SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012  Revision Date: 18.07.2012  Page: 1 of 13  Version: 3.0

Commercial Product Name: TBHP-70-AQ (Packaging)

1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product Information
- Commercial Product Name: TBHP-70-AQ (Packaging)
- Chemical Name: tert-butyl hydroperoxide
- CAS-No.: 75-91-2
- EC-No.: 200-915-7
- Registration number: 01-2119446670-40-0001

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

Use of the Substance/Mixture: polymerisation initiators, Oxidizing agents

1.3 Details of the supplier of the safety data sheet

Company: United Initiators GmbH & Co. KG
- Dr. Gustav-Adolph-Str. 3
- 82049 Pullach
- Germany

E-mail address: contact@united-in.com

1.4 Emergency telephone number

+49 / 89 / 744222 – 0

In case of an emergency in the United States, contact:

For chemical Emergency ONLY call CHEMTREC: 1-800-424-9300

For ALL other inquiries about this product call:

United Initiators Inc.
555 Garden Street, Elyria Ohio 44035 at 1 (440) 323-3112

2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

- Flammable liquids, Category 3
- Organic peroxides, Type F
- Acute toxicity, Category 4
- Acute toxicity, Category 2
- Acute toxicity, Category 3
- Skin corrosion, Category 1C
- Serious eye damage, Category 1
- Skin sensitization, Category 1
- Germ cell mutagenicity, Category 2
- Chronic aquatic toxicity, Category 2

Classification (67/548/EEC, 1999/45/EC)

H226: Flammable liquid and vapour.
H242: Heating may cause a fire.
H302: Harmful if swallowed.
H330: Fatal if inhaled.
H311: Toxic in contact with skin.
H314: Causes severe skin burns and eye damage.
H317: May cause an allergic skin reaction.
H341: Suspected of causing genetic defects.
H411: Toxic to aquatic life with long lasting effects.
SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012 Revision Date: 18.07.2012 Page 2 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)

<table>
<thead>
<tr>
<th>Oxidising</th>
<th>R 7: May cause fire.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable</td>
<td>R10: Flammable.</td>
</tr>
<tr>
<td>Harmful</td>
<td>R21/22: Harmful in contact with skin and if swallowed.</td>
</tr>
<tr>
<td></td>
<td>R68: Possible risk of irreversible effects.</td>
</tr>
<tr>
<td>Corrosive</td>
<td>R34: Causes burns.</td>
</tr>
<tr>
<td>Dangerous for the environment</td>
<td>R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.</td>
</tr>
<tr>
<td>Sensitisng</td>
<td>R43: May cause sensitization by skin contact.</td>
</tr>
<tr>
<td>Toxic</td>
<td>R23: Toxic by inhalation.</td>
</tr>
</tbody>
</table>

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms:

Signal word: Danger

Hazard statements:

- H226: Flammable liquid and vapour.
- H242: Heating may cause a fire.
- H302: Harmful if swallowed.
- H311: Toxic in contact with skin.
- H314: Causes severe skin burns and eye damage.
- H317: May cause an allergic skin reaction.
- H330: Fatal if inhaled.
- H341: Suspected of causing genetic defects.
- H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

Prevention:

- 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.
- P235: Keep cool.
- P260: Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
- P262: Do not get in eyes, on skin, or on clothing.
- P273: Avoid release to the environment.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012  Revision Date: 18.07.2012  Page 3 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)

DE / EN  Version: 3.0

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P315  Get immediate medical advice/attention.
P362  Take off contaminated clothing and wash before reuse.
P378  Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:
P403 + P233  Store in a well-ventilated place. Keep container tightly closed.

Disposal:
P501  Dispose of contents/container to an approved waste disposal plant.

Labelling according to EC Directives: 1999/45/EC

Hazard symbols

<table>
<thead>
<tr>
<th>Toxic</th>
<th>Oxidising</th>
<th>Dangerous for the environment</th>
</tr>
</thead>
</table>

R-phrase(s)

R7  May cause fire.
R10  Flammable.
R21/22  Harmful in contact with skin and if swallowed.
R23  Toxic by inhalation.
R34  Causes burns.
R43  May cause sensitization by skin contact.
R51/53  Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R68  Possible risk of irreversible effects.

S-phrase(s)

S3/7  Keep container tightly closed in a cool place.
S14  Keep away from strong acids, bases, heavy metal salts and other reducing substances.
S24  Avoid contact with skin.
S26  In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37/39  Wear suitable protective clothing, gloves and eye/face protection.
S45  In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S50  Do not mix with activators and catalyst promoters.
S61  Avoid release to the environment. Refer to special instructions/ Safety data sheets.
2.3 Other hazards
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

3. Composition/information on ingredients
3.1 Substances
Chemical nature: 70%
Aqueous solution

The product is a chemical substance within the meaning of the REACH Regulation (1907/2006/EC). The following table contains the main constituent at the top.
Further dangerous ingredients are mentioned when it is necessary in accordance with Appendix II No. 3.1 of the REACH Regulation.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-butyl hydroperoxide</td>
<td>75-91-2</td>
<td>200-915-7</td>
<td></td>
</tr>
</tbody>
</table>

4. First aid measures
4.1 Description of first aid measures
General advice: Take off all contaminated clothing immediately. Never give anything by mouth to an unconscious person. Remove from exposure, lie down. In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

If inhaled: Remove to fresh air. Call a physician immediately.

In case of skin contact: Wash off immediately with soap and plenty of water.

In case of eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

If swallowed: Clean mouth with water and drink afterwards plenty of water. If a person vomits when lying on his back, place him in the recovery position. Do NOT induce vomiting. If swallowed, seek medical advice immediately and show this container or label.

4.2 Most important symptoms and effects, both acute and delayed
no data available

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. Firefighting measures
5.1 Extinguishing media
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012  Revision Date: 18.07.2012  Page 5 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)
DE / EN  Version: 3.0

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media : High volume water jet

5.2 Special hazards arising from the substance or mixture
Specific hazards during firefighting : Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses.

5.3 Advice for firefighters
Special protective equipment for firefighters : Use personal protective equipment.
Further information : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Wear personal protective equipment.

6.2 Environmental precautions
Avoid subsoil penetration. Do not allow material to contaminate ground water system. Do not contaminate water. If the product contaminates rivers and lakes or drains inform respective authorities. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Remove mechanically and with care (e.g. with clean polyethylene plastic shovel). Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations.

6.4 Reference to other sections
see chapter. 7, 8, 11, 12 and 13

6.5 Other information
Never add other substances or waste material to product residue. Move product residue to a safe place and dispose of properly.

7. Handling and storage

7.1 Precautions for safe handling
Advice on safe handling : For personal protection see section 8.
Dust explosion class : no data available

7.2 Conditions for safe storage, including any incompatibilities
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012  Revision Date: 18.07.2012  Page 6 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)

DE / EN  Version: 3.0

Requirements for storage areas and containers: 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. Keep container tightly closed. No smoking.

Further information on storage conditions: Avoid impurities (e.g. rust, dust, ash), risk of decomposition.

Advice on common storage: Store apart from other dangerous and incompatible substances.

| Storage temperature | 2 - 35 °C |
| Other data          | Storing temperature for reasons of quality Crystal build-up below 0 °C |

7.3 Specific end uses
no data available

8. Exposure controls/personal protection

8.1 Control parameters
Contains no substances with occupational exposure limit values.

Other information on limit values: see chapter 16

8.2 Exposure controls

Engineering measures
Provide adequate ventilation.

Personal protective equipment

Respiratory protection: Short duration filter unit: Filter A

Hand protection
Material: butyl-rubber
Glove thickness: 0.5 mm
Break through time: >= 8 h
Remarks: Skin should be washed after contact.

Eye protection: Tightly fitting safety goggles
Face protection
# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012  Revision Date: 18.07.2012  Page 7 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)

DE / EN  Version: 3.0

| Skin and body protection                                      | Protective suit  
|                                                              | Remove and wash contaminated clothing before re-use. |
| Hygiene measures                                              | Wash hands before breaks and immediately after handling the product.  
|                                                              | Keep away from food, drink and animal feedingstuffs. |

## Environmental exposure controls

**General advice**

- Avoid subsoil penetration.
- Do not allow material to contaminate ground water system.
- Do not contaminate water.
- If the product contaminates rivers and lakes or drains inform respective authorities.
- Do not let product enter drains.

### 9. Physical and chemical properties

#### 9.1 Information on basic 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>characteristic</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>Not relevant</td>
</tr>
<tr>
<td>pH</td>
<td>no data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>&lt; 0 °C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range range</td>
<td>Crystal build-up below 0 °C</td>
</tr>
</tbody>
</table>
| Flash point                                   | 38 °C  
| Method: ISO 3679, Seta-Flash                  |       |
| Evaporation rate                              | Not relevant |
| Flammability (solid, gas)                     | not applicable |
| Lower explosion limit                         | not applicable |
| Upper explosion limit                         | not applicable |
| Vapour pressure                               | 5.078 Pa at 25 °C |
| Relative vapour density                       | no data available |
| Density                                       | 0.93 g/cm3 at 20 °C |
| Water solubility                              | 691 g/l at 20 °C |
| Partition coefficient: n-octanol/water        | log Pow: 0.85 at 20 °C |
| Solubility in other solvents                  | no data available |
| Autoignition temperature                      | not applicable, Decomposes on heating. |
SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012
Revision Date: 18.07.2012
Page 8 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)

DE / EN Version: 3.0

Decomposition temperature : > 80 °C, SADT (UN test H.4), SADT possible at temperatures above approximately 80 °C.
Viscosity, dynamic : 4.1 mPa.s at 20 °C
Viscosity, kinematic : no data available
Explosive properties : no data available
Oxidizing properties : Organic peroxide

9.2 Other information
Ignition temperature : not applicable
Refraction index : 1.387
at 20 °C

10. Stability and reactivity

10.1 Reactivity
Stable under recommended storage conditions.

10.2 Chemical stability
Contact with incompatible substances can cause disintegration at or below SADT.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.
Stability: Stable under recommended storage conditions.

10.4 Conditions to avoid
Keep away from heat and sources of ignition.

10.5 Incompatible materials
Materials to avoid : Accelerators, strong acids and bases, heavy metals and heavy metal salts, reducing agents, Avoid impurities (e.g. rust, dust, ash), risk of decomposition.

10.6 Hazardous decomposition products
Hazardous decomposition products : Irritant, caustic, flammable, noxious/toxic gases and vapours can develop in the case of fire and decomposition
Thermal decomposition : > 80 °C
Method: SADT (UN test H.4)
Note: SADT possible at temperatures above approximately 80 °C.

11. Toxicological information

11.1 Information on toxicological effects
Acute toxicity
# SAFETY DATA SHEET

(according to Regulation (EC) No. 1907/2006)

Print Date: 18.07.2012  
Revision Date: 18.07.2012  
Page 9 of 13  

Commercial Product Name: TBHP-70-AQ (Packaging)

<table>
<thead>
<tr>
<th>DE / EN</th>
<th>Version: 3.0</th>
</tr>
</thead>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **Acute oral toxicity**     | LD50 rat: 560 mg/kg  
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution |
| **Acute inhalation toxicity** | LC50 rat: 1.85 mg/l  
Exposure time: 4 h  
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution  
Note: Aerosol |
| **Acute dermal toxicity**   | LD50 rabbit: 440 mg/kg  
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution |
| **Skin corrosion/irritation** |               |
| **Skin irritation**         | Causes burns. |
| **Serious eye damage/eye irritation** |               |
| **Eye irritation**          | Causes burns. |
| **Respiratory or skin sensitization** |               |
| **Sensitisation**           | Classification: May cause sensitization by skin contact.  
Result: Causes sensitization.  
Method: Maximisation Test  
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution |
| **Germ cell mutagenicity**  |               |
| **Genotoxicity in vitro**   | Type: Ames test  
Result: Mutagenic |
| **Carcinogenicity**         |               |
| **Remarks**                 | Mutagenicity:  
In vitro tests showed mutagenic effects |
| **Reproductive toxicity**   | no data available |
| **Teratogenicity**          | no data available |
| **STOT - single exposure**  | no data available |
| **STOT - repeated exposure** |               |
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012 Revision Date: 18.07.2012 Page 10 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)

DE / EN Version: 3.0

no data available

Aspiration hazard
Aspiration toxicity
no data available

Further information
tert-butyl hydroperoxide: Ingestion of aqueous solution causes gastrointestinal burns. Ingestion causes burns of the upper digestive and respiratory tracts.

12. Ecological information

12.1 Toxicity

Toxicity to fish
LC50 (Pimephales promelas (fathead minnow)): 29.61 mg/l
Exposure time: 96 h
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution

Toxicity to daphnia and other aquatic invertebrates
EC50 (Daphnia): 14 mg/l
Exposure time: 48 h
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution

Toxicity to algae
EC50 (Pseudokirchneriella subcapitata): 1.47 mg/l
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution
NOEC (Pseudokirchneriella subcapitata): 0.22 mg/l
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution

Toxicity to bacteria
EC50 (Bacteria): 17 mg/l
Exposure time: 30 min
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution

12.2 Persistence and degradability

Biodegradability
Result: Not readily biodegradable.
Method: Closed Bottle Test
Test substance: tert-butyl hydroperoxide (TBHP), 70%, aqueous solution

12.3 Bioaccumulative potential
no data available
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Print Date: 18.07.2012 Revision Date: 18.07.2012 Page 11 of 13

Commercial Product Name: TBHP-70-AQ (Packaging)

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).

12.6 Other adverse effects
no data available

13. Disposal considerations

13.1 Waste treatment methods
Advice on disposal and packing: Disposal:
Dispose of in conjunction with appropriate waste disposal authorities
and in accordance with disposal regulations.
Waste codes should be assigned by the user based on the application
for which the product was used.

14. Transport information

ADR
UN number: 3109
Description of the goods: ORGANIC PEROXIDE TYPE F, LIQUID (tert-BUTYL HYDROPEROXIDE)
Class: 5.2
Packing group: --
Classification Code: P1
Hazard identification No: 539
Labels: 5.2 (8)
Limited quantity: LQ16
Tunnel restriction code: (D)
Environmentally hazardous: yes

RID
UN number: 3109
Description of the goods: ORGANIC PEROXIDE TYPE F, LIQUID (tert-BUTYL HYDROPEROXIDE)
Class: 5.2
Packing group: --
Classification Code: P1
Hazard identification No: 539
Labels: 5.2 (8)
Limited quantity: LQ16
Environmentally hazardous: yes
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Commercial Product Name: TBHP-70-AQ (Packaging)

IATA
UN number : 3109
Description of the goods : Organic peroxide type F, liquid (tert-Butyl hydroperoxide)
Class : 5.2
Packing group : --
Labels : 5.2 (HEAT, 8)
Packing instruction (cargo aircraft) : 570
Environmentally hazardous : no
Packing instruction (passenger aircraft) : 570

IMDG
UN number : 3109
Description of the goods : ORGANIC PEROXIDE TYPE F, LIQUID (tert-BUTYL HYDROPEROXIDE)
Class : 5.2
Packing group : --
Labels : 5.2 (8)
EmSNNumber 1 : F-J
EmS Number 2 : S-R
Marine pollutant : yes

Special precautions for user
see chapter: 6, 7 and 8

15. Regulatory information

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

National legislation
Water contaminating class (Germany) : WGK 3 (highly water endangering)
VwVwS (German water pollution authority), appendix 4
Other regulations : BGV B4 organische Peroxide. (German regulatory requirements)
BG-Merkblatt M001 beachten (German regulatory requirements)
Produkt unterliegt nicht dem Sprengstoffgesetz (SprengS). (German regulatory requirements) Take note of Dir 92/85/EEC on the safety and health at work of pregnant workers. Take note of Dir 94/33/EC on the protection of young people at work. Störfallverordnung Anhang I (German regulatory requirements)
Gefahrengruppe nach § 3 BGV B4: (German regulatory requirements) II (German regulatory requirements)

15.2 Chemical Safety Assessment
no data available
16. Other information

Full text of R-phrases referred to under sections 2 and 3

R 7 May cause fire.
R 10 Flammable.
R21/22 Harmful in contact with skin and if swallowed.
R23 Toxic by inhalation.
R34 Causes burns.
R43 May cause sensitization by skin contact.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R68 Possible risk of irreversible effects.

Full text of H-Statements referred to under sections 2 and 3.

H226 Flammable liquid and vapour.
H242 Heating may cause a fire.
H302 Harmful if swallowed.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H330 Fatal if inhaled.
H341 Suspected of causing genetic defects.
H411 Toxic to aquatic life with long lasting effects.

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.