section 10 of MSDS for details.

INCOMPATIBILITY (MATERIALS TO AVOID)

None known.

CONDITIONS TO AVOID

None known.

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11. TOXICOLOGICAL INFORMATION

ACUTE INHALATION

Method: No information available. Remarks: No data available

OTHER

No data available

SENSITIZATION

Test Type: Sensitisation, skin; Result: Negative. Method: OECD Guideline 429 (LLNA).

MUTAGENICITY

Negative in the Ames test.

12. ECOLOGICAL INFORMATION

ECOTOXICITY

No data available

DISTRIBUTION

No data available

CHEMICAL FATE

No data available

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD

Disposal should be made in accordance with federal, state and local regulations., Incineration recommended in approved incinerator according to federal, state, and local regulations.

14. TRANSPORT INFORMATION

Further Information:

This product is not regarded as dangerous goods according to the national and international regulations on the transport of dangerous goods.

SR1000 150F

POLYTRIMETHYLHYDROSILYLSILICATE

15. REGULATORY INFORMATION

Inventories

TSCA list	y (Positive listing)
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	y (Positive listing)
Canada NDSL Inventory	n (Negative listing)
EU list of existing chemical substances	y (Positive listing)
Australia Inventory of Chemical Substances (AICS)	y (Positive listing)
Canada DSL Inventory	y (Positive listing)
Korea Existing Chemicals Inventory (KECI)	y (Positive listing)
China Inventory of Existing Chemical Substances	y (Positive listing)
Japan Inventory of Existing & New Chemical Substances (ENCS)	y (Positive listing)

For inventories that are marked as quantity restricted or special cases, please contact Momentive.

US Regulatory Information

SARA (311,312) HAZARD CLASS
No SARA Hazards

SARA (313) CHEMICALS

Canadian Regulatory Information

WHMIS HAZARD CLASS
NON-CONTROLLED

CALIFORNIA PROPOSITION 65

Warning! This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

OTHER

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are

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POLYTRIMETHYLHYDROSILYLSILICATE

appropriate., C = ceiling limit NEGL = negligible EST = estimated NF = none found
NA = not applicable UNKN = unknown NE = none established REC = recommended ND =
none determined V = recommended by vendor SKN = skin TS = trade secret R =
recommended MST = mist NT = not tested STEL = short term exposure limit ppm =
parts per million ppb = parts per billion By-product= reaction by-product, TSCA inventory status
not required under 40 CFR part 720.30(h-2).



Material Safety Data Sheet

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MSDS NO. 002

SECTION 1. PRODUCT INFORMATION

PRODUCT NAME
SILBOND® PURE

CHEMICAL NAME
Tetraethyl Orthosilicate

SYNONYM
Silicic acid, tetraethyl ester, Tetraethyl orthosilicate

CHEMICAL FORMULA
Si (OC₂H₅)₄

CAS # 78-10-4

CHEMICAL FAMILY
Alkyl Silicate

PRODUCT USE
High Purity TEOS

MANUFACTURERS NAME
Silbond Corporation

ADDRESS
9901 Sand Creek Highway
Weston, MI 49289

EMERGENCY CONTACT
Carl McLaughlin.

COUNTRY
U.S.A.

EMERGENCY TELEPHONE #1
1-517-436-3171

EMERGENCY TELEPHONE #2
CHEMTREC USA 1-800-424-9300
OUTSIDE USA 703-527-3887

ISSUE DATE
02/ 15/2010

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE DESCRIPTION	PERCENT	CAS#
Tetraethyl Orthosilicate	-100.000	78-10-4

SECTION 3. HAZARDS IDENTIFICATION

APPEARANCE & ODOR
Clear liquid with a sweet odor.

STATEMENT OF HAZARDS
CAUTION!
COMBUSTIBLE LIQUID AND VAPOR
KEEP AWAY FROM HEAT AND FLAME
KEEP CONTAINER CLOSED
USE ADEQUATE VENTILATION

FIRE AND EXPLOSION HAZARDS

This product is a combustible liquid. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapor mixtures are explosive above the flash point. Drums have nylon closures and should vent during fires..

All information concerning this product and/or all suggestions for handling and use contained herein are offered in good faith and are believed to be reliable. Silbond Corporation, however, makes no warranty as to the accuracy and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purpose. The information contained herein supersedes all previously issued bulletins on the subject matter covered.

SECTION 3. HAZARDS IDENTIFICATION (CONTINUED)

PRIMARY ROUTE OF EXPOSURE

Skin contact and inhalation are the principal routes of exposure to this product.

INHALATION ACUTE EXPOSURE EFFECTS

Inhalation of vapor may irritate the respiratory tract and may cause central nervous system depression with dizziness, headache, or confusion.

SKIN CONTACT ACUTE EXPOSURE EFFECTS

Prolonged or repeated contact may cause moderate irritation.

EYE CONTACT ACUTE EXPOSURE EFFECTS

Prolonged or repeated exposure may cause irritation. By testing was a non irritant to rabbit eyes.

INGESTION ACUTE EXPOSURE EFFECTS

Irritation to the mouth, throat, esophagus and stomach may be caused by ingestion of this material.

NFPA HEALTH RATING

2

NFPA FLAMMABILITY RATING

2

NFPA REACTIVITY RATING

0

NFPA OTHER

NA

SECTION 4. FIRST AID MEASURES

INHALATION

Remove to fresh air. If breathing becomes difficult, oxygen may be given, preferably with a physician's advice. If not breathing, give artificial respiration. Get medical attention.

SKIN CONTACT

Remove contaminated clothing and equipment. Wash all affected areas with plenty of soap and water for at least 15 minutes. Do not attempt to neutralize with chemical agents. Wash any contaminated clothing and shoes before reuse. Obtain medical advice if irritation occurs.

EYE CONTACT

Flush eyes with large quantities of running water for a minimum of 15 minutes. If the victim is wearing contact lenses, remove them. Hold the eyelids apart during flushing to ensure rinsing of the entire surface of the eye and lids with water. DO NOT let victim rub eye(s). Do not attempt to neutralize with chemical agents. Oils or ointments should not be used at this time. Get medical attention if eye irritation occurs.

INGESTION

If swallowed, do not induce vomiting. Give several glasses of water Never give anything by mouth to a person who is unconscious or convulsing. If victim is unconscious, monitor pulse, breathing, and airway. If breathing stops, begin artificial respiration immediately. If the heart has stopped, give cardiopulmonary resuscitation (CPR). Get medical attention immediately.

MEDICAL CONDITIONS AGGRAVATED

Medical conditions that are generally recognized and being aggravated by exposure to this product include asthma and inflammatory or fibrotic pulmonary diseases. Persons with pre-existing skin, liver, kidney, blood and/or chronic respiratory disease are at increased risk if exposed to this material.

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SECTION 4. FIRST AID MEASURES (CONTINUED)

NOTE TO PHYSICIAN

No specific antidote is known. Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical conditions.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT

128.0 °F 53.3 °C

FLASH METHOD

Tag Closed Cup

AUTO IGNITION TEMPERATURE

N/D F N/D C

UPPER EXPLOSION LIMIT

N/D

LOWER EXPLOSION LIMIT

N/D

EXTINGUISHING METHOD

Use water fog, dry powder, foam or carbon dioxide extinguishing agents.

FIRE FIGHTING PROCEDURES

As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate non-essential personnel from the fire area. Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. If possible, move containers from the fire area. High-pressure water may spread product from broken containers increasing contamination of fire hazard. Dike fire water for later disposal. Do not allow contaminated water to enter waterways.

FIRE AND EXPLOSION HAZARDS

This product is a combustible liquid. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapor-air mixtures are explosive above the flash point. Containers have nylon closures and should vent during fires.

OTHER FIRE AND EXPLOSION HAZARDS

Decomposes under fire conditions to give off oxides of silicon and carbon.

HAZARDOUS PRODUCTS/COMBUSTION

Oxides of silicon and carbon may be produced by the combustion of this product.

SECTION 6. ACCIDENTAL RELEASE MEASURES

CLEAN-UP

If material is spilled, all ignition sources in the area should be extinguished and the leak stopped at the source. For large spills dike ahead of spill to contain. For small spills, absorb with sand, clay or other inert absorbent. Place in containers for disposal. Personnel involved in spill control and cleanup should follow the recommended exposure controls in SECTION 8 of this MSDS. All non-essential personnel should be evacuated from the immediate spill area.

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SECTION 6. ACCIDENTAL RELEASE MEASURES (Continued)

WASTE DISPOSAL

The characteristic of ignitability per RCRA could apply to the unused product if it becomes a waste material. The EPA hazardous waste number D001 could apply. It is the responsibility of the waste generator to evaluate whether his wastes are hazardous by characteristics or listing.

CONTAINER DISPOSAL

Containers should be cleaned of residual product before disposal. Empty containers should be disposed of in accordance with all applicable laws and regulations. No burning or welding should be done on empty containers.

SECTION 7. HANDLING/STORAGE/TRANSPORTATION

HANDLING

Electrically grounded tanks and containers should always be used as should non-sparking, electrically grounded hand tools and appliances. Ground or bond to ground all vessels when transferring to prevent the accumulation of static electricity. See National Electric Code.

STORAGE

Because the product is a combustible liquid, storage should meet the requirement of 29 CFR 1910.106, Flammable and Combustible Liquids Code. Store in a cool, dry, well-ventilated area away from sources of heat, ignition, direct sunlight, oxidizers, acids and alkalis. Keep container closed when not in use.

MAXIMUM STORAGE TEMPERATURE

Store below flashpoint if possible.

GENERAL COMMENTS

This product may attack certain plastics over extended periods of time. The preferred materials of construction for use with this product is stainless steel.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION

Use NIOSH-approved organic vapor respirators with dust, mist and fume filters to reduce potential for inhalation exposure if use conditions generate vapor, mist or aerosol and adequate ventilation (e.g. outdoor or well-ventilated area) is not available. Consult NIOSH Pocket Guide for Chemical Hazards. Where exposure potential necessitates a higher level of protection, use a NIOSH-approved, positive-pressure/pressure-demand, air-supplied respirator. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the workshift) to assure breakthrough exposure does not occur.

SKIN PROTECTION

Skin contact with liquid or its aerosol should be prevented through the use of suitable protective clothing, gloves and footwear selected with regard for use condition exposure potential.

EYE PROTECTION

Eye contact with liquid or its aerosol should be minimized through the use of suitable protective clothing and gloves selected with regard for use condition exposure potential.

VENTILATION PROTECTION

Local exhaust ventilation, enclosed system design, continuous monitoring devices, process isolation and remote control are traditional exposure control techniques which may be used to effectively minimize employee exposure.

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION (Continue)

OTHER PROTECTION

All food and smoking materials should be kept in a separate area away from the storage/use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for exposure to this material. Before eating, drinking or smoking, hands and face should be thoroughly washed.

APPLICABLE EXPOSURE LIMITS

Other than any exposure limits, which may be displayed in Section 15, there are no other known exposure limits applicable for this product or its components.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

VAPOR PRESSURE (mm Hg)

1
@ 68 °F 20 °C

VAPOR DENSITY (Air = 1.0)

7.22

EVAPORATION RATE

1
(Butyl acetate = 1)

VOLATILE %

99.9
(by volume)

BOILING POINT

334.00 °F 167.77 °C
(at 760 mm Hg)

ODOR THRESHOLD (ppm)

AP 85
ppm

SPECIFIC GRAVITY

0.934
@ 68 °F 20 °C

BULK DENSITY

N/D

SOLUBILITY IN WATER

Hydrolyzes in water

SOLUBILITY IN OTHER SOLVENTS

Miscible with organic solvents

COEFFICIENT OF OIL/WATER

N/D

POUR POINT

N/D F N/D C

MELTING POINT

-116.00 °F -82.22 °C

pH FACTOR

N/D

CLOUD POINT

N/D F N/D C

OTHER

Viscosity @ 68 °F (20 °C) 0.76 cps

SECTION 10. STABILITY AND REACTIVITY

STABILITY

This product is stable at ambient temperatures and atmospheric pressures. It is not self-reactive and is not sensitive to physical impact.

INCOMPATIBILITIES

This product hydrolyzes slowly and nonviolently under moist alkaline or acidic conditions at ambient temperatures and atmospheric pressures to form silicon dioxide and ethanol. It reacts with oxidizing agents such as nitrates and hypochlorites. This product may attack certain plastics over extended periods of time. Dupont's Viton® elastomer is not recommended.

POLYMERIZATION

Hazardous polymerization is not expected to occur.

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SECTION 10. STABILITY AND REACTIVITY (Continued)

DECOMPOSITION

Thermal decomposition products include oxides of carbon and silicon .

CONDITIONS TO AVOID

Under wet alkaline or acidic conditions, prolonged storage at elevated temperatures should be avoided to assure product integrity. Store away from foodstuffs, animal feed and incompatibles such as oxidizers, acids and alkalis.

SECTION 11. TOXICOLOGICAL INFORMATION

INHALATION EFFECTS

The acute inhalation LC50 is greater than 7.5 mg/L in both male and female rats. A single 4-hour inhalation exposure of 7.5 mg/L (greater than 99 percent respirable) did not produce signs of toxicity in male and female rats.

INHALATION CHRONIC EXPOSURE EFFECTS

Prolonged and/or repeated inhalation may cause severe respiratory irritation, pulmonary edema and possible kidney and liver damage.

DERMAL EFFECTS

The acute dermal LD50 is greater than 1000 mg/kg in rabbits. A single dermal application of 1000 mg/kg did not produce signs of toxicity in rabbits. This product was a moderate irritant to rabbit skin following a 24-hr. exposure to 500 mg.

SKIN CONTACT CHRONIC EXPOSURE EFFECTS

Chronic dermal exposure effects for this product are not known. However, prolonged and/or repeated contact is expected to cause skin irritation.

EYE EFFECTS

100 mg applied to rabbits eyes produced mild irritation. Laboratory tests performed by Stauffer Chemical found Condensed ethyl silicate to be non-irritating to the eyes. (T-4621, T5485).

EYE CONTACT CHRONIC EXPOSURE EFFECTS

Chronic eye exposure effects for this product are not known.

INGESTION EFFECTS

The oral LD50 for this material is 2000 mg/kg in male rats. A single oral dose of 1000 mg/kg did not produce signs of toxicity in male rats. Higher doses produced decreased physical activity, piloerection, excessive urination and mortality.

INGESTION CHRONIC EXPOSURE EFFECTS

If swallowed, this product may cause irritation of the mouth, throat, and stomach. May cause central nervous system depression with dizziness, headache, or confusion. May cause kidney and liver damage.

CARCINOGENICITY/MUTAGENICITY

Neither this product nor its components have been classified as a carcinogen by IARC, NTP, OSHA, or ACGIH.

REPRODUCTIVE EFFECTS

The reproductive toxicity of this product is not known.

NEUROTOXICITY

The neurotoxic effects of this product are not known.

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SECTION 11. TOXICOLOGICAL INFORMATION (Continued)

OTHER EFFECTS

No other toxic effects for this product are known.

TARGET ORGANS

Overexposure to this product may affect the skin and respiratory system. Overexposure to ethyl silicate may cause damage to the liver, kidneys and cause anemia.

SECTION 12. ECOLOGICAL INFORMATION

ECOLOGICAL TOXICITY

The ecological toxicity of this product is not known.

OTHER ECOLOGICAL INFORMATION

Other ecological information on this product is not known.

CHEMICAL FATE INFORMATION

This product hydrolyzes slowly in wet alkaline or acidic conditions to silicon oxides and ethanol.

OTHER REGULATORY INFORMATION

No other regulatory information is available on this product.

SECTION 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

The characteristic of Ignitability per RCRA could apply to the unused product if it becomes a waste material. The EPA hazardous waste number D001 could apply. It is the responsibility of the waste generator to evaluate whether his wastes are hazardous by characteristics or listing.

CONTAINER DISPOSAL

Containers should be cleaned of residual product before disposal. Empty containers should be disposed of in accordance with all applicable laws and regulations. No burning or welding should be done on empty containers.

SECTION 14. TRANSPORT INFORMATION

SHIPPING DESCRIPTION

FOR US(BULK):

Combustible Liquid, n.o.s. (Tetra ethyl silicate)

Combustible Liquid, NA 1993, PG III

2008 ERG GUIDE NO. 128

(unregulated in non-bulk containers)

FOR INTERNATIONAL:

Tetra ethyl silicate

Class 3, Packing Group III

UN 1292

REQUIRED LABEL(S)

Combustible liquid (Bulk U.S.)

Flammable Liquid (International)

ENVIRONMENTALLY HAZARDOUS SUBSTANCE OR MARINE POLLUTANT

This product does not contain an environmentally hazardous substance or marine pollutant per 49 CFR 172.101 Appendix A & B.

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SECTION 15. REGULATORY INFORMATION

EXPOSURE LIMITS/REGULATORY INFORMATION (IN MG/M3)

SUBSTANCE DESCRIPTION	REG. AGCY	PEL	TLV	TWA	STEL	CEIL
Tetraethyl Orthosilicate	OSHA	850	N/D	N/D	N/D	N/D
	ACGIH	N/D	85	N/D	N/D	N/D
	NIOSH	N/D	N/D	85	N/D	N/D
	SUPPLIER	N/D	N/D	N/D	N/D	N/D

LISTED ON THE FOLLOWING: MA LIST NJ R-T-K PA LIST TSCA MITI 2-2048

LEGEND:

EXPOSURE LIMIT DESCRIPTIONS

CEIL	Ceiling Exposure Limit
PEL	Permissible Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average

REGULATORY LIST DESCRIPTIONS

CAA 112	Clean Air Act Sect. 112
CERCLA	CERCLA Hazardous Substances
DSL	Domestic Substance List-Canada
IARC	IARC Carcinogens-Grps. 1,2A,2B
MA LIST	Massachusetts Substance List
NDSL	Non-Domestic Subst. List-Canada
NJ R-T-K	New Jersey R-T-K Hazard. Sub.
PA. LIST	Penn. Hazardous Substance List
PROP 65	California Proposition 65
SARA 302	SARA Title III, Section 302
SARA 312	SARA Title III, Section 312
TSCA	Toxic Subst. Cont. Act - listed
MITI	Japanese List
N/D	= Not Determined

SECTION 16. OTHER INFORMATION

CREATED BY
Product Stewardship Group

REVISION NO. 005

OTHER INFORMATION

No other information is available.

WHMIS HAZARD CLASS B-3

HAZARD RATING SOURCE HMIS

HEALTH 2 FLAMMABILITY 2

REACTIVITY 0 OTHER

REVISION CHANGE(S):

1. Flashpoint revised from 105 F to 128 F
2. Viscosity revised from 0.72cps to 0.76 cps
3. Review

ORDER NO:JA534278

MATERIAL SAFETY DATA SHEET
CUST:ANTARES HEALTH PRODUCTS.

MSDS NO:10000042
VERSION:002 07/07/15



UNIVAR®

Univar
3075 Highland Pkwy STE 200
Downers Grove, IL 60515
425-889-3400

SAFETY DATA SHEET

1. Identification

Product Identifier: TOLUENE

Other means of identification

SDS number: 000100000042

Recommended use and restriction on use

Recommended use: Not available.

Restrictions on use: Not known.

Emergency telephone number:For emergency assistance Involving chemicals

call CHEMTREC day or night at: 1-800-424-9300. CHEMTREC INTERNATIONAL Tel# 703-527-3887

2. Hazard(s) identification

Hazard classification

Physical hazards

Flammable liquids Category 1

Health hazards

Skin corrosion/irritation Category 2

Serious eye damage/eye irritation Category 2A

Toxic to reproduction Category 2

Environmental hazardsAcute hazards Category 2
to the aquatic environment

Label elements

Hazard symbol

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**Signal word**

Danger

Hazard statement

Flammable liquid and vapor.
Causes serious eye irritation.
Causes skin irritation.
Suspected of damaging the unborn child.
May be fatal if swallowed and enters airways.
May cause drowsiness or dizziness.
Causes damage to organs through prolonged or repeated exposure.

Precautionary statement**Prevention**

Keep away from heat/sparks/open flames/hot surfaces. No smoking. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Use personal protective equipment as required.

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 (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

Storage

Store in a dry place. Store in a well-ventilated place.

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Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification

Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion.

3. Composition/information on ingredients

Substances

Chemical identity	Common name and synonyms	CAS number	Content in percent (%)*
Toluene		108-88-3	99%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Composition comments:

The components are not hazardous or are below required disclosure limits.

4. First-aid measures

Ingestion:

Never give liquid to an unconscious person. Do NOT induce vomiting. Get medical attention immediately.

Inhalation:

Move to fresh air. If breathing is difficult, give oxygen. Perform artificial respiration if breathing has stopped.

Skin contact:

Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Eye contact:

Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart.

Most important symptoms/effects, acute and delayed**Symptoms:**

No data available.

Indication of immediate medical attention and special treatment needed**Treatment:**

No data available.

5. Fire-fighting measures

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General fire hazards: No data available.
Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use: Dry powder, carbon dioxide, foam. Water fog.

Unsuitable extinguishing media: No data available.

Specific hazards arising from the chemical: No data available.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: No data available.

Special protective equipment for fire-fighters: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: No data available.

Methods and material for containment and cleaning up: All equipment used when handling the product must be grounded. Eliminate sources of ignition. Absorb spillage with non-combustible, absorbent material. Dike for later disposal. Prevent runoff from entering drains, sewers, or streams.

7. Handling and storage

Precautions for safe handling: Avoid contact with skin and eyes. Avoid breathing mists or vapors. Flammable/combustible - Keep away from oxidizers, heat and flames. Use only with adequate ventilation.

Conditions for safe storage, including any incompatibilities: No data available.

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8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Chemical identity	Type	Exposure Limit values	Source
Toluene	TWA	20 ppm	US. ACGIH Threshold Limit Values (03 2013)
	REL	100 ppm 375 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	STEL	150 ppm 560 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	TWA	100 ppm 375 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	STEL	150 ppm 560 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	Ceiling	300 ppm	US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)
	TWA	200 ppm	US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)
	MAX. CONC	500 ppm	US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)
	TWA	100 ppm 375 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
	STEL	150 ppm 580 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
	AN ESL	1,200 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	ST ESL	3,470 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	ST ESL	920 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	AN ESL	330 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	Ceiling	500 ppm	US. California Code of Regulations,

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			Title 8, Section 5155. Airborne Contaminants (02 2012)
	TWA PEL	10 ppm 37 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
	STEL	150 ppm 560 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)

Biological limit values

Chemical identity	Exposure Limit values	Source
Toluene (o-Cresol, with hydrolysis: Sampling time: End of shift.)	0.3 mg/g (Creatinine in urine)	ACGIH BEL (03 2013)
Toluene (toluene: Sampling time: Prior to last shift of work week.)	0.02 mg/l (Blood)	ACGIH BEL (03 2013)
Toluene (toluene: Sampling time: End of shift.)	0.03 mg/l (Urine)	ACGIH BEL (03 2013)

Appropriate engineering controls No data available.

Individual protection measures, such as personal protective equipment

General information: No data available.
Eye/face protection: No data available.

Skin protection

Hand protection: No data available.
Other: No data available.

Respiratory protection: No data available.

Hygiene measures: No data available.

9. Physical and chemical properties

Physical state: Liquid
Form: No data available.
Color: No data available.
Odor: No data available.

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Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	-95 °C
Initial boiling point and boiling range:	110 °C
Flash Point:	4 °C
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	No data available.
Solubility(ies)	
Solubility in water:	No data available.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No data available.
Chemical stability:	No data available.
Possibility of hazardous reactions:	No data available.
Conditions to avoid:	No data available.
Incompatible materials:	No data available.
Hazardous decomposition products:	No data available.

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11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Ingestion: No data available.
Inhalation: No data available.
Skin contact: No data available.
Eye contact: No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product: ATEmix {}: 2,626.262626 mg/kg

Dermal

Product:

Not classified for acute toxicity based on available data.

Inhalation

Product:

No data available.

Specified substance(s):

Toluene

LC 50 (Rat, 4 h): 8,000 mg/l

Repeated dose toxicity

Product:

No data available.

Skin corrosion/irritation

Product:

No data available.

Serious eye damage/eye irritation

Product:

No data available.

Respiratory or skin sensitization

Product:

No data available.

Carcinogenicity

Product:

No data available.

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No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:

No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):

No carcinogenic components identified

Germ cell mutagenicity**In vitro****Product:** No data available.**In vivo****Product:** No data available.**Reproductive toxicity****Product:** No data available.**Specific target organ toxicity - single exposure****Product:** No data available.**Specific target organ toxicity - repeated exposure****Product:** No data available.**Aspiration hazard****Product:** No data available.**Other effects:** No data available.**12. Ecological information****Ecotoxicity:****Acute hazards to the aquatic environment:****Fish****Product:** No data available.**Specified substance(s):****Toluene**LC 50 (Rainbow trout, donaldson trout (*Oncorhynchus mykiss*), 24 h): 6.26 - 8.4 mg/l Mortality LC 50 (Pink salmon (*Oncorhynchus gorbuscha*), 24 h): 6.97 - 8.62 mg/l Mortality LC 50 (Pink salmon (*Oncorhynchus gorbuscha*), 24 h): 7.45 - 8.75 mg/l Mortality LC 50 (Medaka, high-eyes (*Oryzias latipes*), 24 h): 80 mg/l Mortality LC 50 (Zebra danio (*Danio rerio*), 24 h): > 100 mg/l Mortality**Aquatic invertebrates****Product:** No data available.**Specified substance(s):****Toluene**LC 50 (Water flea (*Daphnia magna*), 24 h): 240 - 420 mg/l Mortality LC 50 (Brine shrimp (*Artemia salina*), 24 h): 33 mg/l Mortality LC 50 (Water flea

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(Daphnia magna), 24 h): 470 mg/l Mortality LC 50 (Brine shrimp (Artemia sp.), 24 h): 42.8 - 63.8 mg/l Mortality LC 50 (Rotifer (Brachionus plicatilis), 24 h): 519.5 - 585.7 mg/l Mortality

Chronic hazards to the aquatic environment:**Fish****Product:** No data available.**Aquatic invertebrates****Product:** No data available.**Toxicity to Aquatic Plants****Product:** No data available.**Persistence and degradability****Biodegradation****Product:** No data available.**BOD/COD ratio****Product:** No data available.**Bioaccumulative potential****Bioconcentration factor (BCF)****Product:** No data available.**Specified substance(s):**

Toluene

Green algae (Chlorella fusca), Bioconcentration factor (BCF): 380 (Not reported)

Green algae (Selenastrum capricornutum), Bioconcentration factor (BCF): 3,016 (Static)

Green algae (Chlorella fusca vacuolata), Bioconcentration factor (BCF): 380 (Static)

Shore crab (Hemigrapsus nudus), Bioconcentration factor (BCF): 31 (Flow through)

Ide, silver or golden orfe (Leuciscus idus), Bioconcentration factor (BCF): 94 (Not reported)

Partition coefficient n-octanol / water (log Kow)**Product:** No data available.**Specified substance(s):**

Toluene

Log Kow: 2.73

Mobility in soil:

No data available.

Known or predicted distribution to environmental compartments

Toluene

No data available.

13. Disposal considerations**Disposal instructions:** No data available.

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Contaminated packaging: No data available.

14. Transport information**DOT**

UN number:	UN 1294
UN proper shipping name:	Toluene
Transport hazard class(es)	
Class:	3
Label(s):	3
Packing group:	II
Marine Pollutant:	Not regulated.
Special precautions for user:	-

IMDG

UN number:	UN 1294
UN proper shipping name:	TOLUENE
Transport hazard class(es)	
Class:	3
Label(s):	3
EmS No.:	F-E, S-D
Packing group:	II
Marine Pollutant:	Not regulated.
Special precautions for user:	-

IATA

UN number:	UN 1294
Proper Shipping Name:	Toluene
Transport hazard class(es):	
Class:	3
Label(s):	3
Packing group:	II
Environmental hazards	Not regulated.
Special precautions for user:	-
Other information	
Passenger and cargo aircraft:	Allowed.
Cargo aircraft only:	Allowed.

15. Regulatory information

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 Revision date: 07/07/2015



US federal regulations US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Toluene Reportable quantity: 1000 lbs.

Superfund amendments and reauthorization act of 1986 (SARA)

Hazard categories

Not listed.

SARA 302 Extremely hazardous substance

None present or none present in regulated quantities.

SARA 304 Emergency release notification

Chemical Identity	RQ
Toluene	1000 lbs.

SARA 311/312 Hazardous chemical

Chemical Identity	Threshold Planning Quantity
Toluene	500 lbs

SARA 313 (TRI reporting)

Chemical identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Toluene	10000 lbs	25000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Toluene Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

None present or none present in regulated quantities.

US state regulations

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Toluene Developmental toxin.

Toluene Female reproductive toxin.

US. New Jersey Worker and Community Right-to-Know Act

Toluene Listed

US. Massachusetts RTK - Substance List

Toluene Listed

US. Pennsylvania RTK - Hazardous Substances

Toluene Listed

US. Rhode Island RTK

Toluene Listed

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Inventory Status: Australia AICS:	Not in compliance with the inventory.
Canada DSL Inventory List:	Not in compliance with the inventory.
EU EINECS List:	On or in compliance with the inventory
EU ELINCS List:	Not in compliance with the inventory.
Japan (ENCS) List:	Not in compliance with the inventory.
EU No Longer Polymers List:	Not in compliance with the inventory.
China Inv. Existing Chemical Substances:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	Not in compliance with the inventory.
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	Not in compliance with the inventory.
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	Not in compliance with the inventory.
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

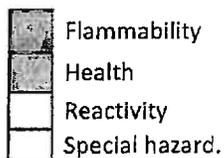
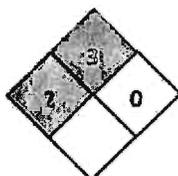
HMIS Hazard ID

Health	*	2
Flammability		3
		0
PERSONAL PROTECTION		B

B - Safety Glasses & Gloves

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; *Chronic health effect

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

Issue date: 07/07/2015
Revision date: No data available.
Version #: 1.3
Further Information: No data available.

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: LIGHT COLORED OR COLORLESS MOBILE LIQUID WITH AN AROMATIC ODOR.
BOILING POINT: 279-284 F (137-140 C) SPECIFIC GRAVITY: 0.86
VOLATILITY: 100% VAPOR PRESSURE: 6 MMHG @ 20 C
EVAPORATION RATE: (BUTYL ACETATE = 1) 0.6 SOLUBILITY IN WATER: 0.00003%

PAGE: 1
PO NBR: 12402

ACCT: 183395-01
CAT NO: X54

DATE: 08/09/91
INDEX: 1591220017Z

XYLENE
XYLENE
XYLENE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 798-7100
EMERGENCY NUMBER: (201) 798-7100
CHEMTRAC ASSISTANCE: (800) 424-3300

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **XYLENE**
TRADE NAMES/SYNONYMS: DILAN; DIMETHYLBENZENE; XYL01; RCRA U239; STCC 4809350;
UN 1307; X35; X4; X5; X16; X55; C8H10; ACC25150
CAS-NUMBER 1330-20-7

CHEMICAL FAMILY: HYDROCARBON, AROMATIC
MOLECULAR FORMULA: C6-H4-(C-H)2

MOLECULAR WEIGHT: 106.16

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=0 PERSISTENCE=1

RPPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: XYLENE (O-, M-, P-ISOMERS) PERCENT: 83.0
CAS# 1330-20-7
COMPONENT: ETHYL BENZENE PERCENT: 17.0
CAS# 100-41-4

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

XYLENE
100 PPM (434 MG/M3) OSHA TWA; 150 PPM (651 MG/M3) OSHA STEL
100 PPM (434 MG/M3) ACGIH TWA; 150 PPM (651 MG/M3) ACGIH STEL
100 PPM (434 MG/M3) NIOSH RECOMMENDED TWA
150 PPM (651 MG/M3) NIOSH RECOMMENDED STEL
100 PPM (434 MG/M3) DFG MAK TWA;
200 PPM (866 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE; CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1501, AROMATIC HYDROCARBONS).

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

ETHYL BENZENE:
100 PPM (434 MG/M3) OSHA TWA; 125 PPM (543 MG/M3) OSHA STEL
100 PPM (434 MG/M3) ACGIH TWA; 125 PPM (543 MG/M3) ACGIH STEL
100 PPM (434 MG/M3) NIOSH RECOMMENDED TWA
125 PPM (543 MG/M3) NIOSH RECOMMENDED STEL
100 PPM (434 MG/M3) DFG MAK TWA (SKIN);
200 PPM (866 MG/M3) DFG MAK 5 MINUTE PEAK, MOMENTARY VALUE, 8 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE; CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1501, AROMATIC HYDROCARBONS).

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ODOR THRE: DI 0.3 PPM VAPOR DENSITY: 3.7
SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, EITHER, MANY ORGANIC SOLVENTS

FIRE AND EXPLOSION DATA
FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.
VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.
VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE
DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY
GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.
FLASH POINT: 81-90 F (27-32 C) (CC) UPPER EXPLOSIVE LIMIT: 7.0X
LOWER EXPLOSIVE LIMIT: 1.0X AUTOIGNITION TEMP.: 867-984 F (464-529 C)
FLAMMABILITY CLASS (OSHA): IC

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).
FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING
WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE
IS EXTINGUISHED. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE
WATER AND USE FROTHING OR MONITOR NOZZLES. IF THIS IS IMPOSSIBLE, WITHDRAW FROM
AREA AND USE FROTHING OR MONITOR NOZZLES IMMEDIATELY IN CASE OF RISING SOUND FROM
VENTING SAFETY DEVICES OR FROM COLLAPSE OF TANKS DUE TO FIRE. ISOLATE FOR
1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR, OR TANK TRUCK IS INVOLVED IN FIRE
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG,
SOLID STREAMS MAY SPREAD FIRE. COOL CONTAINERS WITH FLOODING QUANTITIES OF
WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS,
KEEP UPWIND.

WATER MAY BE INEFFECTIVE (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE
LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984)

TRANSPORTATION DATA
DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101;
FLAMMABLE LIQUID
DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND
SUBPART 173
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.119
EXCEPTIONS: 49 CFR 173.118

TOXICITY
XYLENE:
IRITATION DATA: 200 PPM EYE-HUMAN; 87 MG EYE-RABBIT MILD; 5 MG/24 HOURS
EYE-RABBIT SEVERE; 100% SKIN-RABBIT MODERATE; 300 MG/24 HOURS SKIN-RABBIT
MODERATE

TOXICITY DATA: 10000 PPM/6 HOURS INHALATION-HUMAN LC50; 200 PPM INHALATION-HUMAN
LCLO; 5000 PPM/4 HOURS INHALATION-RAT LC50; 450 PPM INHALATION-GUINEA PIG
LCLO; 50 MG/KG ORAL-HUMAN LD50; 4300 MG/KG ORAL-RAT LD50; 1700 MG/KG
SUBCUTANEOUS-RAT LD50; 129 MG/KG INTRAVENOUS-RABBIT LD50; 2 GM/KG
INTRAPERITONEAL-MAMMAL LD50; 2459 MG/KG INTRAPERITONEAL-RAT LD50; 1548 MG/KG
INTRAPERITONEAL-MOUSE LD50; 2000 MG/KG INTRAPERITONEAL-GUINEA PIG LDLO

REPRODUCTIVE EFFECTS: DATA (RTECS), (CPROD), (TESTFAT), (3BMKAUJ),
CARCINOGENS: HUMAN INADEQUATE EVIDENCE, ANIMAL INADEQUATE EVIDENCE,
CLASS GROUP 3
LOCAL EFFECTS: IRRITANT; INHALATION: SKIN, EYE,
ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INHA-
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSION, POISONING MAY AL- AFFECT
THE NERVOUS SYSTEM, LIVER AND KIDNEYS
AT INCREASED RISK FROM EXPOSURE; PREGNANT WOMEN
ADDITIONAL DATA: ALCOHOL MAY ENHANCE THE TOXIC EFFECTS. STIMULANTS SUCH
AS EPINEPHRINE OR EPINEDRINE MAY INDUCE VENTRICULAR FIBRILLATION.
ETHYL BENZENE:
IRITATION DATA: 15 MG/24 HOURS OPEN SKIN-RABBIT MILD; 100 MG EYE-RABBIT,
TOXICITY DATA: 100 PPM/4 HOURS INHALATION-HUMAN LCLO; 4000 PPM/4 HOURS
INHALATION-RAT LCLO; 50 GM/M3/2 HOURS INHALATION-MOUSE LCLO; 10000 PPM

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INHALATION-GUINEA PIG LCLO, 17800 MG/KG SKIN-RABBIT LD50; 3500 MG/KG ORAL-RAT LD50; 2272 MG/KG INTRAPERITONEAL-MOUSE LD50; MUTAGENIC DATA

CHRONIC REPRODUCTIVE EFFECTS DATA (RTECS).
LOCAL TOXICITY: IRRITANT. INHALATION SKIN EYES
ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INGESTION; SLIGHTLY TOXIC BY DERMAL ABSORPTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE LIVER.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH PRE-EXISTING SKIN DISORDERS OR ALLERGIC DERMATITIS, RENAL OR LIVER DYSFUNCTION.
ADDITIONAL COMMENTS: ETHYL BENZENE EXPOSED TO PHOTOOXIDATION IN THE PRESENCE OF OZONE AND NITROGEN DIOXIDES, AS IN THE FORMATION OF SMOG, YIELDS PRODUCTS HAVING CONSIDERABLE IRRITANCY TO THE HUMAN EYE.

HEALTH EFFECTS AND FIRST AID

INHALATION:

IRRIANT/NARCOTIC. 1000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH. ACUTE EXPOSURE TO HIGHER CONCENTRATIONS MAY CAUSE MORE SEVERE IRRITATION AND INITIAL CENTRAL NERVOUS SYSTEM EXCITATION FOLLOWED BY DEPRESSION. SIGNS AND SYMPTOMS MAY INCLUDE RESPIRATORY DIFFICULTY AND SUBSTERNAL PAIN. TRANSIENT ABDOMINAL PAIN, DIZZINESS, BROWNSNESS, HEADACHE, NAUSEA, VOMITING, ANDREXIA, AND EMOTIONAL LABILITY. SLURRED SPEECH, BLURRED VISION, NYSTAGMUS, AND INCREASED SALIVATION. SEVERE EXPOSURE TO THE FACE AND A FEELING OF INCREASED BODY HEAT IN SEVERE EXPOSURE. MAY BE PUNCTATED BY DEGREE OF ANESTHESIA, NEUROIRRITABILITY, AND COMA WHICH MAY BE CONVULSIONS EXCEPT IN TERMINAL ASPHYXIA. LIVER AND KIDNEY DAMAGE MAY OCCUR, BUT ARE USUALLY MILD AND TRANSIENT. A GROUP OF SUBJECTS WHO INHALED 12.3 UMOL/L OF XYLENE WHILE EXERCISING BECAME SIGNIFICANTLY IMPAIRED ON 3 NEUROPSYCHOLOGICAL TESTS. EXPOSURE OF 3 PAINTERS TO APPROXIMATELY 10,000 PPM FOR 18.5 HOURS RESULTED IN DEATH FROM PULMONARY EDEMA AND PECTHIAL BRONCHITIS. HEMORRHAGE AND RENAL ANEMIA UNCOMMON. CHRONIC EXPOSURE EXPERIENCED RETROGRADE AMNESIA UNCOMMON. CHRONIC EXPOSURE TO 100 PPM OF XYLENE FOR 19-24 HOURS AND HIGH CONCENTRATIONS MAY CAUSE DEATH FROM SUDDEN VENTRICULAR FIBRILLATION, BUT MORE FREQUENTLY DEATH OCCURS FROM RESPIRATORY ARREST. CHRONIC EXPOSURE- REPEATED OR PROLONGED INHALATION OF VAPORS ABOVE 200 PPM MAY CAUSE NAUSEA, VOMITING, ABDOMINAL PAIN, AND ANDREXIA. OTHER COMMON COMPLAINTS INCLUDE HEADACHE, FATIGUE, LASSITUDE, IRRITABILITY, BREATHING DIFFICULTIES, AND FLATULENCE. EFFECTS ON THE NERVOUS SYSTEM MAY RESULT IN TASTATION FOLLOWED BY DEPRESSION, PARESTHESIAS, TREMORS, APPREHENSION, TYPE NARCOLEPSY, DIZZINESS, HEADACHE, AND TINNITUS. EFFECTS ON REACTION TIME HAVE BEEN OBSERVED. REPEATED EXPOSURE TO 50 PPM OF XYLENE SWELLED AND OCCURRED WITH REPEATED EXPOSURE TO 50 PPM OF XYLENE. SWELLED AND OCCURRED WITH REPEATED THROAT, STRONG THIRST, MUCOSAL HEMORRHAGE, AND ANEMIA HAVE BEEN REPORTED. EFFECTS ON THE LIVER, KIDNEY, CARDIOVASCULAR SYSTEM, AND THE BONE MARROW HAVE ALSO BEEN REPORTED. ALTHOUGH THE LATTER HAS BEEN QUESTIONED. EXPOSURE OF RABBITS TO 1150 PPM FOR 40-55 DAYS RESULTED IN A REVERSIBLE DECREASE IN THE RED AND WHITE CELL COUNTS AND AN INCREASE IN THE PLATELETS. ONE CASE OF AN APPARENT EPILEPTIFORM SEIZURE FOLLOWING A RELATIVELY BRIEF EXPOSURE HAS OCCURRED. WOMEN MAY DEVELOP MENSTRUAL DISORDERS, SUCH AS MENORRHAGIA INCLUDING TOXICITY. CHANGES OF PREGNANT WIFE AND FETAL EFFECTS AND DELIVERY REPEATED EXPOSURE OF PREGNANT WIFE AND FETAL EFFECTS AND INDIVIDUAL OR THE MIXED ISOMERS HAS RESULTED IN MATERNAL EFFECTS AND ABNORMALITIES. INCLUDED AMONG THESE EFFECTS ARE FETAL DEATH, FEOTOXICITY, PRE- AND POST-IMPLANTATION MORTALITY, ABORTION, CRANIOFACIAL AND MUSCULOSKELETAL ABNORMALITIES, AND EXTRA EMBRYONIC STRUCTURES.

ETHYL BENZENE:

IRRIANT/NARCOTIC. 2000 PPM IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH. ACUTE EXPOSURE MAY CAUSE SEVERE IRRITATION OF THE NOSE AND THROAT. CONSIDER AN ADEQUATE WARNING PROPERLY AT LEVELS BELOW SYSTEMIC TOXICITY. AT HIGHER CONCENTRATIONS COUGH, FATIGUE, DEPRESSION, VERTIGO OR DIZZINESS, DYSPNEA, SENSE OF CHEST CONSTRICTION, HEADACHE, NARCOSIS, AND COMA MAY OCCUR. DEATH IS POSSIBLE FROM RESPIRATORY CENTER PARALYSIS. EXPOSED ANIMALS EXHIBITED SIMILAR SYMPTOMS, AS WELL AS TREMOR OF THE

EXTREMITIES, STALIC AND MOTOR ATAXIA, STAGGERING GAIT, AND LOSS OF RIGHTING REFLEX. LOSS OF CONSCIOUSNESS WAS FOLLOWED BY DEATH FROM RESPIRATORY PARALYSIS. PATHOLOGIES INCLUDED EDEMA AND CONGESTION OF THE PLAIN AND LUNGS GENERALIZED VISCERAL HYPEREMIA, EPITHELIAL NECROSIS OF CONSIDERED TUBULES, AND HEPATIC DYSTROPHY. PUPIL AND EYE IRRITATION ARE REPRODUCTIVE EFFECTS HAVING REPORTED AT LEVELS BELOW SYSTEMIC TOXICITY. CHRONIC EXPOSURE MAY CAUSE IRRITATION IN ANIMALS. RESPIRATORY TRACT, FATIGUE, SLEEPINESS, HEADACHE, IRRITABILITY, AND FUNCTIONAL DISORDERS. CHRONIC INHALATION EXPOSURE IN ANIMALS HAS CAUSED UPPER RESPIRATORY INFLAMMATION, NERVOUS SYSTEM DISORDERS, DYSTROPHIC CHANGES IN THE LIVER AND KIDNEYS INCLUDING TOXIC HEPATITIS, CHANGES IN BLOOD UREA NITROGEN ACTIVITY, LEUKOCYTOSIS, AND RETICULOCYTOSIS. TESTICULAR DYSPLASIA WAS OBSERVED IN RABBITS AND MONKEYS. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS; IN ONE CASE PREGNANT RATS EXPOSED

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POST-IMPLANTATION MORTALITY.

ETHYL BENZENE:

ACUTE EXPOSURE- MAY CAUSE ABDOMINAL PAIN, NAUSEA, AND VOMITING WHICH MAY LEAD TO ASPIRATION WITH EXTENSIVE EDEMA AND HEMORRHAGE OF LUNG TISSUE. ASPIRATION BY RATS CAUSED IMMEDIATE DEATH BY CARDIAC ARREST AND RESPIRATORY PARALYSIS. INGESTION OF 408-680 MG/KG/DAY FOR 182 DAYS BY RATS CAUSED SLIGHT LIVER AND KIDNEY WEIGHT INCREASES WITH SLIGHT PATHOLOGICAL SIGNS.

FIRST AID- EXTREME CARE MUST BE USED TO PREVENT ASPIRATION. GASTRIC LAVAGE WITH A CUFFED ENDOTRACHEAL TUBE IN PLACE TO PREVENT FURTHER ASPIRATION SHOULD BE DONE WITHIN 15 MINUTES, IN THE ABSENCE OF DEPRESSION OR CONVULSIONS OR IMPAIRED GAG REFLEX. EMESIS CAN ALSO BE INDUCED USING SYRUP OF IPECAC WITHOUT INCREASING THE HAZARD OF ASPIRATION (DREISSBACH, HANDBOOK OF PESTICIDE TOXICOLOGY, 1975). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

XYLENE:
NITRIC ACID; EXOTHERMIC REACTION.
OXIDIZERS (STRONG); FIRE AND EXPLOSION HAZARD.
PLASTICS, RUBBER, COATINGS; MAY BE ATTACKED.
SULFURIC ACID; EXOTHERMIC REACTION.

ETHYL BENZENE:

ACIDS (STRONG); POSSIBLE VIOLENT REACTION.
AMMONIA; POSSIBLE VIOLENT REACTION.
BASES (STRONG); POSSIBLE VIOLENT REACTION.
OXIDIZERS (STRONG); FIRE AND EXPLOSION HAZARD.
PLASTICS; MAY BE ATTACKED.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.105.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NEPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE IS PREFERABLE. INSIDE STORAGE SHOULD BE IN A STANDARD FLAMMABLE LIQUIDS STORAGE ROOM OR CABINET. SEPARATE FROM OXIDIZING MATERIALS (NEPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U239.

CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLODIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

SPILL AND LEAK PROCEDURES

SOIL SPILL.
SPREADING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE
SURFACE USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED
CONCRETE. ABSORB LIQUID MASS WITH PLY ASH OR CEMENT POWDER.
IMMOBILIZE SPILL WITH UNIVERSAL GELLING AGENT.

REDUCE VAPOR AND FIRE HAZARD WITH APPROPRIATE FOAM.
AUX SPILL:
KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.
WATER SPILL:
LIMIT SPILL MOTION AND DISPERSION WITH NATURAL BARRIERS OR DIL SPILL CONTROL
BOOMS.
APPLY DETERGENTS, SOAPS, ALCOHOLS OR ANOTHER SURFACE ACTIVE AGENT.
APPLY UNIVERSAL GELLING AGENT TO IMMOBILIZE TRAPPED SPILL AND INCREASE
EFFICIENCY OF REMOVAL.

IF DISSOLVED, AT A CONCENTRATION OF 10 PPM OR GREATER, APPLY ACTIVATED CARBON
AT TEN TIMES THE AMOUNT THAT HAS BEEN SPILLED.
USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.
USE MECHANICAL DREDDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND
PRECIPITATES.

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER
SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ADSORBENT
MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL FOR LARGER SPILLS, DISPOSE
FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARDOUS
AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARDOUS AREA AND RESTRICT ENTRY.
REPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES
THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS
SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE
AND THE STATE EMERGENCY RESPONSE COMMISSION (SERC) UNDER CERCLA AND RCRA.
THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RELEASE OF
CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802, OR (202) 426-2675 IN THE
METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION TO MEET PUBLISHED
EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS
BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO
CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF
LABOR, NIOSH SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND
IN THE WORK PLACE. THE WORKING LIMITS OF THE RESPIRATOR AND
BE JOINTLY APPROVED BY THE NATIONAL MINING HEALTH AND SAFETY COMMISSION
HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

XYLENE (O-, M-, AND P-ISOMERS):
1000 PPM - ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
ANY POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR
CARTRIDGE(S).
ANY SELF-CONTAINED BREATHING APPARATUS.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A
CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CARTRIDGE.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.
FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS
OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.
ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A
PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN
AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND
OR OTHER POSITIVE-PRESSURE MODE.
CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT
TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.
GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS

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EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT
EYE CONTACT WITH THIS SUBSTANCE.
EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY
BE EXPOSED TO THIS SUBSTANCE, AN EYE WASH SHOULD BE PROVIDED FOR EMERGENCY USE.
FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.
CREATION DATE: 11/14/84 REVISION DATE: 05/16/81

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ATTACHMENT I
EMISSION UNITS TABLE

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)
 New Equipment: Blue

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 (See Note)
009	104.014	Incinerator	1977	10 MMBtu/hr	Existing	Scrubber
010	104.014	Incinerator Scrubber	1977	80 gpm	Existing	None
108	104.014	██████████ Tank	1961	1,900 gal	Existing	Incinerator
108L	104.014	██████████ Tank Loading	2007	NA	Existing	Incinerator
230	104.014	Double Cone Dryer	2016	165 CF	New	Incinerator Scrubber
232C	104.014	██████████ Condenser	2016	NA	New	Incinerator Scrubber
232	104.014	Reactor █	2016	2,000 gal	New	Incinerator Scrubber
233	104.014	Reactor █	2016	1,000 gal	New	Incinerator
234	107.03	DCD Super Sack/Drum Loading	2016	NA	New	117 Dust Collector
235	107.03	DCD Super Sack/Drum Unloading	2016	NA	New	117 Dust Collector

NOTE: The control being utilized depends on the material being processed/produced. The specific controls being utilized during different production runs are provided in the calculations.

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

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 (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
104.014	Upward Vertical	*	Various	009, 010	Incinerator*, Incinerator Scrubber	NA	NA	VOC p-Xylene Toluene	35.02 0.02 35.00	3.37 0.01 3.06	0.46 0.02 0.44	0.03 0.01 0.02	Gas	EE	NA
107.03	Upward Vertical	234, 235	DCD Super Sack/Drum Loading/Unloading	117	Dust Collector	NA	NA	PM PM10 PM2.5	0.26 0.12 0.02	0.04 0.02 0.01	0.26 0.12 0.02	0.04 0.02 0.01	Solid	AP-42	NA

* - Sources venting through this emission point during T2960 or SR-1000 production include 009, 010, 108, 108L, 230, 232C, 232, and 233.

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 (i.e., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/week).

³ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, 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 the 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/m³) at standard conditions (68 °F

and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO₂, use units of ppmv (See 45CSR10).

ATTACHMENT L
EMISSION UNIT DATA SHEETS

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*): Various (See Attachment I)

1. Name or type and model of proposed affected source:

Catofin: Catofin 310 is a powdery catalyst that is mixed with ascorbic acid and water to regenerate it. The final product is dried, packaged, and sent off-site for use in various industrial applications.

T2960: T2960 is a solid, powdered catalyst produced from the reaction of a precursor catalyst and tetraethyl orthosilicate. The dried product is shipped off-site for use in other processes. The existing incinerator and incinerator scrubber will be used for emission control.

SR-1000: SR-1000 is a proprietary product brought on site to dry and remove toluene, and is used to generate catalysts. The existing incinerator will be used for emission control.

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:

Catofin: Total Batches per year: 182; Single Batch Time: 40 hr. (approximated)
[REDACTED]

T2960: Total Batches per year: 100; Single Batch Time: 16 hr.
[REDACTED]

SR-1000: Total Batches per year: 60; Single Batch Time: 42 hr.
[REDACTED]

4. Name(s) and maximum amount of proposed material(s) produced per hour:

Catofin: 4,000 lb. Catofin 331
T2960: 2,310 lb T-2865 Catalyst
SR-1000: 1,430 lb. SR-1000

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

No reactions generate additional pollutants.

* 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:

NA

(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: NA

(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

24

Days/Week

7

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		lb/hr	grains/ACF
b.	SO ₂		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM ₁₀	0.12	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	35.02	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	p-Xylene	0.02	lb/hr	grains/ACF
	Toluene	35.00	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

Amount of Catofin, T2960, and SR-1000 produced.

REPORTING

None

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

NA

ATTACHMENT M

AIR POLLUTION CONTROL DEVICE SHEETS

22. Type of Pollutant(s) to be collected (if particulate give specific type):

23. Is there any SO₃ in the emission stream? No Yes SO₃ content: _____ ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

Pollutant	IN		OUT	
	lb/hr	grains/acf	lb/hr	grains/acf

25. Complete the table:

Particulate Size Range (microns)	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
	Weight % for Size Range	Weight % for Size Range
0 - 2		
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		

26. How is filter monitored for indications of deterioration (e.g., broken bags)?

- Continuous Opacity
- Pressure Drop
- Alarms-Audible to Process Operator
- Visual opacity readings, Frequency:
- Other, specify:

27. Describe any recording device and frequency of log entries:

28. Describe any filter seeding being performed:

29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

30. Describe the collection material disposal system:

31. Have you included **Baghouse Control Device** in the Emissions Points Data Summary Sheet?

32. 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:

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.

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

ATTACHMENT N
SUPPORTING EMISSIONS CALCULATIONS

By: JJD
Date: 06/20/2016

Checked By: PEW
Date: 06/24/2016

T2960

Pollutant	Uncontrolled		Controlled	
	pph	tpy	pph	tpy
PM	0.16	0.01	0.16	0.01
PM10	0.08	0.004	0.08	0.004
PM2.5	0.01	0.001	0.01	0.001
VOC	4.06	0.31	0.17	0.02

SR-1000

Pollutant	Uncontrolled		Controlled	
	pph	tpy	pph	tpy
PM	0.24	0.01	0.24	0.01
PM10	0.11	0.003	0.11	0.003
PM2.5	0.02	0.0005	0.02	0.0005
VOC	35.02	3.06	0.46	0.02
p-Xylene	0.02	0.003	0.02	0.0005
Toluene	35.00	3.06	0.44	0.02
Total HAPs	35.02	3.06	0.46	0.02

Catofin

Pollutant	Uncontrolled		Controlled	
	pph	tpy	pph	tpy
PM	0.26	0.02	0.26	0.02
PM10	0.12	0.011	0.12	0.01
PM2.5	0.02	0.002	0.02	0.00

Maximum Emissions

Pollutant	Uncontrolled		Controlled	
	pph	tpy	pph	tpy
PM	0.26	0.04	0.26	0.04
PM10	0.12	0.02	0.12	0.02
PM2.5	0.02	0.01	0.02	0.01
VOC	35.02	3.37	0.46	0.03
p-Xylene	0.02	0.01	0.02	0.01
Toluene	35.00	3.06	0.44	0.02
Total HAPs	35.02	3.07	0.46	0.03

(1) Hourly emissions are taken from the highest hourly rate for each pollutant between the TEOS, SR-1000, and Catofin processes.

Optima Belle, LLC
Double Cone Dryer Installation

Potesta & Associates, Inc.
Project Number 0101-14-0162-010

By: JJD
Date: 06/20/2016

Checked By: PEW
Date: 06/24/2016

Total Emissions Estimate for a Campaign of T2960

Number of Batches in Process (1)
Number of Batches Per Year

1 No.
100 No.

Total Emissions

Pollutant	Uncontrolled		Controlled	
	pph (Max Rate)(1)	tpy (100 batches)	pph (Max Rate)(1)	tpy (100 batches)
PM	0.16	0.01	0.16	0.01
PM10	0.08	0.004	0.08	0.004
PM2.5	0.01	0.001	0.01	0.001
VOC	4.06	0.31	0.17	0.02

(1) Hourly emissions rate is the max rate of emissions based on Emissions Master multiplied by the number of batches that could be in process. The batches will not be at the same point within the process. This is a conservative estimate that all batches will be emitting the maximum hourly emissions value for a single batch.

Product: T2960
 Process Name: T2960
 Production Quantity:
 Process Cycle Time: 18.0 hr
 Date: 4/18/2016
 File: C:\Users\Jhook\Desktop\Products\TEOS\TEOS 1.emm
 Comments:

Compound	Activities Emitting	Emissions		Emissions
		Uncontrolled (lb)	Controlled (lb)	Percent Removal
Air	2	1.810309117	1.810309117	0
Ethanol	6	6.291635791	0.346374043	94.49469018
Nitrogen	14	86.39762143	86.39762143	0
T-2779	5	0	0	
T-2865	6	0	0	
Tetraethyl Orthosilicate	8	3.12123079	0.214456942	93.12909053
Water	11	0	1.193334086	
Total VOC		6.291635791	0.346374043	

Compound	Process Cycle	Compound Emission	Compound Emission	Uncontrolled	Max Rate (lb/hr)	Controlled
	Average (lb/hr)	Hours	Average (lb/hr)	(lb/hr)	Within 1 hour	(lb/hr)
Air	0.100572729	8	0.22628864	0.452577279	0.452577279	0.452577279
Ethanol	0.019243002	12.5	0.027709923	4.059277139	0.170211415	0.170211415
Nitrogen	4.799867857	17.99944444	4.800016006	21.07732876	21.07732876	21.07732876
T-2779	0	3.5	0	0	0	0
T-2865	0	12.5	0	0	0	0
Tetraethyl Orthosilicate	0.011914275	14.5	0.014790134	2.151466467	0.092547795	0.092547795
Water	0.066296338	16.49944444	0.072325713	0	0.316778344	0.316778344
Total VOC	0.019243002	12.5	0.027709923	4.059277139	0.170211415	0.170211415

- (1) Process Cycle Average = Compound emission quantity / Total process cycle time in hours.
 (2) Compound Emission Average = Compound emission quantity / Compound emission time in hours.

Classification	Activities Emitting	Emissions		Emissions Percent Removal
		Uncontrolled (lb)	Controlled (lb)	
All Emissions	16	97.62079713	89.96209562	7.845358505
Acid	0	0	0	
Acid Gases	0	0	0	
Asbestos	0	0	0	
Base	0	0	0	
Biological	0	0	0	
CO	0	0	0	
Company List	0	0	0	
CR+6	0	0	0	
Dioxin	0	0	0	
ETG	0	0	0	
EVOS	0	0	0	
Exclude	0	0	0	
Gas	0	0	0	
HAP	0	0	0	
Hydrogen	0	0	0	
LOC	0	0	0	
Metal	0	0	0	
NOx	0	0	0	
Other	0	0	0	
Particulate	0	0	0	
Pb	0	0	0	
PM10	0	0	0	
PM2.5	0	0	0	
Radionuclide	0	0	0	
SO2	0	0	0	
TSP	0	0	0	
TVOS	0	0	0	
VCM	0	0	0	
VOC	6	6.291635791	0.346374043	94.49469018
Ethanol	6	6.291635791	0.346374043	94.49469018
Unclassified	16	91.32916134	89.61572157	1.876114635
Air	2	1.810309117	1.810309117	0
Nitrogen	14	86.39762143	86.39762143	0
T-2779	5	0	0	
T-2865	6	0	0	
Tetraethyl Orthosilicate	8	3.12123079	0.214456942	93.12909053
Water	11	0	1.193334086	

Classification	Process Cycle	Emission	Emission	Max Rate (lb/hr)
	Average (lb/hr)	Hours	Average (lb/hr)	Within 1 hour
All Emissions	4.997894201	17.99888889	4.998202732	21.41968104
Acid	0	0	0	0
Acid Gases	0	0	0	0
Asbestos	0	0	0	0
Base	0	0	0	0
Biological	0	0	0	0
CO	0	0	0	0
Company List	0	0	0	0
CR+6	0	0	0	0
Dioxin	0	0	0	0
ETG	0	0	0	0
EVOS	0	0	0	0
Exclude	0	0	0	0
Gas	0	0	0	0
HAP	0	0	0	0
Hydrogen	0	0	0	0
LOC	0	0	0	0
Metal	0	0	0	0
NOx	0	0	0	0
Other	0	0	0	0
Particulate	0	0	0	0
Pb	0	0	0	0
PM10	0	0	0	0
PM2.5	0	0	0	0
Radionuclide	0	0	0	0
SO2	0	0	0	0
TSP	0	0	0	0
TVOS	0	0	0	0
VCM	0	0	0	0
VOC	0.019243002	12.5	0.027709923	0.170211415
Unclassified	4.978651199	17.99888889	4.978958542	21.41562177

- (1) Process Cycle Average = Classification emission quantity / Total process cycle time in hours.
(2) Emission Average = Classification emission quantity / Classification emission time in hours.

Vessel	Vent ID	Device # 1	Device # 1 Temp (°C)	Device # 2	Device # 2 Temp (°C)
DCD-2	DCD-DC	DC-01	25		
DCD-2	DCD-DC	Incinerator (Bldg 216)	1500	Incinerator Scrubber	20
Drum 216					
Drum 216 (2)					
RX-7		Incinerator (Bldg 216)	1500	Incinerator Scrubber	20

Uncontrolled Emissions

Process: T2960

Emissions reported in Pounds.

Activity	Recipe Step	Vessel	Air	Ethanol	Nitrogen	T-2779	T-2865	Tetraethyl Orthosilicate	Water
1		DCD-2			2.1382	0			
2		DCD-2			0	0			
3		DCD-2			5.1572	0			
4		DCD-2			1.2794	0		1.84E-02	
5		DCD-2			0	0		0	
6		DCD-2		0.51717	18.727		0	0.19373	
7		DCD-2		1.0343	37.4539		0	0.38745	
8		DCD-2		4.0593	21.0773		0	2.1515	
9		DCD-2			0		0		
9		RX-7	0.90515	0.34042				0.1851	
10		RX-7		0	0			0	
11		DCD-2			0		0		
12		DCD-2			0				
12		Drum 216			0.56452		0		
13		RX-7			0				
13		Drum 216	0.90515	0.34042				0.1851	

Controlled Emissions

Process: T2960

Emissions reported in Pounds.

Activity	Recipe Step	Vessel	Air	Ethanol	Nitrogen	T-2779	T-2865	Tetraethyl Orthosilicate	Water
1		DCD-2			2.1382	0			
2		DCD-2			0	0			
3		DCD-2			5.1572	0			
4		DCD-2			1.2794	0			
5		DCD-2			0	0		1.84E-04	1.92E-02
6		DCD-2		5.17E-04	18.727		0	0	0
7		DCD-2		1.03E-03	37.4539		0	1.94E-03	0.28139
8		DCD-2		4.06E-03	21.0773		0	3.87E-03	0.56278
9		DCD-2			0		0	2.15E-02	0.31678
9		RX-7	0.90515	3.40E-04				0	0
10		RX-7		0	0			1.85E-03	1.32E-02
11		DCD-2			0		0	0	0
12		DCD-2			0				0
12		Drum 216			0.56452		0		0
13		RX-7			0				0
13		Drum 216	0.90515	0.34042				0.1851	

Description: Particulate emissions are generated through the drop of solid materials into process vessels.

Basis: AP-42 Equation 13.2.4-3 is used to generate emissions from this operation. No control factor for the building enclosure and dust collector is being claimed at this time without guidance from the WVDEP.

Compound	Number of Batches	Pounds per Batch (lb)	Tons per Campaign	U (mph)	M (%)	Emissions (lb/ton)			Emissions (lb/hr)			Emissions (tpy)		
						PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
T-2779	100	2354	117.7	7.0	0.25	0.0674	0.0319	0.0048	0.0793	0.0375	0.0057	0.00397	0.00188	0.00028
Product Drumout	100	2354	117.7	7.0	0.25	0.0674	0.0319	0.0048	0.0793	0.0375	0.0057	0.00397	0.00188	0.00028
Total						0.1587	0.0750	0.0114	0.0079	0.0038	0.0006			

(1) WVDEP allows for 7 mph to be claimed for wind speed.

From AP-42:

$$E = k(0.0032) \frac{\left(\frac{U}{3}\right)^{1.5}}{\left(\frac{M}{2}\right)^{1.4}} \text{ (pound (lb)/hour)}$$

where:

- E = emission factor
- k = particle size multiplier (dimensionless)
- U = mean wind speed, meters per second (m/s) (miles per hour (mph))
- M = material moisture content (%)

From AP-42:

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 10 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053*

* Multiplier for < 2.5 µm taken from Reference 14.

By: JJD
 Date: 06/20/2016

Checked By: PEW
 Date: 06/24/2016

Total Emissions Estimate for a Campaign of SR-1000

Number of Batches in Process (1)

1 No.

Number of Batches Per Year

60 No.

Total Emissions

Pollutant	Uncontrolled		Controlled	
	pph (Max Rate)(1)	tpy (60 batches)	pph (Max Rate)(1)	tpy (60 batches)
PM	0.24	0.01	0.24	0.01
PM10	0.11	0.003	0.11	0.003
PM2.5	0.02	0.0005	0.02	0.0005
VOC	35.02	3.06	0.46	0.02

HAPs

p-Xylene	0.02	0.003	0.02	0.001
Toluene	35.00	3.06	0.44	0.02

(1) Hourly emissions rate is the max rate of emissions based on Emissions Master multiplied by the number of batches that could be in process. The batches will not be at the same point within the process. This is a conservative estimate that all batches will be emitting the maximum hourly emissions value for a single batch.

Product: SR-1000
 Process Name: SR-1000
 Production Quantity:
 Process Cycle Time: 42.0 hr
 Date: 4/21/2016
 File: C:\Users\Jhook\Desktop\Products\SR-1000\SR-1000 1.emm
 Comments:

Compound	Activities Emitting	Emissions		Emissions Controlled (lb)	Emissions Percent Removal
		Uncontrolled (lb)			
Air	3	1.095970029		1.095970029	0
Nitrogen	7	337.0565853		337.0565853	0
p-Xylene	3	0.053116167		0.0177408	66.6
SR-1000	5	0		0	
Toluene	5	101.7309211		0.541390705	99.4678209
Total HAPs		101.7840373		0.559131505	
Total VOC		101.7840373		0.559131505	

Compound	Process Cycle	Compound Emission		Uncontrolled (lb/hr)	Max Rate (lb/hr) Within 1 hour	Controlled (lb/hr)
	Average (lb/hr)	Hours	Average (lb/hr)			
Air	0.026094525	2	0.547985015	0.547985015	0.547985015	0.547985015
Nitrogen	8.025156793	41.99833333	8.025475264	312.6460023	9.725615884	312.6460023
p-Xylene	0.0004224	2	0.0088704	0.017705389	0.017705389	0.017705389
SR-1000	0	40.99805556	0	0	0	0
Toluene	0.012890255	40.99805556	0.013205278	35.00000000	0.440099884	0.440099884
Total HAPs	0.013312655	42.99805556	0.022075678	35.01770539	0.457805273	0.457805273
Total VOC	0.013312655	42.99805556	0.022075678	35.01770539	0.457805273	0.457805273

- (1) Process Cycle Average = Compound emission quantity / Total process cycle time in hours.
 (2) Compound Emission Average = Compound emission quantity / Compound emission time in hours.

Classification	Activities Emitting	Emissions		Emissions Percent Removal
		Uncontrolled (lb)	Controlled (lb)	
All Emissions	10	439.9365926	338.7116868	23.00897617
Acid	0	0	0	
Acid Gases	0	0	0	
Asbestos	0	0	0	
Base	0	0	0	
Biological	0	0	0	
CO	0	0	0	
Company List	0	0	0	
CR+6	0	0	0	
Dioxin	0	0	0	
ETG	0	0	0	
EVOS	0	0	0	
Exclude	0	0	0	
Gas	0	0	0	
HAP	8	101.7840373	0.559131505	99.45066877
p-Xylene	3	0.053116167	0.0177408	66.6
Toluene	5	101.7309211	0.541390705	99.4678209
Hydrogen	0	0	0	
LOC	0	0	0	
Metal	0	0	0	
NOx	0	0	0	
Other	0	0	0	
Particulate	0	0	0	
Pb	0	0	0	
PM10	0	0	0	
PM2.5	0	0	0	
Radionuclide	0	0	0	
SO2	0	0	0	
TSP	0	0	0	
TVOS	0	0	0	
VCM	0	0	0	
VOC	8	101.7840373	0.559131505	99.45066877
p-Xylene	3	0.053116167	0.0177408	66.6
Toluene	5	101.7309211	0.541390705	99.4678209
Unclassified	10	338.1525553	338.1525553	0
Air	3	1.095970029	1.095970029	0
Nitrogen	7	337.0565853	337.0565853	0
SR-1000	5	0	0	

Classification	Process Cycle	Emission	Emission	Max Rate (lb/hr)
	Average (lb/hr)	Hours	Average (lb/hr)	Within 1 hour
All Emissions	8.064563972	41.99777778	8.064990691	10.29253461
Acid	0	0	0	0
Acid Gases	0	0	0	0
Asbestos	0	0	0	0
Base	0	0	0	0
Biological	0	0	0	0
CO	0	0	0	0
Company List	0	0	0	0
CR+6	0	0	0	0
Dioxin	0	0	0	0
ETG	0	0	0	0
EVOS	0	0	0	0
Exclude	0	0	0	0
Gas	0	0	0	0
HAP	0.013312655	41.99833333	0.013313183	0.440099884
Hydrogen	0	0	0	0
LOC	0	0	0	0
Metal	0	0	0	0
NOx	0	0	0	0
Other	0	0	0	0
Particulate	0	0	0	0
Pb	0	0	0	0
PM10	0	0	0	0
PM2.5	0	0	0	0
Radionuclide	0	0	0	0
SO2	0	0	0	0
TSP	0	0	0	0
TVOS	0	0	0	0
VCM	0	0	0	0
VOC	0.013312655	41.99833333	0.013313183	0.440099884
Unclassified	8.051251317	41.99777778	8.051677332	10.2736009

- (1) Process Cycle Average = Classification emission quantity / Total process cycle time in hours.
(2) Emission Average = Classification emission quantity / Classification emission time in hours.

Vessel	Vent ID	Device # 1	Device # 1 Temp (°C)
DR-1			
DR-1		Incinerator (Bldg 216)	1500
FW Tank		Incinerator (Bldg 216)	1500
Virtual Tanker		Incinerator (Bldg 216)	1500
VPSP-1			

Uncontrolled Emissions

Process: SR-1000

Emissions reported in Pounds.

Activity	Recipe Step	Vessel	Air	Nitrogen	p-Xylene	SR-1000	Toluene
1		DR-1		4.5257		0	0.4401
2		DR-1		312.1161		0	30.3518
3		VPSP-1	0.54799		1.77E-02		
4		DR-1		3.8454		0	0.93906
5		DR-1		16.0395		0	70
6		DR-1		0		0	0
7		VPSP-1	0				
7		FW Tank		0.52989	1.77E-02		
8		FW Tank		0			
8		Virtual Tar	0.54799		1.77E-02		

Controlled Emissions

Process: SR-1000

Emissions reported in Pounds.

Activity	Recipe Step	Vessel	Air	Nitrogen	p-Xylene	SR-1000	Toluene
1		DR-1		4.5257		0	0.4401
2		DR-1		312.1161		0	3.04E-02
3		VPSP-1	0.54799		1.77E-02		
4		DR-1		3.8454		0	9.39E-04
5		DR-1		16.0395		0	7.00E-02
6		DR-1		0		0	0
7		VPSP-1	0				
7		FW Tank		0.52989	1.77E-05		
8		FW Tank		0			
8		Virtual Tanker	0.54799		1.77E-05		

Optima Belle, LLC
 SR-1000
 PM Drop Emissions

Description: Particulate emissions are generated through the drop of solid materials into process vessels.

Basis: AP-42 Equation 13.2.4-3 is used to generate emissions from this operation. No control factor for the building enclosure and dust collector is being claimed at this time without guidance from the WVDEP.

Compound	Number of Batches	Pounds per Batch (lb)	Tons per Campaign (ton)	U (mph)	M (%)	Emissions (lb/ton)			Emissions (lb/hr)			Emissions (tpy)		
						PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
SR-1000 (Charge)	60	3500	105	7.0	0.25	0.0674	0.0319	0.0048	0.1180	0.0558	0.0084	0.00354	0.00167	0.00025
SR-1000 (Drumout)	60	3500	105	7.0	0.25	0.0674	0.0319	0.0048	0.1180	0.0558	0.0084	0.00354	0.00167	0.00025
Total									0.2359	0.1116	0.0169	0.0071	0.0033	0.0005

(1) WVDEP allows for 7 mph to be claimed for wind speed.

From AP-42:

$$E = k(0.0032) \frac{\left(\frac{U}{3}\right)^{1.5}}{\left(\frac{M}{2}\right)^{1.4}} \text{ (pound (lb)/ton)}$$

where:

- E = emission factor
- k = particle size multiplier (dimensionless)
- U = mean wind speed, meters per second (m/s) (miles per hour (mph))
- M = material moisture content (%)

From AP-42:

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows.

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 10 μm	< 15 μm	< 10 μm	< 5 μm	< 2.5 μm
0.74	0.44	0.35	0.26	0.053*

*Multiplier for < 2.5 μm taken from Reference 14

Product:
 Process Name:
 Production Quantity:
 Process Cycle Time: 8783.9997 hr
 Date: 5/6/2016
 File: untitled.emm
 Comments:

Compound	Activities Emitting	Emissions		Emissions	Percent Removal
		Uncontrolled (lb)	Controlled (lb)		
Nitrogen	1	219.084783	219.084783		0
p-Xylene	1	3.324177536	0.003324178		99.9
Toluene	1	6.239533025	0.006239533		99.9
Total HAPs		9.563710561	0.009563711		
Total VOC		9.563710561	0.009563711		

Compound	Process Cycle	Compound Emission	Uncontrolled	Compound Emission	Max Rate (lb/hr)
	Average (lb/hr)	Hours	(lb/hr)	Average (lb/hr)	Within 1 hour
Nitrogen	0.024941347	8783.999722	0.024941347	0.024941347	0.024941347
p-Xylene	3.78436E-07	8783.999722	0.000378436	3.78436E-07	3.78436E-07
Toluene	7.10329E-07	8783.999722	0.000710329	7.10329E-07	7.10329E-07
Total HAPs	1.08876E-06		0.001088765	1.08876E-06	1.08876E-06
Total VOC	1.08876E-06		0.001088765	1.08876E-06	1.08876E-06

- (1) Process Cycle Average = Compound emission quantity / Total process cycle time in hours.
 (2) Compound Emission Average = Compound emission quantity / Compound emission time in hours.

Classification	Activities Emitting	Emissions		Emissions
		Uncontrolled (lb)	Controlled (lb)	Percent Removal
All Emissions	1	228.6484935	219.0943467	4.178530418
Acid	0	0	0	
Acid Gases	0	0	0	
Asbestos	0	0	0	
Base	0	0	0	
Biological	0	0	0	
CO	0	0	0	
Company List	0	0	0	
CR+6	0	0	0	
Dioxin	0	0	0	
ETG	0	0	0	
EVOS	0	0	0	
Exclude	0	0	0	
Gas	0	0	0	
HAP	1	9.563710561	0.009563711	99.9
p-Xylene	1	3.324177536	0.003324178	99.9
Toluene	1	6.239533025	0.006239533	99.9
Hydrogen	0	0	0	
LOC	0	0	0	
Metal	0	0	0	
NOx	0	0	0	
Other	0	0	0	
Particulate	0	0	0	
Pb	0	0	0	
PM10	0	0	0	
PM2.5	0	0	0	
Radionuclide	0	0	0	
SO2	0	0	0	
TSP	0	0	0	
TVOS	0	0	0	
VCM	0	0	0	
VOC	1	9.563710561	0.009563711	99.9
p-Xylene	1	3.324177536	0.003324178	99.9
Toluene	1	6.239533025	0.006239533	99.9
Unclassified	1	219.084783	219.084783	0
Nitrogen	1	219.084783	219.084783	0

Classification	Process Cycle	Emission	Emission	Max Rate (lb/hr)
	Average (lb/hr)	Hours	Average (lb/hr)	Within 1 hour
All Emissions	0.024942436	8783.999722	0.024942436	0.024942436
Acid	0	0	0	0
Acid Gases	0	0	0	0
Asbestos	0	0	0	0
Base	0	0	0	0
Biological	0	0	0	0
CO	0	0	0	0
Company List	0	0	0	0
CR+6	0	0	0	0
Dioxin	0	0	0	0
ETG	0	0	0	0
EVOS	0	0	0	0
Exclude	0	0	0	0
Gas	0	0	0	0
HAP	1.08876E-06	8783.999722	1.08876E-06	1.08876E-06
Hydrogen	0	0	0	0
LOC	0	0	0	0
Metal	0	0	0	0
NOx	0	0	0	0
Other	0	0	0	0
Particulate	0	0	0	0
Pb	0	0	0	0
PM10	0	0	0	0
PM2.5	0	0	0	0
Radionuclide	0	0	0	0
SO2	0	0	0	0
TSP	0	0	0	0
TVOS	0	0	0	0
VCM	0	0	0	0
VOC	1.08876E-06	8783.999722	1.08876E-06	1.08876E-06
Unclassified	0.024941347	8783.999722	0.024941347	0.024941347

- (1) Process Cycle Average = Classification emission quantity / Total process cycle time in hours.
(2) Emission Average = Classification emission quantity / Classification emission time in hours.

Vessel	Vent ID	Device # 1	Device # 1 Temp (°C)
FWTank		Incinerator (Bldg 216)	1500

Uncontrolled Emissions

Process:

Emissions reported in Pounds.

Activity	Recipe Step	Vessel	Nitrogen	p-Xylene	Toluene
1		FWTank	219.0848	3.3242	6.2395

Controlled Emissions

Process:

Emissions reported in Pounds.

Activity	Recipe Step	Vessel	Nitrogen	p-Xylene	Toluene
1		FWTank	219.0848	3.32E-03	6.24E-03

Activity	Recipe Step	Type	Activity Title
1		Storage	FW Tank Storage

Optima Belle, LLC
 Catofin - Ascorbic Acid
 PM Drop Emissions

Description: Particulate emissions are generated through the drop of solid materials into process vessels.

Basis: AP-42 Equation 13.2.4-3 is used to generate emissions from this operation. No control factor for the building enclosure and dust collector is being claimed at this time without guidance from the WVDEP.

Compound	Number of Batches	Pounds per Batch (lb)	Tons per Campaign	U (mph) (1)	M (%)	Emissions (lb/ton)			Emissions (lb/hr)			Emissions (tpy)		
						PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
Catofin (Charge)	182	3853	350.63	7.0	0.25	0.0674	0.0319	0.0048	0.1299	0.0614	0.0093	0.01182	0.00559	0.00085
Ascorbic Acid (Charge)	182	55	5.01	7.0	0.25	0.0674	0.0319	0.0048	0.0019	0.0009	0.0001	0.00017	0.00008	0.00001
Catofin (Drum Out)	182	3853	350.63	7.0	0.25	0.0674	0.0319	0.0048	0.1299	0.0614	0.0093	0.01182	0.00559	0.00085
Total									0.2616	0.1237	0.0187	0.0238	0.0113	0.0017

(1) WVDEP allows for 7 mph to be claimed for wind speed.

From AP-42:

$$E = k(0.0032) \left(\frac{U}{5} \right)^{1.5} \left(\frac{M}{2} \right)^{1.5} \text{ (pound (lb)/hour)}$$

where:

- E = emission factor
- k = particle size multiplier (dimensionless)
- U = mean wind speed, meters per second (m/s) (miles per hour (mph))
- M = material moisture content (%)

From AP-42:

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 10 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053*

* Multiplier for <2.5 µm taken from Reference 1-4.

ATTACHMENT O

**MONITORING/RECORDKEEPING/REPORTING/TESTING
PLANS**

ATTACHMENT O

MONITORING/RECORDKEEPING/ REPORTING/TESTING PLANS

Optima Belle, LLC plans to follow the monitoring, recordkeeping, reporting, and testing required by the issued permit.

ATTACHMENT P
PUBLIC NOTICE

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is given that Optima Belle, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Regulation 13 Class II Administrative Update to operate the facility on W. DuPont Avenue near Belle, Kanawha County, West Virginia. The latitude and longitude coordinates are: 38.239659 and -81.551886.

The applicant estimates the potential to discharge the following Regulated Air Pollutants from the facility will be: PM of 0.04 tons per year (tpy); PM10 of 0.02 tpy; PM2.5 of 0.01 tpy; VOC of 0.03 tpy; Toluene of 0.02 tpy; Xylene of 0.01 tpy and total HAPS of 0.03 tpy.

Startup of operation is planned to begin on or about the 1st day of August, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 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 1250, during normal business hours.

Dated this the **(PLEASE INSERT DAY)** day of July, 2016.

By: Optima Chemical Group, LLC
K. Gene Williams
President
200 Willacoochee Highway
Douglas, Georgia 31535

ATTACHMENT Q
BUSINESS CONFIDENTIAL CLAIMS

Precautionary Notice Claims of Confidentiality

The person submitting this information may assert that some or all of the information submitted is entitled to confidential treatment as provided by West Virginia Legislative Rule 45CSR31, entitled Confidential Information. Information covered by such a claim will be disclosed by the Division of Air Quality (DAQ) only to the extent, and by means of the procedures, set forth in 45CSR31. Please contact the West Virginia Secretary of State's Office at 304/558-6000 to obtain a copy of 45CSR31 in order to ensure that all required procedures are followed.

Information concerning the types and amounts of air pollutants discharged as that term is defined in WVCSR §45-31-2.4, shall not be claimed as confidential.

Any claim of confidentiality shall be made in accordance with the requirements of 45CSR31 and must accompany the information at the time it is submitted to the DAQ. **If no claim of confidentiality is made at the time of submission or is not made in accordance with the requirements of 45CSR31, the DAQ may make the information available to the public without further notice.**

Included below are procedures to be followed in submitting information claimed as confidential. This information is intended to assist a person with claiming confidential information and is not meant to relieve a person of his/her obligation to review the provisions of 45CSR31 and to comply with such rule. The procedures are as follows:

1. Indicate clearly the items of information claimed confidential by marking each page with the term Claimed Confidential, with the date of such claim of confidentiality. With the exception of documents of a size greater than 8½" x 14", information claimed confidential must be submitted on colored paper.
2. Include a cover document which justifies the claim of confidentiality in accordance with the specific criteria under WVCSR §45-31-4.1. A sample cover document is attached for your information and use. The cover document will be available for public disclosure and must include the following information:
 - (a) The identity of the person making the submission of information claimed confidential;
 - (b) The reason for the submission of information;
 - (c) The name, an address in the State of West Virginia and telephone number of the designee who shall be contacted in accordance with 45CSR31;
 - (d) Identification of each segment of information within each page that is submitted as confidential and the justification for each segment claimed confidential, including the criteria under WVCSR 45-31-4.1;

- (e) The period of time for which confidential treatment is desired (e.g., until a certain date, until the occurrence of a specified event or permanently); and,
 - (f) Signature of a responsible official or an authorized representative of such person.
3. At the same time as the information claimed confidential is submitted to the DAQ on colored paper, a complete set of the information, including the cover document previously required under paragraph 2, must be submitted on white paper with the information claimed to be confidential blacked or whited out and the words Redacted Copy Claim of Confidentiality marked clearly on each such page, so that the information is suitable for public disclosure. In the case of drawings and blueprints, mark each page with the words Redacted Copy Claim of Confidentiality, include the title or legend of the drawing, and black or white out the information claimed confidential. The redacted page may be 8½" x 11" in size.
4. In the case of a permit application or supplemental information to an application, DAQ requires an applicant to submit three (3) copies of the application. Of those three (3) copies, one (1) must be a complete set of the application containing the information claimed confidential on colored paper and two (2) must be redacted copies. The DAQ reserves the right, however, to request additional copies of the information containing the confidential material.

Attachment

Attachment Q Business Confidential Claim

Company Name	Optima Belle, LLC	Responsible Official		
Company Address	900 W. DuPont Avenue Belle, WV 25015	Confidential Information Designee in State of WV	Name	K. Gene Williams
			Title	President
			Address	200 Willacoochee Highway Douglas, GA 31535
Person/Title Submitting Confidential Information	K. Gene Williams		Phone	(912) 384-5101
	President		Fax	(912) 384-6330

Reason for Submittal Of Confidential Information : R13 Class II Administrative Update

Identification of Confidential Information	Rationale for Confidential Claim 45CSR31-4.1a-e	Confidential Treatment Time Period
<ul style="list-style-type: none"> -Equipment design and capacity information -Process descriptions -Process flow diagrams -Site Map 	<p>a. Information initially claimed confidential by E.I. Dupont De Nemours and Company, Inc. and The Chemours Company FC, LLC. Information continues to be confidential under Optima Belle, LLC. The claim has not expired by its term, or been waived or withdrawn. The confidential information should continue to be maintained as such for an indefinite time period.</p> <p>See attached for b-e</p>	Permanent

Responsible Official Signature:	
Responsible Official Title:	President
Date Signed:	7/15/16

NOTE: Must be signed and dated in **BLUE INK**.

Rationale for Confidentiality Claim (Cont.)

- b. Information claimed confidential is not available to the general public. Within the company, Optima Belle, LLC (Optima) distributes technical information on a need-to-know basis and has used its business confidentiality policy to prevent inadvertent dissemination of information. This policy includes:
- * Marking of business confidential documents,
 - * Limited distribution of documents,
 - * Shredding of confidential documents before disposal.

Employees are aware of the competitive nature of their business and are trained in guarding confidential information.

- c. Information revealing the process technology in this submittal is not reasonably obtainable by persons other than Optima employees who need to know. To maintain the confidentiality of such information, Optima employees involved with confidential information sign a confidentiality agreement.
- d. There is no statute that has been reviewed that requires disclosure of information claimed to be confidential.
- e. Optima claims business confidentiality protection for the information submitted since disclosure would allow competent engineers within a competitor's company to determine the manner or process by which Optima produces this product and would provide competitors information without paying for technology or conducting research and development necessary to obtain the technology.

ATTACHMENT S

TITLE V PERMIT REVISION INFORMATION

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:	
<input type="checkbox"/> SIP	<input type="checkbox"/> FIP
<input checked="" type="checkbox"/> Minor source NSR (45CSR13)	<input type="checkbox"/> PSD (45CSR14)
<input type="checkbox"/> NESHAP (45CSR15)	<input type="checkbox"/> Nonattainment NSR (45CSR19)
<input type="checkbox"/> Section 111 NSPS (Subpart(s) _____)	<input type="checkbox"/> Section 112(d) MACT standards (Subpart(s) _____)
<input type="checkbox"/> Section 112(g) Case-by-case MACT	<input type="checkbox"/> 112(r) RMP
<input type="checkbox"/> Section 112(i) Early reduction of HAP	<input type="checkbox"/> Consumer/commercial prod. reqts., section 183(e)
<input type="checkbox"/> Section 129 Standards/Reqts.	<input type="checkbox"/> Stratospheric ozone (Title VI)
<input type="checkbox"/> Tank vessel reqt., section 183(f)	<input type="checkbox"/> Emissions cap 45CSR§30-2.6.1
<input type="checkbox"/> NAAQS, increments or visibility (temp. sources)	<input type="checkbox"/> 45CSR27 State enforceable only rule
<input type="checkbox"/> 45CSR4 State enforceable only rule	<input type="checkbox"/> Acid Rain (Title IV, 45CSR33)
<input type="checkbox"/> Emissions Trading and Banking (45CSR28)	<input type="checkbox"/> Compliance Assurance Monitoring (40CFR64) ⁽¹⁾
<input type="checkbox"/> NO _x Budget Trading Program Non-EGUs (45CSR1)	<input type="checkbox"/> 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:	
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.	

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.

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
R13-0882K	Not issued as of 6/22/2016	None
R13-0882J	05/18/2016	None
R13-0882I	03/04/2016	CO-R21-97-31

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
R13-0882 (previous versions)	Various	None
	/ /	

6. Change in Potential Emissions

Pollutant	Change in Potential Emissions (+ or -), TPY
VOC	0.03
PM/PM10/PM2.5	0.04/0.02/0.01
p-Xylene	0.01
Toluene	0.02

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)

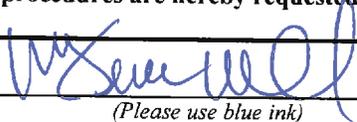
Note: This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:

- 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):


(Please use blue ink)

Date:

7 / 15 / 16
(Please use blue ink)

Named (typed):

K. Gene Williams

Title:

President

Note: Please check if the following included (if applicable):

Compliance Assurance Monitoring Form(s)

Suggested Title V Draft Permit Language

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