The ideal material for parts requiring excellent flex fatigue, resistance to tearing, creep and abrasion resistance at a range of temperatures and difficult chemical conditions.

DuPont™ Hytrel® is a Thermoplastic Polyether Ester Elastomer block copolymer consisting of a hard (crystalline) segment of polybutylene terephthalate
and soft (amorphous) segments based on long-chain polyether glycols.

Typical Hytrel® Applications

● key pads ● hinges ● oil & petrol cap seals ● high temperature seals
● pump diaphragms ● noise absorbing gears ● hot water tubing
● electrical connectors ● rail pads ● impact and sound absorbing housings
● sporting goods ● rotational mouldings ● medical devices
● 2-shot over-moulded components ● soft touch dynamic handles
● automotive CVJ boots

Hytrel® Standard Grades

Offering the best balance of properties and costs

- Low temperature performance
- Excellent flex fatigue resistance
- High impact strength
- High chemical resistance
- High tear strength

Hytrel® High Performance Grades

Giving an extra measure of performance and service life

- Improved tear strength
- Better heat ageing properties
- Excellent abrasion resistance

Hytrel® Specialities

- Food approvals
- Water approvals
- UL94 V0 flame retardant concentrates
- Hydrolytic stabiliser concentrates
- UV stabiliser concentrates

Typical Hytrel® Properties

Properties*	Hardness	Density	Tensile Strength	Elongation at Break	Resistance to Flex Cut Growth	
Standard	ISO 868	ISO1183	ASTM D 638	ASTM D 638	ASTM D1052	ISO815
Conditions					Ross (Pierced)	Ross (Unpierced)
Units	Shore	g/cm³	MPa	%	Cycles to Failure	Cycles to Failure
G3548L	35 D	1.15	10	200	>1 x 106	>1 x 106
4056	40 D	1.17	28	550	>1 x 106	>1 x 106
6356	63 D	1.22	41	420	5 x 105	1 x 106
7246	72 D	1.25	46	360	N/A	N/A

* Property values listed are typical values from tests on injection moulded plaques

Hytrel® Processing & Handling Guide*

Grade	Melt Temp	Barrel Temperatures				Mould Temp	Screw Speed	Back Pressure	Drying Temp	Drying Time
		Rear	Middle	Front	Nozzle					
	°C	°C	°C	°C	°C	°C	m/s		°C	Hrs
G3548	190	190	190	190	165	45	0.2	low	100	2 ~3
4056	180	180	180	180	155	45	0.2	low	100	2 ~3
6356	240	240	240	240	240	45	0.2	low	100	2 ~3
7246	240	240	240	240	240	45	0.2	low	100	2 ~3

* This should only be used as a guide as part geometry, thickness, processing temperatures and rates will affect final cycle conditions

Purging

Empty the barrel for idle periods of 15 mins or longer. Purge thoroughly before and after use of this product with polyethylene or polypropylene.

Recycling / Regrind

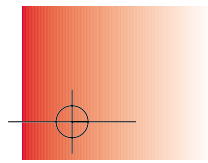
Hytrel® can be reprocessed up to 50%. However, the quality of regrind is essential to retain mechanical properties. All regrind needs to be dried prior to processing.

Colouring

For colour effects contact Distrupol Compounds.

Storage & Handling

Available in 25 kg bags, if left exposed will absorb moisture and will require drying.



Compositions of Hytrel®:

	Description	Characteristics*	Typical Uses
high productivity grades:			
Hytrel ® G3548W	Low modulus molding and extrusion grade. Contains improved color-stable antioxidants.	Very flexible grade of Hytrel ® . Excellent flex resistance, especially at low temperatures. Moldable even in thin sections. Can be used in light-colored products.	Applications requiring flex life coupled with good flexibility at low temperatures. Thin, flexible membranes. Good for high original color retention.
. Hytrel ® G4074	Low modulus molding and extrusion grade. Contains a discoloring antioxidant.	Excellent heat-aging resistance and resistance to oils at high temperatures. Best low modulus molding and extrusion grade	Tubing Hose jackets Wire and cable jackets Film sheeting Molded products
Hytrel ® G4078W	Low modulus molding and extrusion grade. Contains improved color-stable antioxidants.	Like Hytrel ® G4074, except that heat-aging resistance is reduced. Can be used in light-colored products.	Applications requiring high original color retention. Molded and extruded products for consumer use.
Hytrel ® G4774	Medium-low modulus molding and extrusion grade. Contains a discoloring antioxidant.	Excellent heat-aging resistance and resistance to oils at high temperatures. Good resistance to oils, fuels, and solvents.	Tubing Hose jackets Wire and cable jackets Profiles Molded products
Hytrel ® G4778	Medium-low modulus molding and extrusion grade. Contains color-stable antioxidants.	Good balance of low and high temperature properties.	Tubing Molded and extruded products for consumer use.

Hytrel ® G5544	Medium modulus molding and extrusion grade. Contains a discoloring antioxidant.	Excellent heat-aging resistance and resistance to oils at high temperatures.	Same as Hytrel ® G4774.
high performance grades:			
Hytrel ® 4056	Low modulus extrusion grade. Contains color-stable antioxidants.Not recommended for molding.	Excellent low-temperature properties. Excellent flex-fatigue resistance. Excellent creep resistance.	Hose jackets Wire and cable jackets Film and sheeting Belting Seals
Hytrel ® 4069	Low modulus molding and extrusion grade. Contains color-stable antioxidants.	Low modulus grade similar to Hytrel ® 4056 with a higher melting point.	Same as Hytrel ® 4056 and molded products.
Hytrel ® 4556	Medium-low modulus molding and extrusion grade. Contains color-stable antioxidants.	Same as Hytrel ® 4069.	Same as Hytrel ® 4056 and molded products.
Hytrel ® 5526	Medium modulus molding grade. Contains color-stable antioxidants.	Combine the best balance of properties of the product line.	Seals, packing, and gaskets Gears and bearings
Hytrel ® 5556	Medium modulus molding and extrusion grade. Contains color-stable antioxidants.	Combine the best balance of properties of the product line.	Tubing and hose Wire and cable jackets Film and sheeting Belting and molded products
Hytrel ® 6356	Medium-high modulus molding and extrusion grade. Contains color-stable antioxidants.	Very good resistance to oils, hydraulic fluids, and fuels. Very good resistance to permeation by gases and liquids.	Tubing and hose Film Profiles Seals Gears and sprockets Fuel tanks

Hytrel ® 7246	High modulus molding and extrusion grade. Contains color-stable antioxidants.	High service temperature. Retains good low-temperature flexibility. Excellent resistance to oils, fuels, and solvents. Low fuel permeability.	Tubing Wire and cable jackets Gears and sprockets Oil field parts
Hytrel ® 8238	Highest modulus molding and extrusion grade. Contains color-stable antioxidants.	Highest service temperature. Best resistance to oils, fuels, and solvents. Lowest fuel permeability.	Tubing Wire and cable jackets Gears and sprockets Oil field parts Electrical connectors

The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

"HYTREL" DYM THERMOPLASTIC POLYESTER ELASTOMER ALL ON SYNONYM LIST
DYM007
DYM007 Revised 19-APR-2002

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"HYTREL" is a registered trademark of DuPont.

Tradenames and Synonyms

"HYTREL" DYM100 NC010
"HYTREL" DYM160 NC010, DYM250S NC010, #
"HYTREL" DYM300 NC010, DYM350 NC010
"HYTREL" DYM500 NC010. DYM830 NC010, DYM1300 NC010

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont Engineering Polymers
1007 Market Street
Wilmington,DE 19898

PHONE NUMBERS
Product Information : 1-(800)-441-7515
Transport Emergency : 1-(800)-424-9300
Medical Emergency : 1-(800)-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
BUTYLENE/POLY(ALKYLENE ETHER) PHTHALATE		>98

Components (Remarks)

Material is not known to contain Toxic Chemicals under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Potential Health Effects

ADDITIONAL HEALTH EFFECTS

Before using this resin, please read Bulletin H-38066, "Handling and Processing Precautions for 'HYTREL'."

(HAZARDS IDENTIFICATION - Continued)

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION
No specific intervention is indicated as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary. If exposed to fumes from overheating or combustion, move to fresh air. Consult a physician if symptoms persist.

SKIN CONTACT
The compound is not likely to be hazardous by skin contact, but cleansing the skin after use is advisable. If molten polymer gets on skin, cool rapidly with cold water. Do not attempt to peel polymer from skin. Obtain medical treatment for thermal burn.

EYE CONTACT
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION
No specific intervention is indicated as compound is not likely to be hazardous by ingestion.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : Not Applicable

Not a fire or explosion hazard.

Combustible. Hazardous gases/vapors produced in fire are carbon monoxide.

Extinguishing Media

Water, Foam, Dry Chemical, CO2.

Fire Fighting Instructions

Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

HANDLING AND STORAGE

Handling (Personnel)

See FIRST AID and PERSONAL PROTECTIVE EQUIPMENT SECTIONS.

Storage

Store in a cool, dry place. Keep containers tightly closed to prevent moisture absorption and contamination.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

VENTILATION When hot processing this material, use local and/or general exhaust ventilation to control the concentration of vapors and fumes below exposure limits.

In cutting or grinding operations with this material, use local exhaust to control the concentration of dust below exposure limits.

Personal Protective Equipment

EYE/FACE PROTECTION

Wear safety glasses. Wear coverall chemical splash goggles and face shield when possibility exists for eye and face contact due to splashing or spraying of molten material. A full face mask respirator provides protection from eye irritation.

RESPIRATORS

A NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge with a dust/mist filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

PROTECTIVE CLOTHING

(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

If there is potential contact with hot/molten material, wear heat resistant clothing and footwear.

Exposure Guidelines

Exposure Limits
"HYTREL" DYM THERMOPLASTIC POLYESTER ELASTOMER ALL ON SYNONYM LIST DYM007
PEL (OSHA) : Particulates (Not Otherwise Regulated)
15 mg/m3, 8 Hr. TWA, total dust
5 mg/m3, 8 Hr. TWA, respirable dust

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Melting Point	: 150-225 C (302-437 F)
Solubility in Water	: Insoluble
Odor	: None
Form	: Pellets
Specific Gravity	: >1

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Conditions to Avoid

Oxidizing (heating in air). Abnormally long processing time or high temperatures can produce irritating and toxic fumes.

Incompatibility with Other Materials

Incompatible or can react with oxidizing agents.

Decomposition

Hazardous gases or vapors can be released, including acrolein, tetrahydrofuran, crotonaldehyde, acetaldehyde.

Polymerization

Polymerization will not occur.

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:
No information is available. Toxicity is expected to be low based on insolubility in water.

DISPOSAL CONSIDERATIONS

Waste Disposal

Preferred options for disposal are (1) recycling, (2) incineration with energy recovery, and (3) landfill. The high fuel value of this product makes option 2 very desirable for material that cannot be recycled, but incinerator must be capable of scrubbing out acidic combustion products. Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations.

TRANSPORTATION INFORMATION

Shipping Information

Not regulated in transportation by DOT/IMO/IATA.

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : In compliance with TSCA Inventory requirements for commercial purposes.

State Regulations (U.S.)

STATE RIGHT-TO-KNOW LAWS

No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this Material Safety Data Sheet.

SUBSTANCES ON THE PENNSYLVANIA HAZARDOUS SUBSTANCES LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.01% FOR SPECIAL HAZARDOUS SUBSTANCES): None known.

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: None known.

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1 % OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS): None known.

OTHER INFORMATION

Additional Information

MEDICAL USE: CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications see DuPont CAUTION Bulletin No. H-50102.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : I. V. BEBENSEE
DUPONT ENGINEERING POLYMERS
Address : CHESTNUT RUN PLAZA 713
WILMINGTON, DE 19880-0713
Telephone : 302-999-4257

 # Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

"HYTREL" THERMOPLASTIC POLYESTER ELASTOMER ON SYNONYM LIST HYT007
HYT007 Revised 6-MAR-2000

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"HYTREL" is a registered trademark of DuPont.

Corporate MSDS Number : DU007295

Tradenames and Synonyms

"HYTREL" 3046 NC010, 3046-120 NC010, 3046X1, 3048X1, 3078,
"HYTREL" 4056, 4059FG, 4068, 4069, 4069B, 4533,
"HYTREL" 4556, 4556B, 4733X1 NC010, 4733SPP NC010
"HYTREL" 4733SPPA NC010
"HYTREL" 4766X1, 4767,
"HYTREL" 5526, 5553FG NC010, 5556, 6356, 6359FG,
"HYTREL" 7246, 7246HV, 8238,
"HYTREL" BM4783X-1,
"HYTREL" G3548L, G3548W,
"HYTREL" G4044, G4074, G4074-103, G4078W, G4774, G4778,
"HYTREL" G5544,
"HYTREL" HTC2300X06,
"HYTREL" HTR6108, HTR8171, HTR8171 NC010, HTR8186, HTR8206,
"HYTREL" HTR8241, HTR8242,
"HYTREL" HTR8382, HTR8347 NC010, HTR8347SPP NC010,
"HYTREL" HTR8407 NC010, HTR8408 NC010, HTR8409 NC010,
"HYTREL" HTR8543 NC010, HTR8618 NC010, HTR8636 NC010, #
"HYTREL" HTX8347, HTX8382,
"HYTREL" HTX8457 NC010,
"HYTREL" HTX8531 NC010, HTX8532 NC010, HTX8542 NC010

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont Engineering Polymers
1007 Market Street
Wilmington,DE 19898

PHONE NUMBERS
Product Information : 1-(800)-441-7515
Transport Emergency : 1-(800)-424-9300
Medical Emergency : 1-(800)-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
BUTYLENE/POLY(ALKYLENE ETHER) PHTHALATE		>90

Components (Remarks)

Material is not known to contain Toxic Chemicals under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Potential Health Effects

ADDITIONAL HEALTH EFFECTS

Before using this resin, please read Bulletin H-38066, "Handling and Processing Precautions for 'HYTREL'."

ACUTE OR IMMEDIATE EFFECTS: ROUTES OF ENTRY AND SYMPTOMS

INGESTION Low toxicity. Not a probable route of exposure.

SKIN Molten polymer will produce thermal burns.

EYE Mechanical irritant.

INHALATION Polymer granules not respirable. In case of overheating fumes may be irritating to the eyes and upper respiratory tract and lungs.

CHRONIC EFFECTS None known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE None known.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION
No specific intervention is indicated as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary. If exposed to fumes from overheating or combustion, move to fresh air. Consult a physician if symptoms persist.

(FIRST AID MEASURES - Continued)

SKIN CONTACT
The compound is not likely to be hazardous by skin contact, but cleansing the skin after use is advisable. If molten polymer gets on skin, cool rapidly with cold water. Do not attempt to peel polymer from skin. Obtain medical treatment for thermal burn.

EYE CONTACT
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION
No specific intervention is indicated as compound is not likely to be hazardous by ingestion.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : Not Applicable

Not a fire or explosion hazard.

Combustible. Hazardous gases/vapors produced in fire are carbon monoxide.

Extinguishing Media

Water, Foam, Dry Chemical, CO2.

Fire Fighting Instructions

Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Spill Clean Up

Sweep up to avoid slipping hazard.

HANDLING AND STORAGE

Handling (Personnel)

See FIRST AID and PERSONAL PROTECTIVE EQUIPMENT SECTIONS.

Storage

Store in a cool, dry place. Keep containers tightly closed to prevent moisture absorption and contamination.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

VENTILATION When hot processing this material, use local and/or general exhaust ventilation to control the concentration of vapors and fumes below exposure limits.

In cutting or grinding operations with this material, use local exhaust to control the concentration of dust below exposure limits.

Personal Protective Equipment

EYE/FACE PROTECTION

Wear safety glasses. Wear coverall chemical splash goggles and face shield when possibility exists for eye and face contact due to splashing or spraying of molten material. A full face mask respirator provides protection from eye irritation.

RESPIRATORS

A NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge with a dust/mist filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

PROTECTIVE CLOTHING

If there is potential contact with hot/molten material, wear heat resistant clothing and footwear.

Exposure Guidelines

Exposure Limits
"HYTREL" THERMOPLASTIC POLYESTER ELASTOMER ON SYNONYM LIST HYT007
PEL (OSHA) : Particulates (Not Otherwise Regulated)
15 mg/m3, 8 Hr. TWA, total dust
5 mg/m3, 8 Hr. TWA, respirable dust

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Melting Point	: 150-225 C (302-437 F)
Solubility in Water	: Insoluble
Odor	: None
Form	: Pellets
Color	: Off-white to light yellow
Specific Gravity	: >1

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Conditions to Avoid

Oxidizing (heating in air). Abnormally long processing time or high temperatures can produce irritating and toxic fumes.

Incompatibility with Other Materials

Incompatible or can react with oxidizing agents.

Decomposition

Hazardous gases or vapors can be released, including acrolein, tetrahydrofuran, crotonaldehyde, acetaldehyde.

Polymerization

Polymerization will not occur.

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:

No information is available. Toxicity is expected to be low based on insolubility in water. Do not discharge to streams, ponds, lakes or sewers.

DISPOSAL CONSIDERATIONS

Waste Disposal

Preferred options for disposal are (1) recycling, (2) incineration with energy recovery, and (3) landfill. The high fuel value of this product makes option 2 very desirable for material that cannot be recycled, but incinerator must be capable of scrubbing out acidic combustion products. Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations.

TRANSPORTATION INFORMATION

Shipping Information

Not regulated in transportation by DOT/IMO/IATA.

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : In compliance with TSCA Inventory requirements for commercial purposes.

State Regulations (U.S.)

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WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: None known.

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1 % OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS): None known.

OTHER INFORMATION

Additional Information

MEDICAL USE: CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications see DuPont CAUTION Bulletin No. H-50102.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

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DUPONT ENGINEERING POLYMERS
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This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS