



<b>MATERIALS SAFETY DATA SHEET (MSDS) Syn Gas</b>	MSDS Number:	
	Version number:	
	Date issued:	
	Page No:	

## 1. Product Identification

Product Identifier	Flammable Gas Mixture: Carbon Dioxide / Carbon Monoxide / Hydrogen/Methane
Product type	Gas.
Product use	Synthetic/Analytical chemistry.

## Manufacturer/Importer/Supplier/Distributor information

Manufacturer Supplier	
E-Mail	
Contact Person	confirm
Emergency Telephone	Entity 1   Made by India

## 2. Hazard(s) identification

OSHA/HCS status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
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### Classification of the substance or mixture

Flammable Gases	Category 1
Gases Under Pressure	Compressed gas
Acute Toxicity (inhalation)	Category 4



Toxic to Reproduction	Category 1
Specific Target Organ Toxicity (Repeated Exposure)	Category 1

GHS label elements	
<b>Hazard pictograms</b>	
<b>Signal word</b>	<b>Danger</b>
<b>Hazard statements</b>	Extremely flammable gas. Contains gas under pressure; may explode if heated. Harmful if inhaled. May damage fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure. May displace oxygen and cause rapid suffocation. May increase respiration and heart rate. Asphyxiating even with adequate oxygen. May form explosive mixtures with air.
<b>Precautionary statements</b>	
<b>General</b>	Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Approach suspected leak area with caution.
<b>Prevention</b>	Obtain special instructions before use. Wear protective gloves. Wear protective clothing. Wear eye or face protection. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only outdoors or in a well ventilated area. Do not breathe gas. Do not eat, drink or smoke when using this product.
<b>Response</b>	Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources. IF exposed or concerned: Get medical advice or attention. IF INHALED: Call a POISON CENTER or doctor if you feel unwell.
<b>Storage</b>	Store locked up. Protect from sunlight. Store in a well-ventilated place.
<b>Disposal</b>	Dispose of contents and container in accordance with all local, regional, national and international regulations.



<b>Hazards not otherwise classified</b>	In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation
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### 3. Composition and ingredient information

Chemical name	CAS number	%
Hydrogen	1333-74-0	40
Carbon Dioxide	124-38-9	10
Carbon monoxide	630-08-0	45
Methane	74-82-8	5

### 4. First-aid measures

<b>Description of first aid measures</b>	First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.
<b>If inhaled:</b>	Keep patient calm, remove to fresh air, seek medical attention.
<b>On skin contact:</b>	Thaw out frostbites under cold liquid or water, do not rub affected parts of the body, apply sterile dressings, consult a skin specialist.
<b>On contact with eyes</b>	Wash affected eyes for at least 15 minutes under running water with eyelids held open.
<b>On ingestion:</b>	Rinse mouth immediately and then drink plenty of water, induce vomiting, seek medical attention.
<b>Most important symptoms and effects, both acute and delayed</b>	Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and in section 11
<b>Indication of any immediate medical attention and special treatment needed</b>	Treat according to symptoms (decontamination, vital functions), no known specific antidote. If necessary, give oxygen.

### 5. Fire-fighting measures

<b>Extinguishing media</b>	
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<b>Suitable extinguishing media</b>	Shutting off the source of the gas is the preferred method of control.
<b>Unsuitable extinguishing media</b>	Do not use water jet to extinguish.
<b>Special hazards arising from the substance or mixture</b>	
<b>Specific hazards</b>	Exposure to fire may cause containers to rupture/explode .
<b>Hazardous combustion products</b>	None that are more hazardous than the product itself .

<b>Advice for firefighters</b>	
<b>Specific methods</b>	Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. If possible, stop flow of product. Use water spray or fog to knock down fire fumes if possible. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Move containers away from the fire area if this can be done without risk.
<b>Special protective equipment for fire fighters</b>	Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

## 6. Accidental Release Measures

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

<b>Personal precautions, protective equipment and emergency procedures</b>	Avoid all sources of ignition: Heat, sparks, open flame. Wear respiratory protection if ventilation is inadequate. Ensure adequate ventilation. Wind direction should be noted. Avoid contact with the skin, eyes and clothing.
<b>Environmental precautions</b>	Discharge into the environment must be avoided.
<b>Methods and material for containment and cleaning up</b>	For small amounts: Allow to evaporate. Ensure adequate ventilation. Swirl gases/vapours/mists with water spray jet.
<b>Reference to other sections</b>	Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.



## 7. Handling and storage

### Precautions for safe handling

<b>Protective measures</b>	Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not breathe gas. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid exposure during pregnancy.
<b>Advice on general occupational hygiene</b>	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. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
<b>Conditions for safe storage, including any incompatibilities</b>	Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Store locked up. Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

## 8. Exposure Controls/ Personal Protection

### Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
Hydrogen	California PEL for Chemical Contaminants ( Table AC-1) (United States). Oxygen Depletion [Asphyxiant]. ACGIH TLV (United States, 3/2019). Oxygen Depletion [Asphyxiant]. Explosive potential ACGIH TLV (United States, 3/2019). Oxygen Depletion [Asphyxiant].
Carbon Dioxide	STEL: 54000 mg/m <sup>3</sup> 15 minutes. STEL: 30000 ppm 15 minutes. TWA: 9000 mg/m <sup>3</sup> 8 hours. TWA: 5000 ppm 8 hours.



	<p><b>NIOSH REL (United States, 10/2016).</b>          STEL: 54000 mg/m<sup>3</sup> 15 minutes.          STEL: 30000 ppm 15 minutes.          TWA: 9000 mg/m<sup>3</sup> 10 hours.          TWA: 5000 ppm 10 hours.  <b>OSHA PEL (United States, 5/2018).</b>          TWA: 9000 mg/m<sup>3</sup> 8 hours.          TWA: 5000 ppm 8 hours.  <b>OSHA PEL 1989 (United States, 3/1989).</b>          STEL: 54000 mg/m<sup>3</sup> 15 minutes.          STEL: 30000 ppm 15 minutes.          TWA: 18000 mg/m<sup>3</sup> 8 hours.          TWA: 10000 ppm 8 hours.</p>
<p><b>Carbon monoxide</b></p>	<p><b>California PEL for Chemical Contaminants ( Table AC-1) (United States).</b>          PEL: 25 ppm 8 hours.          CEIL: 200 ppm  <b>ACGIH TLV (United States, 3/2019).</b>          TWA: 25 ppm 8 hours.          TWA: 29 mg/m<sup>3</sup> 8 hours.  <b>OSHA PEL 1989 (United States, 3/1989).</b>          TWA: 35 ppm 8 hours.          TWA: 40 mg/m<sup>3</sup> 8 hours.          CEIL: 200 ppm          CEIL: 229 mg/m<sup>3</sup>  <b>NIOSH REL (United States, 10/2016).</b>          TWA: 35 ppm 10 hours.          TWA: 40 mg/m<sup>3</sup> 10 hours.          CEIL: 200 ppm          CEIL: 229 mg/m<sup>3</sup>  <b>OSHA PEL (United States, 5/2018).</b>          TWA: 50 ppm 8 hours.          TWA: 55 mg/m<sup>3</sup> 8 hours.</p>

<p><b>Appropriate engineering controls</b></p>	<p>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. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.</p>
<p><b>Environmental exposure controls</b></p>	<p>Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.</p>
<p><b>Individual protection measures</b></p>	
<p><b>Hygiene measures</b></p>	<p>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. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.</p>



<b>Eye/face protection</b>	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side shields.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
<b>Body protection</b>	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear antistatic protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
<b>Other skin protection</b>	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
<b>Respiratory protection</b>	Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. 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.

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## 9. Physical and chemical properties

### Information on basic physical and chemical properties

<b>Physical state</b>	Gas.
<b>Colour</b>	Not available.
<b>Odour</b>	Not available.
<b>Odour threshold</b>	Not available.
<b>pH value</b>	Not available.
<b>Melting point</b>	-211.6°C (-348.9°F) This is based on data for the following ingredient: carbon monoxide. Weighted average: -236.59°C (-393.9°F)



<b>Boiling point</b>	Not available.
<b>Flash point</b>	Study technically not feasible.
<b>Evaporation rate</b>	Not available.
<b>Flammability</b>	Extremely flammable.
<b>Vapor density</b>	Highest known value: 1.5 (Air = 1) (Carbon dioxide). Weighted average: 0.83 (Air = 1)
<b>Relative density</b>	Not available.
<b>Gas Density (lb/ft 3)</b>	Weighted average: 0.09
<b>Solubility</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.

## 10. Stability and reactivity

<b>Reactivity</b>	No specific test data related to reactivity available for this product or its ingredients.
<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>Conditions to avoid</b>	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
<b>Incompatible materials</b>	Oxidizers
<b>Hazardous decomposition products</b>	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
<b>Hazardous polymerization</b>	Under normal conditions of storage and use, hazardous polymerization will not occur.

## 11. Toxicological information

### Information on toxicological effects

#### Acute Toxicity

<b>Assessment of acute toxicity</b>	Of high toxicity after short-term inhalation. The product has not been tested. The statement has been derived from the properties of the individual components Information on: carbon monoxide Experimental/calculated data: LC50 rat (by inhalation): 2,07 mg/l 1807 ppm 4 h (similar to OECD guideline 403)The following percentage of the mixture consists of component(s) with unknown hazards regarding the acute toxicity: 60 - 92 %
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<b>Irritation</b>	Assessment of irritating effects: No data available concerning irritating effects. The substance is gaseous at room temperature and pressure. Testing for this particular end point is technically not feasible and/or this endpoint does not represent a relevant exposure scenario
<b>Respiratory/Skin sensitization</b>	Assessment of sensitization: The chemical structure does not suggest a sensitizing effect.
<b>Germ cell mutagenicity</b>	Assessment of mutagenicity: No data was available concerning mutagenic activity. The chemical structure does not suggest a specific alert for such an effect.
<b>Carcinogenicity</b>	Assessment of carcinogenicity: Not evaluated
<b>Reproductive toxicity</b>	Assessment of reproduction toxicity: No reliable data are available concerning reproduction toxicity. The potential to impair fertility cannot be excluded when given at maternally toxic doses. The product has not been tested. The statement has been derived from the properties of the individual components.
<b>Developmental toxicity</b>	Assessment of teratogenicity: The substance caused malformations/developmental toxicity in laboratory animals. May cause harm to the unborn child. The product has not been tested. The statement has been derived from the properties of the individual components.
<b>Specific target organ toxicity (Single Exposure)</b>	Assessment of STOT single: Based on available Data, the classification criteria are not met. Remarks: The product has not been tested. The statement has been derived from the properties of the individual components.
<b>Repeated dose toxicity and Specific target organ toxicity (repeated exposure)</b>	
<b>Assessment of repeated dose toxicity</b>	Repeated inhalation exposure to small quantities may affect certain organs. Damages blood cells. The product has not been tested. The statement has been derived from the properties of the individual components.
<b>Aspiration hazard</b>	No aspiration hazard expected.

## 12. Ecological information

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<b>Toxicity</b>	Assessment of aquatic toxicity: Study scientifically not justified.
<b>Persistence and degradability</b>	Assessment biodegradation and elimination (H <sub>2</sub> O): The product is highly volatile and can be eliminated from water by stripping.
<b>Bio accumulative potential</b>	Bioaccumulation potential: Accumulation in organisms is not to be expected.
<b>Mobility in soil</b>	Assessment transport between environmental compartments: Volatility: The substance will rapidly evaporate into the atmosphere from the water surface. The product has not been tested. The statement has been derived from the properties of the individual components. Adsorption in soil: Adsorption to solid soil phase is not expected. The product has not been tested. The statement has been derived from the properties of the individual components.
<b>Other adverse effects</b>	The product does not contain substances that are listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.



<b>Additional information</b>	Other ecotoxicological advice: Do not discharge product into the environment without control.
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### 13. Disposal considerations

<b>Disposal methods</b>	The generation of waste should be avoided or minimized wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.
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### 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
<b>UN number</b>	UN1954	UN1954	UN1954	UN1954	UN1954
<b>UN proper shipping name</b>	COMPRESSED GAS, FLAMMABLE, N.O.S. (Hydrogen, Carbon monoxide, Carbon dioxide, Methane)	COMPRESSED GAS, FLAMMABLE, N.O.S. (Hydrogen, Carbon monoxide, Carbon dioxide, Methane)	COMPRESSED GAS, FLAMMABLE, N.O.S. (Hydrogen, Carbon monoxide, Carbon dioxide, Methane)	COMPRESSED GAS, FLAMMABLE, N.O.S. (Hydrogen, Carbon monoxide, Carbon dioxide, Methane)	COMPRESSED GAS, FLAMMABLE, N.O.S. (Hydrogen, Carbon monoxide, Carbon dioxide, Methane)
<b>Transport hazard class(es)</b>	2.1 	2.1 	2.1 	2.1 	2.1 
<b>Packing group</b>	-	-	-	-	-
<b>Environmental hazards</b>	No.	No.	No.	No.	No.

**“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”**

#### Additional information



<b>TDG Classification</b>	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).Explosive Limit and Limited Quantity Index 0.0125ERAP Index 3000Passenger Carrying Vessel Index ForbiddenPassenger Carrying Road or Rail Index Forbidden
<b>Special precautions for user</b>	Transport within user's premises: Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.
<b>Transport in bulk according to IMO instruments</b>	Not available.

## 15. Regulatory information

### Safety, health and environmental regulations/legislation specific for the substance or mixture

<b>EU-Regulations</b>	
<b>Restrictions on use</b>	Restricted to professional users (Annex XVII REACH). Contains no substance on the REACH candidate list.
<b>Other information, restriction and prohibition regulations</b>	Contains no substance subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.
<b>Seveso Directive : 2012/18/EU (Seveso III)</b>	Covered.
<b>National regulations Regulatory reference</b>	Ensure all national/local regulations are observed.
<b>Chemical safety assessment</b>	A CSA does not need to be carried out for this product.

## 16. Other Information

### History

<b>Product name</b>
<b>Product code</b>
<b>Date of printing</b>
<b>Date of issue/Date of revision</b>
<b>Date of previous issue</b>
<b>Version</b>



Prepared by

## 17. Change Details

