

DuPont™ Viton® B-600

Technical Information — Rev. 3, July 2010

Introduction

Viton® B-600* fluoroelastomer is a gum polymer that demonstrates improved terpolymer processing and lower compound viscosity, along with the excellent heat and fluid resistance characteristics of the “B-family” of Viton®. Viton® B-600 is especially suited to curing with the bisphenol system: Viton® Curative No. 20 and No. 30 or Viton® Curative No. 50.

Compared to Viton® B, Viton® B-600 provides:

- Improved compression molding
 - increased mold flow
 - easier mold release
- Improved extrusion and calendaring
- Increased cure rate
- Improved compression set resistance

Applications

Viton® B-600 is highly recommended for applications like:

- Molded goods, e.g., shaft seals
- Calendered goods, e.g., flue duct expansion joints

Use of Viton® B-600

Table 1 contains information comparing compounds of Viton® B-600 and Viton® B. Compound A is cured with Viton® Curative No. 50 (for better demolding), and Compound B with Viton® Curative No. 20 and No. 30. VPA No. 3 processing aid is recommended for best demolding. A study that compares the effect of carbon black level of Viton® B-600 is shown in Table 2.

Safety and Handling

Before handling or processing Viton® B-600, please read and be guided by the recommendations as described in DuPont bulletin, “Handling Precautions for Viton® and Related Chemicals”.

Viton® B-600 should be handled similar to other types of Viton®. Keep off skin and wash well after handling. For safe handling of other compounding ingredients, please refer to the respective manufacturers' information.

Product Description

Chemical Composition	Terpolymer of hexafluoropropylene, vinylidene fluoride and tetrafluoroethylene
Physical Form	Free-flowing pellets
Color	Silver-Gray, translucent
Odor	None
Specific Gravity	1.85
Solubility	Low molecular weight esters and ketones
Storage Stability	Excellent
Mooney Viscosity (ML 1+10 at 121 °C [250 °F])	65

*Viton® B-600 was formerly named VTR-6173.

Table 1. The Performance of DuPont™ Viton® B-600 in Typical Compounds

	A Viton® B-600	B Viton® B-600	C Viton® B
Viton® B-600	100	100	—
Viton® B	—	—	100
Viton® Curative No. 20	—	3.0	3.0
Viton® Curative No. 30	—	3.8	3.8
Viton® Curative No. 50	2.5	—	—
MT Black (N990)	30	30	30
High Activity Magnesium Dioxide	3	3	3
Calcium Hydroxide	6	6	6
VPA No. 3	1	1	1
Stock Properties			
Mooney Scorch, MS at 121 °C (250 °F)			
Minimum Viscosity, units	64	65	79
Time to 10-unit rise, min	>30	>30	>30
ODR at 177 °C (350 °F), Micro die, 3° arc, 12 min			
M _L , N·m (in·lb)	2.7 (23)	2.9 (25)	4.6 (40)
t _{s2} , min	2.2	1.5	1.6
t'90, min	3.7	3.2	4.2
M _H , N·m (in·lb)	12.9 (111)	10.7 (92)	13.3 (115)
Vulcanizate Properties			
Press Cure: 10 min at 177 °C (350 °F)			
Post Cure: 24 hr at 232 °C (450 °F)			
Stress/Strain at 23 °C (73 °F) — Original			
100% Modulus, MPa (psi)	6.3 (910)	5.2 (755)	7.5 (1085)
Tensile Strength, MPa (psi)	13.0 (1890)	12.5 (1810)	14.8 (2150)
Elongation at Break, %	220	260	215
Hardness, durometer A, points	74	72	76
Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 275 °C (528 °F)			
100% Modulus, MPa (psi)	3.0 (430)	3.0 (435)	4.6 (670)
Tensile Strength, MPa (psi)	8.3 (1200)	7.6 (1105)	10.2 (1485)
Elongation at Break, %	335	370	280
Hardness, durometer A, points	71	70	75
Compression Set, Method B, Plied Discs, %			
22 hr at 200 °C (392 °F)	13	21	26
70 hr at 200 °C (392 °F)	22	28	38
Fluid Resistance, Volume Swell, %			
Fuel C, 70 hr at 23 °C (73 °F)	3.0	2.9	2.6
Methanol, 70 hr at 23 °C (73 °F)	19	19	17
Stauffer 7700 Fluid, 70 hr at 175 °C (347 °F)	9	9	9
Conc. Sulfuric Acid (96%), 70 hr at 150°C (302 °F)	22	24	28
Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 150 °C (302 °F) in Conc. Sulfuric Acid (96%)			
100% Modulus, MPa (psi)	3.6 (515)	3.5 (505)	3.7 (540)
Tensile Strength, MPa (psi)	7.7 (1115)	7.4 (1075)	7.3 (1065)
Elongation at Break, %	250	265	245
Hardness, durometer A, points	68	65	67

Table 2. The Effect of Carbon Black Level in DuPont™ Viton® B-600

	D 5 phr	E 15 phr	F 30 phr	G 45 phr	H 60 phr
Viton® B-600	93.4	93.4	93.4	93.4	93.4
MT Black (N990)	5	15	30	45	60
High-Activity Magnesium Dioxide	3	3	3	3	3
Calcium Hydroxide	6	6	6	6	6
Viton® Curative No. 20	3.0	3.0	3.0	3.0	3.0
Viton® Curative No. 30	3.8	3.8	3.8	3.8	3.8
VPA No. 3	1	1	1	1	1
Stock Properties					
Mooney Scorch MS at 121 °C (250 °F)					
Minimum Viscosity, units	53	57	72	76	90
Time to 10-unit rise, min	>30	>30	>30	>30	>30
ODR at 177 °C, (350 °F), Micro die, 3° arc, 12 min					
M _L , N·m (in·lb)	2.8 (24)	2.8 (24)	3.5 (30)	3.2 (28)	3.7 (32)
t _{s2} , min	1.9	1.9	1.8	1.7	1.5
t _{c90} , min	3.6	3.6	3.9	3.9	3.9
M _H , N·m (in·lb)	9.7 (84)	10.2 (88)	11.1 (96)	11.7 (101)	12.2 (105)
Vulcanizate Properties					
Press Cure: 10 min at 177 °C (350 °F)					
Post Cure: 24 hr at 232 °C (450 °F)					
Stress/Strain at 23 °C — Original					
100% Modulus, MPa (psi)	2.2 (315)	3.3 (475)	5.3 (775)	7.2 (1045)	9.6 (1385)
Tensile Strength, MPa (psi)	11.1 (1615)	12.3 (1785)	12.7 (1835)	12.1 (1755)	12.0 (1735)
Elongation at Break, %	325	290	225	190	140
Hardness, durometer A, points	56	63	71	82	88
Stress/Strain at 23 °C — After aging 70 hr at 275 °C (528 °F)					
100% Modulus, MPa (psi)	1.1 (165)	1.7 (245)	2.9 (420)	4.0 (575)	4.7 (685)
Tensile Strength, MPa (psi)	7.4 (1070)	7.0 (1015)	7.1 (1025)	6.4 (930)	6.1 (890)
Elongation at Break, %	550	440	375	340	285
Hardness, durometer A, points	55	62	71	83	89
Compression Set, Method B, Plied Discs, %					
22 hr at 200 °C (392 °F)	18	20	20	24	36
70 hr at 200 °C (392 °F)	25	28	31	34	45
Fluid Resistance, Volume Swell, %					
Fuel C, 70 hr at 23 °C (73 °F)	3.4	3.0	3.0	2.6	2.3
Methanol, 70 hr at 23 °C (73 °F)	23	21	20	14	11
Stauffer 7700 Fluid, 70 hr at 175 °C (347 °F)	11	10	9	8	7
Conc. Sulfuric Acid (96%), 70 hr at 150 °C (302 °F)	26	24	22	29	35
Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 150 °C (302 °F) in Conc. Sulfuric Acid (96%)					
100% Modulus, MPa (psi)	1.3 (275)	2.5 (365)	3.7 (540)	3.0 (430)	2.0 (285)
Tensile Strength, MPa (psi)	8.8 (1280)	8.3 (1200)	8.1 (1170)	5.5 (800)	6.8 (990)
Elongation at Break, %	320	300	245	325	390
Hardness, durometer A, points	51	57	65	67	59

Test Procedures

Property Measured	Test Procedure
Compression Set	ASTM D395-85, Method B (25% deflection)
Compression Set — Low Temperature	ASTM D1299-87, Method B (25% deflection)
Compression Set, O-Rings	ASTM D1414-78 (87)
Hardness	ASTM D2240-87, durometer A
Mooney Scorch	ASTM D1646-87, using the small rotor. Minimum viscosity and time to a 1-, 5-, and 10-unit rise are reported.
Mooney Viscosity	ASTM D1646-87, ten pass 100 °C and 121 °C
ODR (vulcanization characteristics measured with an oscillating disk cure meter)	ASTM D2084
Property Change After Oven Heat-Aging	ASTM D573-88
Stress/Strain Properties	
100% Modulus	ASTM D412-87, pulled at 8.5 mm/s (20 in/min)
Tensile Strength	
Elongation at Break	
Stiffness, Torsional, Clash-Berg	ASTM D1043-87
Temperature Retraction	ASTM D1329-88
Volume Change in Fluids	ASTM D471-79

Note: Test temperature is 24 °C (75 °F), except where specified otherwise

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