Vamac® Ultra LT

Ethylene Acrylic Elastomer

DuPont Performance Elastomers

Message:

DuPont™ Vamac® Ultra LT polymer has improved low-temperature properties compared to Vamac® G. The Tg for Vamac® Ultra LT polymer is about 12°C lower than the Tg for Vamac® G. A compound made from Vamac® Ultra LT with 20 phr of plasticizer has a Tg of -54°C. A compound without any plasticizer has a Tg of -40°C and that compound maintains that Tg after aging in air for six weeks at 150°C or for one week at 175°C.
The fluid resistance of Vamac® Ultra LT compounds is not as good as the G/GLS compounds, but resistance can be improved by blending with Vamac® G. The blends with G will have intermediate low-temperature performance and intermediate fluid resistance.
The polymer is typically cured with a diamine. It can also be cured with a peroxide. The gum elastomer has a low level of a processing aid and a nominal specific gravity of 1.03. The polymer has a mild acrylic odor and the storage stability of the polymer is excellent.
Cured compounds made from Vamac® Ultra LT have a good combination of properties including a wide operating window for end use temperatures. A compound with no plasticizer has a temperature window of -40°C up to 165°C and the compound can withstand short term temperature spikes up to 200°C. The low temperature properties can be improved by the addition of a plasticizer, and with 20 phr of plasticizer the initial Tg is about -54°C. The cured compounds are typically rated as class E for heat resistance using the ASTM D2000 system and this means that they will pass a heat rating test of 70 hours at 175°C (347°F). They will also pass a six week air aging requirement at temperatures as high as 165°C (329°F).
The fluid resistance of a cured compound depends on the carbon black and plasticizer level. A typical value for volume swell in IRM 903 fluid after aging for 168 hr at 150°C (302°F) is about 90%.
The compounds made from Vamac® Ultra LT have much lower volume swell in transmission fluid and in engine oils. The volume swell in Service Fluid 105 (1 week/150°C) is about 50% and the volume swell in ASTM #1 (1 week/150°C) is about 7%.
Most of the newer engine oils, transmission fluids, and high temperature greases are more synthetic and have higher aliphatic content than conventional test oils. The newer fluids also have much lower or no aromatic content. The volume swell in IRM903 may not be a good predictor for performance in the newer fluids.
The compression set values for compounds based on Vamac® Ultra LT were measured after one week at 150°C and the range in values is from 20 to 40%. The results depend on the curative package, the level of carbon black and the level of plasticizer.
CSR (Compressive Stress Relaxation) tests run on Vamac® Ultra LT compounds exhibit very good properties for six weeks at 150°C in engine oils. The percent retained sealing force is a relatively high value and this is probably due to the relatively high volume swell. The Vamac® Ultra LT compounds have higher values compared to the Vamac® G compounds which in turn have higher retained sealing forces compared to Vamac® GLS compounds.
The properties of Vamac® Ultra LT compounds make them well suited for a wide range of automotive applications, including, molded boots, powertrain seals and gaskets, rocker cover seals, transmission oil coolant hoses, power steering hoses, turbocharger hoses, crankcase ventilating tubes, coverings for fuel and coolant hoses, O-rings, grommets and crankshaft dampers.
Vamac® Ultra LT is a halogen free polymer and does not decompose to give off corrosive gases when exposed to flame. It can be used for flame retardant, low-smoke, non-halogen wire and cable jackets and in non-halogen, low smoke flooring.
Vamac® Ultra LT compounds are well suited for injection, transfer or compression molding. They also can be extruded.

General Information	
Additive	Processing Aid
Features	Halogen Free High Heat Resistance Low Temperature Resistant
Uses	Automotive Applications Gaskets Grommets Hose Seals Tubing
Appearance	Clear/Transparent Opaque

Forms	Bale
Processing Method	Compression Molding
	Extrusion
	Injection Molding
	Resin Transfer Molding

Physical	Nominal Value	Unit	Test Method
Mooney Viscosity			ASTM D1646
121°C [1]	8	MU	
121°C	12	MU	
ML 1+4, 100°C [2]	11	MU	
ML 1+4, 100°C [3]	23	MU	
ML 1+4, 100°C	37	MU	
Hardness	**Nominal Value**	**Unit**	**Test Method**
Durometer Hardness			ASTM D2240
Shore A	60		
Shore A [4]	63		
Elastomers	**Nominal Value**	**Unit**	**Test Method**
Tensile Stress (100% Strain)	3.10	MPa	ASTM D412
Tensile Strength			ASTM D412
Yield	14.3	MPa	
Yield [5]	11.0	MPa	
Tensile Elongation (Break)	360	%	ASTM D412
Tear Strength [6]			ASTM D624
--	28.2	kN/m	
-- [7]	27.7	kN/m	
Compression Set			ASTM D395
150°C, 70 hr	22	%	
150°C, 70 hr [8]	25	%	
150°C, 138 hr	31	%	
150°C, 168 hr [9]	35	%	
Aging	**Nominal Value**	**Unit**	**Test Method**
Change in Glass Transition Temperature			
-- [10]	-46	°C	ASTM D471
-- [11]	-44	°C	ASTM D471
-- [12]	-51	°C	ASTM D471
-- [13]	-52	°C	ASTM D471
150°C [14]	-42	°C	ASTM D573
150°C [15]	-47	°C	ASTM D573
175°C [16]	-41	°C	ASTM D573
175°C [17]	-43	°C	ASTM D573

Glass Transition Temperature			ASTM D3418
DMA Results - dan delta [18]	-32	°C	
DMA Results - dan delta [19]	-41	°C	
DMA Results - loss modulus [20]	-45	°C	
DMA Results - loss modulus [21]	-37	°C	
Static O-Ring test [22]	-55	°C	
Static O-Ring test [23]	-63	°C	
TR10	-39	°C	
TR10 [24]	-45	°C	
TR30	-32	°C	
TR30 [25]	-33	°C	
MDR			ASTM D5289
MH : 177°C [26]	7.83	dNm	
MH : 177°C [27]	9.63	dNm	
ML : 177°C [28]	0.410	dNm	
ML : 177°C [29]	0.370	dNm	
t50 : 177°C [30]	2.1	min	
t50 : 177°C [31]	2.1	min	
t90 : 177°C [32]	8.9	min	
t90 : 177°C [33]	9.4	min	
ts2 : 177°C [34]	1.2	min	
ts2 : 177°C [35]	1.4	min	
Mooney Scorch			ASTM D1646
t10 : 121°C [36]	17.4	min	
t10 : 121°C	14.8	min	
t3 [37]	10.1	min	
t3 : 121°C	9.2	min	
Volatiles	0.6	wt%	Internal Method

Thermal	Nominal Value	Unit	Test Method
Glass Transition Temperature			ASTM D3418
-- [38]	-54.0	°C	
--	-42.0	°C	

NOTE	
1.	20 phr plasticizer
2.	Target
3.	20 phr plasticizer
4.	20 phr plasticizer
5.	20 phr plasticizer
6.	Die C
7.	20 phr plasticizer
8.	20 phr plasticizer
9.	20 phr plasticizer

10.	after 1 week in ASTM #1, 20 phr plasticizer
11.	after 1 week in ASTM #1
12.	after 1 week in SF105
13.	after 1 week in SF105, 20 phr plasticizer
14.	after Air Aging, 6 weeks
15.	after Air Aging, 6 weeks, 20 phr plasticizer
16.	after Air Aging, 1 week
17.	after Air Aging, 1 week, 20 phr plasticizer
18.	1 Hz
19.	20 phr plasticizer, 1 Hz
20.	20 phr plasticizer, 1 Hz
21.	1 Hz
22.	1 Hz
23.	20 phr plasticizer, 1 Hz
24.	20 phr plasticizer
25.	20 phr plasticizer
26.	20 mins/0.5 degree arc, 20 phr plasticizer
27.	20 mins/0.5 degree arc
28.	20 mins/0.5 degree arc
29.	20 mins/0.5 degree arc, 20 phr plasticizer
30.	20 mins/0.5 degree arc
31.	20 mins/0.5 degree arc, 20 phr plasticizer
32.	20 mins/0.5 degree arc, 20 phr plasticizer
33.	20 mins/0.5 degree arc
34.	20 mins/0.5 degree arc
35.	20 mins/0.5 degree arc, 20 phr plasticizer
36.	20 phr plasticizer
37.	20 phr plasticizer
38.	20 phr plasticizer

Recommended distributors for this material

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