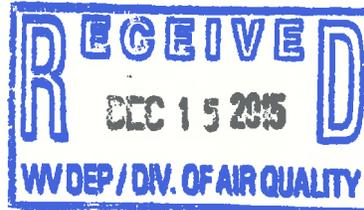


609 West Main Street • P.O. Drawer 190 • Clarksburg, WV 26302-0190  
304.624.9700 • 304.622.0981 • 304.842.3325 • <http://www.msesinc.com>  
Office Fax 24 Hour World Wide Web

December 3, 2015  
Project No. 15-358



Permits Section  
WV DEP  
Division of Air Quality  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304

**Armstrong World Industries, Inc. – Millwood Plant  
Millwood, WV  
45CSR13 Permit Determination Application**

Please find enclosed one copy of a 45CSR13 permit determination application for Armstrong World Industries, Inc. (Armstrong).

Armstrong is providing this permit determination to identify the existing exhaust ventilation originally installed for heat dissipation and the additional future exhaust ventilation fans planned for installation along with the potential formaldehyde emissions associated with those exhaust fans.

Questions regarding this application should be directed to me at (304)624-9700 or [brian.woods@msesinc.com](mailto:brian.woods@msesinc.com) or John Keeling at 304-624-9700 or [john@msesinc.com](mailto:john@msesinc.com).

Sincerely,

Brian R. Woods  
Senior Safety/Environmental Specialist

cc: Kendra Hersman  
Armstrong World Industries, Inc.

Enclosure



WEST VIRGINIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 DIVISION OF AIR QUALITY  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304  
 Phone: (304) 926-0475  
 www.dep.wv.gov/daq

**PERMIT DETERMINATION FORM  
(PDF)**

FOR AGENCY USE ONLY: PLANT I.D. # \_\_\_\_\_  
 PDF # \_\_\_\_\_ PERMIT WRITER: \_\_\_\_\_

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):  
 Armstrong World Industries, Inc.

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):  
 Armstrong Millwood Plant

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE:  
 3 2 7 9 9 3

4A. MAILING ADDRESS:  
 P.O. Box 220, Millwood, WV 25262

4B. PHYSICAL ADDRESS:  
 141 Sensenich Drive, Millwood, WV 25262

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A):  
 From US-33E turn left onto WV-68S. Continue on WV-68S for 0.4 miles. Turn right onto WV-25. Continue approximately 6 miles. Turn right onto Sensenich Drive.

5B. NEAREST ROAD:  
 Sensenich Drive

5C. NEAREST CITY OR TOWN:  
 Millwood

5D. COUNTY:  
 Jackson

5E. UTM NORTHING (KM):  
 4,307

5F. UTM EASTING (KM):  
 427.2

5G. UTM ZONE:  
 17

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:  
 Kendra Hersman

6B. TITLE:  
 EH&S Manager

6C. TELEPHONE:  
 304-273-3903

6D. FAX:  
 304-273-0035

6E. E-MAIL:  
 khersman@armstrong.com

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):  
 035 — 00049

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH THIS PROCESS (FOR AN EXISTING FACILITY ONLY):  
 R13-2864A, R30-03500049-2014

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST: No

8A. TYPE OF EMISSION SOURCE (CHECK ONE):  
 NEW SOURCE     ADMINISTRATIVE UPDATE  
 MODIFICATION     OTHER (PLEASE EXPLAIN IN 11B)

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?  
 YES     NO

9. IS DEMOLITION OR PHYSICAL RENOVATION AT AN EXISTING FACILITY INVOLVED?     YES     NO

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:  
 01/15/2016

10B. DATE OF ANTICIPATED START-UP:  
 02/01/16

11A. PLEASE PROVIDE A DETAILED PROCESS FLOW DIAGRAM SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS ATTACHMENT B.

11B. PLEASE PROVIDE A DETAILED PROCESS DESCRIPTION AS ATTACHMENT C.

12. PLEASE PROVIDE MATERIAL SAFETY DATA SHEETS (MSDS) FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS ATTACHMENT D. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

**13A. REGULATED AIR POLLUTANT EMISSIONS:**

⇒ **FOR A NEW FACILITY**, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY**, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.

POLLUTANT	HOURLY PTE (LB/HR)	YEARLY PTE (TON/YR) (HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM		
PM <sub>10</sub>		
VOCs		
CO		
NO <sub>x</sub>		
SO <sub>2</sub>		
Pb		
HAPs (AGGREGATE AMOUNT)		
TAPs (INDIVIDUALLY)*	0.00224 lb/hr (Formaldehyde)	0.0098 ton/yr (Formaldehyde)
OTHER (INDIVIDUALLY)*		

\* ATTACH ADDITIONAL PAGES AS NEEDED

**13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.**

CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112(b) OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).

**14. CERTIFICATION OF DATA**

I, STEVE WOOLARD (TYPE NAME) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A RESPONSIBLE OFFICIAL\*\* (PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: William S Woolard

TITLE: Plant Manager DATE: 12, 9, 15

\*\* THE DEFINITION OF THE PHRASE 'RESPONSIBLE OFFICIAL' CAN BE FOUND AT 45CSR13, SECTION 2.23.

**NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:**

ATTACHMENT A     ATTACHMENT B     ATTACHMENT C     ATTACHMENT D     ATTACHMENT E

RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:



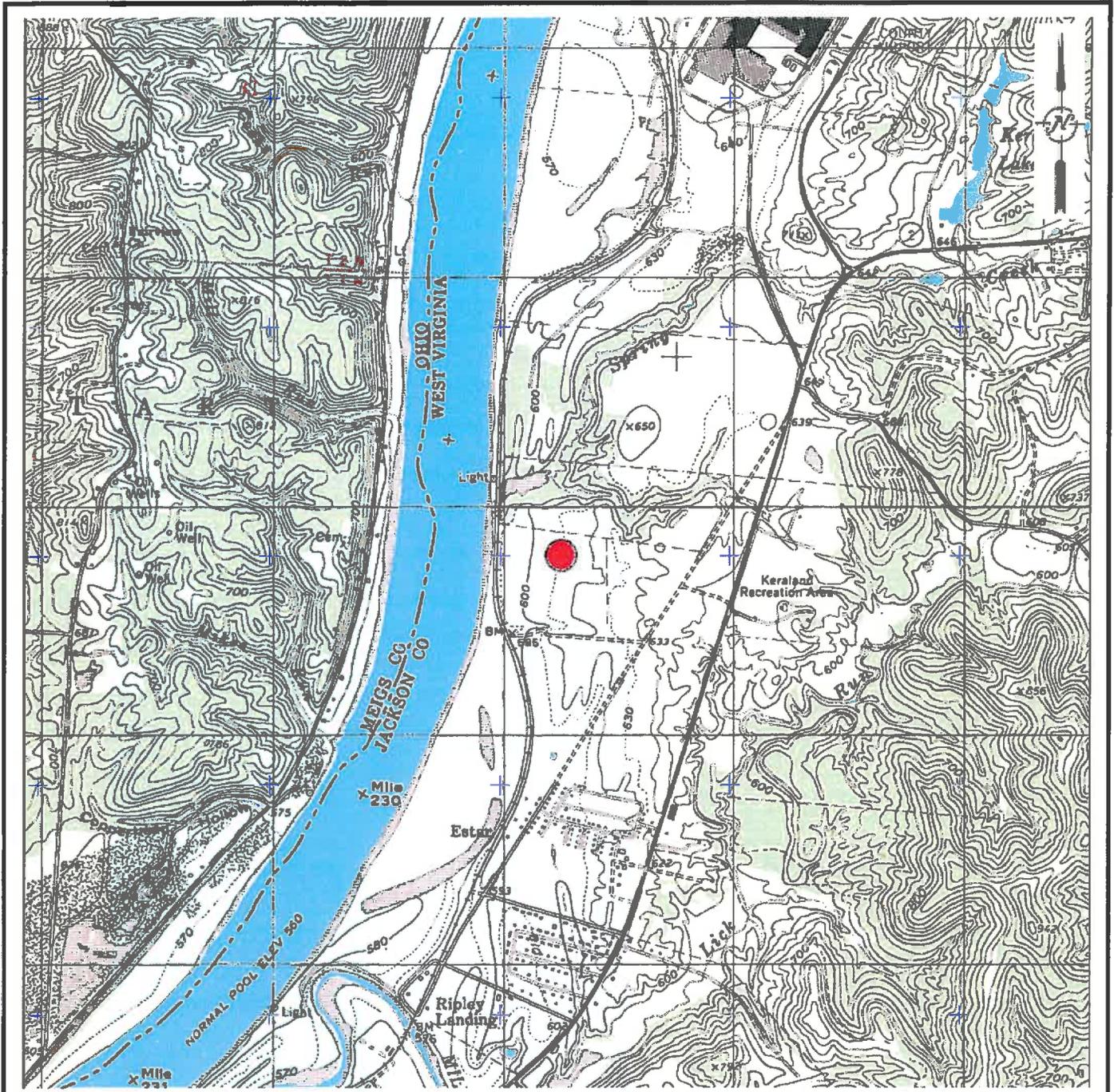
## LIST OF ATTACHMENTS

<u>Attachment</u>	<u>Description</u>
A	Location Map
B	Process Flow Diagram
C	Detailed Process Description
D	MSDS Sheet
E	Calculations

# Attachment A

---

Location Map



Reference:  
 Source Data  
 U.S.G.S. 7.5' Minute  
 Topographic Quadrangle Map  
 MyTopo Map Pass  
 Ravenswood, WV  
 1996  
 Downloaded October 23, 2015

## Location Map

Millwood Plant  
 Jackson County, WV

SCALE  
 1:24000

*MSES consultants, inc.*  
 Clarksburg, West Virginia

**ARMSTRONG WORLD  
 INDUSTRIES**

**Millwood Plant  
 Jackson County, WV**

**Attachment A**

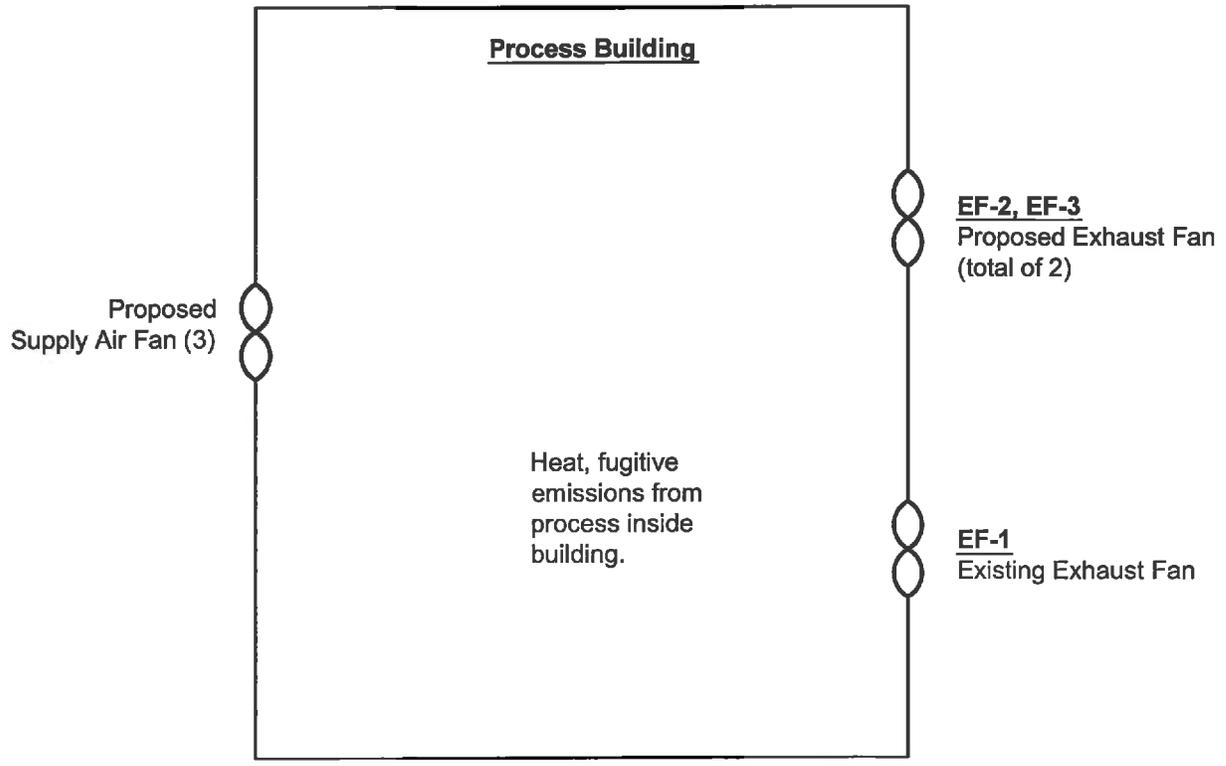
MSES Project No. 15-358

**Attachment B**

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Process Flow Diagram

F:\On-going\Projects\15-358 Armstrong CHOH\Permit Determination\Drafting\15-358-1.dwg, Layout1, 11/10/2015 3:49:33 PM, Anthony Friend, DWG To PDF.pc3, ANSI full bleed A (8.50 x 11.00 inches)



## ARMSTRONG WORLD INDUSTRIES

### MILLWOOD PLANT EXHAUST VENTILATION IMPROVEMENT PROCESS FLOW DIAGRAM

Drawn by	AAF	11/15
Engineer	JJK	11/15
Checked by	JJK	11/15
		Date

Scale:  
NOT TO SCALE

Dwg. No.

15-358-1

Prepared by **MSES consultants, inc.**

# Attachment C

Detailed Process Description

---

# ATTACHMENT C

## PROCESS DESCRIPTION

The Armstrong World Industries (AWI) Millwood plant produces slag wool through the melting of slag in a Submerged Electric Arc Furnace with fibers spun from the molten slag.

During some recent Industrial Hygiene sampling for assessment of Personnel exposure to potential air contaminants, some limited concentrations of formaldehyde were measured. A review of the process revealed that an additive, Carbowax Polyethylene Glycol 600 (PEG), for which the SDS is provided in Attachment D is applied to the fibers that contains polyethylene glycol when heated has the potential to decompose and produce formaldehyde as an air contaminant. Even though the concentrations measured were relatively low, AWI felt it necessary to assess the process to determine the potential quantity of Formaldehyde (a 45 CSR 27 listed Toxic Air Pollutant) that could be released. The assessment concluded that the maximum annual formaldehyde emissions associated with the process including those fugitive emissions within the building for a totaled 284 pounds per year which is well below the 45 CSR 27 1,000 pound per year limit for formaldehyde. The basis for this assessment and the associated calculations are provided in Attachment E of this document.

In order to minimize the potential for personnel exposure to formaldehyde, AWI intends to provide additional exhaust ventilation for the building.

This permit determination is provided to identify the existing exhaust ventilation originally installed for heat dissipation and the additional future exhaust ventilation fans planned for installation along with the potential formaldehyde emissions associated with those exhaust fans.

**Attachment D**

MSDS Sheet

---



**The Dow Chemical Company  
2030 Willard H. Dow Center  
Midland, MI 48674  
United States**

**GRAE CON CONSTRUCTION INC  
ARMSTRONG WORLD INDUSTRIES  
141 SENSENICH DR  
MILLWOOD, WV 25262-0000  
United States**

**Material Safety Data Sheet(s) enclosed  
Order #: 18197013  
Customer: 0001727104**



Print Date: 03/10/2014

The enclosed Material Safety Data Sheet(s) (MSDS) provide the latest information on products you have received from our company. Since you may redirect the product to more than one workplace, please ensure that this information is disseminated to all persons handling the product.

This MSDS supersedes all previous MSDS versions provided for this product. Please replace any previous versions. This MSDS has either been revised since your last product order or is for a product that you have purchased for the first time this calendar year.

The Dow Chemical Company is committed to RESPONSIBLE CARE® and the principles of Product Stewardship. Our MSDSs are the primary vehicle for transmitting health, safety, environmental and disposal information on our products. We are counting on our customers to understand the nature of the hazards associated with these products, and to use them safely and in compliance with relevant regulations.

Due to the proliferation of sources of information such as copies of manufacturer-specific Material Safety Data Sheets, The Dow Chemical Company cannot be responsible for Material Safety Data Sheets obtained from any source other than The Dow Chemical Company. If you have obtained a Material Safety Data Sheet from another source, or you are not sure that a sheet is current, please contact The Dow Chemical Company for the most current version.

We urge you to contact us if you have any questions regarding the safe handling, storage, use or disposal of our products. Simply call our Customer Information Group at 800-258-2436.



# Material Safety Data Sheet

The Dow Chemical Company

Product Name: CARBOWAX(TM) POLYETHYLENE GLYCOL 600

Issue Date: 04/11/2012

Print Date: 10 Mar 2014

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

## 1. Product and Company Identification

Product Name  
CARBOWAX(TM) POLYETHYLENE GLYCOL 600

### COMPANY IDENTIFICATION

The Dow Chemical Company  
2030 Willard H. Dow Center  
Midland, MI 48674  
United States

Customer Information Number:

800-258-2436

SDSQuestion@dow.com

### EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

989-636-4400

Local Emergency Contact:

989-636-4400

## 2. Hazards Identification

### Emergency Overview

Color: Colorless above freezing point

Physical State: Liquid above freezing point

Odor: Mild

Hazards of product:

No significant immediate hazards for emergency response are known.

### OSHA Hazard Communication Standard

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

### Potential Health Effects

**Eye Contact:** May cause slight temporary eye irritation. Corneal injury is unlikely.

**Skin Contact:** Prolonged contact may cause slight skin irritation with local redness.

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

Prolonged/repeated exposure to damaged skin (as in burn patients) may result in absorption of toxic amounts.

®(TM)\*Trademark

**Inhalation:** At room temperature, exposure to vapor is minimal due to low volatility; single exposure is not likely to be hazardous. For respiratory irritation and narcotic effects: No relevant data found.  
**Ingestion:** Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

**Aspiration hazard:** Based on physical properties, not likely to be an aspiration hazard.

**Effects of Repeated Exposure:** Recent findings of kidney failure and death in burn patients, as well as some studies using animal burn models, suggest that polyethylene glycol may have been a factor. The use of topical applications containing this material may not be appropriate in severely burned patients or individuals with impaired renal function.

### **3. Composition Information**

<b>Component</b>	<b>CAS #</b>	<b>Amount</b>
Polyethylene glycol	25322-68-3	> 99.0 %

### **4. First-aid measures**

#### **Description of first aid measures**

**General advice:** If potential for exposure exists refer to Section 8 for specific personal protective equipment.

**Inhalation:** Move person to fresh air; if effects occur, consult a physician.

**Skin Contact:** Wash skin with plenty of water.

**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.

**Ingestion:** No emergency medical treatment necessary.

#### **Most important symptoms and effects, both acute and delayed**

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

#### **Indication of immediate medical attention and special treatment needed**

Absorption may be promoted by damaged skin. J Pharm Sci. 1985 Oct;74(10):1062-6; Burns Incl Therm Inj 1982 Sep;9(1):49-52. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

### **5. Fire Fighting Measures**

#### **Suitable extinguishing media**

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

**Extinguishing Media to Avoid:** Do not use direct water stream. May spread fire.

#### **Special hazards arising from the substance or mixture**

**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.

**Unusual Fire and Explosion Hazards:** Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

### Advice for firefighters

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. 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.

**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.

## 6. Accidental Release Measures

**Personal precautions, protective equipment and emergency procedures:** Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

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

**Methods and materials for containment and cleaning up:** Contain spilled material if possible. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

## 7. Handling and Storage

### Handling

**General Handling:** See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

**Other Precautions:** Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

### Storage

Store in original container. Use product promptly after opening. Avoid prolonged exposure to heat and air. Store in the following material(s): Stainless steel. Polypropylene. Polyethylene-lined container. Teflon. Glass-lined container. Plaste 3066 lined container. Plaste 3070 lined container. 316 stainless steel.

**Shelf life:** Use within 36 Months

## 8. Exposure Controls / Personal Protection

### Exposure Limits

Component	List	Type	Value
Polyethylene glycol	AIHA WEEL	TWA Particulate.	10 mg/m3

### Personal Protection

**Eye/Face Protection:** Use safety glasses (with side shields).

**Skin Protection:** When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, boots, apron, or full-body suit will depend on the task.

**Hand protection:** Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. 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, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

**Ingestion:** Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

**Engineering Controls**

**Ventilation:** Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

**9. Physical and Chemical Properties**

<b>Appearance</b>	
Physical State	Liquid above freezing point
Color	Colorless above freezing point
Odor	Mild
Odor Threshold	No test data available
pH	4.5 - 7.0 ASTM E70 (5% aqueous solution)
Melting Point	Not applicable to liquids
Freezing Point	20 - 25 °C (68 - 77 °F) ASTM D1177
Boiling Point (760 mmHg)	> 200 °C (> 392 °F) Calculated Decomposes.
Flash Point - Closed Cup	238 °C (460 °F) ASTM D93
Flash Point - Open Cup	273 °C (523 °F) ASTM D92
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	Not applicable to liquids
Flammable Limits In Air	Lower: No test data available Upper: No test data available
Vapor Pressure	< 0.01 mmHg @ 20 °C ASTM E1719
Vapor Density (air = 1)	>10 Calculated
Specific Gravity (H2O = 1)	1.128 20 °C/20 °C Calculated
Solubility in water (by weight)	100 % @ 20 °C Measured
Partition coefficient, n-octanol/water (log Pow)	< 2.26 Estimated.
Autoignition Temperature	No test data available
Decomposition Temperature	No test data available
Kinematic Viscosity	9.9 - 11.3 cSt @ 98.9 °C ASTM D445
Explosive properties	no data available
Oxidizing properties	no data available

Liquid Density 9.395 lb/gal @ 20 °C ASTM D4052 @ freezing pt.  
Molecular Weight 570 - 630 g/mol Calculated  
Volatile Organic Compounds 1 g/l EPA Method No. 24

## 10. Stability and Reactivity

### Reactivity

No dangerous reaction known under conditions of normal use.

### Chemical stability

Thermally stable at typical use temperatures.

### Possibility of hazardous reactions

Polymerization will not occur.

**Conditions to Avoid:** Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems.

**Incompatible Materials:** Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

### Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Alcohols. Ethers. Carbon dioxide. Carboxylic acids. Polymer fragments.

## 11. Toxicological Information

### Acute Toxicity

#### Ingestion

LD50, rat > 10,000 mg/kg

#### Dermal

LD50, rabbit > 20,000 mg/kg

#### Inhalation

Typical for this family of materials. No deaths occurred at this concentration. LC50, 6 h, Aerosol, rat > 2.5 mg/l

### Eye damage/eye irritation

May cause slight temporary eye irritation. Corneal injury is unlikely.

### Skin corrosion/irritation

Prolonged contact may cause slight skin irritation with local redness.

### Sensitization

#### Skin

For this family of materials: Did not cause allergic skin reactions when tested in humans. For this family of materials, sensitization studies done in guinea pigs have been negative.

#### Respiratory

No relevant data found.

### Repeated Dose Toxicity

Recent findings of kidney failure and death in burn patients, as well as some studies using animal burn models, suggest that polyethylene glycol may have been a factor. The use of topical applications containing this material may not be appropriate in severely burned patients or individuals with impaired renal function. Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

### Chronic Toxicity and Carcinogenicity

Similar material(s) did not cause cancer in laboratory animals.

### Developmental Toxicity

For similar material(s): Did not cause birth defects in laboratory animals.

**Reproductive Toxicity**

For similar material(s): In animal studies, did not interfere with reproduction.

**Genetic Toxicology**

For similar material(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

## 12. Ecological Information

### Toxicity

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, *Pimephales promelas* (fathead minnow), static test, 96 h: > 10,000 mg/l

**Aquatic Invertebrate Acute Toxicity**

LC50, *Daphnia magna* (Water flea), 48 h: > 10,000 mg/l

**Aquatic Plant Toxicity**

EbC50, *Skeletonema costatum*, biomass growth inhibition, 3 d: 14,853 mg/l

### Persistence and Degradability

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

**OECD Biodegradation Tests:**

Biodegradation	Exposure Time	Method	10 Day Window
90 %	28 d	OECD 301F Test	Not applicable
55 %	28 d	OECD 306 Test	Not applicable

**Biological oxygen demand (BOD):**

BOD 5	BOD 10	BOD 20	BOD 28
7 %	52 %	71 %	

Chemical Oxygen Demand: 1.82 mg/mg

Theoretical Oxygen Demand: 1.77 mg/mg

**Bioaccumulative potential**

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient, n-octanol/water (log Pow): < 2.25 Estimated.

**Mobility in soil**

Mobility in soil: No data available.

## 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**  
NOT REGULATED

**DOT Bulk**  
NOT REGULATED

**IMDG**  
NOT REGULATED

**ICAO/IATA**  
NOT REGULATED

*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 not 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	No
Delayed (Chronic) Health Hazard	No
Fire Hazard	No
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

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

### Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

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

### 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.

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

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

Component	CAS #	Amount
Acetaldehyde	75-07-0	<= 15.0 PPM
Formaldehyde	50-00-0	<= 15.0 PPM
1,4-Dioxane	123-91-1	<= 10.0 PPM

### US. Toxic Substances Control Act

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**

**Product Literature**

Additional information on this product may be obtained by calling your sales or customer service contact. Ask for a product brochure. Additional information on this and other products may be obtained by visiting our web page.

**Hazard Rating System**

<b>NFPA</b>	<b>Health</b>	<b>Fire</b>	<b>Reactivity</b>
	1	1	0

**Recommended Uses and Restrictions**

**Identified uses**

A partial list of examples include pharmaceutical products, personal care products, automotive products, household products, packaging products, petroleum chemicals, plastics, inks, coatings, adhesives, chemical intermediates, rubber processing, lubricants, metalworking fluids, mold release agents, ceramics, and wood treating. This product has clearances under FDA Food Additive Regulations. It is the responsibility of the user of this product as a Direct or Indirect Food Additive to read and understand all applicable FDA regulations in Title 21 of the Code of Federal regulations as well as any other applicable regulations. CAUTION! For food, feed, drug or cosmetic applications, use CARBOWAX(TM) SENTRY(TM) brands, NF (National Formulary), FCC (Food Chemical Codex) Grade. Only SENTRY brand products are tested to meet NF and FCC standards for these applications. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

**Revision**

Identification Number: 78091 / 1001 / Issue Date 04/11/2012 / Version: 3.0  
 Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

**Legend**

N/A	Not available
WW	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.

*The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is*

*the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.*

# Attachment E

Calculations

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ATTACHEMENT E  
TAP EMISSION CALCULATIONS

Conversions

Cubic Meter X 35.3 = Cubic Feet      35.3  
gram / 453.6 = LBM      0.002191541

$D = A * B * 60 / (35.3 * 453.6 * 1000000)$

$E = A * C * 60 / (35.3 * 453.6 * 1000000)$

$F = 365 * 24$

$G = D * F$

$H = E * F$

10/14/2015

Calculations

FORMULA VARIABLES -->

	A	B	C	D	E	F	G	H
Test Location	CHOH Concentration ( <sup>2</sup> ) (µg/m <sup>3</sup> )	Air Flow Based On Fan Rating (CFM)	Maximum Theoretical Air Flow (CFM)	Calculated (LBM/Hour)	Maximum (LBM/Hour)	Production (Hours/Year)	Calculated (Pounds/Year)	Maximum (Pounds/Year)
Furnace Baghouse Fan <sup>(1)</sup>	6	150,000	150,000	0.0034	0.0034	8760	29.4	29.4
Collection Chamber Baghouse <sup>(2)</sup>	22	274,000	274,000	0.0225	0.0225	8760	196.7	196.7
Fiber Line Baghouse <sup>(2)</sup>	10	60,000	60,000	0.0022	0.0022	8760	19.6	19.6
East Building Exhaust Fan <sup>(1)</sup>	6	100,000	100,000	0.0022	0.0022	8760	19.6	19.6
Proposed Building Exhaust Fan <sup>(3)</sup>	6	50,000	50,000	0.0011	0.0011	8760	9.8	9.8
Proposed Building Exhaust Fan <sup>(3)</sup>	6	50,000	50,000	0.0011	0.0011	8760	9.8	9.8
						<b>Total Potential To Emit</b>	<b>284.8</b>	

(1) Samples collected from the Furnace Baghouse Fan and East Building Exhaust Fan were below the minimum reporting limit for the sampling method. The facility has used the mid-range of the minimum reporting limit of 12µg/m<sup>3</sup> since detection below this limit is not possible.

(2) Sample concentration is the average of three 24-hour test periods.

(3) Not constructed, but anticipated emissions once constructed.

Confidential - Attorney Client Privilege

## Attachment E Emission Calculations

The Armstrong World Industries (AWI) Millwood plant had provided estimated emission calculation on the attached spreadsheet. Sampling was performed at the specified locations to determine the maximum potential emissions for formaldehyde. The total potential for all formaldehyde emissions at the facility was 284 pounds/year or 0.142 tons/year. The proposed two (2) additional exhaust fans account for only 19.6 pounds/year or 0.0098 tons/year of the total emissions. AWI collected three 24-hour samples to obtain emission levels for each location. Please refer to the attached calculation sheet for details.