

# If you need even more versatility, look to HYTREL®... a thermoplastic and an elastomer all in one

HYTREL® thermoplastic polyester elastomers provide a winning combination for many parts and components. They give the flexibility of rubbers, the strength of plastics, and the processibility of thermoplastics. They can be processed easily on conventional injection, blow and rotational moulding equipment, and can also be extruded and melt-cast.

HYTREL® is ideal for parts requiring low flex fatigue and high load-bearing capacity. It is strongly resistant to tearing, flex-cut growth, creep and abrasion. Its mechanical properties provide the strength and stiffness you need, in addition to outstanding toughness. Its chemical properties make it highly resistant to hydrocarbons and many other fluids.

HYTREL® retains these properties at temperatures from  $-40^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$ , and even up to  $+150^{\circ}\text{C}$  with additional heat stabilisers.

HYTREL® standard grades are available in a full range of Shore D hardnesses from 35 to 82, as well as high performance grades with hardnesses of 30D and 72D. Special grades include heat stabilised, flame retardant, food approved, glass-reinforced, blow moulding and extrusion grades. Concentrates offered include black pigments, UV protection additives, hydrolysis resistant additives, heat stabilisers, and flame retardants.

If you have multi-part or multi-material components that could be made simpler or operate more efficiently with HYTREL® we invite you to learn more about this unique thermoplastic elastomer.



1. HYTREL® in Airbag Deployment Door application offers a unique consistency of physical properties over a wide range of temperature, it can be used in extreme low temperature environments and withstands the automotive interior requirements including UV, aesthetics.

2. Flexibility in design, increased stiffness without adding weight or thickness, and an impeccable performance at all temperatures was reason enough for the people at Salomon to choose HYTREL® for the energy spring of their in-line skate.

3. HYTREL® proved to be the answer for the interior door handle in the restyled SEAT Toledo. Besides a nice, soft touch and matt surface, SEAT was looking for very specific mechanical and chemical properties. The possibility of moulding the DuPont elastomer in a tool that was designed for the previously used acetal copolymer meant a significant cost saving, as HYTREL® has similar mould shrinkage.

4. The Suehiro Industry Co. Ltd knows all about "zapping". Their change to HYTREL®, from the traditional silicone rubber for keypads of remote controls resulted in shorter production cycles, increased design flexibility and an ideal "feel". "An altogether superior class of product" is how Suehiro's development manager describes HYTREL®.

5. Using HYTREL®, Paguag developed a range of flexible coupling with longer service life, greater reliability and better performance. HYTREL® has very good resistance to synthetic oil, water, grease, ozone and many other chemicals. It also has excellent resistance to flex fatigue and crack propagation and maintains these properties over a wide range of temperatures.

6. The HYTREL® HTR8105 BK in CVJ boots put an end to a very costly and complicated repair in case of failure during the life of the car. These CVJ boots for the Ford Mondeo moulded by ContiTech in Germany, are extremely cost-effective compared to their rubber counterparts, and offer superior toughness and resistance to greases.



7. Another HYTREL® application in automotive components is the blow-moulded air-duct made of HYTREL® HTR4275 BK. VW has adopted this innovative technology and benefits for noise reduction, light weight and an overall reduction of the number of parts in the engine compartment, due to its multi-functionality.

By using these parts, engine performance can be improved by as much as 2%.

# Properties of HYTREL® thermoplastic polyester elastomer resins

					Standard grades					
Property <sup>1)</sup>	Test conditions	ISO test method	Units	G3548L	G4074	G4078W	G4774	G5544		
MECHANICAL	Stress at break (tensile)	50 mm/min	527-1/-2	MPa	10	21	17	20	35	
	Strain at break (tensile)	50 mm/min	527-1/-2	%	200	340	310	275	480	
	Stress at 5% strain	50 mm/min	527-1/-2	MPa	1,7	2,4	3,0	3,8	6,0	
	Stress at 10% strain	50 mm/min	527-1/-2	MPa	2,6	3,8	4,5	6,0	10,5	
	Tensile modulus	1 mm/min	527-1/-2	MPa	28	55	51	108	185	
	Flexural modulus			178	MPa					
		-40°C				62	207	166	320	850
		23°C				32	60	66	117	183
		100°C				7	33	16	69	125
	Izod impact strength (notched) <sup>2)</sup>		ASTM							
-40°C		D256	J/m	No Break	27	27	144	133		
	23°C	Method A		No Break	No Break	No Break	No Break	No Break		
THERMAL	Melting temperature, by DSC	10°K/min	3146 C	°C	156	170	170	208	215	
	Temperature of deflection under load			75-1/2						
		0,45 MPa			°C	50	50	65	100	
		1,8 MPa			°C			45	45	
	Vicat softening temperature	10 N	306	°C	75	110	120	175	190	
RHEOL	Melt mass-flow rate	Temperature/Load	1133	g/10 min	10	5,2	5,3	11	10	
				°C/kg	190/2,16	190/2,16	190/2,16	230/2,16	230/2,16	
	Density		1183	kg/m <sup>3</sup>	1150	1180	1180	1200	1220	
	Water absorption	Saturation, immersed	Similar to ISO 62	%	5,0	3,7	5,4	4,1	2,2	
OTHERS	Shore hardness D	(max. reading)	ASTM	points	35	40	40	47	55	
			D2240							
		15 s	868		26	34	34	43	50	
	Resistance to flex cut growth, Ross (pierced)		ASTM	Cycles to 5 × cut		>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>	0,8 × 10 <sup>6</sup>
			D1052		>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>	8 × 10 <sup>6</sup>	
	Abrasion resistance		ASTM	mg/1000 rev.						
		D1044								
Taber, CS-17 wheel			30		9	20	13	9		
	Taber, H-18 wheel		310	193	260	168	116			
Initial tear resistance	2 mm, die C	34	kN/m	51	81	88	94	123		

1) All properties were measured on injection-moulded specimens at 23°C, unless specified otherwise.

2) Specimens 6,35 mm thick.

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Standard grades			High-performance grades							Specialty grades			
6358	7248	8238	4056	4068	4556	5526	5556	6356	7246	5555HS	HTR 4275 BK	HTR 5612	HTR 8068
41	46	49	30	28	31	40	42	46	53	40	40	36	13
420	350	400	420	600	550	500	500	490	450	500	450	450	240
9,0	14,0	27,6	2,4	2,4	4,1	6,9	6,9	12,0	14,0	6,9	7,6	5,5	3,9
13,1	20,0	30,3	3,6	3,5	5,7	10,3	10,3	16,0	20,0	10,3	10,3	8,3	5,2
280	525	1150	53			188	180	280	525		150	115	140
1850	2390	3030	155	172	230	760	760	1800	2410	760	910	510	650
290	544	1210	62	55	80	200	180	296	527	207	160	134	174
		255	27	28	44	110	110	150	207	110	59	46	50
30	40	30	No Break	No Break	No Break	128	170	48	40	43	70	110	90
No Break	210	40	No Break	No Break	No Break	No Break	No Break	No Break	210	No Break	No Break	No Break	No Break
213	218	223	150	193	193	203	203	211	218	203	196	201	169
115	95	105	50	55	50	65	70	85	95	60	68	62	
51	45	45			35	45	45	45	45	40	45	44	
195	205	210	110	135	160	180	180	195	205	180	174	155	110
9	13	12,5	5,3	8,5	8,5	18	7,5	8,5	12,5	8,5	1,8	3,0	4,6
230/2,16	240/2,16	240/2,16	190/2,16	220/2,16	220/2,16	220/2,16	220/2,16	230/2,16	240/2,16	220/2,16	230/2,16	230/2,16	230/2,16
1220	1250	1280	1150	1100	1140	1190	1200	1220	1260	1220	1160	1160	1430
0,6	0,6	0,6	0,7	0,7	0,6	0,6	0,6	0,6	0,6	0,7	0,6	0,6	*
63	72	82	40	40	45	55	55	63	72	55	55	50	46
58	68	74	39	33	40	51	52	58	68	50	52		
		N/A	>10 <sup>6</sup>	>10 <sup>6</sup>		5 × 10 <sup>5</sup>	5 × 10 <sup>5</sup>	5 × 10 <sup>5</sup>	3 × 10 <sup>4</sup>	10 <sup>5</sup>	5 × 10 <sup>4</sup>		
			>10 <sup>6</sup>	>10 <sup>6</sup>	>10 <sup>6</sup>	>5 × 10 <sup>5</sup>	>5 × 10 <sup>5</sup>	>5 × 10 <sup>5</sup>	>3 × 10 <sup>4</sup>	>10 <sup>5</sup>	>5 × 10 <sup>4</sup>	>6 × 10 <sup>5</sup>	
		9	3	15	3	7	6	7	13		20	38	25
		20	100	80	72	70	64	77	47	112	227	186	
		253	101	95	116	158	158	175	200	158	163	145	75

N/A = not applicable

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