Safety Data Sheet (SDS) — R114

November 21, 2018 Revised

Source: Hudson R-114 SDS. The official SDS is the printed document supplied with the shipment; if the two differ, the printed version prevails.

SAFETY DATA SHEET R-114

1 IDENTIFICATION

PRODUCT NAME:	1,2-Dichloro	-1,1,2,2-Tetrafluoroethane
SYNONYMS:	1,2-Dichlorotetraflu	oroethane, R-114, REFRIGERANT 114, CFC 114,

RECOMMENDED USE: Refrigerant DISTRIBUTOR: Hudson Technologies Company ADDRESS: PO Box 1541 One Blue Hill Plaza Pearl River, NY 10965 EMERGENCY PHONE: 1- 800-501-4376 CHEMTREC PHONE: 1-800-424-9300 INFORMATION PHONE: 1-800-953-2244

2 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Contact with the liquid may cause frostbite. Overexposure to vapors by inhalation may cause dizziness and loss of concentration. At higher levels, central nervous system depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C), decomposition products may include Hydrochloric Acid (HCL), Hydrofluoric Acid (HF) and carbonyl halides. HAZARD CLASSIFICATION: Gases Under Pressure USDOT Hazard Class 2.2, Non-Flammable Gas SIGNAL WORD: WARNING HAZARD STATEMENTS: Gas under pressure; may explode if heated Harms public heal and the environment by destroying ozone in the upper atmosphere Harmful in contact with skin - may cause frostbite May displace oxygen and cause rapid suffocation. Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. PRECAUTIONARY STATEMENTS PREVENTION: Do not breathe vapors. Use only with adequate ventilation - never in a closed space. Wear protective gloves. Wear eye protection. RESPONSE: If inhaled: Remove person to fresh air and keep comfortable for breathing.
Immediately call a physician. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen. Avoid stimulants.

Do not give adrenalin If on skin	Wash with plenty of water (not hot water) or use other means to warm skin slowly.

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

STORAGE: Protect from sunlight. Store in well-ventilated place. Do not heat above 120°F (50°C). Do not store in damp areas. DISPOSAL: Comply with Federal, State and local regulations. Reclaim by distillation or remove to a permitted waste disposal facility CARCINOGENICITY: Ingredients found on one of the OSHA designated carcinogen lists are listed below. INGREDIENT NAME NTP STATUS IARC STATUS OSHA LIST No ingredients listed in this section

3 COMPOSITION / INFORMATION ON INGREDIENTS

PRODUCT NAME: 1,2-Dichloro-1,1,2,2-Tetrafluoroethane SYNONYMS: R-114, REFRIGERANT 114, CFC 114 INGREDIENT NAME CAS NUMBER WEIGHT % Ingredient Name CAS Number Weight%100 1,2-Dichloro-1,1,2,2-Tetrafluoroethane (CFC-114) 76-14-2 Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of this Safety Data Sheet.

4 FIRST AID MEASURES

SKIN: Promptly flush skin with water until all chemical is removed. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. Get medical attention if symptoms persist. EYES: Immediately flush eyes with large amounts of water for at least 15 minutes (in case of frostbite water should be lukewarm, not hot) lifting eyelids occasionally to facilitate irrigation. Get medical attention if symptoms persist. INHALATION: Immediately remove to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Get medical attention. Do not give epinephrine (adrenaline). INGESTION: Ingestion is unlikely because of the physical properties and is not expected to be hazardous. In case of accidental ingestion, get medical attention. Do not induce vomiting unless instructed to do so by a physician. ADVICE TO PHYSICIAN: Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only 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

FLAMMABLE LIMITS IN AIR, UPPER: N/A (% BY VOLUME) LOWER: N/A FLASH POINT: None NFPA HAZARD CLASSIFICATION HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 1 OTHER: EXTINGUISHING MEDIA: Appropriate for combustibles in the area. SPECIAL FIRE FIGHTING PROCEDURES: The product is not flammable. Use water spray to cool containers. Self-contained breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions. UNUSUAL FIRE AND EXPLOSION HAZARDS: Cylinders may rupture under fire conditions. CFC 114 should not be permitted to mix with air above atmospheric pressure or at high temperatures, or in an oxygen enriched environment, since under such conditions it can become combustible in the presence of an ignition source. HAZARDOUS DECOMPOSITION PRODUCTS: Under high temperatures, this product can form hydrofluoric acid, and possibly carbonyl fluoride.

6 ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment.) Evacuate unprotected personnel. Protected personnel should remove ignition sources and shut off leak, if without risk, and provide ventilation. Use self-contained breathing apparatus (SCBA) for large spills or releases. Unprotected personnel should not return until air has been tested and determined safe, including low- lying areas. Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7 HANDLING AND STORAGE

NORMAL HANDLING: Always wear recommended personal protective equipment. Avoid breathing vapors and liquid contact with eyes, skin or clothing. Do not puncture or drop cylinders, expose them to open flame or excessive heat. Use authorized cylinders only. Follow standard safety precautions for handling and use of compressed gas cylinders. R-114 should not be mixed with air above atmospheric pressure for leak testing or any other purpose. STORAGE RECOMMENDATIONS: Store in a cool, well-ventilated area of low fire risk and keep out of direct sunlight. Protect cylinder and its fittings from physical damage. Storage in subsurface locations should be avoided. Close valve tightly after use and when empty. Cylinder temperatures should not exceed 52° C (125° F).

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide local ventilation at filling zones and areas where leakage is probable. Mechanical (general) ventilation may be adequate for other operating and storage areas. PERSONAL PROTECTIVE EQUIPMENT SKIN PROTECTION: Skin contact with refrigerant may cause frostbite. General work clothing and gloves (leather) should provide adequate protection. If prolonged contact with the liquid 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: For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

RESPIRATORY PROTECTION	None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space, where the concentration may be above the PEL of 1,000 ppm, use a self-contained, NIOSH- approved breathing apparatus or supplied air respirator.
For escape	use the former or a NIOSH-approved gas mask with organic vapor canister.

ADDITIONAL RECOMMENDATIONS: Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn. High dose-level warning signs are recommended for areas of principle exposure. Provide eyewash stations and quick-drench shower facilities at convenient locations. For tank cleaning operations, see OSHA regulations, 29 CFR 1910.132 and 29 CFR 1910.133. EXPOSURE GUIDELINES INGREDIENT NAME ACGIH TLV OSHAPEL000TWA(8hr) NIOSHREL1000ppmTWA(8hr)1,2-Dichloro-1,1,2,2-

Tetrafluoroethane 1000 TWA (8hr) 1 OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS: Hydrogen Fluoride: ACGIH TLV: 3 ppm ceiling

9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear, colorless liquified gas ODOR: Slight ethereal MOLECULAR WEIGHT 170.92/g/mole PHYSICAL STATE: liquified gas BOILING POINT (@ 736 mm Hg): F: 38.8 C: 3.8 FREEZING POINT F: -137.2 C: -94 VAPOR PRESSURE (psia): 27.3 @ 70F (68C) VAPOR DENSITY (AIR = 1): 5.9 (air =1) SPECIFIC VOLUME (ft3 /lb): 2.1277 EVAPORATION RATE (CCL4 =1): >1 SOLUBILITY IN WATER (@14.7 psia): Not available PERCENT SOLIDS BY WEIGHT: Gas 100% By Wt VOLATILE ORGANIC COMPOUNDS (VOC): Gas PERCENT VOLATILE:

10 STABILITY AND REACTIVITY

NORMALLY STABLE (CONDITIONS TO AVOID): The product is stable. Do not mix with oxygen or air above atmospheric pressure. Any source of high temperature, such as lighted cigarettes, flames, hot spots or welding may yield toxic and/or corrosive decomposition products. INCOMPATIBILITIES: Under specific conditions: e.g. very high temperatures and/or appropriate pressures – Freshly abraded aluminum surfaces may cause strong exothermic reaction. Chemically active metals: potassium, calcium, powdered aluminum, magnesium and zinc. HAZARDOUS DECOMPOSITION PRODUCTS: Halogens, halogen acids and possibly carbonyl halides. These materials are toxic and irritating. HAZARDOUS POLYMERIZATION: Will not occur.

11 TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS: LC50 : 2 hr. (rat) - >600,000 ppm SENSITISATION: Cardiac sensitization (dogs) – 45,000 ppm REPEATED DOSE TOXICITY: Inhalation (rat) – NOEL 1000ppm Note- Subchronic toxicity OTHER DATA: May cause cardiac arrhythmia. Rapid evaporation of the liquid may cause frostbite.

12 ECOLOGICAL INFORMATION

Aquatic Toxicity: Not available Degradability (BOD): R-114 is a gas at room temperature; therefore, it is unlikely to remain in water.

13 DISPOSAL CONSIDERATIONS

RCRA - Not a hazardous waste. OTHER DISPOSAL CONSIDERATIONS: Disposal must comply with federal, state, and local disposal or discharge laws. R-114 is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling. The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14 TRANSPORT INFORMATION

HAZARD CLASS: PROPER SHIPPING NAME: ID NUMBER: PACKING GROUP: LABEL STATEMENT: SHIPPING CONTAINERS: 2.2 1,2-Dichloro-1,1,2,2-Tetrafluoroethane, Tetrafluoroethane or Refrigerant Gas R114 UN1958

N/A NONFLAMMABLE GAS Tank Cars, cylinders, ton tanks For additional information on shipping regulations affecting this material, contact the information number found in

15 REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA) TSCA INVENTORY STATUS: Components listed on the TSCA inventory OTHER TSCA ISSUES: None SARA TITLE III / CERCLA “Reportable Quantities” (RQs) and/or “Threshold Planning Quantities” (TPQs) exist for the following ingredients. INGREDIENT NAME SARA / CERCLA RQ (lb.) SARA EHS TPQ (lb.) No ingredients listed in this section Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee. SECTION 311 HAZARD CLASS: IMMEDIATE PRESSURE SARA 313 TOXIC CHEMICALS: The following ingredients are SARA 313 “Toxic Chemicals”. CAS numbers and weight percents are found in Section 3. INGREDIENT NAME COMMENT No ingredients listed in this section STATE RIGHT-TO-KNOW In addition to the ingredients found in Section 3, the following are listed for state right-to-know purposes. INGREDIENT NAME WEIGHT % COMMENT No ingredients listed in this section ADDITIONAL REGULATORY INFORMATION: 1,2-Dichloro-1,1,2,2-Tetrafluoroethane (CFC-114) is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. WARNING: Do not vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered. 1,2-Dichloro-1,1,2,2-Tetrafluoroethane (CFC-114), is a substance that harms public health and environment by destroying ozone in the upper atmosphere. 1,2-Dichloro-1,1,2,2-Tetrafluoroethane is a greenhouse gas which may contribute to global warming. . California Prop. 65: This product does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16 OTHER INFORMATION

DISCLAIMER: The above information is based upon technical information believed to be accurate but does not purport to all-inclusive and should be used only as a guide. Hudson Technologies Company shall not be held liable for any damage from handling or from contact with this product. No warranty of merchantability or any warranty, express or implied is made with respect to such information

This English-language Safety Data Sheet reproduces the manufacturer's official English SDS. The official SDS is the printed document supplied with the shipment.