DuPont™ Hytrel® 6646 NC010

THERMOPLASTIC POLYESTER ELASTOMER

Product Information

Common features of Hytrel® thermoplastic polyester elastomer include mechanical and physical properties such as exceptional toughness and resilience, high resistance to creep, impact and flex fatigue, flexibility at low temperatures and good retention of properties at elevated temperatures. In addition, it resists many industrial chemicals, oils and solvents. Special grades include heat stabilised, flame retardant, food contact compliant, blow molding and extrusion grades. Concentrates offered include black pigments, UV protection additives, heat stabilisers, and flame retardants.

Hytrel® thermoplastic polyester elastomer is plasticiser free.

The good melt stability of Hytrel® thermoplastic polyester elastomer normally enables the recycling of properly handled production waste. If recycling is not possible, DuPont recommends, as the preferred option, incineration with energy recovery (-24 kJ/g of base polymer) in appropriately equipped installations.

For disposal, local regulations have to be observed.

Hytrel® thermoplastic polyester elastomer typically is used in demanding applications in the automotive, fluid power, electrical/electronic, consumer goods, appliance and power tool, sporting goods, furniture, industrial and off-road transportation/equipment industry.

Hytrel® 6646 is a medium modulus grade with nominal hardness of 66D. It contains non-discoloring stabilizer. It can be processed by many conventional thermoplastic processing techniques like injection molding and extrusion.

General information	Value	Unit	Test Standard
Resin Identification	TPC-ET	-	ISO 1043
Part Marking Code	TPC-ET	-	ISO 11469
Rheological properties	**Value**	**Unit**	**Test Standard**
Melt mass-flow rate	13	g/10min	ISO 1133
Melt mass-flow rate, Temperature	240	°C	ISO 1133
Melt mass-flow rate, Load	2.16	kg	ISO 1133
Moulding shrinkage, parallel	1.4	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.4	%	ISO 294-4, 2577
Mechanical properties (TPE)	**Value**	**Unit**	**Test Standard**
Yield stress	20	MPa	ISO 527-1/-2
Yield strain	29	%	ISO 527-1/-2
Stress at 10% strain	16	MPa	ISO 527-1/-2
Stress at 100% strain	20	MPa	ISO 527-1/-2
Stress at break	35	MPa	ISO 527-1/-2
Strain at break	>300	%	ISO 527-1/-2
Nominal strain at break	380	%	ISO 527-1/-2
Shore D hardness, max	66	-	ISO 7619-1
Shore D hardness, 15s	60	-	ISO 7619-1
Mechanical properties	**Value**	**Unit**	**Test Standard**
Tensile Modulus	310	MPa	ISO 527-1/-2
Tensile creep modulus			ISO 899-1
1h	260	MPa	
1000h	190	MPa	
Charpy impact strength, 23°C	N	kJ/m²	ISO 179/1eU
Charpy notched impact strength			ISO 179/1eA
23°C	110[P]	kJ/m²	
-30°C	13	kJ/m²	
Thermal properties	**Value**	**Unit**	**Test Standard**
Melting temperature, 10°C/min	211	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	0	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	45	°C	
0.45 MPa	87	°C	

P: Partial Break

To find out more, visit DuPont Performance Polymers or contact nearest DuPont location.

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Vicat softening temperature, 50°C/h, 50N	100	°C	ISO 306	
Thermal conductivity of melt	0.15	W/(m K)	-	
Spec. heat capacity of melt	2150	J/(kg K)	-	
Eff. thermal diffusivity	5.44E-8	m²/s	-	
Flammability	**Value**	**Unit**	**Test Standard**	
Burning Behav. at 1.5mm nom. thickn.	HB	class	IEC 60695-11-10	
Thickness tested	1.5	mm	IEC 60695-11-10	
Burning Behav. at thickness h	HB	class	IEC 60695-11-10	
Thickness tested	3	mm	IEC 60695-11-10	
Oxygen index	21	%	ISO 4589-1/-2	
FMVSS Class	B	-	ISO 3795 (FMVSS 302)	
Burning rate, Thickness 1 mm	<100	mm/min	ISO 3795 (FMVSS 302)	
Other properties	**Value**	**Unit**	**Test Standard**	
Humidity absorption, 2mm	0.2	%	Sim. to ISO 62	DS
Water absorption, 2mm	0.6	%	Sim. to ISO 62	DS
Density	1230	kg/m³	ISO 1183	
Density of melt	1070	kg/m³	-	

DS: Derived from similar grade

VDA Properties	**Value**	**Unit**	**Test Standard**	
Odour	2.5	class	VDA 270	
Fogging, G-value (condensate)	0.1	mg	ISO 6452	
Injection	**Value**	**Unit**	**Test Standard**	
Drying Recommended	yes	-	-	
Drying Temperature	110	°C	-	
Drying Time, Dehumidified Dryer	2 - 3	h	-	
Processing Moisture Content	≤0.08	%	-	
Melt Temperature Optimum	245	°C	-	
Min. melt temperature	240	°C	-	
Max. melt temperature	260	°C	-	
Mold Temperature Optimum	45	°C	-	
Min. mould temperature	45	°C	-	
Max. mould temperature	55	°C	-	
Hold pressure range	≤70	MPa	-	
Extrusion	**Value**	**Unit**	**Test Standard**	
Drying Temperature	90 - 110	°C	-	
Drying Time, Dehumidified Dryer	2 - 3	h	-	
Processing Moisture Content	≤0.06	%	-	
Melt Temperature Optimum	235	°C	-	
Melt Temperature Range	225 - 245	°C	-	

Characteristics			
Processing	• Injection Moulding • Film Extrusion • Profile Extrusion	• Sheet Extrusion • Other Extrusion • Casting	• Thermoforming
Delivery form	• Pellets		
Special characteristics	• Light stabilised or stable to light		
Regional Availability	• North America • Europe	• Asia Pacific • South and Central America	• Near East/Africa • Global

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Chemical Media Resistance

Acids

- ✓ Acetic Acid (5% by mass) (23°C)
- ✓ Citric Acid solution (10% by mass) (23°C)
- ✓ Lactic Acid (10% by mass) (23°C)
- ✗ Hydrochloric Acid (36% by mass) (23°C)
- ✗ Nitric Acid (40% by mass) (23°C)
- ✗ Sulfuric Acid (38% by mass) (23°C)
- ✓ Sulfuric Acid (5% by mass) (23°C)
- ✗ Chromic Acid solution (40% by mass) (23°C)

Bases

- ✓ Sodium Hydroxide solution (35% by mass) (23°C)
- ✓ Sodium Hydroxide solution (1% by mass) (23°C)
- ✓ Ammonium Hydroxide solution (10% by mass) (23°C)

Alcohols

- ✓ Isopropyl alcohol (23°C)
- ✓ Methanol (23°C)
- ✓ Ethanol (23°C)

Hydrocarbons

- ✓ n-Hexane (23°C)
- ✓ Toluene (23°C)
- ✓ iso-Octane (23°C)

Ketones

- ✗ Acetone (23°C)

Ethers

- ✗ Diethyl ether (23°C)

Mineral oils

- ✓ SAE 10W40 multigrade motor oil (23°C)
- ✗ SAE 10W40 multigrade motor oil (130°C)
- ✗ SAE 80/90 hypoid-gear oil (130°C)
- ✓ Insulating Oil (23°C)
- ✗ Motor oil OS206 304 Ref.Eng.Oil, ISP (135°C)
- ✗ Automatic hypoid-gear oil Shell Donax TX (135°C)
- ✗ Hydraulic oil Pentosin CHF 202 (125°C)

Standard Fuels

- ✗ ISO 1817 Liquid 1 - E5 (60°C)
- ✗ ISO 1817 Liquid 2 - M15E4 (60°C)
- ✗ ISO 1817 Liquid 3 - M3E7 (60°C)

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✗	ISO 1817 Liquid 4 - M15 (60°C)
✓	Standard fuel without alcohol (pref. ISO 1817 Liquid C) (23°C)
✓	Standard fuel with alcohol (pref. ISO 1817 Liquid 4) (23°C)
✓	Diesel fuel (pref. ISO 1817 Liquid F) (23°C)
✓	Diesel fuel (pref. ISO 1817 Liquid F) (90°C)
✗	Diesel fuel (pref. ISO 1817 Liquid F) (>90°C)
✓	Diesel EN 590 (100°C)

Salt solutions

✓	Sodium Chloride solution (10% by mass) (23°C)
✗	Sodium Hypochlorite solution (10% by mass) (23°C)
✓	Sodium Carbonate solution (20% by mass) (23°C)
✓	Sodium Carbonate solution (2% by mass) (23°C)
✓	Zinc Chloride solution (50% by mass) (23°C)

Other

✓	Ethyl Acetate (23°C)
✗	Hydrogen peroxide (23°C)
✗	DOT No. 4 Brake fluid (130°C)
✗	Ethylene Glycol (50% by mass) in water (108°C)
✓	1% nonylphenoxy-polyethyleneoxy ethanol in water (23°C)
✓	50% Oleic acid + 50% Olive Oil (23°C)
✓	Water (23°C)
✗	Water (90°C)
✓	Phenol solution (5% by mass) (23°C)
✗	Coolant Glysantin G48, 1:1 in water (125°C)

Symbols used:

✓ possibly resistant

Defined as: Supplier has sufficient indication that contact with chemical can be potentially accepted under the intended use conditions and expected service life. Criteria for assessment have to be indicated (e.g. surface aspect, volume change, property change).

✗ not recommended - see explanation

Defined as: Not recommended for general use. However, short-term exposure under certain restricted conditions could be acceptable (e.g. fast cleaning with thorough rinsing, spills, wiping, vapor exposure).

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc. ISO Mechanical properties measured at 4mm (Hytrel® measured at 2 mm), IEC Electrical properties measured at 2mm, all ASTM properties measured at 3.2mm, and test temperatures are 23°C unless otherwise stated.

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable and falls within the normal range of properties. It is intended for use by persons having technical skill, at their own discretion and risk. This data should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end-use conditions prior to specification is essential. Nothing herein is to be taken as a

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license to operate or a recommendation to infringe on patents. Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont customer representative and read Medical Caution H-50103-5.

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