

SAFETY DATA SHEET

Prepared according to the regulation on Safety Data Sheets regarding Hazardous substances and mixtures (R.G. 13/12/2014-29204).

Methyl Isobutyl Carbinol

Initial release date: 09.09.2008

Revision Date: 30.09.2015

Version 2.2

MSDS Number: 800001005658

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

1.1 Product identifier

Trade name : Methyl Isobutyl Carbinol

Product code : S1216

Synonyms : 1,3-dimethyl 1-butanol, 4-methylpentan-2-ol, Methyl Amyl Alcohol, MIBC

CAS-No. : 108-11-2

Index-No. : 603-008-00-8

EC-No. : 203-551-7

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

Use of the Substance/Mixture : Solvent.

Recommended restrictions on use : This product must not be used in applications other than the above without first seeking the advice of the supplier.

1.3 Details of the supplier of the safety data sheet

Company : **Shell Chemicals Europe B.V.**
PO Box 2334
3000 CH Rotterdam
Netherlands

Telephone : +31 (0)10 441 5137 / +31 (0)10 441 5191

Telefax : +31 (0)20 716 8316/ +31 (0)20 713 9230

E-mail address of person responsible for the SDS : sccmsds@shell.com

1.4 Emergency telephone number

Emergency telephone number : +44 (0) 1235 239 670

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification T.R. SEA No 28848

Flammable liquids, Category 3

H226: Flammable liquid and vapour.

Eye irritation, Category 2

H319: Causes serious eye irritation.

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Specific target organ toxicity - single exposure, Category 3, Respiratory system

H335: May cause respiratory irritation.

Classification T.R. SAE No 27092

R10: Flammable.

Irritant

R36/37: Irritating to eyes and respiratory system.

2.2 Label elements

Labelling T.R. SEA No 28848

Hazard pictograms :



Signal word : Warning

Hazard statements :

H226

PHYSICAL HAZARDS:
Flammable liquid and vapour.

H319

HEALTH HAZARDS:
Causes serious eye irritation.

H335

May cause respiratory irritation.
ENVIRONMENTAL HAZARDS:
Not classified as environmental hazard according to CLP criteria.

Precautionary statements :

Prevention:

P210

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P303 + P361 + P353

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P370 + P378

In case of fire: Use appropriate media to extinguish.

P305 + P351 + P338

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Disposal:

P501

Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

2.3 Other hazards

Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition

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sources causing a flashback fire danger.

Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.

If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.

SECTION 3: Composition/information on ingredients

3.1 Substances

Substance name : Methyl Isobutyl Carbinol, 108-11-2

Index-No. : 603-008-00-8

Hazardous components

Chemical Name	CAS-No. EC-No. Registration number	T.R. SAE No 27092	T.R. SEA No 28848	Concentration (%)
4-methylpentan-2-ol	108-11-2 203-551-7	R10 Xi; R36/37	Flam. Liq.3; H226 Eye Irrit.2A; H319 STOT SE3; H335	100

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice : In general no treatment is necessary, however, obtain medical advice.

Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

If inhaled : If inhalation of mists, fumes or vapour causes irritation to the nose or throat, remove to fresh air.
If symptoms persist, obtain medical advice.

In case of skin contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
If persistent irritation occurs, obtain medical attention.

In case of eye contact : Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment.

If swallowed : In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

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4.2 Most important symptoms and effects, both acute and delayed

Symptoms : Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.
Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Alcohol-resistant foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable extinguishing media : None

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Carbon monoxide may be evolved if incomplete combustion occurs.

5.3 Advice for firefighters

Special protective equipment for firefighters : Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

Specific extinguishing methods : Standard procedure for chemical fires.

Further information : Clear fire area of all non-emergency personnel.
Keep adjacent containers cool by spraying with water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Observe the relevant local and international regulations
Notify authorities if any exposure to the general public or the

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environment occurs or is likely to occur.
Local authorities should be advised if significant spillages cannot be contained.
The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Vapour may form an explosive mixture with air.
Avoid contact with skin, eyes and clothing.
Isolate hazard area and deny entry to unnecessary or unprotected personnel.
Stay upwind and keep out of low areas.

6.2 Environmental precautions

Environmental precautions : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Ventilate contaminated area thoroughly. Monitor area with combustible gas indicator.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

6.4 Reference to other sections

For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet., For guidance on disposal of spilled material see Chapter 13 of this Safety Data Sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Technical measures : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk as-

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assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Ensure that all local regulations regarding handling and storage facilities are followed.

- Advice on safe handling : Avoid contact with skin, eyes and clothing. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
- Advice on protection against fire and explosion : Bulk storage tanks should be diked (bunded). Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk. The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Do NOT use compressed air for filling, discharging, or handling operations.
- Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use.

7.2 Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.
- Packaging material : Suitable material: For containers, or container linings use mild steel, stainless steel.
Unsuitable material: Natural, butyl, neoprene or nitrile rubbers.

7.3 Specific end use(s)

- Specific use(s) : Please refer to Ch16 and/or the annexes for the registered uses under REACH.
- Ensure that all local regulations regarding handling and storage facilities are followed.
See additional references that provide safe handling practices: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
CENELEC CLC/TR 50404 (Electrostatics – Code of practice for the avoidance of hazards due to static electricity).

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
4-methylpentan-2-ol	108-11-2	MAC	25 ppm 100 mg/m ³	TR OEL
Further information	Skin absorption of the substance increases the hazard.			

Biological occupational exposure limits

No biological limit allocated.

8.2 Exposure controls

Engineering measures

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:

Use sealed systems as far as possible.

Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.

Local exhaust ventilation is recommended.

Firewater monitors and deluge systems are recommended.

Eye washes and showers for emergency use.

Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

General Information:

Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

Define procedures for safe handling and maintenance of controls.

Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.

Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.

Drain down system prior to equipment break-in or maintenance.

Retain drain downs in sealed storage pending disposal or subsequent recycle.

Personal protective equipment

Eye protection : Wear goggles for use against liquids and gas.
Wear full face shield if splashes are likely to occur.

Hand protection

Remarks : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374,

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US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Butyl rubber. Nitrile rubber. Incidental contact/Splash protection: PVC or neoprene rubber gloves. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Skin and body protection : Wear antistatic and flame retardant clothing if a local risk assessment deems it so.
Skin protection is not required under normal conditions of use. For prolonged or repeated exposures use impervious clothing over parts of the body subject to exposure.
If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to relevant Standard, and provide employee skin care programmes.

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers.
Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
If air-filtering respirators are suitable for conditions of use: Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)].

Protective measures : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Environmental exposure controls

General advice : Local guidelines on emission limits for volatile substances

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must be observed for the discharge of exhaust air containing vapour.
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.
Information on accidental release measures are to be found in section 6.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	: Liquid.
Colour	: clear
Odour	: sweet
Odour Threshold	: Data not available
pH	: Not applicable
Melting / freezing point	: Data not available
Boiling point/boiling range	: 130 - 133 °C
Flash point	: 41 °C Method: IP 170
Evaporation rate	: 0,3 Method: ASTM D 3539, nBuAc=1
Flammability (solid, gas)	: Not applicable
Upper explosion limit	: upper flammability limit 5,5 %(V)
Lower explosion limit	: lower flammability limit 1 %(V)
Vapour pressure	: 420 Pa (20 °C)
Relative vapour density	: 3,5
Relative density	: 0,81 (20 °C)
Density	: 806 - 808 kg/m ³ (20 °C) Method: ASTM D4052

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Solubility(ies) Water solubility	: 16 g/l (20 °C)
Partition coefficient: n-octanol/water	: log Pow: < 3
Auto-ignition temperature	: 305 °C Method: ASTM E-659
Decomposition temperature	: Data not available
Viscosity Viscosity, dynamic	: 5,2 mPa.s (20 °C)
Viscosity, kinematic	: Data not available
Explosive properties	: Not applicable
Oxidizing properties	: Data not available

9.2 Other information

Surface tension	: 22,7 mN/m, 20 °C
Conductivity	: Electrical conductivity: > 10 000 pS/m, A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid, This material is not expected to be a static accumulator.
Molecular weight	: 102,18 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity

The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.

10.2 Chemical stability

No hazardous reaction is expected when handled and stored according to provisions

10.3 Possibility of hazardous reactions

Hazardous reactions : Reacts with strong oxidising agents.

10.4 Conditions to avoid

Conditions to avoid : Avoid heat, sparks, open flames and other ignition sources.

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Prevent vapour accumulation.
In certain circumstances product can ignite due to static electricity.

10.5 Incompatible materials

Materials to avoid : Strong oxidising agents.

10.6 Hazardous decomposition products

Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Information on likely routes of exposure : Inhalation is the primary route of exposure although absorption may occur through skin contact or following accidental ingestion.

Acute toxicity

Product:

Acute oral toxicity : LD50 (Rat): > >2000 - <=5000 mg/kg
Remarks: May be harmful if swallowed.

Acute inhalation toxicity : (Rat): Remarks: Low toxicity by inhalation.
No deaths at highest tested dose.

Acute dermal toxicity : LD50 (Rabbit): > 2000 - <=5000 mg/kg
Remarks: May be harmful in contact with skin.

Skin corrosion/irritation

Product:

Remarks: Causes mild skin irritation.

Serious eye damage/eye irritation

Product:

Remarks: Causes serious eye irritation.

Respiratory or skin sensitisation

Product:

Remarks: Not expected to be a sensitiser.

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Germ cell mutagenicity

Product:

Genotoxicity in vivo : Remarks: No evidence of mutagenic activity.

Carcinogenicity

Product:

Remarks: Not expected to be carcinogenic.

Material	GHS/CLP Carcinogenicity Classification
4-methylpentan-2-ol	No carcinogenicity classification.

Reproductive toxicity

Product:

Effects on fertility :
Remarks: Not expected to impair fertility.
Not expected to be a developmental toxicant.

STOT - single exposure

Product:

Remarks: May cause respiratory irritation.

STOT - repeated exposure

Product:

Remarks: Not expected to be a hazard.

Aspiration toxicity

Product:

Not considered an aspiration hazard.

Further information

Product:

Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

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SECTION 12: Ecological information

12.1 Toxicity

Product:

- Toxicity to fish (Acute toxicity) : Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l
- Toxicity to daphnia and other aquatic invertebrates (Acute toxicity) : Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l
- Toxicity to algae (Acute toxicity) : Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l
- Toxicity to fish (Chronic toxicity) : Remarks: Data not available
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Remarks: NOEC/NOEL expected to be > 10 - <= 100 mg/l
- Toxicity to bacteria (Acute toxicity) : Remarks: Practically non toxic:
LL/EL/IL50 > 100 mg/l

12.2 Persistence and degradability

Product:

- Biodegradability : Remarks: Readily biodegradable.
Oxidises rapidly by photo-chemical reactions in air.

12.3 Bioaccumulative potential

Product:

- Bioaccumulation : Remarks: Does not bioaccumulate significantly.

12.4 Mobility in soil

Product:

- Mobility : Remarks: Dissolves in water.

12.5 Results of PBT and vPvB assessment

Product:

- Assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB..

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12.6 Other adverse effects

Product:

SECTION 13: Disposal considerations

13.1 Waste treatment methods

- Product : Recover or recycle if possible.
It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Do not dispose into the environment, in drains or in water courses
Waste product should not be allowed to contaminate soil or water.
- Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local regulations may be more stringent than regional or national requirements and must be complied with.
- Contaminated packaging : Drain container thoroughly.
After draining, vent in a safe place away from sparks and fire.
Residues may cause an explosion hazard.
Do not, puncture, cut, or weld uncleaned drums.
Send to drum recoverer or metal reclaimer.

SECTION 14: Transport information

14.1 UN number

- ADR : UN 2053
RID : UN 2053
IMDG : UN 2053
IATA : UN 2053

14.2 UN proper shipping name

- ADR : METHYL ISOBUTYL CARBINOL
RID : METHYL ISOBUTYL CARBINOL
IMDG : METHYL ISOBUTYL CARBINOL
IATA : Methyl isobutyl carbinol

14.3 Transport hazard class(es)

- ADR : 3

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RID : 3

IMDG : 3

IATA : 3

14.4 Packing group

ADR

Packing group : III

Classification Code : F1

Hazard Identification Number : 30

Labels : 3

RID

Packing group : III

Classification Code : F1

Hazard Identification Number : 30

Labels : 3

IMDG

Packing group : III

Labels : 3

IATA

Packing group : III

Labels : 3

14.5 Environmental hazards

ADR

Environmentally hazardous : no

RID

Environmentally hazardous : no

IMDG

Marine pollutant : no

14.6 Special precautions for user

Remarks : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollution category : Z

Ship type : 3

Product name : Methyl amyl alcohol

Special precautions : Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

Additional Information : This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined

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space entry.

SECTION 15: Regulatory information

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

Other regulations : The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Regulations on the health and safety precautions for chemicals in the workplace. Regulations on the fire protection of buildings. Regulations on the prevention of industrial accidents and the reduction of their effects.

The components of this product are reported in the following inventories:

AICS : Listed

DSL : Listed

IECSC : Listed

ENCS : Listed

KECI : Listed

PICCS : Listed

EINECS : Listed

TSCA : Listed

SECTION 16: Other information

SDS Author

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Certified Qualification date : 25 May 2015

Certificate number : GBF-1921

Further information

Training advice : Provide adequate information, instruction and training for operators.

Other information : A vertical bar (|) in the left margin indicates an amendment from the previous version.

Revision changes: Revised according to regulation on Safety Data Sheets (SDSs) regarding hazardous substances and mixtures (R.G. 13/12/2014-29204)

Sources of key data used to compile the Safety Data Sheet : The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID data base, EC 1272 regulation, etc).

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

TR / EN