BrightFields, Inc.
Environmental Services

November 18, 2021

Mr. Bradley A. Klotz
DNREC – Division of Air Quality
State Street Commons
100 W. Water Street, Suite 6A
Dover, DE 19904

Subject: Above Ground Storage Tanks Permit Revision (APC-2013/0074 – 0079)
Highline Warren, LLC
1 Crowell Road
Wilmington, DE 19804

Dear Mr. Klotz:

BrightFields, Inc. (BrightFields) previously submitted the application package to revise the permit for the above referenced plant's filling line (APC-2013/0073). The increase in material handling by the plant's filling line will also increase the throughput to the plant's above ground storage tanks (ASTs; currently permitted APC-2013/0074 through 0079). This letter and associated attachments are sent to document the increased emissions anticipated from the ASTs based on the increased throughputs and to request that this increase be included in a revised air permit. Based on discussions with the Delaware Department of Natural Resources and Environmental Control (DNREC), we revised the filling line submittal and calculated the overall facility emissions including the revised filling line emissions, emissions from the ASTs, and other plant emissions.

The application package includes the following:

- AQM-1 (Administrative Information)
- AQM-2 (Overall Process Diagram with attached process flow diagram)
- AQM-3.5 (for methanol, updated for material throughputs),
- AQM-3.5 (for ethanol, updated for material throughputs),
- AQM-3.5 (for propylene glycol, updated for material throughputs),
- AQM-5 (Process Line, updated with new emissions),
- A check for the permit amendment fees ($1,050 per permit) and the permit advertising fee ($325 for the process filling line and ASTs),
- Proof of Local Zoning,
- Safety Data Sheets (SDSs), and
- An updated spreadsheet calculating emissions for the tanks and facility-wide emissions estimates.

The emissions estimates for the tanks were derived using EPA Tanks 4.0.9d software. Emissions estimates were calculated for methanol, ethanol, and propylene glycol. The potential-to-emit (PTE) and actual emissions estimates are included. Tank estimates were developed using the annual throughput

volumes for the filling line, plus an additional 52,000 gallons (approximately 2 railcar volumes) of additional storage capacity. The EPA Tanks 4.0.9d output files calculate the emissions from a single tank assuming that annual throughput volume is divided equally among the tanks in use for that product. The tanks are currently permitted so that any of the products (methanol, ethanol, and propylene glycol) can be stored in any tank. Currently, methanol is stored in three tanks, ethanol in one tank, and propylene glycol in two tanks. Form AQM-5 includes the PTE and anticipated actual emissions.

The attached spreadsheet includes emission estimates for the filling line, the ASTs, a high-density polyethylene (HDPE) bottle production line, and a HDPE Diesel Exhaust Fluid (DEF) bottle production line. The emissions estimates for the filling line are the estimates developed for the proposed increase; these estimates were submitted in 2018 as a permit revisions application and were revised and resubmitted in 2019. The tanks emissions were developed for this requested revision and reflect an increase in annual product throughputs. The emissions estimates for the HDPE bottle line are from the January 15, 2013 registration. The emissions estimates for the HDPE DEF bottle line are from the October 10, 2014 registration. The emissions from each of these processes are summarized in the spreadsheet; please see the worksheet entitled "TOTALS" for the emissions summary.

If you have any questions or comments, please feel free to contact me at (302) 656-9600.

Sincerely,
BrightFields, Inc.

Ken Hannon

Ken Hannon
Engineering Program Manager

cc: Lisa Gochenour, Highline Warren, LLC
Chris Seay (Highline Warren, LLC)

Administrative Information

One original and one copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 West Water Street, Suite 6A
Dover, DE 19904

All Checks Should Be Made Payable To:
State of Delaware

Company and Site Information

1. Company Name: **Highline Warren, LLC**
2. Company Mailing Address: **Lisa Gochenour, 950 South 10th St, Suite 300**
   City: **Omaha** State: **NE** Zip Code: **68108**
3. Site Name: **1 Crowell Road**
4. Site Mailing Address: **Lisa Gochenour, 950 South 10th St, Suite 300**
   (if different from above)
   City: **Omaha** State: **NE** Zip Code: **68108**
5. Physical Location of Site: **1 Crowell Road**
   (if different from above)
   City: **Wilmington** State: **DE** Zip Code: **19804**
6. Site Billing Address: **Lisa Gochenour, 950 South 10th St, Suite 300**
   (if different from above)
   City: **Omaha** State: **NE** Zip Code: **68108**
7. Air Quality Management Facility ID Number: **1000300898**
8. Site NAICS Code): **423120**
   (list all that apply
9. Site SIC Code: **2899**
   (list all that apply)
10. Site Location Coordinates: Latitude: 39 ° 42' 39.732"
    Longitude: 75 ° 37' 22.886"
11. Is the Facility New or Existing? ☐ NEW ☒ EXISTING

If the Facility is an Existing Facility, Complete the Rest of Question 11. If Not, Proceed to Question 12.

11.1. Does the Facility Have Active Air Permits? ☒ YES ☐ NO

12. Is this Application For New Equipment or a Modification to Existing Equipment?
    ☐ New Equipment
    ☒ Modification of Existing Equipment
    ☐ Other (Specify):

If the application is for the modification of existing equipment, complete the rest of Question 12. If not, proceed to Question 13.

Company and Site Information

12.1. Does the Equipment Have an Active Air Permit?	☒ YES ☐ NO
If the equipment has an active air permit, complete the rest of Question 12. If not, proceed to Question 13.	
12.2. Permit Number of Existing Equipment:	**APC 2013 0074 through APC 2013 0079**
13. Status of Equipment Being Applied For:	☒ Natural Minor Source ☐ Synthetic Minor Source ☐ Major Source ☐ Federally Enforceable Restrictions
14. Facility Status:	☒ Natural Minor Facility ☐ Synthetic Minor Facility ☐ Major Facility
If the facility is a Major Source, complete the rest of Question 14. If not, proceed to Question 15.	
14.1. Responsible Official Name:	
14.2. Responsible Official Title:	

Contact Information

15.	Name of Owner or Facility Manager: **Chris Seay**
16.	Title of Owner or Facility Manager: **Facility Manager**
17.	Permit Contact Name: **Chris Seay**
18.	Permit Contact Title: **Facility Manager**
19.	Permit Contact Telephone Number: **(302) 383-6925**
20.	Permit Contact Fax Number: **None**
21.	Permit Contact E-Mail Address: **chris.seay@highlinewarren.com**
22.	Billing Contact Name: **Robby Tucker**
23.	Billing Contact Title: **VP Finance**
24.	Billing Contact Telephone Number: **(901) 236-0703**
25.	Billing Contact Fax Number: **None**
26.	Billing Contact E-Mail Address: **robby.tucker@highlinewarren.com**

Proposed Construction and Operating Schedule

27.	When Will the Proposed Construction/Installation/Modification Occur: As soon as possible
28.	Proposed Operating Schedule: **24** hours/day **7** days/week **52** weeks/year
28.1.	Is There Any Additional Information Regarding the Operating Schedule? ☒ YES ☐ NO
If YES, complete the rest of Question 28. If NO, proceed to Question 29.	

Proposed Construction and Operating Schedule

28.2. Describe the Additional Information: **The facility is generally operated for two shifts for a maximum of six days per week. Many weeks the facility will only be operated for five days per week. Highline Warren would like the flexibility to operate 24/7.**

Coastal Zone Information

29. Is the Facility Located in the Coastal Zone? ☐ YES ☒ NO

If the facility is located in the Coastal Zone complete the rest of Question 29. If not, proceed to Question 30.

29.1. Is a Coastal Zone Permit Required for Construction or Operation of the Source Being Applied for? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Determination if it has not been previously submitted

If a Coastal Zone Permit is required complete the rest of Question 29. If not, proceed to Question 30.

29.2. Has a Coastal Zone Permit Been Issued? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Permit if it has not been previously submitted

Local Zoning Information

30. Parcel Zoning: **I - UDC - INDUSTRIAL**

Attach Proof of Local Zoning if it has not been previously submitted

Application Information

31. Is the Appropriate Application Fee Attached? ☒ YES ☐ NO

32. Is the Advertising Fee Attached? ☒ YES ☐ NO

For help determining your application and advertising fees see:
http://www.dnrec.state.de.us/DNREC2000/Library/Fees/DE%20Permit%20Fees.htm

Attach the appropriate fees. Note that your Application will not be considered complete if the appropriate fees are not included.

33. Is a Cover Letter Describing the Process Attached? ☒ YES ☐ NO

Attach a brief cover letter describing your Application.

If the Facility is a New Facility complete Question 34. If not, proceed to Question35.

34. Is a Copy of the Applicant Background Information Questionnaire on Record at the Department? ☒ YES ☐ NO

If NO, complete the rest of Question 34. If YES, process to Question 35.

34.1 Is a Copy of the Applicant Background Information Questionnaire Attached? ☐ YES ☐ NO

For a copy of the Applicant Background Information Questionnaire see
http://www.dnrec.delaware.gov/services/Documents/Chapter79Form.pdf

Attach a copy of the Applicant Background Information Questionnaire if applicable.

35. Check Which Application Forms are Attached:

Application Information

☒ AQM-1	☐ AQM-3.4	☐ AQM-3.9	☐ AQM-3.14	☐ AQM-4.4	☐ AQM-4.9	☐ AQM-6
☒ AQM-2	☒ AQM-3.5	☐ AQM-3.10	☐ AQM-3.15	☐ AQM-4.5	☐ AQM-4.10	
☐ AQM-3.1	☐ AQM-3.6	☐ AQM-3.11	☐ AQM-4.1	☐ AQM-4.6	☐ AQM-4.11	
☐ AQM-3.2	☐ AQM-3.7	☐ AQM-3.12	☐ AQM-4.2	☐ AQM-4.7	☐ AQM-4.12	
☐ AQM-3.3	☐ AQM-3.8	☐ AQM-3.13	☐ AQM-4.3	☐ AQM-4.8	☒ AQM-5	

36. Check Which Documents are Attached:

- ☐ Coastal Zone Determination
- ☐ Coastal Zone Permit
- ☒ Proof of Local Zoning
- ☒ Application Fee
- ☒ Advertising Fee
- ☐ Applicant Background Information Questionnaire
- ☐ Claim of Confidentiality
- ☐ Manufacturer Specification(s)
- ☒ Material Safety Data Sheets (MSDSs)
- ☒ Supporting Calculations
- ☒ Descriptive Cover Letter
- ☐ Other (Specify):

Confidentiality Information

37. Do You Consider Any of the Information Submitted With this Application Confidential? ☐ YES ☒ NO

For help on how to submit a confidentiality claim see
http://regulations.delaware.gov/register/december2011/final/15%20DE%20Reg%20864%2012-01-11.htm

If a Claim of Confidentiality is made it MUST meet the requirements of Section 6 of DNREC's Freedom of Information ("FOIA") Regulation at the time the Application is submitted.

Signature Block

I, the undersigned, hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all of its attachments as to the truth, accuracy, and completeness of this information. I certify based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete. By signing this form, I certify that I have not changed, altered, or deleted any portions of this application. I acknowledge that I cannot commence construction, alteration, modification or initiate operation until I receive written approval (i.e. permit, registration, or exemption letter) from the Department. I acknowledge that I may be required to perform testing of the equipment to receive construction or operation approval, and that if I do not receive approval to construct or operate that I may appeal the decision.

Chris Seay
Owner or Operator

11/17/21
Date

Chris Seay
Signature of Owner or Operator

One Original and One Copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 W. Water Street, Suite 6A
Dover, Delaware 19904

All Checks Should Be Made Payable To:
State of Delaware

DNREC – Air Quality Management Section
Application to Construct, Operate, or Modify Stationary Sources

Process Flow Diagram

Sketch the Process Flow Diagram for the equipment or process being applied for. Include each emission unit and control device (even existing emission units that will not be modified by this application). You may identify each emission unit with a simple shape. Label each emission unit and control device with a unique identifier. Show the relationship between each emission unit and/or control device by drawing arrows between them to indicate the flow of air pollutants. List which application forms are included for each emission unit or control device below the shape representing each emission unit or control device . See http://www.delaware.gov/reg2/default.htm for example Process Flow Diagrams for common processes. If you already have a Process Flow Diagram for the equipment or process being applied for, you may attach it to the application instead of using this form.

See attached diagram

TOUCH UP OF FINISHED PAINT IS REQUIRED BY INSTALLATION CONTRACTOR. TOUCH UP PAINT SHIPPED WITH TANK.

SHIPPING LUGS AS NEEDED

NOTES

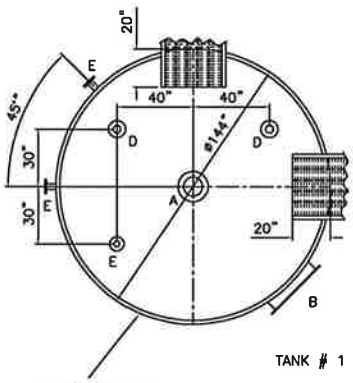
1. SEE PLAN VIEW FOR TRUE ORIENTATION AND LOCATION OF FITTINGS
2. LIFTING LUGS FOR UNLOADING UNIT & STANDING UNIT UPRIGHT TO BE PLACED AS NEEDED BY FABRICATION SHOP
3. A 3"x3"x1/4" STEEL GROUNDING LUG WITH A 5/8" HOLE IN CENTER TO BE PLACED ON SHELL AT BOTTOM OF TANK IN LINE WITH LIFTING LUGS

DESIGN DATA

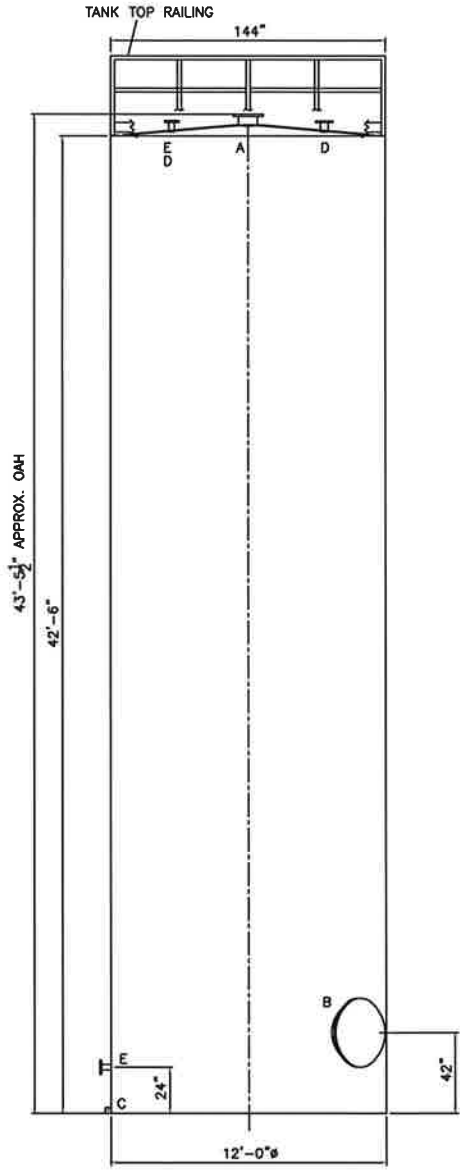
CAPACITY – 35,000 GALLONS
TYPE – SINGLE WALL ABOVEGROUND VERTICAL
NO. REQ. – 6
OPERATING PRESSURE – ATMOSPHERIC
SPECIFIC GRAVITY = 1.0
TANK MATERIAL – MILD CARBON STEEL
THICKNESS – SHALLOW CONED TOP HEAD 7GA. SHELL 1/4" FLAT BOTTOM HEAD 1/4"
CONSTRUCTION – LAP WELD ALL EXTERIOR SEAMS
TANK TEST – 2 PSIG
INT. FINISH – NONE
EXT. FINISH – SP6 BLAST, WHITE URETHANE TOPCOAT
LABEL – U.L. 142

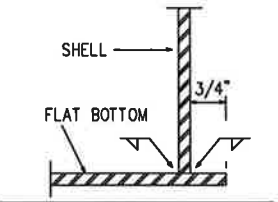
LEGEND

A	10" RFSO 150# FLANGE
B	30" CLOSE BOLT MANWAY W/ 1/8" THICK NEO CORK GASKET
C	GROUNDING LUG WITH 5/8" HOLE
D	4" RFSO 150# FLANGE
E	3" RFSO 150# FLANGE
F	
G	



TANK # 1





BOTTOM JOINT DETAIL

Highland Tank

35,000 GAL 144"ø SW VERTICAL TANK

CUSTOMER: SHURE-LINE CONSTRUCTION, INC.

PROJECT:

QUOTE NO: 306530

CHK'D BY:

SCALE:	DATE:	DWG. BY:	DWG. NO:
3/16"=1'-0"	9/25/12	004	81196

Volatile Organic Storage Tank Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **1 Crowell Road**
2. Tank Identification Number: **TK-01, TK-02, TK-03, TK-04, TK-05, and TK-06**
3. Tank Manufacturer: **Highland Tank**
4. Tank Model: **35,000 gallon 144" Diameter Steel Wall Vertical Tank**
5. Tank Serial Number: **S-615527, S-615522, S-615526, S-615523, S-615525, and S-615524**
6. Tank Type: ☐ External Floating Roof ☐ Internal Floating Roof ☒ Horizontal/Vertical Cylinder ☐ Other (Specify):
7. Tank Material of Construction: ☒ Steel ☐ Plastic ☐ Aluminum ☐ Concrete ☐ Other (Specify):
8. Exterior Tank Color: ☐ Aluminum (Silver) ☐ Gray ☒ White ☐ Black ☐ Other (Specify):
9. Tank Diameter: **12 feet**
10. Tank Height: **42.5 feet**
11. Tank Volume: **35,000 gallons**
12. Product Stored in Tank: **Methanol**

Attach a Material Safety Data Sheet (MSDS) for the Product Stored in the Tank.

13. Density of Product Stored in Tank: **791.3 g/liter** at **15 °C**
14. Molecular Weight of Product Stored in Tank: **32.04**
15. True Vapor Pressure of Product Stored in Tank at Standard Temperature and Pressure: **97.00 mm Hg**
16. Is the Tank Vented? ☒ YES ☐ NO

If YES, complete the rest of Question 16. If NO, proceed to Question 17.

16.1. Type of Vent: ☐ Atmospheric ☒ Conservation ☐ Vacuum Breaker ☐ Closed Vent ☐ Flame Arrestor ☐ Vapor Recovery ☐ Flare ☐ Other (Specify):

16.2 How Does the Tank Vent:
(check all that apply)
☒ Directly to the Atmosphere
☐ Through a Control Device Covered by Forms AQM-4.1 through 4.12
☐ Through Another Control Device Described on This Form

If the tank vents directly to the atmosphere or through another control device described on this form, proceed to Question 16.3. If the tank vents through a control device, provide the stack parameters on the control device form and proceed to Question 17.

General Information

16.3. Emission Point Name: **TK-01, TK02, TK03, TK04, TK05, and TK06**

16.4. Vent Height Above Grade: **43.5 feet**

16.5. Vent Exit Diameter: **0.25 feet**
(Provide Vent Dimensions If Rectangular Vent)

16.6. Is a Vent Cap Present? ☒ YES ☐ NO

16.7. Vent Configuration: *(check all that apply)* ☒ Vertical ☐ Horizontal ☐ Downward-Venting ☐ Other (Specify):

16.8. Vent Exit Gas Temperature: **68 °F**

16.9. Vent Exit Gas Flow Rate: **0.03 ACFM**

16.10. Distance to Nearest Property Line: **100 feet**

16.11. Describe Nearest Obstruction: **Building**

16.12. Height of Nearest Obstruction: **25 feet**

16.13. Distance to Nearest Obstruction: **38 feet**

16.14. Are Vent Sampling Ports Provided? ☐ YES ☒ NO

Floating Roof Tank Information

17. Is the Tank a Floating Roof Tank: ☐ YES ☒ NO

If YES, complete the rest of Question 17. If NO, proceed to Question 18.

17.1. Type of Primary Seal: ☐ Mechanical Shoe ☐ Liquid-Mounted ☐ Other (Specify):

17.2. Gap Between Primary Seal and Tank Wall: **inches**

17.3. Type of Secondary Seal: ☐ Liquid-Mounted ☐ Vapor-Mounted ☐ Foam-Filled ☐ Mechanical ☐ Other (Specify):

17.4. Gap Between Secondary Seal and Tank Wall: **inches**

17.5. List the Type of Each Roof Penetration, the Quantity of Each Penetration, and the Method of Sealing

If there are more than five Roof Penetrations, attach additional copies of this page as needed.

Type of Penetration	Number	Method of Sealing
17.5.1.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover ☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.2.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover ☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):

Floating Roof Tank Information			
17.5.3.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.4.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.5.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):

Control Device Information

18. Is an Air Pollution Control Device Used? ☒ YES ☐ NO

If an Air Pollution Control Device is used, complete the rest of Question 18. If not, proceed to Question 19.

18.1. Is Adsorption Equipment Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.2 and attach it to this application.

18.2. Is a Scrubber Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.4 and attach it to this application.

18.3. Is a Thermal Oxidizer of Afterburner Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.1 and attach it to this application.

18.4. Is a Flare Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.3 and attach it to this application.

18.5. Is Any Other Control Device Used? ☒ YES ☐ NO

If YES, attach a copy of the Control Device Manufacturer's Specification Sheets.

If Any Other Control Device is used, complete the rest of Question 18. If not, proceed to Question 19.

18.6. Describe Control Device: **Conservation vent cap that only allows emissions when pressure becomes greater than 0.5 psi within the tank.**

18.7. Pollutants Controlled: ☒ VOCs ☒ HAPs ☐ Other (Specify):

18.8. Control Device Manufacturer: **Morrison**

18.9. Control Device Model: **Morrison 548A- 1000AV**

18.10. Control Device Serial Number: **N/A**

18.11. Control Device Design Capacity: **N/A**

18.12. Control Device Removal or Destruction Efficiency: **N/A**

Monitoring Information

19. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO

If Yes, attach a copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_x ☐ SO_x ☐ Metals ☐ Other (Specify):

19.2. Describe the Continuous Emission Monitoring System:

19.3. Manufacturer:

19.4. Model:

19.5. Serial Number:

19.6. Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☐ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.7. Emission Units Monitored:

19.8. Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? ☐ YES ☐ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.9. Emission Units Emitting Simultaneously:

Monitoring and Alarm Information

20. Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit? ☐ YES ☒ NO

If YES, complete the rest of Question 20. If NO, proceed to Question 21.

20.1. Describe the System Alarm(s):

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	**Describe Alarm Trigger**	**Monitoring Device or Alarm Type**	**Does the Alarm Initiate an Automated Response?**
20.1.1.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.2.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.3.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

20.1.4.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.5.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Voluntary Emission Limitation Request Information

21. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 21. If NO, proceed to Question 22.

21.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

22. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 22. If NO, proceed to Question 23.

22.1. Describe Any Proposed Operating Limitations:

Additional Information

23. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 23.

23.1. Describe:

Volatile Organic Storage Tank Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **1 Crowell Road**
2. Tank Identification Number: **TK-01, TK-02, TK-03, TK-04, TK-05, and TK-06**
3. Tank Manufacturer: **Highland Tank**
4. Tank Model: **335,000 gallon 144" Diameter Steel Wall Vertical Tank**
5. Tank Serial Number: **S-615527, S-615522, S-615526, S-615523, S-615525, and S-615524**
6. Tank Type: ☐ External Floating Roof ☐ Internal Floating Roof ☒ Horizontal/Vertical Cylinder ☐ Other (Specify):
7. Tank Material of Construction: ☒ Steel ☐ Plastic ☐ Aluminum ☐ Concrete ☐ Other (Specify):
8. Exterior Tank Color: ☐ Aluminum (Silver) ☐ Gray ☒ White ☐ Black ☐ Other (Specify):
9. Tank Diameter: **12 feet**
10. Tank Height: **42.5 feet**
11. Tank Volume: **35,000 gallons**
12. Product Stored in Tank: **Propylene Glycol**

Attach a Material Safety Data Sheet (MSDS) for the Product Stored in the Tank.

13. Density of Product Stored in Tank: **1,030 g/liter** at **25 °C**
14. Molecular Weight of Product Stored in Tank: **76.1**
15. True Vapor Pressure of Product Stored in Tank at Standard Temperature and Pressure: **0.08 mm Hg**
16. Is the Tank Vented? ☒ YES ☐ NO

If YES, complete the rest of Question 16. If NO, proceed to Question 17.

16.1. Type of Vent: ☐ Atmospheric ☒ Conservation ☐ Vacuum Breaker ☐ Closed Vent ☐ Flame Arrestor ☐ Vapor Recovery ☐ Flare ☐ Other (Specify):

16.2 How Does the Tank Vent:
(check all that apply)
☒ Directly to the Atmosphere
☐ Through a Control Device Covered by Forms AQM-4.1 through 4.12
☐ Through Another Control Device Described on This Form

If the tank vents directly to the atmosphere or through another control device described on this form, proceed to Question 16.3. If the tank vents through a control device, provide the stack parameters on the control device form and proceed to Question 17.

General Information

16.3. Emission Point Name: **TK-01, TK02, TK03, TK04, TK05, and TK06**

16.4. Vent Height Above Grade: **43.5 feet**

16.5. Vent Exit Diameter: **0.25 feet**
(Provide Vent Dimensions If Rectangular Vent)

16.6. Is a Vent Cap Present? ☒ YES ☐ NO

16.7. Vent Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting
(check all that apply) ☐ Other (Specify):

16.8. Vent Exit Gas Temperature: **68 °F**

16.9. Vent Exit Gas Flow Rate: **0.00002 ACFM**

16.10. Distance to Nearest Property Line: **100 feet**

16.11. Describe Nearest Obstruction: **Building**

16.12. Height of Nearest Obstruction: **25 feet**

16.13. Distance to Nearest Obstruction: **38 feet**

16.14. Are Vent Sampling Ports Provided? ☐ YES ☒ NO

Floating Roof Tank Information

17. Is the Tank a Floating Roof Tank: ☐ YES ☒ NO

If YES, complete the rest of Question 17. If NO, proceed to Question 18.

17.1. Type of Primary Seal: ☐ Mechanical Shoe ☐ Liquid-Mounted ☐ Other (Specify):

17.2. Gap Between Primary Seal and Tank Wall: **inches**

17.3. Type of Secondary Seal: ☐ Liquid-Mounted ☐ Vapor-Mounted ☐ Foam-Filled ☐ Mechanical ☐ Other (Specify):

17.4. Gap Between Secondary Seal and Tank Wall: **inches**

17.5. List the Type of Each Roof Penetration, the Quantity of Each Penetration, and the Method of Sealing

If there are more than five Roof Penetrations, attach additional copies of this page as needed.

Type of Penetration	Number	Method of Sealing
17.5.1.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover ☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.2.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover ☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):

Floating Roof Tank Information			
17.5.3.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.4.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.5.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):

Control Device Information	
18. Is an Air Pollution Control Device Used?	☒ YES ☐ NO
If an Air Pollution Control Device is used, complete the rest of Question 18. If not, proceed to Question 19.	
18.1. Is Adsorption Equipment Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.2 and attach it to this application.	
18.2. Is a Scrubber Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.4 and attach it to this application.	
18.3. Is a Thermal Oxidizer of Afterburner Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.1 and attach it to this application.	
18.4. Is a Flare Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.3 and attach it to this application.	
18.5. Is Any Other Control Device Used?	☒ YES ☐ NO
If YES, attach a copy of the Control Device Manufacturer's Specification Sheets.	
If Any Other Control Device is used, complete the rest of Question 18. If not, proceed to Question 19.	
18.6. Describe Control Device: **Conservation vent cap that only allows emissions when pressure becomes greater the 0.5 psi within the tank.**	
18.7. Pollutants Controlled: ☒ VOCs ☒ HAPs ☐ Other (Specify):	
18.8. Control Device Manufacturer: **Morrison**	
18.9. Control Device Model: **Morrison 548A - 1000AV**	
18.10. Control Device Serial Number: **N/A**	
18.11. Control Device Design Capacity: **N/A**	
18.12. Control Device Removal or Destruction Efficiency: **N/A**	

Monitoring Information

19. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO

If Yes, attach a copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_x ☐ SO_x ☐ Metals ☐ Other (Specify):

19.2. Describe the Continuous Emission Monitoring System:

19.3. Manufacturer:

19.4. Model:

19.5. Serial Number:

19.6. Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☐ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.7. Emission Units Monitored:

19.8. Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? ☐ YES ☐ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.9. Emission Units Emitting Simultaneously:

Monitoring and Alarm Information

20. Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit? ☐ YES ☒ NO

If YES, complete the rest of Question 20. If NO, proceed to Question 21.

20.1. Describe the System Alarm(s):

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	**Describe Alarm Trigger**	**Monitoring Device or Alarm Type**	**Does the Alarm Initiate an Automated Response?**
20.1.1.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.2.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.3.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

20.1.4.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.5.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Voluntary Emission Limitation Request Information

21. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 21. If NO, proceed to Question 22.

21.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

22. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 22. If NO, proceed to Question 23.

22.1. Describe Any Proposed Operating Limitations:

Additional Information

23. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 23.

23.1. Describe:

Volatile Organic Storage Tank Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **1 Crowell Road**
2. Tank Identification Number: **TK-01, TK-02, TK-03, TK-04, TK-05, and TK-06**
3. Tank Manufacturer: **Highland Tank**
4. Tank Model: **35,000 gallon 144" Diameter Steel Wall Vertical Tank**
5. Tank Serial Number: **S-615527, S-615522, S-615526, S-615523, S-615525, and S-615524**
6. Tank Type: ☐ External Floating Roof ☐ Internal Floating Roof ☒ Horizontal/Vertical Cylinder ☐ Other (Specify):
7. Tank Material of Construction: ☒ Steel ☐ Plastic ☐ Aluminum ☐ Concrete ☐ Other (Specify):
8. Exterior Tank Color: ☐ Aluminum (Silver) ☐ Gray ☒ White ☐ Black ☐ Other (Specify):
9. Tank Diameter: **12 feet**
10. Tank Height: **42.5 feet**
11. Tank Volume: **35,000 gallons**
12. Product Stored in Tank: **Ethanol**

Attach a Material Safety Data Sheet (MSDS) for the Product Stored in the Tank.

13. Density of Product Stored in Tank: **789 kg/cubic meter** at **15 °C**
14. Molecular Weight of Product Stored in Tank: **46.07**
15. True Vapor Pressure of Product Stored in Tank at Standard Temperature and Pressure: **42.75 mm Hg**
16. Is the Tank Vented? ☒ YES ☐ NO

If YES, complete the rest of Question 16. If NO, proceed to Question 17.

16.1. Type of Vent: ☐ Atmospheric ☒ Conservation ☐ Vacuum Breaker ☐ Closed Vent ☐ Flame Arrestor ☐ Vapor Recovery ☐ Flare ☐ Other (Specify):

16.2 How Does the Tank Vent:
(check all that apply)
☒ Directly to the Atmosphere
☐ Through a Control Device Covered by Forms AQM-4.1 through 4.12
☐ Through Another Control Device Described on This Form

If the tank vents directly to the atmosphere or through another control device described on this form, proceed to Question 16.3. If the tank vents through a control device, provide the stack parameters on the control device form and proceed to Question 17.

General Information

16.3. Emission Point Name: **TK-01, TK-02, TK-03, TK-04, TK-05, and TK-06**

16.4. Vent Height Above Grade: **43.5 feet**

16.5. Vent Exit Diameter: **0.25 feet**
(Provide Vent Dimensions If Rectangular Vent)

16.6. Is a Vent Cap Present? ☒ YES ☐ NO

16.7. Vent Configuration: *(check all that apply)* ☒ Vertical ☐ Horizontal ☐ Downward-Venting ☐ Other (Specify):

16.8. Vent Exit Gas Temperature: **68 °F**

16.9. Vent Exit Gas Flow Rate: **0.005 ACFM**

16.10. Distance to Nearest Property Line: **100 feet**

16.11. Describe Nearest Obstruction: **Building**

16.12. Height of Nearest Obstruction: **25 feet**

16.13. Distance to Nearest Obstruction: **38 feet**

16.14. Are Vent Sampling Ports Provided? ☐ YES ☒ NO

Floating Roof Tank Information

17. Is the Tank a Floating Roof Tank: ☐ YES ☒ NO

If YES, complete the rest of Question 17. If NO, proceed to Question 18.

17.1. Type of Primary Seal: ☐ Mechanical Shoe ☐ Liquid-Mounted ☐ Other (Specify):

17.2. Gap Between Primary Seal and Tank Wall: **inches**

17.3. Type of Secondary Seal: ☐ Liquid-Mounted ☐ Vapor-Mounted ☐ Foam-Filled ☐ Mechanical ☐ Other (Specify):

17.4. Gap Between Secondary Seal and Tank Wall: **inches**

17.5. List the Type of Each Roof Penetration, the Quantity of Each Penetration, and the Method of Sealing

If there are more than five Roof Penetrations, attach additional copies of this page as needed.

Type of Penetration	Number	Method of Sealing
17.5.1.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover ☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.2.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover ☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):

Floating Roof Tank Information			
17.5.3.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.4.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):
17.5.5.		☐ Bolted Cover ☐ Siding Cover ☐ Fabric Sleeve ☐ Gasketed Cover	☐ Rubber/Polymer Seal ☐ Weighted Mechanical Activation ☐ Other (Specify):

Control Device Information

18. Is an Air Pollution Control Device Used? ☒ YES ☐ NO

If an Air Pollution Control Device is used, complete the rest of Question 18. If not, proceed to Question 19.

18.1. Is Adsorption Equipment Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.2 and attach it to this application.

18.2. Is a Scrubber Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.4 and attach it to this application.

18.3. Is a Thermal Oxidizer of Afterburner Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.1 and attach it to this application.

18.4. Is a Flare Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.3 and attach it to this application.

18.5. Is Any Other Control Device Used? ☒ YES ☐ NO

If YES, attach a copy of the Control Device Manufacturer's Specification Sheets.

If Any Other Control Device is used, complete the rest of Question 18. If not, proceed to Question 19.

18.6. Describe Control Device: **Conservation vent cap that only allows emissions when pressure becomes greater than 0.5 psi within the tank.**

18.7. Pollutants Controlled: ☒ VOCs ☒ HAPs ☐ Other (Specify):

18.8. Control Device Manufacturer: **Morrison**

18.9. Control Device Model: **Morrison 548A - 1000AV**

18.10. Control Device Serial Number: **N/A**

18.11. Control Device Design Capacity: **N/A**

18.12. Control Device Removal or Destruction Efficiency: **N/A**

Monitoring Information

19. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO

If Yes, attach a copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_x ☐ SO_x ☐ Metals ☐ Other (Specify):

19.2. Describe the Continuous Emission Monitoring System:

19.3. Manufacturer:

19.4. Model:

19.5. Serial Number:

19.6. Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☐ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.7. Emission Units Monitored:

19.8. Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? ☐ YES ☐ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.9. Emission Units Emitting Simultaneously:

Monitoring and Alarm Information

20. Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit? ☐ YES ☒ NO

If YES, complete the rest of Question 20. If NO, proceed to Question 21.

20.1. Describe the System Alarm(s):

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	**Describe Alarm Trigger**	**Monitoring Device or Alarm Type**	**Does the Alarm Initiate an Automated Response?**
20.1.1.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.2.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.3.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

20.1.4.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
20.1.5.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Voluntary Emission Limitation Request Information

21. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 21. If NO, proceed to Question 22.

21.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

22. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 22. If NO, proceed to Question 23.

22.1. Describe Any Proposed Operating Limitations:

Additional Information

23. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 23.

23.1. Describe:

Emissions Information Application

If you are using this form electronically, press F1 at any time for help

Process Information	
1.	Number of Individual Pieces of Process Equipment in Process: **6**
2.	Number of Individual Control Devices in Process: **6 (conservation vents)**

Emissions Information for First Emission Point/Stack	
3.	Emission Point Name: **TK-01, TK-02, TK-03, TK-04, TK-05, and TK-06 (Methanol Storage)**
4.	Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: **Above ground storage tanks for raw methanol storage.**
5.	Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 5.10 through 5.18)	CAS Number (Not required for 5.1 through 5.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
5.1.	Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.2.	PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.3.	$PM_{2.5}$		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.4.	Sulfur Oxides (SO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.5.	Nitrogen Oxides (NO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.6.	Carbon Monoxide (CO)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.7.	Total Volatile Organic Compounds (VOCs)		**21.4 lbs/day**	**15.1 lbs/day**	**2.9** tons/year	**2.0** tons/year
5.8.	Total Hazardous Air		**21.4 lbs/day**	**15.1 lbs/day**	**2.9** tons/year	**2.0** tons/year

Emissions Information for First Emission Point/Stack						
	Pollutants (HAPs)					
5.9.	CO_2		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.10.	CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.11.	**Methanol**	**67-56-1**	**21.4 lbs/day**	**15.1 lbs/day**	**2.9** tons/year	**2.0** tons/year
5.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
6.	Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above: **See EPA Tanks 4.0.9d output files for emissions estimates. If expected annual emissions are greater than 0 but less than 0.01, 0.01 tons/year is reported.**					
Attach the Basis of Determination or Calculations for each Emission Rate provided above.						

Emissions Information for Second Emission Point/Stack						
7.	Emission Point Name: **TK-01, TK-02, TK-03, TK-04, TK-05, and TK-06 (Ethanol Storage)**					
8.	Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: **Above ground storage tank for raw ethanol storage.**					
9.	Pollutant Emissions					
If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.						
	Pollutant Name (Specify VOCs and HAPs Individually in 9.10 through 9.18)	CAS Number (Not required for 9.1 through 9.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
9.1.	Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.2.	PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year

Emissions Information for Second Emission Point/Stack						
9.3.	$PM_{2.5}$		lbs/hour	lbs/hour	tons/year	tons/year
9.4.	Sulfur Oxides (SO_X)		lbs/hour	lbs/hour	tons/year	tons/year
9.5.	Nitrogen Oxides (NO_X)		lbs/hour	lbs/hour	tons/year	tons/year
9.6.	Carbon Monoxide (CO)		lbs/hour	lbs/hour	tons/year	tons/year
9.7.	Total Volatile Organic Compounds (VOCs)		5.7 lbs/day	3.3 lbs/day	0.75 tons/year	0.44 tons/year
9.8.	Total Hazardous Air Pollutants (HAPs)		lbs/day	lbs/day	tons/year	tons/year
9.9.	CO_2		lbs/hour	lbs/hour	tons/year	tons/year
9.10.	CO_{2e}		lbs/hour	lbs/hour	tons/year	tons/year
9.11.	**Ethanol**	64-17-5	5.7 lbs/day	3.3 lbs/day	0.75 tons/year	0.44 tons/year
9.12.			lbs/hour	lbs/hour	tons/year	tons/year
9.13.			lbs/hour	lbs/hour	tons/year	tons/year
9.14.			lbs/hour	lbs/hour	tons/year	tons/year
9.15.			lbs/hour	lbs/hour	tons/year	tons/year

10. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above: **See EPA Tanks 4.0.9d output files for emissions estimates. If expected annual emissions are greater than 0 but less than 0.01, 0.01 tons/year is reported.**

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Third Emission Point/Stack

11. Emission Point Name: **TK-01, TK-02, TK-03, TK-04, TK-05, and TK-06 (Propylene Glycol Storage)**

12. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: **Above Ground Storage tank for raw propylene glycol storage.**

Emissions Information for Third Emission Point/Stack

13. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 13.10 through 13.18)	CAS Number (Not required for 13.1 through 13.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
13.1.	Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.2.	PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.3.	$PM_{2.5}$		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.4.	Sulfur Oxides (SO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.5.	Nitrogen Oxides (NO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.6.	Carbon Monoxide (CO)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.7.	Total Volatile Organic Compounds (VOCs)		**0.06 lbs/day**	**0.02 lbs/day**	**0.01** tons/year	**0.01** tons/year
13.8.	Total Hazardous Air Pollutants (HAPs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.9.	CO_2		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.10.	CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.11.	**Propylene Glycol**	**57-55-6**	**0.06 lbs/day**	**0.02 lbs/day**	**0.01** tons/year	**0.01** tons/year
13.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

Emissions Information for Third Emission Point/Stack
14. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above: **See EPA Tanks 4.0.9d output files for emissions estimates. If expected annual emissions are greater than 0 but less than 0.01, 0.01 tons/year is reported.**
Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Fourth Emission Point/Stack

15. Emission Point Name:

16. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:

17. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 17.10 through 17.18)	CAS Number (Not required for 17.1 through 17.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
17.1.	Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.2.	PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.3.	$PM_{2.5}$		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.4.	Sulfur Oxides (SO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.5.	Nitrogen Oxides (NO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.6.	Carbon Monoxide (CO)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.7.	Volatile Organic Compounds (VOCs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.8.	Total Hazardous Air Pollutants (HAPs)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.9.	CO_2		**lbs/hour**	**lbs/hour**	tons/year	tons/year

Emissions Information for Fourth Emission Point/Stack					
17.10. CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.11.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.12.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.13.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.14.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.15.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
18. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:					
Attach the Basis of Determination or Calculations for each Emission Rate provided above.					
If there are more than four Emission Points/Stacks, attach additional copies of this form as needed.					

Overall Process Emissions					
19. Pollutant Emissions					
If more than 15 pollutants are emitted from this Process, attach additional copies of this page as needed.					
Pollutant Name (Specify VOCs and HAPs Individually in 19.10 through 19.18)	CAS Number (Not required for 19.1 through 19.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
19.1. Particulate Matter (PM)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.2. PM_{10}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.3. $PM_{2.5}$		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.4. Sulfur Oxides (SO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.5. Nitrogen Oxides (NO_X)		**lbs/hour**	**lbs/hour**	tons/year	tons/year

Overall Process Emissions

19.6.	Carbon Monoxide (CO)		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.7.	Total Volatile Organic Compounds (VOCs)		**27.2 lbs/day**	**18.5 lbs/day**	**3.7** tons/year	**2.5** tons/year
19.8.	Total Hazardous Air Pollutants (HAPs)		**21.4 lbs/day**	**15.1 lbs/day**	**2.9** tons/year	**2.0** tons/year
19.9.	CO_2		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.10.	CO_{2e}		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.12.	**Methanol**		**21.4 lbs/day**	**15.1 lbs/day**	**2.9** tons/year	**2.0** tons/year
19.13.	**Ethanol**		**5.7 lbs/hour**	**3.3 lbs/hour**	**0.75** tons/year	**0.44** tons/year
19.14.	**Propylene Glycol**		**0.06 lbs/hour**	**0.02 lbs/hour**	**0.01** tons/year	**0.01** tons/year
19.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

20. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above: **See EPA Tanks 4.0.9d output files for emissions estimates. If expected annual emissions are greater than 0 but less than 0.01, 0.01 tons/year is reported.**

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Minor New Source Review Information

21. Does the Process Have the Potential to Emit More Than Five Tons Per Year of Any Pollutant? ☐ YES ☐ NO

22. Is the Source New or Existing? ☐ NEW ☒ EXISTING
See Question 11 of AQM-1

If the Process has the Potential to Emit more than five tons per year of any pollutant, and is a New Source, a Control Technology Analysis pursuant to Regulation No. 1125 Section 4 must be conducted and attached to this application.

Major New Source Review Information

23. Does the Process Have the Potential to Emit More Than the Significance Level for Any Pollutant? *(Check All That Apply)*

- ☐ Greater Than 25 Tons Per Year of Particulate Matter (PM)
- ☐ Greater Than 15 Tons Per Year of PM_{10}
- ☐ Greater Than 10 Tons Per Year of $PM_{2.5}$
- ☐ Greater Than 40 Tons Per Year of Sulfur Dioxide(SO_2)
- ☐ Greater Than 25 Tons Per Year of Nitrogen Oxides (NO_X) in New Castle and Kent County
- ☐ Greater Than 100 Tons Per Year of Nitrogen Oxides (NO_X) in Sussex County
- ☐ Greater Than 100 Tons Per Year of Carbon Monoxide (CO)
- ☐ Greater Than 25 Tons Per Year of Total Volatile Organic Compounds (VOCs) in New Castle and Kent County
- ☐ Greater Than 50 Tons Per Year of Total Volatile Organic Compounds (VOCs) in Sussex County
- ☐ Greater Than 75,000 Tons Per Year of Equivalent Carbon Dioxide (CO_{2e})

If the Process has the Potential to Emit greater than any of the amounts listed above 7 DE Admin. Code 1125 Sections 2 and/or 3 apply. Contact the Department at (302) 323-4542 or (302) 739-9402 for additional information

Additional Information

24. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 24.

24.1. Describe:

Parcel # 0704640129

Property Address: 1 CROWELL RD
WILMINGTON, DE 19804-
Subdivision: PLEASANT HILLS
Owner: CROWELL ASSOCIATES LLC
761 GRANTHAM LA
Owner Address:
NEW CASTLE, DE 19720
Municipal Info: Unincorporated

Lot #: A
Location:
Map Grid: 09003500
Block:
Census Tract: 127.00
Street Type:
Water:
Microfilm #: 004448

Property Class: INDUSTRIAL
Lot Size: 5.34
Lot Depth: 0
Lot Frontage: 0
Street Finish:

Related Project Plans

	A/P No.	Project Name	Work Type	Status
Details	20010552	SHAFFER, BRENT C., ESQUIRE	ZONING VERIFICATION PROCESS	COMPLETE
Details	20020919	BRENT SHAFFER, ESQUIRE	ZONING VERIFICATION PROCESS	COMPLETE

Permit History (July 1998 – present)

	A/P No.	Permit Type	Status
Details	201214792	COMMERCIAL TENANT FITOUT	Closed
Details	201214514	HVAC PERMIT	Closed
Details	201213565	HVAC PERMIT	Closed
Details	201212442	PLUMBING PERMIT	Closed
Details	201212143	COMMERCIAL TENANT FITOUT	Closed

District & Zoning Info

Districts

- **FIRE/RESCUE - MINQUAS**
- **RED CLAY SCHOOL DIST-TRES**
- NORTH OF C&D CANAL
- COUNCIL 1 - KENNETH R WOODS
- SEWER DISTRICT NORTHERN-ASMT
- PLANNING 8 - LOWER CHRISTINA
- DE REP 19-KIMBERLY WILLIAMS
- DE SEN 09-JOHN "JACK" WALSH
- TRAFFIC ZONE T098 (YR2000)

Zoning

- I - UDC - INDUSTRIAL

Deed History

Grantee(s)	Deed	Multi?	Sale Date	Sale Amount
CROWELL CORPORATION	R86 683	N	8/1/1972	$10.00
ATCC INC	20110727 0041494	N	7/27/2011	$10.00
CROWELL ASSOCIATES LLC	20120511 0026494	N	5/11/2012	$10.00

Tax/Assessment Info

Assessment

Land: 450000
Structure: 1374500
Homesite: 0
Total: 1824500
County Taxable: 1824500
School Taxable: 1824500

Tax Bills as of 8/12/2021 3:01:33 AM

	County			School		
Tax Year	Principal Due	Penalty Due	Amt Paid	Principal Due	Penalty Due	Amt Paid
2010A	$0.00	$0.00	$13,121.26	$0.00	$0.00	$33,278.89
2011A	$0.00	$0.00	$13,211.03	$0.00	$0.00	$32,895.74
2012A	$0.00	$0.00	$13,228.54	$0.00	$0.00	$32,512.59
2013A	$0.00	$0.00	$13,192.60	$0.00	$0.00	$34,501.30
2014A	$0.00	$0.00	$14,009.29	$0.00	$0.00	$37,215.40
2015A	$0.00	$0.00	$13,194.06	$0.00	$0.00	$39,026.06
2016A	$0.00	$0.00	$13,178.73	$0.00	$0.00	$42,552.81
2017A	$0.00	$0.00	$13,211.21	$0.00	$0.00	$45,143.60
2018A	$0.00	$0.00	$14,175.91	$0.00	$0.00	$44,900.95
2019A	$0.00	$0.00	$15,047.02	$0.00	$0.00	$45,229.36

2020A	$0.00	$0.00	$15,138.97	$0.00	$0.00	$45,229.36
2021A	$15,152.66	$0.00	$0.00	$45,019.54	$0.00	$0.00

Tax Payments as of 8/12/2021 3:01:33 AM

Date Paid	Amt Paid
9/21/2010	$46,400.15
8/16/2011	$13,211.03
8/16/2011	$32,895.74
9/28/2012	$45,741.13
9/23/2013	$47,693.90
11/3/2014	$14,009.29
11/3/2014	$37,215.40
9/16/2015	$52,220.12
10/12/2016	$55,731.54
11/1/2016	$3,343.88
9/18/2017	$58,354.81
9/10/2018	$59,076.86
9/11/2019	$60,276.38
8/11/2020	$60,368.33

County Balance Due: $15,152.66

School Balance Due: $45,019.54

These amounts are valid through the last day of the month. For accounts with delinquent balances, statutory penalty will accrue on the first day of next month.

Sewer History as of 8/12/2021 3:01:04 AM

Tax Year	Principal Due	Penalty Due	Date Paid	Amount Paid
2005S1	$0.00	$0.00	3/7/2005	$1,638.81
2005S2	$0.00	$0.00	6/3/2005	$519.23
2005S3	$0.00	$0.00	9/6/2005	$580.36
2005S4	$0.00	$0.00	11/30/2005	$1,872.58
2006S1	$0.00	$0.00	3/3/2006	$598.50
2006S2	$0.00	$0.00	6/5/2006	$639.31
2006S3	$0.00	$0.00	9/7/2006	$650.70
2006S4	$0.00	$0.00	12/6/2006	$1,217.74
2007S1	$0.00	$0.00	4/3/2007	$1,124.78
2007S2	$0.00	$0.00	6/14/2007	$711.02
2007S3	$0.00	$0.00	9/14/2007	$725.07
2007S4	$0.00	$0.00	12/20/2007	$1,733.65
2008S1	$0.00	$0.00	3/26/2008	$1,199.15
2008S2	$0.00	$0.00	5/28/2008	$725.07
2008S3	$0.00	$0.00	9/5/2008	$999.29
2008S4	$0.00	$0.00	12/10/2008	$1,677.88
2009S1	$0.00	$0.00	3/25/2009	$1,538.44
2009S2	$0.00	$0.00	6/10/2009	$594.93
2009S3	$0.00	$0.00	10/2/2009	$1,181.08
2009S4	$0.00	$0.00	12/22/2009	$2,387.71
2010S1	$0.00	$0.00	6/22/2010	$2,409.05
2010S2	$0.00	$0.00	9/29/2010	$1,293.66
2010S3	$0.00	$0.00	9/29/2010	$1,685.62
2010S4	$0.00	$0.00	8/16/2011	$3,344.42
2011S1	$0.00	$0.00	8/16/2011	$2,980.83
2011S2	$0.00	$0.00	8/23/2011	$1,063.97
2011S3	$0.00	$0.00	10/4/2011	$1,203.81
2011S4	$0.00	$0.00	3/28/2012	$2,628.28
2012S1	$0.00	$0.00	3/28/2012	$1,541.44
2012S2	$0.00	$0.00	5/31/2012	$718.23
2012S3	$0.00	$0.00	9/21/2012	$977.90
2012S4	$0.00	$0.00	12/7/2012	$287.29
2013S1	$0.00	$0.00	4/2/2013	$110.50
2013S2	$0.00	$0.00	6/18/2013	$16.57
2013S3	$0.00	$0.00	9/17/2013	$22.96
2013S4	$0.00	$0.00	12/18/2013	$28.70
2014S1	$0.00	$0.00	4/9/2014	$28.70
2014S2	$0.00	$0.00	6/9/2014	$11.48
2014S3	$0.00	$0.00	9/17/2014	$22.96
2014S4	$0.00	$0.00	12/22/2014	$252.57
2015S1	$0.00	$0.00	3/31/2015	$34.44
2015S2	$0.00	$0.00	6/18/2015	$45.92
2015S3	$0.00	$0.00	9/17/2015	$51.66
2015S4	$0.00	$0.00	12/22/2015	$28.70
2016S1	$0.00	$0.00	4/20/2016	$51.66
2016S2	$0.00	$0.00	6/20/2016	$45.92
2016S3	$0.00	$0.00	9/9/2016	$51.67
2016S4	$0.00	$0.00	12/20/2016	$45.92
2017S1	$0.00	$0.00	6/7/2017	$85.28
2017S2	$0.00	$0.00	6/7/2017	$86.10
2017S3	$0.00	$0.00	9/5/2017	$28.70
2017S4	$0.00	$0.00	12/28/2017	$68.88
2018S1	$0.00	$0.00	4/26/2018	$66.02
2018S2	$0.00	$0.00	5/31/2018	$63.14
2018S3	$0.00	$0.00	8/15/2018	$70.72

2018S4	$0.00	$0.00	2/13/2020	$75.53
2019S1	$0.00	$0.00	2/13/2020	$109.29
2019S2	$0.00	$0.00	2/13/2020	$109.29
2019S3	$0.00	$0.00	2/13/2020	$109.29
2019S4	$0.00	$0.00	2/13/2020	$109.29
2020S1	$0.00	$0.00	2/13/2020	$70.68
2020S2	$0.00	$0.00	9/14/2020	$77.10
2020S3	$0.00	$0.00	12/8/2020	$75.07
2020S4	$0.00	$0.00	12/8/2020	$70.72
2021S1	$0.00	$0.00	3/10/2021	$9,785.19
2021S2	$9,785.19	$684.96	Not Available	$0.00
2021S3	$10,366.44	$0.00	Not Available	$0.00

Balance Due: $20,836.59

These amounts do not reflect statutory penalty, which was imposed on the first of the month. To obtain the exact amount necessary to pay the account in full, please call New Castle County's Treasury Division at (302) 395-5340.

Commercial Structure Characteristics

Building #: 01

Occupancy:	440	# of Stories:	1	Year Built:	1965
Struct Class:	C	Quality:	C	Condition:	AV
Floor Level:	F	Grnd Flr Area:	88308	Total Flr Area:	88308
Ext Wall Type:	13	Wall Height:	20	Perimeter:	1251
AC %:	0	Heat %:	90	Rentable Units:	1
Bsmt:	0	Bsmt Util:	0		
Year Renov:	0	Renov Rtng:	0	Eff. Yr Built:	1963

Building #: 01

Occupancy:	310	# of Stories:	2	Year Built:	1965
Struct Class:	C	Quality:	C	Condition:	AV
Floor Level:	A	Grnd Flr Area:	5172	Total Flr Area:	7377
Ext Wall Type:	13	Wall Height:	8	Perimeter:	461
AC %:	90	Heat %:	90	Rentable Units:	1
Bsmt:	0	Bsmt Util:	0		
Year Renov:	0	Renov Rtng:	0	Eff. Yr Built:	1963

Building #: 01

Occupancy:	440	# of Stories:	1	Year Built:	1985
Struct Class:	C	Quality:	C	Condition:	AV
Floor Level:	F	Grnd Flr Area:	1058	Total Flr Area:	1058
Ext Wall Type:	13	Wall Height:	28	Perimeter:	69
AC %:	0	Heat %:	90	Rentable Units:	1
Bsmt:	0	Bsmt Util:	0		
Year Renov:	0	Renov Rtng:	0	Eff. Yr Built:	1983

Mitsubishi International Corporation

SAFETY DATA SHEET
METHANOL

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifier

Product name: Methanol

Product codes(s): Methanol

Synonyms: Alcohol, methyl hydroxide; Methyl hydrate; Methyl alcohol; Wood alcohol; Wood spirit

REACH Registration Number: No data available

1.2 Relevant identified uses of the substance or mixture and uses advised against

General use: Solvent, fuel, feedstock

Uses advised against: No uses advised against

1.3 Details of the supplier of the safety data sheet

Distributor

Mitsubishi International Corporation
1221 McKinney St, Suite, 3500
Houston, Texas 77010
+1-713-652-9245

1.4 Emergency telephone number: Chemtrec: +1-800-424-9300

SECTION 2 - HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture

Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquid - Category 2 [H225]
Acute toxicity, oral - Category 3 [H301]
Acute toxicity, dermal - Category 3 [311]
Acute toxicity, inhalation - Category 3 [H331]
Specific target organ toxicity, single exposure - Category 1 (STOT SE 1) [H370]

2.2 Label Elements

Hazard Symbol(s):

GHS02 GHS06 GHS08

Signal Word: Danger

Hazard Statement(s):

H225 - Highly flammable liquid and vapor
H301 - Toxic if swallowed
H311 - Toxic in contact with skin
H331 - Toxic if inhaled
H370 - Causes damage to organs: eyes, skin, respiratory system, central nervous system, gastrointestinal tract.

Precautionary Statements:

[Prevention]

P210 - Keep away from heat, sparks, open flames and hot surfaces. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground and bond container and receiving equipment.
P241 - Use explosion-proof electrical, ventilating, lighting and mixing equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P260 - Do not breathe fumes, mists, vapors and spray.
P280 - Wear protective gloves, protective clothing, eye protection and face protection.
P264 - Wash hands thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.

[Response]

P370 + P378 - In case of fire: Use water fog, foam, dry chemical or carbon dioxide for extinction.
P303 + P361 + P353 - IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water or shower.
P363 - Wash contaminated clothing before reuse.
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
P330 - Rinse mouth with water.
P321 - Specific treatment: Refer to product label and Section 4. Contact a POISON CENTER or doctor.
P304 + P340 + P311 - IF INHALED: Remove victim to fresh air and keep at rest in a comfortable position for breathing. Call a POISON CENTER or doctorwater or shower.

[Storage]

P403 + P233 + P235 - Store in well-ventilated place. Keep container tightly closed. Keep cool.
P405 - Store locked up.

[Disposal]

P501 - Dispose of contents in accordance with national and local regulations.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

% by Weight	Ingredient	CAS Number	EC Number	Index Number	EC Classification
>99	Methanol	67-56-1	200-659-6	603-001-00-X	F, R11; Xn, R68, R20/21/22

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

3.2 Mixtures

Chemical characterization (preparation)

Not applicable

SECTION 4 - FIRST AID MEASURES

4.1 Description of first aid measures

In all cases of doubt, or when symptoms persist, seek medical attention.

Inhalation: If product vapor or mists causes respiratory irritation or distress, move the exposed person to fresh air immediately. If breathing is difficult or irregular, administer oxygen; if respiratory arrest occurs, start artificial respiration by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. If symptoms persist, seek medical attention immediately.

Eyes: Immediately flush eyes with large amounts of water for 15 minutes. Remove contact lenses, if present and easy to do, after the first 2 minutes and continue rinsing, lifting upper and lower eyelids occasionally. Obtain immediate medical attention, preferably from an ophthalmologist.

Skin: Flush skin with large amounts of water while removing contaminated clothing. Wash affected area with soap and water. Wash contaminated clothing and shoes thoroughly before reuse. Seek prompt medical attention if irritation persists.

Ingestion: Ingestion of methanol is potentially life threatening. Onset of symptoms may be delayed for 18 to 24 hours after digestion. Rinse mouth with water if victim is conscious. Do not induce vomiting unless directed to do so by medical personnel. If conscious, alert and able to swallow, give the victim 2 - 4 cupfuls of water or milk to drink, Never give anything by mouth to an unconscious person. Get immediate medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Potential health symptoms and effects

Eyes: Causes eye irritation characterized by redness, burning sensation, tearing, swelling and inflammation. May cause corneal injury and painful sensitization to light. Continued exposure may cause lesions. Vapors and fumes can cause eye irritation.

Skin: May cause skin irritation. Methanol is a defatting agent. Repeated or prolonged exposure may cause drying and cracking of skin. Absorption through the skin can be toxic. Symptoms may be similar to inhalation exposure.

Inhalation: Irritating to mucous membranes and to the respiratory system. Causes central nervous system depression and particularly affects the optic nerve. Symptoms of over-exposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, narcosis, coma and death.

Ingestion: Ingestion of 100 - 125 ml (~3 to 4 oz.) can be fatal or cause serious, irreversible injury such as blindness. Symptoms are similar to those for inhalation, but severity and speed of appearance may be greater. 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.

Chronic: Prolonged or repeated contact with skin may defat tissue causing dermatitis or aggravate existing skin problems. Pre-existing skin, eye and respiratory disorders may be aggravated by exposure to this product. Impaired kidney, liver and central nervous system functions from pre-existing disorders may be aggravated by exposure to this product. Chronic exposures may cause reproductive disorders and teratogenic effects. Refer to Section 11.2.

4.3 Indication of any immediate medical attention and special treatment needed

Advice to Doctor/Physician and Hospital Personnel: Effects may be delayed. Ethanol may inhibit methanol metabolism.

SECTION 5 - FIRE FIGHTING MEASURES

5.1 Extinguishable media

Suitable methods of extinction: Use media such as water fog, water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable methods of extinction: Methanol will float on water. As a result water using water jets or streams may spread the fire.

5.2 Special hazards arising from the substance or mixture

Flammable liquid and vapor. Methanol burns with a clean, clear flame that is almost invisible in daylight. Vapors may form an explosive mixture with air. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Vapors are easily ignited by heat, sparks or flame. Containers may explode if exposed to fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Symptoms of overexposure to these gases may not be apparent. Seek medical advice.

Explosion hazards: Vapor forms an explosive mixture with air.

5.3 Advice for firefighters

Responders should stay upwind. Full protective equipment including self-contained breathing apparatus should be used (HAZMAT suits) if there is liquid methanol or if vapor levels are above the threshold limit value (TLV). Flames may be invisible during the day. The use of infraed and/or heat detection devices is recommended. Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion when exposed to extreme heat. If possible firefighters should control runoff water to prevent environmental contamination.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective clothing designated in Section 8. Remove all sources of ignition. Ventilate the area. Keep unnecessary and unprotected personnel from entering the hazard area.

6.2 Environmental precautions

Do not flush to sewer. Avoid dispersal of spilled material or runoff and prevent contact with soil and entry into drains, sewers or waterways.

6.3 Methods and materials for containment and cleaning up

Approach spill from upwind direction. Cover drains and contain spill. Recover liquid where possible, or dilute with water or use alcohol-resistant foam to reduce fire hazard. Collect liquid in an approved container, or cover with a large quantity of inert absorbent. Do not use combustible material such as sawdust. Collect product using non-sparking tools and place into approved container for proper disposal. Observe material restrictions (Sections 7.2 and 10.5). Clean contaminated area with soap and water.

US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

6.4 Reference to other sections

For indications about waste treatment, see Section 13.

SECTION 7 - HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Keep away from sources of ignition. No smoking. Wear all appropriate protective equipment specified in Section 8. Wash hands thoroughly after handling. Remove contaminated clothing and wash before reuse. Keep containers closed when not in use.

Advice on protection against fire and explosion

Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use non-sparking type tools and equipment, including explosion proof ventilation.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool, dry, well-ventilated storage areas in closed containers. Keep away from oxidizers, acids and bases.

Transfer to approved containers having correct labeling. DO NOT store in aluminum or lead containers. (Anhydrous methanol is non-corrosive to most metals at ambient temperatures except lead and magnesium. Coatings of copper and its alloys, zinc or aluminum are unsuitable for storage as they are attacked slowly. Mild Steel is the recommended construction material for tanks.)

Plastics may be used for short-term storage, but are not recommended for long-term use due to deterioration effects and the subsequent risk of contamination.

Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition.

Outside or detached storage is recommended. Tanks must be grounded, vented and have vapor emission controls including floating roofs, inert gas blanketing to prevent the formation of explosive mixtures and pressure vacuum relief valves to control tank pressures. Tanks should be of welded construction and should also be diked.

7.3 Specific end uses

Apart from the uses mentioned in Section 1.2, no other specific uses are stipulated.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

CAS Number	Ingredient	OSHA PEL - TWA	ACGIH TLV	NIOSH
67-56-1	Methanol	200 ppm; 250 mg/m3	200 ppm; 160 mg/m3 TWA 250 ppm; 327 mg/m3 STEL Skin designation	200 ppm; 260 mg/m3 TWA; 250 ppm; 325 mg/m3 STEL; 6,000 ppm IDLH Skin designation

8.2 Exposure controls

Individual protection measures: The level of risk of exposure to methanol will dictate the appropriate level of personal protective equipment (PPE) required. Wear protective clothing and chemical resistant footwear to prevent repeated or prolonged contact with methanol. Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the representative supplier.

Hygiene measures: Facilities storing or using this material should be equipped with an eyewash station and safety shower. Change contaminated clothing. Preventive skin protection is recommended. Wash hands thoroughly after use, before eating, drinking or using the lavatory.

Eye/face protection: Wear protective chemical goggles and a face shield use. Refer to 29 CFR 1910.133, ANSI Z87.1 or European Standard EN 166.

Hand Protection: Wear rubber (butyl or nitrile) or neoprene gloves for protection against materials in Section 3. Gloves should be impermeable to chemicals and oil. Breakthrough time of selected gloves must be greater than the intended use period.

Other protective equipment: Protective clothing. Protective boots, if the situation requires.

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

Environmental exposure controls: Do not empty into drains.

PPE must not be considered a long-term solution to exposure control. PPE usage must be accompanied by employer programs to properly select, maintain, clean fit and use. Consult a competent industrial hygiene resource to determine hazard potential and/or the PPE manufacturers to ensure adequate protection.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Clear, colorless liquid
Odor	Mild, pungent alcoholic
Odor Threshold	59 ppm
Molecular Weight	32.04
Chemical Formula	CH3OH
pH	No data available
Freezing/Melting Point, Range	-98 °C (-144.4 °F)
Boiling Point	64.5 °C (148.1 °F)
Evaporation Rate	5.9 (n-BuAc =1); 5.3 (Ether = 1)
Flammability (solid, gas)	Not applicable
Flash Point	11 °C (51.8 °F), closed cup
Autoignition Temperature	455 °C (851 °F), ASTM E-659
Decomposition Temperature	No data available
Lower Explosive Limit (LEL)	6% (v)
Upper Explosive Limit (UEL)	36.5% (v)
Vapor Pressure	97 mm Hg @ 20 °C
Vapor Density	1.11 (Air = 1)
Specific Gravity	0.791 - 0.793
Viscosity	0.55 cps @ 20 °C
Soluble in	Water, Ethanol, Ether, Acetone, Chloroform
Partition Coefficient: n-octanol/water	-0.82/-0.66
Saturation Concentration	166 g/m3
Volatiles by Volume @ 20 °C	100%

9.2 Other data

No data available

SECTION 10 - STABILITY AND REACTIVITY

10.1 Reactivity

No special reactivity has been reported.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapors may form explosive mixture with air. Reacts with strong oxidizing agents and halogenated hydrocarbons. Avoid excessive heat and sources of ignition. The substance decomposes on burning and may produce irritating fumes.

10.4 Conditions to avoid

Ignition sources, high temperatures, incompatible materials, oxidizers. Avoid impact. Avoid confined areas.

10.5 Incompatible materials

Avoid contact with strong oxidizing agents, strong mineral or organic acids, strong bases and halogenated hydrocarbons. Contact with these may cause a violent or explosive reaction. May be corrosive to lead, aluminum, magnesium and platinum.

10.6 Hazardous decomposition products

Thermal decomposition products include oxides of carbon, formic acid, formaldehyde and other toxic fumes and gases.

SECTION 11 - TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute Oral Toxicity

LDLO, Human: 143 mg/kg

LD50, Rat: 1,187 - 2,769 mg/kg

Acute inhalation toxicity

LC50, Rat: 85.26mg/l, 4 h (IUCLID)

Acute dermal toxicity

LD50, Rabbit: 17,100 mg/kg

Skin irritation

No data available

Eye irritation

Causes eye irritation.

Sensitization

No data available

Genotoxicity
No data available
Mutagenicity
No data available
Specific organ toxicity - single exposure
May cause drowsiness or dizziness.
Specific organ toxicity - repeated exposure
No data available
Aspiration hazard
No data available

11.2 Further information

Material is slowly eliminated from the body; therefore, it can have cumulative toxicity effects with repeated exposures. Methanol is a potential hazard to the fetus. May cause liver disorder (e.g. edema, proteinuria) and damage. Significant exposure to this product may adversely affect people with chronic disease of the respiratory system, central nervous system, kidneys, liver, skin and/or eyes.

Methanol is not listed as a carcinogen by ACGIH, IARC, NTP or OSHA. No data is available regarding the mutagenicity and/or teratogenicity of this material, nor is there any available data that indicates it causes adverse developmental and/or fertility effects in humans. Developmental effects have been observed in the offspring of rats and mice exposed to methanol by inhalation. These included skeletal, cardiovascular, urinary system and central nervous system (CNS) malformations in rats and increased resorptions and skeletal and CNS malformations in mice.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12 - ECOLOGICAL INFORMATION

12.1 Toxicity

Methanol is dangerous to aquatic life in high concentrations. A study of methanol's toxic effects on sewage sludge bacteria reported little effect on digestion at 0.1% while 0.5% methanol retarded digestion. Methanol will be broken down into carbon dioxide and water.

Acute and prolonged toxicity to fish: LC50 - Pimephales promelas (Fathead minnow), 96 h: 29,400 mg/l
Toxicity to aquatic invertebrates: EC50 - Daphnia magna (Water flea), static, 24 h: 23,500 mg/l (immobilization)

12.2 Persistence and degradability

Methanol is readily biodegradable in water (test: 99% OECD; BOD 80% ThOD).

When released into the air methanol is expected to exist in the aerosol phase and will be degraded from the ambient atmosphere by the reaction with photochemically produced hydroxyl radicals with an estimated half life of 17.8 days. When released into the soil, methanol is expected to readily biodegrade and leach into groundwater. When released into water, it is expected to have a half life of between 1 and 10 days.

12.3 Bioaccumulation potential

Methanol is not expected to bioaccumulate as the Partition Coefficient is <1.

12.4 Mobility

Mobility in soil is high.

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects

Additional ecological information
Wastewater Purification: Sludge digestion is inhibited at 800 mg/l. Nitrification of activated sludge is inhibited at 160 mg/l.
Do not allow material to run into surface waters, waste water or soil.

SECTION 13 - DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Methods of disposal: The generation of waste should be avoided or minimized whenever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. 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. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Recycling is the recommended disposal method. Biological treatment may be used for dilute aqueous waste. Incineration should only be performed using a legally approved incinerator fitted with emission controls. Methanol wastes are not suitable for underground injection.

RCRA P-Series: No listing
RCRA U-Series: Methanol (CAS #67-56-1); waste number U154 (Ignitable waste)

SECTION 14 - TRANSPORT INFORMATION

United States Department of Transportation (Ground Transportation)

Proper Shipping Name:	Methanol
Hazard Class:	3
UN:	1230
Packing Group:	II
NAERG:	Guide #131
CERCLA Reportable Quantity:	2,268 kg (5,000 lbs)

IMDG (Maritime Transport)

Proper Shipping Name:	Methanol
Hazard Class:	3
UN:	1230
Packing Group:	II
Marine Pollutant:	No

IATA (Air Transportation)

Proper Shipping Name:	Methanol
Hazard Class:	3
UN:	1230
Packing Group:	II

SECTION 15 - REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for substance or mixture

U. S. Federal Regulations

OSHA Hazard Communication Standard: This material is classified as hazardous in accordance with OSHA 29 CRF 1910.1200.

OSHA Process Safety Management Standard: Methanol (CAS #67-56-1) is not regulated under OSHA PSM Standard 29 CFR 1910.119.

EPA Risk Management Planning Standard: Methanol (CAS #67-56-1) is not regulated under EPA RMP Standard (RMP) 40 CFR Part 68.

EPA Federal Insecticide, Fungicide and Rodenticide Act: This product is not a registered Pesticide under the FIFRA, 40 CFR Part 150.

TSCA Status: Methanol (CAS #67-56-1) is listed on the Toxic Substance Control Act (TSCA) Inventory. It is not subject to TSCA 12 (b) Export Notification.

Superfund Amendments and Reauthorization Act (SARA)

SARA Section 311/312 Hazard Categories: Fire Hazard, Acute Health Hazard, Chronic Health Hazard

SARA 313 Information: Methanol (CAS #67-56-1) is subject to the reporting levels established by Section 313 of the Emergency Planning and and Community Right-to Know Act of 1986.

SARA 302/304 Extremely Hazardous Substance

No components of the product exceed the threshold (de minimis) reporting levels established by of these sections of Title III of SARA.

SARA 302/304 Emergency Planning & Notification

No components of the product exceed the threshold (de minimis) reporting levels established by of these sections of Title III of SARA.

Comprehensive Response Compensation and Liability Act (CERCLA): Methanol is a CERCLA reportable material.

Methanol (CAS #67-56-1): RQ = 2,268 kg (5,000 lbs)

Clean Air Act (CAA)

Methanol (CAS #67-56-1) is listed as Hazardous Air Pollutants (HAPs) designated in CAA Section 112 (b).
This product does not contain any Class 1 Ozone depletors.
This product does not contain any Class 2 Ozone depletors.

Clean Water Act (CWA)

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

U.S. State Regulations

California Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986

Methanol (CAS #67-56-1) is known to the State of California to cause reproductive harm (developmental.

Other U.S. State Inventories

Methanol (CAS #67-56-1) is listed on the following State Hazardous Substance Inventories, Right-to-Know lists and/or Air Quality/ Air Pollutants lists: CA, DE, ID, IL, ME, MA, MN, NJ, NY, PA, WA.

Global Chemical Inventory Lists

Country	Inventory Name	Inventory Listing*
Canada:	Domestic Substance List (DSL).	Yes
Canada:	Non-Domestic Substance List (NDSL).	No
Europe:	Inventory of New and Existing Chemicals (EINECS)	Yes
United States:	Toxic Substance Control Act (TSCA)	Yes
Australia:	Australian Inventory of Chemical Substances (AICS)	Yes
New Zealand:	New Zealand Inventory of Chemicals (NZIoC)	Yes
China:	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Japan:	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea:	Existing Chemicals List (ECL)	Yes
Philippines:	Philippines Inventory of Chemicals and Chemical Substances (PICCS)	Yes

*"Yes" indicates that all components of this product are in compliance with the inventory requirements administered by the governing country.
*"No" indicates that one or more components of this product are not on the inventory and are not exempt from listing.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

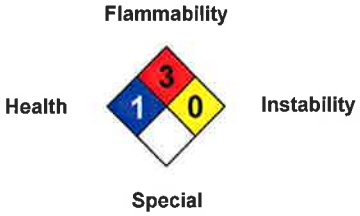
SECTION 16 - OTHER INFORMATION

Hazardous Material Information System (HMIS)

HMIS and NFPA Hazard Rating Legend

* = Chronic Health Hazard	2 = MODERATE
0 = INSIGNIFICANT	3 = HIGH
1 = SLIGHT	4 = EXTREME

National Fire Protection Association (NFPA)



Mitsubishi International Corporation cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. it is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in this sheet was written based on the best knowledge and experience currently available.

Version 1
Preparation date: 14 May 2015

SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY

Product name: Propylene Glycol Industrial Grade

Issue Date: 06/07/2018
Print Date: 07/11/2018

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

1. IDENTIFICATION

Product name: Propylene Glycol Industrial Grade

Recommended use of the chemical and restrictions on use
Identified uses: Manufacture of substance, industrial Distribution of substance, industrial Formulation & (re)packing of substances and mixtures, industrial Uses in Coatings, industrial Uses in Coatings, consumer Use as binders and release agents: Industrial (SU3) Functional Fluids, industrial Use in laboratories, industrial Polymer production: Industrial (SU10) Rubber production and processing, industrial Water treatment chemicals For industrial use. Mining Chemicals Use in laboratories, professional Use as binders and release agents, professional Professional use in cleaning agents. professional use Uses in Coatings, professional Functional Fluids, professional De-icing and anti-icing applications, professional Professional use in agrochemicals. Uses in Coatings, consumer Use in Cleaning Agents, consumer Functional Fluids, consumer Other Consumer Uses Consumer use in agrochemicals. De-icing and anti-icing applications, consumer

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY
2030 DOW CENTER
MIDLAND MI 48674-0000
UNITED STATES

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: CHEMTREC +1 800-424-9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
GHS classification in accordance with 29 CFR 1910.1200
Not a hazardous substance or mixture.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: Propylene Glycol
This product is a substance.

Component	CASRN	Concentration
Propylene glycol	57-55-6	> 99.5 %

4. FIRST AID MEASURES

Description of first aid measures
General advice:
If potential for exposure exists refer to Section 8 for specific personal protective equipment.

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

Skin contact: Wash off with plenty of water.

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

Ingestion: No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

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

Unsuitable extinguishing media: Do not use direct water stream. May spread fire.

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

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

Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

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

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Keep personnel out of low areas. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

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

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Any absorbent material. Collect in suitable and properly labeled open containers. Wash the spill site with large quantities of water. Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Store away from direct sunlight or ultraviolet light. Keep container tightly closed when not in use. Protect from atmospheric moisture. Store in the following material(s): Stainless steel. Aluminum. Container lined with phenolic or epoxy-phenolic FDA food contact approved coating. 316 stainless steel. Opaque HDPE plastic container.
No special storage conditions required.

Storage stability
Shelf life: Use within 12 Month

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value/Notation
Propylene glycol	US WEEL	TWA	10 mg/m3

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

Individual protection measures

Eye/face protection: Use safety glasses (with side shields). If there is a potential for exposure to particles which could cause eye discomfort, wear chemical goggles.

Skin protection

Hand protection: Chemical protective gloves should not be needed when handling this material. Consistent with general hygienic practice for any material, skin contact should be minimized.

Other protection: No precautions other than clean body-covering clothing should be needed.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Liquid.
Color	Colorless
Odor	Odorless
Odor Threshold	No test data available
pH	Not applicable
Melting point/range	< -20 °C (< -4 °F) *EU Method A.1 (Melting / Freezing Temperature)*
Freezing point	< -20 °C (< -4 °F) *EC Method A1*
Boiling point (760 mmHg)	184 °C (363 °F) at 752.46 mmHg *Literature*
Flash point	**closed cup** 104 °C (219 °F) at 1,000.1 hPa *EC Method A9* (PMCC)
Evaporation Rate (Butyl Acetate = 1)	0.01 *Estimated.*
Flammability (solid, gas)	Not applicable to liquids

Lower explosion limit	2.6 % vol *Estimated.*
Upper explosion limit	12.5 % vol *Estimated.*
Vapor Pressure	20 Pa at 25 °C (77 °F) *EC Method A4*
Relative Vapor Density (air = 1)	2.62 *Literature*
Relative Density (water = 1)	1.03 at 20 °C (68 °F) / 20 °C *EU Method A.3 (Relative Density)*
Water solubility	100 % at 20 °C (68 °F) *EU Method A.6 (Water Solubility)*
Partition coefficient: n-octanol/water	log Pow: -1.07 *Measured*
Auto-ignition temperature	> 400 °C (> 752 °F) at 100.01 kPa *EC Method A15*
Decomposition temperature	No test data available
Dynamic Viscosity	43.4 mPa.s at 25 °C (77 °F) *Literature*
Kinematic Viscosity	No test data available
Explosive properties	Not explosive
Oxidizing properties	No
Liquid Density	1.03 g/cm3 at 20 °C (68 °F) *Literature*
Molecular weight	No data available
Pour point	< -57 °C (< -71 °F) *Literature*

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No data available

Chemical stability: Stable under recommended storage conditions. See Storage, Section 7. Hygroscopic

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Avoid direct sunlight or ultraviolet sources.

Incompatible materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Alcohols. Ethers. Organic acids.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity

Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

LD50, Rat, > 20,000 mg/kg

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

LD50, Rabbit, > 2,000 mg/kg No deaths occurred at this concentration.

Acute inhalation toxicity
At room temperature, exposure to vapor is minimal due to low volatility. Mist may cause irritation of upper respiratory tract (nose and throat).

LC50, Rabbit, 2 Hour, dust/mist, 317.042 mg/l No deaths occurred at this concentration.

Skin corrosion/irritation
Prolonged contact is essentially nonirritating to skin.
Repeated contact may cause flaking and softening of skin.

Serious eye damage/eye irritation
May cause slight temporary eye irritation.
Corneal injury is unlikely.
Mist may cause eye irritation.

Sensitization
Did not cause allergic skin reactions when tested in humans.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

Carcinogenicity
Did not cause cancer in laboratory animals.

Teratogenicity
Did not cause birth defects or any other fetal effects in laboratory animals.

Reproductive toxicity
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

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

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

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity

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

LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 Hour, 40,613 mg/l, OECD Test Guideline 203

Acute toxicity to aquatic invertebrates
LC50, Ceriodaphnia dubia (water flea), static test, 48 Hour, 18,340 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants
ErC50, Pseudokirchneriella subcapitata (green algae), 96 Hour, Growth rate inhibition, 19,000 mg/l, OECD Test Guideline 201

Toxicity to bacteria
NOEC, Pseudomonas putida, 18 Hour, > 20,000 mg/l, Method Not Specified.

Chronic aquatic toxicity
Chronic toxicity to aquatic invertebrates
NOEC, Ceriodaphnia dubia (water flea), semi-static test, 7 d, number of offspring, 13,020 mg/l

Persistence and degradability

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Biodegradation may occur under anaerobic conditions (in the absence of oxygen).
10-day Window: Pass
Biodegradation: 81 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent
10-day Window: Not applicable
Biodegradation: 96 %
Exposure time: 64 d
Method: OECD Test Guideline 306 or Equivalent

Theoretical Oxygen Demand: 1.68 mg/mg

Chemical Oxygen Demand: 1.53 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	69.000 %
10 d	70.000 %
20 d	86.000 %

Photodegradation
Atmospheric half-life: 10 Hour
Method: Estimated.

Bioaccumulative potential

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): -1.07 Measured
Bioconcentration factor (BCF): 0.09 Estimated.

Mobility in soil

Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): < 1 Estimated.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Reclaimer. Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Not regulated for transport

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code: Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
No SARA Hazards

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Pennsylvania Worker and Community Right-To-Know Act:
The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	CASRN
Propylene glycol	57-55-6

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

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Product Literature
Additional information on this and other products may be obtained by visiting our web page.

Hazard Rating System
NFPA

Health	Flammability	Instability
1	1	0

Revision
Identification Number: 11118548 / A001 / Issue Date: 06/07/2018 / Version: 9.1

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

TWA	8-hr TWA
US WEEL	USA. Workplace Environmental Exposure Levels (WEEL)

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

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

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

SAFETY DATA SHEET

1. Identification

Denatured Ethyl Alcohol 190 Proof or Anhydrous (SDA 40B or DEB or 187 Proof SDA 40BX)

Product identifier	Mixture
Other means of identification	
CAS number	10A40B, 10B40B, 10B40BT, 10B40BX, 10C40B, 10C40BX, 11B40B, 11C40B, 10B40+, 11B40+, 10B40S, 11B40S, 10C40S, 11C40S, 11B40G, 10R40B, 10R40BE, 10R40BP, 10B40BG, 10C40BG, 11B40BG, 11C40BG
Synonyms	Not available.
Recommended use	None known.
Recommended restrictions	

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name	Grain Processing Corporation
Address	P.O. Box 349 1600 Oregon Street Muscatine, Iowa 52761 USA
Telephone	For Other Information, Call: (563) 264-4265 (M-F 8am-5pm) 24-hour Assistance: (563) 264-4304
Website	www.grainprocessing.com
E-mail	Not available.
Emergency phone number	24-hour CHEMTREC US 1-800-424-9300 24-hour CHEMTREC International 1-703-527-3887
Distillery Permit No.	DSP-IA-7 and/or DSP-IN-29

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 2
Health hazards	Serious eye damage/eye irritation	Category 2A
Environmental hazards	Not classified.	
OSHA defined hazards	Not classified.	

Label elements

Signal word	Danger
Hazard statement	Highly flammable liquid and vapor. Causes serious eye irritation.
Precautionary statement	
Prevention	Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting// equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wash thoroughly after handling. Wear protective gloves/eye protection/face protection.
Response	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. In case of fire: Use to extinguish.
Storage	Store in a well-ventilated place. Keep cool.
Disposal	Dispose of contents/container to .
Hazard(s) not otherwise classified (HNOC)	Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Ethyl Alcohol		64-17-5	~79.5-99.8
tert-Butyl Alcohol		75-65-0	~0.2
Denatonium Benzoate		3734-33-6	~0.002

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation
Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact
Take off immediately all contaminated clothing. Rinse skin with water/shower. Get medical attention if irritation develops and persists.

Eye contact
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion
Rinse mouth thoroughly. If ingestion of a large amount does occur, call a poison control center immediately.

Most important symptoms/effects, acute and delayed
Headache. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Coughing.

Indication of immediate medical attention and special treatment needed
Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

General information
Take off all contaminated clothing immediately. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media
Water fog. Alcohol resistant foam. Carbon dioxide (CO2). Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical
Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. This product is a poor conductor of electricity and can become electrostatically charged. If sufficient charge is accumulated, ignition of flammable mixtures can occur. To reduce potential for static discharge, use proper bonding and grounding procedures. This liquid may accumulate static electricity when filling properly grounded containers. Static electricity accumulation may be significantly increased by the presence of small quantities of water or other contaminants. Material will float and may ignite on surface of water. During fire, gases hazardous to health may be formed.

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

Fire fighting equipment/instructions
In case of fire and/or explosion do not breathe fumes. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. ALWAYS stay away from tanks engulfed in flame. Move containers from fire area if you can do so without risk. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if possible. If not, withdraw and let fire burn out.

Specific methods
Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards
Highly flammable liquid and vapor.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Use appropriate containment to avoid environmental contamination. Transfer by mechanical means such as vacuum truck to a salvage tank or other suitable container for recovery or safe disposal. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. This product is miscible in water.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground. Use appropriate containment to avoid environmental contamination.

7. Handling and storage

Precautions for safe handling

Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. When using do not smoke. Explosion-proof general and local exhaust ventilation. Minimize fire risks from flammable and combustible materials (including combustible dust and static accumulating liquids) or dangerous reactions with incompatible materials. Handling operations that can promote accumulation of static charges include but are not limited to: mixing, filtering, pumping at high flow rates, splash filling, creating mists or sprays, tank and container filling, tank cleaning, sampling, gauging, switch loading, vacuum truck operations. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Avoid contact with eyes. Avoid prolonged exposure. Do not use in areas without adequate ventilation. Wear appropriate personal protective equipment. Wash thoroughly after handling. Observe good industrial hygiene practices.

For additional information on equipment bonding and grounding, refer to the Canadian Electrical Code in Canada, (CSA C22.1), or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity" or National Fire Protection Association (NFPA) 70, "National Electrical Code".

Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat and sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Ethyl Alcohol (CAS 64-17-5)	PEL	1900 mg/m3
		1000 ppm
tert-Butyl Alcohol (CAS 75-65-0)	PEL	300 mg/m3
		100 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Ethyl Alcohol (CAS 64-17-5)	STEL	1000 ppm
tert-Butyl Alcohol (CAS 75-65-0)	TWA	100 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Ethyl Alcohol (CAS 64-17-5)	TWA	1900 mg/m3
		1000 ppm
tert-Butyl Alcohol (CAS 75-65-0)	STEL	450 mg/m3
		150 ppm
	TWA	300 mg/m3
		100 ppm

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using do not smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking.

9. Physical and chemical properties

Appearance Colorless, water-white

Physical state Liquid.

Form Liquid.

Color Colorless.

Odor Mild, fragrant odor

Odor threshold Not available.

pH Not available.

Melting point/freezing point Not available.

Initial boiling point and boiling range 174.2 °F (79 °C) (value for pure anhydrous alcohol)

Flash point 55.0 °F (12.8 °C) (value for pure anhydrous alcohol)

Evaporation rate 2 BuAc (value for pure anhydrous alcohol)

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 3.3 % (value for pure anhydrous alcohol)

Flammability limit - upper (%) 19 % (value for pure anhydrous alcohol)

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure 44 mm Hg @ 20 C (value for pure anhydrous alcohol)

Vapor density 1.6 (value for pure anhydrous alcohol)

Relative density Not available.

Solubility(ies)	
Solubility (water)	miscible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	685 °F (362.78 °C) (value for pure anhydrous alcohol)
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Flammability class	Flammable IB
Oxidizing properties	Not oxidizing.
Percent volatile	100 %
Specific gravity	0.79 - 0.83 @60 F/60 F
VOC	EPA CARB

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Risk of ignition.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Causes serious eye irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Headache. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Coughing.

Information on toxicological effects

Acute toxicity Not known.

Components	Species	Test Results
Ethyl Alcohol (CAS 64-17-5)		
Acute		
Inhalation		
LC50	Mouse	39 mg/l, 4 Hours
Oral		
LD50	Rat	6.2 g/kg

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Possible reproductive hazard.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product		Species	Test Results
Denatured Ethyl Alcohol 190 Proof or Anhydrous (SDA 40B or DEB or 187 Proof SDA 40BX)			
Aquatic			
Crustacea	EC50	Daphnia	6696.6084 mg/l, 48 hours estimated
Fish	LC50	Fish	9984.2705 mg/l, 96 hours estimated
Components		**Species**	**Test Results**
Ethyl Alcohol (CAS 64-17-5)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	7.7 - 11.2 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	> 100 mg/l, 96 hours
tert-Butyl Alcohol (CAS 75-65-0)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	4607 - 6577 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	6130 - 6700 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Ethyl Alcohol	-0.31
tert-Butyl Alcohol	0.35

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D001: Waste Flammable material with a flash point <140 F The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1170
UN proper shipping name	Ethanol or Ethyl alcohol or Ethanol solutions or Ethyl alcohol solutions
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	24, IB2, T4, TP1
Packaging exceptions	4b, 150
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1170
UN proper shipping name	Ethanol or Ethyl alcohol or Ethanol solutions or Ethyl alcohol solutions
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Environmental hazards	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1170
UN proper shipping name	Ethanol or Ethyl alcohol or Ethanol solutions or Ethyl alcohol solutions
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

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

DOT

IATA; IMDG

15. Regulatory information

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

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories Flammable (gases, aerosols, liquids, or solids)
Serious eye damage or eye irritation
Hazard not otherwise classified (HNOC)

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

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

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Ethyl Alcohol (CAS 64-17-5) Low priority

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

tert-Butyl Alcohol (CAS 75-65-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

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

Issue date	04-03-2017
Revision date	05-27-2020
Version #	02
Further information	HMIS® is a registered trade and service mark of the American Coatings Association
HMIS® ratings	Health: 2 Flammability: 3 Physical hazard: 0
NFPA ratings	Health: 2 Flammability: 3 Instability: 0
References	ACGIH EPA: AQUIRE database NLM: Hazardous Substances Data Base US. IARC Monographs on Occupational Exposures to Chemical Agents
Disclaimer	The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. The information in the sheet was written based on the best knowledge and experience currently available. Grain Processing Corporation cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use.

Twinco Romax - Wilmington, Delaware - Estimated Annual Emissions Calculations

Emissions Estimates - Permit Revision Update November 2021

														H-01 thru H-04				
Raw Material or Product	VOC/HAP Name	CAS No.	Molecular Weight (lbs/lbs mole)	Percent of Mixture (Percentage by Weight)	Percent of Mixture (Percentage by Volume)	Temperature (°R)	Vapor Pressure (mm hg)	Estimated throughput of Product (1,000 gallons/day)	Liquid Mole Fraction (m_x)	Partial Vapor Pressure (P_x) (mmHg)	Vapor Mole Fraction (y_x)	Vapor Mass Fraction (X_x)	Maximum Annual Product Throughput (gals/year)	Holding Tank Working Volume (gallons)	Number of Holding Tank Turnovers per Year	Working Loss Emissions from Holding Tanks (lbs/day)	Working Loss Emissions from Holding Tanks (lbs/year)	Working Loss Emissions from Holding Tanks (tons/year)
Wash Products (3 Transfers)	**Methanol**	67-56-1	32.04	35.0%	41.9%	528	96.00	108.00	0.232	22.30546085	0.624	0.747	14,319,809	7,500	1,909.31	6.42	851.43	0.4257
	H_2O		18.01	65.0%	58.1%	528	17.54		0.768	13.46076817	0.376	0.253						
Wash Products (2 Transfers)	**Methanol**	67-56-1	32.04	35.0%	41.9%	528	96.00	108.00	0.232	22.30546085	0.624	0.747	0	7,500				
	H_2O		18.01	65.0%	58.1%	528	17.54		0.768	13.46076817	0.376	0.253						
Marine Extreme	**Propylene Glycol**	57-55-6	76.1	95.7%	96.0%	528	0.08	108.00	0.840	0.067234949	0.023	0.092	2,916,667	7,500	388.89	0.06	1.66	0.0008
	H_2O		18.01	4.3%	4.0%	528	17.54		0.160	2.797939547	0.977	0.908						
100 Plus	**Propylene Glycol**	57-55-6	76.1	56.7%	57.0%	528	0.08	108.00	0.237	0.018938497	0.001	0.006	0	7,500	0.00			
	H_2O		18.01	43.3%	43.0%	528	17.54		0.763	13.38391814	0.999	0.994						
RV Glycol	**Propylene Glycol**	57-55-6	76.1	28.8%	28.0%	528	0.08	108.00	0.087	0.00699544	0.000	0.002	0	7,500				
	H_2O		18.01	71.2%	72.0%	528	17.54		0.913	16.00168699	1.000	0.998						
SuperTech RV	**Propylene Glycol**	57-55-6	76.1	4.3%	4.0%	528	0.08	108.00	0.012	0.000942129	0.0000	0.0002	10,025,063	7,500	1,336.68	0.0007	0.06	0.0000
	Ethanol	64-17-5	46.07	16.8%	20.0%	528	42.75		0.076	3.249552463	0.169	0.342	10,025,063	7,500	1,336.68	1.39	129.47	0.065
	H_2O		18.01	79.0%	73.0%	528	17.54		0.912	15.99572007	0.831	0.658						
RV Plus	**Propylene Glycol**	57-55-6	76.1	4.3%	4.0%	528	0.08	108.00	0.012	0.000943876	0.0000	0.0002	0	7,500	0.00			
	Ethanol	64-17-5	46.07	16.8%	20.0%	528	42.75		0.076	3.255578987	0.169	0.342	0	7,500	0.00			
	H_2O		18.01	78.9%	76.1%	528	17.54		0.912	15.99286537	0.831	0.657						
Pool RV	**Propylene Glycol**	57-55-6	76.1	4.3%	4.0%	528	0.08	108.00	0.012	0.000943876	0.0000	0.0002	0	7,500	0.00			
	Ethanol	64-17-5	46.07	16.8%	20.0%	528	42.75		0.076	3.255578987	0.169	0.342	0	7,500	0.00			
	H_2O		18.01	78.9%	76.1%	528	17.54		0.912	15.99286537	0.831	0.657						

Total VOCs	6.42	0.43
Methanol	6.42	0.43
Propylene Glyco	0.06	0.00
Ethanol	1.39	0.06

vision Update November 202	PT-01					FT-01					TOTAL		
VOC/HAP Name	Process Tank Working Volume (gallons)	Number of Process Tank Turnovers per Year	Working Loss Emissions from Process Tank (lbs/day)	Working Loss Emissions from Process Tank (lbs/year)	Working Loss Emissions from Process Tank (tons/year)	Filling Tank Working Volume (gallons)	Number of Filling Tank Turnovers per Year	Working Loss Emissions from Process Tank (lbs/day)	Working Loss Emissions from Process Tank (lbs/year)	Working Loss Emissions from Process Tank (tons/year)	Total Working Loss Emissions (lbs/day)	Total Working Loss Emissions (lbs/year)	Total Working Loss Emissions (tons/year)
Methanol	1,000	14,319.81	5.94	787.86	0.39	100	143,198.09	5.88	779.05	0.39	18.24	2,418.34	1.21
H_2O													
Methanol	1,000	0.00				100	0.00					0.00	0.00
H_2O													
Propylene Glycol	1,000	2,916.67	0.04	1.20	0.0006	100	29,166.67	0.04	1.14	0.0006	0.15	4.01	0.0020
H_2O													
Propylene Glycol	1,000	0.00				100	0.00					0.00	0.00
H_2O													
Propylene Glycol	1,000	0.00				100	0.00					0.00	0.00
H_2O													
Propylene Glycol	1,000	10,025.06	0.0006	0.06	0.00003	100	100,250.63	0.0006	0.05	0.00003	0.00	0.17	0.00009
Ethanol	1,000	10,025.06	1.25	116.16	0.058	100	100,250.63	1.23	114.31	0.057	3.88	359.94	0.18
H_2O													
Propylene Glycol	1,000	0.00				100	0.00					0.00	0.00
Ethanol	1,000	0.00				100	0.00					0.00	0.00
H_2O													
Propylene Glycol	1,000	0.00				100	0.00					0.00	0.00
Ethanol	1,000	0.00				100	0.00					0.00	0.00
H_2O													

5.94	0.39	5.88	0.39	18.24	1.21
5.94	0.39	5.88	0.39	18.24	1.21
0.04	0.00	0.04	0.00	0.15	0.00
1.25	0.06	1.23	0.06	3.88	0.18

Highline Warren Filling Line Emissions - PTE

Emissions Estimates - Permit Revision Update November 2021

															H-01 thru H-04				
Raw Material or Product	**VOC/HAP Name**	**CAS No.**	**Molecular Weight (lbs/lbs mole)**	**Percent of Mixture (Percentage by Weight)**	**Percent of Mixture (Percentage by Volume)**	**Temperature (°R)**	**Vapor Pressure (mm hg)**	**Estimated throughput of Product (1,000 gallons/day)**	**Days Operating**	**Liquid Mole Fraction (m_x)**	**Partial Vapor Pressure (P_x) (mmHg)**	**Vapor Mole Fraction (y_x)**	**Vapor Mass Fraction (X_x)**	**Maximum Annual Product Throughput (gals/year)**	**Holding Tank Working Volume (gallons)**	**Number of Holding Tank Turnovers per Year**	**Working Loss Emissions from Holding Tanks (lbs/day)**	**Working Loss Emissions from Holding Tanks (lbs/year)**	**Working Loss Emissions from Holding Tanks (tons/year)**
Wash Products	**Methanol**	67-56-1	32.04	35.0%	41.9%	528	96.00	108.00	365	0.232	22.30546085	0.624	0.747	39,420,000	7,500	5,256.00	6.07	2,215.26	1.1076
	H_2O		18.01	65.0%	58.1%	528	17.54			0.768	13.46076817	0.376	0.253						
Marine Extreme	**Propylene Glycol**	57-55-6	76.1	95.7%	96.0%	528	0.08	108.00	365	0.840	0.067234949	0.023	0.092	39,420,000	7,500	5,256.00	0.04	15.86	0.0079
	H_2O		18.01	4.3%	4.0%	528	17.54			0.160	2.797939547	0.977	0.908						
SuperTech RV	**Propylene Glycol**	57-55-6	76.1	4.3%	4.0%	528	0.08	108.00	365	0.012	0.000942129	0.0000	0.0002	39,420,000	7,500	5,256.00	0.00061	0.22	0.00011
	Ethanol	64-17-5	46.07	16.8%	20.0%	528	42.75		365	0.076	3.249552463	0.169	0.342	39,420,000	7,500	5,256.00	1.27	464.05	0.232
	H_2O		18.01	79.0%	73.0%	528	17.54			0.912	15.99572007	0.831	0.658						

Note: The filling line can only process one product at a time.

Total VOCs	6.07	1.11
Methanol	6.07	1.11
Propylene Glyco	0.04	0.01
Ethanol	1.27	0.23

:missions - PTE

vision Update November

	PT-01					FT-01					TOTAL		
VOC/HAP Name	Process Tank Working Volume (gallons)	Number of Process Tank Turnovers per Year	Working Loss Emissions from Process Tank (lbs/day)	Working Loss Emissions from Process Tank (lbs/year)	Working Loss Emissions from Process Tank (tons/year)	Filling Tank Working Volume (gallons)	Number of Filling Tank Turnovers per Year	Working Loss Emissions from Process Tank (lbs/day)	Working Loss Emissions from Process Tank (lbs/year)	Working Loss Emissions from Process Tank (tons/year)	Total Working Loss Emissions (lbs/day)	Total Working Loss Emissions (lbs/year)	Total Working Loss Emissions (tons/year)
Methanol	1,000	39,420.00	5.90	2,151.69	1.08	100	394,200.00	5.87	2,142.89	1.07	17.84	6,509.85	3.25
H_2O													
Propylene Glycol	1,000	39,420.00	0.04	15.40	0.008	100	394,200.00	0.04	15.34	0.008	0.13	46.61	0.02
H_2O													
Propylene Glycol	1,000	39,420.00	0.00059	0.22	0.000108	100	394,200.00	0.00059	0.21	0.000107	0.0018	0.65	0.00033
Ethanol	1,000	39,420.00	1.23	450.73	0.23	100	394,200.00	1.23	448.89	0.22	3.74	1,363.67	0.68
H_2O													

sa one product at a time

5.90	1.08	5.87	1.07	17.84	3.25
5.90	1.08	5.87	1.07	17.84	3.25
0.04	0.01	0.04	0.01	0.13	0.02
1.23	0.23	1.23	0.22	3.74	0.68

This worksheet provides a brief discussion of the formulas used in the "Filling Line Losses" and "Filling Line Losses (PTE)" worksheets.

Calculated parameter	Symbol	Equation/Description
Liquid mole fraction	m_x	$m_x = wt\%_x/MW_x / (wt\%_x/MW_x + wt\%_y/MW_y)$
	$wt\%_x$	weight percent of component x
	MW_x	molecular weight of component x
Partial vapor pressure	P_x	$Px = P^*_x * m_x$ (Raoult's Law)
	P^*_x	vapor pressure of pure component x
Vapor Mole Fraction	y_x	$y_x = P_x/(P_x + P_y)$ (Dalton's Law - derived)
Vapor mass fraction	x_x	$x_x = y_x*MW_x / (y_x*MW_x + y_y*MW_y)$
VOC Filling Emissions	L_W	working loss, lb/yr $L_W = V_Q K_N K_P W_V K_B$ from AP-42 7.1 (Equation 1-35)
	V_Q	net working loss throughput, cubic ft/yr, $V_Q = 5.614 Q$ from AP-42 7.1 (Equation 1-39) Q = annual net throughput, bbl/yr (divide gals/yr by 42 to convert to barrels/yr)
	K_N	working loss turnover (saturation) factor, dimensionless For turnovers <= 36, K_N=1 For turnovers > 36, K_N=(180+N)/6N where N=number of turnovers per year
	K_P	working loss product factor, dimensionless (equal to 0.75 for crude oils and 1 for all other organic liquids)
	W_V	vapor density, lb/cubic ft, $W_V = M_V P_{VA} / (R T_V)$ from AP-42 7.1 (Equation 1-22) M_V = vapor molecular weight, lb/lb-mole R = the ideal gas constant, 10.731 psia cu ft/lb-mole °R P_{VA} = vapor pressure at average daily liquid surface temperature, psia T_V = average vapor temperature, °R
	K_B	vent setting correction factor, dimensionless For open vents and a vent setting range up to ± 0.03 psig, K_B = 1

Note: Standing loss is considered negligible given the short duration of the filling line processes.

Highline Warren AST Emissions

Emissions Estimates - Permit Revision Application November 2021

Potential to Emit Product	CAS No.	Max. Throughput[1] (gallons)	Number of ASTs w/Product	Annual Throughput[2] per Tank (gallons)	Annual Emissions per Tank[3] (lbs)	Annual PTE per Tank (tons)	Max. Daily Emissions per Tank (lbs)[4]
Methanol	67-56-1	16,516,980	3	5,505,660	1,925.5	0.96	7.1
Ethanol	64-17-5	7,864,290	1	7,864,290	1,496.9	0.75	5.7
Propylene Glycol	57-55-6	37,843,200	2	18,921,600	6.07	0.003	0.03
Total PTE (All Tanks)					7,285.7	3.6	27.1

Estimated Annual Emissions Product	CAS No.	Annual Throughput[2] (gallons)	Number of ASTs w/Product	Annual Throughput[2] per Tank (gallons)	Annual Emissions per Tank[3] (lbs)	Annual Emissions per Tank (tons)	Max. Daily Emissions per Tank (lbs)[4]
Methanol	67-56-1	6,052,000	3	2,017,333	1,349.47	0.67	5.0
Ethanol	64-17-5	2,052,000	1	2,052,000	871.42	0.44	3.3
Propylene Glycol	57-55-6	3,252,000	2	1,626,000	1.83	0.001	0.01
Total Emissions (All Tanks)					4,923.5	2.5	18.4

[1] Maximum throughput assume filler line operates 24 hrs/day, 7 days/wk and fills only product with highest concentration of product stored.

[2] Annual throughput based on filling line production projections; includes two additional railcars (52k gallons) of product to be stored.

[3] All emissions are taken from EPA "Tanks 4.0.9d" Emissions Report.

[4] Max daily emissions based on July monthly emissions.

Highline Warren HDPE Bottle Line Emissions

Emissions Estimates - January 15, 2013 Registration

Plastic Processing Emissions Estimates

Potential to Emit (PTE) Calculation

Air Pollutant	Emissions Factor[1] (lbs/million lbs resin)	Maximum Annual Thruput (lbs/year)	Maximum Daily Thruput (lbs/day)	PTE (lbs/yr)	Daily PTE (lbs/day)	Daily Emissions (g/s)	CAA HAP
PM	19.6	3,232,547	8,856	63.36	0.17358	0.00091131	
VOC	21.1	3,232,547	8,856	68.21	0.18687	0.00098106	
Ethane	0.02	3,232,547	8,856	0.06	0.00018	0.00000093	No
Ethylene	0.02	3,232,547	8,856	0.06	0.00018	0.00000093	No
Propylene	0.01	3,232,547	8,856	0.03	0.00009	0.00000046	No
Formaldehyde	0.06	3,232,547	8,856	0.19	0.00053	0.00000279	Yes
Acrolein (<0.02)	0.02	3,232,547	8,856	0.06	0.00018	0.00000093	Yes
Acetaldehyde	0.04	3,232,547	8,856	0.13	0.00035	0.00000186	Yes
Propionaldehyde (<0.02)	0.02	3,232,547	8,856	0.06	0.00018	0.00000093	Yes
Acetone	0.02	3,232,547	8,856	0.06	0.00018	0.00000093	No
Methyl Ethyl Ketone	0.05	3,232,547	8,856	0.16	0.00044	0.00000232	No
Formic Acid (<0.17)	0.17	3,232,547	8,856	0.55	0.00151	0.00000790	No
Acetic Acid (<0.17)	0.17	3,232,547	8,856	0.55	0.00151	0.00000790	No
Acrylic Acid (<0.02)	0.02	3,232,547	8,856	0.06	0.00018	0.00000093	Yes
CAA HAP Total				0.52	0.00142	0.00000744	
			Total Emissions (lbs):	133.56884	0.36594		

[1] The emissions factors are for *HDPE Blow Molding* at 380-F (lowest identified temperature), actual temperature is 350-F
Anthony Barlow, et al., *"Development of Emission Factors for Polyethylene Processing"*, Journal of Air & Waste Management Association, Volume 46, 1996.
Acrolein, propionaldehyde, formic acid, acetic acid, and acrylic acid EF are below detection limits; the detection limit is used for the EF.

Plastic Processing Emissions Estimates

Production Emissions Calculation

Air Pollutant	Emissions Factor[1] (lbs/million lbs resin)	Annual Production Rate (lbs/year)	Maximum Production Rate (lbs/day)	Annual Emissions (lbs/yr)	Daily Emissions (lbs/day)	Daily Emissions (g/s)	CAA HAP
PM	19.6	1,107,037	4,428	21.70	0.08679	0.00045566	
VOC	21.1	1,107,037	4,428	23.36	0.09343	0.00049053	
Ethane	0.02	1,107,037	4,428	0.02	0.00009	0.00000046	No
Ethylene	0.02	1,107,037	4,428	0.02	0.00009	0.00000046	No
Propylene	0.01	1,107,037	4,428	0.01	0.00004	0.00000023	No
Formaldehyde	0.06	1,107,037	4,428	0.07	0.00027	0.00000139	Yes
Acrolein (<0.02)	0.02	1,107,037	4,428	0.02	0.00009	0.00000046	Yes
Acetaldehyde	0.04	1,107,037	4,428	0.04	0.00018	0.00000093	Yes
Propionaldehyde (<0.02)	0.02	1,107,037	4,428	0.02	0.00009	0.00000046	Yes
Acetone	0.02	1,107,037	4,428	0.02	0.00009	0.00000046	No
Methyl Ethyl Ketone	0.05	1,107,037	4,428	0.06	0.00022	0.00000116	No
Formic Acid (<0.17)	0.17	1,107,037	4,428	0.19	0.00075	0.00000395	No
Acetic Acid (<0.17)	0.17	1,107,037	4,428	0.19	0.00075	0.00000395	No
Acrylic Acid (<0.02)	0.02	1,107,037	4,428	0.02	0.00009	0.00000046	Yes
CAA HAP Total				0.18	0.00071	0.00000372	
			Total Emissions (lbs):	45.74275	0.18297		

[1] The emissions factors are for *HDPE Blow Molding* at 380-F (lowest identified temperature), actual temperature is 350-F
Anthony Barlow, et al., *"Development of Emission Factors for Polyethylene Processing"*, Journal of Air & Waste Management Association, Volume 46, 1996.
Acrolein, propionaldehyde, formic acid, acetic acid, and acrylic acid EF are below detection limits; the detection limit is used for the EF.

Plastic Processing Emissions Estimates

Potential to Emit (PTE) Calculation

Air Pollutant	Emissions Factor[1] (lbs/million lbs resin)	Maximum Annual Thruput (lbs/year)	Maximum Daily Thruput (lbs/day)	PTE (lbs/yr)	Daily PTE (lbs/day)	Daily Emissions (g/s)	CAA HAP
PM	19.6	6,570,000	18,000	128.77	0.35280	0.00185220	
VOC	21.1	6,570,000	18,000	138.63	0.37980	0.00199395	
Ethane	0.02	6,570,000	18,000	0.13	0.00036	0.00000189	No
Ethylene	0.02	6,570,000	18,000	0.13	0.00036	0.00000189	No
Propylene	0.01	6,570,000	18,000	0.07	0.00018	0.00000095	No
Formaldehyde	0.06	6,570,000	18,000	0.39	0.00108	0.00000567	Yes
Acrolein (<0.02)	0.02	6,570,000	18,000	0.13	0.00036	0.00000189	Yes
Acetaldehyde	0.04	6,570,000	18,000	0.26	0.00072	0.00000378	Yes
Propionaldehyde (<0.02)	0.02	6,570,000	18,000	0.13	0.00036	0.00000189	Yes
Acetone	0.02	6,570,000	18,000	0.13	0.00036	0.00000189	No
Methyl Ethyl Ketone	0.05	6,570,000	18,000	0.33	0.00090	0.00000473	No
Formic Acid (<0.17)	0.17	6,570,000	18,000	1.12	0.00306	0.00001607	No
Acetic Acid (<0.17)	0.17	6,570,000	18,000	1.12	0.00306	0.00001607	No
Acrylic Acid (<0.02)	0.02	6,570,000	18,000	0.13	0.00036	0.00000189	Yes
CAA HAP Total				1.05	0.00288	0.00001512	
			Total Emissions (lbs):	271.47240	0.74376		

[1] The emissions factors are for *HDPE Blow Molding* at 380-F (lowest identified temperature), actual temperature is 350-F
Anthony Barlow, et al., *"Development of Emission Factors for Polyethylene Processing"*, Journal of Air & Waste Management Association, Volume 46, 1996.
Acrolein, propionaldehyde, formic acid, acetic acid, and acrylic acid EF are below detection limits; the detection limit is used for the EF.

Plastic Processing Emissions Estimates

Production Emissions Calculation

Air Pollutant	Emissions Factor[1] (lbs/million lbs resin)	Annual Production Rate (lbs/year)	Maximum Production Rate (lbs/day)	Annual Emissions (lbs/yr)	Daily Emissions (lbs/day)	Daily Emissions (g/s)	CAA HAP
PM	19.6	4,380,000	12,000	85.85	0.23520	0.00123480	
VOC	21.1	4,380,000	12,000	92.42	0.25320	0.00132930	
Ethane	0.02	4,380,000	12,000	0.09	0.00024	0.00000126	No
Ethylene	0.02	4,380,000	12,000	0.09	0.00024	0.00000126	No
Propylene	0.01	4,380,000	12,000	0.04	0.00012	0.00000063	No
Formaldehyde	0.06	4,380,000	12,000	0.26	0.00072	0.00000378	Yes
Acrolein (<0.02)	0.02	4,380,000	12,000	0.09	0.00024	0.00000126	Yes
Acetaldehyde	0.04	4,380,000	12,000	0.18	0.00048	0.00000252	Yes
Propionaldehyde (<0.02)	0.02	4,380,000	12,000	0.09	0.00024	0.00000126	Yes
Acetone	0.02	4,380,000	12,000	0.09	0.00024	0.00000126	No
Methyl Ethyl Ketone	0.05	4,380,000	12,000	0.22	0.00060	0.00000315	No
Formic Acid (<0.17)	0.17	4,380,000	12,000	0.74	0.00204	0.00001071	No
Acetic Acid (<0.17)	0.17	4,380,000	12,000	0.74	0.00204	0.00001071	No
Acrylic Acid (<0.02)	0.02	4,380,000	12,000	0.09	0.00024	0.00000126	Yes
CAA HAP Total				0.70	0.00192	0.00001008	
			Total Emissions (lbs):	180.98160	0.49584		

[1] The emissions factors are for *HDPE Blow Molding* at 380-F (lowest identified temperature), actual temperature is 350-F
Anthony Barlow, et al., *"Development of Emission Factors for Polyethylene Processing"*, Journal of Air & Waste Management Association, Volume 46, 1996.
Acrolein, propionaldehyde, formic acid, acetic acid, and acrylic acid EF are below detection limits; the detection limit is used for the EF.

Pollutant Name	Max Uncontrolled Emission Rate[1] (lbs/day)	Max Controlled Emission Rate (lbs/day)	Annual PTE (tons/yr)	Expected Annual Emissions[2] (tons/yr)
Process Line				
Total VOCs	18.24	18.24	3.25	1.21
Methanol	18.24	18.24	3.25	1.21
Propylene Glycol	0.15	0.15	0.02	0.01
Ethanol	3.88	3.88	0.68	0.18
Six 35,000-gallon ASTs				
Total VOCs	27.14	18.44	3.64	2.46
Methanol Tank	7.14	5.03	0.96	0.67
Methanol Tank	7.14	5.03	0.96	0.67
Methanol Tank	7.14	5.03	0.96	0.67
Propylene Glycol Tank	0.03	0.01	0.00	0.00
Propylene Glycol Tank	0.03	0.01	0.00	0.00
Ethanol Tank	5.68	3.33	0.75	0.44
HDPE Registration				
PM	0.17358	0.08679	0.03168	0.01584
VOC	0.18687	0.09343	0.03410	0.01705
Ethane	0.00018	0.00009	0.00003	0.00002
Ethylene	0.00018	0.00009	0.00003	0.00002
Propylene	0.00009	0.00004	0.00002	0.00001
Formaldehyde	0.00053	0.00027	0.00010	0.00005
Acrolein (<0.02)	0.00018	0.00009	0.00003	0.00002
Acetaldehyde	0.00035	0.00018	0.00006	0.00003
Propionaldehyde (<0.02)	0.00018	0.00009	0.00003	0.00002
Acetone	0.00018	0.00009	0.00003	0.00002
Methyl Ethyl Ketone	0.00044	0.00022	0.00008	0.00004
Formic Acid (<0.17)	0.00151	0.00075	0.00027	0.00014
Acetic Acid (<0.17)	0.00151	0.00075	0.00027	0.00014
Acrylic Acid (<0.02)	0.00018	0.00009	0.00003	0.00002
CAA HAP Total	0.00142	0.00071	0.00026	0.00013
HDPE/DEF Registration				
PM	0.35280	0.23520	0.06439	0.04292
VOC	0.37980	0.25320	0.06931	0.04621
Ethane	0.00036	0.00024	0.00007	0.00004
Ethylene	0.00036	0.00024	0.00007	0.00004
Propylene	0.00018	0.00012	0.00003	0.00002
Formaldehyde	0.00108	0.00072	0.00020	0.00013
Acrolein (<0.02)	0.00036	0.00024	0.00007	0.00004
Acetaldehyde	0.00072	0.00048	0.00013	0.00009
Propionaldehyde (<0.02)	0.00036	0.00024	0.00007	0.00004
Acetone	0.00036	0.00024	0.00007	0.00004
Methyl Ethyl Ketone	0.00090	0.00060	0.00016	0.00011
Formic Acid (<0.17)	0.00306	0.00204	0.00056	0.00037
Acetic Acid (<0.17)	0.00306	0.00204	0.00056	0.00037
Acrylic Acid (<0.02)	0.00036	0.00024	0.00007	0.00004
CAA HAP Total	0.00288	0.00192	0.00053	0.00035