

Initial Preparation Date: 11/10/11
Last Revision Date: 1/3/12
Effective Date: 1/3/12

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTITY: PEAK REFRIGERANT R-134A

1. CHEMICAL PRODUCT & COMPANY INFORMATION

OLD WORLD INDUSTRIES, LLC
4065 COMMERCIAL AVENUE
NORTHBROOK, ILLINOIS 60062
PHONE: 847-559-2000
EMERGENCY PHONE: 1-800-424-9300 (CHEMTREC)

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Material</u>	<u>CAS#</u>	<u>EC No.</u>	<u>% by Wt.</u>	<u>TLV (ACGIH)</u>	<u>OSHA PEL</u>
Norflurane	811-97-2	212-377-0	100	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Refrigerant- foam blowing agent. Colorless, volatile liquefied gas with ethereal and faint sweetish odor. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels, CNS depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C / 482°F), decomposition products may include Hydrofluoric Acid (HF) and carbonyl halides.

HAZARD RATING SYSTEM

NPFA: HEALTH: 2 FLAMMABILITY: 1 REACTIVITY: 0

HMIS: HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 1 PERSONAL PROTECTION: N/A

KEY: 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

4. FIRST AID MEASURES

Ensure physician has access to this MSDS.

Routes of Entry: Inhalation, Skin, Ingestion

Signs and Symptoms of Exposure: Gross overexposure may cause: central nervous system depression with dizziness, confusion, incoordination, drowsiness or unconsciousness, irregular heart beat with a strange sensation in the chest, apprehension, lightheadedness, feeling of fainting, dizziness, weakness and sometimes progressing to loss of consciousness and death from suffocation if air is displaced by vapors.

Immediate effects of overexposure may include: frostbite, if liquid or escaping vapor contacts the skin or the eyes. If ingested, gastrointestinal discomfort may occur. Gas reduces oxygen available for breathing and high concentrations may cause asphyxiation. The victim will not realize that he/she is suffocating. Increased susceptibility to the effects of this material may be observed in persons with pre-existing disease of the central nervous system or cardiovascular system.

TREATMENT

General Notes: If unconscious, place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician. Treat symptomatically and supportively. Treatment may vary with condition of victim and specifics of incident. Do not give adrenaline or similar drugs.

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If frostbite is present, flush eyes with luke warm (not hot) water. Call a physician.

Skin: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash the contaminated clothing before reuse. Treat for frostbite if necessary by gently warming the affected area.

Inhalation: Move to fresh air. Keep the patient warm and at rest. Artificial respiration and/or oxygen may be necessary. If high concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do not give drugs from adrenaline-ephedrine group. Call a physician.

Ingestion: Ingestion is not considered a potential route of exposure. Refer to the inhalation section, do not induce vomiting without medical advice. Call a physician immediately.

Notes to Physician: Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should only be used with special caution in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions.

5. FIRE FIGHTING MEASURES

FIRE & EXPLOSION HAZARD DATA

Flammable Properties:

Flash Point: Does not flash

Method Used: N/A

Flammability Limits - Percent of vapor concentration at which product can ignite in presence of spark.

LEL: none per ASTM E681

UEL: none per ASTM E681

Ignition Temperature: < 743°C / 1369°F

Hazardous Combustion Products: Cylinders may rupture under fire conditions. Decomposition may occur.

Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and color of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit; therefore, stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

This product is not flammable in air at temperatures up to 100° C (212° F) at atmospheric pressure. However, mixtures of the product with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. It can also become combustible in an oxygen-enriched environment (oxygen concentrations greater than that in air).

Whether a mixture containing this product and air, or the product in an oxygen-enriched atmosphere become combustible depends on the inter-relationship of (1) the temperature, (2) the pressure, and (3) the proportion of oxygen in the mixture. In general, the product should not be allowed to exist with air above atmospheric pressure or at high temperatures, or in an oxygen-enriched environment. For example, it should not be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported, which indicate combustibility of the product in the presence of certain concentrations of chlorine. Also, contact with certain reactive metals may result in formation of explosive or exothermic reactions under specific conditions (e.g. very high temperatures and/or appropriate pressures).

In case of fire, hazardous decomposition products may be produced such as: Hydrogen halides, hydrogen fluoride, carbon monoxide, carbon dioxide (CO²), and carbonyl halides.

Extinguishing Media: In case of fire in the surroundings, use media appropriate for surrounding material. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Fire Fighting Instructions: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Cool containers / tanks with water spray. Water runoff should be contained and neutralized prior to release.

Protective Equipment For Fire Fighters: In the event of fire and/or explosion, do not breathe flames. Self-contained breathing apparatus (SCBA) and protective suit may be required if cylinders rupture or release under fire conditions. Have no unprotected, exposed skin areas.

6. ACCIDENTAL RELEASE MEASURES

Protect People: Immediately evacuate the spill area of unnecessary personnel. Keep people away from and upwind of the spill/leak. As a precautionary measure, eliminate all ignition sources. Wear personal protective equipment. Avoid contact with skin and eyes and inhalation of vapors and/or leaking liquid. Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. In enclosed areas, ventilate the place or wear a self-contained breathing apparatus (risk of anoxia). Do not smoke. Allow gas to escape to the external atmosphere or, preferably, in a fume cupboard or well ventilated, remote area. Ensure that the oxygen content is greater than or equal to 19.5%. Do not touch any spilled material. Prevent the mixture from entering confined spaces. Leak checking may be done by pressure drop test or by using soapy water on joints and outlets. Shut cylinder valve to stop gas leaks from equipment, if possible and safe to do so.

Protect the Environment: Should not be released into the environment. Prevent from entering sewers, basements and work pits or any place where its accumulation can be dangerous

Cleanup: Ventilate the area using forced ventilation, especially in low or enclosed places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) for large spills or releases. Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

Precautions for Safe Handling: Avoid breathing vapor. Avoid liquid contact with eyes and skin. Use with sufficient ventilation to keep employee exposure below recommended limits. This product should not be mixed with air for leak testing or used for any other purpose above atmospheric pressure. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material. Never attempt to lift cylinder by its cap. Do not remove screw cap until immediately ready for use. Always replace cap after use. See “Flammable Properties” section. Contact with chlorine or other strong oxidizing agents should also be avoided.

Conditions for Safe Storage: Keep the container tightly closed in a dry and well-ventilated place. Store in original container. Store in a clean, dry place. Protect from sunlight and do not heat above 52° C (126° F). No materials to be especially mentioned. Use authorized cylinders only. Use a pressure reducing regulator when connecting cylinder to lower pressure (>3000 psig) piping or systems. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Protect cylinders from physical damage, do not puncture or drop cylinders, expose them to open flame or excessive heat. Separate full containers from empty containers. Avoid area where salt or other corrosive materials are present. Avoid excessive inventory and storage time, use a first-in, first-out system. Keep accurate inventory records.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters – Occupational Exposure Limit Values

CAS # 811-97-2	Long Term / Eight Hours		Short Term	
	ppm	Mg/m ³	ppm	Mg/m ³
Austria	1,000	4,200	4,000	16,800
Germany (AGS)	1,000	4,200	8,000	33,600
Germany (DFG)	1,000	4,200	8,000	33,600
Sweden	500	2,000	750	3,000
Switzerland	1,000	4,240	---	---
United Kingdom	1,000	4,240	---	---
U.S. – WEEL (AIHA)	1,000	---	---	---

Protective Measures: Do not breathe vapor. Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are close to the workstation location. For tank cleaning operations, see OSHA regulations, 29 CFR 1910.132 and 29 CFR 1910.133.

Respiratory Protection: Under normal manufacturing conditions, no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a large release occurs. In case of insufficient

ventilation, wear suitable respiratory equipment such as a positive-pressure supplied air respirator. For rescue and maintenance work in storage tanks, use self-contained breathing apparatus.

Skin Protection: Impervious gloves should be used to avoid prolonged or repeated exposure. Skin contact with refrigerant may cause frostbite. If prolonged contact with or gas is anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used. Any contaminated clothing should be promptly removed and washed before reuse.

Eye Protection: Chemical splash goggles or a face shield should be available for use as needed to prevent eye contact.

Engineering Controls: Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places. Refrigerant concentration monitors may be necessary to determine vapor concentrations in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas.

Environmental Exposure Controls: Should not be released into the environment. Prevent from entering sewers, basements and work place or any place where its accumulation can be dangerous.

Consumer Exposure Controls: Avoid breathing vapors. Avoid contact with skin or eyes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point:	-26°C / -15°F at 1013 hPa
Melting Point / Freeze Point:	-101°C / -150°F – 103°C / -153°F at 1013 hPa
Vapor Density (Air=1):	3.6 (air = 1.0) at 25°C / 77°F
Vapor Pressure:	5,915 hPa at 21°C / 70°F and 14,713 hPa at 54°C / 130°F
Density:	1.206 g/cm ³ at 25°C / 77°F (as liquid)
Water Solubility:	1,5 g/l at 25°C / 77°F at 1013 hPa
Appearance:	Liquefied gas
Color:	Colorless to yellowish
Odor:	Very faint sweet odor
Evaporation Rate:	CL4 = 1 (greater than 1) 6620.7 hPa 25°C / 77°F (as liquid)
pH:	Neutral
Auto-ignition Temperature:	> 743°C / 1369°F
Specific Gravity:	1.208 at 25°C / 77°F

10. STABILITY & REACTIVITY DATA

Stability: Material is stable. However, avoid open flames and high temperatures.

Conditions to Avoid: Avoid open flames and high temperatures. The product is not flammable in air under ambient conditions of temperature and pressure. When the mixture pressurized with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

Incompatibility (Materials to Avoid):	Freshly abraded aluminum surfaces. Incompatible with active metals, alkali or alkaline earth metals – powdered Al, Zn, Be, etc.
Hazardous Decomposition Products:	Decomposition products are hazardous: hydrogen halides, carbon dioxide (CO ₂), carbon monoxide, fluorocarbons and carbonyl halides. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.). These materials are toxic and irritating. Contact should be avoided.
Hazardous Polymerization:	Polymerization will not occur.
Possibility of Hazardous Reactions:	Stable under recommended storage conditions. May react with aluminum.

11. TOXICOLOGICAL INFORMATION

Acute Inhalation Toxicity: LC₅₀ > 500,000 ppm/4h (rat)

Acute Dermal Toxicity: No data available.

Repeated Dose Toxicity: Rat NOEL – 40,000 ppm

Skin: Repeated or prolonged contact with the product may cause removal of natural fat from skin, resulting in non-allergic contact dermatitis and skin absorption. Animal testing indicates this material is a slight skin irritant.

Eye: A short duration spray of vapor produced very slight eye irritation.

Ingestion: Ingestion is not considered a potential route of exposure.

Sensitization: Cardiac sensitization dogs, no observed effect at 50,000 ppm. Lowest observable effect level at 75,000 ppm

Mutagenicity (The Effects On Genetic Material): Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures or in animals. In animal testing, this material has not caused permanent genetic damage in reproductive cells of mammals (has not produced heritable genetic damage).

Carcinogenicity, Mutagenicity and Toxicity for Reproduction (CMR Effects): Carcinogenicity information – None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen. In a two-year inhalation study, at a concentration of 50,000 ppm, it produced an increase in late-occurring benign testicular tumors, testicular hyperplasia and testicular weight. The no-effect level for this study was 10,000 ppm. Animal data shows slight fetotoxicity but only at exposure levels producing other toxic effects in the adult animal. Reproductive data on male mice show no change in reproductive performance.

STOT-single Exposure and Repeated Exposure: Single exposure caused cardiac sensitization, a potentially fatal disturbance of heart rhythm associated with a heightened sensitivity to the action of epinephrine. Lowest observed adverse effect level for cardiac sensitization was 75,000 ppm. Single exposure caused lethargy, narcosis and increased respiratory rates. These effects were temporary. Single exposure to near lethal doses caused pulmonary edema. Repeated exposure caused increased adrenals, liver, spleen weight; decreased uterine, prostate weight. Repeated dosing of higher concentrations caused the following temporary effects: tremors.

Delayed and Immediate Effects and Chronic Effects from Short-and Long-term Exposure: Long-term exposure caused significantly decreased body weights in male rats fed 300 mg/kg for 52 weeks, but there was no effect on mortality.

Significant Data With Possible Relevance To Humans:

Additional Information: Registry of Toxic Effects of Chemical Substances # K18842500.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE

Movement & Partitioning: Not available.

Degradation & Transformation: R-134A is a gas at room temperature; therefore, it is unlikely to remain in water.

Ecotoxicology: Not available.

Acute Toxicity	Effect Dose	Exposure Time	Species	Method
Acute Fish Toxicity	LC50 = 450 mg/l	96h	Rainbow Trout	Other
Acute Daphnia Toxicity	EC50 = 980 mg/l	48h	Daphnia Magna	Other
Acute Bacteria Toxicity	No data available			

Bioaccumulative Potential: No appreciable bioaccumulation potential is to be expected (Log Pow < 3).

Octanol Water Partition Coefficient: Log P_{ow} = 1.06

Additional Ecological Information: Accumulation in aquatic organisms is unlikely. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

Other Adverse Effects:

Ozone Depletion Potential (ODP): 0

Global Warming Potential: 1.300

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods: Avoid discharging to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Refer to supplier's waste gas recovery program. Contact the supplier if guidance is required. Reclaim by distillation or remove to a permitted waste disposal facility. Comply with federal, state and local regulations.

RECYCLABLE: Yes

14. TRANSPORT INFORMATION

Land Transport:

UN-No.: 3159
Official Transport Designation: 1, 1, 1, 2-TETRAFLUOROETHANE (Refrigerant GASR 134 a)
Class: 2
Classification Code: 2A
Packing Group: III
Hazard label: 2.2
Tunnel Restriction Code: 3(C/E)
ADR Tank Special Provisions: TAS TT9

Sea Transport (IMDG):

Proper Shipping Name: 1, 1, 1, 2-TETRAFLUOROETHANE (Refrigerant GASR 134a)
Class: 2
UN-No.: 3159
Packing Group: III
Air Transport (ICAO-IATA):

Proper Shipping Name: 1, 1, 1, 2-TETRAFLUOROETHANE (Refrigerant GASR 134a)
Class: 2
UN-No.: 3159
Packing Group: III

Additional Information: Shipping containers: Tank cars, cylinders and ton tanks

15. REGULATORY INFORMATION

THIS PRODUCT CONTAINS COMPONENT(S) CITED ON THE FOLLOWING REGULATIONS:

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>
1, 1, 1, 2 – Tetrafluoroethane	811-97-2

United States TSCA Inventory: This substance is listed in the inventory.

CERCLA: Reportable Quantity (RQ): None

SARA Title III:

Section 311/312 - Categories:

Acute: Yes
Chronic: Yes
Fire: No
Reactivity: No
Pressure: Yes

Section 313 - Emission Reporting: Not listed

Section 302 - Extremely Hazardous Substances: No

Canadian Regulations – DSL: This substance is listed in the inventory.

WHMIS Information: This product has been evaluated in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR. Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer's workplace education program.

EU Regulations:

EINECS: This substance is listed in the inventory.

DSD (67/548/EEC): This substance is not classified in the Annex I of Directive 67/548/EEC.

Australia Regulations – AICS: This substance is listed in the inventory.

Korea – ECL: This substance is listed in the inventory.

Japan – ENCS: This substance is listed in the inventory.

China – IECSC: This substance is listed in the inventory.

Chemical Safety Assessment: A chemical safety assessment has been carried out for this substance.

Additional Regulatory Information: R-134A is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.

WARNING: DO NOT vent product to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered. **Contains 1, 1, 1, 2 – Tetrafluoroethane (HFC-134a)**, a greenhouse gas which may contribute to global warming.

16. OTHER INFORMATION

Contact: Thomas Cholke

Phone: (847) 559-2225

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