

DUPONT™ HYTREL® THERMOPLASTIC POLYESTER ELASTOMER

PRODUCT REFERENCE GUIDE

DuPont™ Hytrel® thermoplastic polyester elastomer

Hytrel® thermoplastic polyester elastomer gives you the power to innovate. It facilitates the design and economical manufacture of a variety of parts and products by combining many of the best features of both high-performance elastomers and flexible plastic materials.

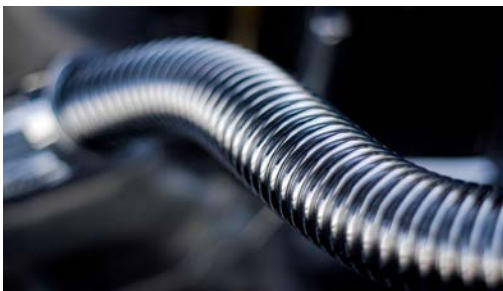
Toughness and Resilience: Hytrel® flexes and recovers, providing excellent flex fatigue resistance, hysteresis and spring-like properties, in addition to exceptional toughness, impact resistance, and creep resistance.

Wide Temperature Range: Flexibility at low temperatures, and good retention of mechanical properties at high temperature.

Resistance to Chemicals: Stands up to oils, fuels, hydrocarbon solvents, many other chemicals.

Economical Processing: Mold Hytrel® by injection, blow or rotational techniques; extrude it into tubes, profiles, fibers/filaments, sheet, blown or cast film, web coating, nonwovens, wire and cable jacketing.

Versatility: Select among grades offering a wide variety of combinations of flexibility, mechanical performance, processing characteristics and other properties. There are no plasticizers or extenders to leach out over time.



Applications

Take advantage of the unique combination of properties and processing productivity offered by Hytrel® to innovate. Use it to develop parts and products that helps cut costs, improve performance, reduce weight, or create new business opportunities.

Hytrel® has proven its performance in a wide variety of applications in automotive, electrical/electronic and various other industrial and consumer products. Some examples include:

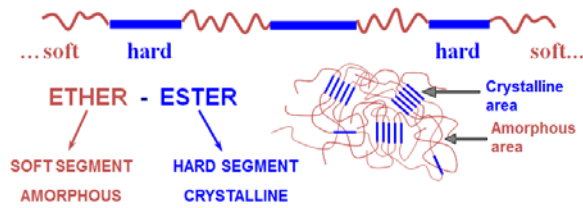
Auto parts and systems: CVJ boots, air intake ducting, air bag deployment doors, various components for heavy trucks and off-road equipment.

Industrial products: Drive or idler belts, energy management parts, gears, hose and tubing, pump diaphragms, seals, shock and noise-absorbing connectors and fasteners, wire and cable jacketing.

Consumer products: Parts for appliances, healthcare, furniture, power tools, sporting goods and other products.

Blends: Used to enhance properties when added to/blended with materials such as PVC, ABS, etc.

Block Copolymer



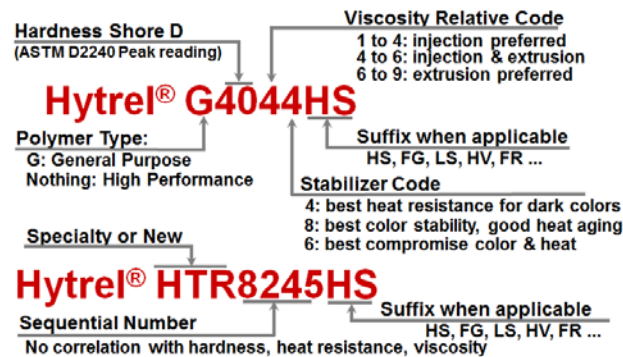
Product Chemistry

Block Copolymer - Hytrel[®] is identified as TPC-ET (thermoplastic polyester elastomer) according to ISO 1043. It is a block copolymer, consisting of a hard (crystalline) segment of polybutylene terephthalate and a soft (amorphous) segment based on polyether chemistry. Properties are determined by the ratio of hard to soft segments and by the composition of the segments.

No Plasticizer - Hytrel[®] grades are inherently flexible, they do not contain plasticizer.

Hardness Range - The Hytrel[®] product line contains grades with ASTM D2240 peak Shore D hardness ranging from 30 to 80 (24 to 70 per ISO 868, 15 sec).

Hytrel[®] Coding System



Hytrel[®] ProductLine



DuPont Hytrel[®] Grades

High Performance – These grades provide an extra measure of strength or serviceability in the most demanding applications and can be used in light-colored parts.

General Purpose – These grades offer the best balance of properties and cost.

Specialty – This family includes grades with enhanced properties or processing characteristics for specific applications.

Concentrates – DuPont offers various additive containing concentrates to be blended with other Hytrel[®] resins to enhance specific properties, as outlined in Table 1.

Product Positioning

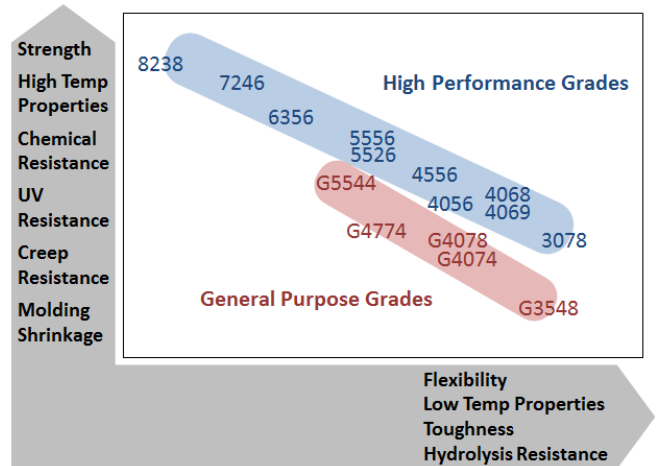


Table 1 Hytrel[®] Concentrates

Product	Description	Typical Letdown Ratio	Typical Uses
Hytrel [®] 21UV	UV light stabilizer concentrate	50:1 to 25:1	Protect light-colored parts and/or black thin parts against UV degradation.
Hytrel [®] 30HS	Heat stabilizer concentrate	20:1	Reduce thermal oxidative degradation to extend useful life at elevated temperatures.
Hytrel [®] 40CB	Carbon black concentrate	7:1 (improved UV resistance) 50:1 to 20:1 (cosmetic black)	Protect against degradation from exposure to UV light or as a black colorant.
Hytrel [®] 52FR	Flame retardant concentrate	10:1	Improve flammability and LOI.
Hytrel [®] 60LW	Lubricant concentrate	50:1 to 25:1	Improve wear and friction properties.

Table 2 – Product Characteristics and Typical Uses

	Characteristics	Processing	Anti-Oxidant	Tubing	Hose, Liners	Corrugate	Wire & Cable	Optical Cable	Profile	Monofilament	Sheeting/Cast Film	Films, Coated Film	Stock Shape	Mandrels	Blends	Belting	Seals, Gaskets	Gears, Bearings, Sprockets
High Performance Hytrel® Resins																		
Hytrel® 3078	Excellent strength, toughness and flexibility over a wide temperature range.	Injection Molding, Extrusion	Color Stable	x			x				x	x						
Hytrel® 4056	Excellent low-temperature properties, flex-fatigue and creep resistance. Low melting point.	Extrusion	Color Stable		x	x	x		x		x	x			x	x	x	
Hytrel® 4068 Hytrel® 4069	Excellent low-temperature properties, flex-fatigue and creep resistance.	Injection Molding, Extrusion	Color Stable	x	x	x	x		x		x					x	x	
Hytrel® 4556	Very good low-temperature properties, flex-fatigue and creep resistance.	Injection Molding, Extrusion	Color Stable	x	x	x	x		x		x					x	x	
Hytrel® 5526	Higher flow version of 5556.	Injection Molding	Color Stable														x	x
Hytrel® 5556	Very good balance of properties.	Injection Molding, Extrusion	Color Stable	x	x	x	x	x	x	x	x			x		x	x	x
Hytrel® 5555HS	Increased heat-aging stability vs 5556.	Injection Molding, Extrusion	Discolors	x	x		x											
Hytrel® 6356	Very good strength, thermal and creep resistance with good flexibility, toughness.	Injection Molding, Extrusion	Color Stable	x	x	x	x	x		x	x	x		x			x	x
Hytrel® 7246	High service temperature with good low-temperature flexibility. Excellent oil, fuel, and solvent resistance. Low fuel permeability.	Injection Molding, Extrusion	Color Stable	x	x	x	x	x		x	x	x	x					x
Hytrel® 8238	Highest service temperature. Excellent oil, fuel, and solvent resistance. Lowest fuel permeability.	Injection Molding, Extrusion	Color Stable	x	x	x	x	x		x	x	x	x					x
General Purpose Hytrel® Resins																		
Hytrel® G3548	Very flexible grade with excellent flex resistance, especially at low temperatures.	Injection Molding, Extrusion	Color Stable				x				x	x						
Hytrel® G4074	Excellent heat-aging resistance and resistance to oils at high temperatures.	Injection Molding, Extrusion	Discolors	x	x		x		x		x	x		x				
Hytrel® G4078 Hytrel® G4078LS	Like Hytrel® G4074, except heat-aging resistance is reduced.	Injection Molding, Extrusion	Color Stable	x	x		x		x		x	x		x				
Hytrel® G4774	Excellent heat-aging resistance and resistance to oils at high temperatures. Good resistance to oils, fuels, and solvents.	Injection Molding, Extrusion	Discolors	x	x		x		x			x		x				
Hytrel® G5544	Excellent heat-aging resistance and resistance to oils at high temperatures.	Injection Molding, Extrusion	Discolors	x	x		x		x	x	x	x		x				

Table 3 – Typical Properties

Grade	Shore D Hardness, 15s ISO 868	Flexural Modulus, MPa ISO 178	Yield Stress, MPa ISO 527	Yield Strain, % ISO 527	Stress at Break, MPa ISO 527	Nominal Strain at Break, % ISO 527	Melt Point, °C ISO 11357	Glass Transition Temp, °C ISO 11357	Density, g/cm ³ ISO 1183	Mold Shrink, % ISO 294
Hytrel [®] 3078	26	21	NY	NY	24	900	177	-60	1.07	0.6
Hytrel [®] 4056	37	64	NY	NY	26	500	152	-50	1.16	0.2-0.4
Hytrel [®] 4068	33	45	NY	NY	29	800	193	-55	1.11	0.8
Hytrel [®] 4069	33	45	NY	NY	29	800	193	-50	1.11	0.8
Hytrel [®] 4556	42	87	NY	NY	34	740	193	-45	1.14	1.1
Hytrel [®] 5526	51	200	14	37	43	780	203	-20	1.19	1.4
Hytrel [®] 5555HS	52	195	15	36	35	640	201	-	1.19	1.5
Hytrel [®] 5556	51	190	14	34	40	600	201	-20	1.19	1.4
Hytrel [®] 6356	57	290	19	33	43	500	210	0	1.22	1.5
Hytrel [®] 7246	64	550	26	26	50	530	218	25	1.26	1.6
Hytrel [®] 8238	70	1150	36	19	46	340	221	50	1.28	1.6
Hytrel [®] G3548	24	25	NY	NY	10	200	157	-	1.15	0.8
Hytrel [®] G4074	35	65	NY	NY	20	360	170	-35	1.18	0.8
Hytrel [®] G4078	33	-	NY	NY	16	250	170	-	1.18	0.5
Hytrel [®] G4078LS	-	58	NY	NY	21	-	175	-	1.18	0.5
Hytrel [®] G4774	43	111	NY	NY	17	400	208	-45	1.19	1.5
Hytrel [®] G5544	51	190	NY	NY	33	290	214	-35	1.22	1.6

NY = No Yield

Technical datasheets on these and additional resins in the Hytrel[®] family can be found on hytrel.dupont.com.

Visit us at plastics.dupont.com or hytrel.dupont.com

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