

Description

DuPont™ Vamac® G is a terpolymer of ethylene, methylacrylate, and a cure site monomer. It is cured using an amine-based vulcanization system. This gum elastomer includes a small amount of processing 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 (212 °F) | 16.5 | ASTM D1646 |
| Volatiles, wt % | ≤ 0.4 | Internal DuPont Test |
| Form, mm (in) | Bale size is nominally: 560 x 370 x 165 (22 x 15 x 7) | Visual inspection |
| Color | Clear | 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 (347 °F) 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 (-22 °F) to 160 °C (320 °F). 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, nonhalogen wire and cable jackets and in nonhalogen, low-smoke flooring.

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

Handling Precautions

Because Vamac® G contains small amounts of residual methylacrylate monomer, adequate ventilation should be provided during mixing and processing to prevent worker exposure to methylacrylate vapor. Additional information may be obtained in the Material Safety Data Sheet (MSDS), and the "Safe Handling and Processing of Vamac® and Vamac® Compounds Guide" available from vamac.dupont.com.



Compound and Vulcanizate Properties

Compounds of DuPont™ Vamac® are formulated and processed by customers to meet their own specific performance requirements. Many of the highest-performing compounds are vulcanizates of Vamac® are proprietary, and cannot be published by DuPont.

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 endusers 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 |
| Coaccelerator: DOTG (guanidine coagent) | 4 |
| Total Parts | 174.5 |
| Stock Properties | |
| Mooney Viscosity: M-L (1+4) at 100 °C (212 °F), Mooney units | 40 |
| Mooney Scorch: MS at 121 °C (250 °F) | |
| Minimum Viscosity, units | 16 |
| Time to 10-unit rise, min. | 13 |

**Table 2 – Physical Properties of Vulcanizate
Slab Cure: 10 min. at 177 °C (350 °F) – Post Cure: 4 hrs at 175 °C (347 °F)**

| Stress/Strain and Hardness | |
|--|--------------|
| Original Values | |
| 100% Modulus, MPa (psi) | 5.1 (735) |
| Tensile Strength, MPa (psi) | 16.55 (2400) |
| Elongation at Break, % | 280 |
| Hardness, "A" Durometer | 68 |
| Aged 1008 Hrs at 150 °C (302 °F) in Air | |
| 100% Modulus, MPa (psi) | 6.4 (925) |
| Tensile Strength, MPa (psi) | 15.3 (2215) |
| Elongation at Break, % | 225 |
| Hardness, "A" Durometer | 77 |
| Aged 70 Hrs at 150 °C (302 °F) Immersed in ASTM #1 Oil | |
| 100% Modulus, MPa (psi) | 4.7 (680) |
| Tensile Strength, MPa (psi) | 14.1 (2040) |
| Elongation at Break, % | 295 |
| Hardness, "A" Durometer | 66 |
| Volume Increase, % | 9 |
| Aged 70 Hrs at 150 °C (302 °F) Immersed in IRM 903 | |
| 100% Modulus, MPa (psi) | 4.8 (695) |
| Tensile Strength, MPa (psi) | 8.8 (1275) |
| Elongation at Break, % | 185 |
| Hardness, "A" Durometer | 48 |
| Volume Increase, % | 60 |
| Aged 1008 Hrs at 150 °C (302 °F) Immersed in SF-105 Oil | |
| 100% Modulus, MPa (psi) | 4.7 (680) |
| Tensile Strength, MPa (psi) | 11.3 (1640) |
| Elongation at Break, % | 150 |
| Hardness, "A" Durometer | 58 |
| Volume Increase, % | 32 |

Table 2 – Physical Properties of Vulcanizate
Slab Cure: 10 min. at 177 °C (350 °F) – Post Cure: 4 hrs at 175 °C (347 °F) (continued)

Stress/Strain and Hardness

**Aged 1008 Hrs at 150 °C (302 °F) Immersed in GM
Dexron® III ATF**

| | |
|-----------------------------|--------------|
| 100% Modulus, MPa (psi) | 5.2 (750) |
| Tensile Strength, MPa (psi) | 13.79 (2000) |
| Elongation at Break, % | 220 |
| Hardness, "A" Durometer | 57 |
| Volume Increase, % | 28 |

Compression Set, Method B, Plied, %

| | Hours Tested | | | | |
|--------------------|--------------|-----|-----|-----|------|
| | 70 | 168 | 336 | 504 | 1008 |
| At 150 °C (302 °F) | 16 | 21 | 26 | 30 | 40 |
| At 177 °C (350 °F) | — | 24 | — | — | — |

Low-Temperature Properties

DSC

Initial, °C (°F) -32.64 (-26.75)

Inflection, °C (°F) -27.92 (-18.26)

Note: The data shown here for this sample compound of Vamac® G fall within the normal range of compound properties, but they should not be used to establish specification limits, nor used alone as the basis for predicting performance under end-use conditions. Additional test data for this and other compounds of Vamac® are available from DuPont on request.

The test methods used in the work are shown below:

| Rheology | |
|---------------------------|--------|
| Mooney Viscosity | D 1646 |
| Mooney Scorch | D 1646 |
| MDR | D 5289 |
| Physicals | |
| Hardness | D 2240 |
| Tensile, Elongation, Mod | D 412 |
| Tear, Die C | D 624 |
| Fluid Aging | D 471 |
| Compression Set | D 395 |
| Tg by DSC | D 3418 |
| Aging in Air | D 573 |
| Temperature of Retraction | D 1329 |

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Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont customer service representative and read Medical Caution Statement H-50103-3.

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