

## 1. Product and company identification

<b>Product name</b>	: LIQUID NITROGEN
<b>Supplier</b>	: Baker Hughes, Inc. 12645 W. Airport Blvd. Sugar Land, TX 77478 For Product Information/MSDSs Call: 281-351-8131
<b>Material Uses</b>	: Special: Multipurpose
<b>Code</b>	: 100225
<b>Validation date</b>	: 9/13/2011.
<b>Print date</b>	: 9/13/2011.
<b>Version</b>	: 1
<b>Responsible name</b>	: Global Regulatory Affairs - Telephone 281-276-5400 or 800-231-3606
<b>In case of emergency</b>	: CHEMTREC 800-424-9300 (U.S. 24 hour) (001)281-276-5400 CANUTEC 613-996-6666 (Canada 24 hours)CHEMTREC Int'l 01-703-527-3887 (International 24 hour)

## 2. Hazards identification

<b>Physical state</b>	: Liquid. [Cryogenic liquid]
<b>Odor</b>	: None.
<b>Color</b>	: Clear. Colorless.
<b>OSHA/HCS status</b>	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
<b>Emergency overview</b>	: WARNING!  EXTREMELY COLD LIQUID AND GAS UNDER PRESSURE. CAUSES SEVERE FROSTBITE. GAS REDUCES OXYGEN AVAILABLE FOR BREATHING.  Can cause burns similar to frostbite. Do not puncture or incinerate container. Avoid breathing gas. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use.
<b>Routes of entry</b>	: Dermal contact. Eye contact. Inhalation.
<b>Potential acute health effects</b>	
<b>Inhalation</b>	: At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.
<b>Ingestion</b>	: Ingestion of liquid can cause burns similar to frostbite.
<b>Skin</b>	: Extremely cold material. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
<b>Eyes</b>	: Extremely cold material. Liquid can cause burns similar to frostbite.
<b>Potential chronic health effects</b>	
<b>Over-exposure signs/symptoms</b>	
<b>Inhalation</b>	: None known.
<b>Ingestion</b>	: frostbite
<b>Skin</b>	: frostbite
<b>Eyes</b>	: frostbite

See toxicological information (section 11)

### 3 . Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Liquid nitrogen	7727-37-9	60 - 100

### 4 . First aid measures

- Eye contact** : Get medical attention immediately. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.
- Skin contact** : In case of contact with liquid, warm frozen tissues slowly with lukewarm water. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product rapidly becomes a gas when released, refer to the inhalation section.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

### 5 . Fire-fighting measures

- Flammability of the product** : Contains gas under pressure. Contains refrigerated gas. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : No specific data.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

### 6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up**
- Small spill** : Immediately contact emergency personnel. Stop leak if without risk.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

## 7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Contains gas under pressure. Contains refrigerated gas. Do not get in eyes or on skin or clothing. Avoid breathing gas. Use only with adequate ventilation. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.
- Storage** : Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use.

## 8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredients:	List name	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	Notations
No exposure limit value known.											

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location. Take off contaminated clothing and wash before reuse.
- Personal protection**
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. The gas can cause asphyxiation without warning by replacing the oxygen in the air. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant gloves: Wear cold insulating gloves.
- Eyes** : Wear chemical safety goggles. When transferring material wear face-shield in addition to chemical safety goggles.
- Skin** : Wear long sleeves and other protective clothing to prevent repeated or prolonged skin contact.

## 9. Physical and chemical properties

- Physical state** : Liquid. [Cryogenic liquid]
- Flash point** : [Product does not sustain combustion.]
- Auto-ignition temperature** : Not available.
- Flammable limits** : Not available.
- Color** : Clear. Colorless.
- Odor** : None.
- pH** : Not available.
- Boiling/condensation point** : Not available.

## 9 . Physical and chemical properties

<b>Initial Boiling Point</b>	: Not available.
<b>Melting/freezing point</b>	: -210°C (-346°F)
<b>Relative density</b>	: 0.81 (-196°C)
<b>Density</b>	: 8.08 (lbs/gal)
<b>Vapor density</b>	: 0.97 [Air = 1]
<b>Odor threshold</b>	: Not available.
<b>Evaporation rate</b>	: Not available.
<b>VOC</b>	: Not available.
<b>Viscosity</b>	: Not available.
<b>Solubility (Water)</b>	: Very slightly soluble in the following materials: water
<b>Vapor pressure</b>	: Not available.
<b>Pour Point</b>	: Not available.
<b>Partition coefficient (LogKow)</b>	: Not available.

## 10 . Stability and Reactivity

<b>Chemical stability</b>	: The product is stable.
<b>Possibility of hazardous reactions</b>	: Under normal conditions of storage and use, hazardous reactions will not occur.
<b>Hazardous polymerization</b>	: Under normal conditions of storage and use, hazardous polymerization will not occur.
<b>Conditions to avoid</b>	: Do not allow gas to accumulate in low or confined areas.
<b>Hazardous decomposition products</b>	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## 11 . Toxicological information

No additional information.

### Chronic toxicity Remarks

1) Liquid nitrogen

Not available.

## 12 . Ecological information

### Aquatic ecotoxicity

**Conclusion/Summary** : Not available.

### Biodegradability

**Conclusion/Summary** : Not available.

## 13. Disposal considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Do not puncture or incinerate container. Empty pressure vessels should be returned to the supplier.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

**LIQUID NITROGEN****14 . Transport information**

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
<b>DOT Classification</b>	UN1977	NITROGEN, REFRIGERATED LIQUID	2.2	-		-
<b>TDG Classification</b>	UN1977	NITROGEN, REFRIGERATED LIQUID	2.2	-		-
<b>IMDG Class</b>	UN1977	NITROGEN, REFRIGERATED LIQUID	2.2	-		<b>Emergency schedules (EmS)</b> F-C S-V
<b>IATA-DGR Class</b>	UN1977	NITROGEN, REFRIGERATED LIQUID	2.2	-		-

PG\* : Packing group

**DOT Reportable Quantity** Not applicable.**Marine pollutant** Not applicable.**North-America NAERG** : 120**15 . Regulatory information****HCS Classification** : Compressed gas**U.S. Federal regulations** : **United States inventory (TSCA 8b)**: All components are listed or exempted.**SARA 302/304/311/312 extremely hazardous substances**: No products were found.**SARA 302/304 emergency planning and notification**: No products were found.**SARA 302/304/311/312 hazardous chemicals**: Nitrogen, refrigerated liquid**SARA 311/312 MSDS distribution - chemical inventory - hazard identification**:  
LIQUID NITROGEN: Sudden release of pressure, Immediate (acute) health hazard

CERCLA: Hazardous substances.: No products were found.

**Clean Air Act (CAA) 112 accidental release prevention**: No products were found.**Clean Air Act (CAA) 112 regulated flammable substances**: No products were found.**Clean Air Act (CAA) 112 regulated toxic substances**: No products were found.**Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)** :  
Not listed**United States inventory (TSCA 8b)** : All components are listed or exempted.**Canada****WHMIS (Canada)** : Class A: Compressed gas.**Canada (CEPA DSL)**: : All components are listed or exempted.

## 16 . Other information

**Label requirements** : EXTREMELY COLD LIQUID AND GAS UNDER PRESSURE. CAUSES SEVERE FROSTBITE. GAS REDUCES OXYGEN AVAILABLE FOR BREATHING.

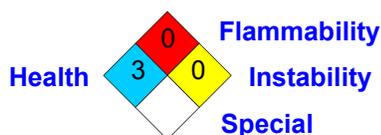
**Hazardous Material Information System (U.S.A.)** :

Health	3
Flammability	0
Physical hazards	2
Personal protection	

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

**National Fire Protection Association (U.S.A.)** :



**Date of printing** : 9/13/2011.

☑ Indicates information that has changed from previously issued version.

### Notice to reader

**NOTE:** The information on this MSDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

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