

# 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.

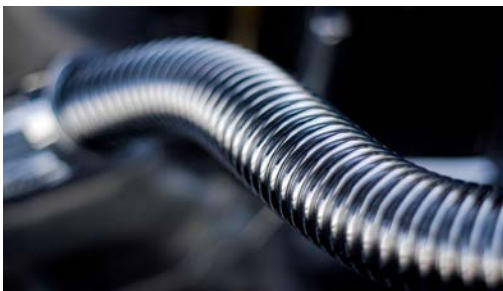
**Toughness and Resilience:** Hytrel® flexes and recovers, providing excellent flex fatigue resistance, hysteresis and spring-like properties, in addition to exceptional toughness, impact resistance, and creep resistance.

**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:

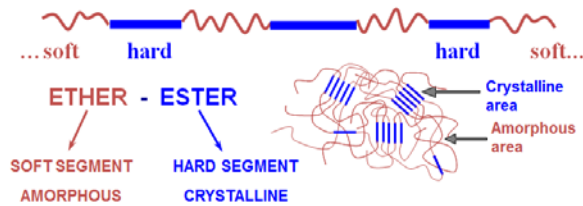
**Auto parts and systems:** CVJ boots, air intake ducting, air bag deployment doors, various components for heavy trucks and off-road equipment.

**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



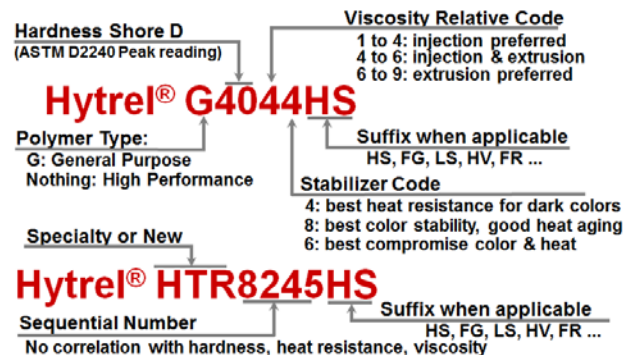
## Product Chemistry

**Block Copolymer** - Hytrel<sup>®</sup> 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<sup>®</sup> grades are inherently flexible, they do not contain plasticizer.

**Hardness Range** - The Hytrel<sup>®</sup> 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<sup>®</sup> Coding System



## Hytrel<sup>®</sup> ProductLine



## DuPont Hytrel<sup>®</sup> Grades

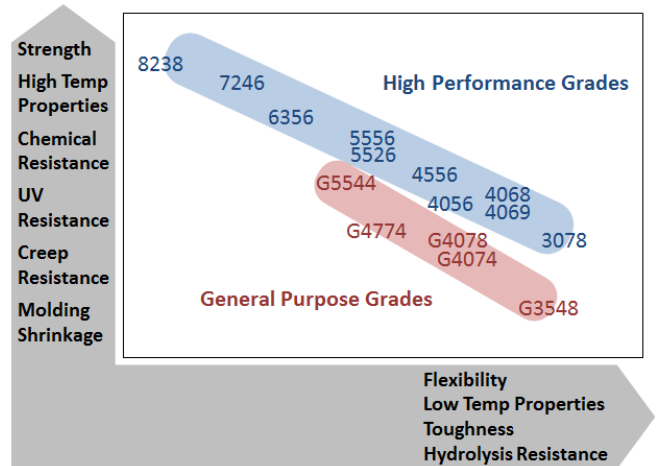
**High Performance** – These grades provide an extra measure of strength or serviceability in the most demanding applications and can be used in light-colored parts.

**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<sup>®</sup> resins to enhance specific properties, as outlined in Table 1.

## Product Positioning



**Table 1 Hytrel<sup>®</sup> Concentrates**

Product	Description	Typical Letdown Ratio	Typical Uses
Hytrel <sup>®</sup> 21UV	UV light stabilizer concentrate	50:1 to 25:1	Protect light-colored parts and/or black thin parts against UV degradation.
Hytrel <sup>®</sup> 30HS	Heat stabilizer concentrate	20:1	Reduce thermal oxidative degradation to extend useful life at elevated temperatures.
Hytrel <sup>®</sup> 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 <sup>®</sup> 52FR	Flame retardant concentrate	10:1	Improve flammability and LOI.
Hytrel <sup>®</sup> 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
<b>High Performance Hytrel® Resins</b>																		
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
<b>General Purpose Hytrel® Resins</b>																		
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 <sup>3</sup> ISO 1183	Mold Shrink, % ISO 294
Hytrel <sup>®</sup> 3078	26	21	NY	NY	24	900	177	-60	1.07	0.6
Hytrel <sup>®</sup> 4056	37	64	NY	NY	26	500	152	-50	1.16	0.2-0.4
Hytrel <sup>®</sup> 4068	33	45	NY	NY	29	800	193	-55	1.11	0.8
Hytrel <sup>®</sup> 4069	33	45	NY	NY	29	800	193	-50	1.11	0.8
Hytrel <sup>®</sup> 4556	42	87	NY	NY	34	740	193	-45	1.14	1.1
Hytrel <sup>®</sup> 5526	51	200	14	37	43	780	203	-20	1.19	1.4
Hytrel <sup>®</sup> 5555HS	52	195	15	36	35	640	201	-	1.19	1.5
Hytrel <sup>®</sup> 5556	51	190	14	34	40	600	201	-20	1.19	1.4
Hytrel <sup>®</sup> 6356	57	290	19	33	43	500	210	0	1.22	1.5
Hytrel <sup>®</sup> 7246	64	550	26	26	50	530	218	25	1.26	1.6
Hytrel <sup>®</sup> 8238	70	1150	36	19	46	340	221	50	1.28	1.6
Hytrel <sup>®</sup> G3548	24	25	NY	NY	10	200	157	-	1.15	0.8
Hytrel <sup>®</sup> G4074	35	65	NY	NY	20	360	170	-35	1.18	0.8
Hytrel <sup>®</sup> G4078	33	-	NY	NY	16	250	170	-	1.18	0.5
Hytrel <sup>®</sup> G4078LS	-	58	NY	NY	21	-	175	-	1.18	0.5
Hytrel <sup>®</sup> G4774	43	111	NY	NY	17	400	208	-45	1.19	1.5
Hytrel <sup>®</sup> 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<sup>®</sup> family can be found on [hytrel.dupont.com](http://hytrel.dupont.com).

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Reference number HYE-A11192-00-B0915

