1. PRODUCT AND COMPANY IDENTIFICATION

Product name: DTBP
CAS-No.: 110-05-4

Recommended use of the chemical and restrictions on use
Recommended use: polymerisation initiators

Manufacturer or supplier's details
Company: United Initiators GmbH
Address: Dr.-Gustav-Adolph-Str. 3
82049 Pullach 09

Emergency telephone number: +49 / 89 / 74422 – 0 (24 h)
E-mail address: contact@united-in.com

2. HAZARDS IDENTIFICATION

GHS Classification
Flammable liquids: Category 2
Organic peroxides: Type E
Germ cell mutagenicity: Category 2
Chronic aquatic toxicity: Category 3

GHS label elements
Hazard pictograms:

Signal word: Danger

Hazard statements:
H225 Highly flammable liquid and vapour.
H242 Heating may cause a fire.
H341 Suspected of causing genetic defects.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements: Prevention:
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.  
P220 Keep/Store away from clothing/ strong acids, bases, heavy metal salts and other reducing substances /combustible materials.
P233 Keep container tightly closed. 
P234 Keep only in original container. 
P240 Ground/bond container and receiving equipment.  
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.  
P242 Use only non-sparking tools.  
P243 Take precautionary measures against static discharge.  
P273 Avoid release to the environment.  
P280 Wear protective gloves/ eye protection/ face protection.  
P281 Use personal protective equipment as required.  

Response:  
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P370 + P378 In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction.  

Storage:  
P405 Store locked up.  
P410 Protect from sunlight.  
P411 + P235 Store at temperatures not exceeding < 40 °C/ < 104 °F. Keep cool.  
P420 Store away from other materials.  

Disposal:  
P501 Dispose of contents and container according to wastes control act.  

Other hazards which do not result in classification  
Vapours may form explosive mixture with air.  

3. COMPOSITION/INFORMATION ON INGREDIENTS  
Substance / Mixture : Substance  
Chemical nature : Organic Peroxide
definition  

Components  

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common Name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Di-tert-butyl peroxide</td>
<td>Di-tert-butyl peroxide</td>
<td>110-05-4</td>
<td>&gt;= 99 - &lt;= 100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES  
General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance. Do not leave the victim unattended. Call a physician immediately.

In case of eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

In case of skin contact: Wash contaminated clothing before re-use. If on skin, rinse well with water. If on clothes, remove clothes. If symptoms persist, call a physician.

If inhaled: If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician. If breathed in, move person into fresh air.

If swallowed: Keep respiratory tract clear. Call a physician immediately.

Most important symptoms and effects, both acute and delayed: Suspected of causing genetic defects.

Protection of first-aiders: First Aid responders should pay attention to self-protection and use the recommended protective clothing.

Notes to physician: Treat symptomatically and supportively.

5. FIREFIGHTING MEASURES

Suitable and unsuitable extinguishing media

Suitable extinguishing media: Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

Unsuitable extinguishing media: High volume water jet

Specific hazards during firefighting: Contact with incompatible materials or exposure to temperatures exceeding SADT may result in a self-accelerating decomposition reaction with release of flammable vapors which may auto-ignite. The product burns violently. Flash back possible over considerable distance. Vapours may form explosive mixtures with air. The product will float on water and can be reignited on surface water. Cool closed containers exposed to fire with water spray.
Specific extinguishing methods: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Do not use a solid water stream as it may scatter and spread fire.
Remove undamaged containers from fire area if it is safe to do so.
Use water spray to cool unopened containers.

Special protective equipment for firefighters: Wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Follow safe handling advice and personal protective equipment recommendations. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. Never return spills in original containers for re-use. Treat recovered material as described in the section "Disposal considerations".

Environmental precautions: Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up: Contact with incompatible substances can cause decomposition at or below SADT. Clear spills immediately. Suppress (knock down) gases/vapours/mists with a water spray jet. To clean the floor and all objects contaminated by this material, use plenty of water. Soak up with inert absorbent material. Isolate waste and do not reuse. Non-sparking tools should be used. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.

7. HANDLING AND STORAGE
Technical measures: See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Advice on protection against fire and explosion: Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Keep away from heat and sources of ignition. Use only explosion-proof equipment. Keep away from combustible material.

Advice on safe handling: Do not breathe vapours/dust.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
Avoid formation of aerosol.
Take precautionary measures against static discharges.
Never return any product to the container from which it was originally removed.
Provide sufficient air exchange and/or exhaust in work rooms.
Avoid confinement.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Smoking, eating and drinking should be prohibited in the application area.
Wash thoroughly after handling.
For personal protection see section 8.
Protect from contamination.

Conditions for safe storage: Avoid impurities (e.g. rust, dust, ash), risk of decomposition.
Electrical installations / working materials must comply with the technological safety standards.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Store in original container.
Keep containers tightly closed in a cool, well-ventilated place.
Store in accordance with the particular national regulations.

Materials to avoid: Keep away from strong acids, bases, heavy metal salts and other reducing substances.

Recommended storage temperature: < 40 °C

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

Engineering measures: Minimize workplace exposure concentrations.

Personal protective equipment
Respiratory protection: In the case of dust or aerosol formation use respirator with an approved filter.

Filter type: ABEK-filter
Eye protection: Tightly fitting safety goggles. Please wear suitable protective goggles. Also wear face protection if there is a splash hazard. Ensure that eyewash stations and safety showers are close to the workstation location.

Hand protection:
- Material: butyl-rubber
- Break through time: $\geq 480$ min
- Glove thickness: 0.5 mm

Remarks:
Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Skin and body protection:
Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.

Hygiene measures:
Keep away from food and drink. When using do not eat or drink. When using do not smoke. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>liquid</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>aromatic</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>$&lt;-25 \ ^\circ C$</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>Decomposition: Decomposes below the boiling point.</td>
</tr>
<tr>
<td>Flash point</td>
<td>$0 \ ^\circ C$ Method: ISO 3679</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET
DTBP

Upper/Lower explosion limit
Upper explosion limit : No data available
Lower explosion limit : No data available
Vapour pressure : 25 hPa (20 °C)
Solubility(ies)
Water solubility : 0.171 g/l (20 °C) insoluble
Relative vapour density : No data available
Density : 0.79 g/cm³ (20 °C)
Partition coefficient: n-octanol/water : log Pow: 3.2 (20 °C)
Self-Accelerating decomposition temperature (SADT) : 80 °C
Method: UN-Test H.4
SADT-Self Accelerating Decomposition Temperature. Lowest temperature at which the tested package size will undergo a self-accelerating decomposition reaction.

Viscosity
Viscosity, dynamic : 0.8 mPa.s (20 °C)
Explosive properties : Not explosive
Oxidizing properties : The substance or mixture is not classified as oxidizing. Organic peroxide

10. STABILITY AND REACTIVITY
Chemical stability and possibility of hazardous reactions : Stable under recommended storage conditions. Stable under recommended storage conditions. Vapours may form explosive mixture with air.
Conditions to avoid : Protect from contamination. Contact with incompatible substances can cause decomposition at or below SADT. Heat, flames and sparks. Avoid confinement.
Incompatible materials : Accelerators, strong acids and bases, heavy metals and heavy metal salts, reducing agents
Hazardous decomposition products : Irritant, caustic, flammable, noxious/toxic gases and vapours can develop in the case of fire and decomposition
11. TOXICOLOGICAL INFORMATION

Health hazard information

Acute toxicity
Not classified based on available information.

Product:
Acute oral toxicity : LD50 (Rat, female): > 2,000 mg/kg
Method: OECD Test Guideline 423
Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity : LC50 (Rat, male and female): > 22 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 436
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Components:

Di-tert-butyl peroxide:
Acute oral toxicity : LD50 (Rat, female): > 2,000 mg/kg
Method: OECD Test Guideline 423
Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity : LC50 (Rat, male and female): > 22 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 436
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Not classified based on available information.

Product:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Components:

Di-tert-butyl peroxide:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation
Not classified based on available information.

Product:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Components:

Di-tert-butyl peroxide:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Respiratory or skin sensitisation

Skin sensitisation
Not classified based on available information.

Respiratory sensitisation
Not classified based on available information.

Product:
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.

Components:

Di-tert-butyl peroxide:
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.

Carcinogenicity
Not classified based on available information.

Product:
Remarks: This information is not available.

Components:

Di-tert-butyl peroxide:
Remarks: This information is not available.
Germ cell mutagenicity
Suspected of causing genetic defects.

**Product:**
Genotoxicity in vitro : Test Type: Ames test
Result: negative

**Components:**
**Di-tert-butyl peroxide:**
Genotoxicity in vitro : Method: OECD Test Guideline 471
Result: negative

: Method: OECD Test Guideline 476
Result: negative

Genotoxicity in vivo : Species: Rat (male)
Method: OECD Test Guideline 474
Result: negative

: Species: Mouse (male)
Method: OECD Test Guideline 483
Result: negative

Germ cell mutagenicity- Assessment : Positive result(s) from in vivo mammalian somatic cell mutagenicity tests.

**Reproductive toxicity**
Not classified based on available information.

**STOT - single exposure**
Not classified based on available information.

**STOT - repeated exposure**
Not classified based on available information.

**Repeated dose toxicity**

**Product:**
Species: Rat, male and female
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Oral
Exposure time: 28 d
Method: OECD Test Guideline 422

**Components:**
**Di-tert-butyl peroxide:**
Species: Rat, male and female
NOAEL: 100 mg/kg
Application Route: Oral
SAFETY DATA SHEET

DTBP

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date:</th>
<th>SDS Number:</th>
<th>Print Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>2018/03/16</td>
<td>600000000009</td>
<td>2018/03/16</td>
</tr>
</tbody>
</table>

Method: OECD Test Guideline 422

**Aspiration toxicity**
Not classified based on available information.

**Components:**

**Di-tert-butyl peroxide:**
No data available

**Further information**

**Product:**
Remarks: Solvents may degrease the skin.

---

12. ECOLOGICAL INFORMATION

**Ecotoxicity**

**Product:**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Endpoint</th>
<th>Exposure</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to fish</td>
<td>LC50</td>
<td>1,000 mg/l</td>
<td>96 h</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OECD Test Guideline 203</td>
</tr>
<tr>
<td>Toxicity to daphnia and other</td>
<td>EC50</td>
<td>73.1 mg/l</td>
<td>48 h</td>
</tr>
<tr>
<td>aquatic invertebrates</td>
<td></td>
<td></td>
<td>OECD Test Guideline 202</td>
</tr>
<tr>
<td>Toxicity to algae</td>
<td>EC50</td>
<td>36 mg/l</td>
<td>72 h</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OECD Test Guideline 201</td>
</tr>
<tr>
<td></td>
<td>NOEC</td>
<td>15 mg/l</td>
<td>72 h</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OECD Test Guideline 201</td>
</tr>
<tr>
<td>Toxicity to microorganisms</td>
<td>EC50</td>
<td>1,000 mg/l</td>
<td>0.5 h</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OECD Test Guideline 209</td>
</tr>
</tbody>
</table>

**Components:**

**Di-tert-butyl peroxide:**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Endpoint</th>
<th>Exposure</th>
<th>Method</th>
</tr>
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<tbody>
<tr>
<td>Toxicity to fish</td>
<td>LC50</td>
<td>1,000 mg/l</td>
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<td></td>
<td></td>
<td>OECD Test Guideline 203</td>
</tr>
<tr>
<td>Toxicity to daphnia and other</td>
<td>EC50</td>
<td>73.1 mg/l</td>
<td>48 h</td>
</tr>
<tr>
<td>aquatic invertebrates</td>
<td></td>
<td></td>
<td>OECD Test Guideline 202</td>
</tr>
</tbody>
</table>
Toxicity to algae:
EC50 (Pseudokirchneriella subcapitata (green algae)): 36 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 15 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms:
EC50 (Bacteria): 1,000 mg/l
Exposure time: 0.5 h
Method: OECD Test Guideline 209

Persistence and degradability
Product:
Biodegradability: Result: Not readily biodegradable.

Components:
Di-tert-butyl peroxide:
Biodegradability: Result: Not readily biodegradable.

Bioaccumulative potential
Product:
Bioaccumulation: Bioconcentration factor (BCF): 60.03

Components:
Di-tert-butyl peroxide:
Bioaccumulation: Bioconcentration factor (BCF): 60.03

Log Pow: 3.2

Mobility in soil
No data available

Other adverse effects
Product:
Additional ecological information:
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: The product should not be allowed to enter drains, water
courses or the soil.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Dispose of wastes in an approved waste disposal facility.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.
Do not burn, or use a cutting torch on, the empty drum.
Dispose of in accordance with local regulations.

Disposal precautions
Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

International Regulations

UNRTDG
UN number : UN 3107
Proper shipping name : ORGANIC PEROXIDE TYPE E, LIQUID (Di-tert-BUTYL PEROXIDE)
Class : 5.2
Packing group : Not assigned by regulation
Labels : 5.2

IATA-DGR
UN/ID No. : UN 3107
Proper shipping name : Organic peroxide type E, liquid (Di-tert-Butyl peroxide)
Class : 5.2
Packing group : Not assigned by regulation
Labels : Organic Peroxides, Keep Away From Heat
Packing instruction (cargo aircraft) : 570
Packing instruction (passenger aircraft) : 570

IMDG-Code
UN number : UN 3107
Proper shipping name : ORGANIC PEROXIDE TYPE E, LIQUID (Di-tert-BUTYL PEROXIDE)
Class : 5.2
Packing group : Not assigned by regulation
Labels : 5.2
EmS Code : F-J, S-R
Marine pollutant : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations
Refer to section 15 for specific national regulation.

Special precautions for user
Not applicable
15. REGULATORY INFORMATION

National regulatory information

Regulation under the Occupational Safety and Health Act
Harmful Substances Prohibited from Manufacturing
Not applicable
Harmful Substances Required Permission for Manufacture
Not applicable
Harmful Agents to be kept below Occupational Exposure Limits
Not applicable
Harmful Agents Required to be kept below Permission Levels
Not applicable
Hazardous substances requiring management
Not applicable
Controlled Substances Subject to Environment Monitoring
Not applicable
Controlled Substances Subject to Health Examination
Not applicable
Regulation under the Chemical Control Act
Toxic Chemicals
Not applicable
Restricted Chemicals
Not applicable
Prohibited Chemicals
Not applicable
Toxic Release Inventory
Not applicable
Accident Precaution Chemicals
Not applicable
Dangerous Substances Safety Management Act
Classification : Group 4, Flammable liquids, Type 1 petroleums, Water insoluble liquid
Hazard rank : Hazardous rank II
Designated Quantity : 200 litre
Safety Warning : Keep away from fire
15.

16. OTHER INFORMATION

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; CPR - Controlled Products Regulations; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of
SAFETY DATA SHEET

DTBP

Version 1.1  Revision Date: 2018/03/16  SDS Number: 600000000009  Print Date: 2018/03/16

Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Issuing date : 600000000009

Revision number and date

Number of Revision : 1.1
Revision Date : 2018/03/16
Date format : yyyy/mm/dd

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.

KR / EN