AFETY DATA SHEET	Г	Honeywell
Harvey item # R422DX25,	R422DX110, & R422DUR	SDS Z046
enetron® 422D		
642747 sion 1.5	Revision Date 05/02/2019	Print Date 07/26/201
CTION 1. IDENTIFICATION		
Product name	: Genetron® 422D	
Number	: 00000011691	
Product Use Description	: Refrigerant	
Manufacturer or supplier's details For more information call	 Honeywell International Inc. 115 Tabor Road Morris Plains, NJ 07950-2546 800-522-8001 +1-973-455-6300(Monday-Friday, 9:0 	0am-5:00pm)
In case of emergency call	 Medical: 1-800-498-5701 or +1-303-3 Transportation (CHEMTREC): 1-800 +1-703-527-3887 	389-1414
CTION 2. HAZARDS IDENTII Emergency Overview	FICATION	
Form	Liquefied gas	
Color	: colourless	
Odor	: odourless	
Classification of the subst	ance or mixture	
	ce : Gases under pressure, Liquefied ga Simple Asphyxiant	IS
GUS Label elemente inclu	iding precautionary statements	
GHS Laber elements, mon		
GHS Laber elements, mot	Page 1 / 15	

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Symbol(s)		
Signal word	: Warning	
Hazard statements	: Contains gas under pressure; ma May displace oxygen and cause r	
Precautionary statements	: Storage: Protect from sunlight. Store in a v	vell-ventilated place.
Hazards not otherwise classified	 Causes asphyxiation in high conc realize that he/she is suffocating. May cause cardiac arrhythmia. May cause frostbite. May cause eye and skin irritation. 	
Consistentiaitu		
anticipated carcinogen by NTF	present at levels greater than or equal to P, IARC, or OSHA. DRMATION ON INGREDIENTS	o 0.1% is identified as a known
No component of this product panticipated carcinogen by NTF	, IARC, or OSHA.	o 0.1% is identified as a known
No component of this product participated carcinogen by NTF	P, IARC, or OSHA.	o 0.1% is identified as a known
No component of this product p anticipated carcinogen by NTF CTION 3. COMPOSITION/INFO Chemical nature	P, IARC, or OSHA.	
No component of this product panticipated carcinogen by NTF CTION 3. COMPOSITION/INFO Chemical nature Chemical n	P, IARC, or OSHA.	Concentration
No component of this product panticipated carcinogen by NTF CTION 3. COMPOSITION/INFO Chemical nature Chemical n	P, IARC, or OSHA.	Concentration 65.10 %

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ES	
Move to fresh air. If breathing is irregular artificial respiration. Use oxygen as req qualified operator is present. Call a phy from adrenaline-ephedrine group.	uired, provided a
: After contact with skin, wash immediate there is evidence of frostbite, bathe (do (not hot) water. If water is not available cloth or similar covering. If symptoms p	o not rub) with lukewarm e, cover with a clean, soft
: Rinse immediately with plenty of water, for at least 15 minutes. In case of frost lukewarm, not hot. If symptoms persist	bite water should be
: Unlikely route of exposure. As this proc inhalation section. Do not induce vomit advice. Call a physician immediately.	
: Because of the possible disturbances of catecholamine drugs, such as epinephi special caution and only in situations of Treatment of overexposure should be of symptoms and the clinical conditions.	rine, should be used with f emergency life support.
SURES	
The product is not flammable. ASHRAE 34 Water spray Carbon dioxide (CO2) Foam Dry chemical	
Contents under pressure. This product is not flammable at ambi- atmospheric pressure. However, this material can ignite when	
Page 3 / 15	
	 ES Move to fresh air. If breathing is irregula artificial respiration. Use oxygen as req qualified operator is present. Call a phy from adrenaline-ephedrine group. After contact with skin, wash immediate there is evidence of frostbite, bathe (do (not hot) water. If water is not available cloth or similar covering. If symptoms p Rinse immediately with plenty of water, for at least 15 minutes. In case of frost lukewarm, not hot. If symptoms persist. Unlikely route of exposure. As this procinhalation section. Do not induce vomit advice. Call a physician immediately. Because of the possible disturbances of catecholamine drugs, such as epinephi special caution and only in situations on Treatment of overexposure should be of symptoms and the clinical conditions. SURES The product is not flammable. ASHRAE 34 Water spray Carbon dioxide (CO2) Foam Dry chemical Contents under pressure. This product is not flammable at ambia atmospheric pressure. However, this material can ignite when

Honeywell

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642747 sion 1.5	Revision Date 05/02/2019	Print Date 07/26/2
	pressure and exposed to strong Container may rupture on heatin Cool closed containers exposed Do not allow run-off from fire figh courses. Vapours are heavier than air and reducing oxygen available for br Fire may cause evolution of: Halogenated compounds Hydrogen fluoride Carbon oxides Carbonyl halides	g. to fire with water spray. hting to enter drains or water d can cause suffocation by
Special protective equipment for firefighters	In the event of fire and/or explose Wear full protective clothing and apparatus. No unprotected exposed skin ar	self-contained breathing
Further information	: Use extinguishing measures tha	
CTION 6. ACCIDENTAL RELE	circumstances and the surround	ing environment.
	circumstances and the surround EASE MEASURES Immediately evacuate personnel Keep people away from and upw Wear personal protective equipm must be kept away. Remove all sources of ignition. Avoid skin contact with leaking lic Ventilate the area. After release, disperses into the a Vapours are heavier than air and reducing oxygen available for bre Avoid accumulation of vapours in Unprotected personnel should no tested and determined safe.	to safe areas. ind of spill/leak. ent. Unprotected persons quid (danger of frostbite). air. can cause suffocation by eathing. low areas. of return until air has been
CTION 6. ACCIDENTAL RELE Personal precautions, protective equipment and	circumstances and the surround EASE MEASURES Immediately evacuate personnel Keep people away from and upw Wear personal protective equipm must be kept away. Remove all sources of ignition. Avoid skin contact with leaking lic Ventilate the area. After release, disperses into the a Vapours are heavier than air and reducing oxygen available for bre Avoid accumulation of vapours in Unprotected personnel should no	to safe areas. ind of spill/leak. ent. Unprotected persons quid (danger of frostbite). air. can cause suffocation by eathing. low areas. of return until air has been s >= 19.5%. e if safe to do so.
CTION 6. ACCIDENTAL RELE Personal precautions, protective equipment and emergency procedures	 circumstances and the surround EASE MEASURES Immediately evacuate personnel Keep people away from and upw Wear personal protective equipm must be kept away. Remove all sources of ignition. Avoid skin contact with leaking lid Ventilate the area. After release, disperses into the a Vapours are heavier than air and reducing oxygen available for bre Avoid accumulation of vapours in Unprotected personnel should no tested and determined safe. Ensure that the oxygen content is 	to safe areas. ind of spill/leak. ent. Unprotected persons quid (danger of frostbite). air. can cause suffocation by eathing. low areas. of return until air has been s >= 19.5%. e if safe to do so.

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containment and cleaning up		
SECTION 7. HANDLING AND ST	ORAGE	
Handling		
Precautions for safe handling	 Handle with care. Avoid inhalation of vapour or mist. Do not get in eyes, on skin, or on clottly Wear personal protective equipment. Use only in well-ventilated areas. Pressurized container. Protect from set to temperatures exceeding 50 °C. Follow all standard safety precautions compressed gas cylinders. Use authorized cylinders only. Protect cylinders from physical damage Do not puncture or drop cylinders, experiment. Do not pierce or burn, even after use. flame or any incandescent material. Do not remove screw cap until immede Always replace cap after use. 	unlight and do not expose for handling and use of ge. lose them to open flame or Do not spray on a naked
Precautions for safe handling	 Perform filling operations only at static ventilation facilities. Containers which are opened must be kept upright to prevent leakage. 	
Advice on protection against fire and explosion	Can form a combustible mixture with a atmospheric pressure. Keep product and empty container aw of ignition.	
Storage		
Conditions for safe storage, including any incompatibilities	 Pressurized container: protect from su to temperatures exceeding 50 °C. Do after use. Keep containers tightly closed in a dry place. Storage rooms must be properly vent Ensure adequate ventilation, especial 	not pierce or burn, even /, cool and well-ventilated ilated.
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		Protect cylinders from physical damage	9.
ECTION 8. EXPOSURE CONTR	ROL	S/PERSONAL PROTECTION	
Protective measures	:	Do not breathe vapour. Avoid contact with skin, eyes and cloth Ensure that eyewash stations and safe the workstation location.	
Engineering measures	:	General room ventilation is adequate for Perform filling operations only at station 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	e protection to eyes
Hand protection	:	Leather gloves In case of contact through splashing: Protective gloves Gloves Polyvinyl alcohol or nitrile- butyl-rubber	gloves
Skin and body protection	:	Avoid skin contact with leaking liquid (o Wear cold insulating gloves/ face shield	
Respiratory protection	:	In case of insufficient ventilation wear s equipment. Wear a positive-pressure supplied-air of Vapours are heavier than air and can be reducing oxygen available for breathing For rescue and maintenance work in st self-contained breathing apparatus. Self-contained breathing apparatus (Ef	respirator cause suffocation by g. torage tanks use
Hygiene measures	:	Handle in accordance with good indust practice. Ensure adequate ventilation, especially Avoid contact with skin, eyes and cloth Remove and wash contaminated cloth Keep working clothes separately.	/ in confined areas. ing.
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Components	CAS-No.	Value	Control parameters	Upda te	Basis
Pentafluoroethan e	354-33-6	TWA : Time weighted average	4,900 mg/m3 (1,000 ppm)	2007	WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide
Pentafluoroethan e	354-33-6	TWA : Time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : Time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : Time weighted average	4,240 mg/m3 (1,000 ppm)	2007	WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide
			1		
Iso-butane	75-28-5	STEL : Short term exposure limit	(1,000 ppm)	02 2013	ACGIH:US. ACGIH Threshold Limit Values
Iso-butane	75-28-5	REL : Recomm ended exposure limit (REL):	1,900 mg/m3 (800 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards

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Honeywell SAFETY DATA SHEET Genetron® 422D 10642747 Revision Date 05/02/2019 Print Date 07/26/2019 Version 1.5 SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES Physical state : Liquefied gas Color : colourless Odor : odourless Odor threshold : Note: no data available : Note: neutral pН : Note: no data available Freezing point Boiling point/boiling range ; -43 °C Flash point : Note: Not applicable Lower explosion limit : Note: None Upper explosion limit : Note: None Vapor pressure : 10,152 hPa at 21.1 °C(70.0 °F) 23,091 hPa at 54.4 °C(129.9 °F) Vapor density : 3.0 Note: (Air = 1.0) Density : 1.15 g/cm3 at 25 °C : Note: not determined Water solubility Page 8 / 15

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Partition coefficient: n-octanol/water	:	Note: no data available	
Ignition temperature	:	Note: not determined	
Decomposition temperature	:	> 250 °C Note: To avoid thermal decompositio	n, do not overheat.
Viscosity, dynamic	:	Note: no data available	
Viscosity, kinematic	:	Note: no data available	
SECTION 10. STABILITY AND RE	AC	CTIVITY	
Reactivity	:	Not classified as a reactivity hazard.	
Chemical stability	:	Stable under normal conditions.	
Possibility of hazardous reactions	:	Hazardous polymerisation does not o	occur.
Conditions to avoid	:	Pressurized container. Protect from s to temperatures exceeding 55 °C. Can form a combustible mixture with atmospheric pressure. Do not mix with oxygen or air above	air at pressures above
Incompatible materials	:	Strong oxidizing agents Finely divided metal powders such a or zinc.	s aluminum, magnesium,
Hazardous decomposition products	:	Halogenated compounds Carbon oxides Hydrogen fluoride Carbonyl halides	
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TION 11. TOXICOLOGICAL	
Acute inhalation toxicity Pentafluoroethane	: > 769000 ppm Exposure time: 4 h Species: Rat
1,1,1,2-Tetrafluoroethane	: LC50: > 500000 ppm Exposure time: 4 h Species: Rat
lso-butane	: LC50: 570000 ppm Exposure time: 15 min Species: Rat
Sensitisation Pentafluoroethane	Cardiac sensitization Species: dogs Note: No-observed-effect level 75 000 ppm Lowest observed effect level 100 000 ppm
1,1,1,2-Tetrafluoroethane	Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observed effect level 75 000 ppm
Repeated dose toxicity Pentafluoroethane	: Species: Rat Application Route: Inhalation Exposure time: (4 Weeks) NOEL: 50000 ppm Subchronic toxicity
1,1,1,2-Tetrafluoroethane	: Species: Rat
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40000 ppm thod: Ames test negative vitro tests did not show mutagenic effects. a: Human lymphocytes negative a: Chinese Hamster Ovary Cells negative a: Chinese Hamster Ovary Cells negative b: Chinese Hamster Ovary Cells b: Chinese Hamster Ovary Cells negative b: Chinese Hamster Ovary Cells b: Chinese Hamster Ovary Cells
 negative vitro tests did not show mutagenic effects. a: Human lymphocytes negative a: Chinese Hamster Ovary Cells negative chinese Hamster Ovary Cells negative chinese Solution exposure Teratog: 50,000 ppm Maternal: 50,000 ppm d not show teratogenic effects in animal experiments. c Rat ion Route: Inhalation exposure Teratog: 50,000 ppm
a: Human lymphocytes negative a: Chinese Hamster Ovary Cells negative : Rabbit ion Route: Inhalation exposure Teratog: 50,000 ppm Maternal: 50,000 ppm d not show teratogenic effects in animal experiments. : Rat ion Route: Inhalation exposure Teratog: 50,000 ppm
negative a: Chinese Hamster Ovary Cells negative : Rabbit ion Route: Inhalation exposure Teratog: 50,000 ppm Maternal: 50,000 ppm d not show teratogenic effects in animal experiments. : Rat ion Route: Inhalation exposure Teratog: 50,000 ppm
Rabbit ion Route: Inhalation exposure Teratog: 50,000 ppm Maternal: 50,000 ppm d not show teratogenic effects in animal experiments. Rat ion Route: Inhalation exposure Teratog: 50,000 ppm
ion Route: Inhalation exposure Teratog: 50,000 ppm Maternal: 50,000 ppm d not show teratogenic effects in animal experiments. : Rat ion Route: Inhalation exposure Teratog: 50,000 ppm
ion Route: Inhalation exposure Teratog: 50,000 ppm
d not show teratogenic effects in animal experiments.
cute Health Hazard Ethane, pentafluoro- (HFC-125): sensitisation threshold (dog): 75000 ppm. etrafluoroethane (HFC-134a): Cardiac sensitisation d (dog): 80000 ppm. Vapours are heavier than air and se suffocation by reducing oxygen available for g. Irritating to eyes and skin. Rapid evaporation of the ay cause frostbite. Avoid skin contact with leaking liquid of frostbite). May cause cardiac arrhythmia.

Genetron® 422D Od42747 ersion 1.5 Revision Date 05/02/2019 Pentafluoroethane Result: Not readily biodegradable. Value: 5 % Method: OECD 301 D Additional ecological information Accumulation in aquatic organisms is unlikely. 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. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. ECTION 13. DISPOSAL CONSIDERATIONS Disposal methods Observe all Federal, State, and Local Environmental regulations. Note This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82. regarding refrigerant recycling. ECTION 14. TRANSPORT INFORMATION DOT UN/ID No. Proper shipping name UN 3163 LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) Class 2.2 Packing group Hazard Labeis 2.2 HATA UN/ID No. Experimention of the goods UN 3163 LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) Class 2.2 Packing instruction (cargo 2.0 Page 12/15 2.2	SAFETY	DATA SHEET	Honeywell			
ersion 1.5 Revision Date 05/02/2019 Print Date 07/26/201 Pentafluoroethane : Result: Not readily biodegradable. Value: 5 % Method: OECD 301 D Further information on ecology : Accumulation in aquatic organisms is unlikely. 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. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. ECTION 13. DISPOSAL CONSIDERATIONS Disposal methods : Observe all Federal, State, and Local Environmental regulations. Note This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations 608 in 40 CFR Part 82 regarding refrigerant recycling. ECTION 14. TRANSPORT INFORMATION DOT UN/ID No. : UN 3163 : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, isobutane) Class Packing group Hazard Labels 2.2 IATA UN/ID No. : UN 3163 : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, isobutane) Class Hazard Labels : 2.2 : 2 Packing group Hazard Labels : 2.2 : 2	enetron	® 422D				
Value: 5 % Method: OECD 301 D Further information on ecology Additional ecological information : Accumulation in aquatic organisms is unlikely. 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. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. ECTION 13. DISPOSAL CONSIDERATIONS Disposal methods : Observe all Federal, State, and Local Environmental regulations. Note : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling. ECTION 14. TRANSPORT INFORMATION DOT UN/ID No. DoT UN/ID No. : UN 3163 Proper shipping name Class 2.2 Packing group Hazard Labels 2.2 IATA UN/ID No. : UN 3163 Proter shipping name LIQUEFFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) 2.2 Packing group Hazard Labels Class 2.2 Packing instruction (cargo : 20)			Revision Date 05/02/2019 Print Date 07/26/2019			
Additional ecological information : Accumulation in aquatic organisms is unlikely. 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. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. ECTION 13. DISPOSAL CONSIDERATIONS Disposal methods : Observe all Federal, State, and Local Environmental regulations. Note This product is subject to U.S. Environmental regulations. Note This product is subject to U.S. Environmental regulations. Disposal methods : Observe all Federal, State, and Local Environmental regulations. Note This product is subject to U.S. Environmental regulations ECTION 14. TRANSPORT INFORMATION : UN/ID No. DOT UN/ID No. : UN 3163 (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) Class 2.2 Packing group Hazard Labels : UN 3163 (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) Class : 2.2 Hazard Labels : 2.2 Packing instruction (cargo : 2.0 Hazard Labels : 2.2 Packing instruction (cargo : 200	Pentafluc		: Result: Not readily biodegradable. Value: 5 %			
Additional ecological information : Accumulation in aquatic organisms is unlikely. 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. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. ECTION 13. DISPOSAL CONSIDERATIONS Disposal methods Observe all Federal, State, and Local Environmental regulations. Note This product is subject to U.S. Environmental regulations. Note This product is subject to U.S. Environmental regulations. Dot UN/ID No. ECTION 14. TRANSPORT INFORMATION DOT UN/ID No. Dot UN/ID No. Class 2.2 Packing group Hazard Labels 2.2 IATA UN/ID No. : UN 3163 pescription of the goods Class 2.2 Hazard Labels 2.2 Packing instruction (cargo : 2.2 Hazard Labels 2.2 Packing instruction (cargo : 2.2 Packing instruction (cargo : 2.0	Further i	nformation on ecology				
Disposal methods Observe all Federal, State, and Local Environmental regulations. Note This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling. ECTION 14. TRANSPORT INFORMATION UN/ID No. : UN 3163 DOT UN/ID No. : UN 3163 Proper shipping name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, 1sobutane) :sobutane) Class 2.2 Packing group : UN 3163 Hazard Labels 2.2 IATA UN/ID No. : UN 3163 Class : 2.2 Packing group : LIQUEFIED GAS, N.O.S. Hazard Labels : 2.2 Packing instruction (cargo : 2.0 Packing instruction (cargo : 2.0	Additional ecological : Acc information This to g with reco This		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. This product is subject to U.S. Environmental Protection			
DOTUN/ID No. Proper shipping name: UN 3163 : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane)Class2.2 Packing group Hazard Labels2.2IATAUN/ID No. Description of the goods: UN 3163 : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane)IATAUN/ID No. Description of the goods: UN 3163 : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane)Class: 2.2 Hazard Labels: 2.2 : 2.2 : 2.2Hazard Labels: 2.2 : 2.0			regulations. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82			
Proper shipping name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) Class 2.2 Packing group 2.2 Hazard Labels 2.2 IATA UN/ID No. : UN 3163 Description of the goods : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) Class : 2.2 Hazard Labels : 2.2 Packing instruction (cargo : 2.0	ECTION 14.	TRANSPORT INFORMA	TION			
Description of the goods : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) Class : 2.2 Hazard Labels : 2.2 Packing instruction (cargo : 200	DOT	Proper shipping name Class Packing group	 LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) 2.2 			
Page 12 / 15	ΙΑΤΑ	Description of the good Class Hazard Labels	ds : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane) : 2.2 : 2.2			
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ersion 1.5		Revis	sion Date 05/02/2019	Print Date 07/26/2019
	aircraft) Packing instructio (passenger aircra		: 200	
IMDG	UN/ID No. Description of the	e goods	: UN 3163 : LIQUEFIED GAS, N.O.S (PENTAFLUOROETHAI 1,1,1,2-TETRAFLUORO	S. NE, ETHANE, ISOBUTANE)
	Class Hazard Labels EmS Number Marine pollutant		2.2 2.2 F-C, S-V no	
ECTION 15. I	REGULATORY INI	ORMATIO	N	
Inventorie	es			
US. Toxic Control Ac	Substances st	: On TSC	CA Inventory	
Australia. Chemical Assessme	(Notification and	: On the	inventory, or in compliance wi	th the inventory
Act (CEPA	Canadian ental Protection \). Domestic es List (DSL)	All com	ponents of this product are on	the Canadian DSL
		: On the	inventory, or in compliance wi	th the inventory
Korea. Ex Inventory	isting Chemicals (KECI)	: On the	inventory, or in compliance wi	th the inventory
Substance	s. The Toxic as and Hazardous ar Waste Control	: On the	inventory, or in compliance wi	th the inventory
	entory of Existing Substances	: On the	inventory, or in compliance wi	th the inventory
NZIOC - N	lew Zealand	: On the	inventory, or in compliance wi	th the inventory
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Honeywell SAFETY DATA SHEET Genetron® 422D 10642747 Version 1.5 Revision Date 05/02/2019 Print Date 07/26/2019 National regulatory information SARA 302 Components : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302. : This material does not contain any chemical components with SARA 313 Components known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313. SARA 311/312 Hazards : Acute Health Hazard Sudden Release of Pressure Hazard 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. 75-28-5 Massachusetts RTK : Iso-butane : Pentafluoroethane **New Jersey RTK** 354-33-6 1,1,1,2-Tetrafluoroethane ; 811-97-2 Iso-butane 2 75-28-5 Pennsylvania RTK : Pentafluoroethane 354-33-6 1,1,1,2-Tetrafluoroethane 811-97-2 Iso-butane 75-28-5 SECTION 16. OTHER INFORMATION HMIS III **NFPA** Health hazard : 1 2 Flammability : 1 1 Physical Hazard : 0 Instability 0 Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system. Page 14 / 15

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Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Previous Issue Date: 05/21/2014

Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group

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Honeywell SAFETY DATA SHEET Genetron 422D 25LB/11.3KG Jug 000000011691 Print Date 03/28/2018 Version 1.4 Revision Date 05/21/2014 SECTION 1. PRODUCT AND COMPANY IDENTIFICATION Product name Genetron® 422D MSDS Number 000000011691 Product Use Description : Refrigerant Manufacturer or supplier's : Honeywell International Inc. details 115 Tabor Road Morris Plains, NJ 07950-2546 For more information call 800-522-8001 : +1-973-455-6300 (Monday-Friday, 9:00am-5:00pm) Medical: 1-800-498-5701 or +1-303-389-1414 In case of emergency call Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887 (24 hours/day, 7 days/week) **SECTION 2. HAZARDS IDENTIFICATION Emergency Overview** : Liquefied gas Form : colourless Color Odor : odourless Classification of the substance or mixture Classification of the substance : Gases under pressure, Liquefied gas or mixture Simple Asphyxiant GHS Label elements, including precautionary statements Page 1 / 15

Honeywell SAFETY DATA SHEET Genetron 422D 25LB/11.3KG Jug 000000011691 Version 1.4 Revision Date 05/21/2014 Print Date 03/28/2018 Symbol(s) Signal word : Warning Hazard statements : Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation. Precautionary statements Storage: Protect from sunlight. Store in a well-ventilated place. Hazards not otherwise : Causes asphyxiation in high concentrations. The victim will not classified realize that he/she is suffocating. May cause cardiac arrhythmia. May cause frostbite. May cause eye and skin irritation.

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 nature : Mixture			
Chemical Name	CAS-No.	Concentration	
Pentafluoroethane	354-33-6	65.10 %	
1,1,1,2-Tetrafluoroethane	811-97-2	31.50 %	
lso-butane	75-28-5	3.40 %	

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CTION 4. FIRST AID MEASUR	ES
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 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. If symptoms persist, call a physician.
Eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.
Ingestion	: Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. 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.
CTION 5. FIREFIGHTING MEA	SURES
Suitable extinguishing media	: The product is not flammable. ASHRAE 34
	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Specific hazards during firefighting	 Contents under pressure. This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under

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Special protective equipment for firefighters	 pressure and exposed to strong ign Container may rupture on heating. Cool closed containers exposed to Do not allow run-off from fire fightin courses. Vapours are heavier than air and ca reducing oxygen available for breat In case of fire hazardous decompos produced such as: Hydrogen halides Hydrogen fluoride Carbon monoxide Carbon dioxide (CO2) Carbonyl halides In the event of fire and/or explosion Wear full protective clothing and se apparatus. No unprotected exposed skin areas 	fire with water spray. g to enter drains or water an cause suffocation by hing. sition products may be do not breathe fumes. If-contained breathing
ECTION 6. ACCIDENTAL RELE	ASE MEASURES	
Personal precautions	 Immediately evacuate personnel to s Keep people away from and upwind Wear personal protective equipment must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid Ventilate the area. After release, disperses into the air. Vapours are heavier than air and cair reducing oxygen available for breath Avoid accumulation of vapours in low Unprotected personnel should not re- tested and determined safe. Ensure that the oxygen content is >= 	of spill/leak. Unprotected persons (danger of frostbite). n cause suffocation by ling. w areas. eturn until air has been
Environmental precautions	: Prevent further leakage or spillage if The product evapourates readily.	safe to do so.
Environmental predations	the predict of apearates readily.	

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SECTION 7. HANDLING AND ST	ORAGE	
Handling		
Handling	 Handle with care. Avoid inhalation of vapour or mist. Do not get in eyes, on skin, or on clo Wear personal protective equipment Use only in well-ventilated areas. Pressurized container. Protect from to temperatures exceeding 50 °C. Follow all standard safety precaution compressed gas cylinders. Use authorized cylinders only. Protect cylinders from physical dam. Do not puncture or drop cylinders, excessive heat. Do not pierce or burn, even after use flame or any incandescent material. Do not remove screw cap until immed Always replace cap after use. 	t. sunlight and do not expose ns for handling and use of age. kpose them to open flame or e. Do not spray on a naked
Handling	 Perform filling operations only at sta ventilation facilities. Containers which are opened must kept upright to prevent leakage. 	
Advice on protection against fire and explosion	: The product is not flammable. Can form a combustible mixture with atmospheric pressure.	n air at pressures above
Storage		
Requirements for storage areas and containers	 Pressurized container: protect from to temperatures exceeding 50 °C. D after use. Keep containers tightly closed in a c place. Storage rooms must be properly ver Ensure adequate ventilation, especi Protect cylinders from physical dam 	o not pierce or burn, even Iry, cool and well-ventilated ntilated. ally in confined areas.

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CTION 8. EXPOSURE C	ONTRO	LS/PE	RSONAL I	PROTECTION			
Protective measures	:	Avo Ens		vith skin, eyes an wash stations ar			se to
Engineering measures	:	Per		entilation is adeo operations only a ties.			dling.
Eye protection	:	Saf If sp	plashes are	oriate: with side-shields likely to occur, w e shield, giving co	ear:	otection to eye	S
Hand protection	:	In c Pro Glo	tective glov ves	act through splas es ol or nitrile- butyl	-	oves	
Skin and body protectio	in :			act with leaking I lating gloves/ fac			
Respiratory protection	:	In case of insufficient ventilation wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use self-contained breathing apparatus.					
Hygiene measures	:	prao Ens Avo Rer	ctice. ure adequa id contact v nove and w	rdance with good te ventilation, es vith skin, eyes an ash contaminate lothes separately	pecially in d clothing d clothing	confined areas	•
Exposure Guidelines Components CA	S-No.		Value	Control parameters	Upda te	Basis	

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Pentafluoroethan e	354-33-6	TWA : time weighted average	4,900 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
Pentafluoroethan e	354-33-6	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : time weighted average	4,240 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
Iso-butane	75-28-5	TWA : time weighted average	(1,000 ppm)	01 2010	ACGIH:US. ACGI Threshold Limit Values
Iso-butane	75-28-5	REL : Recomm ended exposure limit (REL):	1,900 mg/m3 (800 ppm)	2005	NIOSH/GUIDE:US NIOSH: Pocket Guide to Chemica Hazards

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			$\langle \cdot \rangle_{i}$	286				3.5		224	ф÷.		- 52	24		8.9		v79	- 11		-84	27.	347	ωž s	12.		22	27			28	۰.	

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Version 1.4 Revision Date 05/21/2014 Print Date 03/28/2018 Color : colourless Odor : odourless pН : Note: neutral Melting point/freezing point : Note: no data available : -43 °C Boiling point/boiling range Flash point : Note: not applicable Lower explosion limit : Note: None Upper explosion limit : Note: None : 10,152 hPa Vapor pressure at 21.1 °C(70.0 °F) 23,091 hPa at 54.4 °C(129.9 °F) Vapor density : 3.0 Note: (Air = 1.0) Density : 1.15 g/cm3 at 25 °C Water solubility : Note: not determined Ignition temperature : Note: not determined : > 250 °C Decomposition temperature Note: To avoid thermal decomposition, do not overheat.

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SECTION 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: Hazardous polymerisation does not occur.
Conditions to avoid	 Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials to avoid	: Finely divided aluminium Potassium Powdered metals Aluminium Magnesium Zinc
Hazardous decomposition products	 In case of fire hazardous decomposition products may be produced such as: Hydrogen halides Hydrogen fluoride Carbon monoxide Carbon dioxide (CO2) Carbonyl halides
CTION 11. TOXICOLOGICAL	INFORMATION
Acute inhalation toxicity Pentafluoroethane	: > 769000 ppm Exposure time: 4 h Species: rat
	: LC50: > 500000 ppm

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	Species: rat	
lso-butane	: LC50: 570000 ppm Exposure time: 15 min Species: rat	
Sensitisation Pentafluoroethane	: Cardiac sensitization Species: dogs Note: No-observed-effect level 75 000 ppm Lowest observable effect level 100 000 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 Pentafluoroethane	Species: rat Application Route: Inhalation Exposure time: (4 Weeks) NOEL: 50000 ppm Subchronic toxicity	
1,1,1,2-Tetrafluoroethane	: Species: rat NOEL: 40000 ppm	
Pentafluoroethane	: Test Method: Ames test Result: negative	
1,1,1,2-Tetrafluoroethane	: Note: In vitro tests did not show mutage	enic effects
	: Cell type: Human lymphocytes Result: negative	
	: Cell type: Chinese Hamster Ovary Cells Result: negative	3

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Honeywell SAFETY DATA SHEET Genetron 422D 25LB/11.3KG Jug 000000011691 Version 1.4 Revision Date 05/21/2014 Print Date 03/28/2018 Teratogenicity Pentafluoroethane : Species: rabbit Application Route: Inhalation exposure NOAEL, Teratog: 50,000 ppm NOAEL, Maternal: 50,000 ppm Note: Did not show teratogenic effects in animal experiments. Species: rat Application Route: Inhalation exposure NOAEL, Teratog: 50,000 ppm NOAEL, Maternal: 50,000 ppm Note: Did not show teratogenic effects in animal experiments. Further information Note: Acute Health Hazard Ethane, pentafluoro- (HFC-125): Cardiac sensitisation threshold (dog): 75000 ppm. 1,1,1,2-tetrafluoroethane (HFC-134a). Cardiac sensitisation threshold (dog): 80000 ppm. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Irritating to eyes and skin. Rapid evapouration of the liquid may cause frostbite. Avoid skin contact with leaking liquid (danger of frostbite). May cause cardiac arrhythmia. SECTION 12. ECOLOGICAL INFORMATION Biodegradability Pentafluoroethane : Result: Not readily biodegradable. Value: 5 % Method: OECD 301 D Further information on ecology Additional ecological : Accumulation in aquatic organisms is unlikely. information 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. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. Page 117 15

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CTION 13.	DISPOSAL CONSIDERA	TIONS
Disposal		Dbserve all Federal, State, and Local Environmental egulations.
Note		This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.
CTION 14.	TRANSPORT INFORMA	TION
DOT	UN/ID No. Proper shipping name	 : UN 3163 : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane)
	Class Packing group Hazard Labels	2.2 2.2
ΙΑΤΑ	UN/ID No. Description of the good	: UN 3163 s : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane,
	Class Hazard Labels	Isobutane) 2.2 2.2
	Packing instruction (cal aircraft) Packing instruction (passenger aircraft)	rgo : 200 : 200
IMDG	UN/ID No. Description of the good	: UN 3163 s : LIQUEFIED GAS, N.O.S. (PENTAFLUOROETHANE,
	Class Hazard Labels EmS Number Marine pollutant	1,1,1,2-TETRAFLUOROETHANE, ISOBUTANE) : 2.2 : 2.2 : F-C, S-V : no

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SECTION 15. REGULATORY INFORMATION

Inventories

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)	:	All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Toxic Chemical Control Law (TCCL) List	:	On the inventory, or in compliance with the inventory
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	On the inventory, or in compliance with the inventory
China. Inventory of Existing Chemical Substances	:	On the inventory, or in compliance with the inventory
NZIOC - New Zealand	:	On the inventory, or in compliance with the inventory
National regulatory informa	atic	on
SARA 302 Components	:	SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components		SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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SARA 311/312 Hazards	: Acute Health Sudden Rele	Hazard ase of Pressure Ha	zard	
California Prop. 65		cause cancer, birth	ny chemicals known to State defects, or any other	of
Massachusetts RTK	: Iso-butane		75-28-5	
New Jersey RTK	: Pentafluoroe : 1,1,1,2-Tetra : Iso-butane		354-33-6 811-97-2 75-28-5	
Pennsylvania RTK	: Pentafluoroe : 1,1,1,2-Tetra : Iso-butane		354-33-6 811-97-2 75-28-5	
WHMIS Classification		has been classified	according to the hazard crit ins all of the information requ	
CTION 16. OTHER INFORMA	TION			-
	HMIS III	NFPA		
Health hazard Flammability	; 1 ; 1	2		
Physical Hazard	: 0	I		
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and belief at the date of its put handling, use, processing, stor warranty or quality specificatio may not be valid for such mate unless specified in the text. Fir	blication. The information given rage, transportation, disposal a n. The information relates only erial used in combination with a nal determination of suitability o	to the best of our knowledge, information is designed only as a guidance for safe and release and is not to be considered a to the specific material designated and any other materials or in any process, of any material is the sole responsibility of for any specific product properties.
versions. Previous Issue Date: 09/13/20	12	This version replaces all previous
r repared by noneyweir r endi	mance materials and Technold	

SAFETY DATA SHEE	l	Honeywell
Sid Harvey item # R4	22DX25	SDS # Z0464
enetron 422D 25lb/11.3kg Ju	g - Cn	
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/ersion 1.4	Revision Date 05/21/2014	Print Date 07/27/2016
ECTION 1. PRODUCT AND C		
Product name	: Genetron® 422D	
i roador name		
MSDS Number	: 000000011691	
Product Use Description	: Refrigerant	
Manufacturer or supplier's details	: Honeywell International Inc. 115 Tabor Road	
For more information call	Morris Plains, NJ 07950-2546 : 800-522-8001 +1-973-455-6300 (Monday-Friday, 9:00am-5:00pm)	
In case of emergency call	Medical: 1-800-498-5701 or +1-30 Transportation (CHEMTREC): 1-8 +1-703-527-3887	13-389-1414 300-424-9300 or
	: (24 hours/day, 7 days/week)	
ECTION 2. HAZARDS IDENTIF	ICATION	
Emergency Overview		
Form	: Liquefied gas	
Color	: colourless	
Odor	: odourless	
Classification of the substa	nce or mixture	
Classification of the substanc or mixture	e : Gases under pressure, Liquefied Simple Asphyxiant	gas
GHS Label elements, inclue	ling precautionary statements	
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Symbol(s)		
Signal word	: Warning	
Hazard statements	: Contains gas under pressure; may May displace oxygen and cause rap	explode if heated.
Precautionary statements	: Storage: Protect from sunlight. Store in a we	
Hazards not otherwise classified	 Causes asphyxiation in high concer realize that he/she is suffocating. May cause cardiac arrhythmia. May cause frostbite. May cause eye and skin irritation. 	ntrations. The victim will not
Carcinogenicity No component of this product pr anticipated carcinogen by NTP, CTION 3. COMPOSITION/INFOR		1.1% is identified as a known o
Chemical nature	: Mixture	
Chemical Na	me CAS-No.	Concentration
Pentafluoroethane	354-33-6	65.10 %
1,1,1,2-Tetrafluoroethane	811-97-2	31.50 %
Iso-butane	75-28-5	3.40 %
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ersion 1.4		Revision Date 05/21/2014	Print Date 07/27/201
CTION 4. FIRST AID MEASU	RES	3	
Inhalation	:	Move to fresh air. If breathing is irregular of artificial respiration. Use oxygen as require qualified operator is present. Call a physic from adrenaline-ephedrine group.	ed, provided a
Skin contact		After contact with skin, wash immediately there is evidence of frostbite, bathe (do no (not hot) water. If water is not available, co cloth or similar covering. If symptoms pers	ot rub) with lukewarm over with a clean, soft
Eye contact	:	Rinse immediately with plenty of water, als for at least 15 minutes. In case of frostbite lukewarm, not hot. If symptoms persist, ca	water should be
Ingestion	:	Unlikely route of exposure. As this product inhalation section. Do not induce vomiting advice. Call a physician immediately.	t is a gas, refer to the without medical
Notes to physician			
Treatment	:	Because of the possible disturbances of ca catecholamine drugs, such as epinephrine special caution and only in situations of em Treatment of overexposure should be direc symptoms and the clinical conditions.	, should be used with nergency life support.
CTION 5. FIREFIGHTING MEA	รบ	RES	
Suitable extinguishing media	:	The product is not flammable. ASHRAE 34 Use water spray, alcohol-resistant foam, of carbon dioxide. Use extinguishing measures that are appr circumstances and the surrounding enviro	opriate to local
Specific hazards during firefighting	:	Contents under pressure. This product is not flammable at ambient t atmospheric pressure. However, this material can ignite when mi	
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00000011691	동작 방안님께 관련해 방법은 가지 않는 것이 같이 있는 것이 있는 것이 있는 것이다. 같이 있는 것이 아이지 않는 것이 있는 것이 있는 것이 있는 것이 있는 것이다. 같이 있는 것이 아이지 않는 것이 같이 있는 것이 같이 있는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없는 것이 있는 것이 없다.
ersion 1.4	Revision Date 05/21/2014 Print Date 07/27/201
	pressure and exposed to strong ignition sources. Container may rupture on heating.
	Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses.
	Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
	In case of fire hazardous decomposition products may be produced such as:
	Hydrogen halides Hydrogen fluoride
	Carbon monoxide Carbon dioxide (CO2)
	Carbonyl halides
Special protective equipment for firefighters	In the event of fire and/or explosion do not breathe fumes.
	Wear full protective clothing and self-contained breathing
	apparatus. No unprotected exposed skin areas.
CTION 6. ACCIDENTAL RELE/ Personal precautions	 apparatus. No unprotected exposed skin areas. ASE MEASURES Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
CTION 6. ACCIDENTAL RELEA	 apparatus. No unprotected exposed skin areas. ASE MEASURES Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe. Ensure that the oxygen content is >= 19.5%.
CTION 6. ACCIDENTAL RELEA	 apparatus. No unprotected exposed skin areas. ASE MEASURES Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe.
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ECTION 7. HANDLING AND ST	ORAGE	
Handling		
Handling	to temperatures exceeding 50 Follow all standard safety prect compressed gas cylinders. Use authorized cylinders only. Protect cylinders from physical Do not puncture or drop cylinde excessive heat.	on clothing. oment. as. from sunlight and do not expose °C. autions for handling and use of damage. ers, expose them to open flame or er use. Do not spray on a naked erial.
Handling	 Perform filling operations only a ventilation facilities. Containers which are opened n kept upright to prevent leakage 	nust be carefully resealed and
Advice on protection against fire and explosion	: The product is not flammable. Can form a combustible mixture atmospheric pressure.	e with air at pressures above
Storage		
Requirements for storage areas and containers	to temperatures exceeding 50 ° after use.	n a dry, cool and well-ventilated y ventilated. specially in confined areas.

enetron 422D 25lb/11.3kg Jug - 0 00000011691 /ersion 1.4 ECTION 8. EXPOSURE CONTROL Protective measures : Engineering measures : Eye protection :	Revision Date 05/21/2014 Print Date 07/27/20
ECTION 8. EXPOSURE CONTROL Protective measures	-S/PERSONAL PROTECTION Do not breathe vapour. Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are close to the workstation location. General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities. Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear:
Protective measures : Engineering measures :	-S/PERSONAL PROTECTION Do not breathe vapour. Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are close to the workstation location. General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities. Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear:
Engineering measures	Do not breathe vapour. Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are close to the workstation location. General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities. Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear:
Engineering measures	Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are close to the workstation location. General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities. Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear:
	Ventilation facilities. Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear:
Eye protection :	Safety glasses with side-shields If splashes are likely to occur, wear:
	coggies of lace shield, giving complete protection to eyes
	Leather gloves In case of contact through splashing: Protective gloves Gloves Polyvinyl alcohol or nitrile- butyl-rubber gloves
Skin and body protection :	Avoid skin contact with leaking liquid (danger of frostbite). Wear cold insulating gloves/ face shield/ eye protection.
	In case of insufficient ventilation wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
	Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Keep working clothes separately.
Exposure Guidelines Components CAS-No.	Value Control Upda Basis parameters te
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SAFETY DATA SHEET

Honeywell

Genetron 422D 25lb/11.3kg Jug - Cn

000000011691

ion 1.4		Revision Dat	e 05/21/2014		Print Date 07/27
Pentafluoroethan e	354-33-6	TWA : time weighted average	4,900 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
Pentafluoroethan e	354-33-6	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : time weighted average	4,240 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
so-butane	75-28-5	TWA : time weighted average	(1,000 ppm)	01 2010	ACGIH:US. ACGIH Threshold Limit Values
so-butane	75-28-5	REL : Recomm ended exposure limit (REL):	1,900 mg/m3 (800 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
ON 9. PHYSICAL A		L PROPERTI	ES		
		Page 7	15		

SAFETY DATA SHEET

Honeywell

Genetron 422D 25lb/11.3kg Jug - Cn 000000011691

sion 1.4	Revision Date 05/21/2014	Print Date 07/27/2
Color	: colourless	
Odor	: odourless	
рН	: Note: neutral	
Melting point/freezing point	: Note: no data available	
Boiling point/boiling range	: -43 °C	
Flash point	: Note: not applicable	
Lower explosion limit	: Note: None	
Jpper explosion limit	: Note: None	
√apor pressure	: 10,152 hPa at 21.1 °C(70.0 °F) 23,091 hPa at 54.4 °C(129.9 °F)	
/apor density	: 3.0 Note: (Air = 1.0)	
Density	: 1.15 g/cm3 at 25 °C	
Vater solubility	: Note: not determined	
gnition temperature	: Note: not determined	
Decomposition temperature	: > 250 °C Note: To avoid thermal decomposition, do	not overheat.
	Page 8 / 15	s

SAFETY DATA SHEET	Honeywell
enetron 422D 25lb/11.3kg Jug 00000011691	- Cn
ersion 1.4	Revision Date 05/21/2014 Print Date 07/27/2
CTION 10. STABILITY AND RE	ACTIVITY
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: Hazardous polymerisation does not occur.
Conditions to avoid	 Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials to avoid	 Finely divided aluminium Potassium Powdered metals Aluminium Magnesium Zinc
Hazardous decomposition products	 In case of fire hazardous decomposition products may be produced such as: Hydrogen halides Hydrogen fluoride Carbon monoxide Carbon dioxide (CO2) Carbonyl halides
CTION 11. TOXICOLOGICAL IN	FORMATION
Acute inhalation toxicity Pentafluoroethane	: > 769000 ppm Exposure time: 4 h Species: rat
1,1,1,2-Tetrafluoroethane	: LC50: > 500000 ppm Exposure time: 4 h
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SAFETY DATA SHEET		Honeywell
Genetron 422D 25lb/11.3kg Jug	ı - Cn	
Version 1.4	Revision Date 05/21/2014	Print Date 07/27/201
	Species: rat	
Iso-butane	: LC50: 570000 ppm Exposure time: 15 min Species: rat	
Sensitisation		
Pentafluoroethane	 Cardiac sensitization Species: dogs Note: No-observed-effect level 75 000 ppm Lowest observable effect level 100 000 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 Pentafluoroethane	: Species: rat Application Route: Inhalation Exposure time: (4 Weeks) NOEL: 50000 ppm Subchronic toxicity	
1,1,1,2-Tetrafluoroethane	: Species: rat NOEL: 40000 ppm	
Pentafluoroethane	: Test Method: Ames test Result: negative	
1,1,1,2-Tetrafluoroethane	: Note: In vitro tests did not show mu	utagenic effects
	: Cell type: Human lymphocytes Result: negative	
	: Cell type: Chinese Hamster Ovary Result: negative	Cells
······	Page 10 / 15	

SAFETY DATA SHEE	1	Honeywell
enetron 422D_25lb/11.3kg Ju 00000011691	g - Cn	
ersion 1.4	Revision Date 05/21/2014	Print Date 07/27/201
Teratogenicity Pentafluoroethane		
rentalitoroethane	: Species: rabbit Application Route: Inhalation expos	
	NOAEL, Teratog: 50,000 ppm	sure
	NOAEL, Maternal: 50,000 ppm	
	Note: Did not show teratogenic effe	cts in animal experiments.
	Species: rat	
	Application Route: Inhalation expos	ure
	NOAEL,Teratog: 50,000 ppm NOAEL,Maternal: 50,000 ppm	
	Note: Did not show teratogenic effe	cts in animal experiments
		ete in animai experiments.
Further information	: Note: Acute Health Hazard Ethane	pentafluoro- (HFC-125)
	Cardiac sensitisation threshold (doc	I): 75000 ppm.
	1,1,1,2-tetrafluoroethane (HFC-134	a): Cardiac sensitisation
	threshold (dog): 80000 ppm. Vapou can cause suffocation by reducing c	rs are neavier than air and
	breathing. Irritating to eyes and skin	. Rapid evapouration of the
	liquid may cause frostbite. Avoid ski	n contact with leaking liquid
	(danger of frostbite). May cause car	diac arrhythmia.
CTION 12. ECOLOGICAL INF	ORMATION	
Biodegradability Pentafluoroethane		
r entandoroethane	: Result: Not readily biodegradable. Value: 5 %	
	Method: OECD 301 D	
Further information on ecol	ogy	
Additional ecological	Accumulation in aquatic organisms i	s unlikely.
information	This product contains greenhouse g	ases which may contribute
	to global warming. Do NOT vent to the with provisions of the U.S. Clean Air	ne atmosphere. To comply Act, any residual must be
	recovered.	
	This product is subject to U.S. Enviro	onmental Protection 40 CFR Part 82
	Agency Clean Air Act Regulations at	
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000000	11691	
ersion 1.4		Revision Date 05/21/2014 Print Date 07/27/2010
ECTION 13	3. DISPOSAL CONSIDERAT	TIONS
Disposa	al methods : O re	bserve all Federal, State, and Local Environmental gulations.
Note	C	his product is subject to U.S. Environmental Protection Agency lean Air Act Regulations Section 608 in 40 CFR Part 82 egarding refrigerant recycling.
CTION 14	. TRANSPORT INFORMAT	ION
DOT	UN/ID No. Proper shipping name	 UN 3163 LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane)
	Class Packing group Hazard Labels	2.2
IATA	UN/ID No. Description of the goods	 UN 3163 LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane)
	Class Hazard Labels Packing instruction (carg aircraft) Packing instruction	: 2.2 : 2.2
IMDG	(passenger aircraft) UN/ID No.	: UN 3163
	Description of the goods	: LIQUEFIED GAS, N.O.S. (PENTAFLUOROETHANE, 1,1,1,2-TETRAFLUOROETHANE, ISOBUTANE)
	Class Hazard Labels EmS Number Marine pollutant	: 2.2 : 2.2 : F-C, S-V : no

enetron 422D 25lb/11.3kg Ju 00000011691	g - Cn	
ersion 1.4	Revision Date 05/21/2014	Print Date 07/27/2010
ECTION 15. REGULATORY IN	FORMATION	
Inventories		
US. Toxic Substances Control Act	: On TSCA Inventory	
Australia. Industrial Chemical (Notification and Assessment) Act	: On the inventory, or in compliance with t	he inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	: All components of this product are on the	e Canadian DSL.
Japan. Kashin-Hou Law List	: On the inventory, or in compliance with t	he inventory
Korea. Toxic Chemical Control Law (TCCL) List	: On the inventory, or in compliance with the	he inventory
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	: On the inventory, or in compliance with the	ne inventory
China. Inventory of Existing Chemical Substances	: On the inventory, or in compliance with the	ne inventory
NZIOC - New Zealand	: On the inventory, or in compliance with the	ne inventory
National regulatory informa	tion	
SARA 302 Components	: SARA 302: No chemicals in this material reporting requirements of SARA Title III, s	are subject to the Section 302.
SARA 313 Components	: SARA 313: This material does not contain components with known CAS numbers th (De Minimis) reporting levels established Section 313.	at exceed the threshold
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Revision	Date 05/21/2014	Print Date 07/27/20
		Finit Date 0//2//20
		zard
: This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.		
: Iso-butane		75-28-5
		354-33-6 811-97-2 75-28-5
		354-33-6 811-97-2 75-28-5
This product	has been classified	according to the hazard criteria is all of the information required
HMIS III	NFPA	
: 1 : 1	2 1	
: 0		
	Sudden Rel Sudden	California to cause cancer, birth or reproductive harm.

Genetron 422D 25lb/11.3kg Jug - Ch JODDODD11691 Marriel Comparison Version 1.4 Revision Date 05/21/2014 The information provided in this Safety Data Sheet is correct to the best of our and belief at the date of its publication. The information relates only to the specific or marriel used in combination of suitability of any relates and its user. This information are lates only to the specific or marriel used in combination of suitability of any specific or the user. This information are highlighted in the margin. This version replexes and its user. This information are highlighted in the margin. This version replexes and the user by Honeywell Performance Materials and Technologies Product States and by Honeywell Performance Materials and Technologies Product States and State	loneywell
The information provided in this Safety Data Sheet is correct to the best of our and belief at the date of its publication. The information given is designed only handling, use, processing, storage, transportation, disposal and release and is warranty or quality specification. The information relates only to the specific m may not be valid for such material used in combination with any other materia unless specified in the text. Final determination of suitability of any material is the user. This information should not constitute a guarantee for any specific pr Changes since the last version are highlighted in the margin. This version repl versions. Previous Issue Date: 09/13/2012	
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 Spece of synthetic weint endmance materials and reconologies Product Ste 	as a guidance for safe s not to be considered a aterial designated and ls or in any process, the sole responsibility o oduct properties. aces all previous
	wardsnip Group
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Safety Data Sheet	SDS# Z0464
Sid Harvey item #'s	R422Dx25 & R422Dx110 Chemours™
Freon [™] MO29 (R-4221	D) Refrigerant
Version 3.0	
Revision Date 02/16/2016	Ref. 13000027389
This SDS adheres to the standa requirements in other countries.	rds and regulatory requirements of the United States and may not meet the regulatory
SECTION 1. PRODUCT AND C	OMPANY IDENTIFICATION
Product name Tradename/Synonym	 Freon[™] MO29 (R-422D) Refrigerant ISCEON[®] MO29 R-422D MO29
Product Grade/Type	: ASHRAE Refrigerant number designation: R-422D
Product Use	: Refrigerant, For professional users only.
Restrictions on use Manufacturer/Supplier	 Do not use product for anything outside of the above specified uses The Chemours Company FC, LLC 1007 Market Street Wilmington, DE 19899 United States of America
Product Information Medical Emergency Transport Emergency	 1-844-773-CHEM (outside the U.S. 1-302-773-1000) 1-866-595-1473 (outside the U.S. 1-302-773-2000) CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)
SECTION 2. HAZARDS IDENT	FICATION
Product hazard category Gases under pres	
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Safety Data Sheet	Chemours [™]
Freon [™] MO29 (R-422	D) Refrigerant
Version 3.0	
Revision Date 02/16/2016	Ref. 130000027389
Label content Pictogram	
Signal word	: Warning
Hazardous warnings	: Contains gas under pressure; may explode if heated.
Hazardous prevention measures	: Protect from sunlight. Store in a well-ventilated place.
Other hazards	

Misuse or intentional inhalation abuse may lead to death without warning. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	Concentration
354-33-6	65.1 %
811-97-2	31.5 %
	354-33-6



Freon [™] MO29 (R-422D) Refrigerant			
Version 3.0				
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Isobutane (HC-600a)		75-28-5	3.4 %	
				1
SECTION 4. FIRST AID MEASU	RES			
General advice	: Never give anything by mout persist or in all cases of doub	h to an unconscious perso ot seek medical advice.	n. When symptoms	
Inhalation	: Remove from exposure, lie of	lown Move to fresh air Ke	ep patient warm and at	
innaiation	rest. Artificial respiration and			
Skin contact	: In case of contact, immediate	ely flush skin with plenty of	water for at least 15	
	minutes. Take off all contami Wash contaminated clothing			
	gently warming affected area			
Eye contact	: In case of contact, immediate	ely flush eyes with plenty o	f water for at least 15	
	minutes. Consult a physician	if necessary.		
Ingestion	: Is not considered a potential	route of exposure.		
Most important	: Anaesthetic effects Light-hea			
symptoms/effects, acute and delayed	sensation in the chest, heart dizziness or weakness	thumping, apprehension, f	eeling of fainting,	
Protection of first-aiders		to refer to Contine O for one		
Protection of first-alders	: If potential for exposure exist equipment.	is refer to Section 8 for spe	cilic personal protective	
Notes to physician	: Because of possible disturba			
	such as epinephrine, that ma should be used with special of		emergency life support	
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Safety Data Sheet	
	Chemours"
Freon [™] MO29 (R-422D)	Refrigerant
Version 3.0	
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SECTION 5. FIREFIGHTING MEA	SURES
Suitable extinguishing media	: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	: No applicable data available.
Specific hazards	: Cylinders are equipped with pressure and temperature relief devices, but may still 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 colour of the torch flame. 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 substance is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance in an oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of this substance in the presence of certain concentrations of chlorine.
Special protective equipment for firefighters	: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.
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	Chemours [™]
Freon [™] MO29 (R-422D)	Refrigerant
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Further information	: Cool containers/tanks with water spray. Water runoff should be contained and neutralized prior to release.
SECTION 6. ACCIDENTAL RELEA	ASE MEASURES
	G MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. ROTECTIVE EQUIPMENT during clean-up.
Safeguards (Personnel)	: Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect.
Environmental precautions	: Should not be released into the environment. In accordance with local and national regulations.
Spill Cleanup	: Evaporates. Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect.
Accidental Release Measures	: Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.
SECTION 7. HANDLING AND STO	DRAGE
Handling (Personnel)	: Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
Handling (Physical Aspects)	: Contact with chlorine or other strong oxidizing agents should also be avoided.
Dust explosion class	: Not applicable
Storage	: Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Never attempt to lift cylinder by its cap. Use a

Safety Data Sheet	
reon [™] MO29 (R-422D)	Refrigerant
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	check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Avoid area where salt or other corrosive materials are present. The product has an indefinite shelf life when stored properly.
Storage period	: > 10 yr
Storage temperature	: <52 °C (< 126 °F)
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.
Personal protective equipment Respiratory protection	: Under normal manufacturing conditions, no respiratory protection is required when using this product.
Respiratory protection	when using this product.
Respiratory protection Hand protection	 when using this product. Additional protection: Impervious gloves Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne
Respiratory protection Hand protection Eye protection	 when using this product. Additional protection: Impervious gloves Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material. Self-contained breathing apparatus (SCBA) is required if a large release
Respiratory protection Hand protection Eye protection Protective measures Exposure Guidelines	 when using this product. Additional protection: Impervious gloves Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

No applicable data available. 1,1,1,2-Tetrafluoroethane (HFC-134a) No applicable data available. Isobutane (HC-600a) TLV (ACGIH) 1,000 ppm STEL		Chemours"
No applicable data available. 1,1,2-Tetrafluoroethane (HFC-134a) No applicable data available. Isobutane (HC-600a) TLV (ACGIH) 1,000 ppm STEL ECTION 9. PHYSICAL AND CHEMICAL PROPERTIES Appearance Physical state : gaseous Form : Liquefied gas Color : gight, ether-like Odor threshold : No applicable data available. pH : neutral Metting point/freezing point : Not available for this mixture. Boiling point/boiling range : Boiling point -43.2 °C (-45.8 °F). Flash point : does not flash	on [™] MO29 (R-422D) Rei	frigerant
No applicable data available. 1,1,1,2-Tetrafluoroethane (HFC-134a) No applicable data available. Isobutane (HC-600a) TLV (ACGIH) TLV (ACGIH) 1,000 ppm STEL EETION 9. PHYSICAL AND CHEMICAL PROPERTIES Appearance gaseous Form : gaseous Form : Liquefied gas Color : olourless Odor : slight, ether-like Odor threshold : No applicable data available. pH : neutral Metting point/freezing point : Melting point/range Not available for this mixture. Boiling point/boiling range : Boiling point -43.2 °C (-45.8 °F). Flash point : does not flash	on 3.0	
1,1,2-Tetrafluoroethane (HFC-134a) No applicable data available. Isobutane (HC-600a) TLV (ACGIH) 1,000 ppm STEL EETION 9. PHYSICAL AND CHEMICAL PROPERTIES Appearance Physical state : gaseous : Liquefied gas Color : gaseous Form : Liquefied gas Color : slight, ether-like Odor : slight, ether-like Odor threshold : No applicable data available. pH : neutral Melting point/freezing point : Melting point/range Not available for this mixture. Boiling point/boiling range : Boiling point Flash point : does not flash	sion Date 02/16/2016	Ref. 130000027389
No applicable data available. Isobutane (HC-600a) TLV (ACGIH) 1,000 ppm STEL ECTION 9. PHYSICAL AND CHEMICAL PROPERTIES Appearance Physical state : gaseous : Liquefied gas Color : colourless Odor : slight, ether-like Odor : slight, ether-like Odor threshold : No applicable data available. pH : neutral Melting point/freezing point : Melting point/range Not available for this mixture. Boiling point/boiling range : Boiling point -43.2 °C (-45.8 °F). Flash point : does not flash	No applicable data available.	
TLV (ACGIH) 1,000 ppm STEL ECTION 9. PHYSICAL AND CHEMICAL PROPERTIES Appearance gaseous Physical state : gaseous Form : Liquefied gas Color : colourless Odor : slight, ether-like Odor : slight, ether-like Odor threshold : No applicable data available. pH : neutral Melting point/freezing point : Melting point/range Not available for this mixture. Boiling point/boiling range : Boiling point -43.2 °C (-45.8 °F) Flash point : does not flash	1,1,1,2-Tetrafluoroethane (HFC No applicable data available.	:-134a)
Appearance Physical state Form Color: gaseous : Liquefied gas : colourlessOdor: slight, ether-likeOdor threshold: No applicable data available.pH: neutralMelting point/freezing point Not available for this mixture.Boiling point/boiling range Flash point: Boiling point (-43.2 °C (-45.8 °F))Flash point: does not flash		GIH) 1,000 ppm STEL
Odor threshold: No applicable data available.pH: neutralMelting point/freezing point: Melting point/range Not available for this mixture.Boiling point/boiling range: Boiling point -43.2 °C (-45.8 °F)Flash point: does not flash		
pH: neutralMelting point/freezing point: Melting point/range Not available for this mixture.Boiling point/boiling range: Boiling point -43.2 °C (-45.8 °F)Flash point: does not flash	ppearance Physical state : c Form : L	gaseous Liquefied gas
Melting point/freezing point: Melting point/range Not available for this mixture.Boiling point/boiling range: Boiling point -43.2 °C (-45.8 °F)Flash point: does not flash	ppearance Physical state : g Form : L Color : c	gaseous Liquefied gas colourless
Boiling point/boiling range : Boiling point Flash point : does not flash	ppearance Physical state : 0 Form : L Color : c Ddor : s	gaseous Liquefied gas colourless slight, ether-like
-43.2 °C (-45.8 °F) Flash point : does not flash	ppearance Physical state : Q Form : L Color : c Odor : s Odor threshold : N	gaseous Liquefied gas colourless slight, ether-like No applicable data available.
	ppearance Physical state : g Form : l Color : c Odor : s Odor : s Odor threshold : N H : r Melting point/freezing point : N	gaseous Liquefied gas colourless slight, ether-like No applicable data available. neutral Melting point/range
Evaporation rate : No applicable data available.	ppearance Physical state : 0 Form : 1 Color : 0 odor : 0 odor : 1 H : 1 felting point/freezing point : 1 N : 1 soiling point/boiling range : 1	gaseous Liquefied gas colourless slight, ether-like No applicable data available. neutral Melting point/range Not available for this mixture.
	ppearance Physical state : 0 Form : 1 Color : 0 Odor : 5 Odor threshold : 1 H : 7 Aelting point/freezing point : 1 Soiling point/boiling range : 6	gaseous Liquefied gas colourless slight, ether-like No applicable data available. neutral Melting point/range Not available for this mixture. Boiling point 43.2 °C (-45.8 °F)
Flammability (solid, gas) : Not applicable	ppearance Physical state : g Form : L Color : c Odor : s Odor : s Odor threshold : N H : r Melting point/freezing point : N Soiling point/boiling range : E Flash point : N	gaseous Liquefied gas colourless slight, ether-like No applicable data available. heutral Melting point/range Not available for this mixture. Boiling point 43.2 °C (-45.8 °F) does not flash
Upper explosion limit : Method: None per ASTM E681	ppearance : <td:< td=""> : : : : : : : : <td::< td=""> <td::< td=""> : : : : : <td::< td=""> <td::< td=""> <td::< td=""> : : <td::< td=""> <td::< td=""> <td::< td=""> <td::< td=""> : <td::< td=""> <td::< td=""> <td::< td=""> <td::< td=""> <td::<< td=""><td>gaseous Liquefied gas colourless slight, ether-like No applicable data available. heutral Melting point/range Not available for this mixture. Boiling point 43.2 °C (-45.8 °F) does not flash No applicable data available.</td></td::<<></td::<></td::<></td::<></td::<></td::<></td::<></td::<></td::<></td::<></td::<></td::<></td::<></td::<></td:<>	gaseous Liquefied gas colourless slight, ether-like No applicable data available. heutral Melting point/range Not available for this mixture. Boiling point 43.2 °C (-45.8 °F) does not flash No applicable data available.



Freon[™] MO29 (R-422D) Refrigerant

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Lower explosion limit	: Method: None per ASTM E681
Vapor pressure	: 11,279 hPa at 25 °C (77 °F)
Vapor density	: 3.9 at 25°C (77°F) and 1013 hPa (Air=1.0)
Specific gravity (Relative density)	: 1.15 at 25 °C (77 °F)
Water solubility	: No applicable data available.
Solubility(ies)	: No applicable data available.
Partition coefficient: n- octanol/water	: No applicable data available.
Auto-ignition temperature	: No applicable data available.
Decomposition temperature	: No applicable data available.
Viscosity, kinematic	: No applicable data available.
Viscosity, dynamic	: No applicable data available.
% Volatile	: 100 %

SECTION 10. STABILITY AND REACTIVITY

Reactivity Chemical stability	No applicable data available.Stable under recommended storage conditions.
Possibility of hazardous reactions	: Polymerization will not occur.
Conditions to avoid	: The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised 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.
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Incompatible materials :	Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts	
Hazardous decomposition : products	: Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride., These materials are toxic and irritating., Avoid contact with decomposition products	
SECTION 11. TOXICOLOGICAL INFO	RMATION	
Pentafluoroethane (HFC-125) Inhalation 4 h LC50	: > 800000 ppm , Rat	
Inhalation No Observed Adverse Effect Concentration	: 75000 ppm , Dog Cardiac sensitization	
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	: 100000 ppm , Dog Cardiac sensitization	
Skin sensitization	: Does not cause respiratory sensitisation., human	
Repeated dose toxicity	: Inhalation Rat	
	gas No toxicologically significant effects were found.	
Carcinogenicity	: Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.	
Mutagenicity	 Animal testing did not show any mutagenic effects. Evidence suggests this substance does not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells. 	
Reproductive toxicity	: No toxicity to reproduction Animal testing showed no reproductive toxicity.	
Teratogenicity	: Animal testing showed no developmental toxicity.	



reon [™] MO29 (R-422D) Ref	igerant
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Revision Date 02/16/2016	Ref. 130000027389
Further information	: Cardiac sensitisation threshold limit : 490000 mg/m3
,1,1,2-Tetrafluoroethane (HFC-134a) Inhalation 4 h LC50	: > 567000 ppm , Rat
Inhalation No Observed Adverse Effect	: 40000 ppm , Dog Cardiac sensitization
Concentration Inhalation Low Observed Adverse Effect	: 80000 ppm , Dog Cardiac sensitization
Concentration (LOAEC) Skin irritation	: No skin irritation, Rabbit
Eye irritation	: No eye irritation, Rabbit
Skin sensitization	: Does not cause skin sensitisation., Guinea pig
	Does not cause respiratory sensitisation., Rat
Repeated dose toxicity	: Inhalation Rat
	gas NOAEL: 50000, No toxicologically significant effects were found.
Carcinogenicity	 Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.
Mutagenicity	: Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Reproductive toxicity	 No toxicity to reproduction No effects on or via lactation Animal testing showed no reproductive toxicity.
Teratogenicity	: Animal testing showed no developmental toxicity.
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Freon [™] MO29 (R-422D) Refrigerant		
	ingerant	
Version 3.0		
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Further information	: Cardiac sensitisation threshold limit : 334000 mg/m3	
Isobutane (HC-600a) Inhalation 4 h LC50	: 276808 ppm , Rat The toxicological data has been taken from products of similar composition.	
Inhalation 4 h LC50	: > 31 mg/l , Rat	
Inhalation Low Observed Adverse Effect Concentration (LOAEC) Inhalation No Observed	 50000 ppm , Dog Cardiac sensitization 25000 ppm , Dog 	
Adverse Effect Concentration Dermal	 25000 ppm , Dog Cardiac sensitization Not applicable 	
Oral	: Not applicable	
Skin irritation	: No skin irritation, Not tested on animals Not expected to cause skin irritation based on expert review of the properties of the substance.	
Eye irritation	 No eye irritation, Not tested on animals Not expected to cause eye irritation based on expert review of the properties of the substance. 	
Skin sensitization	 Not tested on animals Not expected to cause sensitization based on expert review of the properties of the substance. 	
Repeated dose toxicity	: Inhalation Rat	
	No toxicologically significant effects were found.	
Mutagenicity	 Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects. 	
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rsion 3.0	
evision Date 02/16/2016	Ref. 130000027389
Reproductive toxicity	: No toxicity to reproduction Animal testing showed no reproductive toxicity.
Teratogenicity	: Animal testing showed no developmental toxicity.
Further information	: Cardiac sensitisation threshold limit : 118.9 mg/m3
Program (NTP) Report on C	A.6. The classifications may differ from those listed in the National Toxicology Carcinogens (latest edition) or those found to be a potential carcinogen in the search on Cancer (IARC) Monographs (latest edition).
Program (NTP) Report on C International Agency for Res None of the components pre by IARC, NTP, or OSHA, as SECTION 12. ECOLOGICAL INFORM Aquatic Toxicity	Carcinogens (latest edition) or those found to be a potential carcinogen in the search on Cancer (IARC) Monographs (latest edition). esent in this material at concentrations equal to or greater than 0.1% are listed s a carcinogen.
Program (NTP) Report on C International Agency for Res None of the components pre	Carcinogens (latest edition) or those found to be a potential carcinogen in the search on Cancer (IARC) Monographs (latest edition). esent in this material at concentrations equal to or greater than 0.1% are listed s a carcinogen.
Program (NTP) Report on C International Agency for Res None of the components pre by IARC, NTP, or OSHA, as SECTION 12. ECOLOGICAL INFORM Aquatic Toxicity Pentafluoroethane (HFC-125)	Carcinogens (latest edition) or those found to be a potential carcinogen in the search on Cancer (IARC) Monographs (latest edition). esent in this material at concentrations equal to or greater than 0.1% are listed s a carcinogen. MATION : Oncorhynchus mykiss (rainbow trout) 450 mg/l
Program (NTP) Report on C International Agency for Res None of the components pre by IARC, NTP, or OSHA, as SECTION 12. ECOLOGICAL INFORM Aquatic Toxicity Pentafluoroethane (HFC-125) 96 h LC50	 Carcinogens (latest edition) or those found to be a potential carcinogen in the search on Cancer (IARC) Monographs (latest edition). esent in this material at concentrations equal to or greater than 0.1% are listed a carcinogen. MATION Concorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances. Algae 142 mg/l
Program (NTP) Report on C International Agency for Res None of the components pre by IARC, NTP, or OSHA, as SECTION 12. ECOLOGICAL INFORM Aquatic Toxicity Pentafluoroethane (HFC-125) 96 h LC50 96 h ErC50	 Carcinogens (latest edition) or those found to be a potential carcinogen in the search on Cancer (IARC) Monographs (latest edition). esent in this material at concentrations equal to or greater than 0.1% are listed as a carcinogen. MATION Concorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances. Algae 142 mg/l Information given is based on data obtained from similar substances. Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
Program (NTP) Report on C International Agency for Res None of the components pre by IARC, NTP, or OSHA, as SECTION 12. ECOLOGICAL INFORM Aquatic Toxicity Pentafluoroethane (HFC-125) 96 h LC50 96 h ErC50 72 h NOEC	 Carcinogens (latest edition) or those found to be a potential carcinogen in the search on Cancer (IARC) Monographs (latest edition). esent in this material at concentrations equal to or greater than 0.1% are listed is a carcinogen. MATION Concorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances. Algae 142 mg/l Information given is based on data obtained from similar substances. Pseudokirchneriella subcapitata (green algae) 13.2 mg/l Information given is based on data obtained from similar substances. Daphnia magna (Water flea) 980 mg/l Information given is based on data obtained from similar substances.

Safety	Data	Sheet
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ersion 3.0		
evision Date 02/	16/2016	Ref. 130000027389
		Information given is based on data obtained from similar substances.
72 h	NOEC	Pseudokirchneriella subcapitata (green algae) 13.2 mg/l Information given is based on data obtained from similar substances.
48 h	EC50	Daphnia magna (Water flea) 980 mg/l
obutane (HC-600 96 h	Da) LC50	: Fish 24.11 mg/l
72 h	EC50	Algae 7.71 mg/l
48 h	EC50	Daphnia (water flea) 14.22 mg/l
CTION 13. DIS Waste disposa Product	pern	be used after re-conditioning. Recover by distillation or remove to a nitted waste disposal facility. Comply with applicable Federal, e/Provincial and Local Regulations.
Waste disposa	al methods - : Can pern State	be used after re-conditioning. Recover by distillation or remove to a nitted waste disposal facility. Comply with applicable Federal,
Waste disposa Product Contaminated	al methods - : Can pern State	be used after re-conditioning. Recover by distillation or remove to a nitted waste disposal facility. Comply with applicable Federal, e/Provincial and Local Regulations.
Waste disposa Product Contaminated	al methods - : Can pern State packaging : Emp	be used after re-conditioning. Recover by distillation or remove to a nitted waste disposal facility. Comply with applicable Federal, e/Provincial and Local Regulations.
Waste disposa Product Contaminated	al methods - : Can pern State packaging : Emp ANSPORT INFORMATIO UN number Proper shipping nam Class	 be used after re-conditioning. Recover by distillation or remove to a nitted waste disposal facility. Comply with applicable Federal, e/Provincial and Local Regulations. by pressure vessels should be returned to the supplier. N i 1078 i Refrigerant gases, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane) i 2.2
Waste disposa Product Contaminated	al methods - : Can pern State packaging : Emp ANSPORT INFORMATIO UN number Proper shipping nam	 be used after re-conditioning. Recover by distillation or remove to a nitted waste disposal facility. Comply with applicable Federal, e/Provincial and Local Regulations. by pressure vessels should be returned to the supplier. N 1078 Refrigerant gases, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
Waste disposa Product Contaminated ECTION 14. TRA DOT	al methods - : Can pern State packaging : Emp ANSPORT INFORMATIO UN number Proper shipping nam Class Labelling No.	be used after re-conditioning. Recover by distillation or remove to a hitted waste disposal facility. Comply with applicable Federal, e/Provincial and Local Regulations. https://www.sels.should.be.returned to the supplier. N : 1078 i 1078 i Refrigerant gases, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane) : 2.2 : 2.2 : 1078

Safety	Data	Sheet
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Freon[™] MO29 (R-422D) Refrigerant Version 3.0 Revision Date 02/16/2016 Ref. 130000027389 Labelling No. : 2.2 IMDG UN number : 1078 Proper shipping name : REFRIGERANT GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane) Class : 2.2 Labelling No. : 2.2 SECTION 15. REGULATORY INFORMATION : This material does not contain any chemical components with known CAS SARA 313 Regulated numbers that exceed the threshold (De Minimis) reporting levels established Chemical(s) by SARA Title III, Section 313. PA Right to Know : Substances on the Pennsylvania Hazardous Substances List present at a Regulated Chemical(s) concentration of 1% or more (0.01% for Special Hazardous Substances): Isobutane (HC-600a) NJ Right to Know : Substances on the New Jersey Workplace Hazardous Substance List present Regulated Chemical(s) at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): Isobutane (HC-600a) California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

SECTION 16. OTHER INFORMATION

Freon[™] and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC. Chemours[™] and the Chemours Logo are trademarks of The Chemours Company. Before use read Chemours safety information. For further information contact the local Chemours office or nominated distributors.

Revision Date : 02/16/2016



Freon[™] MO29 (R-422D) Refrigerant

Version 3.0

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Ref. 130000027389

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.

Safety Data Sheet	
Sid Harvey it	em #'s R422DX25 & R422DX110 SDS # Z0464
DuPont [™] ISCEON [®] M	1O29 (R-422D) Refrigerant
Version 2.0	
Revision Date 04/01/2015	Ref. 13000027389
This SDS adheres to the standar requirements in other countries	ards and regulatory requirements of the United States and may not meet the regulatory s.
SECTION 1. PRODUCT AND	COMPANY IDENTIFICATION
Product name Tradename/Synonym	 DuPont[™] ISCEON[®] MO29 (R-422D) Refrigerant ISCEON[®] MO29 R-422D MO29
Product Grade/Type	: ASHRAE Refrigerant number designation: R-422D
Product Use	: Refrigerant, For professional users only.
Restrictions on use Manufacturer/Supplier	 Do not use product for anything outside of the above specified uses DuPont 1007 Market Street Wilmington, DE 19898 United States of America
Product Information Medical Emergency Transport Emergency	 +1-800-441-7515 (outside the U.S. +1-302-774-1000) 1-800-441-3637 (outside the U.S. 1-302-774-1139) CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)
SECTION 2. HAZARDS IDENT	TIFICATION
Product hazard category Gases under pres	ssure Liquefied gas
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Safety Data Sheet		OUPOND ®
DuPont [™] ISCEON [®] M	O29 (R-422D) Refrigerant	
Version 2.0		
Revision Date 04/01/2015	Ref. 13000027389	
Label content Pictogram		
Signal word	: Warning	
Hazardous warnings	: Contains gas under pressure; may explode if heated.	
Hazardous prevention measures	: Protect from sunlight. Store in a well-ventilated place.	
	tion abuse may lead to death without warning. Ir and can cause suffocation by reducing oxygen available for breathin uid may cause frostbite.	g.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Pentafluoroethane (HFC-125)	354-33-6	65.1 %
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	31.5 %
Isobutane (HC-600a)	75-28-5	3.4 %



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SECTION 4. FIRST AID MEASURES

General advice	: Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
Inhalation	: Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
Skin contact	 In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Take off all contaminated clothing immediately. Consult a physician. Wash contaminated clothing before re-use. Treat for frostbite if necessary by gently warming affected area.
Eye contact	: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.
Ingestion	: Is not considered a potential route of exposure.
Most important symptoms/effects, acute and delayed	 Anaesthetic effects Light-headedness irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness
Protection of first-aiders	: If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Notes to physician	: Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	se extinguishing measures that are appropriate to loca e surrounding environment.	l circumstances and
Unsuitable extinguishing media	o applicable data available.	



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Specific hazards	: Cylinders are equipped with pressure and temperature relief devices, but may still 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 colour of the torch flame. 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 substance is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance 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, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of this substance in the presence of certain concentrations of chlorine.
Special protective equipment for firefighters	: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.
Further information	: Cool containers/tanks with water spray. Water runoff should be contained and neutralized prior to release.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Safeguards (Personnel)	:	Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect.
Environmental precautions	:	Should not be released into the environment. In accordance with local and national regulations.
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Spill Cleanup	 Evaporates. Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect.
Accidental Release Measures	: Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.
SECTION 7. HANDLING AND ST	DRAGE
Handling (Personnel)	 Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
Handling (Physical Aspects)	: Contact with chlorine or other strong oxidizing agents should also be avoided.
Dust explosion class	: Not applicable
Storage	 Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Avoid area where salt or other corrosive materials are present. The product has an indefinite shelf life when stored properly.
Storage period	: > 10 yr
Storage temperature	: <52 °C (< 126 °F)
SECTION 8. EXPOSURE CONTR	OLS/PERSONAL PROTECTION
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
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			reas prior to use enclosed areas.	of torches or other open flames, or if employees are
Personal protective equipmen Respiratory protection			rmal manufactu ng this product.	ring conditions, no respiratory protection is required
Hand protection	:	Additiona	I protection: Imp	pervious gloves
Eye protection	:	the possi	ety glasses with bility exists for fa vith this material	side shields. Additionally wear a face shield where ace contact due to splashing, spraying or airborne
Protective measures	:	Self-cont occurs.	ained breathing	apparatus (SCBA) is required if a large release
Exposure Guidelines Exposure Limit Values				
Pentafluoroethane (HFC-1 AEL *		JPONT)	1,000 ppm	8 & 12 hr. TWA
1,1,1,2-Tetrafluoroethane AEL *		C-134a) JPONT)	1,000 ppm	8 & 12 hr. TWA
lsobutane (HC-600a) TLV	(A0	CGIH)	1,000 ppm	STEL
* AEL is DuPont's Acceptab lower than the AEL are in ef				rnmentally imposed occupational exposure limits which are edence.
SECTION 9. PHYSICAL AND CH	EMI	CAL PRO	PERTIES	

Appearance

Physical state	:	gaseous
Form	:	Liquefied gas
Color	:	colourless



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Odor	: slight, ether-like
Odor threshold	: No applicable data available.
рН	: neutral
Melting point/freezing point	: Melting point/range Not available for this mixture.
Boiling point/boiling range	: Boiling point -43.2 °C (-45.8 °F)
Flash point	: does not flash
Evaporation rate	: No applicable data available.
Flammability (solid, gas)	: Not applicable
Upper explosion limit	: Method: None per ASTM E681
Lower explosion limit	: Method: None per ASTM E681
Vapor pressure	: 11,279 hPa at 25 °C (77 °F)
Vapor density	: 3.9 at 25°C (77°F) and 1013 hPa (Air=1.0)
Specific gravity (Relative density)	: 1.15 at 25 °C (77 °F)
Water solubility	: No applicable data available.
Solubility(ies)	: No applicable data available.
Partition coefficient: n- octanol/water	: No applicable data available.
Auto-ignition temperature	: No applicable data available.
Decomposition temperature	: No applicable data available.
Viscosity, kinematic	: No applicable data available.
Viscosity	: No applicable data available.

R-422D) Refrigerant	
Ref. 13000027389	
100 %	
No applicable data available. Stable under recommended storage conditions.	
Polymerization will not occur.	
The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised 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.	
Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts	
Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride., These materials are toxic and irritating., Avoid contact with decomposition products	
RMATION	
: > 800000 ppm , Rat	
: 100000 ppm , Dog Cardiac sensitization	
: 75000 ppm , Dog Cardiac sensitization	
: Does not cause respiratory sensitisation., human	
: Inhalation Rat -	
gas NOAEL: > 50000, No toxicologically significant effects were found.	
: Not classifiable as a human carcinogen.	
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F NS F Taff A Ekha	



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	Overall weight of evidence indicates that the substance is not carcinogenic.
Mutagenicity	 Animal testing did not show any mutagenic effects. Evidence suggests this substance does not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells.
Reproductive toxicity	: No toxicity to reproduction Animal testing showed no reproductive toxicity.
Teratogenicity	: Animal testing showed no developmental toxicity.
Further information	: Cardiac sensitisation threshold limit : 490000 mg/m3
1,1,1,2-Tetrafluoroethane (HFC-134a) Inhalation 4 h LC50	: > 567000 ppm , Rat
Inhalation No Observed Adverse Effect Concentration	: 40000 ppm , Dog Cardiac sensitization
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	: 80000 ppm , Dog Cardiac sensitization
Skin irritation	: No skin irritation, Rabbit
Eye irritation	: No eye irritation, Rabbit
Skin sensitization	: Does not cause skin sensitisation., Guinea pig
	Does not cause respiratory sensitisation., Rat
Repeated dose toxicity	: Inhalation Rat
	gas NOAEL: 50000, No toxicologically significant effects were found.
Carcinogenicity	 Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.
Mutagenicity	: Animal testing did not show any mutagenic effects.
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Revision Date 04/01/2015	Ref. 13000027389
	Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Reproductive toxicity	 No toxicity to reproduction No effects on or via lactation Animal testing showed no reproductive toxicity.
Teratogenicity	: Animal testing showed no developmental toxicity.
Further information	: Cardiac sensitisation threshold limit : 334000 mg/m3
Isobutane (HC-600a) Inhalation 4 h LC50	: 276808 ppm , Rat The toxicological data has been taken from products of similar composition.
Inhalation 4 h LC50	: > 31 mg/l , Rat
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	: 50000 ppm , Dog Cardiac sensitization
Inhalation No Observed Adverse Effect	: 25000 ppm , Dog Cardiac sensitization
Concentration Dermal	: Not applicable
Oral	: Not applicable
Skin irritation	 No skin irritation, Not tested on animals Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	 No eye irritation, Not tested on animals Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	: Not tested on animals Not expected to cause sensitization based on expert review of the properties of the substance.
Repeated dose toxicity	: Inhalation Rat
	No toxicologically significant effects were found.
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evision Date 04/01/2015	Ref. 13000027389
Mutagenicity	 Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.
Reproductive toxicity	: No toxicity to reproduction Animal testing showed no reproductive toxicity.
Teratogenicity	: Animal testing showed no developmental toxicity.
Further information	: Cardiac sensitisation threshold limit : 118.9 mg/m3
Program (NTP) Report on Ca	A.6. The classifications may differ from those listed in the National Toxicology ircinogens (latest edition) or those found to be a potential carcinogen in the
None of the components pres by IARC, NTP, or OSHA, as a SECTION 12. ECOLOGICAL INFORM	
None of the components pres by IARC, NTP, or OSHA, as a SECTION 12. ECOLOGICAL INFORM/ Aquatic Toxicity	sent in this material at concentrations equal to or greater than 0.1% are listed a carcinogen.
None of the components pres by IARC, NTP, or OSHA, as a SECTION 12. ECOLOGICAL INFORM Aquatic Toxicity Pentafluoroethane (HFC-125)	 Sent in this material at concentrations equal to or greater than 0.1% are listed a carcinogen. ATION Concorhynchus mykiss (rainbow trout) 450 mg/l
None of the components pres by IARC, NTP, or OSHA, as a SECTION 12. ECOLOGICAL INFORMA Aquatic Toxicity Pentafluoroethane (HFC-125) 96 h LC50	 Sent in this material at concentrations equal to or greater than 0.1% are listed a carcinogen. ATION Concorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances. Algae 142 mg/l
None of the components pres by IARC, NTP, or OSHA, as a SECTION 12. ECOLOGICAL INFORM/ Aquatic Toxicity Pentafluoroethane (HFC-125) 96 h LC50 96 h ErC50	 Sent in this material at concentrations equal to or greater than 0.1% are listed a carcinogen. ATION Concorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances. Algae 142 mg/l Information given is based on data obtained from similar substances. Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
None of the components press by IARC, NTP, or OSHA, as a SECTION 12. ECOLOGICAL INFORM/ Aquatic Toxicity Pentafluoroethane (HFC-125) 96 h LC50 96 h ErC50 72 h NOEC 48 h EC50	 Sent in this material at concentrations equal to or greater than 0.1% are listed a carcinogen. ATION Concorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances. Algae 142 mg/l Information given is based on data obtained from similar substances. Pseudokirchneriella subcapitata (green algae) 13.2 mg/l Information given is based on data obtained from similar substances. Daphnia magna (Water flea) 980 mg/l
None of the components press by IARC, NTP, or OSHA, as a SECTION 12. ECOLOGICAL INFORM/ Aquatic Toxicity Pentafluoroethane (HFC-125) 96 h LC50 96 h ErC50 72 h NOEC 48 h EC50 1,1,1,2-Tetrafluoroethane (HFC-134a)	 Sent in this material at concentrations equal to or greater than 0.1% are listed a carcinogen. ATION Concorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances. Algae 142 mg/l Information given is based on data obtained from similar substances. Pseudokirchneriella subcapitata (green algae) 13.2 mg/l Information given is based on data obtained from similar substances. Daphnia magna (Water flea) 980 mg/l Information given is based on data obtained from similar substances.



Revision Date 04/0	01/2015	Ref. 13000027389		
		Information given is based on data obtained from similar substances.		
72 h	NOEC :	Pseudokirchneriella subcapitata (green algae) 13.2 mg/l Information given is based on data obtained from similar substances.		
48 h	EC50 :	Daphnia magna (Water flea) 980 mg/l		
Isobutane (HC-600 96 h		Fish 24.11 mg/l		
72 h	EC50 :	Algae 7.71 mg/l		
48 h	EC50 :	Daphnia (water flea) 14.22 mg/l		
SECTION 13. DIS Waste disposa Product Contaminated	permit State/F	S e used after re-conditioning. Recover by distillation or remove to a ted waste disposal facility. Comply with applicable Federal, Provincial and Local Regulations. pressure vessels should be returned to the supplier.		
SECTION 14. TRA	ANSPORT INFORMATION			
DOT	UN number	: 1078		
IATA_C	Proper shipping name Class Labelling No. UN number Proper shipping name	 Refrigerant gases, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane) 2.2 2.2 1078 Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane, 		
IMDG	Class Labelling No. UN number	Pentafluoroethane) : 2.2 : 2.2 : 1078		
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DuPont[™] ISCEON[®] MO29 (R-422D) Refrigerant

Version 2.0

Revision Date 04/01/2015		Ref. 130000027389
Cla	per shipping na ss pelling No.	ame : REFRIGERANT GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane) : 2.2 : 2.2
SECTION 15. REGULATO	ORY INFORMA	TION
SARA 313 Regulate Chemical(s)	nu	nis material does not contain any chemical components with known CAS Imbers that exceed the threshold (De Minimis) reporting levels established V SARA Title III, Section 313.
PA Right to Know Regulated Chemica	ll(s) co	ubstances on the Pennsylvania Hazardous Substances List present at a ncentration of 1% or more (0.01% for Special Hazardous Substances): obutane (HC-600a)
NJ Right to Know Regulated Chemica	ll(s) at	ubstances on the New Jersey Workplace Hazardous Substance List present a concentration of 1% or more (0.1% for substances identified as ircinogens, mutagens or teratogens): Isobutane (HC-600a)
California Prop. 65		nemicals known to the State of California to cause cancer, birth defects or ny other harm: none known

SECTION 16. OTHER INFORMATION

ISCEON is a registered trademark of E. I. du Pont de Nemours and Company [®] DuPont's registered trademark Before use read DuPont's safety information. For further information contact the local DuPont office or DuPont's nominated distributors. Revision Date : 04/01/2015

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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DuPont[™] ISCEON[®] MO29 (R-422D) Refrigerant

Version 2.0

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Significant change from previous version is denoted with a double bar.

Material Safety I	Data	Sheet
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Version 2.2

Revision Date 09/12/2011

Ref. 13000027389

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name Product Grade/Type	:	DuPont [™] ISCEON [®] MO29 [™] refrigerant ASHRAE Refrigerant number designation: R-422D
Tradename/Synonym	:	Isceon [®] MO29 R-422D MO29
MSDS Number	:	13000027389
Product Use	:	Refrigerant
Manufacturer	:	DuPont 1007 Market Street Wilmington, DE 19898
Product Information Medical Emergency Transport Emergency	::	1-800-441-7515 (outside the U.S. 1-302-774-1000) 1-800-441-3637 (outside the U.S. 1-302-774-1139) CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview Misuse or intentional inhalation abuse may lead to death without warning. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite.

Potential Health Effects Skin	:	Contact with liquid or refrigerated gas can cause cold burns and frostbite.
Eyes	:	Contact with liquid or refrigerated gas can cause cold burns and frostbite.



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Inhalation	symptoms, due t Other symptoms Anaesthetic effer incoordination, d strange sensatio fainting, dizzines	vier than air and can cause suff	inhalation abuse are: s, confusion, , irregular heartbeat with a apprehension, feeling of
Target Organs Isobutane (<0.1% butadiene)	: Central nervous	system	
Carcinogenicity None of the component IARC, NTP, or OSHA, a	-	at concentrations equal to or g	reater than 0.1% are listed
None of the component IARC, NTP, or OSHA, a	s a carcinogen.		reater than 0.1% are listed
None of the component IARC, NTP, or OSHA, a TION 3. COMPOSITION/INF	s a carcinogen.	DIENTS	
None of the component IARC, NTP, or OSHA, a TION 3. COMPOSITION/INF Component Pentafluoroethane (HFC-125	s a carcinogen.	DIENTS CAS-No.	Concentration
None of the component IARC, NTP, or OSHA, a TION 3. COMPOSITION/INF Component Pentafluoroethane (HFC-125 1,1,1,2-Tetrafluoroethane (HI	s a carcinogen.	DIENTS CAS-No. 354-33-6	Concentration 65.7 %
None of the component IARC, NTP, or OSHA, a	s a carcinogen.	DIENTS CAS-No. 354-33-6 811-97-2	Concentration 65.7 % 32.5 %



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Skin contact	 In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Take off all contaminated clothing immediately. Consult a physician Wash contaminated clothing before re-use. Treat for frostbite if necessary by
	gently warming affected area.
Eye contact	: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.
Inhalation	: Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
Ingestion	: Is not considered a potential route of exposure.
General advice	: Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
Notes to physician	: Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life suppor should be used with special caution.
CTION 5. FIREFIGHTING ME	ASURES
Flammable Properties Flash point	: does not flash
Lower explosion limit	: Method : None per ASTM E681
Upper explosion limit	: Method : None per ASTM E681
Fire and Explosion Hazard	: Cylinders are equipped with pressure and temperature relief devices, but ma still 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 colour of the torch flame. 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

disperse refrigerant vapors from the work area before using any open flames.



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	This substance is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance 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, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of this substance in the presence of certain concentrations of chlorine.
Firefighting Instructions :	In the event of fire, wear self-contained breathing apparatus. Wear neoprene gloves during cleaning up work after a fire. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Cool containers / tanks with water spray.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with cleanup. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Safeguards (Personnel)	Evacuate personnel to safe areas.	
Spill Cleanup	Ventilate area using forced ventilation, especially low or enclo where heavy vapors might collect. Recover free liquid for reus reclamation.	
Accidental Release Measures	Prevent material from entering sewers, waterways, or low are Avoid open flames and high temperatures. Self-contained bre apparatus (SCBA) is required if a large release occurs.	

SECTION 7. HANDLING AND STORAGE

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Handling (Personnel)	 Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8. Handle in accordance with good industrial hygiene and safety practice.
Storage	 Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Keep container tightly closed in a dry and well-ventilated place. Store in original container. Protect from contamination.
Storage temperature	: <52 °C (< 126 °F)
SECTION 8. EXPOSURE CONT	ROLS/PERSONAL PROTECTION
SECTION 8. EXPOSURE CONT	 ROLS/PERSONAL PROTECTION Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released.
	: Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released.
Engineering controls Personal protective equipme	 Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released. For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation
Engineering controls Personal protective equipmen Respiratory protection	 Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released. For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Engineering controls Personal protective equipmen Respiratory protection Hand protection	 Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released. For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Additional protection: Impervious gloves Wear safety glasses or coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing,
Engineering controls Personal protective equipmen Respiratory protection Hand protection Eye protection	 Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released. For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Additional protection: Impervious gloves Wear safety glasses or coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material. Self-contained breathing apparatus (SCBA) is required if a large release
Engineering controls Personal protective equipmer Respiratory protection Hand protection Eye protection Protective measures Exposure Guidelines Exposure Limit Values Pentafluoroethane	 Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released. For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Additional protection: Impervious gloves Wear safety glasses or coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

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DuPont [™] ISCEON [®] MO	29 [™] refrie	gerant		
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1,1,1,2-Tetrafluoroethane	9			
AEL *		1,000 ppm	8 & 12 hr. TWA	
Isobutane (<0.1% butadie TLV	ene) (ACGIH)	1,000 ppm	TWA	
ECTION 9. PHYSICAL AND CH Form Color Odor pH Boiling point % Volatile	EMICAL PRO : Liquefie : colourle : slight, e : neutral : -43 °C (: 100 %	d gas ss ther-like		
Vapour Pressure Density	: 12,200 l : 1.157 g/ (as liqui			
Specific gravity Water solubility Vapour density	: 5 g/l at 2	25 °C (77 °F) 25 °C (77 °F) 5°C (77°F) and 10	13 hPa (Air=1.0)	
ECTION 10. STABILITY AND R	EACTIVITY			
Stability	: Stable u	Inder recommend	ed storage conditions.	
Conditions to avoid	and pres flammat flammat	ssure. When pres	surised with air or oxyg es of HCFCs or HFCs ler certain conditions.	nt conditions of temperature gen, the mixture may become with chlorine may become
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Incompa			metals Alkaline earth metals, Powdered metals, Powdered metal salts			
Hazardo product:	ous decomposition s	: Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride., These materials are toxic and irritating., Avoid contact with decomposition products				
SECTION 1	1. TOXICOLOGICAL INF	ORMA	ΓΙΟΝ			
Pentafluoro	ethane (HFC-125) Dermal	:	not applicable			
	Oral	:	not applicable			
	Inhalation 4 h LC50	:	> 800000 ppm , rat			
	Inhalation	:	dog Cardiac sensitization			
	Skin irritation	:	No skin irritation, Not tested on animals Not expected to cause skin irritation based on expert review of the properties of the substance.			
	Eye irritation	:	No eye irritation, Not tested on animals Not expected to cause eye irritation based on expert review of the properties of the substance.			
	Skin sensitization	:	Does not cause skin sensitization., Not tested on animals Not expected to cause sensitization based on expert review of the properties of the substance.			
			There are no reports of human respiratory sensitization.			
	Repeated dose toxicity	:	Inhalation rat No toxicologically significant effects were found.			
	Carcinogenicity	:	Overall weight of evidence indicates that the substance is not carcinogenic.			
	Mutagenicity	:	Did not cause genetic damage in animals. Did not cause genetic damage in cultured mammalian cells.			
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	Did not cause genetic damage in cultured bacterial cells.	
Reproductive toxici	 Evidence suggests the substance is not a reproductive toxin in animals. Information given is based on data obtained from similar substance 	es.
Teratogenicity	: Animal testing showed no developmental toxicity.	
Further information	: Cardiac sensitisation threshold limit : 490000 mg/m3	
1,1,1,2-Tetrafluoroethane (HFC- Dermal	134a) : not applicable	
Oral	: not applicable	
Inhalation 4 h LC5	: 567000 ppm , rat	
Inhalation	: dog Cardiac sensitization	
Skin irritation	 slight irritation, rabbit Not expected to cause skin irritation based on expert review of the properties of the substance. 	
	No skin irritation, human	
Eye irritation	 slight irritation, rabbit Not expected to cause eye irritation based on expert review of the properties of the substance. 	
	No eye irritation, human	
Skin sensitization	: Did not cause sensitization on laboratory animals., guinea pig Not expected to cause sensitization based on expert review of the properties of the substance.	
	Did not cause sensitization on laboratory animals. There are no reports of human respiratory sensitization.	
Repeated dose tox	city : Inhalation rat No toxicologically significant effects were found.	
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Carcinogenicity	 Overall weight of evidence indicates that the substance is not carcinogenic. An increased incidence of benign tumours was observed in laboratory animals.
Mutagenicity	 Did not cause genetic damage in animals. Did not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells.
Reproductive toxicity	: Animal testing showed no reproductive toxicity.
Teratogenicity	: Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.
Further information	: Cardiac sensitisation threshold limit : 312975 mg/m3
Isobutane (<0.1% butadiene) Dermal	: not applicable
Oral	: not applicable
Inhalation 4 h LC50	 276808 ppm , rat The toxicological data has been taken from products of similar composition.
Skin irritation	 No skin irritation, Not tested on animals Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	 No eye irritation, Not tested on animals Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	 Not tested on animals Not expected to cause sensitization based on expert review of the properties of the substance.
Mutagenicity	: Did not cause genetic damage in animals. Did not cause genetic damage in cultured bacterial cells.



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SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity Pentafluoroethane (HFC-125)					
96 h LC50	:	Oncorhynchus mykiss (rainbow trout) > 81.8 mg/l Information given is based on data obtained from similar substances.			
96 h LC50	:	Danio rerio (zebra fish) > 200 mg/l Information given is based on data obtained from similar substances.			
96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 450 mg/l Information given is based on data obtained from similar substances.			
72 h EC50	:	Pseudokirchneriella subcapitata (green algae) > 118 mg/l Information given is based on data obtained from similar substances.			
72 h EC50	:	Pseudokirchneriella subcapitata (green algae) > 114 mg/l Information given is based on data obtained from similar substances.			
96 h EC50	:	Algae 142 mg/l Information given is based on data obtained from similar substances.			
48 h EC50	:	Daphnia magna (Water flea) > 200 mg/l Information given is based on data obtained from similar substances.			
48 h EC50	:	Daphnia magna (Water flea) > 97.9 mg/l Information given is based on data obtained from similar substances.			
1,1,1,2-Tetrafluoroethane (HFC-134a)					
96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 450 mg/l			
72 h EC50	:	Algae > 118 mg/l Information given is based on data obtained from similar substances.			
48 h EC50	:	Daphnia magna (Water flea) 980 mg/l			
SECTION 13. DISPOSAL CONSIDERATIONS					

Waste Disposal

: Can be used after re-conditioning. Recover by distillation or remove to a 10/12



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evision Date 09/	12/2011	Ref.	. 130000027389
			e disposal facility. Comply with applicable Federal,
		State/Provincial	I and Local Regulations.
Environmental	Hazards :	Empty pressure	e vessels should be returned to the supplier.
ECTION 14. TRA	ANSPORT INFORM	ATION	
DOT	UN number		: 1078
	Proper shipping	1 name	: Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane,
		j name	Pentafluoroethane)
	Class		: 2.2
IATA_C	Labelling No. UN number		: 2.2 : 1078
			. 10/0
	Proper shipping	j name	: Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane,
	Class		Pentafluoroethane) : 2.2
	Labelling No.		: 2.2
IMDG	UN number		: 1078
	Proper shipping	j name	: Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane,
	Class		Pentafluoroethane) : 2.2
	Labelling No.		: 2.2
	C C		
ECTION 15. REC	GULATORY INFORM	ΜΑΤΙΟΝ	
SARA 313	Pegulated :	SADA 313. This	s material does not contain any chemical components with
Chemical(s			mbers that exceed the threshold (De Minimis) reporting levels
Chomical(0)	,		SARA Title III, Section 313.
California P	rop. 65	Chemicals know	wn to the State of California to cause cancer, birth defects or
		any other harm:	
PA Right to	Know	Substances on t	the Pennsylvania Hazardous Substances List present at
	Chemical(s)		of 1% or more (0.01% for Special Hazardous
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NJ Right to Know Regulated Chemical(s)	 Substances): Isobutane (<0.1% butadiene) Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): Isobutane (<0.1% butadiene) 				
SECTION 16. OTHER INFORMATION					
	HMIS				
Health : Flammability : Reactivity/Physical hazard : PPE :	1 0 1 Personal Protection rating to be supplied by user depending on use conditions.				
Before use read DuPont's safe	the local DuPont office or DuPont's nominated distributors.				
the date of its publication. The storage, transportation, dispos information relates only to the	s Safety Data Sheet is correct to the best of our knowledge, information and belief at information given is designed only as a guidance for safe handling, use, processing, al and release and is not to be considered a warranty or quality specification. The specific material designated and may not be valid for such material used in combination iny process, unless specified in the text.				
Significant change from previous version is denoted with a double bar.					
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