Perchloroethylene

SRF Limited: An Overview

SRF is a multi-business entity engaged in the manufacture of chemical based industrial intermediates. Today, its business portfolio covers Technical Textiles, Chemicals, Packaging Films and Engineering Plastics. With headquarters in Gurgaon, India, the $760 million company with a global workforce of around 5500 has operations in three more countries, UAE, Thailand and South Africa. SRF is the market leaders in most of its businesses in India and also enjoys global leadership in some of its businesses.

The company is equipped with state-of-the-art R&D facilities, for process innovations and product development. A winner of the prestigious Deming Application for its tyre cord business, SRF adopts TQM as a management way. SRF remains committed to creating a culture of excellence through the people development and employee friendly approaches.

Primary Feedstock applications:

- Production of fluorocarbons (HFC-125)
- Triclosan
- Hexachloroethane

Primary Application non-Feedstock applications:

1. Dry-cleaning
2. Solvent for organic materials
3. De-greasing of metals in mechanical engineering, instrument - making industry
4. Manufacture of photopolymer printed boards
5. Production of needles for disposable syringes
6. Textiles and woodworking industry
7. Paint strippers/ spot removers.

S. No.	Characteristics	Unit	Specification
1.	Appearance	-	Clear, almost colourless Liquid, free from matter in suspension and sediment.
2.	Purity by GC, w/w, *Minimum*	%	99.90
3.	Trichloroethylene (TCE) content, w/w, *Maximum*	Ppm	50
4.	Relative density 27/27°C	-	1.610 - 1.620
5.	Residue on evaporation, w/w, *Maximum*	%	0.01
6.	Distillation range between 119 to 122°C, The temperature being corrected for 760 mmHg pressure, *Minimum*	%	95
7.	Alkalinity (As NaOH), w/w	Ppm	5 – 30
8.	Free chlorine	-	To pass the test
9.	Colour, *Maximum*	Hazen	25
10.	Moisture, w/w, *Maximum*	Ppm	100
11.	Non Volatile Residue, w/w, *Maximum*	Ppm	10

Packaging Options:-

SRF

Certificate Of Analysis

Product Name: Perchloroethylene

CAS Number: 127-18-4	**Molecular Formula:** C_2Cl_4	**Molecular Weight:** 165.83
To: -	**Date Of Analysis:** 09.09.2012	
	Period of Manufacturing: September- 2012	
	Quantity: 1.0 Ltr	
Batch No/Lot No.: PCE/09/09/2012	**Retest Date:** August 2013	
COMMODITY: Containing 1.0 ltr of Perchloroethylene in glass bottle	**Order No.:** -	
	Date Of Dispatch: 11.09.2012	

Sr. No.	Characteristics	Unit	Specification	Result
1	Appearance	-	Clear, almost colourless Liquid, free from matter in suspension and sediment.	Clear, almost colourless Liquid, free from matter in suspension and sediment.
2	Identification by GC	-	The RT of the Sample should be match with RT of reference standard	Complies
3	Purity by GC, w/w, *Minimum*	%	99.90	99.97
4	Trichloroethylene (TCE) content, w/w, *Maximum*	ppm	50	5
5	Relative density 27/27°C	-	1.610 - 1.620	1.616
6	Residue on evaporation, w/w, *Maximum*	%	0.01	0.008
7	Distillation range between 119 to 122°C, The temperature being corrected for 760 mmHg pressure, *Minimum*	%	95	Complies
8	Alkalinity (As NaOH), w/w	ppm	5 - 30	8
9	Free chlorine	-	To pass the test	Complies
10	Colour, *Maximum*	Hazen	25	7
11	Moisture, w/w, *Maximum*	ppm	100	46
12	Non Volatile Residue, w/w, *Maximum*	ppm	10	6

Remarks : The product complies with above specification.

Note: " Product Shelf life: One Year from the date of packaging subject to ensuring storage conditions as mentioned in the Material Safety Data Sheet for this product."

Date Of COA Release: 11.09.2012

Compiled by	Checked by	Approved by
11/09/12	11.09.12	11/09/12
Junior Officer - QA P-R&D	Senior Executive - QA P-R&D	Chief Manager - QA P-R&D

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New Delhi-110 016 India

MATERIAL SAFETY DATA SHEET

(PCE)

1 Chemical Product & Company Information:

Product Name	:	**Perchloroethylene**
Trade Names / Synonyms	:	Perchloroethylene; 1,1,2,2- Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil.
Substance	:	Perchloroethylene
Chemical Family	:	Chlorinated Aliphatic
Product Use	:	Dry-cleaning solvent, vapor degreasing solvent, drying agent for metal and some other solids, used as heat transfer medium and in the manufacture of fluorocarbon.
Manufacturer	:	**SRF Ltd.** Chemicals Business, D 2/1,GIDC Phase II, PCPIR, Dahej, Bharuch – 392130, Gujarat – India.
Emergency Call	:	**+ 91 97 37 04 03 83/ 84 /85/ 86**

2 Composition & Information on Ingredients:

Component	:	Perchloroethylene
CAS Number	:	127-18-4
UN No	:	1897
Percentage	:	Min 99.9

3 Hazard Identification:

NFPA Ratings (Scale 0-4)	:	Health = 3, Fire = 0, Reactivity = 0
Emergency Review:	:	
Appearance	:	Clear Liquid
Color	:	Colorless
Physical State	:	Liquid
Odor	:	Ethereal
Major Health Hazard:	:	
Potential Acute Health Effects:	:	Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact, (permeator), of eye contact (irritant), of ingestion.
Potential Chronic Health Effects:	:	
Carcinogenic Effects	:	Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP.
Mutagenic Effects	:	Mutagenic for bacteria and/or yeast.
Teratogenic Effects	:	Not available.

Developmental Toxicity	:	Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

4 First Aid Measures:

Eye Contact	:	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Short term Skin Contact	:	In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Prolonged Skin Contact	:	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.
Short term Inhalation	:	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Prolong Inhalation	:	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.
Short term Ingestion	:	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Serious Ingestion	:	Not available.

5 Fire Fighting Measures:

Fire & Explosion Hazard	:	Gives off irritating or toxic fumes (or gases) in a fire. Not considered to be an explosion hazard. Thermal decomposition products or combustion: hydrogen chloride.
Extinguishing Media	:	In case of fire in the surroundings: use appropriate extinguishing media.
Fire Fighting Instructions	:	Keep unnecessary people away, isolate hazard area and deny entry. Wear approved positive-pressure self-contained breathing apparatus. Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products, Stay upwind and keep out of low areas. Cool containers with water.
Flash Point	:	Not applicable
Auto ignition Temperature	:	Not applicable
Flammability Limits	:	Not applicable

6 Accidental Release Measures:

Small Spill	:	Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill	:	Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

7 Handling & Storage:

Handling Precautions	:	Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not get on skin or in eyes. Do not ingest or inhale.
Storage	:	Keep away from heat and flame. Keep out of direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances.

8 Exposure Control, Personal Protection:

Exposure Limits	:	TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL)
Ventilation	:	Provide local exhaust ventilation system. Ventilation equipment should be explosion resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.
Eye Protection	:	For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.
Clothing	:	Wear appropriate chemical resistant clothing.
Gloves	:	Wear non permeable gloves.
Respirator	:	Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any supplied-air respirator with a full face piece that is operated in a pressure-demand or other positive pressure mode. Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode.
For Unknown Concentrations or Immediately Dangerous to Life or Health	:	Any supplied-air respirator with full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full face piece.
Personal Protection in Case of a Large Spill	:	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

9 Physical & Chemical Properties:

Physical state and appearance	:	Liquid
Odor	:	Ethereal
Taste	:	Not available
Molecular Weight	:	165.83 g/mole
Color	:	Clear Colorless
pH (1% solution/ water)	:	Not available
Boiling Point	:	121.3°C (250.3°F)
Melting Point	:	22.3°C (-8.1°F)
Critical Temperature	:	347.1°C (656.8°F)
Specific Gravity	:	1.6227 (Water = 1)
Vapor Pressure	:	1.7 kPa (@ 20°C)
Vapor Density	:	5.7 (Air = 1)
Volatility	:	Not available
Odor Threshold	:	5 - 50 ppm
Water/ Oil Dist. Coefficient	:	The product is more soluble in oil; log(oil/water) = 3.4
Ionicity (in Water)	:	Not available
Dispersion Properties	:	Not available
Solubility	:	Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils.
Solubility in water	:	0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.
pH	:	Not available
Volatility	:	Not available
Odor Threshold	:	Not available

10 Stability & Reactivity:

Stability	:	The product is stable.
Instability Temperature	:	Not available
Conditions of Instability	:	Incompatible materials
Incompatibility with various substances	:	Reactive with oxidizing agents, metals, acids, alkalis.
Corrosivity	:	Non-corrosive in presence of glass.
Special Remarks on Reactivity	:	Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminium, magnesium, potassium, chemically active metals such as lithium, beryllium , barium. Protect from light.
Special Remarks on Corrosivity	:	Slowly corrodes aluminium, iron, and zinc.
Polymerization	:	Will not occur.

11 Toxicological Information:

Routes of Entry	:	Absorbed through skin. Eye contact, Inhalation, Ingestion.
Toxicity to Animals	:	WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].
Chronic Effects on Humans	:	CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).
Other Toxic Effects on Humans	:	Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.
Special Remarks on Toxicity to Animals	:	Lowest Published Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg
Special Remarks on Chronic Effects on Humans	:	May cause adverse reproductive effects and birth defects(teratogenic). May affect genetic material (mutagenic). May cause cancer.
Special Remarks on other Toxic Effects on Humans	:	Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symptoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.
Eyes	:	Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behaviour/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, emotional instability, stupor, coma). It may cause pulmonary edema.
Ingestion	:	It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behaviour/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects.

Skin	:	Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis, fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behaviour/ central nervous system/peripheral nervous system (impaired memory, numbness of extremities, peripheral neuropathy and other.

12 Ecology Information:

Ecotoxicity	:	Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].
BOD5 and COD	:	BOD5 and COD: Not available.
Products of Biodegradation	:	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	:	The product itself and its products of degradation are not toxic.
Special Remarks on the Products of Biodegradation	:	Not available

13 Disposal Considerations:

Dispose in accordance with all applicable regulations. Not a hazardous waste.

14 Transport Information:

Proper Shipping Name	:	Perchloroethylene
UN/NA	:	1897
Hazard Class	:	6.1
Packing Group	:	III
Special Provisions for Transport	:	Marine Pollutant

15 Regulatory Information:

California prop. 65	:	This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene.
CERCLA	:	Hazardous Substances. Tetrachloroethylene

Other Regulations:

OSHA	:	Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS	:	This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B	:	Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2A	:	Material causing other toxic effects (VERY TOXIC).
DSCL (EEC)	:	R40- Possible risks of irreversible effects.
R51/53	:	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S23	:	Do not breathe gas/fumes/vapour/spray
S26	:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S37	:	Wear suitable gloves.
S61	:	Avoid release to the environment.

16 Other Information:

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