Genetron® ST-20 Flush

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SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Genetron® ST-20 Flush
MSDS Number	:	000000013778
Product Use Description	:	Solvent
Company	:	Honeywell International, Inc. 101 Columbia Road Morristown, NJ 07962-1057
For more information call	:	800-522-8001 (Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical: 1-800-498-5701 or +1-651-523-0309**
	:	**Transportation: 1-800-424-9300 or +1-703-527-3887**
	:	(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	liquid
Color	:	colourless
Odor	:	slight sweet ether-like
Hazard Summary	:	This product is not flammable at ambient temperatures and atmospheric pressure. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating. Inhalation may cause central nervous system effects. May cause cardiac arrhythmia. May cause drowsiness and dizziness. Do not breathe vapour. Irritating to eyes and skin. May be harmful if swallowed. Avoid contact with skin, eyes and clothing. At higher temperatures, (>250 C), decomposition products may include hydrofluoric acid (HF) and carbonyl halides. The ACGIH Threshold Limit Values (2007) for Hydrogen Fluoride are TLV-TWA 0.5 ppm and Ceiling Exposure Limit 2 ppm.

Potential Health Effects

Skin	:	Irritating to skin.
Eyes	:	Irritating to eyes.

Ingestion	:	May be harmful if swallowed. May cause systemic poisoning with symptoms paralleling those of inhalation.
Inhalation	:	Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating. Inhalation may cause central nervous system effects. Vapours may cause drowsiness and dizziness. Effects of breathing high concentrations of vapour may include: Cardiac arrhythmias
Chronic Exposure	:	None known.
Target Organs	:	Central nervous system Heart Liver

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Concentration
1,1,1,3,3-Pentafluoropropane	460-73-1	40.00 - 70.00 %
1,1,1,2-Tetrafluoroethane	811-97-2	10.00 - 30.00 %
trans-Dichloroethylene	156-60-5	10.00 - 30.00 %

SECTION 4. FIRST AID MEASURES

Inhalation	:	Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.
Skin contact	:	After contact with skin, wash immediately with plenty of water. If symptoms persist, call a physician. Take off all contaminated clothing immediately. Wash contaminated clothing before re-use.

Eye contact	:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.
Ingestion	:	Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician immediately.

Notes to physician

Treatment	:	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.

SECTION 5. FIRE-FIGHTING MEASURES

Flash point	:	not applicable
Lower explosion limit	:	None
Upper explosion limit	:	None
Suitable extinguishing media	:	The product is not flammable. ASTM D 56-87 Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
Specific hazards during fire fighting	:	This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Exposure to decomposition products may be a hazard to health. In case of fire hazardous decomposition products may be produced such as: Carbon monoxide Carbon dioxide (CO2) Carbonyl halides Gaseous hydrogen chloride (HCl). Gaseous hydrogen fluoride (HF).
Additional advice	:	This product is a mixture of a low-boiling non-flammable

component and a flammable component. In the event of a liquid spill, the low-boiling non-flammable component will evaporate from the mixture faster, leaving a mixture enriched with the flammable component. The enriched mixture may be flammable.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Ensure adequate ventilation.
Environmental precautions	:	Should not be released into the environment. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers).
Methods for cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Wear personal protective equipment. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Do not use in areas without adequate ventilation. Perform filling operations only at stations with exhaust ventilation facilities. Open drum carefully as content may be under pressure.
Advice on protection against fire and explosion	:	Can form a combustible mixture with air at pressures above atmospheric pressure. Keep product and empty container away from heat and sources of ignition.

Storage

Requirements for storage areas and containers	:	Store away from incompatible substances. Keep away from direct sunlight. Keep containers tightly closed in a dry, cool and well-ventilated place. Ensure adequate ventilation, especially in confined areas. Keep in original packaging, tightly closed. Protect from physical damage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures	:	Ensure that eyewash stations and safety showers are close to the workstation location. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing.
Engineering measures	:	Use with local exhaust ventilation. Perform filling operations only at stations with exhaust ventilation facilities.
Eye protection	:	Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear: Goggles or face shield, giving complete protection to eyes
Hand protection	:	Impervious butyl rubber gloves Neoprene gloves Gloves must be inspected prior to use. Replace when worn.
Skin and body protection	:	Wear as appropriate: Solvent-resistant gloves Solvent-resistant apron and boots If splashes are likely to occur, wear: Protective suit
Respiratory protection	:	In case of insufficient ventilation wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator. For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas. Remove and wash contaminated clothing before re-use. Contaminated work clothing should not be allowed out of the workplace.

Keep working clothes separately.
Wash hands before breaks and immediately after handling the product.

Exposure Guidelines

1,1,1,3,3-Pentafluoropropane	460-73-1	WEEL	TWA	300 ppm	1,644 mg/m3
1,1,1,2-Tetrafluoroethane	811-97-2	HONEYWELL	TWA		1,000 ppm
		WEEL	TWA	1,000 ppm	4,240 mg/m3
trans-Dichloroethylene	156-60-5	ACGIH	TWA		200 ppm
		NIOSH	REL	200 ppm	790 mg/m3
		OSHA Z1	PEL	200 ppm	790 mg/m3
		OSHA Z1A	TWA	200 ppm	790 mg/m3

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	liquid
Color	:	colourless
Odor	:	slight sweet ether-like
pH	:	neutral
Freezing point	:	not determined
Boiling point/boiling range	:	15 °C (59 °F)
Vapor pressure	:	1,310 hPa at 20 °C (68 °F)
Relative vapour density	:	not determined
Density	:	not determined
Water solubility	:	not determined
Partition coefficient: n-octanol/water	:	log Pow: 1.35

1,1,1,3,3-pentafluoropropane (HFC-245fa)

Partition coefficient: n-octanol/water : log Pow: 1.06

1,1,1,2-tetrafluoroethane (HFC-134a)

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid : Protect from heat/overheating.
Keep away from direct sunlight.
Heat, flames and sparks.

Materials to avoid : Calcium
Magnesium
Aluminium
Zinc
Potassium
Finely divided aluminium

Hazardous decomposition products : Halogenated compounds
Carbonyl halides
Carbon dioxide (CO2)
Hydrogen halides

Hazardous reactions : Hazardous polymerisation does not occur.
Stable under normal conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity
trans-Dichloroethylene : LD50: 1,235 mg/kg
Species: rat

Acute inhalation toxicity
1,1,1,3,3-Pentafluoropropane : LC50: > 200000 ppm
Exposure time: 4 h
Species: rat
Note: No deaths
Evidence of transient anesthetic effect.

LC50: > 100000 ppm
Exposure time: 4 h
Species: mouse
Note: No deaths

Evidence of transient underactivity during exposure.

1,1,1,2-Tetrafluoroethane	:	LC50: > 500000 ppm Exposure time: 4 h Species: rat
trans-Dichloroethylene	:	LC50: > 24100 ppm Exposure time: 4 h Species: rat

Acute dermal toxicity

1,1,1,3,3-Pentafluoropropane	:	LD50: > 2,000 mg/kg Species: rabbit
trans-Dichloroethylene	:	LD50: > 5,000 mg/kg Species: rabbit

Skin irritation

trans-Dichloroethylene	:	Species: rabbit Result: Moderate skin irritation

Eye irritation

trans-Dichloroethylene	:	Species: rabbit Result: Moderate eye irritation

Sensitisation

1,1,1,3,3-Pentafluoropropane	:	Cardiac sensitization Species: dogs Note: No effects noted at 35,000 ppm, the threshold for induction of cardiac arrhythmias in the presence of injected adrenalin was 44,000 ppm.
1,1,1,2-Tetrafluoroethane	:	Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observable effect level 75 000 ppm

Repeated dose toxicity

1,1,1,3,3-Pentafluoropropane	:	Species: rat NOEL: 50000 ppm Embryotoxicity Not a teratogen

Species: rat (pups)
NOEL: 50000 ppm

Species: rat (dams)
NOEL: 2000 ppm
due to decrease in body weight gains at 10,000 ppm and 50,000 ppm

Species: rat
Method: 2 Generation Inhalation Toxicity
Exposures 6hrs/day, 7 days/wk at 0(control), 2000, 10,000 and 50,000 ppm.

Species: rat (dams)
Toxicity seen in dams at 10,000 and 50,000 ppm and in pups at 50,000 ppm.
Increased mortality late in the lactation phase of the study.

Species: rat
28-day Inhalation Study
NOAEL (No observed adverse effect level) - 50,000 ppm
NOEL - 500 ppm
Dose levels: 0,500, 2000, 10,000 and 50,000 ppm

Species: rat
90-day Inhalation Study
Dose levels: 0,500, 2000, 10,000 and 50,000 ppm
NOAEL (No observed adverse effect level) - 2,000 ppm

Overall, subchronic studies showed dose-related increases in urinary fluoride levels, urine volumes and water consumption. Increases were noted in hematological parameters, BUN levels and serum liver enzyme activities (GOT, GPT). These increases did not follow a dose response; however, they indicate that HFC-245fa is metabolized in the liver. Significant recovery was noted in these parameters following a 2-week, non-exposure period which followed the 28-day exposure period. No histopathological effects were noted in the 28-day study. The 90-day study noted an increase in incidence and severity (trace to moderate) of mycarditis (inflammation of the heart muscle) at 10,000 and 50,000 ppm. This was not noted at the 500 or 2,000 ppm dose levels nor was it seen the 28-day study at 50,000 ppm.

1,1,1,2-Tetrafluoroethane : Species: rat
NOEL: 40000 ppm

trans-Dichloroethylene : Species: rat
NOEL: 4000 ppm
90-day Inhalation Study

Species: rat
Method: Embryotoxicity
Not a teratogen
Foetal toxicity
at maternally toxic concentrations.

Species: rat (pups)
NOEL: 12000 ppm
Skeletal malformation
decrease in body weight

Species: rat (dams)
NOEL: 6000 ppm

Genotoxicity in vitro

1,1,1,3,3-Pentafluoropropane	:	Cell type: Human lymphocytes Result: Weak positive activation without S9 at 30% v/v; not active with S9 up to 70% v/v.
1,1,1,2-Tetrafluoroethane	:	Note: In vitro tests did not show mutagenic effects
trans-Dichloroethylene	:	Note: In vitro tests did not show mutagenic effects
	:	Test Method: Ames test Metabolic activation: with or without metabolic activation Result: negative

Genotoxicity in vivo

1,1,1,3,3-Pentafluoropropane	:	Species: mouse Cell type: Bone marrow Application Route: Inhalation Method: Mutagenicity (micronucleus test) Result: negative
Further information	:	Note: Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. Avoid skin contact with leaking liquid (danger of frostbite).

SECTION 12. ECOLOGICAL INFORMATION

Toxicity to fish

1,1,1,3,3-Pentafluoropropane : EC50: > 81.8 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)

NOEC: > 10 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)

Toxicity to daphnia and other aquatic invertebrates.
1,1,1,3,3-Pentafluoropropane : EC50: > 97.9 mg/l
Exposure time: 48 h
Species: Daphnia

NOEC: > 97.9 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)

Toxicity to algae
1,1,1,3,3-Pentafluoropropane : Growth inhibition
EC50: > 118 mg/l
Species: Algae
Method: OECD Test Guideline 201

Further information on ecology

Additional ecological information : 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.
Refer to sections 610 and 612 for list of acceptable and unacceptable uses for this product.
Further information on ecology

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Information: Observe all Federal, State, and Local Environmental regulations.

SECTION 14. TRANSPORT INFORMATION

DOT UN/ID No. : UN 1950
Proper shipping name : Aerosols, non-flammable

	Class		2.2
	Packing group		
	Hazard Labels		2.2
IATA	UN/ID No.	:	UN 1950
	Description of the goods	:	Aerosols, non-flammable
	Class	:	2.2
	Hazard Labels	:	2.2
	Packing instruction (cargo aircraft)	:	203
	Packing instruction (passenger aircraft)	:	203
	Packing instruction (passenger aircraft)	:	Y203
IMDG	UN/ID No.	:	UN 1950
	Description of the goods	:	Aerosols, non-flammable
	Class	:	2.2
	Hazard Labels	:	2.2
	EmS Number	:	F-D
	Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

Inventories

1907/2006 (EU)	:	On the inventory, or in compliance with the inventory
US. Toxic Substances Control Act	:	On TSCA Inventory
Australia. Industrial Chemical (Notification and Assessment) Act	:	On the inventory, or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 144)	:	All components of this product are on the Canadian DSL list.
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Existing Chemicals Inventory (KECI)	:	On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	Not in compliance with the inventory
	:	1,1,1,3,3-Pentafluoropropane 460-73-1
China. Inventory of Existing Chemical Substances	:	On the inventory, or in compliance with the inventory
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	:	On the inventory, or in compliance with the inventory

National regulatory information

SARA 313 Components	:	trans-Dichloroethylene 156-60-5
SARA 311/312 Hazards	:	Acute Health Hazard Sudden Release of Pressure Hazard
CERCLA Reportable Quantity	:	6452 lbs
California Prop. 65	:	This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
Massachusetts RTK	:	trans-Dichloroethylene 156-60-5
New Jersey RTK	:	trans-Dichloroethylene 156-60-5
Pennsylvania RTK	:	trans-Dichloroethylene 156-60-5
WHMIS Classification	:	D2B A This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

SECTION 16. OTHER INFORMATION

		HMIS III	NFPA
Health hazard	:	2	2
Flammability	:	1	1
Physical Hazard	:	1	
Instability	:		1