



ACCORDING TO US CFR 1910.1200

## 1. SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### 1.1 Product identifier

Product Name	R404A
Trade Name	Refrigerant 404A, HFC 404A.
Synonym(s)	REFRIGERANT GAS MIX.
CAS No.	Mixture.
EC No.	Mixture.

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified Use(s)	Refrigerant.
Uses Advised Against	Not known.

### 1.3 Details of the supplier of the safety data sheet

Company Identification	Hudson Technologies Company
Address	PO Box 1541 One Blue Hill Plaza Pearl River, New York USA
Postal code	10965
Telephone	+1 (800) 953 2244
Fax	+1 (845) 512 6070
E-mail	<a href="mailto:information@hudsontech.com">information@hudsontech.com</a>

### 1.4 Emergency telephone number

Company	+1 (800) 501 4376
CHEMTREC (U.S.)	+1 (800) 424 9300
INTERNATIONAL	+1 (703) 527 3887

## 2. SECTION 2: HAZARDS IDENTIFICATION

### 2.1 Classification of the substance or mixture

US CFR 1910.1200	Gases under pressure; Press. Gas; Liquefied gas.
------------------	--

2.2 Label elements

Product Name R404A

Hazard Pictogram(s)



GHS04

Signal Word(s) Warning.

Hazard Statement(s) H280: Contains gas under pressure; may explode if heated.  
 OSHA-H01: MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.

Precautionary Statement(s) P202: Do not handle until all safety precautions have been read and understood.  
 P410+P403: Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards

May cause asphyxiation when concentrations are sufficient to reduce oxygen below safe breathing levels.

May cause frost-bite.

2.4 Additional Information

CGA-PG05: Use a back flow preventive device in the piping.

CGA-PG06: Close valve after each use and when empty.

CGA-PG02 : Protect from sunlight when ambient temperature exceeds 52 °C (125 °F).

CGA-PG27: Read and follow the Safety Data Sheet (SDS) before use.

This SDS is available in languages other than English.

3. SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENT(S)	CAS No.	%W/W	Hazard Statement(s)	Hazard Pictogram(s)
1,1,1-trifluoroethane (R-143A)	420-46-2	52	Flam. Gas 1 H220 Liquefied gas; H280	GHS02 GHS04

Pentafluoroethane (R-125)	354-33-6	44	Press. Gas, Liquefied gas; H280	GHS04
1,1,1,2- tetrafluoroethane (R-134A)	811-97-2	4	Press. Gas, Liquefied gas; H280	GHS04

#### 4. SECTION 4: FIRST AID MEASURES

##### 4.1 Description of first aid measures

Inhalation	If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing has stopped, apply artificial respiration. Get medical attention.
Skin Contact	Flush skin with large amounts of water. Thaw frosted parts with lukewarm water. Do not rub affected area. If symptoms persist, obtain medical attention.
Eye Contact	Flush eyes with water for at least 15 minutes while holding eyelids open. If symptoms persist, obtain medical attention.
Ingestion	Unlikely route of exposure.

##### 4.2 Most important symptoms and effects, both acute and delayed

Inhalation: High concentrations: Headache, Dizziness, Confusion, Loss of coordination, Nausea, Drowsiness, Unconsciousness.

##### 4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

#### 5. SECTION 5: FIREFIGHTING MEASURES

Non-flammable.

##### 5.1 Extinguishing media

Suitable Extinguishing media As appropriate for surrounding fire.

Unsuitable extinguishing media None.

##### 5.2 Special hazards arising from the substance or mixture

Contains gas under pressure; may explode if heated. The product should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. Decomposes in a fire giving off toxic fumes: Carbon monoxide,

Carbon dioxide, Hydrogen fluoride, Carbonyl halides.

### 5.3 Advice for fire-fighters

Fire fighters should wear complete protective clothing including self-contained breathing apparatus. If it is safe to do so, containers should be removed from fire area because they are likely to rupture under fire conditions.

## 6. SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

Evacuate area. Ensure adequate ventilation. Wear appropriate personal protective equipment, avoid direct contact.

### 6.2 Environmental precautions

Do not allow to enter drains, sewers or watercourses.

### 6.3 Methods and material for containment and cleaning up

Allow small spillages to evaporate provided there is adequate ventilation.

### 6.4 Reference to other sections

See Also Section 8, 13.

## 7. SECTION 7: HANDLING AND STORAGE

### 7.1 Precautions for safe handling

Provide sufficient ventilation. Avoid breathing gas. Avoid contact with skin and eyes. Wear protective gloves/protective clothing/eye protection/face protection. Do not drag, roll, slide or drop cylinders. Use a suitable hand truck design for cylinder movement. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object into valve cap openings. Doing so may damage valve causing a leak to occur. Secure cylinders in an upright position at all times, close all valves when not in use. Keep closed even when empty. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

### 7.2 Conditions for safe storage, including any incompatibilities

Protect from sunlight. Store in a well-ventilated place.

Storage temperature <125°F (52°C)  
 Storage life Stable under normal conditions.  
 Incompatible materials Potassium, Calcium, Powdered Aluminium, Magnesium and Zinc.

**8. SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

8.1 Control parameters

Occupational Exposure Limits

SUBSTANCE	CAS No.	LEL (8 hr TWA ppm)	LEL (8 hr TWA mg/m³)	STEL (ppm)	STEL (mg/m³)	Note
1,1,1-trifluoroethane (R-143A)	420-46-2	1000	3400			
Pentafluoroethane (R-125)	354-33-6	1000	4900			
1,1,1,2-tetrafluoroethane (R-134A)	811-97-2	1000	4240			

Remark Workplace Environmental Exposure Level (AIHA)

8.2 Exposure controls

Appropriate engineering controls Ensure adequate ventilation.

Personal protection equipment



Eye Protection

Wear eye/face protection.



Skin protection

Wear suitable gloves.



Respiratory protection type A may be appropriate.

Where engineering controls are not fitted or inadequate wear suitable respiratory protective equipment. A suitable mask with filter

Thermal hazards Not applicable.

**9. SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

9.1 Information on basic physical and chemical properties

Appearance	Gas. Color: Colorless.
Odor	Faint ethereal.
Odor threshold	Not established.
pH	Neutral.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	-52.1°F (-46.7°C)
Flash Point	Not applicable.
Evaporation rate	>1 (CC14 =1)
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	Not applicable.
Vapor pressure	182.1 psia @ 77°F (25°C)
Vapor density	3.43 @ 77°F (25°C) (Air = 1)
Density (g/ml)	Not available.
Relative density	1.05 @ 77°F (25°C)
Solubility(ies)	Solubility (Water): Slightly soluble. Solubility (Other): Not available.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not applicable.
Decomposition Temperature (°C)	>482°F (250°C)
Viscosity	Not applicable.
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

9.2 Other information

Percent Volatile (%)	100%
----------------------	------

**10. SECTION 10: STABILITY AND REACTIVITY**

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical Stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

No hazardous reactions known if used for its intended purpose.

10.4 Conditions to avoid

Keep away from heat and direct sunlight.

10.5 Incompatible materials

Potassium, Calcium, Powdered Aluminium, Magnesium and Zinc.

10.6 Hazardous decomposition product(s)

Halogens, halogen acids and possibly carbonyl halides.

**11. SECTION 11: TOXICOLOGICAL INFORMATION**

11.1 Information on toxicological effects

Acute toxicity - Ingestion	Low acute toxicity.
Acute toxicity - Skin Contact	Low acute toxicity.
Acute toxicity - Inhalation	Low acute toxicity.
	1,1,1-trifluoroethane:
	Cardiac Sensitization threshold (dog)> 30 000ppm
Skin corrosion/irritation	Liquid contact can cause severe irritation and frostbite.
Serious eye damage/irritation	Liquid contact can cause severe irritation and frostbite.
Skin sensitization data	Not classified.
Respiratory sensitization data	Not classified.
Germ cell mutagenicity	There is no evidence of mutagenic potential.
Carcinogenicity	No evidence of carcinogenicity.
Reproductive toxicity	Not classified.
Lactation	Not classified.
STOT - single exposure	None anticipated.
STOT - repeated exposure	None anticipated.
Aspiration hazard	Not classified.

11.2 Other information

Not known.

**12. SECTION 12: ECOLOGICAL INFORMATION**

12.1 Toxicity

Toxicity - Aquatic invertebrates Low toxicity to invertebrates.

1,1,1-trifluoroethane:



SAFETY DATA SHEET

12-Sep-2016

Toxicity - Fish EC50 (calculated) = 115mg/l  
Low toxicity to fish.  
1,1,1-trifluoroethane:  
LC50 (estimated) = 109mg/l

Toxicity - Algae Low toxicity to algae.

Toxicity - Sediment Not classified.

Compartment

Toxicity - Terrestrial Not classified.

Compartment

12.2 Persistence and Degradation  
Not readily biodegradable.

12.3 Bioaccumulative potential  
The product has low potential for bioaccumulation.

12.4 Mobility in soil  
Not applicable.

12.5 Other adverse effects  
None anticipated.

**13. SECTION 13: DISPOSAL CONSIDERATIONS**

13.1 Waste treatment methods  
Containers must not be punctured or destroyed by burning, even when empty. Refer to manufacturer/supplier for information on recovery/recycling.

13.2 Additional Information  
Disposal should be in accordance with local, state or national legislation.  
R-404A is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

**14. SECTION 14: TRANSPORT INFORMATION**

14.1 UN number  
UN No. 3337

14.2 UN proper shipping name  
UN proper shipping name REFRIGERANT GAS R404A.

14.3 Transport hazard class(es)  
ADR/RID Class 2.2



IMDG Class 2.2  
 IMDG EMS Not available.

ICAO/IATA  
 Excepted Quantities E1  
 Passenger and Cargo Aircraft  
 Limited Quantities Packing  
 Instructions

Cargo Aircraft Limited Quantities

Max net Qty  
 Special Provisions Not applicable.  
 Emergency Response 2 L  
 Guidebook (ERG) Code  
 ADR Classification Code 2A  
 ADR HIN 20  
 ADR Transport Category 3  
 Tunnel Restriction Code C/E  
 Emergency Action Code 2TE  
 Advice on Additional Personal Not applicable.  
 Protection (APP)  
 14.4 Packing group  
 Packing group Not applicable.  
 Labels 2.2



Special Provisions Not applicable.  
 Limited Quantities 120 m  
 Excepted Quantities E1  
 Mixed Packing Instructions for Packages P200  
 Special Packing Provisions for Packages Not applicable.  
 Mixed Packing Instructions for Packages MP9



#### 14.5 Environmental hazards

Environmental hazards Not classified as a Marine Pollutant.

#### 14.6 Special precautions for user

Special precautions for user Not known.

#### 14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Packing Instructions for Portable (M) T50

Tanks

Special Provisions for Portable Not applicable.

Tanks

Tank Code for Tanks PxBN(M)

Special Provisions for Tanks TA4 TT9

Vehicle for Tank Carriage AT

Special Provisions for Carriage - Not applicable.

Packages

Special Provisions for Carriage - Not applicable.

Bulk

Special Provisions for Carriage - CV9 CV10 CV36

Loading, Unloading and Handling

Special Provisions for Carriage - Not applicable.

Operation

### 15. SECTION 15: REGULATORY INFORMATION

#### 15.1 Federal

Toxic and hazardous substances All chemicals are not listed.

(29 CFR 1910; Subpart Z )

National emission standards for All chemicals are not listed.

hazardous air pollutants (40 CFR

61.01)

Title III Consolidated List of Lists All chemicals are not listed.

TSCA (Toxic Substance Control All chemicals listed.

Act)

Sara 313 Toxic Chemicals All chemicals are not listed.

CAA 602 - Ozone Depleting All chemicals are not listed.

Substances (ODS)

15.2 State

State Right to Know Lists All chemicals are not listed.  
 Proposition 65 (California) All chemicals are not listed.

15.3 Other

OSPAR List of Chemicals for Priority Action All chemicals are not listed.

NTP (National Toxicology Program) All chemicals are not listed.

OSHA (List of Highly Hazardous Chemicals, Toxics and Reactives) All chemicals are not listed.

IARC (International Agency for Research on Cancer) All chemicals are not listed.

**16. SECTION 16: OTHER INFORMATION**

The following sections contain 1-16 revisions or new statements:

NFPA		HMIS	
Health	2	Health	1
Fire	1	Flammability	1
Instability	0	Physical hazards	0

LEGEND:

Hazard Pictogram(s)



GHS04

Hazard Statement(s) H280: Contains gas under pressure; may explode if heated.

Precautionary Statement(s) P410+P403: Protect from sunlight. Store in a well-ventilated place.



SAFETY DATA SHEET

12-Sep-2016

Additional Information required by Federal Standard 313 Rev. E:

Contract or Solicitation                      SPE4A6-16-D-0226  
Number:  
Prime Contractor:                              Hudson Technologies, Inc.  
Prime Contractor CAGE:                      7DSQ0  
Manufacturer/Contractor CAGE:            7AHB8  
National Stock Number (NSN):            6830013913104, 6830013920959, 6830013920960  
Specification Reference:

Disclaimers                                      Information contained in this publication or as otherwise supplied to Users is believed to be accurate and is given in good faith, but it is for the Users to satisfy themselves of the suitability of the product for their own particular purpose. Hudson Technologies Company gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that exclusion is prevented by law. Hudson Technologies Company accepts no liability for loss or damage (other than that arising from death or personal injury caused by defective product, if proved), resulting from reliance on this information. Freedom under Patents, Copyright and Designs cannot be assumed.