SECTION 1: IDENTIFICATION

Product Identifier
Product Form: Mixture
Product Name: HOT SHOT 2™ (R-417C)

Intended Use of the Product
Refrigerant

Name, Address, and Telephone of the Responsible Party

Company
ICOR International
10640 E 59th St.
Indianapolis, IN 46236
800-497-6805 (Monday-Friday, 7:30 am-4:30 pm ET)

Emergency Telephone Number
Emergency number: CHEMTREC 800-424-9300 (24 Hours/Day, 7 Days/Week)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture
Classification (GHS-US)
Simple Asphyxiant
Liquefied gas H280

Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US):

Signal Word (GHS-US):
Warning

Hazard Statements (GHS-US):
H280 - Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation

Precautionary Statements (GHS-US):
P410+P403 - Protect from sunlight. Store in a well-ventilated place

Other Hazards
Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions. Liquid contact with eyes or skin may cause frostbite.

Unknown Acute Toxicity (GHS-US): Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>% (w/w)</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1,2-Tetrafluoroethane</td>
<td>(CAS No) 811-97-2</td>
<td>78.8</td>
<td>Simple Asphyxiant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Liquefied gas, H280</td>
</tr>
<tr>
<td>Pentafluoroethane (HFC125)</td>
<td>(CAS No) 354-33-6</td>
<td>19.5</td>
<td>Simple Asphyxiant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Liquefied gas, H280</td>
</tr>
<tr>
<td>n-Butane (HC-600)</td>
<td>(CAS No) 106-97-8</td>
<td>1.7</td>
<td>Simple Asphyxiant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flam. Gas 1, H220</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Liquefied gas, H280</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures
General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).
HOT SHOT 2™
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

Skin Contact: Rinse immediately with plenty of water. Obtain medical attention if irritation develops or persists.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

Ingestion: Do NOT induce vomiting. Rinse mouth. Immediately call a POISON CENTER or doctor/physician.

**Most Important Symptoms and Effects Both Acute and Delayed**

General: Vapors are heavier than air and may cause Asphyxiantxia by reduction of the oxygen content.

Inhalation: May cause respiratory irritation.

Skin Contact: May cause skin irritation. Liquid contact may cause frostbite.

Eye Contact: May cause eye irritation.

Ingestion: Ingestion is likely to be harmful or have adverse effects.

**Chronic Symptoms:** None expected under normal conditions of use.

**Indication of Any Immediate Medical Attention and Special Treatment Needed**

If you feel unwell, seek medical advice (show the label where possible).

**SECTION 5: FIRE-FIGHTING MEASURES**

**Extinguishing Media**

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: None known.

**Special Hazards Arising From the Substance or Mixture**

Fire Hazard: Hot Shot 2 is not flammable at atmospheric pressure and in air at temperatures up to 100 °C (212 °F). Hot Shot 2 should not exist with air/excess oxygen at elevated pressures and high temperatures. Hot Shot 2 can become combustible with high concentrations of air at elevated pressure and/or temperature and 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). For example, do not mix Hot Shot 2 with air under pressure for leak detection purposes.

Explosion Hazard: Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity: Hazardous reactions will not occur under normal conditions.

**Advice for Firefighters**

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.


**Reference to Other Sections**

Refer to section 9 for flammability properties.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**Personal Precautions, Protective Equipment and Emergency Procedures**

General Measures: Avoid all contact with skin, eyes, or clothing. Avoid breathing vapors.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).


For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Stop leak if safe to do so. Ventilate area.

Environmental Precautions

Avoid release to the environment.

**Methods and Material for Containment and Cleaning Up**

For Containment: Ventilate area.

Methods for Cleaning Up: Isolate area until gas has dispersed.

**Reference to Other Sections**

See Heading 8. Exposure controls and personal protection.
SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Ruptured cylinders may rocket.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from direct sunlight, extremely high or low temperatures and incompatible materials.


Storage Area: Store in a well-ventilated place.

Specific End Use(s)

Refrigerant.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

<table>
<thead>
<tr>
<th>Material</th>
<th>Control Parameter</th>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Butane (HC-600) (106-97-8)</td>
<td>USA ACGIH ACGIH STEL (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>USA NIOSH NIOSH REL (TWA) (mg/m³)</td>
<td>1900 mg/m³</td>
</tr>
<tr>
<td></td>
<td>USA NIOSH NIOSH REL (TWA) (ppm)</td>
<td>800 ppm</td>
</tr>
<tr>
<td></td>
<td>Manitoba OEL STEL (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>Newfoundland &amp; Labrador OEL STEL (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>Nova Scotia OEL STEL (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>Ontario OEL TWA (ppm)</td>
<td>800 ppm</td>
</tr>
<tr>
<td></td>
<td>Prince Edward Island OEL STEL (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>Saskatchewan OEL STEL (ppm)</td>
<td>1250 ppm</td>
</tr>
<tr>
<td></td>
<td>Saskatchewan OEL TWA (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td>Pentfluoroethane (HFC125) (354-33-6)</td>
<td>ICOR AEL* OEL 8 &amp; 12 hr TWA (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>AIHA WEEL OEL 8 hr TWA</td>
<td>1000 ppm, 4900 mg/m³</td>
</tr>
<tr>
<td>1,1,1,2-Tetrafluoroethane (HFC-134a) (811-97-2)</td>
<td>ICOR AEL* OEL 8 &amp; 12 hr TWA (ppm)</td>
<td>1000 ppm</td>
</tr>
<tr>
<td></td>
<td>AIHA WEEL OEL 8 hr TWA</td>
<td>1000 ppm, 4900 mg/m³</td>
</tr>
</tbody>
</table>

* ICOR acceptable Exposure Limit. ICOR reviews industry standards and recommendations in consideration of acceptable exposure limitations. Where regulated exposure limits are lower than ICOR’s recommended AEL, those limits shall supersede.

Exposure Controls

Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed.


Materials for Protective Clothing: Chemically resistant materials and fabrics.

Hand Protection: Impervious butyl rubber gloves.

Eye Protection: Chemical goggles or safety glasses.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Environmental Exposure Controls: Do not allow the product to be released into the environment.

Consumer Exposure Controls: Do not eat, drink or smoke during use.
SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquefied Gas</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Slightly ethereal</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH</td>
<td>Neutral</td>
</tr>
<tr>
<td>Relative Evaporation Rate (butylacetate=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Dew @ 1 atm. -29.1 °C (-20.4 °F)</td>
</tr>
<tr>
<td></td>
<td>Bubble @ 1 atm. -32.6 °C (-26.7°F)</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Auto-ignition Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not available</td>
</tr>
<tr>
<td>Lower Flammable Limit</td>
<td>Not available</td>
</tr>
<tr>
<td>Upper Flammable Limit</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>@ 21.1 °C (70 °F) 96.7 psia</td>
</tr>
<tr>
<td></td>
<td>@ 54.4 °C (130 °F) 237.9 psia</td>
</tr>
<tr>
<td>Relative Vapor Density at 20 °C</td>
<td>Not available</td>
</tr>
<tr>
<td>Relative Density</td>
<td>Not available</td>
</tr>
<tr>
<td>Density</td>
<td>Liquid @ 1 atm. 85.91 lb/ft³</td>
</tr>
<tr>
<td></td>
<td>Vapor @ 1 atm. .3377 lb/ft³</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility</td>
<td>Not available</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>Explosion Data – Sensitivity to Mechanical Impact</td>
<td>Not expected to present an explosion hazard due to mechanical impact.</td>
</tr>
<tr>
<td>Explosion Data – Sensitivity to Static Discharge</td>
<td>Not expected to present an explosion hazard due to static discharge.</td>
</tr>
</tbody>
</table>

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Hazardous reactions will not occur under normal conditions.

Chemical Stability: Stable under recommended handling and storage conditions (see section 7).

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Ignition sources. Incompatible materials.


SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity: Not classified

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: May cause respiratory irritation.
Symptoms/Injuries After Skin Contact: May cause skin irritation. Liquid contact may cause frostbite.
Symptoms/Injuries After Eye Contact: May cause eye irritation.
Symptoms/Injuries After Ingestion: Ingestion is likely to be harmful or have adverse effects.

Chronic Symptoms: None expected under normal conditions of use.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>LC50 Inhalation Rat</th>
<th>ATE US (vapors)</th>
<th>ATE US (dust, mist)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentafluoroethane (HFC125) (354-33-6)</td>
<td>2910 g/m³ (4 h)</td>
<td>2,910.00 mg/l/4h</td>
<td>2,910.00 mg/l/4h</td>
</tr>
<tr>
<td>n-Butane (HC-600) (106-97-8)</td>
<td>658 mg/l/4h</td>
<td>658.00 mg/l/4h</td>
<td>658.00 mg/l/4h</td>
</tr>
<tr>
<td>1,1,1,2-Tetrafluoroethane (HFC-134a) (811-97-2)</td>
<td>1500 g/m³ (4 h)</td>
<td>1,500.00 mg/l/4h</td>
<td>1,500.00 mg/l/4h</td>
</tr>
</tbody>
</table>

SECTION 12: ECOLOGICAL INFORMATION

Toxicity: Not classified

Persistence and Degradability: Not available

Bioaccumulative Potential

<table>
<thead>
<tr>
<th>n-Butane (HC-600) (106-97-8)</th>
<th>BCF fish 1</th>
<th>1.57 - 1.97</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Log Pow</td>
<td>2.88 (at 20 °C)</td>
</tr>
</tbody>
</table>

Mobility in Soil: Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Recover, reclaim or recycle when practical. Dispose of waste material in accordance with all local, regional, national, and international regulations. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling. Contact a certified reclamer for recovery/reclamation of this product.


SECTION 14: TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name: LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2- Tetrafluoroethane)

Hazard Class: 2.2

Identification Number: UN3163

Label Codes: 2.2

ERG Number: 126

14.2 In Accordance with IMDG

Proper Shipping Name: LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2- Tetrafluoroethane)

Hazard Class: 2.2

Identification Number: UN3163
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Label Codes : 2.2
EmS-No. (Fire) : F-C
EmS-No. (Spillage) : S-V

14.3 In Accordance with IATA
Proper Shipping Name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2- Tetrafluoroethane)
Identification Number : UN3163
Hazard Class : 2.2
Label Codes : 2.2
ERG Code (IATA) : 2L

14.4 In Accordance with TDG
Proper Shipping Name : LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2- Tetrafluoroethane)
Hazard Class : 2.2
Identification Number : UN3163
Label Codes : 2.2

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

SARA Section 311/312 Hazard Classes: Sudden release of pressure hazard

EPA Clean Air Act: This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82

Pentafluoroethane (HFC125) (354-33-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

n-Butane (HC-600) (106-97-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

1,1,1,2-Tetrafluoroethane (HFC-134a) (811-97-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

California Proposition 65: This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

n-Butane (HC-600) (106-97-8)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Canadian Regulations

WHMIS Classification: Class A - Compressed Gas

Pentafluoroethane (HFC125) (354-33-6)
Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification: Uncontrolled product according to WHMIS classification criteria
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<table>
<thead>
<tr>
<th>n-Butane (HC-600) (106-97-8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the Canadian DSL (Domestic Substances List) inventory.</td>
<td></td>
</tr>
<tr>
<td>WHMIS Classification</td>
<td>Class A - Compressed Gas</td>
</tr>
<tr>
<td></td>
<td>Class B Division 1 - Flammable Gas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1,1,1,2-Tetrafluoroethane (HFC-134a) (811-97-2)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the Canadian DSL (Domestic Substances List) inventory.</td>
<td></td>
</tr>
<tr>
<td>WHMIS Classification</td>
<td>Class A - Compressed Gas</td>
</tr>
</tbody>
</table>

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

<table>
<thead>
<tr>
<th>Revision date</th>
<th>07/13/2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Information</td>
<td>This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.</td>
</tr>
</tbody>
</table>

GHS Full Text Phrases:

- Compressed gas
- Gases under pressure
- Compressed gas
- Flammable Gas 1
- Flammable gases Category 1
- Liquefied gas
- Gases under pressure
- Liquefied gas
- Simple Asphyxiant
- Simple Asphyxiant
- H220
- Extremely flammable gas
- H280
- Contains gas under pressure; may explode if heated

Party Responsible for the Preparation of This Document
ICOR International
10640 E 59th St.
Indianapolis, IN 46236
800-497-6805

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

North America GHS US 2012 & WHMIS