

**CLASS II ADMINISTRATIVE UPDATE  
APPLICATION FOR OPTIMA BELLE, LLC  
FOR  
PERMITS R13-0882K AND R30-03900001**

**REDACTED APPLICATION**

*Prepared for:*

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

*Prepared by:*

**Potesta & Associates, Inc.**  
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Project No. 0101-14-0162-011

October 2016

**POTESTA**

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Attachments Not Applicable to this Application: Attachments M and R.

**SECTION I - III**

**GENERAL APPLICANT INFORMATION**



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**DIVISION OF AIR QUALITY**

601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
(304) 926-0475  
[www.dep.wv.gov/daq](http://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 <b>Certificate of Incorporation/Organization/Limited Partnership</b> (one page) including any name change amendments or other Business Registration Certificate as <b>Attachment A</b> . ⇒ If NO, provide a copy of the <b>Certificate of Authority/Authority of L.L.C./Registration</b> (one page) including any name change amendments or other Business Certificate as <b>Attachment A</b> .			
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): R13-0882K, 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 manufacture D-Mannose.

14A. Provide the date of anticipated installation or change: January 15, 2017 ⇒ If this is an <b>After-The-Fact</b> permit application, provide the date upon which the proposed change did happen: NA	14B. Date of anticipated Start-Up if a permit is granted: January 15, 2017
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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](http://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: D-Mannose 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 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.*

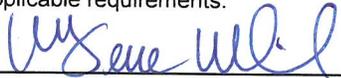
35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

**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   
(Please use blue ink)

DATE: 10/19/16  
(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): Janet Corcoran		36B. Title: EHS Associate
36C. E-mail: jcorcoran@optimachem.com	36D. Phone: (912) 720-5192	36E. FAX: Use email

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate               | <input checked="" 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 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: September 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: September 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 startup of operations to begin on January 15, 2017 and after approval of the permit.

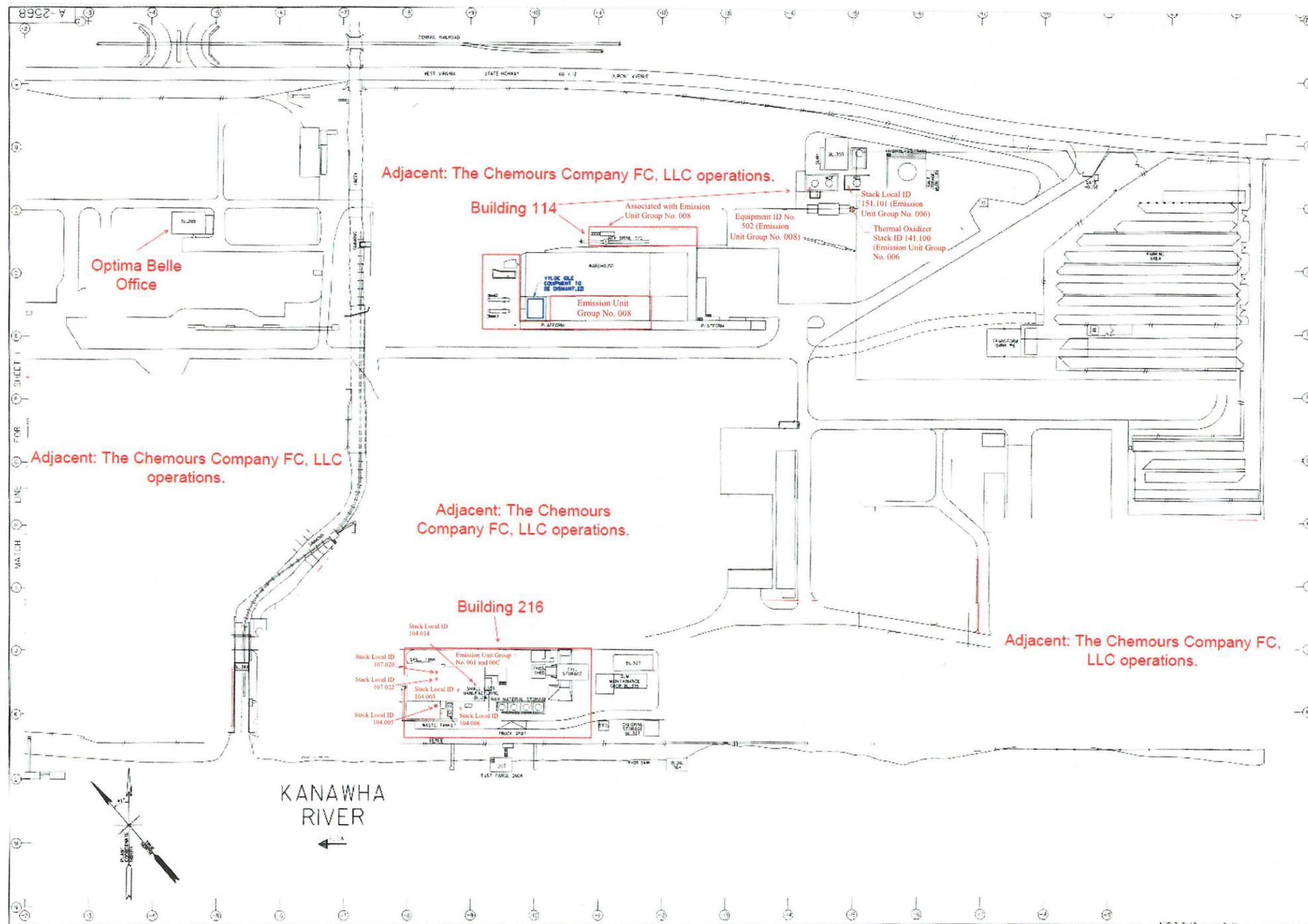
**ATTACHMENT D**  
**REGULATORY DISCUSSION**

## **ATTACHMENT D**

### **REGULATORY DISCUSSION**

The addition of D-Mannose process/manufacturing to this facility does not modify the regulatory basis for the permit. The equipment being utilized to manufacture D-Mannose is existing permitted equipment with controls which are specified in the permit. No new pollution control equipment will be added.

**ATTACHMENT E**  
**PLOT PLAN**



7012 MacCorkle Avenue, S.E  
 Charleston, West Virginia 25304  
 Phone: (304) 342-1400  
 Fax: (304) 343-9031

**Optima Belle, LLC**  
 Kanawha County, West Virginia  
 Project No. 0101-14-0162-011

**ATTACHMENT F**  
**DETAILED PROCESS FLOW DIAGRAM**

**REDACTED**

Information claimed confidential by  
Optima Belle, LLC October 1, 2016.

**ATTACHMENT G**  
**PROCESS DESCRIPTION**

## **ATTACHMENT G**

### **PROCESS DESCRIPTION**

#### Process Description – d-Mannose

D-Mannose, a crystalline solid, is produced from d-Mannose syrup which is diluted in alcohol, filtered, crystallized, and dried.

#### Process Summary:

D-Mannose syrup and alcohol are charged to a reactor, mixed, and filtered. The filtered material is then crystallized before being sent to a centrifuge and then a dryer for moisture removal. The final product is dry d-Mannose crystals.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**REDACTED**

Information claimed confidential by  
Optima Belle, LLC October 1, 2016.

[REDACTED]

[REDACTED]

[REDACTED]

**ATTACHMENT H**  
**MATERIAL SAFETY DATA SHEETS (MSDS)**



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## SAFETY DATA SHEET

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### Section 1: IDENTIFICATION

**Product Name:** SDA 3-A 200 Proof Kosher  
**Product Code:** B5751  
**MSDS Date:** May 8, 2014

Chemisphere Corporation  
2101 Clifton Ave  
St. Louis, MO 63139

**General Information:** 314-644-1300  
**CHEMTREC:** 800-424-9300

### Section 2: HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW:

#### GHS Classification:

Flammable liquids, Category 2  
Skin irritation, Category 2  
Eye irritation, Category 2B  
Specific target organ toxicity - single exposure Category 3  
Specific target organ toxicity - single exposure (Category 1)

#### GHS Labeling



Symbol:

Signal Word: Danger

#### Hazard Statements:

Highly flammable liquid and vapor  
Causes skin and eye irritation  
May cause respiratory irritation.  
Causes damage to organs through prolonged or repeated exposure

#### Precautionary Statements:

##### Prevention:

Do not breathe mist/vapors/spray.  
Do not eat, drink or smoke when using this product.  
Ground/Bond container and receiving equipment.  
Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
Keep container tightly closed.  
Take precautionary measures against static discharge.  
Use only non-sparking tools.  
Use only outdoors or in a well-ventilated area.  
Wash thoroughly after handling.  
Wear protective gloves/protective clothing/eye protection/face protection.

**Response:**

Call a poison center/doctor if you feel unwell.

Get medical advice/attention if you feel unwell.

If eye irritation persists: Get medical advice/attention.

If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If inhaled: Remove person to fresh air and keep comfortable for breathing.

IF ON SKIN (or hair): Take off immediately all contaminated clothing and wash before reuse. Rinse skin with water/shower.

If skin irritation occurs: Get medical advice/attention.

In case of fire: consider carbon dioxide, dry chemical powder, dry sand, limestone powder, or alcohol resistant foam to extinguish.

**Storage:**

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

Store locked up.

**Disposal:**

Dispose of contents/container in accordance with local/regional/national/international regulations.

**Potential Health Effects:** See Section 11 for more information

This product does not contain carcinogens or potential carcinogens as listed by OSHA, IARC, or NTP.

This material contains components that are considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Potential Environmental Effects:** See Section 12 for more information.

### Section 3: COMPOSTION/INFORMATION ON INGREDIENTS

No.	Component CAS REG. NO.	Amount %	OSHA		ACGIH	
			TWA	STEL	TWA	STEL
1	Methanol CAS #67-56-1	1-10	Not avail	Not avail	200 ppm	250 ppm
2	Ethyl Alcohol CAS #64-17-5	90-100	1000 ppm	Not Available	1000 ppm	Not Available

### Section 4: FIRST AID MEASURES

**Emergency first aid procedures by route of exposure:**

**Inhalation:** If symptoms are experienced, remove source of contamination or move victim to fresh air. If affected person is not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:** Do not induce vomiting. If the material is swallowed, get medical attention or advice. Never give anything by mouth to an unconscious person. If a person vomits when lying on his back, place him in the recovery position. Medical care must emphasize the control of acidosis and the use of intravenous bicarbonate has been lifesaving. Evidence is good that treatment of methanol absorption is enhanced through the administration of ethanol, which should be given to produce a blood level of at least 0.1%. Ethanol diminishes the production of toxic metabolites of methanol. Blood methanol level of 50 mg/100mL is an indication for hemodialysis, which has improved the prognosis of methanol intoxication. Methanol is often confused with beverage alcohol (ethylalcohol). Care must be taken to prevent its ingestion, the most frequent cause of methanol poisoning. Prevent aspiration of vomit. Turn victim's head to the side. Do not induce vomiting. If the material is swallowed, get medical attention or advice.

**Skin:** If irritation is experienced, flush with water. If irritation persists, get medical attention.

**Eyes:** Immediately flush eyes with water for at least 15 minutes while holding eyelids open. If symptoms persist, get medical attention.

## Section 5: FIRE FIGHTING MEASURES

**Flash Point: (ethyl alcohol)** 13°C (55.4°F)  
**Auto-ignition Temperature: (ethyl alcohol)** 363°C (685.4°F)  
**Lower Explosion Limit: (ethyl alcohol)** 3.3%  
**Upper Explosion Limit: (ethyl alcohol)** 19.0%  
**Flammability Classification:** Class IB Flammable Liquid

### Suitable Extinguishing Media:

Use methods appropriate for the surrounding fire. Consider water spray or fog, carbon dioxide, dry chemical powder, or alcohol resistant foam.

### Products of Combustion:

Upon decomposition this product may emit carbon dioxide, carbon monoxide, and/or low molecular weight hydrocarbons.

### Fire Fighting Equipment/Instructions:

Wear protective clothing and equipment suitable for the surrounding fire, including helmet, facemask, and self contained breathing apparatus.

HAZARD	HMIS	NFPA
Toxicity	1	2
Fire	3	3
Reactivity	0	0

## Section 6: ACCIDENTAL RELEASE MEASURES

**Personal Protection:** For large spills wear gloves, Tyvek suits, safety glasses, and appropriate NIOSH approved respiratory protection. Keep unnecessary personnel away. Eliminate all sources of ignition or flammables that may come into contact with a spill of this material.

**Special Properties:** Flammable Liquid! This material releases vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, its vapor can cause a flash fire. Use only with adequate ventilation. Vapors are heavier than air and may travel long distances along the ground to an ignition source and flash back. A vapor and air mixture can create an explosion hazard in confined spaces such as sewers. If container is not properly cooled, it can rupture in the heat of a fire.

**Environmental Precautions:** Prevent discharge to open bodies of water, municipal sewers, and watercourses.

**Method for Containment:** Absorb spilled liquid in suitable non-flammable inert material such as clay, vermiculite or diatomaceous earth.

**Methods for Clean-up:** Ventilate area of leak or spill. Use spark-proof tools to sweep or scrape up and containerize in approved chemical waste container. Wash spill area with water.

## Section 7: HANDLING AND STORAGE

### Handling:

Keep away from heat, sparks and flame. Use only with adequate ventilation.

To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

**Storage:**

Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

## Section 8: EXPOSURE CONTROLS/ PERSONAL PROTECTION

**Engineering Controls:** Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protective Equipment (PPE)**

**Respiratory Protection:** Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

**Eye/Face Protection:** Safety glasses with side shields are recommended as minimum protection in industrial settings.

**Hand Protection:** Butyl rubber gloves

**Body:** Avoid skin contact. If product comes in contact with clothing, immediately remove soaked clothing and shower.

**Other Protective Equipment:**

Facilities storing or utilizing this material should be equipped with eyewash and safety shower facilities.

See section 3 for exposure limits.

## Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance, State	Clear liquid
Color	Colorless
Odor	Not available
pH (1%soln/water)	Not Available
Vapor Density (Ethyl Alcohol)	1.6
Boiling Point (Ethyl Alcohol)	78.5°C
Vapor Pressure (Ethyl Alcohol)	57.3 hPa at 20°C
Melting Point (Ethyl Alcohol)	-114.1°C
Freezing Point (Ethyl Alcohol)	Not Available
Flash Point (See Section 5)	
Flammability Properties (See section 5)	
Solubility (in water)	Soluble
Specific Gravity (Ethyl Alcohol)	0.78-0.8
Evaporation Rate	Not Available
Octanol/Water partition coefficient (Kow) (Ethyl Alcohol)	-0.32
Auto-ignition temperature: (Ethyl Alcohol)	363°C
Decomposition temperature:	Not Available
Viscosity:	Not Available

## Section 10: STABILITY AND REACTIVITY

**Stability:** This material is considered stable at ambient temperatures 70°C (21°C).

**Condition to Avoid:** Flames, sparks, electrostatic discharge, heat and other ignition sources.

**Incompatible Materials:** This product reacts with strong acid, strong bases, and oxidizing agents.

**Hazardous Decomposition:** Upon decomposition, this product evolves carbon monoxide, carbon dioxide, and/or low weight hydrocarbons.

**Hazardous Reactions:** This product will not undergo polymerization.

## Section 11: TOXICOLOGICAL INFORMATION

### ACUTE EFFECTS:

#### Analysis LD50

Ethyl Alcohol (64-17-5)  
Oral LD50 Rat: 7060 mg/kg

Methanol (67-56-1)  
LD50: Oral, Mouse - 7300 mg/Kg  
LD50: Oral, Rabbit - 14200 mg/Kg  
LD50: Oral, Rat - 5628 mg/Kg  
LD50: Skin, Rabbit - 15800 mg/Kg  
LC50: Inhalation, Rat - 64000 ppm

### CHRONIC EFFECTS:

Ethyl Alcohol (64-17-5)

**Carcinogenic Effects:** A4 - Not classifiable for human or animal by ACGIH.

**Mutagenic Effects:** Not Available.

**Teratogenic Effects:** Not Available.

**Developmental Toxicity:** Ethyl alcohol is a developmental toxin when consumed during pregnancy

**Target Organs:** When consumed, ethyl alcohol can target the respiratory system, skin, eyes, CNS, liver, blood, and reproductive system. **Inhalation:** May cause irritation to the mucous membranes of the upper respiratory tract. Exposure over 1000 ppm may cause headache, drowsiness, lassitude, loss of appetite, inability to concentrate, throat irritation **Ingestion:** Can cause depression of Central Nervous System, nausea, vomiting, diarrhea, intoxication, and in acute cases, death **Eye:** Liquid and vapor may cause irritation. Splashes may cause temporary pain and blurred vision **Skin:** May cause irritation, cracking, flaking, and defatting of skin on prolonged contact **Chronic Exposure:** Prolonged skin contact causes drying and cracking of skin. May affect nervous system, liver, blood, reproductive system. **Signs and Symptoms:** Headache, drowsiness, lassitude, loss of appetite, inability to concentrate, irritation of throat/eye/skin, depression of central nervous system, nausea, vomiting, diarrhea, skin defatting.

Methanol (67-56-1)

**Carcinogenic Effects:** Not available

**Mutagenic Effects:** Laboratory experiments have resulted in mutagenic effects.

**Teratogenic Effects:** Chronic exposure may cause reproductive disorders and teratogenic effects.

**Developmental Toxicity:** Chronic exposure may cause reproductive disorders.

**Target Organs:** Eyes, CNS, skin, GI tract, and respiratory system. **Inhalation:** An irritant to the mucous membranes. Toxic effects exerted upon nervous system, particularly the optic nerve. Once absorbed into the body, it is very slowly eliminated. Symptoms of over-exposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. A person may get better but then worse up to 30 hours later.

**Ingestion:** Toxic. Symptoms similar to those for inhalation, but severity and speed of appearance may be greater. May be fatal or cause blindness. Usual fatal dose: 100 – 125 ml. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure.

**Skin Contact:** Methyl Alcohol is a defatting agent and may cause skin to become dry and cracked. Skin absorption can occur in harmful amounts; symptoms may parallel inhalation exposure.

**Eye Contact:** Irritant, characterized by a burning sensation, redness, tearing, inflammation, possible corneal injury, painful sensitization to light. Continued exposure may cause lesions.

**Chronic Exposure:** Marked impairment of vision has been reported. Repeated or prolonged skin contact may cause dermatitis. Chronic exposure may cause reproductive disorders and teratogenic effects. Laboratory experiments have resulted in mutagenic effects.

## Section 12: ECOLOGICAL INFORMATION

**Ecotoxicity:** Ethyl Alcohol (64-17-5)

96 hour LC50 *Oncorhynchus mykiss*: 12,900 mg/L (flow-through) (30days old)  
96 hour LC50 *Pimephales promelas*: 14.2 mg/L  
5 min EC50 *Photobacterium phosphoreum*: 35,470 mg/L  
30 min EC50 *Photobacterium phosphoreum*: 34,634 mg/L  
48 hour EC50 *Daphnia magna*: 9,268 mg/L  
24 hour EC50 *Daphnia magna*: 10,800 mg/L

**Ecotoxicity:** Methanol (67-56-1)

EC50 (48 h) : 13,200 mg/l Species : Rainbow trout (*Oncorhynchus mykiss*).  
EC50 (48 h) : 16,000 mg/l Species : Bluegill sunfish (*Lepomis macrochirus*).  
EC50 (48 h) : > 10,000 mg/l Species : *Daphnia*

## Section 13: DISPOSAL CONSIDERATIONS

Dispose of in accordance with local, state, and federal regulations.

## Section 14: TRANSPORTATION INFORMATION

**Proper Shipping Name:** Alcohols, n.o.s.  
**Hazard Class:** 3  
**Identification No.:** UN1987  
**Packing Group:** II  
**Label:** Flammable Liquid

## Section 15: REGULATORY INFORMATION

**TSCA Inventory** This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.

**SARA 302/304** The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.

**SARA 313:** Methanol (CAS #67-56-1) 1.0% de minimus

**CERCLA** The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are: Methanol [CAS No. 67-56-1] RQ = 5,000

**SARA 311/312 Hazard** The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40

CFR 370.2. This material would be classified under the following hazard categories: fire, Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard

**California Prop. 65 Components**

This product contains a chemical known to State of California to cause reproductive harm: methanol.

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**Section 16: OTHER SUPPLEMENTAL INFORMATION**

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**Prepared by: Chemisphere Corp. on May 8, 2014**

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**Disclaimer:**

The information and recommendations contained in the Safety Data Sheet (SDS) are supplied pursuant to 29 CFR 1910.1200 of the Occupational Safety and Health Standards Hazard Communication Rule. The information and recommendations set forth herein are presented in good faith and believed to be correct as of this date hereof.

Chemisphere, however, makes no representation as to the completeness or accuracy thereof, and information is supplied upon the express condition that the persons receiving the information will be required to make their own determination as to its suitability for their purposes prior to use. In no event will Chemisphere be responsible for any damages of any nature whatsoever resulting from the use of, reliance upon, or the misuse of this information. User assumes all risk of use, storage and handling of the product in compliance with applicable federal, state and local laws and regulations.

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This information relates to the material designated and may not be valid for such material used in combination with any other materials nor in any process.



## MATERIAL SAFETY DATA SHEET

Date : 17 December, 2007

Former date : 7 April, 2003

### 1. IDENTIFICATION OF THE CHEMICAL AND OF THE MANUFACTURER, IMPORTER OR OTHER UNDERTAKING

#### Identification of the substance or preparation

Trade name  
XAM4P (Mannose syrup)

Code of the preparation  
-

#### The intended use of the chemical

Main component used as a sugar, a dietary supplement or pharma intermediate

The chemical cannot be used by general public, usage only by trained personnel.

#### Use category

Dietary supplement, Pharma applications

#### Identification of the manufacturer, importer or other undertaking

Manufacturer	Danisco Sweeteners Limited
Street address	41-51 Brighton Road Redhill Surrey RH1 6YS Great Britain
Telephone number	+ (44) 1737 773732
Telefax	+ (44) 1737 773117
VAT code	GB644490724

### 2. COMPOSITION AND INFORMATION ON INGREDIENTS

#### Description

Mannose:  
Formula,  $C_6H_{12}O_6$   
Molecular Weight 180.2  
CAS number 3458-28-4

Sugar / Carbohydrates / Monosaccharides / Aldoses / Hexoses

#### Other information

Min. 75 % pure mannose syrup. Various dissolved sugars, lignins and salts. Dry substance min. 67 %. No ingredients added.

Trade name : XAM4P, Mannose syrup

Date : 20.12.2011

Former date : 07.04.2003

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### **3. HAZARDS IDENTIFICATION**

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The hazardousness of the substance have not been investigated -> Data not available

Substance needs to be handled with caution

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### **4. FIRST AID MEASURES**

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<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
<b>Skin</b>	Wash skin immediately with soap and plenty of water or at least 15 minutes.
<b>Splashes in eyes</b>	Flush eyes immediately with plenty of water for at least 15 minutes. Seek immediate medical attention.
<b>Ingestion</b>	If swallowed, wash out mouth with water. If person is conscious and alert, seek immediate medical attention.

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### **5. FIRE-FIGHTING MEASURES**

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<b>Suitable extinguishing media</b>	Water, chemical foam or CO <sub>2</sub> .
<b>Special exposure hazards in a fire</b>	Toxic fumes emitted under fire conditions.
<b>Special protective equipment for a fire</b>	Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

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### **6. ACCIDENTAL RELEASE MEASURES**

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**Personal precautions**

Wear NIOSH/MSHAS approved respirator, chemical safety goggles, rubber boots and compatible chemical-resistant gloves.

**Environmental precautions**

Spills and leakages should not be put into the sewer or normal litter collection system.

**Methods for cleaning up**

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Trade name : XAM4P, Mannose syrup

Date : 20.12.2011

Former date : 07.04.2003

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## 7. HANDLING AND STORAGE

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### Handling

Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

### Storage

Keep in tightly closed containers; Store in a cool dry place. Material will freeze, store above 5 °C in. pH is slightly acidic, store stainless or properly lined container.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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**Special instructions for protection and hygiene** Wash thoroughly after handling;  
Wash contaminated clothing before reuse

**Respiratory protection** Use respirators and components, tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection** Chemical resistant gloves

**Eye protection** Chemical safety goggles with splash guard/face shield

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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### Appearance

Dark viscous liquid, slight burnt acid odor

### Information on changes in the physical state

<b>Boiling point/boiling range</b>	105 °C
<b>Melting point/melting range</b>	Not applicable, liquid
<b>Specific gravity (H<sub>2</sub>O=1)</b>	1.31
<b>Flash point</b>	Not applicable

**Explosion hazard** Not determined, expected to be non explosive as a water based solution.

**Explosive limits**           a) lower           Not available  
  b) upper           Not available

**Vapour pressure** Not determined

**Relative density** Not available

**Solubility** Soluble in water  
Soluble in alcohol

**Partition coefficient (for ingredients):** Not available

n-octanol/water

**Viscosity**

Not determined

**Other information**

slight burnt acid odor

Trade name : XAM4P, Mannose syrup

Date : 20.12.2011

Former date : 07.04.2003

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**10. STABILITY AND REACTIVITY**

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**Materials to avoid**

Strong oxidizing agents.

**Hazardous decomposition products**

Carbon monoxide, carbon dioxide.

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**11. TOXICOLOGICAL INFORMATION**

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The toxicological properties have not been investigated -> Data not available.

Following effects on humans are anyhow possible and should be considered:

Skin contact: May cause skin irritation.

Eye contact: May cause eye irritation.

Multiple Routes: May be harmful by inhalation, ingestion or skin absorption.

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**12. ECOLOGICAL INFORMATION**

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The ecological properties have not been investigated -> Data not available.

Bio- and chemical degradation and bioaccumulative potential have not been investigated -> Data not available.

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**13. DISPOSAL CONSIDERATIONS**

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**Waste Disposal**

Dissolve or mix the material with a combustible solvent, and burn in chemical incinerator equipment with an afterburner and scrubber. Observe all federal, state and local environmental regulations.

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**14. TRANSPORT INFORMATION**

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The chemical and physical properties have not been fully investigated, so no transportation classifications is assigned

**Land Transport** ADR/RID

No classification assigned

**Air Transport** IA TA/ICA O

No classification assigned

**Maritime Transport** IMDG

No classification assigned

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**15. REGULATORY INFORMATION**

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EC Number (EINECS)

222-392-4

**S phrases**

24, 25 Avoid contact with skin, avoid contact with eyes.

Trade name : XAM4P, Mannose syrup

Date : 20.12.2011

Former date : 07.04.2003

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**16. OTHER INFORMATION**

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We note that this substance will be handled only by trained personnel within a cGMP environment.

The substance will not be made available to third parties that will not work under controlled conditions or have untrained personnel or are not able to take care of healthy and environmental aspects.

# SAFETY DATA SHEET

**Airgas**

Methanol (Methyl Alcohol)

## Section 1. Identification

**GHS product identifier** : Methanol (Methyl Alcohol)  
**Chemical name** : methanol  
**Other means of identification** : Methyl alcohol  
**Product use** : Synthetic/Analytical chemistry.  
**Synonym** : Methyl alcohol  
**SDS #** : 001065  
**Supplier's details** : Airgas USA, LLC and its affiliates  
259 North Radnor-Chester Road  
Suite 100  
Radnor, PA 19087-5283  
1-610-687-5253  
  
**Emergency telephone number (with hours of operation)** : 1-866-734-3438

## Section 2. Hazards identification

**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).  
**Classification of the substance or mixture** : FLAMMABLE LIQUIDS - Category 2  
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (respiratory tract) - Category 1

### GHS label elements

#### Hazard pictograms



#### Signal word

: Danger

#### Hazard statements

: Highly flammable liquid and vapor.  
May displace oxygen and cause rapid suffocation.  
Corrosive to the respiratory tract.

### Precautionary statements

#### General

: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

#### Prevention

: Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid breathing vapor.

#### Response

: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.

#### Storage

: Store locked up. Store in a well-ventilated place. Keep cool.

#### Disposal

: Dispose of contents and container in accordance with all local, regional, national and international regulations.

**Date of issue/Date of revision** : 5/20/2015. **Date of previous issue** : 10/16/2014. **Version** : 0.04 1/14

## Section 2. Hazards identification

**Hazards not otherwise classified** : None known.

## Section 3. Composition/information on ingredients

**Substance/mixture** : Substance  
**Chemical name** : methanol  
**Other means of identification** : Methyl alcohol

### CAS number/other identifiers

**CAS number** : 67-56-1  
**Product code** : 001065

Ingredient name	%	CAS number
methanol	100	67-56-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

## Section 4. First aid measures

### Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.  
**Inhalation** : May cause respiratory irritation.  
**Skin contact** : No known significant effects or critical hazards.

## Section 4. First aid measures

**Frostbite** : Try to warm up the frozen tissues and seek medical attention.

**Ingestion** : No known significant effects or critical hazards.

### Over-exposure signs/symptoms

**Eye contact** : No specific data.

**Inhalation** : Adverse symptoms may include the following:  
respiratory tract irritation  
coughing

**Skin contact** : No specific data.

**Ingestion** : No specific data.

### Indication of immediate medical attention and special treatment needed, if necessary

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments** : No specific treatment.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### Extinguishing media

**Suitable extinguishing media** : Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.

**Unsuitable extinguishing media** : Do not use water jet.

**Specific hazards arising from the chemical** : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### Methods and materials for containment and cleaning up

**Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

**Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

### Precautions for safe handling

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

## Section 7. Handling and storage

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## Section 8. Exposure controls/personal protection

### Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
methanol	<p><b>ACGIH TLV (United States, 3/2012).</b>  <b>Absorbed through skin.</b>            STEL: 328 mg/m<sup>3</sup> 15 minutes.            STEL: 250 ppm 15 minutes.            TWA: 262 mg/m<sup>3</sup> 8 hours.            TWA: 200 ppm 8 hours.</p> <p><b>NIOSH REL (United States, 1/2013).</b>  <b>Absorbed through skin.</b>            STEL: 325 mg/m<sup>3</sup> 15 minutes.            STEL: 250 ppm 15 minutes.            TWA: 260 mg/m<sup>3</sup> 10 hours.            TWA: 200 ppm 10 hours.</p> <p><b>OSHA PEL (United States, 6/2010).</b>            TWA: 260 mg/m<sup>3</sup> 8 hours.            TWA: 200 ppm 8 hours.</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b>  <b>Absorbed through skin.</b>            STEL: 325 mg/m<sup>3</sup> 15 minutes.            STEL: 250 ppm 15 minutes.            TWA: 260 mg/m<sup>3</sup> 8 hours.            TWA: 200 ppm 8 hours.</p>

**Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

## Section 8. Exposure controls/personal protection

- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## Section 9. Physical and chemical properties

### Appearance

- Physical state** : Liquid. [CLEAR, COLORLESS, FLAMMABLE, POISONOUS LIQUID WITH CHARACTERISTIC PUNGENT ODOR]
- Color** : Colorless. Clear.
- Molecular weight** : 32.05 g/mole
- Molecular formula** : C-H4-O
- Boiling/condensation point** : 64.7°C (148.5°F)
- Melting/freezing point** : -97.8°C (-144°F)
- Critical temperature** : Not available.
- Odor** : Characteristic.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : Closed cup: 9.7°C (49.5°F)
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : 2.1 (butyl acetate = 1)
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Lower: 6%  
Upper: 44%
- Vapor pressure** : 16.9 kPa (126.963291808 mm Hg) [room temperature]
- Vapor density** : 1.1 (Air = 1)
- Specific Volume (ft<sup>3</sup>/lb)** :
- Gas Density (lb/ft<sup>3</sup>)** : Not available.

## Section 9. Physical and chemical properties

Relative density	: 0.79
Solubility	: Not available.
Solubility in water	: 1000 g/l
Partition coefficient: n-octanol/water	: -0.77
Auto-ignition temperature	: 455°C (851°F)
Decomposition temperature	: Not available.
SADT	: Not available.
Viscosity	: Dynamic (room temperature): 0.544 to 0.59 mPa·s (0.544 to 0.59 cP)

## Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Incompatibility with various substances	: Extremely reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
methanol	LC50 Inhalation Gas.	Rat	145000 ppm	1 hours
	LC50 Inhalation Gas.	Rat	64000 ppm	4 hours

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
methanol	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	40 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

#### Sensitization

Not available.

#### Mutagenicity

Date of issue/Date of revision : 5/20/2015. Date of previous issue : 10/16/2014. Version : 0.04 7/14

## Section 11. Toxicological information

Not available.

### Carcinogenicity

Not available.

### Reproductive toxicity

Not available.

### Teratogenicity

Not available.

### Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
methanol	Category 3	Not applicable.	Respiratory tract irritation

### Specific target organ toxicity (repeated exposure)

Not available.

### Aspiration hazard

Not available.

**Information on the likely routes of exposure** : Not available.

### Potential acute health effects

**Eye contact** : No known significant effects or critical hazards.  
**Inhalation** : May cause respiratory irritation.  
**Skin contact** : No known significant effects or critical hazards.  
**Ingestion** : No known significant effects or critical hazards.

### Symptoms related to the physical, chemical and toxicological characteristics

**Eye contact** : No specific data.  
**Inhalation** : Adverse symptoms may include the following:  
respiratory tract irritation  
coughing  
**Skin contact** : No specific data.  
**Ingestion** : No specific data.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

**Potential immediate effects** : Not available.  
**Potential delayed effects** : Not available.

#### Long term exposure

**Potential immediate effects** : Not available.  
**Potential delayed effects** : Not available.

### Potential chronic health effects

Not available.

## Section 11. Toxicological information

<b>General</b>	: No known significant effects or critical hazards.
<b>Carcinogenicity</b>	: No known significant effects or critical hazards.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.
<b>Teratogenicity</b>	: No known significant effects or critical hazards.
<b>Developmental effects</b>	: No known significant effects or critical hazards.
<b>Fertility effects</b>	: No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Not available.

## Section 12. Ecological information

### Toxicity

Not available.

### Persistence and degradability

Not available.

### Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
methanol	-0.77	<10	low

### Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

### United States - RCRA Toxic hazardous waste "U" List

## Section 13. Disposal considerations

Ingredient	CAS #	Status	Reference number
Methanol (l); Methyl alcohol (l)	67-56-1	Listed	U154

## Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
<b>UN number</b>	UN1230	UN1230	UN1230	UN1230	UN1230
<b>UN proper shipping name</b>	METHANOL	METHANOL	METHANOL	METHANOL	METHANOL
<b>Transport hazard class(es)</b>	3 	3 	3 	3 (6.1)  	3 (6.1)  
<b>Packing group</b>	II	II	-	II	II
<b>Environment</b>	No.	No.	No.	No.	No.
<b>Additional information</b>	<p><b>Reportable quantity</b> 5000 lbs / 2270 kg [759.08 gal / 2873.4 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.</p> <p><b>Limited quantity</b> Yes.</p> <p><b>Packaging instruction</b> <b>Passenger aircraft</b> Quantity limitation: 1 L</p> <p><b>Cargo aircraft</b> Quantity limitation: 60 L</p> <p><b>Special provisions</b> IB2, T7, TP2</p>	<p><b>Explosive Limit and Limited Quantity Index</b> 1</p> <p><b>Passenger Carrying Road or Rail Index</b> 1</p> <p><b>Special provisions</b> 43</p>	-	-	<p><b>Passenger and Cargo Aircraft</b> Quantity limitation: 1 L <b>Cargo Aircraft Only</b> Quantity limitation: 60 L <b>Limited Quantities - Passenger Aircraft</b> Quantity limitation: 1 L</p>

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

**Special precautions for user** : **Transport within user’s premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** : Not available.

## Section 15. Regulatory information

**U.S. Federal regulations** : TSCA 8(a) CDR Exempt/Partial exemption: Not determined  
 United States inventory (TSCA 8b): This material is listed or exempted.

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

### SARA 302/304

#### Composition/information on ingredients

No products were found.

**SARA 304 RQ** : Not applicable.

### SARA 311/312

**Classification** : Fire hazard  
 Immediate (acute) health hazard

#### Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
methanol	100	Yes.	No.	No.	Yes.	No.

### SARA 313

	Product name	CAS number	%
<b>Form R - Reporting requirements</b>	methanol	67-56-1	100
<b>Supplier notification</b>	methanol	67-56-1	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

### State regulations

**Massachusetts** : This material is listed.

**New York** : This material is listed.

**New Jersey** : This material is listed.

**Pennsylvania** : This material is listed.

### California Prop. 65

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

## Section 15. Regulatory information

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
methanol	No.	Yes.	No.	No.

**Canada inventory** : This material is listed or exempted.

### International regulations

#### International lists

- : **Australia inventory (AICS)**: This material is listed or exempted.
- : **China inventory (IECSC)**: This material is listed or exempted.
- : **Japan inventory**: This material is listed or exempted.
- : **Korea inventory**: This material is listed or exempted.
- : **Malaysia Inventory (EHS Register)**: Not determined.
- : **New Zealand Inventory of Chemicals (NZIoC)**: This material is listed or exempted.
- : **Philippines inventory (PICCS)**: This material is listed or exempted.
- : **Taiwan inventory (CSNN)**: Not determined.

**Chemical Weapons Convention List Schedule I Chemicals** : Not listed

**Chemical Weapons Convention List Schedule II Chemicals** : Not listed

**Chemical Weapons Convention List Schedule III Chemicals** : Not listed

### Canada

#### WHMIS (Canada)

- : Class B-2: Flammable liquid
- : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
- : Class D-2A: Material causing other toxic effects (Very toxic).
- : Class D-2B: Material causing other toxic effects (Toxic).
- : **CEPA Toxic substances**: This material is not listed.
- : **Canadian ARET**: This material is not listed.
- : **Canadian NPRI**: This material is listed.
- : **Alberta Designated Substances**: This material is not listed.
- : **Ontario Designated Substances**: This material is not listed.
- : **Quebec Designated Substances**: This material is not listed.

## Section 16. Other information

**Canada Label requirements** : Class B-2: Flammable liquid  
 Class D-1B: Material causing immediate and serious toxic effects (Toxic).  
 Class D-2A: Material causing other toxic effects (Very toxic).  
 Class D-2B: Material causing other toxic effects (Toxic).

### Hazardous Material Information System (U.S.A.)

Health	1
Flammability	3
Physical hazards	0

## Section 16. Other information

**Caution:** HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

### National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

### History

**Date of printing** : 5/20/2015.

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**Date of previous issue** : 10/16/2014.

**Version** : 0.04

### Key to abbreviations

: ATE = Acute Toxicity Estimate  
 BCF = Bioconcentration Factor  
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals  
 IATA = International Air Transport Association  
 IBC = Intermediate Bulk Container  
 IMDG = International Maritime Dangerous Goods  
 LogPow = logarithm of the octanol/water partition coefficient  
 MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)  
 UN = United Nations  
 ACGIH – American Conference of Governmental Industrial Hygienists  
 AIHA – American Industrial Hygiene Association  
 CAS – Chemical Abstract Services  
 CEPA – Canadian Environmental Protection Act  
 CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)  
 CFR – United States Code of Federal Regulations  
 CPR – Controlled Products Regulations  
 DSL – Domestic Substances List  
 GWP – Global Warming Potential  
 IARC – International Agency for Research on Cancer  
 ICAO – International Civil Aviation Organisation  
 Inh – Inhalation  
 LC – Lethal concentration  
 LD – Lethal dosage  
 NDSL – Non-Domestic Substances List  
 NIOSH – National Institute for Occupational Safety and Health

## Section 16. Other information

TDG – Canadian Transportation of Dangerous Goods Act and Regulations  
TLV – Threshold Limit Value  
TSCA – Toxic Substances Control Act  
WEEL – Workplace Environmental Exposure Level  
WHMIS – Canadian Workplace Hazardous Material Information System

**References** : Not available.

▣ Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

**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)**

Emission Unit ID <sup>1</sup>	Emission Point ID <sup>2</sup>	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type <sup>3</sup> and Date of Change	Control Device <sup>4</sup>
<b>The following equipment and associated control devices are for the d-Mannose process only.</b>						
002	104.014	Dryer	1977	500 pph	Existing	Dryer Condenser Incinerator
004	104.014	Dryer Condenser	NA	113 cu ft	Existing	Incinerator
009	104.014	Incinerator	1977	10 MMBtu/hr	Existing	NA
112	104.014	J Tank	1951	8,000 gal	Existing	Incinerator
201	104.014	Centrifuge	1961	500 pph	Existing	Incinerator
201A	104.014	Wet Cake Bin	NA	NA	Existing	Incinerator
202	104.014	M/L Disengaging Tank	1988	925 gal	Existing	Incinerator
208	104.014	Reactor #6	1977	4,000 gal	Existing	Incinerator
208C	104.014	Reactor #6 Condenser	NA	NA	Existing	Incinerator
209	104.014	Reactor #8	1977	4,000 gal	Existing	Incinerator
210	107.022	Product Packout	2005	825 cfh	Existing	Dust Collector
227	104.014	CWT Tank	2005	8,000 gal	Existing	Incinerator
229	104.014	Tanker Truck	2016	NA	Existing	Incinerator
Fugitive	Fugitive	Two (2) Filters	2016	NA	Existing	None

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 <sup>1</sup>	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 <sup>3</sup>  (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup> (hr/yr)	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
104.014	Upward Vertical	*	Various	009	Incinerator	NA	NA	VOC Methanol Total HAPs	2.85 0.28 0.28	0.22 0.02 0.02	0.02 0.01 0.01	0.02 0.01 0.01	Gas	EE	NA
107.022	Upward Vertical	210	Product Packout	023	Dust Collector	NA	NA	PM PM10 PM2.5	0.24 0.11 0.02	0.03 0.02 0.01	0.24 0.11 0.02	0.03 0.02 0.01	Solid	AP-42	NA

\* - Sources venting through this emission point during LAME production include 002, 004, 009, 112, 201, 201A, 202, 208, 208C, 209, 227, and 229

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.

<sup>1</sup> Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

<sup>2</sup> 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/wk).

<sup>3</sup> 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.

<sup>4</sup> 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).

<sup>5</sup> 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).

<sup>6</sup> 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).

<sup>7</sup> 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 K**

**FUGITIVE EMISSIONS DATA SUMMARY SHEET**

# Attachment K – Fugitive Emissions Data Summary Sheet

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
<p>1.) Will there be haul road activities?</p> <p><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.</p>
<p>2.) Will there be Storage Piles?</p> <p><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.</p>
<p>3.) Will there be Liquid Loading/Unloading Operations?</p> <p><input checked="" type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.</p>
<p>4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation?</p> <p><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.</p>
<p>5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)?</p> <p><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.</p>
<p>6.) Will there be General Clean-up VOC Operations?</p> <p><input checked="" type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.</p>
<p>7.) Will there be any other activities that generate fugitive emissions?</p> <p><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.</p>
<p>If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."</p>

<b>FUGITIVE EMISSIONS SUMMARY</b>		All Regulated Pollutants - Chemical Name/CAS <sup>1</sup>	Maximum Potential Uncontrolled Emissions <sup>2</sup>		Maximum Potential Controlled Emissions <sup>3</sup>		Est. Method Used <sup>4</sup>
	lb/hr		ton/yr	lb/hr	ton/yr		
Haul Road/Road Dust Emissions Paved Haul Roads		NA					
Unpaved Haul Roads		NA					
Storage Pile Emissions		NA					
Loading/Unloading Operations		NA					
Wastewater Treatment Evaporation & Operations		NA					
Equipment Leaks		NA					
General Clean-up VOC Emissions	Filter Cleaning/Changeout						
	Ethanol	2.30	0.14	2.30	0.14		
	Methanol	0.08	0.01	0.08	0.01		EE
	VOC	2.38	0.15	2.38	0.15		
Other	HAPs	0.08	0.01	0.08	0.01		
	NA						

<sup>1</sup> List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, all applicable Greenhouse Gases (including CO<sub>2</sub> and methane), etc. DO NOT LIST H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

<sup>2</sup> Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>3</sup> Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>4</sup> Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

**ATTACHMENT L**  
**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:

D-Mannose production is being proposed for the Small Lots Manufacturing (SLM) Building 216. This process will use the existing permitted equipment that is listed in Attachment I. D-Mannose is a crystalline solid produced from D-Mannose syrup which is diluted in alcohol, filtered, crystallized, and dried.

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:

D-Mannose  
Total Batches Per Year: 31  
Single Batch Time: 66.9 hours

[REDACTED]

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

D-Mannose (dried): 7,088 lb

[REDACTED]

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

No chemical reaction. D-Mannose syrup is mixed in alcohol to allow impurity removal by filtration before crystallization and drying.

\* 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:			
NA			
(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:			
NA			
(g) Proposed maximum design heat input:			× 10 <sup>6</sup> 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 <sub>x</sub>	lb/hr	grains/ACF
b. SO <sub>2</sub>	lb/hr	grains/ACF
c. CO	lb/hr	grains/ACF
d. PM <sub>10</sub>	0.11 lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs	5.23 lb/hr	grains/ACF
g. Pb	lb/hr	grains/ACF
h. Specify other(s)		
HAPS	0.36 lb/hr	grains/ACF
Ethanol	4.87 lb/hr	grains/ACF
Methanol	0.36 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.

<p><b>MONITORING</b> None</p>	<p><b>RECORDKEEPING</b> Amount of D-Mannose produced.</p>
-----------------------------------	---

<p><b>REPORTING</b> None</p>	<p><b>TESTING</b> None</p>
----------------------------------	--------------------------------

**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

This is existing equipment that has been in place for years.

**ATTACHMENT N**

**SUPPORTING EMISSIONS CALCULATIONS**

By: JJD  
Date: 9/13/2016

Checked By: PEW  
Date: 9/28/2016

**Total Emissions Estimate for a Campaign of D-Mannose**

Number of Batches in Process 1  
Number of Batches Per Year 31

**Process Emissions**

Pollutant	Uncontrolled		Controlled	
	lb/hr (Max Rate)(1)	ton/yr (31 batches)	lb/hr (Max Rate)(1)	ton/yr (31 batches)
PM	0.24	0.03	0.24	0.03
PM10	0.11	0.02	0.11	0.02
PM2.5	0.02	0.01	0.02	0.01
Ethanol	2.57	0.20	0.01	0.01
Methanol	0.28	0.02	0.01	0.01
VOC	2.85	0.22	0.02	0.02
Total HAPs	0.28	0.02	0.01	0.01

**Fugitive Emissions (Filter Changeouts)**

Pollutant	Uncontrolled		Controlled	
	lb/hr (Max Rate)(1)	ton/yr (31 batches)	lb/hr (Max Rate)(1)	ton/yr (31 batches)
Ethanol	2.30	0.14	2.30	0.14
Methanol	0.08	0.01	0.08	0.01
VOC	2.38	0.15	2.38	0.15
Total HAPs	0.08	0.01	0.08	0.01

**Total PTE**

Pollutant	Uncontrolled		Controlled	
	lb/hr (Max Rate)(1)	ton/yr (31 batches)	lb/hr (Max Rate)(1)	ton/yr (31 batches)
PM	0.24	0.03	0.24	0.03
PM10	0.11	0.02	0.11	0.02
PM2.5	0.02	0.01	0.02	0.01
Ethanol	4.87	0.34	2.31	0.15
Methanol	0.36	0.03	0.09	0.02
VOC	5.23	0.37	2.40	0.17
Total HAPs	0.36	0.03	0.09	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: D-Mannose  
 Process Name: D-Mannose (Ardilla) @ Belle  
 Production Quantity: 3133.0 kg  
 Process Cycle Time: 66.9 hr  
 Date: 8/22/2016  
 File: N:\Emission Master Files\Belle\D-Mannose Belle\Ardilla D-Mannose Belle\_R\_0.emm  
 Comments:

Compound	Activities Emitting	Emissions		Emissions Percent Removal
		Uncontrolled (lb)	Controlled (lb)	
D-Glucose	33	0	0	
D-Mannose	33	0	0	
Ethanol	29	12.6103547	0.012610	99.9
Methanol	29	1.514782	0.001515	99.9
Nitrogen	40	267.1339988	267.1339988	0
Water	33	1736.566951	1736.566951	0

Compound	Process Cycle	Compound Emission	Compound Emission	Max Rate (lb/hr)*	Uncontrolled	Controlled
	Average (lb/hr)	Hours	Average (lb/hr)	Within 1 hour	lb/hr	lb/hr
D-Glucose	0	51.39888889	0	0	0	0
D-Mannose	0	51.39888889	0	0	0	0
Ethanol	0.137916447	43.14888889	0.213831933	2.3035	2.567266667	0.002567267
Methanol	0.00481188	43.14888889	0.007460558	0.0801	0.279236667	0.000279237
Nitrogen	3.993034361	62.89777778	4.247113462	15.12576281	24.80566667	24.80566667
Water	25.95765248	51.39888889	33.78607959	433.75	433.75	433.75

- (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.  
 \* Max Rate includes controlled emissions and fugitive filter changes.

Classification	Activities Emitting	Emissions		Emissions Percent Removal
		Uncontrolled (lb)	Controlled (lb)	
<b>All Emissions</b>	42	2027.36046	2013.249475	0.696027449
Acid	0	0	0	
Acid Gases	0	0	0	
Asbestos	0	0	0	
Base	0	0	0	
Biological	0	0	0	
<b>CATEGORY I</b>	0	0	0	
ASBESTOS	0	0	0	
BIOLOGICAL	0	0	0	
Cr(+6)	0	0	0	
DIOXIN	0	0	0	
HAP-PARTICULATE	0	0	0	
METAL	0	0	0	
OTHER PARTICULATE	0	0	0	
RADIONUCLIDE	0	0	0	
<b>CATEGORY II</b>	0	0	0	
HAP-VOC	0	0	0	
OTHER VOC	0	0	0	
<b>CATEGORY III</b>	0	0	0	
ACID	0	0	0	
HAP-ACID	0	0	0	
<b>CATEGORY IV</b>	0	0	0	
<b>CATEGORY V (CO)</b>	0	0	0	
<b>CATEGORY VI (NOx)</b>	0	0	0	
<b>CATEGORY VII (SO2)</b>	0	0	0	
<b>CATEGORY VIII</b>	0	0	0	
CO	0	0	0	
CR+6	0	0	0	
Dioxin	0	0	0	
ETG	0	0	0	
EVOS	0	0	0	
Gas	0	0	0	
HAP	29	1.835177652	0.321914778	82.45865857
Methanol	29	1.835177652	0.321914778	82.45865857
Hydrogen	0	0	0	
LOC	0	0	0	
Metal	0	0	0	
NOx	0	0	0	
Particulate	0	0	0	
Pb	0	0	0	
PM10	0	0	0	
Radionuclide	0	0	0	
SO2	0	0	0	
TSP	0	0	0	
TVOS	0	0	0	
VCM	0	0	0	
VOC	29	23.6595104	9.54852511	59.64191588
Ethanol	29	21.82433275	9.226610333	57.72328786
Methanol	29	1.835177652	0.321914778	82.45865857
<b>Unclassified</b>	42	2003.700949	2003.700949	0
D-Glucose	33	0	0	
D-Mannose	33	0	0	
Nitrogen	40	267.1339988	267.1339988	0
Water	33	1736.566951	1736.566951	0

Classification	Process Cycle	Emission	Emission	Max Rate (lb/hr)
	Average (lb/hr)	Hours	Average (lb/hr)	Within 1 hour
All Emissions	30.09341517	66.89722222	30.09466474	433.75
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
CATEGORY I	0	0	0	0
ASBESTOS	0	0	0	0
BIOLOGICAL	0	0	0	0
Cr(+6)	0	0	0	0
DIOXIN	0	0	0	0
HAP-PARTICULATE	0	0	0	0
METAL	0	0	0	0
OTHER PARTICULATE	0	0	0	0
RADIONUCLIDE	0	0	0	0
CATEGORY II	0	0	0	0
HAP-VOC	0	0	0	0
OTHER VOC	0	0	0	0
CATEGORY III	0	0	0	0
ACID	0	0	0	0
HAP-ACID	0	0	0	0
CATEGORY IV	0	0	0	0
CATEGORY V (CO)	0	0	0	0
CATEGORY VI (NOx)	0	0	0	0
CATEGORY VII (SO2)	0	0	0	0
CATEGORY VIII	0	0	0	0
CO	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
Gas	0	0	0	0
HAP	0.00481188	43.14888889	0.007460558	0.0801
Hydrogen	0	0	0	0
LOC	0	0	0	0
Metal	0	0	0	0
NOx	0	0	0	0
Particulate	0	0	0	0
Pb	0	0	0	0
PM10	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	0.142728328	43.14888889	0.221292491	2.3836
Unclassified	29.95068684	66.89722222	29.95193048	433.75

(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)
Carbon Filter Belle					
CWT Belle		Incinerator Belle	1000		
Dryer Belle		Condenser Dryer Belle	-25	Incinerator Belle	1000
Dryer Belle		Incinerator Belle	1000		
J Tank Belle		Incinerator Belle	1000		
MLDT Belle		Incinerator Belle	1000		
Polish Filter Belle					
RX-6 Belle					
RX-6 Belle		Condenser RX-6 Hast C	-25	Incinerator Belle	1000
RX-6 Belle		Incinerator Belle	1000		
RX-8 Belle		Condenser RX-8 Belle	-10	Incinerator Belle	1000
RX-8 Belle		Incinerator Belle	1000		

**Uncontrolled Emissions**

Process:

D-Mannose (Ardilla) @ Belle

Emissions reported in Pounds.

Activity	Recipe Step	Duration (h)	Vessel	D-Glucose	D-Mannose	Ethanol (lb.)	Ethanol (lb/hr)	Methanol (lb)	Methanol (lb/hr)	Nitrogen (lb)	Nitrogen (lb/hr)	Water (lb)	Water (lb/hr)
1	1.5	CWT Belle				3.3417	2.2278	0.36357	0.24238	19.3703	12.91353333		0
2	1.5	RX-6 Belle		0	0					15.7195	10.47966667	0.34994	0.233293333
3	2.0	RX-6 Belle		0	0					17.5731	8.78655	0.72626	0.36313
4	4.0	RX-6 Belle		0	0							1735	433.75
5	1.0	RX-6 Belle		0	0					0	0	0	0
6	0.25	RX-6 Belle		0	0					0	0	0	0
7	2.0	CWT Belle								0	0	0	0
7	2.0	RX-6 Belle		0	0	6.01E-02	0.030061	1.96E-02	0.009818	20.2171	10.10855	6.05E-04	0.000302615
8	2.0	RX-6 Belle		0	0	6.25E-03	0.003124	1.83E-03	0.00091605	2.2732	1.1366	1.56E-04	0.00007812
9	6.0	Carbon Filter Belle								0	0	0	0
10	8.0	Polish Filter Belle								0	0	0	0
11	4.0	RX-6 Belle								0	0	0	0
11	4.0	RX-8 Belle		0	0	0.1679	0.041975	4.18E-02	0.01045825	18.0044	4.5011	4.63E-03	0.0011576
12	4.0	Polish Filter Belle		0	0	9.214	2.3035	0.3204	0.0801				
13	12.0	RX-8 Belle		0	0	0	0	0	0	0	0	0	0
14	0.5	RX-8 Belle		0	0	0.21726	0.43452	2.36E-02	0.047296	1.3433	2.6866	3.23E-03	0.0064668
15	0.25	RX-8 Belle		0	0	0	0	0	0	0	0	0	0
16	0.3	MLDT Belle		0	0	0.24841	0.828033333	3.04E-02	0.101253333	7.4417	24.80566667	1.60E-02	0.053316667
17	0.15	RX-8 Belle		0	0	0	0	0	0	0	0	0	0
17	0.15	Dryer Belle		0	0	7.04E-02	0.469313333	8.61E-03	0.05739	2.109	14.06	4.53E-03	0.03022
18	0.15	MLDT Belle		0	0	0.28852	1.923466667	3.85E-02	0.256493333	1.8098	12.06533333	3.84E-03	0.025587333
19	1.0	MLDT Belle								0	0	0	0
19	1.0	J Tank Belle		0	0	0.33859	0.33859	4.37E-02	0.043699	9.4132	9.4132	1.64E-02	0.016446
20	0.3	MLDT Belle		0	0	0.77018	2.567266667	8.38E-02	0.279236667	6.517	21.72333333	5.23E-02	0.174333333
21	0.15	Dryer Belle		0	0	0.22379	1.491933333	2.43E-02	0.161906667	1.974	13.16	1.38E-02	0.09204
22	0.15	MLDT Belle		0	0	0.28852	1.923466667	3.85E-02	0.256493333	1.6765	11.17666667	1.26E-02	0.083666667
23	1.0	MLDT Belle								0	0	0	0
23	1.0	J Tank Belle		0	0	1.0497	1.0497	0.12049	0.12049	8.7963	8.7963	5.38E-02	0.053769
24	0.3	MLDT Belle		0	0	0.77018	2.567266667	8.38E-02	0.279236667	6.517	21.72333333	5.23E-02	0.174333333
25	0.15	Dryer Belle		0	0	0.22379	1.491933333	2.43E-02	0.161906667	1.974	13.16	1.38E-02	0.09204
26	0.15	MLDT Belle		0	0	0.28852	1.923466667	3.85E-02	0.256493333	1.6765	11.17666667	1.26E-02	0.083666667
27	1.0	MLDT Belle								0	0	0	0
27	1.0	J Tank Belle		0	0	1.0497	1.0497	0.12049	0.12049	8.7963	8.7963	5.38E-02	0.053769
28	0.3	MLDT Belle		0	0	0.77018	2.567266667	8.38E-02	0.279236667	6.517	21.72333333	5.23E-02	0.174333333
29	0.15	Dryer Belle		0	0	0.22379	1.491933333	2.43E-02	0.161906667	1.974	13.16	1.38E-02	0.09204
30	0.15	MLDT Belle		0	0	0.28852	1.923466667	3.85E-02	0.256493333	1.6765	11.17666667	1.26E-02	0.083666667
31	1.0	MLDT Belle								0	0	0	0
31	1.0	J Tank Belle		0	0	1.0497	1.0497	0.12049	0.12049	8.7963	8.7963	5.38E-02	0.053769
32	0.5	Dryer Belle		0	0	1.08E-02	0.02117	2.97E-03	0.0059352	1.0199	2.0398	2.36E-04	0.0004724
33	2.0	Dryer Belle		0	0	3.23E-03	0.00161635	1.00E-03	0.0005024	0.31331	0.156655	6.96E-05	3.47805E-05
34	12.0	Dryer Belle		0	0	0.86082	0.071735	0.13807	0.011505833	93.6348	7.8029	4.37E-02	0.003644333

Uncontrolled Emissions	lb/hr
D-Glucose	0
D-Mannose	0
Ethanol	2.567266667
Methanol	0.279236667
Nitrogen	24.80566667
Water	433.75

## Controlled Emissions

Process: D-Mannose (Ardilla) @ Belle

Emissions reported in Pounds.

Activity	Recipe Step	Vessel	D-Glucose	D-Mannose	Ethanol	Methanol	Nitrogen	Water
1		CWT Belle			3.34E-03	3.64E-04	19.3703	
2		RX-6 Belle	0	0			15.7195	0.34994
3		RX-6 Belle	0	0			17.5731	0.72626
4		RX-6 Belle	0	0				1735
5		RX-6 Belle	0	0			0	0
6		RX-6 Belle	0	0			0	0
7		CWT Belle					0	
7		RX-6 Belle	0	0	6.01E-05	1.96E-05	20.2171	6.05E-04
8		RX-6 Belle	0	0	6.25E-06	1.83E-06	2.2732	1.56E-04
9		Carbon Filter Belle					0	
10		Polish Filter Belle					0	
11		RX-6 Belle					0	
11		RX-8 Belle	0	0	1.68E-04	4.18E-05	18.0044	4.63E-03
12		Polish Filter Belle	0	0	9.214	0.3204		0
13		RX-8 Belle	0	0	0	0	0	0
14		RX-8 Belle	0	0	2.17E-04	2.36E-05	1.3433	3.23E-03
15		RX-8 Belle	0	0	0	0	0	0
16		RX-8 Belle	0	0	0	0	0	0
16		MLDT Belle	0	0	2.48E-04	3.04E-05	7.4417	1.60E-02
17		RX-8 Belle	0	0	0	0	0	0
17		Dryer Belle	0	0	7.04E-05	8.61E-06	2.109	4.53E-03
18		MLDT Belle	0	0	2.89E-04	3.85E-05	1.8098	3.84E-03
19		MLDT Belle					0	
19		J Tank Belle	0	0	3.39E-04	4.37E-05	9.4132	1.64E-02
20		MLDT Belle	0	0	7.70E-04	8.38E-05	6.517	5.23E-02
21		Dryer Belle	0	0	2.24E-04	2.43E-05	1.974	1.38E-02
22		MLDT Belle	0	0	2.89E-04	3.85E-05	1.6765	1.26E-02
23		MLDT Belle					0	
23		J Tank Belle	0	0	1.05E-03	1.20E-04	8.7963	5.38E-02
24		MLDT Belle	0	0	7.70E-04	8.38E-05	6.517	5.23E-02
25		Dryer Belle	0	0	2.24E-04	2.43E-05	1.974	1.38E-02
26		MLDT Belle	0	0	2.89E-04	3.85E-05	1.6765	1.26E-02
27		MLDT Belle					0	
27		J Tank Belle	0	0	1.05E-03	1.20E-04	8.7963	5.38E-02
28		MLDT Belle	0	0	7.70E-04	8.38E-05	6.517	5.23E-02
29		Dryer Belle	0	0	2.24E-04	2.43E-05	1.974	1.38E-02
30		MLDT Belle	0	0	2.89E-04	3.85E-05	1.6765	1.26E-02
31		MLDT Belle					0	
31		J Tank Belle	0	0	1.05E-03	1.20E-04	8.7963	5.38E-02
32		Dryer Belle	0	0	1.06E-05	2.97E-06	1.0199	2.36E-04
33		Dryer Belle	0	0	3.23E-06	1.00E-06	0.31331	6.96E-05
34		Dryer Belle	0	0	8.61E-04	1.38E-04	93.6348	4.37E-02



**Description:** Particulate emissions are generated through the drop of solid materials into packaging containers.

**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	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
D-Mannose	31	7086	25	7.0	0.25	0.0674	0.0319	0.0048	0.24	0.11	0.02	0.03	0.02	0.01
Total Emissions									0.24	0.11	0.02	0.03	0.02	0.01

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

From AP-42:

$$E = k(0.0032) \left(\frac{U}{5}\right)^{1.3} \left(\frac{M}{2}\right)^{1.6} \text{ (pound [lb]/ton)}$$

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				
< 30 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.

**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**

## 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 Class II Administrative Update to Regulation 13 Permit R13-0882K 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 0.03 tons per year (tpy); PM10 of 0.02 tpy; PM2.5 of 0.01 tpy; Ethanol of 0.15 tpy; Methanol of 0.02 tpy; VOC of 0.17 tpy; and HAPS of 0.02 tpy.

Startup of operation is planned to begin on or about the 15th day of January, 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> 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 October, 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.

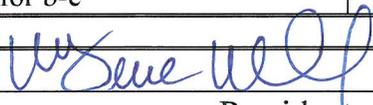
Attachment

## Attachment Q Business Confidential Claim

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

<b>Reason for Submittal Of Confidential Information : R13 Class II Administrative Update</b>
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<b>Identification of Confidential Information</b>	<b>Rationale for Confidential Claim 45CSR31-4.1a-e</b>	<b>Confidential Treatment Time Period</b>
-Equipment design and capacity information -Process descriptions -Process flow diagrams -Site Map	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.  See attached for b-e	Permanent

<b>Responsible Official Signature:</b>	
<b>Responsible Official Title:</b>	President
<b>Date Signed:</b>	10/19/16

**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

<b>1. New Applicable Requirements Summary</b>	
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) <sup>(1)</sup>
<input type="checkbox"/> NO <sub>x</sub> Budget Trading Program Non-EGUs (45CSR1)	<input type="checkbox"/> NO <sub>x</sub> Budget Trading Program EGUs (45CSR26)
<p><sup>(1)</sup> If this box is checked, please include <b>Compliance Assurance Monitoring (CAM) Form(s)</b> for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why <b>Compliance Assurance Monitoring</b> is not applicable:</p>    	
<b>2. Non Applicability Determinations</b>	
<p>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.</p>          	

**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
R13-0882L	Under review at DAQ	None
R13-0882K	07/11/2016	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
PM	0.03
PM10	0.02
PM2.5	0.01
Ethanol	0.15
Methanol	0.02
VOC	0.17
HAPs	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.

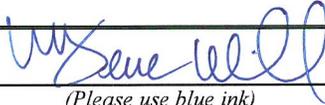
**7. Certification For Use Of Minor Modification Procedures (Required Only for Minor Modification Requests)**

**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):	 <i>(Please use blue ink)</i>	Date:	10 / 19 / 16 <i>(Please use blue ink)</i>
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.