SAFETY DATA SHEET

DTBP

Version 1.2
Revision Date: 03/16/2018
SDS Number: 600000000009
Print Date: 03/16/2018

SECTION 1. IDENTIFICATION

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

Manufacturer or supplier's details
Company name of supplier : United Initiators, Inc.
Address : 555 Garden Street
Elyria OH 44035
Telephone : +1-440-323-3112
Telefax : +1-440-323-2659
Emergency telephone : CHEMTREC US (24h): +1-800-424-9300
CHEMTREC WORLD (24h): +1-703-527-3887
E-mail address of person responsible for the SDS : cs-initiators.nafta@united-in.com

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

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the Hazardous Products Regulations
Flammable liquids : Category 2
Organic peroxides : Type E
Germ cell mutagenicity : Category 2
Acute aquatic toxicity : Category 3
Chronic aquatic toxicity : Category 3

GHS label elements
Hazard pictograms : 

Signal Word : Danger
Hazard Statements : H225 Highly flammable liquid and vapor.
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, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P234 Keep only in original packaging.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof electrical/ventilating/lighting/equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
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): Take off immediately all contaminated clothing. Rinse skin with water.
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 to extinguish.

Storage:
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P410 Protect from sunlight.
P411 Store at temperatures not exceeding < 40 °C/ < 104 °F.
P420 Store separately.

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

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substance / Mixture</th>
<th>Substance</th>
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<tr>
<td>Substance name</td>
<td>Di-tert-butyl peroxide</td>
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<tr>
<td>CAS-No.</td>
<td>110-05-4</td>
</tr>
<tr>
<td>Chemical nature</td>
<td>Organic Peroxide liquid</td>
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<table>
<thead>
<tr>
<th>Hazardous ingredients</th>
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<tr>
<td>Chemical name</td>
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SECTION 4. FIRST AID MEASURES

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

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.

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.

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.

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.

SECTION 5. FIRE-FIGHTING MEASURES

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

Unsuitable extinguishing media : High volume water jet

Specific hazards during fire fighting : 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. Vapors 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: 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.

Further information: 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.

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

SECTION 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 vapors accumulating to form explosive concentrations. Vapors 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/vapors/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.

SECTION 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 vapors). 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 vapors/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

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients 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

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. Wash hands before breaks and at the end of workday.

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.

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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: liquid
Color: colorless
Odor: aromatic
Odor Threshold: No data available
pH: No data available
Melting point/freezing point: $<-25 \, ^\circ C$
### Initial boiling point and boiling range
- **Decomposition:** Decomposes below the boiling point.

### Flash point
- **0 °C**
- **Method:** ISO 3679

### Evaporation rate
- **No data available**

### Flammability (solid, gas)
- **Not applicable**

### Upper explosion limit
- **No data available**

### Lower explosion limit
- **No data available**

### Vapor pressure
- **25 hPa (20 °C)**

### Relative vapor density
- **No data available**

### Density
- **0.79 g/cm³ (20 °C)**

### Water solubility
- **0.171 g/l (20 °C)**
- **Insoluble**

### 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
- **0.8 mPa.s (20 °C)**

### Explosive properties
- **Not explosive**

### Oxidizing properties
- The substance or mixture is not classified as oxidizing.
- **Organic peroxide**

### SECTION 10. STABILITY AND REACTIVITY

#### Reactivity
- **Stable under recommended storage conditions.**

#### Chemical stability
- **Stable under recommended storage conditions.**

#### Possibility of hazardous reactions
- **Vapors 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

SECTION 11. TOXICOLOGICAL 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: vapor
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

Ingredients:

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: vapor
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

**Ingredients:**
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

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

Respiratory or skin sensitization

Skin sensitization
Not classified based on available information.

Respiratory sensitization
Not classified based on available information.

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

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

Germ cell mutagenicity
Suspected of causing genetic defects.
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Product:
Genotoxicity in vitro : Test Type: Ames test
Result: negative

Ingredients:
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.

Carcinogenicity
Not classified based on available information.

Product:
Remarks: This information is not available.

Ingredients:
Di-tert-butyl peroxide:
Remarks: This information is not available.

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
**Ingredients:**

**Di-tert-butyl peroxide:**
Species: Rat, male and female  
NOAEL: 100 mg/kg  
Application Route: Oral  
Method: OECD Test Guideline 422

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

**Ingredients:**

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

**Further information**

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

**SECTION 12. ECOLOGICAL INFORMATION**

**Ecotoxicity**

**Product:**

**Toxicity to fish**
- LC50 (Poecilia reticulata (guppy)): 1,000 mg/l  
  Exposure time: 96 h  
  Method: OECD Test Guideline 203

**Toxicity to daphnia and other aquatic invertebrates**
- EC50 (Daphnia magna (Water flea)): 73.1 mg/l  
  Exposure time: 48 h  
  Method: OECD Test Guideline 202

**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

**Ingredients:**

**Di-tert-butyl peroxide:**
**Toxicity to fish**
- LC50 (Poecilia reticulata (guppy)): 1,000 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates:
- EC50 (Daphnia magna (Water flea)): 73.1 mg/l
  Exposure time: 48 h
  Method: OECD Test Guideline 202

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.

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

Bioaccumulative potential

**Product:**
- Bioaccumulation: Bioconcentration factor (BCF): 60.03

**Ingredients:**
- **Di-tert-butyl peroxide:**
  - Bioaccumulation: Bioconcentration factor (BCF): 60.03
  - Partition coefficient: n-octanol/water: 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.
SECTION 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.

SECTION 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.

Domestic regulation

TDG
UN number                  :  UN 3107
Proper shipping name      :  ORGANIC PEROXIDE TYPE E, LIQUID
(DI-tert-BUTYL PEROXIDE)
Class                      :  5.2
Packing group              :  II
Labels                     :  5.2
ERG Code                   :  145
Marine pollutant           :  no

SECTION 15. REGULATORY INFORMATION

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

DSL (CA)                    :  All components of this product are on the Canadian DSL
AICS (AU)                   :  On the inventory, or in compliance with the inventory
NZIoC (NZ)                  :  On the inventory, or in compliance with the inventory
ENCS (JP)                   :  On the inventory, or in compliance with the inventory
ISHL (JP)                   :  On the inventory, or in compliance with the inventory
KECI (KR)                   :  On the inventory, or in compliance with the inventory
PICCS (PH)                  :  On the inventory, or in compliance with the inventory
IECSC (CN)                  :  On the inventory, or in compliance with the inventory
TCSI (TW)                   :  On the inventory, or in compliance with the inventory
TSCA (US)                   :  On TSCA Inventory

Canadian lists
No substances are subject to a Significant New Activity Notification.

SECTION 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 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

Revision Date : 03/16/2018

The information provided in this Material 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.

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