

### Warning



## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

Trade name	: Formirgas H2; H5
SDS no	: RS-H2-N2-01
Other means of identification	
CAS no.	: None.
EC no.	: None.
Index no.	: None.
REACH no.	: None.

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	: Industrial and professional use. Welding and cutting. Perform risk assessment prior to use.
Uses advised against	: Consumer use. Uses other than those listed above are not supported, contact your supplier for more information on other uses. Attention: These products must not be applied to humans or animals unless they are expressly designated as medical or medicinal gases!.

### 1.3. Details of the supplier of the safety data sheet

Messer Tehnogas AD Beograd  
Banjicki put no. 62  
11090 Belgrade, Serbia  
Telephone: +381 11 35 37 200 Fax: +381 11 35 37 291  
e-mail: [postoffice@messer.rs](mailto:postoffice@messer.rs)  
Web: [www.messer.rs](http://www.messer.rs)

#### Person responsible for the safety data sheet:

Tamara Ječmenica, Chemicals Advisor  
Telephone: +381 65 35 37 785  
e-mail: [sds@messer.rs](mailto:sds@messer.rs)

### 1.4. Emergency telephone number

Emergency telephone number	: Poison Control Center, VMA Crnotravska 17, Belgrade Serbia Tel. : +381(0) 11 360 8440 (24h)
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## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards	Gases under pressure : Compressed gas	H280
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### 2.2. Label elements

#### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



GHS04

Signal word (CLP)	: Warning
Hazard statements (CLP)	: H280 - Contains gas under pressure; may explode if heated.
Precautionary statements (CLP)	
- Storage	: P410+P403 - Protect from sunlight. Store in a well-ventilated place.

### 2.3. Other hazards

Asphyxiant in high concentrations.  
Not classified as PBT or vPvB. [Not classified as PMT or vPvM.](#)  
The substance / mixture has no endocrine disrupting properties.

## SECTION 3: Composition/information on ingredients

**3.1. Substances** Not applicable

### 3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP] ATE, EUH-statements, M-Factors
hydrogen	CAS no.: 1333-74-0 EC no.: 215-605-7 Index no.: 001-001-00-9 REACH no.: *1	2 – 5	Flam. Gas 1A, H220 Press. Gas (Comp.), H280
Nitrogen	CAS no.: 7727-37-9 EC no.: 231-783-9 Index no.: --- REACH no.: *1	Rest	Press. Gas (Comp.), H280

Full text of H- and EUH-statements: see section 16

Contains no other components or impurities which will influence the classification of the product.

\*1: Listed in Annex IV / V REACH, exempted from registration.

\*3: Registration not required: Substance manufactured or imported < 1t/y.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- Inhalation	: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Maintain an open airway. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact	: Adverse effects not expected from this product.
- Eye contact	: Adverse effects not expected from this product. If irritation occurs: Flush eyes with plenty of water. Remove any contact lenses. Get medical advice / attention.
- Ingestion	: Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. See section 11.



### **4.3. Indication of any immediate medical attention and special treatment needed**

Take first aid measures. Loosen tight clothing, such as a collar, tie or belt.  
Place the unconscious person in a lateral position. Seek medical attention.

## **SECTION 5: Firefighting measures**

### **5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.  
Product does not burn, use fire control measures appropriate for the surrounding fire.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

### **5.2. Special hazards arising from the substance or mixture**

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None.

### **5.3. Advice for firefighters**

- Specific methods : 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.  
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.  
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.  
Standard EN 469 - Protective clothing for firefighters.  
Standard EN 659 - Protective gloves for firefighters.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

## **SECTION 6: Accidental release measures**

### **6.1. Personal precautions, protective equipment and emergency procedures**

- For non-emergency personnel : Act in accordance with local emergency plan.  
Try to stop release. Evacuate area.  
Ensure adequate air ventilation. Stay upwind.  
See section 8 of the SDS for more information on personal protective equipment.
- For emergency responders : Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Oxygen detectors should be used when asphyxiating gases may be released.  
See section 5.3 of the SDS for more information.

### **6.2. Environmental precautions**

Try to stop release.

### **6.3. Methods and material for containment and cleaning up**

Ventilate area.

### **6.4. Reference to other sections**

See also sections 8 and 13.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Safe handling of the gas receptacle

: The product must be handled in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke while working with the product.  
Wash hands after use. Only experienced and properly instructed persons should handle gases under pressure. Wear personal protective equipment (See section 8).  
Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Avoid suck back of water, acid and alkalis. Do not breathe gas.  
Avoid release of product into work area.

Safe handling of the gas receptacle

: Refer to supplier's container handling instructions. Protect containers from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. If the protection cap is too tight, remove it with adjustable wrench. Never insert sharp objects into the cavities of the cap, this can lead to damage to the valve and leakage. Open valve slowly to avoid pressure shock.  
If user experiences any difficulty operating valve discontinue use and contact supplier.  
Never attempt to repair or modify container valves or safety relief devices.  
Damaged valves should be reported immediately to the supplier.  
Keep container valve outlets clean and free from contaminants particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Close container valve after each use and when empty, even if still connected to equipment.  
Never use direct flame or electrical heating devices to raise the pressure of a container.  
Do not allow backfeed into the container.  
Never attempt to transfer gases from one cylinder / container to another.  
Do not remove or deface labels provided by the supplier for the identification of the content of the container.

#### 7.2. Conditions for safe storage, including any incompatibilities

Observe all regulations and local requirements regarding storage of containers.  
Containers should not be stored in conditions likely to encourage corrosion.  
Container valve guards or caps should be in place.  
Containers should be stored in the vertical position and properly secured to prevent them from falling over.  
Stored containers should be periodically checked for general condition and leakage.  
Keep container below 50°C in a well ventilated place.  
Store containers in location free from fire risk and away from sources of heat and ignition.  
Keep away from combustible materials.

#### 7.3. Specific end use(s)

None.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

OEL (Occupational Exposure Limits)	: None available.
DNEL (Derived-No Effect Level)	: None available.
PNEC (Predicted No-Effect Concentration)	: None available.

#### 8.2. Exposure controls

##### 8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation.  
Systems under pressure should be regularly checked for leakages.  
Oxygen detectors should be used when asphyxiating gases may be released.  
Consider the use of a work permit system e.g. for maintenance activities.

##### 8.2.2. Individual protection measures, e.g. personal protective equipment

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:

PPE compliant to the recommended EN/ISO standards should be selected.

- Eye/face protection : Wear safety glasses with side shields.  
Standard EN 166 - Personal eye-protection - specifications.  
[Standard EN ISO 16321-1 - Eye and face protection for occupational use Part 1: General requirements.](#)
- Skin protection
  - Hand protection : Wear working gloves when handling gas containers.  
Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher.  
Recommended types include wrist gloves from leather or synthetic material with equivalent performance, fabric gloves, fabric gloves with leather palms.
  - Other : Wear safety shoes while handling containers.  
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- Respiratory protection : Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.  
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.  
When indicated by a risk assessment, Respiratory Protective Equipment must be used. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD.
- Thermal hazards : When cutting / welding, wear safety glasses with appropriate filters on the lenses.

##### 8.2.3. Environmental exposure controls

None necessary.



### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

##### Appearance

- Physical state at 20°C / 101.3kPa : Gas.

- Colour : Colourless.

Odour : Odourless.

Melting point / Freezing point : Not applicable for gas mixtures.

Boiling point : Not applicable for gas mixtures.

It is technically not possible to determine the boiling point or range of this mixture. Component with lowest boiling point: Hydrogen -253 °C

Flammability : Non flammable.

Lower explosion limit : Not available

Upper explosion limit : Not available

Flash point : Not applicable for gases and gas mixtures.

Auto-ignition temperature : Not known.

Decomposition temperature : Not applicable.

pH : Not applicable for gases and gas mixtures.

Viscosity, kinematic : No reliable data available.

Water solubility [20°C] : Mixture is partially soluble in water.

Partition coefficient n-octanol/water (Log K<sub>ow</sub>) : Not applicable for gas mixtures.

Vapour pressure [20°C] : Not applicable.

Vapour pressure [50°C] : Not applicable.

Density and/or relative density : Not applicable.

Relative vapour density (air=1) : Lighter or similar to air.

Particle characteristics : Not applicable for gases and gas mixtures.

Nanoforms are not relevant for gases and gas mixtures.

#### 9.2. Other information

##### 9.2.1. Information with regard to physical hazard classes

Explosion limits : Flammability range not available.

Oxidising properties : No oxidising properties.

##### 9.2.2. Other safety characteristics

Molar mass : Not applicable for gas mixtures.

Evaporation rate : Not applicable for gases and gas mixtures.

Other data : None.

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Data for mixtures are not available.

#### 10.2. Chemical stability

Stable under normal conditions.

#### 10.3. Possibility of hazardous reactions

This mixture contains components with the following reactivity: Can form explosive mixture with air. May react violently with oxidants.

**10.4. Conditions to avoid**

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.  
Avoid moisture in installation systems.

**10.5. Incompatible materials**

For additional information on compatibility refer to ISO 11114.

**10.6. Hazardous decomposition products**

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**SECTION 11: Toxicological information**

**11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008**

<b>Acute toxicity</b>	: Toxicological effects not expected from this product if occupational exposure limit values are not exceeded.
<b>Skin corrosion/irritation</b>	: No known effects from this product.
<b>Serious eye damage/irritation</b>	: No known effects from this product.
<b>Respiratory or skin sensitisation</b>	: No known effects from this product.
<b>Germ cell mutagenicity</b>	: No known effects from this product.
<b>Carcinogenicity</b>	: No known effects from this product.
<b>Toxic for reproduction : Fertility</b>	: No known effects from this product.
<b>Toxic for reproduction : unborn child</b>	: No known effects from this product.
<b>STOT-single exposure</b>	: No known effects from this product.
<b>STOT-repeated exposure</b>	: No known effects from this product.
<b>Aspiration hazard</b>	: Not applicable for gases and gas mixtures.

**11.2. Information on other hazards**

Other information : The substance / mixture has no endocrine disrupting properties.

**SECTION 12: Ecological information**

**12.1. Toxicity**

Assessment	: No ecological damage caused by this product.
EC50 48h - Daphnia magna [mg/l]	: No data available.
EC50 72h - Algae [mg/l]	: No data available.
LC50 96 h - Fish [mg/l]	: No data available.

<b>Hydrogen (1333-74-0)</b>	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

### Nitrogen (7727-37-9)

EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

#### 12.2. Persistence and degradability

Assessment : No ecological damage caused by this product.

#### 12.3. Bioaccumulative potential

Assessment : No ecological damage caused by this product.

#### 12.4. Mobility in soil

Assessment : No ecological damage caused by this product.

#### 12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

#### 12.6. Endocrine disrupting properties

Assessment : The substance / mixture has no endocrine disrupting properties.

#### 12.7. Other adverse effects

Other adverse effects : Not classified as PMT or vPvM.

Effect on the ozone layer : No effect on the ozone layer.

Effect on global warming : Contains greenhouse gas(es).

## SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Do not discharge into any place where its accumulation could be dangerous.  
May be vented to atmosphere in a well ventilated place.  
Return unused product in original container to supplier.  
Refer to the EIGA code of practice Doc.30/21 "Disposal of Gases", downloadable at <http://www.eiga.eu> for more guidance on suitable disposal methods.

List of hazardous waste codes (from Commission Delegated Decision (EU) 2025/934 of 5 March 2025 amending Decision 2000/532/EC) : 16 05 05 : Gases in pressure containers other than those mentioned in 16 05 04\*.

#### 13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

## SECTION 14: Transport information

#### 14.1. UN number or ID number

In accordance with ADR / RID / IMDG / IATA / ADN

UN-No. : 1956

### **14.2. UN proper shipping name**

<b>Transport by road/rail/inland waterways (ADR/RID/ADN)</b>	: COMPRESSED GAS, N.O.S. (Nitrogen, Hydrogen)
<b>Transport by air (ICAO-TI / IATA-DGR)</b>	: Compressed gas, n.o.s. (Nitrogen, Hydrogen)
<b>Transport by sea (IMDG)</b>	: COMPRESSED GAS, N.O.S. (Nitrogen, Hydrogen)

### **14.3. Transport hazard class(es)**

#### **Labelling**



2.2 : Non flammable, non-toxic gases.

#### **Transport by road/rail/inland waterways (ADR/RID/ADN)**

Class	: 2
Classification code	: 1A
Hazard identification number	: 20
Tunnel Restriction	: E - Passage forbidden through tunnels of category E

#### **Transport by air (ICAO-TI / IATA-DGR)**

Class / Div. (Sub. risk(s)) : 2.2

#### **Transport by sea (IMDG)**

Class / Div. (Sub. risk(s)) : 2.2  
Emergency Schedule (EmS) - Fire : F-C  
Emergency Schedule (EmS) - Spillage : S-V

### **14.4. Packing group**

Transport by road/rail/inland waterways (ADR/RID/ADN)	: Not applicable.
Transport by air (ICAO-TI / IATA-DGR)	: Not applicable.
Transport by sea (IMDG)	: Not applicable.

### **14.5. Environmental hazards**

Transport by road/rail/inland waterways (ADR/RID/ADN)	: None.
Transport by air (ICAO-TI / IATA-DGR)	: None.
Transport by sea (IMDG)	: None.

### **14.6. Special precautions for user**

#### **Packing Instruction(s)**

Transport by road/rail/inland waterways (ADR/RID/ADN)	: P200.
Transport by air (ICAO-TI / IATA-DGR)	
Passenger and Cargo Aircraft	: 200.
Cargo Aircraft only	: 200.
Transport by sea (IMDG)	: P200.

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 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.

### 14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

## SECTION 15: Regulatory information

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

#### RS Regulations

Pravilnik o ograničenjima i zabranama proizvodnje, stavljanja u promet i korišćenja hemikalija ("Sl. glasnik RS", br. 90/13, 25/15, 2/16, 44/17, 36/18, 9/20, 57/22, 29/24 i 90/25) : None.

Pravilnik o izvozu i uvozu određenih opasnih hemikalija („Sl. glasnik RS“ br. 93/23 i 78/25) : None.

Zakon o kontroli opasnosti od velikih udesa koji uključuju opasne supstance ("Sl. glasnik RS", br. 94/24) : Covered.

Pravilnik o Listi opasnih supstanci, vrstama i količinama opasnih supstanci i kriterijumima za razvijanje kompleksa u komplekse nižeg reda i komplekse višeg reda ("Sl. glasnik RS", br. 28/25)	Qualifying quantity (tonnes)	
	Lower-tier	Upper-tier
Hydrogen	5	50

#### EU Regulations

Other information, restriction and prohibition regulations : None.  
Not listed on the PIC list (Regulation EU 649/2012).  
Not listed on the POP list (Regulation EU 2019/1021).

Seveso Directive : 2012/18/EU (Seveso III) : Covered.

Seveso III Part II (Named dangerous substances)	Qualifying quantity (tonnes)	
	Lower-tier	Upper-tier
Hydrogen	5	50

### 15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

## SECTION 16: Other information

Indication of changes : In Section 1, the Safety Data Sheet is supplemented with information about details of the supplier of the safety data sheet.  
In Section 2, the Safety Data Sheet is supplemented with other hazards.  
In Section 8, the Safety Data Sheet is supplemented with information about personal protection and environmental exposure controls.

### Abbreviations and acronyms

- In Section 12, the Safety Data Sheet is supplemented with other adverse effects.
- In Section 13, the Safety Data Sheet is supplemented with information about waste treatment methods.
- In Section 15, the Safety Data Sheet is supplemented with regulatory information.
- : [ADN - International Carriage of Dangerous Goods by Inland Waterways](#)
- ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
- ATE - Acute Toxicity Estimate
- CAS - Chemical Abstract Service number
- CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
- CSA - Chemical Safety Assessment
- DNEL - Derived No Effect Levels
- EINECS - European Inventory of Existing Commercial Chemical Substances
- EC- European Community number
- EIGA - European Industrial Gases Association
- EN - European Standard
- IATA - International Air Transport Association
- ICAO - International Civil Aviation Organization
- IMDG - International Maritime Dangerous Goods
- IMO - International Maritime Organization
- LC50 - Lethal Concentration to 50 % of a test population
- LD50 - Lethal Dose 50%
- LEL - Lower Explosive Limit
- OEL - Occupational exposure limits
- PBT - Persistent, Bioaccumulative and Toxic
- [PMT - Perzistentno, mobilno i toksično .](#)
- PNEC - Predicted No Effect Concentration
- PPE - Personal Protection Equipment
- [PROC - Procesna kategorija \(Process category\).](#)
- REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
- RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
- RMM - Risk Management Measures
- STOT - RE - Specific Target Organ Toxicity - Repeated Exposure
- STOT- SE - Specific Target Organ Toxicity - Single Exposure
- STEL - Short Term Exposure Limit
- TWA -8-hour total weight average
- UEL - Upper explosive limit
- UFI - Unique Formula Identifier
- UN - United Nations
- vPvB - Very Persistent and Very Bioaccumulative
- [vPvM - veoma perzistentno i veoma mobilno.](#)
- WGK - Water Hazard Class
- : Receptacle under pressure. The hazard of asphyxiation is often overlooked and must be stressed during operator training. For more guidance, refer to EIGA SL 01 "Dangers of Asphyxiation", downloadable at <http://www.eiga.eu>
- : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP). Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.eiga.eu>

### Training advice

### Further information

Full text of H- and EUH-statements	
Flam. Gas 1A	Flammable gases, Category 1A
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
Press. Gas (Comp.)	Gases under pressure : Compressed gas

#### DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Details given in this document are believed to be correct at the time of going to press.

Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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