

**Danger**



### SECTION 1: Identification of the hazardous chemical and of the supplier

#### 1.1. Product identifier

Trade name : carbon monoxide  
Name : Carbon monoxide  
CAS-No. : 630-08-0  
Formula : CO

#### 1.2. Other means of identification

Product code : ALM/SDS/237

#### 1.3. Recommended use of the chemical and restrictions on use

Recommended use : Industrial and professional uses. Perform risk assessment prior to use.  
Contact supplier for more information on uses.  
Restrictions on use : Consumer use.

#### 1.4. Supplier details

AIR LIQUIDE MALAYSIA SDN. BHD.  
Lot PT 2317, No. 21, Jalan PTB 1  
Kawasan Perindustrian Tangga Batu, Mukim Sungai Udang,  
76400 Melaka  
Malaysia  
T +606-3513512

#### 1.5. Emergency phone number

Emergency number : +606-3513512

### SECTION 2: Hazards identification

#### 2.1. Classification of the hazardous chemical

Classification according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Flammable gases, Category 1	H220
Gases under pressure : Compressed gas	H280
Acute toxicity (inhalation:gas) Category 3	H331
Reproductive toxicity, Category 1A	H360D
Specific target organ toxicity – Repeated exposure, Category 1	H372

#### 2.2. Label elements

Labelling according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Hazard pictograms (GHS MY) :



Signal word (GHS MY) : Danger  
Hazard statements (GHS MY) : H220 - Extremely flammable gas  
H280 - Contains gas under pressure; may explode if heated  
H331 - Toxic if inhaled

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Precautionary statements (GHS MY)

H360D - May damage the unborn child  
H372 - Causes damage to organs through prolonged or repeated exposure  
: P201 - Obtain special instructions before use  
P202 - Do not handle until all safety precautions have been read and understood  
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking  
P260 - Do not breathe dust/fume/gas/mist/vapours/spray  
P261 - Avoid breathing dust/fume/gas/mist/vapours/spray  
P264 - Wash ... thoroughly after handling  
P270 - Do not eat, drink or smoke when using this product  
P271 - Use only outdoors or in a well-ventilated area  
P280 - Wear protective gloves/protective clothing/eye protection/face protection  
P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing  
P308+P313 - IF exposed or concerned: Get medical advice/attention  
P311 - Call a POISON CENTER or doctor/physician  
P314 - Get medical advice/attention if you feel unwell  
P321 - Specific treatment (see ... on this label)  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely  
P381 - Eliminate all ignition sources if safe to do so  
P403 - Store in a well-ventilated place  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed  
P405 - Store locked up  
P410+P403 - Protect from sunlight. Store in a well-ventilated place  
P501 - Dispose of contents/container to ...

### 2.3. Other hazards that do not result in classification

Other hazards which do not result in classification : None.

## SECTION 3: Composition and information of the ingredients of the hazardous chemical

### 3.1. Substances

Name	Product identifier	%
Carbon monoxide (Main constituent)	CAS-No.: 630-08-0	100

Full text of H-statements: see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First-aid measures

### 4.1. Description of necessary first aid measures

First-aid measures after inhalation : Provide oxygen. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.  
First-aid measures after skin contact : Adverse effects not expected from this product.  
First-aid measures after eye contact : Adverse effects not expected from this product.  
First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

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

Most important symptoms and effects, both acute and delayed : Symptoms may include dizziness, headache, nausea and loss of co-ordination. Delayed adverse effects possible. See section 11.

### 4.3. Indication of immediate medical attention and special treatment needed, if necessary

Other medical advice or treatment : Obtain medical assistance.

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### SECTION 5: Fire-fighting measures

#### 5.1. Suitable extinguishing media

- Suitable extinguishing media : Water spray or fog. Dry powder.  
Unsuitable extinguishing media : Do not use water jet to extinguish. Carbon dioxide.

#### 5.2. Physicochemical hazards arising from the chemical

- Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.  
Hazardous combustion products : None that are more hazardous than the product itself.

#### 5.3. Special protective equipment and precautions for fire fighters

- Special protective equipment for fire fighters : 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.
- 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, Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
- EAC code : 2SE

### SECTION 6: Accidental release measures

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

- General measures : Act in accordance with local emergency plan. Stay upwind. Try to stop release. Evacuate area. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Eliminate ignition sources. Ensure adequate air ventilation.

##### **6.1.1. For non-emergency personnel**

- Emergency procedures : Act in accordance with local emergency plan. Try to stop release. Evacuate area. Eliminate ignition sources. Ensure adequate air ventilation. Stay upwind. See section 8 of the SDS for more information on personal protective equipment.

##### **6.1.2. For emergency responders**

- Emergency procedures : Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. See section 5.3 of the SDS for more information.

#### 6.2. Environmental precautions

Try to stop release.

#### 6.3. Methods and materials for containment and cleaning up

- Methods and material for containment and cleaning up : Ventilate area.

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### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Safe handling of the gas receptacle

: Refer to supplier's container handling instructions. Do not allow backfeed into the container. 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 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 attempt to transfer gases from one cylinder/container to another. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the content of the container. Suck back of water into the container must be prevented. Open valve slowly to avoid pressure shock.

Safe use of the product

: Avoid exposure, obtain special instructions before use. Installation of a cross purge assembly between the container and the regulator is recommended. The product must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use. Do not smoke while handling product. 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. Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment. Purge air from system before introducing gas. Take precautionary measures against static discharge. Keep away from ignition sources (including static discharges). Consider the use of only non-sparking tools. Ensure equipment is adequately earthed.

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

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. Segregate from oxidant gases and other oxidants in store. All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

### SECTION 8: Exposure controls and personal protection

#### 8.1. Control parameters

carbon monoxide (630-08-0)	
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Kohlenstoffmonoxid
AGW (OEL TWA) [1]	35 mg/m <sup>3</sup>
AGW (OEL TWA) [2]	30 ppm
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); Z - Ein Risiko der Fruchtschädigung kann auch bei Einhaltung des AGW und des BGW nicht ausgeschlossen werden; EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich)
Regulatory reference	TRGS900

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<b>Germany - Biological limit values (TRGS 903)</b>	
Biological limit value	5 % Parameter: CO-Hb - Untersuchungsmaterial: B = Vollblut - Probenahmezeitpunkt: b) Expositionsende, bzw. Schichtende - Festlegung/Begründung: 05/2013 DFG
Remark	Ableitung des BGW als Höchstwert wegen akut toxischer Effekte. Gesonderte Bewertung für Raucher
Regulatory reference	TRGS 903
<b>United Kingdom - Occupational Exposure Limits</b>	
Local name	Carbon monoxide
WEL TWA (OEL TWA) [1]	23 mg/m <sup>3</sup> 35 mg/m <sup>3</sup> Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
WEL TWA (OEL TWA) [2]	20 ppm 30 ppm Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
WEL STEL (OEL STEL)	117 mg/m <sup>3</sup> 232 mg/m <sup>3</sup> Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
WEL STEL (OEL STEL) [ppm]	100 ppm 200 ppm Limits applicable to underground mining & tunnelling industries ONLY until 21/8/23
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Carbon monoxide
ACGIH OEL TWA [ppm]	25 ppm
Remark (ACGIH)	TLV® Basis: COHb-emia. Notations: BEI
Regulatory reference	ACGIH 2023

### Exposure limit values for the other components

No additional information available

#### **8.1.1 Biological monitoring**

No additional information available

#### **8.2. Appropriate engineering controls**

Appropriate engineering controls

: Gas detectors should be used when toxic gases may be released. Product to be handled in a closed system and under strictly controlled conditions. Preferably use permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Consider the use of a work permit system e.g. for maintenance activities.

#### **8.3. Individual protection measures, such as PPE**

<b>Hand protection:</b>
Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher.
<b>Eye protection:</b>
Wear safety glasses with side shields. Standard EN 166 - Personal eye-protection - specifications

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### Respiratory protection:

Keep self contained breathing apparatus readily available for emergency use. 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. Never use any kind of filtering respiratory protection equipment when working with this substance due to it having poor or no warning properties.

### Personal protective equipment symbol(s):



Thermal hazard protection  
Environmental exposure controls

: None in addition to the above sections.  
: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

## SECTION 9: Physical and chemical properties

Physical state	: Gas
Appearance	: No data available
Colour	: Colourless.
Odour	: Odourless.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH	: Not applicable for gases and gas mixtures.
Melting point	: -205 °C
Freezing point	: No data available
Boiling point	: -191.5 °C
Flash point	: Not applicable for gases and gas mixtures.
Evaporation rate	: No data available
Flammability (solid, gas)	: Extremely flammable gas.
Explosive limits	: Upper explosion limit: 76 vol % Lower explosion limit: 10.9 vol %
Vapour pressure	: Vapour pressure: Not applicable. Vapour pressure at 50°C: Not applicable.
Relative vapour density at 20°C	: Not applicable.
Relative density	: 0.79 Relative gas density: 1
Solubility	: Water: 30 mg/l
Partition coefficient n-octanol/water (Log Pow)	: No data available
Partition coefficient n-octanol/water (Log Kow)	: 1.78
Critical temperature	: -140 °C
Auto-ignition temperature	: 620 °C
Decomposition temperature	: Not applicable.
Viscosity, kinematic	: No reliable data available.
Viscosity, dynamic	: No reliable data available.
Explosive properties	: Not applicable.
Density	: Not applicable for gases and gas mixtures.
Critical pressure	: 3499 kPa
Molecular mass	: 28 g/mol
Oxidising properties	: Not applicable.

## SECTION 10: Stability and reactivity

Reactivity	: No reactivity hazard other than the effects described in sub-sections 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, Avoid moisture in installation systems.

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Incompatible materials	: See also 'EIGA Doc.95: Avoidance of Failure of CO and of CO/CO <sub>2</sub> Mixtures Cylinders' at <a href="http://www.eiga.eu">www.eiga.eu</a> . For additional information on compatibility refer to ISO 11114, Air, Oxidisers.
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 toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Toxic if inhaled. Toxic if inhaled.

carbon monoxide (630-08-0)	
LC50 Inhalation - Rat [ppm]	3760 ppm/1h (ADR)
Skin corrosion or irritation	: Not classified pH: Not applicable for gases and gas mixtures.
Serious eye damage or eye irritation	: Not classified
Respiratory sensitization	: Not classified
Skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: May damage the unborn child.
Specific target organ toxicity (STOT) – single exposure	: Not classified
Target organ(s)	: Blood.
Specific target organ toxicity (STOT) – repeated exposure	: Causes damage to organs through prolonged or repeated exposure.
Target organ(s)	: heart
Aspiration hazard	: Not classified
carbon monoxide (630-08-0)	
Viscosity, kinematic	No reliable data available.
Other information	: The substance/mixture has no endocrine disrupting properties.

### SECTION 12: Ecological information

#### 12.1. Ecotoxicity

Ecology - general	: No ecological damage caused by this product.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified

carbon monoxide (630-08-0)	
Partition coefficient n-octanol/water (Log Kow)	1.78

#### 12.2. Persistence and degradability

carbon monoxide (630-08-0)	
Persistence and degradability	Will not undergo hydrolysis. Not readily biodegradable.

#### 12.3. Bioaccumulative potential

carbon monoxide (630-08-0)	
Partition coefficient n-octanol/water (Log Kow)	1.78
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). See section 9.

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### 12.4. Mobility in soil

carbon monoxide (630-08-0)	
Mobility in soil	No additional information available
Partition coefficient n-octanol/water (Log Kow)	1.78
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.

### 12.5. Other adverse effects

Ozone	: Not classified
Effect on global warming	: No known effects from this product.
Effect on the ozone layer	: None.
Other adverse effects	: No known effects from this product.

## SECTION 13: Disposal information

### 13.1. Disposal methods

Waste treatment methods	: Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Must not be discharged to atmosphere. Return unused product in original container to supplier. Contact supplier if guidance is required. Ensure that the emission levels from local regulations or operating permits are not exceeded. Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <a href="http://www.eiga.eu">http://www.eiga.eu</a> for more guidance on suitable disposal methods.
Additional information	: External treatment and disposal of waste should comply with applicable local and/or national regulations.

## SECTION 14: Transportation information

### 14.1. UN number

UN-No.(UN RTDG)	: 1016
UN-No. (IMDG)	: 1016
UN-No. (IATA)	: 1016

### 14.2. UN proper shipping name

Proper Shipping Name (UN RTDG)	: CARBON MONOXIDE, COMPRESSED
Proper Shipping Name (IMDG)	: CARBON MONOXIDE, COMPRESSED
Proper Shipping Name (IATA)	: Carbon monoxide, compressed

### 14.3. Transport hazard class(es)

#### UN RTDG

Transport hazard class(es) (UN RTDG)	: 2.3 (2.1)
Danger labels (UN RTDG)	: 2.3, 2.1



#### IMDG

Transport hazard class(es) (IMDG)	: 2.3 (2.1)
Danger labels (IMDG)	: 2.3, 2.1





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### IATA

Transport hazard class(es) (IATA) : 2.3 (2.1)

#### 14.4. Packing Group, if applicable

Packing group (UN RTDG) : Not applicable

Packing group (IMDG) : Not applicable

Packing group (IATA) : Not applicable

#### 14.5. Environmental hazards

Dangerous for the environment : No

Marine pollutant : No

Other information : No supplementary information available

#### 14.6. Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)

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.

### UN RTDG

Limited quantities (UN RTDG) : 0

Excepted quantities (UN RTDG) : E0

Packing instruction (UN RTDG) : P200

### IMDG

Special provisions (IMDG) : 974

Limited quantities (IMDG) : 0

Excepted quantities (IMDG) : E0

Packing instructions (IMDG) : P200

EmS-No. (Fire) : F-D - FIRE SCHEDULE Delta - FLAMMABLE GASES

EmS-No. (Spillage) : S-U - SPILLAGE SCHEDULE Uniform - GASES (FLAMMABLE, TOXIC OR CORROSIVE)

Stowage category (IMDG) : D

Stowage and handling (IMDG) : SW2

Properties and observations (IMDG) : Flammable, toxic, odourless gas. Explosive limits: 12% to 75% Slightly lighter than air (0.97).

### IATA

PCA Limited quantities (IATA) : Forbidden

PCA limited quantity max net quantity (IATA) : Forbidden

PCA packing instructions (IATA) : Forbidden

PCA max net quantity (IATA) : Forbidden

CAO packing instructions (IATA) : Forbidden

CAO max net quantity (IATA) : Forbidden

Special provisions (IATA) : A2

ERG code (IATA) : 10P

#### 14.7. Special precautions for user

IBC code : Not applicable.

#### 14.8. Hazchem or Emergency Action Code

EAC code : 2SE.

## SECTION 15: Regulatory information

### 15.1. Safety, health, and environmental regulations specific for the hazardous chemical in question

#### carbon monoxide (630-08-0)

EHS Notification and Registration Scheme	Applicable
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EHS Notification and Registration Scheme	Applicable
Environmental Quality (Chlorofluorocarbons Prohibition) Order 1993	Not applicable
Environmental Quality (Industrial Effluent) Regulations 2009	
Environmental Quality (Scheduled Wastes) Regulations 2007	
Control of Industrial Major Accident Hazards Regulations 1996	
Prohibition of Use of Substance Order 1999	
Use and Standards of Exposure of Chemical Hazardous to Health Regulations 2000	
Chemical Weapons Convention Act	
Corrosive and Explosive Substances and Offensive Weapons Act	
Dangerous Drugs Act	
Pesticides Act	
Petroleum (Safety Measures) Act	
Poisons Act 1952	
Poisons (Psychotropic Substances) Regulations 1989	

### 15.2. International agreements

No additional information available

## SECTION 16: Other information

Version : 2.0  
Issue date : 2/28/2017  
Revision date : 30/10/2023  
Supersedes : 01/03/2022

Abbreviations and acronyms : ATE - Acute Toxicity Estimate  
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008  
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006  
EINECS - European Inventory of Existing Commercial Chemical Substances  
CAS# - Chemical Abstract Service number  
PPE - Personal Protection Equipment  
LC50 - Lethal Concentration to 50 % of a test population  
RMM - Risk Management Measures  
PBT - Persistent, Bioaccumulative and Toxic  
vPvB - Very Persistent and Very Bioaccumulative  
STOT- SE : Specific Target Organ Toxicity - Single Exposure  
CSA - Chemical Safety Assessment  
EN - European Standard  
UN - United Nations  
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road  
IATA - International Air Transport Association  
IMDG code - International Maritime Dangerous Goods  
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail  
WGK - Water Hazard Class  
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure

Training advice : Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard. Ensure operators understand the flammability hazard.

Safety Data Sheet (SDS), Malaysia\_AL

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.