KEVLAR®

DUPONT®

KEVLAR® engineered elastomer with Acrylonitrile Butadiene Rubber (NBR)

Merge 1F770
(Seal Formulation)

TEST COMPOUND FORMULATION

Nitrile Rubber	Krynac 34N50	100	90.8	84.6	69.2
1F770		0	12	20	40
N772 carbon black		60	60	60	60
Ether ester plasticizer	Thiokol TP 759	7	7	7	7
Mixed DPPD	Wingstay 100	2	2	2	2
Epoxy oil	Paraplex G 50	5	5	5	5
Stearic acid		0.5	0.5	0.5	0.5
Zinc oxide		4	4	4	4
MBT		2	2	2	2
MBTS		2	2	2	2
TETD		2	2	2	2
Sulfasan R		2	2	2	2
Engineered elastomer content (pphr)		0	12	20	40
Aramid Content (pphr)		0.0	2.8	4.6	9.2

PROPERTIES

Mooney Viscosity @ 100°C

ML 1+4	MU	40.0	44.2	46.0	54.2

Mooney Scorch MS 121°C

Time to +5	Mins	11.8	11.6	11.5	11.1
Time to +10	Mins	14.8	14.6	14.5	14.3
Minimum	MU	14.9	16.9	17.9	21.5

Mooney Scorch MS 121°C aged 2 weeks @ 38C 100% RH

Time to +5	Mins	9.7	10.2	9.9	9.5
Time to +10	Mins	12.2	12.5	12.3	16.9
Minimum	MU	18.7	20.4	21.9	27.5

Mooney Scorch MS 121°C aged 2 weeks @ 38C 100% RH & 2 weeks @ RT

Time to +5	Mins	12.0	11.9	12.1	11.0
Time to +10	Mins	15.1	14.9	15.7	14.4
Minimum	MU	23.6	24.1	27.5	34.5

Mooney Scorch MS 121°C aged 2 weeks @ 38C 100% RH & 2 weeks @ RT & 2 weeks 100% RH

Time to +5	Mins	10.5	9.9	9.9	9.1
Time to +10	Mins	12.8	12.4	12.3	10.9
Minimum	MU	33.3	36.9	40.7	52.7

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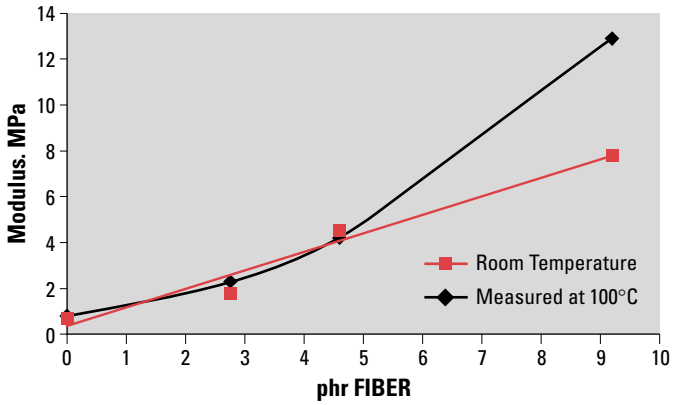
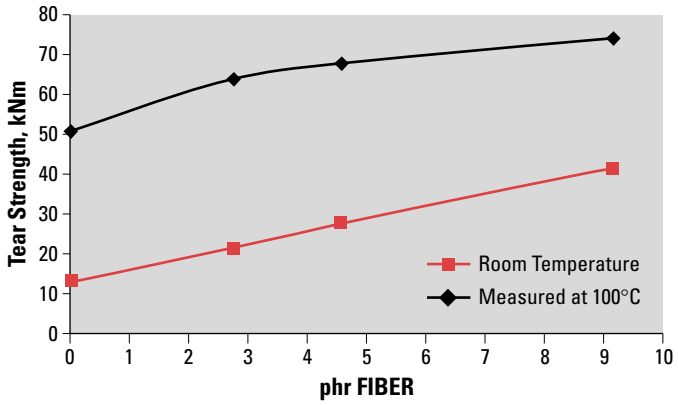
Engineered elastomer content (pphr)		0	12	20	40
Aramid Content (pphr)		0.0	2.8	4.6	9.2
ODR 160°C 100 Range 30 mins					
M_L	DNm	6.31	7.58	8.59	10.22
T_{S2}	Mins	1.71	1.63	1.63	1.63
T_{90}	Mins	5.81	5.35	5.31	5.42
M_H	DNm	82	87	92	102
Vulcanisate Properties Measured on 2mm sheet cured 10 mins @160°C					
Machine Direction					
Hardness	° Shore A	58.8	71.3	74.8	83.2
Tensile Strength	MPa	16.3	14.4	12.2	13.2
Modulus @25%	MPa	0.8	2.3	4.2	12.9
Modulus @50%	MPa	1.3	5.1	8.1	14.3
Modulus @100%	MPa	2.2	6.6	8.9	
E/B	%	512	491	374	56
Density		1.201	1.205	1.21	1.216
DIN Abrasion	Cu mm	175	150	146	146
Tear, Die C	KNm	50.9	64.6	67.2	74.0
Cross Machine Direction					
Tensile Strength	MPa	15.4	14	12.1	9.9
Modulus @25%	MPa	0.8	1.5	2.4	4.6
Modulus @50%	MPa	1.2	2.5	3.7	4.6
Modulus @100%	MPa	2.0	4.0	5.5	8.5
E/B	%	507	487	389	172
Vulcanisate Properties Measured @ 100°C					
Tensile Strength	MPa	5	6.1	6	7.9
Modulus @25%	MPa	0.7	1.8	4.5	7.8
Modulus @50%	MPa	1.2	3.6	5.9	
Modulus @100%	MPa	2.2	4.2	5.9	
E/B	%	189	217	141	35
Tear, Die C	KNm	13	21.2	27.8	41.7
Air Aged 168 Hrs @ 100°C					
Hardness	° Shore A	65.2	75.6	80.1	85.0
Change	%	6.4	4.3	5.2	1.8
Tensile Strength	MPa	17.7	15.5	13.5	16.9
Change	%	9	8	11	28
Modulus @ 50%	MPa	1.7	5.7	7.9	
Change	%	31	12	2	
E/B	%	427	388	277	40
Change	%	-17	-21	-26	-29
Air Aged 72 Hrs @ 100°C in ASTM 1 Oil					
Hardness	° Shore A	62.2	73.4	76.8	83.4
Change	° Shore A	3.4	2.1	2.0	0.2
Volume Change	%	-5.53	-5.65	-5.76	-6.22
Weight Change	%	-5.32	-5.46	-5.55	-5.92
Air Aged 72 Hrs @ 100°C in ASTM 2 Oil					
Hardness	° Shore A	58.1	69.7	75.9	85.0
Change	° Shore A	0.7	1.6	1.1	1.8
Volume Change	%	-0.05	-0.34	-0.55	-0.84
Weight Change	%	-0.83	-1.05	-1.25	-1.77

Engineered elastomer content (pphr)		0	12	20	40
Aramid Content (pphr)		0.0	2.8	4.6	9.2
Air Aged 72 Hrs @ 100°C in ASTM 3 Oil					
Hardness	° Shore A	55	70.2	75.7	83.6
Change	° Shore A	3.8	1.1	1.1	0.4
Volume Change	%	7.82	7.26	6.74	5.76
Weight Change	%	5.22	4.74	4.22	3.48
Brittleness - ASTM 2137	°C	-30	-26	-21	-17
Low Temperature Torsional Stiffness - ISO 1432					
T^{10}	°C	-24.6	-24.6	-24.8	-24.6
T^{100}	°C	-27.5	-29.4	-30.0	-30.7

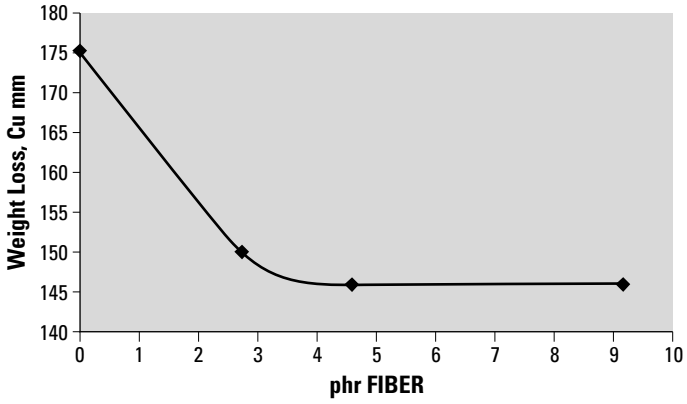
Modulus at 25% Elongation Machine Direction



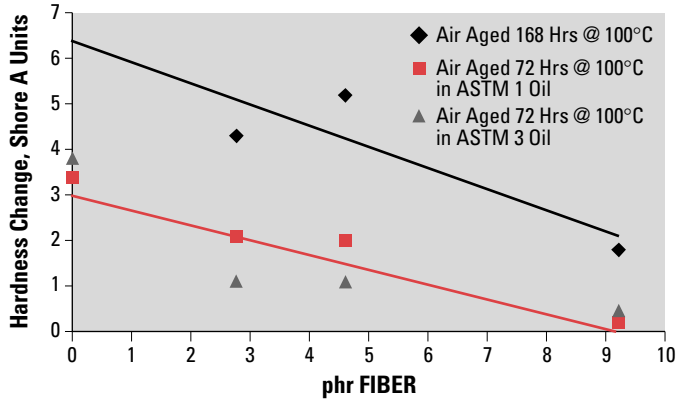
Tear Strength, Die C



DIN Abrasion



Hardness Change



- Engineered elastomer merge 1F770 contains:
  - 23 weight percent reinforcement
  - 77 weight percent of a medium ACN content NBR rubber
- Specific gravity is 1.05
- 'Nugget' shape product form
- Packaged in 15 kilograms kraft bags with a low melt (<100°C) EVA liner

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