SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND THE COMPANY

1.1 Product Identifier

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Frostbite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product #</td>
<td>3803100</td>
</tr>
<tr>
<td>SDS #</td>
<td>154</td>
</tr>
<tr>
<td>SDS Date</td>
<td>August 22, 2013</td>
</tr>
</tbody>
</table>

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

<table>
<thead>
<tr>
<th>Product Use</th>
<th>Rapid cooling of paraffin blocks and tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses Advised Against</td>
<td>All other uses.</td>
</tr>
</tbody>
</table>

1.3 Details of the Supplier of the Substance or Mixture

<table>
<thead>
<tr>
<th>Manufacturer/Preparer:</th>
<th>Leica Biosystems Richmond, Inc.</th>
<th>Leica Biosystems Canada, Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5205 Route 12</td>
<td>83 Terracon Place</td>
</tr>
<tr>
<td></td>
<td>Richmond, IL 60071</td>
<td>Winnipeg, Manitoba R2J 4B3</td>
</tr>
<tr>
<td></td>
<td>800-225-8867</td>
<td>800-665-7425</td>
</tr>
</tbody>
</table>

1.4 Emergency Telephone Number

<table>
<thead>
<tr>
<th>Emergency Spill Information</th>
<th>1-800-424-9300 (CHEMTREC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+1 703-527-3887 International calls (call collect)</td>
</tr>
<tr>
<td>Other Product Information</td>
<td>1-800-225-8867</td>
</tr>
</tbody>
</table>

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture

CLP/GHS Classification (1272/2008):

<table>
<thead>
<tr>
<th>Physical:</th>
<th>Health:</th>
<th>Environmental:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol Category 3</td>
<td>Not Hazardous</td>
<td>Not Hazardous</td>
</tr>
</tbody>
</table>

EU Classification (67/548/EEC): Not classified as dangerous.

2.2 Label Elements:

WARNING! Contains 1,1,1,2-Tetrafluoroethane

Hazard Phrases

| H229 | Pressurized container: may burst if heated. |

Precautionary Phrases

| P210 | Keep away from heat/sparks/open flames/hot surfaces. — No smoking. |
| P251 | Pressurized container: Do not pierce or burn, even after use. |
| P410+P412 | Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F. |
2.3 Other Hazards: None

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number / EINECS Number / REACH Reg. Number</th>
<th>% (w/w)</th>
<th>EU Classification (67/548/EEC)</th>
<th>CLP/GHS Classification (1272/2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1,2-Tetrafluoroethane</td>
<td>811-97-2 212-377-2</td>
<td>100</td>
<td>Not classified as dangerous.</td>
<td>Aerosol Category 3 (H229)</td>
</tr>
</tbody>
</table>

See Section 16 for full text of GHS and EU Classifications.

SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures

First Aid

**Eye contact:** Immediately flush eyes with large amounts of water for at least 15 minutes (in case of frostbite, water should be lukewarm - not hot), lifting eyelids occasionally to facilitate irrigation. Get immediate medical attention if symptoms persist.

**Skin contact:** Promptly flush skin with water until all the chemical is removed. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. In the absence of water, cover with a clean, soft cloth or similar covering. Call a physician.

**Inhalation:** Immediately remove to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Call a physician.

**Ingestion:** Ingestion is unlikely because of the physical properties, and is not expected to be hazardous. Do not induce vomiting unless instructed to do so by a physician. Call a physician immediately.

See Section 11 for more detailed information on health effects.

4.2 Most Important symptoms and effects, both acute and delayed: May cause cryogenic burns or injury to skin and eyes.

4.3 Indication of any immediate medical attention and special treatment needed: In case of frostbite, get immediate medical attention if symptoms persist.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing Media:
Use any media that is suitable for the surrounding fire. Material itself is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture
**Unusual Fire and Explosion Hazards:** Material is not flammable at ambient temperatures and atmospheric pressure. Container may rupture explosively on heating, or if damaged.
Combustion Products: Halogenated compounds, hydrogen fluoride, carbon oxides and possibly carbonyl halides.

5.3 Advice for Fire-Fighters: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool. Use shielding to protect from rupturing cans.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures:
Wear appropriate protective equipment. Avoid skin contact with leaking liquid (risk of frostbite). Ventilate the area.

6.2 Environmental Precautions:
Prevent release to environment, and recover material if possible. Report spill as required by local and federal regulations.

6.3 Methods and Material for Containment and Cleaning Up:
Place leaking container in well ventilated area and allow pressure to release.

6.4 Reference to Other Sections:
Refer to Section 8 for personal protective equipment, and Section 13 for disposal information.

SECTION 7: HANDLING and STORAGE

7.1 Precautions for Safe Handling:
Avoid breathing gas and liquid contact with eyes, skin, or clothing. Do not puncture or drop cans, expose them to open flame or excessive heat. Protect from sunlight and do not expose to temperatures above 120°F. Do not pierce or burn containers, even empty. Do not spray on naked flame or any incandescent material.

7.2 Conditions for Safe Storage, Including any Incompatibilities:
Store in a cool, well-ventilated area out of direct sunlight. Protect from physical damage.

7.3 Specific end use(s):
Industrial uses: None identified
Professional uses: Rapid cooling of paraffin blocks and tissue

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>US OEL</th>
<th>EU IOEL</th>
<th>UK OEL</th>
<th>Germany OEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1,2-Tetrafluoroethane</td>
<td>1000 ppm TWA</td>
<td>None Established</td>
<td>1000 ppm TWA</td>
<td>1000 ppm TWA 8000 ppm STEL</td>
</tr>
</tbody>
</table>

Refer to local or national authority for exposure limits not listed above.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Biological Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1,2-T</td>
<td>None Established</td>
</tr>
</tbody>
</table>
8.2 Exposure Controls:

**Recommended Monitoring Procedures:** Collection on charcoal with analysis by gas chromatography.

**Appropriate Engineering Controls:** Use with adequate ventilation to minimize exposure.

**Personal Protective Measures**

**Eye/face Protection:** Follow facility requirements.

**Skin Protection:** None normally required. Do not spray directly on skin.

**Hands:** None normally required. Do not spray directly on skin.

**Respiratory Protection:** None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space where concentration may be above the recommended exposure limit of 1,000 ppm, use a self-contained, NIOSH-approved positive pressure self-contained breathing apparatus or supplied air respirator.

**Other protection:** None required.

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**SECTION 9: PHYSICAL and CHEMICAL PROPERTIES**

9.1 Information on basic Physical and Chemical Properties

- **Appearance:** Gas in container.
- **Odor:** No odor
- **pH:** 2-3
- **Boiling Point:** -26°C (-15°F) (water)
- **Evaporation Rate:** Not determined
- **Vapor Pressure:** 4203 mmHg (@20°C)
- **Odor Threshold:** Not applicable
- **Melting/Freezing Point:** 101°C (-49°F)
- **Flash Point:** Not flammable
- **Lower Flammability Limit:** Not applicable
- **Upper Flammability Limit:** Not applicable
- **Vapor Density (Air=1):** 3.18
- **Solubility:** Soluble in water
- **Autoignition Temperature:** Not applicable
- **Viscosity:** Not applicable
- **Oxidizing Properties:** None
- **Molecular Formula:** C2-H2-F4
- **Relative Density:** Not established
- **Octanol/Water Partition Coefficient:** Not available
- **Decomposition Temperature:** Not established
- **Explosive Properties:** Not explosive (Excessive heat may cause canister to rupture violently)
- **Specific Gravity (H2O=1):** 1.21
- **Molecular Weight:** 102.03

9.2 Other Information: None available

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**SECTION 10: STABILITY and REACTIVITY**

10.1 Reactivity: Reactive under specific conditions: such as very high temperatures and/or appropriate pressures.

10.2 Chemical Stability: Normally stable.
10.3 Possibility of Hazardous Reactions: Any source of high temperature, such as lighted cigarettes, flames, hot spots, welding may yield toxic and/or corrosive decomposition products.

10.4 Conditions to Avoid: Do not mix with oxygen or air above atmospheric pressure. Any source of high temperature.

10.5 Incompatible Materials: Freshly abraded aluminum surfaces (may cause strong exothermic reaction). Chemically active metals: potassium, calcium, powdered aluminum, magnesium, and zinc.

10.6 Hazardous Decomposition Products: Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Halogenated compounds, hydrogen fluoride, carbon oxides and possibly carbonyl halides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects:

Potential Health Effects:

Eye Contact: Liquid contact can cause irritation. May cause frostbite.

Skin contact: May cause dryness or defatting. Liquid contact could cause frostbite.

Inhalation: Vapors may cause drowsiness and dizziness. High concentrations in may dilute oxygen in the air resulting in asphyxiation. Non-occupational exposure and accidental or abusive inhalation of aerosols /due to Fluorocarbon propellants/ have also been documented, the main symptoms being CNS depression and cardiovascular reactions.

Ingestion: Product is a gas.

Acute toxicity:
LC50 Inhalation Rat: >500,000 ppm/4hr

Skin corrosion/irritation: No data available. May cause frostbite.

Eye damage/ irritation: No data available. Not classified as an eye irritant.

Respiratory Irritation: Human experience indicated that high vapor concentrations may cause confusion, pulmonary irritation. Inhaled fluorocarbons sensitized the myocardium to catecholamines, frequently resulting in lethal ventricular arrhythmias.

Respiratory Sensitization: Not a respiratory sensitizers.

Skin Sensitization: Not a skin sensitizers.

Germ Cell Mutagenicity: No data available for mixture. None of the components are germ cell mutagens.

Carcinogenicity: Not listed as carcinogens by OSHA, ACGIH, IARC, NTP, or the EU Dangerous Substances Directive.

Reproductive Toxicity: No data available for mixture. This product is not expected to cause adverse reproductive effects.

Specific Target Organ Toxicity:

Single Exposure: None known.
Repeat Exposure: None known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity: No data available.

12.2 Persistence and degradability: Product is a gas at room temperature, therefore, it is unlikely to remain in water.

12.3 Bioaccumulative Potential: 1,1,1,2-tetrafluoroethane will not bioconcentrate in fish and aquatic organisms

12.4 Mobility in Soil: If released to soil, 1,1,1,2-tetrafluoroethane will rapidly volatilize from either moist or dry soil to the atmosphere. It will display moderate to high mobility in soil.

12.5 Results of PVT and vPvB assessment: Not required.

12.6 Other Adverse Effects: None known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods: Dispose in accordance with local, state and national regulations.

SECTION 14: TRANSPORTATION INFORMATION

<table>
<thead>
<tr>
<th>14.1 UN Number</th>
<th>14.2 UN Proper Shipping Name</th>
<th>14.3 Hazard Class(s)</th>
<th>14.4 Packing Group</th>
<th>14.5 Environmental Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>US DOT</td>
<td>UN3159 1,1,1,2-Tetrafluoroethane</td>
<td>2</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>Canadian TDG</td>
<td>UN3159 1,1,1,2-Tetrafluoroethane</td>
<td>2</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>EU ADR/RID</td>
<td>UN3159 1,1,1,2-Tetrafluoroethane</td>
<td>2</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>IMDG</td>
<td>UN3159 1,1,1,2-Tetrafluoroethane</td>
<td>2</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>IATA/ICAO</td>
<td>UN3159 1,1,1,2-Tetrafluoroethane</td>
<td>2</td>
<td>N/A</td>
<td>No</td>
</tr>
</tbody>
</table>

14.6 Special Precautions for User: None
14.7 Transport in Bulk According to Annex III MARPOL 73/78 and the IBC Code: Not determined.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

INTERNATIONAL INVENTORIES

EPA TSCA INVENTORY: All of the components are listed on the TSCA inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT: All of the ingredients are listed on the Canadian Domestic Substances List.

EUROPEAN UNION: All of the components of this product are listed on the European Inventory of New and Existing Chemical Substances (EINECS) inventory.
AUSTRALIA: All of the ingredients of this product are listed on the Australian Inventory of Chemical Substances (AICS).

CHINA: All of the ingredients are listed on the Chinese chemical inventory.

KOREA: All of the components of this product are listed on the Korean Existing Chemical List (KECL).

NEW ZEALAND: All of the components of this product are listed on the New Zealand Inventory of Chemicals (NzIoC).

PHILIPPINES: All of the components of this product are listed on the Philippine Inventory of Chemicals and Chemical Substances (PICCS).

JAPAN: All of the components of this product are listed on the Japanese Existing and New Chemical Substances List (ENCS).

U.S. REGULATIONS

OSHA HAZARD CLASSIFICATION: Compressed Gas

EPA SARA 302: This product does not contain chemicals regulated under SARA Section 302.

CERCLA Section 103: This product is not subject to CERCLA reporting requirements. Many states have more stringent release reporting requirements. Report spills as required under federal, state and local regulations.

EPA SARA 311 HAZARD CLASSIFICATION: Sudden release of pressure.

EPA SARA 313: This product contains the following chemicals that are regulated under SARA Title III, section 313: None

CALIFORNIA PROPOSITION 65: This product contains the following chemicals which are known to the State of California to cause cancer, reproductive toxicity or birth defects (developmental toxicity): None known

INTERNATIONAL REGULATIONS

WHMIS CLASSIFICATION: Class A

SECTION 16: OTHER INFORMATION

Revision History: Updated Logo and website.

EU Classes and Risk Phrases for Reference (See Sections 2 and 3)
None

CLP/GHS Classification and H Phrases for Reference (See Section 3)
H229 Pressurized container: may burst if heated.

NFPA Rating: Health: 1 Fire: 0 Instability: 0
HMIS Rating: Health: 1 Fire: 0 Physical Hazard: 0

This Safety Data Sheet has been prepared in accordance with the REACH regulation in the EU and the Globally Harmonized System for the Classification and Labeling of Chemicals (GHS). It complies with the requirements of the Canadian Controlled Products Regulations and US 29CFR 1910.1200. To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries makes any warranty of merchantability or any other warranty, expressed or implied, which respect to such information, and we assume no liability resulting from its use. In no event shall Leica Biosystems be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages resulting from use of or reliance upon this information.

www.LeicaBiosystems.com

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