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Technical Data

VANOX[®] ZMTI Antioxidant Heat Resistance in Peroxide-Cured EPDM

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VANOX[®] ZMTI Antioxidant Heat Resistance in Peroxide-Cured EPDM

VANOX ZMTI works synergistically with other antioxidants to improve heat resistance in peroxide-cured EPDM. Neither VANOX ZMTI nor AGERITE[®] RESIN D[®] antioxidant interfere with peroxide cure systems. Using these antioxidants, the optimal ratio was found to be 2 phr of VANOX ZMTI to 1 phr of AO (AGERITE RESIN D). This combination provides superior aged strength and retention of properties, as shown in the results below for Compound 4.

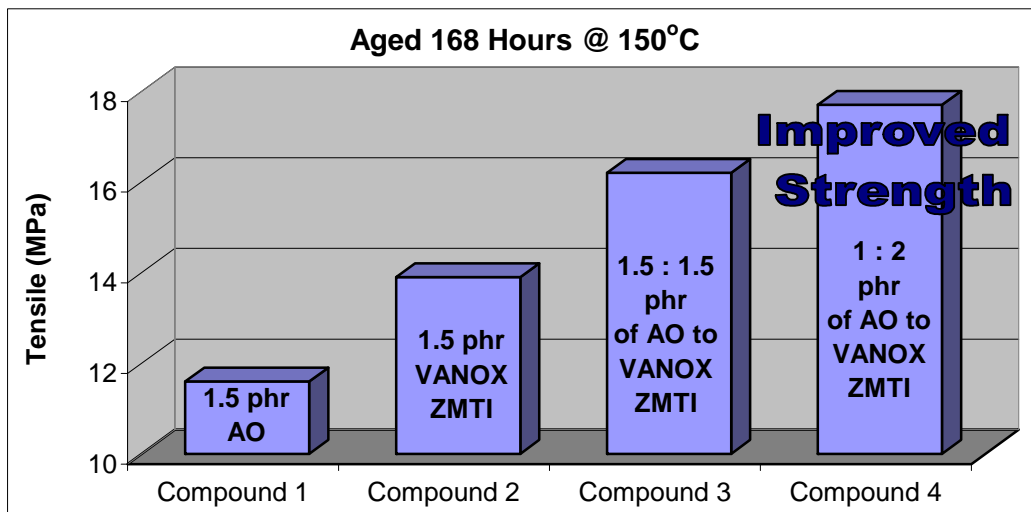


Figure 1: Aged Tensile Strength

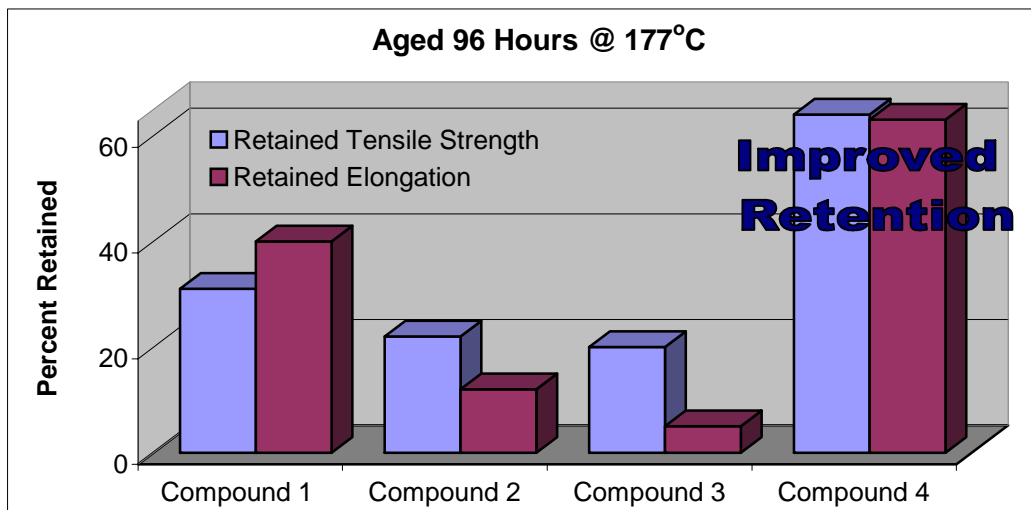


Figure 2: Retained Tensile Strength and Elongation

Ingredients	Compounds (phr)			
	1	2	3	4
EPDM Terpolymer	100.0	100.0	100.0	100.0
N550 Carbon Black	50.0	50.0	50.0	50.0
Zinc Oxide	5.0	5.0	5.0	5.0
VANFRE[®] AP-2 processing aid	0.5	0.5	0.5	0.5
VAROX[®] DCP-40C crosslinking agent	8.0	8.0	8.0	8.0
VANAX[®] MBM accelerator	1.0	1.0	1.0	1.0
AGERITE[®] RESIN D[®] antioxidant	1.5	-----	1.5	1.0
VANOX[®] ZMTI antioxidant	-----	1.5	1.5	2.0
Totals	166.0	166.0	167.5	167.5

* Mooney Viscosity (ML 1+4 at 125°C) = 20; Ethylene, mass % = 50; ENB, mass % = 4.9; Molecular Weight = Medium

RESIN D is a registered trademark of Emerald Performance Materials, LLC.

AGERITE, VANFRE, VANOX, and VAROX are registered trademarks of R.T. Vanderbilt Company, Inc.

PHYSICAL PROPERTIES

Press Cured t_c 90 + 2 min. @ 171°C (340°F)

100% Modulus, MPa	6.0	9.0	4.9	7.6
Tensile Strength, MPa	13.8	13.5	15.7	14.4
Elongation, %	187	120	212	149
Hardness, Shore A	73	75	71	74

OVEN AGED 168 HOURS @ 150°C (302°F)

Tensile Retained, %	84	103	103	123
Elongation Retained, %	84	111	91	109
Hardness, Shore A	+2	+2	+6	+2

OVEN AGED 96 HOURS @ 177°C (350°F)

Tensile Retained, %	31	22	20	64
Elongation Retained, %	40	12	5	63
Hardness, Shore A	+4	+9	+13	+5

COMPRESSION SET – METHOD B – 168 HOURS @ 177°C (350°F)

Press Cured t_c 90 + 7 min. @ 171°C (340°F)

Set, %	32	36	37	29
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MDR, ASTM D 5289 @ 177°C (350°F), 0.5°Arc

Minimum Torque, M_L , dN·m	1.0	1.3	0.9	1.0
Maximum Torque, M_H , dN·m	37.4	47.2	31.8	39.7
t_{s1} , minutes	0.5	0.3	0.6	0.4
t_c 90, minutes	7.7	6.9	7.3	7.6

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