

MATERIAL SAFETY DATA SHEET (MSDS)

File No. 2102

Prepared on

20 June, 2000

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME : Duranex 2016
NAME OF COMPANY : Polyplastics Co., Ltd.
SECTION IN CHARGE : Technical Dept.
ADDRESS : 3-2-5 Kasumigaseki, Chiyoda-ku, Tokyo
TELEPHONE NUMBER : 03-3593-2181
FACSIMILE NUMBER : 03-3593-2189

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE : Mixture
CHEMICAL NAME : Polybutyleneterephthalate (PBT)
SYNONYM(S) : PBT resin
CAS REGISTRY NUMBER : 24968-12-5(Base Resin)
INGREDIENTS AND COMPOSITION : PBT >80%
Flame retardant and others <20%
CHEMICAL FORMULA : $-\text{[OC-}\phi\text{-COO(CH}_2\text{)}_4\text{O]}_n-$
File No. in Official gazette : (7)-1039(Base Resin)
(Japanese Chemical Substances Control Law)
UN CLASS : Not applicable
UN NUMBER : Not applicable

3. HAZARDS IDENTIFICATION

CLASS OF HAZARDOUS CHEMICALS FOR MSDS IN JAPAN : Not applicable
PHYSICAL AND CHEMICAL HAZARDS: Neither dangerous reaction, fire nor explosion can be caused under normal conditions .

4. FIRST-AID MEASURES

EYE CONTACT

Cool and rinse the eye with clean water for at least 15 minutes when the eyes had contact with molten polymer.

In case of wearing contact lenses, remove the lenses as soon as possible, and ask a physician for advice.

When the eye had contact with the polymer in an ordinary solid form, rinse the eye with clean water without delay.

If the discomfort persists, ask a physician for advice.

SKIN CONTACT

Cool the contacted skin with clean water without delay, if a contact with the polymer in a molten form. Do not force to remove the solid resin on the skin. If any burns are observed on the skin, ask a physician for advice.

INHALATION

When a gas generated from the molten polymer has been inhaled, remove fresh air without delay and wait until the victim is recovered.

If sick feeling continues, ask a physician for advice.

INGESTION

Help to vomit as much as possible. If sick feeling continues, and ask a physician for advice.

5. FIRE-FIGHTING MEASURES

FIRE-EXTINGUISHING MEASURES:

Extinguish the fire with water. A method of extinguishing an ordinary fire may be applied.

(Caution) 1) Incomplete combustion leads to generation of toxic gases such as carbon monoxide or tetrahydrofuran, in addition to carbonic acid gas and water.

2) In case the fire gained force, use a gas mask or other protective equipment.

3) Do not apply water directly to processing machines.

FIRE-EXTINGUISHING AGENTS:

Water, foam fire-extinguishing agent, powder fire-extinguishing agent, and carbon dioxide gas.

6. ACCIDENTAL LEAKAGE MEASURES

When pellets were spilled on the road or floor, wipe them off with a broom or cleaner. Handle the spillage in accordance with provisions given in the "Resin pellet spillage preventive manual", in order to prevent intakes by marine animals and birds.

7. HANDLING AND STORAGE

HANDLING: 1) Polybutyleneterephthalate resin in a pellet form will neither ignite nor explode at room temperatures. Keep it away from the igniting sources, as it quickly gains force once it is ignited.

2) Polybutyleneterephthalate pellets spilled on the floor are likely to cause slipping. Remove such spillage at any times.

3) For molding work, effective means for local exhaust are required to discharge gases generated by melt processing.

4) Avoid inhaling of gases generated in moulding work.

Do not directly touch resin of high temperature.

5) Avoid retaining hot resin in the processing machines for many hours.

STORAGE : 1) Keep the substance away from any fire or heat sources for the sake of safe storage.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONTROL CONCENTRATION : None at present

PERMISSIBLE CONCENTRATION:

OSHA PEL/1985

Max. permissible concentration of inactive powder 15 mg/m³

- ditto - (Aspiration) 5 mg/m³

ACGIH TLV/1992 1993

Exposure limit of the powder TWA 10 mg/m³

ENGINEERING MEASURES:

When handling dust: Use totally enclosed containers resisting dust explosion.

When heat melted in molding: Effective local ventilation must be provided.

PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY PROTECTION : Wear a dust-proof mask.

EYE PROTECTION : Wear protective glasses or goggles.

HAND PROTECTION : Wear heat-resisting gloves against burns, when handling molten polymer.

SKIN & BODY PROTECTION : Wear long sleeve clothes against burns, when handling molten polymer.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE : Pellet

DENSITY : 1.43 g/cm³

BOILING POINT : Not applicable

MELTING POINT : 228°C

VAPOR PRESSURE	: Not applicable
VOLATILITY	: Not applicable
SUBLIMATION	: None
SOLUBILITY IN WATER	: Insoluble

10. PHYSICAL HAZARD (STABILITY AND REACTIVITY)

FLASH POINT	: 300°C or higher
IGNITION POINT	: 300°C or higher
DUST EXPLOSIVENESS	
UPPER EXPLOSION LIMIT	: Not applicable
LOWER EXPLOSION LIMIT	: 35 g/cm ³
INFLAMMABILITY	: Inflammable (Designated as inflammable resin by the Fire Service Law)
SPONTANEOUS COMBUSTIBILITY	: None
REACTIVITY WITH WATER	: None
OXIDIZABILITY	: None
SELF-REACTIVITY	: None
STABILITY	: Stable for normal storage or handling
OTHERS	: None

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (INCLUDING LD ₅₀)	: No finding
SUBACUTE TOXICITY	: No finding
CHRONIC TOXICITY	: No finding
SKIN CORROSIVE PROPERTIES	: No finding
SENSITIZING & IRRITANT EFFECTS	: Gas generated in drying or melting is irritating eyes and skins.
CARCINOGENECITY	: No finding
MUTAGENECITY (Micro organisms, chromosomal aberration):	No finding
REPRODUCTIVE TOXICITY	: No finding
TERATOGENICITY	: No finding
OTHERS (Including generation of hazardous gases by reaction with water, for example)	: No finding

(Remarks) "No finding" in this report means that there will be no hazard in general, but no proving data is available at the time of reporting.

OTHER CAUTIONS:

- 1) With regard to dust, the maximum permissible concentration and limits are fixed by OSHA and ACGIH.

12. ECOLOGICAL INFORMATION

BIODEGRADABILITY : No finding
BIOACCUMULATION : No finding
FISH TOXICITY : No finding
OTHERS :

13. DISPOSAL CONSIDERATION

- (1) This is designated as waste plastics among industrial wastes by the Wastes Disposal Law. Dispose waste Duranex through licensed wastes handlers or local autonomous bodies if they are handling wastes disposal.
 - (2) When disposed by incineration, use the well controlled incinerators in accordance with the Wastes Disposal Law, Air Pollution Control Law and Water Pollution Prevention Law.
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14. TRANSPORT CONSIDERATION

- (1) Handle with care so as not to give damages to containers or not to be subjected to wetting.
 - (2) Secure the containers firmly so as not to cause collapsing.
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15. REGULATORY INFORMATION

- (1) Wastes Disposal Law designates it as waste plastics among industrial wastes.
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16. OTHER INFORMATION

HANDLING OF THE DETAILS GIVEN ABOVE:

This MSDS is the English version translated from the Japanese MSDS which is prepared for domestic use.

Details given above are based on references, information and data available at this moment, but no warranty can be made on exactness of these details. They are also prepared on the assumption that the product will be handled in a normal way. For special handling, adequate safety and environmental measures should be taken in respect to its applications. Our products are not specifically intended for implants for medical and dental applications, and therefore they are not recommended for such applications.

Please contact Technical Department of Polyplastics Co., Ltd. for further information.

(Telephone Number 03-3593-2181).

MATERIAL SAFETY DATA SHEET (MSDS)

File No. 2001

Prepared on

20 June, 2000

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME : Duranex 2002
NAME OF COMPANY : Polyplastics Co., Ltd.
SECTION IN CHARGE : Technical Dept.
ADDRESS : 3-2-5 Kasumigaseki, Chiyoda-ku, Tokyo
TELEPHONE NUMBER : 03-3593-2181
FACSIMILE NUMBER : 03-3593-2189

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE : Substance
CHEMICAL NAME : Polybutyleneterephthalate (PBT)
SYNONYM(S) : PBT resin
CAS REGISTRY NUMBER : 24968-12-5(Base Resin)
INGREDIENTS AND COMPOSITION : PBT > 99%, Others < 1%
CHEMICAL FORMULA : $[-OC\phi COO(CH_2)_4O]_n$
File No. in Official gazette : (7)-1039(Base Resin)
(Japanese Chemical Substances Control Law)
UN CLASS : Not applicable
UN NUMBER : Not applicable

3. HAZARDS IDENTIFICATION

CLASS OF HAZARDOUS CHEMICALS FOR MSDS IN JAPAN : Not applicable

PHYSICAL AND CHEMICAL HAZARDS: It is inflammable substance and combustible if an igniting source is existent.
Neither dangerous reaction, fire nor explosion can be caused under normal conditions .

4. FIRST-AID MEASURES

EYE CONTACT

Cool and rinse the eye with clean water for at least 15 minutes when the eyes had contact with molten polymer.

In case of wearing contact lenses, remove the lenses as soon as possible, and ask a physician for advice.

When the eye had contact with the polymer in an ordinary solid form, rinse the eye with clean water without delay.

If the discomfort persists, ask a physician for advice.

SKIN CONTACT

Cool the contacted skin with clean water without delay, if a contact with the polymer in a molten form. Do not force to remove the solid resin on the skin. If any burns are observed on the skin, ask a physician for advice.

INHALATION

When a gas generated from the molten polymer has been inhaled, remove fresh air without delay and wait until the victim is recovered.

If sick feeling continues, ask a physician for advice.

INGESTION

Help to vomit as much as possible. If sick feeling continues, and ask a physician for advice.

5. FIRE-FIGHTING MEASURES

FIRE-EXTINGUISHING MEASURES:

Extinguish the fire with water. A method of extinguishing an ordinary fire may be applied.

(Caution) 1) Incomplete combustion leads to generation of toxic gases such as carbon monoxide or tetrahydrofuran, in addition to carbonic acid gas and water.

2) In case the fire gained force, use a gas mask or other protective equipment.

3) Do not apply water directly to processing machines.

FIRE-EXTINGUISHING AGENTS:

Water, foam fire-extinguishing agent, powder fire-extinguishing agent, and carbon dioxide gas.

6. ACCIDENTAL LEAKAGE MEASURES

When pellets were spilled on the road or floor, wipe them off with a broom or cleaner. Handle the spillage in accordance with provisions given in the "Resin pellet spillage preventive manual", in order to prevent intakes by marine animals and birds.

7. HANDLING AND STORAGE

HANDLING: 1) Polybutyleneterephthalate resin in a pellet form will neither ignite nor explode at room temperatures, but it falls under the inflammables designated by the Fire Service Law. Keep it away from the igniting sources, as it quickly gains force once it is ignited.

2) Polybutyleneterephthalate pellets spilled on the floor are likely to cause slipping. Remove such spillage at any times.

3) For molding work, effective means for local exhaust are required to discharge gases generated by melt processing.

4) Avoid inhaling of gases generated in moulding work.

Do not directly touch resin of high temperature.

5) Avoid retaining hot resin in the processing machines for many hours.

STORAGE : 1) Keep the substance away from any fire or heat sources for the sake of safe storage.

2) Polybutyleneterephthalate is a synthetic resin designated as an inflammable substance by the Fire Service Law and should be handled in accordance with municipal rules and regulations (concerning fire-fighting equipment, indoor storage, for instance).

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONTROL CONCENTRATION : None at present

PERMISSIBLE CONCENTRATION:

OSHA PEL/1985

Max. permissible concentration of inactive powder 15 mg/m³

- ditto - (Aspiration) 5 mg/m³

ACGIH TLV/1992 1993

Exposure limit of the powder TWA 10 mg/m³

ENGINEERING MEASURES:

When handling dust: Use totally enclosed containers resisting dust explosion.

When heat melted in molding: Effective local ventilation must be provided.

PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY PROTECTION : Wear a dust-proof mask.

EYE PROTECTION : Wear protective glasses or goggles.

HAND PROTECTION : Wear heat-resisting gloves against burns, when handling molten polymer.

SKIN & BODY PROTECTION : Wear long sleeve clothes against burns, when handling molten polymer.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	: Pellet
DENSITY	: 1.31 g/cm ³
BOILING POINT	: Not applicable
MELTING POINT	: 228°C
VAPOR PRESSURE	: Not applicable
VOLATILITY	: Not applicable
SUBLIMATION	: None
SOLUBILITY IN WATER	: Insoluble

10. PHYSICAL HAZARD (STABILITY AND REACTIVITY)

FLASH POINT	: 300°C or higher
IGNITION POINT	: 300°C or higher
DUST EXPLOSIVENESS	
UPPER EXPLOSION LIMIT	: Not applicable
LOWER EXPLOSION LIMIT	: 35 g/cm ³
INFLAMMABILITY	: Inflammable (Designated as inflammable resin by the Fire Service Law)
SPONTANEOUS COMBUSTIBILITY	: None
REACTIVITY WITH WATER	: None
OXIDIZABILITY	: None
SELF-REACTIVITY	: None
STABILITY	: Stable for normal storage or handling
OTHERS	: None

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (INCLUDING LD ₅₀)	: No finding
SUBACUTE TOXICITY	: No finding
CHRONIC TOXICITY	: No finding
SKIN CORROSIVE PROPERTIES	: No finding
SENSITIZING & IRRITANT EFFECTS	: Gas generated in drying or melting is irritating eyes and skins.
CARCINOGENECITY	: No finding
MUTAGENECITY (Micro organisms, chromosomal aberration):	No finding
REPRODUCTIVE TOXICITY	: No finding
TERATOGENICITY	: No finding
OTHERS (Including generation of hazardous gases by reaction with water, for example)	: No finding

(Remarks) "No finding" in this report means that there will be no hazard in general, but no proving data is available at the time of reporting.

OTHER CAUTIONS:

- 1) With regard to dust, the maximum permissible concentration and limits are fixed by OSHA and ACGIH.

12. ECOLOGICAL INFORMATION

BIODEGRADABILITY : No finding
BIOACCUMULATION : No finding
FISH TOXICITY : No finding
OTHERS :

13. DISPOSAL CONSIDERATION

- (1) This is designated as waste plastics among industrial wastes by the Wastes Disposal Law. Dispose waste Duranex through licensed wastes handlers or local autonomous bodies if they are handling wastes disposal.
- (2) When disposed by incineration, use the well controlled incinerators in accordance with the Wastes Disposal Law, Air Pollution Control Law and Water Pollution Prevention Law.

14. TRANSPORT CONSIDERATION

- (1) Handle with care so as not to give damages to containers or not to be subjected to wetting.
- (2) Secure the containers firmly so as not to cause collapsing.

15. REGULATORY INFORMATION

- (1) Fire Service Law designates it as inflammable synthetic resin.
Designated quantity: More than 20 m³ for the foamed product.
More than 3,000 kg for other types.
- (2) Wastes Disposal Law designates it as waste plastics among industrial wastes.

16. OTHER INFORMATION

HANDLING OF THE DETAILS GIVEN ABOVE:

This MSDS is the English version translated from the Japanese MSDS which is prepared for domestic use.

Details given above are based on references, information and data available at this moment, but no warranty can be made on exactness of these details. They are also prepared on the assumption that the product will be handled in a normal way. For special handling, adequate safety and environmental measures should be taken in respect to its applications. Our products are not specifically intended for implants for medical and dental applications, and therefore they are not recommended for such applications. Please contact Technical Department of Polyplastics Co., Ltd. for further information. (Telephone Number 03-3593-2181).