

ALFAAA14708

## Di-tert-butyl dicarbonate

### SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**产品说明:**  
**Product Description:** 二碳酸二叔丁酯, 97+%  
**Di-tert-butyl dicarbonate**

**Cat No. :** A14708  
**Synonyms** BOC anhydride; DIBOC; Di-tert-butyl pyrocarbonate  
**CAS No** 24424-99-5  
**Molecular Formula** C<sub>10</sub> H<sub>18</sub> O<sub>5</sub>

**Supplier** Avocado Research Chemicals Ltd.  
 (Part of Thermo Fisher Scientific)  
 Shore Road, Heysham  
 Lancashire, LA3 2XY,  
 United Kingdom  
 Office Tel: +44 (0) 1524 850506  
 Office Fax: +44 (0) 1524 850608

**Emergency Telephone Number** For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11  
 Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99  
**CHEMTREC** Tel. No. **US**:001-800-424-9300 / **Europe**:001-703-527-3887

**E-mail address** begel.sdsdesk@thermofisher.com

**Recommended Use** Laboratory chemicals.  
**Uses advised against** No Information available

### SECTION 2. HAZARD IDENTIFICATION

**Physical State**  
 Solid Low melting solid

**Appearance**  
 White

**Odor**  
 No information available

#### Emergency Overview

Flammable solid. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage. Fatal if inhaled. May cause respiratory irritation. Moisture sensitive. May form combustible dust concentrations in air.

#### Classification of the substance or mixture

|  |            |
|--|------------|
| Flammable solids.                                  | Category 2 |
| Acute Inhalation Toxicity - Vapors                 | Category 1 |
| Skin Corrosion/Irritation                          | Category 2 |
| Serious Eye Damage/Eye Irritation                  | Category 1 |
| Skin Sensitization                                 | Category 1 |
| Specific target organ toxicity - (single exposure) | Category 3 |

#### Label Elements

## Di-tert-butyl dicarbonate



## Signal Word

## Danger

## Hazard Statements

H228 - Flammable solid  
H315 - Causes skin irritation  
H317 - May cause an allergic skin reaction  
H318 - Causes serious eye damage  
H330 - Fatal if inhaled  
H335 - May cause respiratory irritation

## Precautionary Statements

## Prevention

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking  
P240 - Ground and bond container and receiving equipment  
P264 - Wash face, hands and any exposed skin thoroughly after handling  
P271 - Use only outdoors or in a well-ventilated area  
P272 - Contaminated work clothing should not be allowed out of the workplace  
P280 - Wear protective gloves/protective clothing/eye protection/face protection  
P284 - Wear respiratory protection

## Response

P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing  
P310 - Immediately call a POISON CENTER or doctor  
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water  
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish  
P362 + P364 - Take off contaminated clothing and wash it before reuse

## Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed  
P405 - Store locked up

## Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

## Physical and Chemical Hazards

Flammable solid. Vapors may cause flash fire or explosion. May form combustible dust concentrations in air.

## Health Hazards

Causes skin irritation. May cause an allergic skin reaction. Fatal if inhaled. May cause respiratory irritation.

## Environmental hazards

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants. Will likely be mobile in the environment due to its volatility. The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces.

## Other Hazards

May form explosible dust-air mixture if dispersed. Toxic to terrestrial vertebrates. This product does not contain any known or suspected endocrine disruptors.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Component                                     | CAS No     | Weight % |
|---|------------|----------|
| Dicarmonic acid, bis(1,1-dimethylethyl) ester | 24424-99-5 | >95      |

## Di-tert-butyl dicarbonate

**SECTION 4. FIRST AID MEASURES****General Advice**

Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

**Eye Contact**

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

**Skin Contact**

Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

**Inhalation**

Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

**Ingestion**

Do NOT induce vomiting. Call a physician or poison control center immediately.

**Most important symptoms and effects**

None reasonably foreseeable. Causes severe eye damage. May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

**Self-Protection of the First Aider**

Use personal protective equipment as required.

**Notes to Physician**

Treat symptomatically.

**SECTION 5. FIRE-FIGHTING MEASURES****Suitable Extinguishing Media**

Water spray, carbon dioxide (CO<sub>2</sub>), dry chemical, alcohol-resistant foam.

**Extinguishing media which must not be used for safety reasons**

Water may be ineffective.

**Specific Hazards Arising from the Chemical**

Flammable. Very toxic by inhalation. Risk of ignition. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition. Fine dust dispersed in air may ignite.

**Protective Equipment and Precautions for Firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

**SECTION 6. ACCIDENTAL RELEASE MEASURES****Personal Precautions**

Avoid dust formation. Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

**Environmental Precautions**

Should not be released into the environment.

**Methods for Containment and Clean Up**

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Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

Refer to protective measures listed in Sections 8 and 13.

**SECTION 7. HANDLING AND STORAGE****Handling**

Wear personal protective equipment/face protection. Avoid dust formation. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance.

**Storage**

Keep container tightly closed in a dry and well-ventilated place. To maintain product quality: Keep refrigerated. Flammables area.

**Specific Use(s)**

Use in laboratories

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Control Parameters****Monitoring methods**

BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. MDHS70 General methods for sampling airborne gases and vapours MDHS 88 Volatile organic compounds in air. Laboratory method using diffusive samplers, solvent desorption and gas chromatography MDHS 96 Volatile organic compounds in air - Laboratory method using pumped solid sorbent tubes, solvent desorption and gas chromatography

**Exposure Controls****Engineering Measures**

Use only under a chemical fume hood. Use explosion-proof electrical/ventilating/lighting equipment. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

**Personal protective equipment****Eye Protection**

Goggles (European standard - EN 166)

**Hand Protection**

Protective gloves

| Glove material | Breakthrough time | Glove thickness | EU standard | Glove comments        |
|----------------|-------------------|-----------------|-------------|-----------------------|
| Natural rubber | See manufacturers | -               | EN 374      | (minimum requirement) |
| Nitrile rubber | recommendations   |                 |             |                       |
| Neoprene       |                   |                 |             |                       |
| PVC            |                   |                 |             |                       |

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

**Skin and body protection**

Long sleeved clothing

**Respiratory Protection**

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard

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EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Large scale/emergency use** Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced  
**Recommended Filter type:** Particulates filter conforming to EN 143

**Small scale/Laboratory use** Maintain adequate ventilation Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.  
**Recommended half mask:-** Particle filtering: EN149:2001

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

**Environmental exposure controls** No information available.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

|   |  |  |
|---|--|--|
| <b>Appearance</b>                               | White  |  |
| <b>Physical State</b>                           | Solid Low melting solid                        |  |
| <b>Odor</b>                                     | No information available                       |  |
| <b>Odor Threshold</b>                           | No data available                              |  |
| <b>pH</b>                                       | No information available                       |  |
| <b>Melting Point/Range</b>                      | 22 - 24 °C / 71.6 - 75.2 °F                    |  |
| <b>Softening Point</b>                          | No data available                              |  |
| <b>Boiling Point/Range</b>                      | 56 - 57 °C / 133 - 135 °F                      | @ 0.5 mmHg                               |
| <b>Flash Point</b>                              | 37 °C / 98.6 °F                                | <b>Method -</b> No information available |
| <b>Evaporation Rate</b>                         | Not applicable                                 | Solid                                    |
| <b>Flammability (solid,gas)</b>                 | No information available                       |  |
| <b>Explosion Limits</b>                         | No data available                              |  |
| <b>Vapor Pressure</b>                           | 1.33 hPa @ 70 °C                               |  |
| <b>Vapor Density</b>                            | Not applicable                                 | Solid                                    |
| <b>Specific Gravity / Density</b>               | 1.020  |  |
| <b>Bulk Density</b>                             | No data available                              |  |
| <b>Water Solubility</b>                         | No information available                       |  |
| <b>Solubility in other solvents</b>             | No information available                       |  |
| <b>Partition Coefficient (n-octanol/water)</b>  |  |  |
| <b>Component</b>                                | <b>log Pow</b>                                 |  |
| Dicarboxylic acid, bis(1,1-dimethylethyl) ester | 1.87   |  |
| <b>Autoignition Temperature</b>                 | 460 °C / 860 °F                                |  |
| <b>Decomposition Temperature</b>                | No data available                              |  |
| <b>Viscosity</b>                                | Not applicable                                 | Solid                                    |
| <b>Explosive Properties</b>                     | No information available                       |  |
| <b>Oxidizing Properties</b>                     | No information available                       |  |
| <b>Molecular Formula</b>                        | C <sub>10</sub> H <sub>18</sub> O <sub>5</sub> |  |
| <b>Molecular Weight</b>                         | 218.25   |  |

## SECTION 10. STABILITY AND REACTIVITY

**Stability** Moisture sensitive.

**Hazardous Reactions** None under normal processing.

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|                                 |   |
|---------------------------------|---|
| <b>Hazardous Polymerization</b> | Hazardous polymerization does not occur.  |
| <b>Conditions to Avoid</b>      | Avoid dust formation. Incompatible products. Excess heat. Exposure to moisture. Keep away from open flames, hot surfaces and sources of ignition. |
| <b>Materials to avoid</b>       | Acids. Bases. Reducing Agent.   |

**Hazardous Decomposition Products** Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>).

## SECTION 11. TOXICOLOGICAL INFORMATION

## Product Information

## (a) acute toxicity;

| Component                                     | LD50 Oral              | LD50 Dermal            | LC50 Inhalation                          |
|---|------------------------|------------------------|--|
| Dicarmonic acid, bis(1,1-dimethylethyl) ester | >5000 mg/kg ( Mammal ) | >2000 mg/kg ( Mammal ) | LC50 = 100 mg/m <sup>3</sup> ( Rat ) 4 h |

(b) skin corrosion/irritation; Category 2

(c) serious eye damage/irritation; Category 1

## (d) respiratory or skin sensitization;

## Respiratory

No data available

## Skin

Category 1

May cause sensitization by skin contact

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; Category 3

## Results / Target organs

Respiratory system

(i) STOT-repeated exposure; No data available

## Target Organs

No information available.

(j) aspiration hazard; Not applicable  
Solid

## Symptoms / effects, both acute and delayed

Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity effects** Do not empty into drains.

## Di-tert-butyl dicarbonate

**Persistence and Degradability****Persistence**

Persistence is unlikely, based on information available.

**Degradability**

Decomposes in contact with water.

**Degradation in sewage treatment plant**

Decomposes in contact with water.

**Bioaccumulative Potential**

Bioaccumulation is unlikely

| Component                                     | log Pow | Bioconcentration factor (BCF) |
|---|---------|-------------------------------|
| Dicarbonic acid, bis(1,1-dimethylethyl) ester | 1.87    | No data available             |

**Mobility in soil**

The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces. Will likely be mobile in the environment due to its volatility. Disperses rapidly in air.

**Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors.

**Persistent Organic Pollutant**

This product does not contain any known or suspected substance.

**Ozone Depletion Potential**

This product does not contain any known or suspected substance.

**SECTION 13. DISPOSAL CONSIDERATIONS****Waste from Residues/Unused Products**

Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

**Contaminated Packaging**

Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

**Other Information**

Waste codes should be assigned by the user based on the application for which the product was used. Do not flush to sewer. Can be landfilled or incinerated, when in compliance with local regulations. Do not empty into drains.

**SECTION 14. TRANSPORT INFORMATION****Road and Rail Transport****UN-No**

UN2930

**Proper Shipping Name**

Toxic solid, flammable, organic, n.o.s.

**Technical Shipping Name**

Dicarbonic acid, bis(1,1-dimethylethyl) ester

**Hazard Class**

6.1

**Subsidiary Hazard Class**

4.1

**Packing Group**

II

**IMDG/IMO****UN-No**

UN2930

**Proper Shipping Name**

Toxic solid, flammable, organic, n.o.s.

**Technical Shipping Name**

Dicarbonic acid, bis(1,1-dimethylethyl) ester

**Hazard Class**

6.1

**Subsidiary Hazard Class**

4.1

**Packing Group**

II

**IATA****UN-No**

UN2930

**Proper Shipping Name**

Toxic solid, flammable, organic, n.o.s.

**SAFETY DATA SHEET****Di-tert-butyl dicarbonate**

|                                |   |
|--------------------------------|---|
| <b>Technical Shipping Name</b> | Dicarmonic acid, bis(1,1-dimethylethyl) ester |
| <b>Hazard Class</b>            | 6.1   |
| <b>Subsidiary Hazard Class</b> | 4.1   |
| <b>Packing Group</b>           | II  |

**Special Precautions for User** No special precautions required

**SECTION 15. REGULATORY INFORMATION****International Inventories**

X = listed, China (IECSC), Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), Korea (KECL).

| Component                                     | The Inventory of Hazardous Chemicals (2015 Edition) | List of dangerous goods GB 12268 - 2012 | TCSI | IECSC | EINECS    | TSCA | DSL | PICCS | ENCS | ISHL | AICS | KECL     |
|---|---|---|------|-------|-----------|------|-----|-------|------|------|------|----------|
| Dicarmonic acid, bis(1,1-dimethylethyl) ester | -   | -                                       | X    | X     | 246-240-1 | X    | X   | X     | X    | X    | X    | KE-10019 |

**National Regulations****SECTION 16. OTHER INFORMATION**

**Prepared By** Health, Safety and Environmental Department  
**Creation Date** 26-Jun-2014  
**Revision Date** 26-Apr-2024  
**Revision Summary** New emergency telephone response service provider.

**Training Advice**

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

**Legend**

**CAS** - Chemical Abstracts Service

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

**PICCS** - Philippines Inventory of Chemicals and Chemical Substances

**IECSC** - Chinese Inventory of Existing Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

**ENCS** - Japanese Existing and New Chemical Substances

**AICS** - Australian Inventory of Chemical Substances

**NZIoC** - New Zealand Inventory of Chemicals

**WEL** - Workplace Exposure Limit

**ACGIH** - American Conference of Governmental Industrial Hygienists

**DNEL** - Derived No Effect Level

**RPE** - Respiratory Protective Equipment

**LC50** - Lethal Concentration 50%

**NOEC** - No Observed Effect Concentration

**PBT** - Persistent, Bioaccumulative, Toxic

**TWA** - Time Weighted Average

**IARC** - International Agency for Research on Cancer

**PNEC** - Predicted No Effect Concentration

**LD50** - Lethal Dose 50%

**EC50** - Effective Concentration 50%

**POW** - Partition coefficient Octanol:Water

**vPvB** - very Persistent, very Bioaccumulative



**Di-tert-butyl dicarbonate**

**ICAO/IATA** - International Civil Aviation Organization/International Air Transport Association

**ADR** - European Agreement Concerning the International Carriage of Dangerous Goods by Road

**OECD** - Organisation for Economic Co-operation and Development

**BCF** - Bioconcentration factor

**IMO/IMDG** - International Maritime Organization/International Maritime Dangerous Goods Code

**MARPOL** - International Convention for the Prevention of Pollution from Ships

**ATE** - Acute Toxicity Estimate

**VOC** - (Volatile Organic Compound)

**Key literature references and sources for data**

<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

**Disclaimer**

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

**End of Safety Data Sheet**