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**FORANE 142b/22 60/40 BLEND**  
**POTENTIAL FLAMMABILITY HAZARD**

A blend containing 60 weight percent 1-chloro-1, 1-difluoroethane (142b) and 40 weight percent chlorodifluoromethane (22) is nonflammable when tested by ASTM E681-79. Thus, if liquid 60/40 blend were completely vaporized, the vapors would not ignite in any proportion with air.

The 142b component is a flammable gas which boils at  $-9.4^{\circ}\text{C}$  ( $115.1^{\circ}\text{F}$ ) and has a vapor pressure of 43.5 psia at  $21^{\circ}\text{C}$  ( $70^{\circ}\text{F}$ ). The flammability limits of 142b are 6.9 to 15.5 volume percent 142b in air.

The 22 component is a nonflammable gas which boils at  $-40^{\circ}\text{C}$  ( $15.1^{\circ}\text{F}$ ) and has a vapor pressure of 136 psia at  $21^{\circ}\text{C}$  ( $70^{\circ}\text{F}$ ).

At  $70^{\circ}\text{F}$  the saturated vapor above the 60/40 blend contains about 36 weight percent 142b and 64 weight percent 22 and is therefore much richer in 22, the nonflammable, higher pressure component. Thus, if there is leakage of vapor, the residual liquid will become increasingly rich in 142b, the lower pressure, flammable component. This process is called fractionation.

Once the liquid fractionates so that it contains more than 63.4 weight percent 142b, it is classified as flammable. In other words, if such a mixture were completely vaporized, flammable mixtures with air could result. However, the composition of the vapor in equilibrium with a liquid 142b/22 mixture remains in the nonflammable range until the liquid contains more than 80% 142b.

Because it fractionates, any large vapor leak or liquid spill of the 60/40 blend from a transportation tank or storage tank must be considered a potential fire or explosion hazard comparable to that of 142b itself. Flames, internal combustion engines, and other sources of ignition must be removed from the area. Suitable fire fighting equipment must be nearby until any spilled liquid is removed or has all evaporated. The vapors should be dispersed with forced air ventilation (explosion-proof motor) or water spray to keep the concentration below the lower flammability limit of 142b, and the atmosphere checked for flammability and oxygen deficiency. Supplied or self-contained breathing air masks should be worn by firefighters.

Because the composition of product in a storage system may change for various reasons, it should be monitored regularly. Personnel should also be alert for unaccounted losses indicating a leak, and periodic tests for composition should be made. Storage facilities should conform to those for a flammable gas, as described by the Compressed Gas Association. Electrical connections required in areas of possible exposure are described in the National Electrical Code. For this purpose, National Materials Advisory Board Publication 353-5 suggests that 142b be classed as a Group D Material. Any transfers of the 60/40 blend which must be done by mechanical means should be done by pumps which are driven only by suitable (hazardous classification) electric motors.

**Flammability Characteristics of FORANE® 142b**  
**(1-Chloro-1, 1-Difluoroethane)**

**Flammability Limits (ASTM E-681)**

<b>(Tested by Atochem N.A.)</b>	<b><u>70°F</u></b>	<b><u>250°F</u></b>
LFL (volume %)		
- fuse wire ignition	7.8	Not Determined
- match ignition	6.9	6.1
UFL (volume %)		
- match ignition	17	17.8
(Humidity: Water-saturated room air.)		

**Maximum Explosion Pressure**

**Maximum Rate of Pressure Rise**

<b>(Testing by Fenwal, Inc) (13.1 FT<sup>3</sup> vessel, 10 vol%)</b>	<b><u>70°F</u></b>	<b><u>250°F</u></b>
Maximum Pressure (PSIG)	88	68
Rate of Pressure Rise (psi/sec)	88	92
Flash Point (ASTM D 1310) (Tested by Atochem N.A.)	None observed	

**Comparison of Properties**

	<b><u>Forane 142b</u></b>	<b><u>Ethyl Alcohol</u></b>	<b><u>Propane</u></b>
* Limits of Flammability (LFL / UFL, volume %)	6.9 / 17	3.5 / 18.4	2.2 / 9.5
(LFL, mg fuel/liter air)	283	65	40
* Rate of Pressure Rise (psi/sec)	88	1615	7065
* Heat of Combustion (BTU / lb) (calculated – vapor products)	4,000	12,000	20,000
* Autoignition Temperature	600°C + (1100°F) +	425°C (800°F)	450°C (840°F)

**Notice:** While the information contained herein is, to the best of our knowledge and belief, accurate, the chemical, physical and toxicological properties have not been completely evaluated. The information may include descriptions of the flammability properties of the material under controlled laboratory conditions and should not be used to describe the behavior of this material under actual fire conditions. These results may be used, however, as part of an overall fire risk assessment related to a particular use. Since the conditions of handling and use are beyond our control, we make no guarantee of results. We assume no liability for injuries, damages, or penalties resulting from its use whether or not our recommendations are followed. Such recommendations are not to be taken as a license to operate or to infringe any patent.

**FORANE ® 142B LIQUID DENSITY CHART**

<b><u>TEMP (F)</u></b>	<b><u>LBS/FT(3)</u></b>	<b><u>TEMP (F)</u></b>	<b><u>LBS/FT(3)</u></b>
-30	77.54	55	71.27
-25	77.21	60	70.85
-20	76.87	65	70.43
-15	76.53	70	70.00
-10	76.18	75	69.56
-5	75.83	80	69.11
0	75.48	85	68.66
5	75.12	90	68.20
10	74.76	95	67.73
15	74.39	100	67.25
20	74.02	105	66.76
25	73.64	110	66.26
30	73.26	115	65.75
35	72.88	120	65.23
40	72.48	125	64.71
45	72.09	130	64.16
50	71.68		