

# ecomate® FOAM BLOWING AGENT

Product Name:

**Ecomate®**

CAS Registry Number:

**107-31-3**

EINICS Number:

**203-481-7**

UN Number:

**1243**

Harmonized Tariff Code:

**2915.13.5000**

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## GENERAL DESIGN CONSIDERATIONS



Please read through entirety of document. If anything in this document is unclear to recipient, please contact an FSI Representative for assistance with clarification.

Some important considerations in the design and construction of Ecomate® storage and handling facilities are flammability, environmental contamination, volume, and worker exposure. Specific design requirements for Ecomate receiving and storage facilities and handling depend on several factors, including volumes stored and handled, container type, mode of transportation, processes used at the facility, proximity to other hazardous materials, and applicable laws and regulations regarding the storage and use of Ecomate. Compliance with requirements set forth by NFPA 30 (or to the relevant regional fire regulations) is advised.

Ecomate is a flammable liquid blowing agent with a boiling point of 90°F (31.5°C), a flash point of -2°F (-19°C), and LEL/UEL of 5% / 23% respectively. Other data can be obtained from the PDS (*Product Data Sheet*) and SDS (*Safety Data Sheet*).

Ecomate is non-corrosive if kept dry. This may be accomplished by use of a dry Nitrogen (N<sub>2</sub>) blanket on all storage vessels.

Systems for unloading, handling, and storing Ecomate require the same analysis and design expertise as systems for other hazardous chemical products. The following information lists general considerations important in designing such systems. FSI is always available for consultation or review of transfer, storage, drumming, and blending designs and facilities.



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## TRANSFER

Ecomate is most safely transferred by Nitrogen ( $N_2$ ). Head pressure from the shipping vessel to the bulk storage or holding vessel. **DO NOT USE AIR.** Due to low viscosity and lubrication, pumping mechanisms do not work well. Ecomate is non-corrosive if kept dry. In lieu of  $N_2$  transfer, appropriate explosion rated pumps and grounding equipment should be utilized.

## GROUNDING

Electrically grounded equipment should be used when transferring. This includes pouring from one vessel to another. While Ecomate will not accumulate a static charge (due to its high electrical conductivity of  $1.92 \times 10^9$  pS/m), vapors in the flammable range may be ignited by a static discharge of sufficient energy.

## HOSES & PIPING

Convolute 321 stainless steel hoses with 304 stainless steel braid and reinforced EPDM hose is acceptable. Schedule 80 or stainless steel piping for 1in+ (25.4+mm) is acceptable. For smaller diameters use 304 stainless steel tubing with stainless steel compression fittings.

## BULK STORAGE VESSELS

Large quantities of Ecomate should be kept dry with use of  $N_2$  blanket and stored outside; including drum quantities. Vertical and horizontal storage vessels are acceptable. Carbon Steel or Stainless Steel materials can be used for bulk tank storage. Size/Volume should be a minimum of 1.5 times the volume of one bulk shipment or 8,000 gal. (30,000 L). Pressure ratings for bulk storage tanks must be high enough to resist pressure induced by ambient and solar heating [see Pressure Chart attachment] and ideally accommodate head pressure for transfer. In most cases a bulk storage vessel with a pressure rating of 50 psi (3 Bar) or higher will suffice. It is advised to paint storage vessels to reflect solar heating.





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### **PRESSURE RELIEF VALVES**

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Adequate requirements for Pressure Relief Valves (PRVs) are set forth by NFPA 30.

### **LEVEL GAUGES**

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Use of mechanical or digital (ultrasonic, sonar, etc.) is acceptable. Compatibility of any plastic parts on level gauges should be checked. It is recommended to make use of an overfill alarm.

*[Reference SHAND & JURS 92021 Automatic Tank Gauge Brochure]*

### **VALVES & SEALS**

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All valves should be stainless steel with Teflon seals. Other seals made from PTFE and Kalrez are recommended. EPDM is acceptable. Utilization of Emergency Shut-Off valves is recommended.

### **METERS**

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All meters used should be stainless steel turbines with tungsten carbide bearings and magnetic pickup. Turbine meters are recommended due to high accuracy for low viscosity materials.

### **ELECTRICAL & DETECTION**

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Explosion rated electrical equipment and vapor/flammable detectors should be utilized in off-loading and storage containment areas. Infra-Red level gages should NOT be used. Most "Hot Wire" detection is acceptable. Ecomate has similar/same standard calibration as methane for detection equipment.

*[Reference SMC Model 20x Series Attachment]*

### **SPILL CONTAINMENT**

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100% volume containment of bulk tanks is recommended.

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### DRUM BULK STORAGE

Mild steel drums may also be used for storage. Drums should be kept out of sunlight and rain and must have an N<sub>2</sub> blanket for capping off. Drums with UN1A1/X1.8/300 rating are recommended. Flammable substance cabinets are recommended for drum storage.

[Reference DENIOS ENGINEERING attached pamphlet]



### MAINTENANCE & INSPECTION

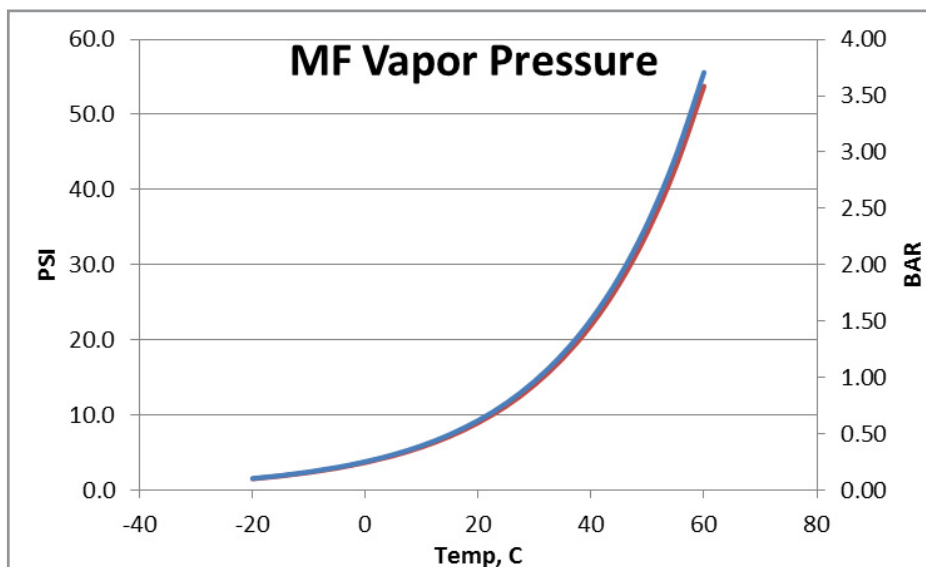
Preventive maintenance and inspection of containers, hoses, pumps, fittings, fire protection equipment, and refrigeration units used for ecomate should be conducted. An adequate supply of spare parts should be maintained. Overpressure, overfill, and flammable/combustible gas detectors should be maintained and calibrated regularly.

The inspection program should include appropriately scheduled inspection of equipment and storage areas.

Preventive maintenance schedules should be developed for critical equipment such as tank instrumentation, firefighting equipment, combustible gas detectors, pumps, safety relief valves, gaskets, etc.

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## PRESSURE CHARTS



Methyl Formate		
TEMP [C]	VP [mm Hg]	[BAR]
-20	77	0.10
-15	97	0.13
-10	121	0.16
-5	152	0.20
0	190	0.25
5	237	0.32
10	297	0.39
15	371	0.49
20	465	0.62
25	581	0.77
30	727	0.97
35	910	1.21
40	1138	1.51
45	1424	1.89
50	1781	2.37
55	2229	2.96
60	2788	3.71



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### TYPICAL PRESSURE STORAGE TANK CONFIGURATION

- |                          |  |                              |                            |
|--------------------------|--|------------------------------|----------------------------|
| 1. Pressure Safety Valve | 5. Manway                              | 9. Filter                    | 13. Check Valve            |
| 2. Tank Support          | 6. Level Transmitter with Output Gauge | 10. Pressure Gauge           | 14. Level Transmittor      |
| 3. Tank Drain            | 7. Outlet Line                         | 11. NFPA Identification Code | 15. Containment Dike       |
| 4. Safety Railing        | 8. Approved Ground                     | 12. Block Valve              | 16. Temperature Indication |

