

Product 3176B
 Revision Date 12/10/2016
 Revision 1



Safety Data Sheet (SDS)

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Product Name 3176B
Synonyms, Trade Names No information available.

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Identified Uses Vacuum casting.
Uses Advised Against No uses advised against are identified.

1.3 Details of the Supplier of the Safety Data Sheet

Supplier Renishaw plc
 Brooms Road
 Stone Business Park
 Stone, Staffordshire
 ST15 0SH
 United Kingdom
 Tel: +44 (0) 1785 285000 (during UK office hours 09:00 to 17:00 UTC).
 msds@renishaw.com

Contact Person

1.4 Emergency Telephone Number

Emergency Telephone 999 / 911 or local emergency number.

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture

Classification (EC 1272/2008)
 Physical and Chemical Hazards Not classified
 Human Health Acute Tox 4 - H332, Skin Irrit.2 - H315, Eye Irrit.2A - H319, Resp. Sens 1 - H334, Skin. Sens 1 - H317, Carc. 2 - H351, STOT SE 2 - H371, STOT SE 3 - H335, STOT RE 2 - H373
 Environment Not classified

2.2 Label Elements

Contains Diphenylmethane diisocyanate

Label in Accordance With (EC) No. 1272/2008



Signal Word Danger

Hazard Statements
 H315 Causes skin irritation.
 H317 May cause an allergic skin reaction
 H319 Causes serious eye irritation.
 H332 Harmful if inhaled.
 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
 H335 May cause respiratory irritation.
 H351 Suspected of causing cancer by inhalation.
 H371 May cause damage to organs (lungs).
 H373 May cause damage to organs (respiratory system) through prolonged or repeated

exposure (by inhalation)

Precautionary Statements

Prevention

P202 Do not handle until all safety precautions have been read and understood.
 P260 Do not breathe dust/fume/ gas/mist/vapours/spray.
 P280 Wear protective gloves/ protective clothing/eye protection/face protection.
 P281 Use personal protective equipment as required.
 P285 In case of inadequate ventilation wear respiratory protection.

Response

P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTRE or doctor/physician
 P304 + P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
 P309 + P311 IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.

Storage

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

EUH Statements

EUH204 Contains isocyanates. May produce an allergic reaction.

2.3 Other Hazards

None known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance

Not applicable.

3.2 Mixtures

| Name | Product Identifier | GHS Classification | % |
|------------------------------|-------------------------------|--|---------|
| Diphenylmethane diisocyanate | CAS-No.: 9016-87-9 EC No.: | Acute Tox 4 - H332, Skin Irrit.2 - H315, Eye Irrit.2A - H319, Resp. Sens 1 - H334, Skin. Sens 1 - H317, Carc. 2 - H351, STOT SE 2 - H371, STOT SE 3 - H335, STOT RE 2 - H373 | 60-100% |

The Full Text for all Hazard Statements Are Displayed in Section 16.

Composition Comments

The data shown are in accordance with the latest EC Directives.

SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures

General Information

Provide general first aid, rest, warmth and fresh air. As a general rule, in case of doubt or if symptoms persist, always call a doctor. Seek medical attention for all burns and eye injuries, regardless how minor they may seem. First aid personnel must be aware of own risk during rescue.

Inhalation

Consult a physician. Show this safety data sheet to the doctor in attendance. Likely to cause asthma and should be treated as a sensitiser.
 If this product is inhaled and symptoms occur, move the exposed person to fresh air promptly. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention.

Ingestion

Asthma like symptoms may develop immediately or may be delayed up to several hours. If an allergic respiratory reaction occurs, get immediate medical attention.

Skin Contact

DO NOT induce vomiting! Never give anything by mouth to an unconscious person. If this product is ingested, remove victim immediately from source of exposure. Provide rest, warmth and fresh air. Rinse mouth thoroughly. Get medical attention immediately.
 Remove affected person from source of contamination. Immediately wash with soap and water, preferably under a shower, removing contaminated clothing while washing proceeds. Continue to rinse for at least 15 minutes. Seek medical attention immediately.

Eye Contact

Remove affected person from source of contamination. Immediately wash with soap and water, preferably under a shower, removing contaminated clothing while washing proceeds. Continue to rinse for at least 15 minutes. Seek medical attention immediately.
 Do not rub eye. Avoid contaminating unaffected eye. If this product contacts the eyes, gently flush eyes with water for at least fifteen (15) minutes, lifting the upper and lower eyelids occasionally. Remove contact lenses if present and easy to do so. Get prompt medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

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| General Information | The severity of the symptoms described will vary dependent on the concentration and the length of exposure. Signs and symptoms of exposure: Cough, shortness of breath, headache, nausea, and vomiting. Symptoms may be delayed. |
| Inhalation | Harmful if inhaled. Causes respiratory tract irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| Ingestion | Harmful if swallowed. There may be soreness and redness of the mouth and throat. |
| Skin Contact | May cause an allergic skin reaction. Contact with skin may cause irritation. |
| Eye Contact | Causes serious eye irritation. May cause irritation, redness, and tearing. |

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed

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| Notes to the Physician | Treat symptomatically. Immediate effects can be expected after short-term exposure. |
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SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing Media

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| Extinguishing Media | Use fire-extinguishing media appropriate for surrounding materials. Foam, dry powder, carbon dioxide (CO2), water spray. |
| Unsuitable Extinguishing Media | High volume water jet. |

5.2 Special Hazards Arising From the Substance or Mixture

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| Hazardous Combustion Products | Thermal decomposition or combustion may liberate carbon oxides and nitrogen oxides. |
| Unusual Fire & Explosion Hazards | No unusual fire or explosion hazards noted. |
| Specific Hazards | If heated, harmful vapours may be formed. |

5.3 Advice for Firefighters

| | |
|--|---|
| Special Fire Fighting Procedures | Ventilate closed spaces before entering them. Water spray should be used to cool containers. If possible, fight fire from protected position. Keep up-wind to avoid fumes. |
| Protective Equipment for Firefighters | Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents. |

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

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|---------------------------------|---|
| Personal Precautions | Wear protective clothing as described in Section 8 of this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. Provide adequate ventilation. In case of inadequate ventilation, use respiratory protection. Eliminate all sources of ignition. Do not touch or walk through spilled material. If necessary evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Read and follow manufacturer's recommendations. |
| For Emergency Responders | Follow safe handling advice and personal protective equipment recommendations for normal use of product. |

6.2 Environmental Precautions

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| Environmental Precautions | Avoid discharge in to drains and water courses. |
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6.3 Methods and Material for Containment and Cleaning Up

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| Spill Clean Up Methods | DO NOT touch spilled material! Stop leak if possible without risk. Wear necessary protective equipment. Ventilate and evacuate the area. Eliminate all sources of ignition. Use non-sparking hand tools and explosion proof electrical equipment for clean up. In case of a large scale of spill, dyke area with sand to stop the spill spreading. Recover spilled liquid if possible. After recovery of spilled liquid, do not close container tightly - remove to a safe well ventilated area. Absorb spillage with non-combustible, absorbent material - sand. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labelled container. |
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6.4 Reference to Other Sections

Reference to Other Sections See section 1 for emergency contact. For personal protection, see section 8. For waste disposal, see section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for Safe Handling

Handling Use personal protective equipment, see Section 8. Avoid inhalation of vapours and contact with skin and eyes. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. If necessary, use local exhaust ventilation. Keep away from ignition sources. Avoid prolonged or repeated contact. Wash thoroughly after handling. Do not use contact lenses.

7.2 Conditions for Safe Storage, Including Any Incompatibilities

Storage Precautions Store in cool dry areas away from direct sunlight or sources of ignition. Keep the product in its original container. Keep upright, locked up and out of reach of children. Keep containers tightly closed. Avoid contact with acids, water and moisture.

Storage Class Toxic storage.

7.3 Specific End Use(s)

Specific End Use(s) The identified uses for this product are detailed in Section 1.

Usage Description Use only according to directions. Replace and tighten cap after use.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters

| Component | STD | TWA (8 Hrs) | | STEL (15mins) | | Notes |
|------------------------------|-----|-------------|-----------|---------------|-----------|-------|
| Diphenylmethane diisocyanate | WEL | | 0.02mg/m3 | | 0.07mg/m3 | Sen |

Ingredient Comments WEL - Workplace Exposure Limits - EH40/2005 Workplace exposure limits.

8.2 Exposure Controls

Protective Equipment



Engineering Measures

Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Facilities for handling this product should be closed system. Ensure surfaces and floors are made from non-permeable material. Where risk assessment shows air-purifying respirators are appropriate a full face respirator conforming to EN 143 should be used, and suitable respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Respiratory Equipment

Recommended: Respirator with combination filter for vapour /particulate - Type A2B2P3 (EN 141). ABEK (EN 14387). Consult manufacturer for specific advice. Use respirators and components tested and approved under appropriate government standards such as CEN (EU).

Hand Protection

Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374) is recommended. Selection of the glove material depends on consideration of the penetration times, rates of diffusion and degradation, and concentration specific to the workplace. Suggested material: Butyl-rubber. Consult manufacturer for specific advice. Gloves must be inspected prior to use. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.

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| Eye Protection | Wear safety goggles or face shield to prevent any possibility of eye contact. Use equipment for eye protection tested and approved under appropriate government standards such as EN 166(EU). |
| Other Protection | Wear appropriate clothing to prevent any possibility of skin contact. Suggested PPE: chemical resistant full-length overalls and boots. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist. The selected clothing must satisfy the European norm standard EN 943. |
| Hygiene Measures | DO NOT SMOKE IN WORK AREA! Wash hands at the end of each work shift and before eating, smoking and using the toilet. Keep container tightly closed. Handle in accordance with good industrial hygiene and safety practice. Wash promptly if skin becomes contaminated. |
| Process Conditions | Ensure that eye flushing systems are located close by in the work place. |

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

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|--|----------------------------------|
| Appearance | Liquid. |
| Colour | Dark brown. |
| Odour | Barely Perceptible Odour. |
| Odour Threshold - Lower | No information available. |
| Odour Threshold - Upper | No information available. |
| pH-Value, Conc. Solution | No information available. |
| pH-Value, Diluted Solution | No information available. |
| Melting Point | No information available. |
| Initial Boiling Point and Boiling Range | >35°C. |
| Flash Point | > 93.00 °C |
| Evaporation Rate | No information available. |
| Flammability State | No information available. |
| Flammability Limit - Lower(%) | No information available. |
| Flammability Limit - Upper(%) | No information available. |
| Vapour Pressure | No information available. |
| Vapour Density (air=1) | No information available. |
| Relative Density | 1.21g/cm ³ @ 20.00 °C |
| Bulk Density | No information available. |
| Solubility | No information available. |
| Decomposition Temperature | No information available. |
| Partition Coefficient; n-Octanol/Water | No information available. |
| Auto Ignition Temperature (°C) | >600°C. |
| Viscosity | No information available. |
| Explosive Properties | Not classified as explosive. |
| Oxidising Properties | No information available. |

9.2 Other Information

| | |
|----------------------------------|---------------------------|
| Molecular Weight | No information available. |
| Volatile Organic Compound | No information available. |
| Other Information | None noted. |

SECTION 10: STABILITY AND REACTIVITY**10.1 Reactivity**

| | |
|-------------------|---|
| Reactivity | Stable product under recommended storage and handling conditions. |
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10.2 Chemical Stability

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|------------------|---|
| Stability | Stable under normal temperature conditions and recommended use. |
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10.3 Possibility of Hazardous Reactions

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|-----------------------------------|--|
| Hazardous Reactions | Decomposition may occur on exposure to conditions or materials listed below. |
| Hazardous Polymerisation | No information available. |
| Polymerisation Description | No information available. |

10.4 Conditions to Avoid

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|----------------------------|--|
| Conditions to Avoid | Keep away from open flames, hot surfaces and sources of ignition, incompatible products, and exposure to moist air or water. |
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10.5 Incompatible Materials

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|---------------------------|--|
| Materials to Avoid | Avoid contact with water, oxidizing agents, alcohols, amines, bases and copper alloys. |
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10.6 Hazardous Decomposition Products

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|---|--|
| Hazardous Decomposition Products | Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours. |
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SECTION 11: TOXICOLOGICAL INFORMATION**11.1 Information on Toxicological Effects**

| | |
|--|---|
| Toxicological Information | No toxicological information for the overall finished product. |
| Acute Toxicity (Oral LD50) | No information available. |
| Acute Toxicity (Dermal LD50) | No information available. |
| Acute Toxicity (Inhalation LD50) | No information available. |
| Serious Eye Damage/Irritation | Causes serious eye irritation. |
| Skin Corrosion/Irritation | No information available. |
| Respiratory Sensitisation | No information available. |
| Skin Sensitisation | No information available. |
| Germ Cell Mutagenicity | No information available. |
| Carcinogenicity | No information available. |
| Specific Target Organ Toxicity - Single Exposure: | |
| STOT - Single Exposure | No information available. |
| Specific Target Organ Toxicity - Repeated Exposure: | |
| STOT - Repeated Exposure | No information available. |
| Inhalation | Harmful if inhaled. Causes respiratory tract irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| Ingestion | Harmful if swallowed. There may be soreness and redness of the mouth and throat. |
| Skin Contact | May cause an allergic skin reaction. Contact with skin may cause irritation. |

| | |
|-------------------------------|--|
| Eye Contact | Causes serious eye irritation. May cause irritation, redness, and tearing. |
| Waste Management | When handling waste, consideration should be made to the safety precautions applying to handling of the product. |
| Routes of Entry | No information available. |
| Target Organs | Eyes, skin, digestive system, respiratory system. |
| Aspiration Hazards: | No information available. |
| Reproductive Toxicity: | No information available. |

| Name | LD50 Oral | LD50 Dermal | LD50 Inhalation |
|------------------------------|---------------|---------------------|-----------------|
| Diphenylmethane diisocyanate | 49.00g/kg Rat | >9400.00g/kg Rabbit | |

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

| | |
|---|---|
| Acute Toxicity - Fish | No information available. |
| Acute Toxicity - Aquatic Invertebrates | No information available. |
| Acute Toxicity - Aquatic Plants | No information available. |
| Acute Toxicity - Microorganisms | No information available. |
| Chronic Toxicity - Fish | No information available. |
| Chronic Toxicity - Aquatic Invertebrates | No information available. |
| Chronic Toxicity - Aquatic Plants | No information available. |
| Chronic Toxicity - Microorganisms | No information available. |
| Ecotoxicity | No Ecological information on the finished product. |
| Eco Toxicological Information | No ecological toxicity available on the overall finished product. |

12.2 Persistence and Degradability

| | |
|---------------------------------|---------------------------|
| Degradability | Biodegradable. |
| Biological Oxygen Demand | No information available. |
| Chemical Oxygen Demand | No information available. |

12.3 Bioaccumulative Potential

| | |
|---|--------------------------------|
| Bioaccumulative Potential | No Bio-accumulation potential. |
| Bioaccumulation Factor | No information available. |
| Partition Coefficient; n-Octanol/Water | No information available. |

12.4 Mobility in Soil

| | |
|-----------------|-----------------------------|
| Mobility | Readily absorbed into soil. |
|-----------------|-----------------------------|

12.5 Results of PBT and vPvB Assessment

Results of PBT and vPvB Assessment This substance is not identified as a PBT substance.

12.6 Other Adverse Effects

| | |
|------------------------------|-------------------------|
| Other Adverse Effects | Negligible ecotoxicity. |
|------------------------------|-------------------------|

SECTION 13: DISPOSAL CONSIDERATIONS

| | |
|-------------------------|--|
| Waste Management | When handling waste, consideration should be made to the safety precautions applying to handling of the product. |
|-------------------------|--|

13.1 Waste Treatment Methods

| | |
|-------------------------|---|
| Disposal Methods | Dispose of waste and residues in accordance with local authority requirements, and in |
|-------------------------|---|

accordance with all local, national and international regulations. For waste disposal, use a licensed industrial waste disposal agent.

SECTION 14: TRANSPORT INFORMATION

14.1 UN Number

| | |
|---------------|-----------------|
| UN No. (ADR) | Not applicable. |
| UN No. (IMDG) | Not applicable. |
| UN No. (IATA) | Not applicable. |

14.2 UN Proper Shipping Name

| | |
|---------------------------|-----------------|
| ADR Proper Shipping Name | Not applicable. |
| IMDG Proper Shipping Name | Not applicable. |
| IATA Proper Shipping Name | Not applicable. |

14.3 Transport Hazard Class(es)

| | |
|------------|-----------------|
| ADR Class | Not applicable. |
| IMDG Class | Not applicable. |
| IATA Class | Not applicable. |

| | |
|------------------|----------------|
| Transport Labels | Not applicable |
|------------------|----------------|

14.4 Packing Group

| | |
|---------------------------|-----------------|
| ADR/RID/ADN Packing Group | Not applicable. |
| IMDG Packing Group | Not applicable. |
| IATA Packing Group | Not applicable. |

14.5 Environmental Hazards

| | |
|------|----|
| ADR | No |
| IMDG | No |
| IATA | No |

14.6 Special Precautions for User

| | |
|-------------------------|-----------------|
| EMS | Not applicable. |
| Emergency Action Code | Not applicable. |
| Hazard No. (ADR) | Not applicable. |
| Tunnel Restriction Code | Not applicable. |

14.7 Transport in Bulk According to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

| | |
|-----------------------------------|--|
| EU Legislation | Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments. The UN Globally Harmonized System (GHS) Safety Data Sheet format (Annex IV) is implemented as Annex II of REACH EU No 453/2010 of 20th May 2010 amending regulation (EC) No 1907/2006. |
| Approved Code of Practice | Workplace Exposure Limits Guidance Note EH40/2005. |
| Chemical Safety Assessment | No chemical safety assessment has been carried out. |

SECTION 16: OTHER INFORMATION

| | |
|---------------------------------|---|
| General Information | This Safety Data Sheet is in accordance with Reach Regulation (EC) No 453/2010. |
| Revision Comments | This is first issue. |
| Revision Date | 12/10/2016 |
| Revision | 1 |
| Safety Data Sheet Status | Approved. |

Hazard Statements In Full

| | |
|---------------|--|
| H315 | Causes skin irritation. |
| H317 | May cause an allergic skin reaction |
| H319 | Causes serious eye irritation. |
| H332 | Harmful if inhaled. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H335 | May cause respiratory irritation. |
| H351 | Suspected of causing cancer [*]. |
| H371 | May cause damage to organs [*]. |
| H373 | May cause damage to organs [*] through prolonged or repeated exposure [*]. |
| EUH204 | Contains isocyanates. May produce an allergic reaction. |

Disclaimer

This 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. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.