

DCM Shriram Ltd.
[Unit: SHRIRAM ALKALI & CHEMICALS]

SAFETY DATA SHEET

HYDROGEN GAS

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Supplier : DCM Shriram Ltd.
Unit : Shriram Alkali & Chemicals
749/GIDC, Jhagadia-393110,
Dist- Bharuch, Gujarat.
Phone No: (02645)222000/222015

Substance : Hydrogen

Trade Name/Synonyms : Dihydrogen, Parahydrogen, Refrigerant gas R702, Water gas

CAS number : 1333-74-0

Application : Industrial use. Use as directed.

SECTION 2: HAZARDS IDENTIFICATION

HAZARD PICTOGRAM:



NFPA RATING:

Health Rating : 0 - None
Flammability Rating : 4 - Severe
Reactivity Rating : 0 - None
Contact Rating : None

RISK PHRASE(S) R12 : Extremely flammable.

SAFETY PHRASE(S) S9 : Keep container in a well-ventilated place.
S16 : Keep away from sources of ignition – No smoking.
S33 : Take precautionary measures against static discharges.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Name : Hydrogen, compressed

Name	Product identifier	%
Hydrogen	(CAS No) 1333-74-0	99.5 - 100

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SECTION 4: FIRST AID MEASURES

- First-aid measures after inhalation : Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.
- First-aid measures after skin contact : Adverse effects not expected from this product.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

SECTION 5: FIREFIGHTING MEASURES

- Suitable extinguishing media : Carbon dioxide, dry chemical powder, water spray, fog.
- Fire hazard : EXTREMELY FLAMMABLE GAS. The hydrogen flame is nearly invisible. Hydrogen has a low ignition energy; escaping hydrogen gas may ignite spontaneously. A fireball forms if the gas cloud ignites immediately after release. Hydrogen forms explosive mixtures with air and oxidizing agents.
- Explosion hazard : EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.
- Reactivity : No reactivity hazard other than the effects described below.
- Firefighting instructions : If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive re-ignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.
- Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so.
- Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.
- Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture.

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- Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
- Stop flow of product if safe to do so.
- Use water spray or fog to knock down fire fumes if possible.

SECTION 6: ACCIDENTAL RELEASE MEASURES

General measures : **DANGER: EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.** See section 5. Evacuate personnel to a safe area. Appropriate self-contained breathing apparatus may be required. Approach suspected leak area with caution. Remove all sources of ignition, if safe to do so. Reduce gas with fog or fine water spray. Stop flow of product if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable gas may spread from leak. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling:

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment. Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents.

Storage conditions:

Store only where temperature will not exceed 125°F (52°C). Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements. Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE:

When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device

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in the piping. Gases can cause rapid suffocation because of oxygen deficiency;
store and use with

adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Appropriate engineering controls	: Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): Inadequate - Use only in a closed system. Use explosion proof equipment and lighting.
Eye protection	: Wear safety glasses with side shields.
Respiratory protection	: An air-supplied respirator must be used while working with this product in confined spaces. The respiratory protection used must conform to OSHA rules.
Other information	: Consider the use of flame resistant anti-static safety clothing. Wear safety shoes while handling containers.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: Gas
Appearance	: Colorless gas.
Molecular mass	: 2 g/mol
Color	: Colorless.
Odor	: Odorless.
Odor threshold	: No data available
pH	: Not applicable.
Relative evaporation rate (butyl acetate=1)	: No
Melting point	: -259.2 °C (-434.56°F)
Freezing point	: No data available
Boiling point	: -252.9 °C (-422.97°F)
Flash point	: No data available
Critical temperature	: -239.9 °C (-399.82°F)
Auto-ignition temperature	: 566 °C (1051°F)
Decomposition temperature	: No data available
Vapor pressure	: Not applicable.
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Density	: 0.089 g/l (0.0056 lb/ft ³) (at STP = 0°C and 1atm)
Relative gas density	: 0.07

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Solubility : Water: 1.6 mg/l

Viscosity, kinematic : Not applicable.
Viscosity, dynamic : Not applicable.
Oxidizing properties : None.
Explosion limits : 4 - 77 vol %
Gas group : Compressed gas
Additional information : Burns with invisible flame.

SECTION 10: STABILITY AND REACTIVITY

Reactivity : No reactivity hazard other than the effects described below.
Chemical stability: Stable under normal conditions.
Possibility of hazardous reactions: Can form explosive mixture with air. May react violently with oxidants.
Conditions to avoid: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Incompatible materials: Oxidizing agents, Lithium, Halogen.
Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute toxicity : Not classified
Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
Specific target organ toxicity (single exposure) : Not classified
Specific target organ toxicity (repeated exposure): Skin corrosion/ irritation, Serious eye damage/irritation
Aspiration hazard, Respiratory or skin sensitization
Carcinogenicity : Not classified

SECTION 12: ECOLOGICAL INFORMATION

Ecology - general : No ecological damage caused by this product.

Persistence and degradability

Hydrogen, compressed (1333-74-0)

Persistence and degradability	No ecological damage caused by this product.
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Hydrogen (1333-74-0)

Persistence and degradability	No ecological damage caused by this product.
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Mobility in soil

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Hydrogen, compressed (1333-74-0)	
Mobility in soil	No data available.
Ecology – soil	No ecological damage caused by this product.
Hydrogen (1333-74-0)	
Mobility in soil	No data available.
Ecology – soil	No ecological damage caused by this product.
Effect on ozone layer	: None.
Effect on the global warming	: No known effects from this product.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste disposal recommendations : Dispose of contents/container in accordance with regulations.
Contact supplier for any special requirements.

SECTION 14: TRANSPORT INFORMATION

Transport document description : UN1049 Hydrogen, compressed, 2.1
UN-No. : UN1049
Hazchem Code : 2SE
Proper Shipping Name : Hydrogen, compressed
Transport hazard class(es) : 2.1 - Flammable gas
Hazard labels :



Additional Information :

Emergency Response Guide (ERG) Number : 115 (UN1049)

Other information : No supplementary information available.
Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows

what to do in the event of an accident or an emergency. Before transporting product containers:

- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. : 1049
Proper Shipping Name : Hydrogen, compressed
Class : 2 - Gases
MFAG-No : 115

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Air transport

UN-No. : 1049
Proper Shipping Name : Hydrogen, compressed
Class : 2
Civil Aeronautics Law : Gases under pressure/Gases flammable under pressure

SECTION 15: REGULATORY INFORMATION

- Refer Section-2
- As per National regulations material is a Hazardous chemical

SECTION 16: OTHER INFORMATION

Name of the firm	Address	Contact Person in Emergency	Telephone no.
Shriram Alkali & Chemicals (SAC)	749, GIDC Estate Jhagadia. Pin-393110 Dist: Bharuch	Head of Production	Telephone NOS : 02645-222000/222015

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