SOLUTION SHOWCASE

Celanese

CELANESE VAMAC® AEM ETHYLENE ACRYLIC ELASTOMER FOR WIRE AND CABLE APPLICATIONS

BACKGROUND

Halogen-Free and Flame Retardant (HFFR or NHFR) materials are important for applications that require fire safety, for example in wire and cable, molded parts, and flooring in the transportation sector.

Celanese Vamac® AEM ethylene acrylic elastomer is not inherently resistant to burning. However, when properly compounded, a wire jacket of Vamac® AEM will pass the demanding UL-44 vertical wire flame test, generating very low smoke compared to other flame-resistant materials and provide non-halogen off-gases in fire situations.

Celanese Vamac® AEM compounds have proven records in flame retardant applications to provide an excellent characteristic combination of:

- Oil resistance
- Heat resistance
- Good low temperature flexibility
- Non-halogenated

Vamac® AEM dipolymer such as Vamac® AEM DP or Ultra DX are usually preferred for HFFR compounds. They provide more stable compound viscosity and better heat aging properties.

APPLICATIONS

Celanese Vamac® AEM compounds offer low smoke and low toxicity cables applications in a vast array of industries, which include

- HEV / EV Battery Cable
- Rolling Stock Cable
- Airplane Cable
- Mining Cable
- Off-Shore Oil Platform Cable
- Marine Cable
- Military Applications (e.g. submarine, fighter plane)

GENERAL PROPERTIES AND PROCESSING

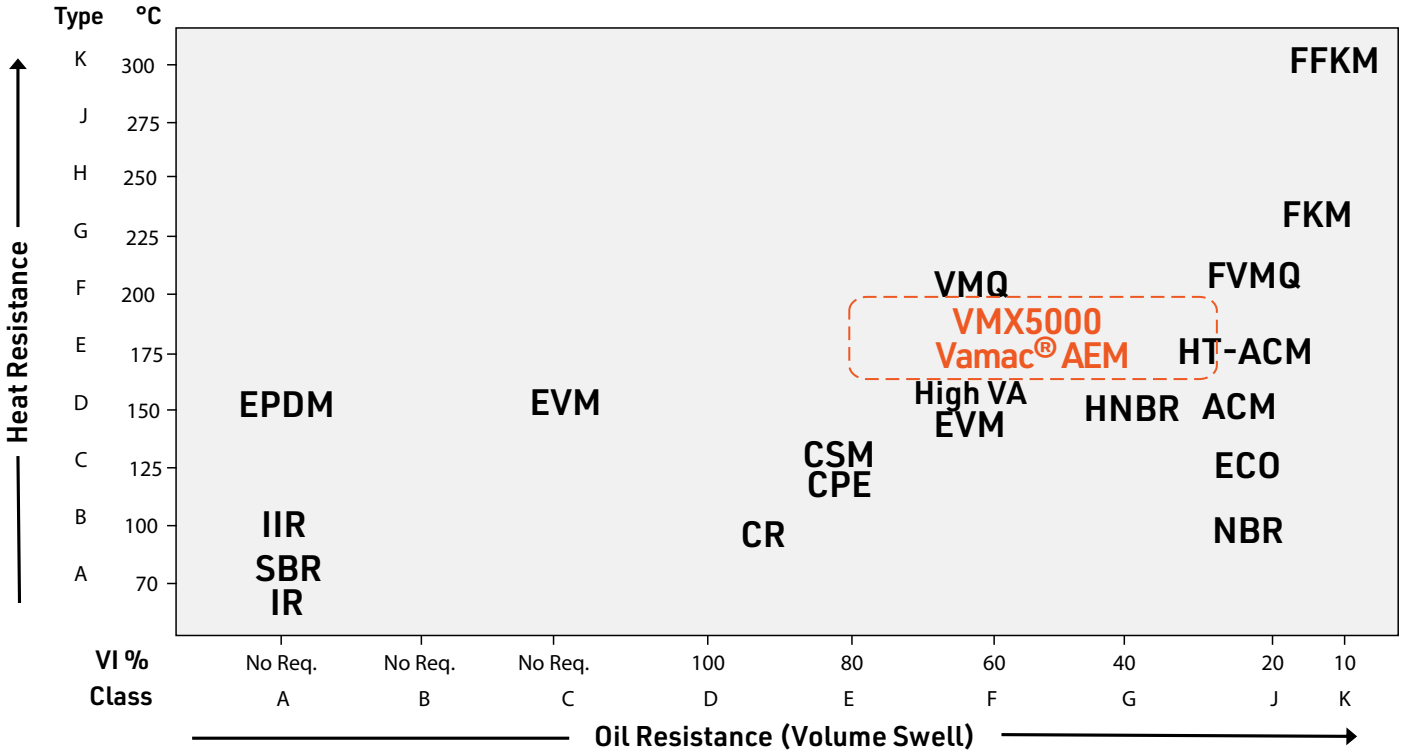
Celanese Vamac® AEM compounds possess extraordinary advantages in both properties and processing.

- Flexible at RT and Low Temperature (75-95 Shore A)
- High Temperature Resistance (Class C, D 125°C - 150°C)
- Resistant to Variety of Fluids (lubricants, diesel, battery acids, engine coolant, salt water and various oils, etc.)
- Good Abrasion Resistance and Electrical Resistivity (>1012 Ohm-cm)
- Ozone and Weather Resistance
- Easy to Process (Fast extrusion speed with smooth surface)
- Curing Flexibility (CV or E-Beam)
- Colorful and Applicable to Thin-Wall

And especially, for fire related properties they are:

- Non-halogenated
- Flame Retardant (LOI > 35, UL-94 V-0)
- Low Smoke Generations
- Low Fire Hazard / Toxic Gas

CELANESE VAMAC® AEM CHARACTERISTICS IN HEAT AND OIL RESISTANCE



CELANESE VAMAC® AEM PRODUCT PORTFOLIO

W&C Segment

Standard	Vamac® AEM G 16.5 MU, -30°C 1974	Vamac® AEM GLS 18.5 MU, -24°C 1992	Vamac® AEM GXF 17.5 MU, -31°C 2003			Vamac® AEM DP 22 MU, -29°C 2001
Ultra			Vamac® AEM Ultra XF 23 MU, -31°C 2015	Vamac® AEM VMX3123 23 MU 2018		
Ultra	Vamac® AEM Ultra IP 29 MU, -31°C 2008	Vamac® AEM Ultra LS 29 MU, -25°C 2013	Vamac® AEM Ultra HT 29 MU, -32°C 2012	Vamac® AEM Ultra HT-OR 29 MU, -26°C 2013	Vamac® AEM VMX4017 11 MU, -41°C 2006	Vamac® AEM Ultra DX 26 MU, -29°C 2014
Features	Best Compression Set, Fast Cure	Best Compression Set, Fast Cure, Low oil swell	Best Dynamic Fatigue Resistance	Low oil swell version of Ultra HT	Best low T performance	Peroxide cure, No post cure
Application	Molded parts, Seals & Gaskets, High pressure hoses	Molded parts (lower swell)	High Temperature Turbo Charger Hose		CVJ boots, Seals	Hoses, cables, HFFR
Vamac® VMX5000 Series						

VAMAC® AEM GRADES:

Recommendation for S&G, Molded Air Duct

- G, GLS, Ultra IP, Ultra LS
- High cross-link density
- Ultra grades for better physical properties, hot demolding
- Stable modulus during life cycle (ageing)
- 'LS' = low swell, higher MA

Recommendation for Extruded Hoses & Dynamic Applications

- GXF, Ultra XF, Ultra HT, Ultra HT-OR
- Low cross-link density
- Ultra grades for better physical properties,
- Intermediate viscosity grade (Ultra XF) for larger processing window
- 'OR' = oil resistance, higher MA

Special Grades

- Dipolymer DP and Ultra DX
- Low temperature polymer VMX4017
- VMX5000 for higher heat resistance

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