

1. Identification

| | |
|---|--|
| Product identifier | Odorized Natural Gas |
| Other means of identification | |
| Synonyms | Natural Gas/Methane. |
| Recommended use | Primarily used as a heating fuel for domestic and industrial purposes. |
| Recommended restrictions | - |
| Manufacturer/Importer/Supplier/Distributor information | |
| Supplier | MANITOBA HYDRO |
| Address | 360 Portage Avenue Winnipeg, Manitoba Canada R3C 0G8 |
| Emergency Telephone (24/7) | (204) 480-5900 (in Winnipeg) 1-888-624-9376 (outside Winnipeg) |

2. Hazard(s) identification

| | | |
|------------------------------|----------------------|----------------|
| Physical hazards | Flammable gases | Category 1 |
| | Gases under pressure | Compressed gas |
| | Simple asphyxiants | Category 1 |
| Health hazards | Sensitization, skin | Category 1 |
| Environmental hazards | Not classified. | |

Label elements



| | |
|---------------------------------|--|
| Signal word | Danger |
| Hazard statement | Extremely flammable gas. Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation. May cause an allergic skin reaction. |
| Precautionary statement | |
| Prevention | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Avoid breathing gas. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves. Wear respiratory protection. |
| Response | IF ON SKIN: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources. |
| Storage | Protect from sunlight. Store in a well-ventilated place. |
| Disposal | Dispose of contents/container in accordance with local/regional/national/international regulations. |
| Other hazards | None known. |
| Supplemental information | None. |

3. Composition/information on ingredients

Mixtures

| Chemical name | CAS number | % |
|---------------------------|------------|------|
| Natural Gas | 8006-14-2 | ≤100 |
| 2-Propanethiol, 2-Methyl- | 75-66-1 | <2 |

| Constituents | CAS number | % |
|--------------|------------|---------|
| Methane | 74-82-8 | 90 - 99 |
| Ethane | 74-84-0 | ≤ 6 |
| Nitrogen | 7727-37-9 | ≤ 3 |
| Butane | 106-97-8 | ≤ 3 |
| Pentane | 109-66-0 | ≤ 3 |
| Propane | 74-98-6 | ≤ 3 |

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory tract irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation. Move to fresh air. Get medical attention immediately.

Skin contact

In case of eczema or other skin disorders: Seek medical attention and take along these instructions. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. If frostbite occurs, immerse affected area in warm water (not exceeding 105°F/41°C). Keep immersed for 20 to 40 minutes. Get medical attention immediately.

Eye contact

Rinse with water. Get medical attention if irritation develops and persists.

Ingestion

Not likely, due to the form of the product.

Most important symptoms/effects, acute and delayed

Headache. Dizziness. Fatigue. Nausea, vomiting. Very high exposure can cause suffocation from lack of oxygen. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves. May cause an allergic skin reaction. Dermatitis. Rash.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media

Water fog. Foam. Halon. Dry chemical powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media

None known.

Specific hazards arising from the chemical

Burns with a pale blue, nearly invisible flame. Gas is easily ignited with low-ignition energy, including static electricity. Gas is lighter than air and can accumulate in the upper sections of enclosed spaces. Pressure in a container can build up due to heat, and it may rupture if pressure relief devices should fail to function. During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions

In case of fire and/or explosion do not breathe fumes. DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED. In case of fire: Stop leak if safe to do so. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. ALWAYS stay away from tanks engulfed in flame. Move containers from fire area if you can do so without risk. Do not direct water at source of leak or safety devices as icing may occur. Use water spray to cool unopened containers. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if possible. If not, withdraw and let fire burn out.

Specific methods

Promptly isolate the scene by removing persons from the vicinity of the incident if there is a fire. Do not extinguish flames at leak because of the possibility of a uncontrolled re-ignition exists. If it is safe to do so, cut off fuel supply and/or allow fire to burn out. The fire should burn out fairly rapidly depending on the amount of natural gas condensate floating on the surface of the produced water. If leak or spill has not ignited, water spray or ventilation can be used to disperse the vapors. Cool containers exposed to flames with water until well after the fire is out.

General fire hazards

Extremely flammable gas. Contents under pressure. Pressurized container may explode when exposed to heat or flame.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

In the event of a leak evacuate all personnel until ventilation can restore oxygen concentrations to safe levels. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep out of low areas. Gas is lighter than air and can accumulate in the upper sections of enclosed spaces. Wear appropriate protective equipment and clothing during clean-up. Avoid breathing gas. Emergency personnel need self-contained breathing equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Refer to attached safety data sheets and/or instructions for use. Stop leak if you can do so without risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors or divert vapor cloud drift. Isolate area until gas has dispersed. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Do not smoke. This product is intended for transport by pipeline only. All equipment used when handling the product must be grounded. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Purge air from system before introducing gas. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Avoid breathing gas. Avoid contact with eyes, skin, and clothing. Do not enter storage areas or confined spaces unless adequately ventilated. Use only outdoors or in a well-ventilated area. Oxygen concentration should not fall below 19.5 % at sea level (pO₂ = 135 mmHg). Mechanical ventilation or local exhaust ventilation may be required. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep away from heat, sparks and open flame. This material can accumulate static charge which may cause spark and become an ignition source. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Stored containers should be periodically checked for general condition and leakage. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

| Constituents | Type | Value |
|------------------------|------|----------|
| Butane (CAS 106-97-8) | STEL | 1000 ppm |
| Pentane (CAS 109-66-0) | TWA | 1000 ppm |

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

| Constituents | Type | Value |
|------------------------|------|------------------------|
| Butane (CAS 106-97-8) | TWA | 1000 ppm |
| Propane (CAS 74-98-6) | TWA | 1000 ppm |
| Pentane (CAS 109-66-0) | TWA | 1770 mg/m ³ |
| | | 600 ppm |
| Ethane (CAS 74-84-0) | TWA | 1000 ppm |

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

| Components | Type | Value |
|-----------------------------|------|----------|
| Natural Gas (CAS 8006-14-2) | TWA | 1000 ppm |

| Constituents | Type | Value |
|------------------------|------|----------|
| Butane (CAS 106-97-8) | STEL | 750 ppm |
| | TWA | 600 ppm |
| Propane (CAS 74-98-6) | TWA | 1000 ppm |
| Pentane (CAS 109-66-0) | TWA | 600 ppm |

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

| Constituents | Type | Value |
|-----------------------|------|----------|
| Ethane (CAS 74-84-0) | TWA | 1000 ppm |
| Methane (CAS 74-82-8) | TWA | 1000 ppm |

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

| Constituents | Type | Value |
|------------------------|------|----------|
| Butane (CAS 106-97-8) | STEL | 1000 ppm |
| Pentane (CAS 109-66-0) | TWA | 1000 ppm |

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

| Components | Type | Value |
|-----------------------------|------|----------|
| Natural Gas (CAS 8006-14-2) | TWA | 1000 ppm |

| Constituents | Type | Value |
|------------------------|------|----------|
| Butane (CAS 106-97-8) | TWA | 800 ppm |
| Propane (CAS 74-98-6) | TWA | 1000 ppm |
| Pentane (CAS 109-66-0) | TWA | 600 ppm |
| Ethane (CAS 74-84-0) | TWA | 1000 ppm |
| Methane (CAS 74-82-8) | TWA | 1000 ppm |

Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety)

| Constituents | Type | Value |
|------------------------|------|------------|
| Butane (CAS 106-97-8) | TWA | 1900 mg/m3 |
| | | 800 ppm |
| Propane (CAS 74-98-6) | TWA | 1800 mg/m3 |
| | | 1000 ppm |
| Pentane (CAS 109-66-0) | TWA | 350 mg/m3 |
| | | 120 ppm |

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Explosion proof exhaust ventilation is recommended.

Individual protection measures, such as personal protective equipment

Eye/face protection

Face shield is recommended. Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection

Wear appropriate chemical resistant gloves. Direct contact with liquid can cause frostbite. Thermally protective gloves are recommended.

Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment. DO NOT USE AIR PURIFYING RESPIRATORS. Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

When using do not smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance

Physical state

Gas Compressed.

Form

Compressed liquefied gas.

Color

Colorless.

Odor

Skunky, strong stinging.

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| Odor threshold | 200 ppm of odorous natural gas |
| pH | Not applicable. |
| Melting point/freezing point | -297.4 °F (-183 °C) (as Methane) |
| Initial boiling point and boiling range | -259.6 °F (-162 °C) (as Methane) |
| Flash point | -306.4 °F (-188.0 °C) Tag Closed Cup |
| Evaporation rate | Not available. |
| Flammability (solid, gas) | Flammable gas. |
| Upper/lower flammability or explosive limits | |
| Flammability limit - lower (%) | 5 % |
| Flammability limit - upper (%) | 15.4 % |
| Vapor pressure | 300 - 600 psig (in pipeline) |
| Vapor density | 0.53 - 0.7 (gaseous specific gravity) (as Methane) |
| Relative density | Not available. |
| Solubility(ies) | |
| Solubility (water) | 0.002 % Slight (as Methane) |
| Partition coefficient (n-octanol/water) | Not available. |
| Auto-ignition temperature | 998.6 °F (537 °C) |
| Decomposition temperature | Not available. |
| Viscosity | Not applicable. |
| Other information | |
| Explosive properties | Not explosive. |
| Molecular weight | 16.04 (Methane) |
| Oxidizing properties | Not oxidizing. |
| Percent volatile | 100 % by volume |

10. Stability and reactivity

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|---|---|
| Reactivity | The product is stable and non-reactive under normal conditions of use, storage and transport. |
| Chemical stability | Material is stable under normal conditions. |
| Possibility of hazardous reactions | Polymerization will not occur. Contact with halogenated compounds and oxidizers may produce violent reactions and fires. |
| Conditions to avoid | Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials. Shocks and physical damage. Sensitive to static discharge. |
| Incompatible materials | Strong oxidizing agents. Halogenated compounds. |
| Hazardous decomposition products | Carbon oxides. Trace amounts of: Sulfur oxides (SOx.). Nitrogen oxides (NOx). |

11. Toxicological information

Information on likely routes of exposure

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|---|---|
| Inhalation | Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Methane may cause narcosis above 300,000 ppm (30% in air). |
| Skin contact | May cause an allergic skin reaction. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. |
| Eye contact | Direct contact with eyes may cause temporary irritation. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. |
| Ingestion | Expected to be a low ingestion hazard. |
| Symptoms related to the physical, chemical and toxicological characteristics | Headache. Dizziness. Fatigue. Nausea, vomiting. Very high exposure can cause suffocation from lack of oxygen. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves. May cause an allergic skin reaction. Dermatitis. Rash. |

Information on toxicological effects

Acute toxicity Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels.

| Product | Species | Test Results |
|--|--|-----------------------------------|
| Odorized Natural Gas (CAS Mixture) | | |
| Inhalation | | |
| LC50 | | 900000 ppm (90% in air) (Methane) |
| Components | Species | Test Results |
| 2-Propanethiol, 2-Methyl- (CAS 75-66-1) | | |
| Acute | | |
| Dermal | | |
| LD50 | Rabbit | > 2000 mg/kg, 24 Hours |
| Inhalation | | |
| LC50 | Rat | 97.5 mg/l, 4 Hours |
| Oral | | |
| LD50 | Rat | 4729 mg/kg |
| Constituents | Species | Test Results |
| Butane (CAS 106-97-8) | | |
| Acute | | |
| Inhalation | | |
| LC50 | Rat | 658 mg/l, 4 Hours |
| Pentane (CAS 109-66-0) | | |
| Acute | | |
| Inhalation | | |
| LC50 | Rat | 364 mg/l, 4 Hours |
| Propane (CAS 74-98-6) | | |
| Acute | | |
| Inhalation | | |
| Gas | | |
| LC50 | Rat | > 80000 ppm, 15 Minutes |
| Skin corrosion/irritation | Prolonged skin contact may cause temporary irritation. | |
| Serious eye damage/eye irritation | Direct contact with eyes may cause temporary irritation. | |
| Respiratory or skin sensitization | | |
| Canada - British Columbia OELs: Simple asphyxiant | | |
| Nitrogen (CAS 7727-37-9) | | Simple asphyxiant. |
| Canada - Manitoba OELs Hazard: Asphyxiant | | |
| Nitrogen (CAS 7727-37-9) | | Simple asphyxiant. |
| Canada - Ontario OELs: Asphyxiant | | |
| Nitrogen (CAS 7727-37-9) | | Simple asphyxiant. |
| Canada - Quebec OELs: Asphyxiant | | |
| Ethane (CAS 74-84-0) | | Simple asphyxiant. |
| Methane (CAS 74-82-8) | | Simple asphyxiant. |
| Nitrogen (CAS 7727-37-9) | | Simple asphyxiant. |
| Respiratory sensitization | Not a respiratory sensitizer. | |
| Skin sensitization | May cause an allergic skin reaction. | |
| Germ cell mutagenicity | No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic. | |
| Carcinogenicity | Not classifiable as to carcinogenicity to humans. | |
| Reproductive toxicity | This product is not expected to cause reproductive or developmental effects. | |
| Specific target organ toxicity - single exposure | Not classified. | |

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|---|--|
| Specific target organ toxicity - repeated exposure | Not classified. |
| Aspiration hazard | Not likely, due to the form of the product. |
| Chronic effects | Prolonged exposure to Natural gas can lead to hypoxia, bluish colouration to the skin, numbness, damage to the nervous system, heart sensitization, reduced consciousness and death. |

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

| Constituents | Species | | Test Results |
|------------------------|---------|---------|--------------------|
| Pentane (CAS 109-66-0) | | | |
| Aquatic | | | |
| Crustacea | EC50 | Daphnia | 2.3 mg/l, 48 Hours |
| Fish | LC50 | Fish | 3.1 mg/l, 96 Hours |

Persistence and degradability The product is biodegradable.

Bioaccumulative potential Not expected to bioconcentrate or bioaccumulate.

Partition coefficient n-octanol / water (log Kow)

Pentane (CAS 109-66-0) 3.39

Mobility in soil Because of its high volatility, the product is unlikely to cause ground or water pollution.

Other adverse effects The product contains substances which contribute to global warming (greenhouse effect).

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose of in accordance with local regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

TDG

UN number UN1971
UN proper shipping name NATURAL GAS, COMPRESSED with high methane content
Transport hazard class(es)
Class 2.1
Subsidiary risk -
Packing group -
Environmental hazards No
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IATA

UN number UN1971
UN proper shipping name NATURAL GAS, COMPRESSED with high methane content
Transport hazard class(es)
Class 2.1
Subsidiary risk -
Packing group -
Environmental hazards No
ERG Code 10L
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN1971
UN proper shipping name NATURAL GAS, COMPRESSED with high methane content

Transport hazard class(es)**Class** 2.1**Subsidiary risk** -**Packing group** -**Environmental hazards****Marine pollutant** No**EmS** F-D, S-U**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** Not applicable. This product is not intended to be transported except by pipeline.**15. Regulatory information****Canadian regulations** This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.**Canada. Excluded VOCs. Guidelines for Volatile Organic Compounds in Consumer Products. CEPA 1999. Environment Canada, as amended**

Ethane (CAS 74-84-0)

Methane (CAS 74-82-8)

Controlled Drugs and Substances Act

Not regulated.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Methane (CAS 74-82-8)

Precursor Control Regulations

Not regulated.

International regulations**Stockholm Convention**

Not applicable.

Rotterdam Convention

Not applicable.

Kyoto protocol

Methane (CAS 74-82-8) Listed.

Montreal Protocol

Not applicable.

Basel Convention

Not applicable.

International Inventories**Country(s) or region****Inventory name****On inventory (yes/no)***

| | | |
|-------------|--|-----|
| Australia | Australian Inventory of Chemical Substances (AICS) | Yes |
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| China | Inventory of Existing Chemical Substances in China (IECSC) | Yes |
| Europe | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes |
| Europe | European List of Notified Chemical Substances (ELINCS) | No |
| Japan | Inventory of Existing and New Chemical Substances (ENCS) | No |
| Korea | Existing Chemicals List (ECL) | Yes |
| New Zealand | New Zealand Inventory | Yes |
| Philippines | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | No |
| Taiwan | Taiwan Chemical Substance Inventory (TCSI) | Yes |

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|-----------------------------|---|-------------------------------|
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | Yes |

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Issue date 23-October-2020

Revision date -

Version # 02

Disclaimer MANITOBA HYDRO cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.