

Vamac[®] G

Ethylene Acrylic Elastomer - Technical Data

Description

DuPont[™] Vamac[®] G is a terpolymer of ethylene, methyl acrylate, and a cure site monomer. It is cured using an amine-based vulcanization system. This gum elastomer includes a small amount of process-aid and has a nominal specific gravity of 1.03. It has a mild acrylic odor. Use adequate ventilation during storage, mixing, and processing to prevent accumulation of residual vapors. Storage stability is excellent.

Product Properties

Property	Target Value	Method
Mooney Viscosity ML 1+4 at 100 °C	16.5	ASTM D1646
Volatiles	≤ 0.4 wt %	Internal DuPont Test
Form (25kg bale)	51.6 x 34.4 x 13.6 cm	Visual inspection
Color	Clear to light yellow translucent	Visual inspection

Major Performance Properties and Applications

Vamac[®] G has excellent high-temperature durability and oil resistance with service lubricants, coupled with good low-temperature flexibility. Compounds of Vamac[®] G are typically rated at 175 °C for heat resistance, with oil swell values around 50% in IRM 903 oil. The properties of Vamac[®] G make it well suited for a wide range of automotive applications, including powertrain seals and gaskets, rocker cover and piston seals, oil coolant hoses, power steering hoses, turbocharger hoses, crankcase ventilating tubes, coverings for fuel and coolant hoses, O-rings, grommets and spark plug boots.

Vamac[®] G is an excellent vibration damping material that is uniquely insensitive to temperature over a range of -30 °C to 160 °C. Compounds of Vamac[®] G are suitable for use in torsional dampers and isolator pads.

Vamac[®] G is a halogen-free polymer and does not decompose to give off corrosive gasses when exposed to flame. It is used for flame-retarded, low-smoke, non-halogen wire and cable jackets and in non-halogen, low-smoke flooring.

Vamac[®] G is well suited for injection, transfer and compression molding, and is easily extruded.

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Handling Precautions

Because Vamac[®] ethylene-acrylic elastomers contain small amounts of residual methyl acrylate monomer, adequate ventilation should be provided during storage and processing to prevent worker exposure to methyl acrylate vapor. Additional information may be found in the Vamac[®] product Safety Data Sheet (SDS), and DuPont[™] bulletin, *Safe Handling and Processing of Vamac[®]*.

Compound and Vulcanizate Properties

Compounds of DuPont[™] Vamac[®] are formulated and processed by customers to meet their own specific performance requirements.

DuPont has independently formulated a wide variety of Vamac[®] compounds for its own short and long-term properties testing programs. A typical compound of Vamac[®] G is reviewed below, followed by vulcanizate performance test data that can help end-users evaluate the potential fitness of similar compounds for their own applications.

Table 1 – Sample Compound, Vamac[®] G

Ingredients	Parts
Vamac [®] G	100
Antioxidant: Naugard [®] 445	1
Release agent: Stearic acid	1.5
Release agent: Vanfre [®] VAM (alkylphosphate)	1
Release agent: Armeen [®] 18 (octadecylamine)	0.5
SRF black (N774)	65
Curative: Diak [™] No. 1 (hexamethylene diamine carbamate)	1.5
Cure Accelerator: DOTG (guanidine coagent)	4
Total Parts	174.5

Stock Properties	
Mooney Viscosity: ML (1+4) at 100 °C, Mooney units	40
Mooney Scorch: MS at 121 °C	
Minimum Viscosity, units	16
Time to 10-unit rise, min.	13

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Table 2 – Physical Properties of Vulcanizate

Slab Cure: 10 min. at 177 °C / Post Cure: 4 hrs at 175 °C

Stress/Strain and Hardness

Original Values

100% Modulus, MPa	5.1
Tensile Strength, MPa	16.6
Elongation at Break, %	280
Hardness, "A" Durometer	68

Aged 1008 Hrs at 150 °C in Air

100% Modulus, MPa	6.4
Tensile Strength, MPa	15.3
Elongation at Break, %	225
Hardness, "A" Durometer	77

Aged 70 Hrs at 150 °C Immersed in ASTM #1 Oil

100% Modulus, MPa	4.7
Tensile Strength, MPa	14.1
Elongation at Break, %	295
Hardness, "A" Durometer	66
Volume Increase, %	9

Aged 70 Hrs at 150 °C Immersed in IRM 903

100% Modulus, MPa	4.8
Tensile Strength, MPa	8.8
Elongation at Break, %	185
Hardness, "A" Durometer	48
Volume Increase, %	60

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Table 2 – Physical Properties of Vulcanizate (continued)

Slab Cure: 10 min. at 177 °C / Post Cure: 4 hrs at 175 °C

Stress/Strain and Hardness

Aged 1008 Hrs at 150 °C Immersed in SF-105 Oil

100% Modulus, MPa	4.7
Tensile Strength, MPa	11.3
Elongation at Break, %	150
Hardness, "A" Durometer	58
Volume Increase, %	32

Aged 1008 Hrs at 150 °C Immersed in GM Dexron® III ATF

100% Modulus, MPa	5.2
Tensile Strength, MPa	13.8
Elongation at Break, %	220
Hardness, "A" Durometer	57
Volume Increase, %	28

Low-Temperature Properties (DSC)

Initial, °C	-32.64
Inflection, °C	-27.92

Compression Set, ASTM D395 Method B, Plied

Hours Tested	70	168	336	504	1008
at 150 °C, %	16	21	26	30	40
at 177 °C, %	—	24	—	—	—

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ASTM Test Methods used for this work:

Rheology

Mooney Viscosity	D 1646
Mooney Scorch	D 1646

Physicals

Hardness	D 2240
Tensile, Elongation, Modulus	D 412
Ageing in Air	D 573
Fluid Ageing	D 471
Compression Set	D 395
Tg by DSC	D 3418

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