

Technical Data Sheet

SUPRENE[®] 590F

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SUPRENE EPDM 590F is a non-oil extended grade with very high Mooney viscosity and high ethylene content.

SUPRENE EPDM 590F enable to show excellent tensile properties with highly loaded fillers, thus makes it possible for rubber producer to reduce compounding cost.

SUPRENE EPDM 590F is well balanced between processability and physical properties. It has good green strength, which can give better shape retention and higher extrudability.

SUPRENE EPDM 590F is mainly used solid extrudate for automotive parts such as window seal, hose and used in other various applications.

Raw Polymer Properties

	Test Method	Unit	Min.	Max.	Typical Value
Mooney Viscosity, (ML 1+8, 150 °C unmilled)	ASTM D1646	-	82	92	87
Ethylene Content *	ASTM D3900	wt%	65	71	67
ENB Content	ASTM D6047	wt%	5.5	7.5	6.5
Oil Content	-	phr	-	-	-
Specific Gravity	ASTM D792	-	-	-	0.86
Volatile Matter	ASTM D1416	wt%	-	0.8	0.2
Ash	ASTM D1416	wt%	-	0.15	0.01
Physical Form, (kg/bale)	-	-	-	-	Friable Bale (25kg/bale)

* Ethylene Content + Propylene Content = 100%

SUPRENE[®] 590F

Raw Polymer

Properties	Test Method	S590F	S5890F
Mooney Viscosity ML 1+8 @ 150°C	ASTM D1646	87.0	64.0*
Ethylene Content, wt%	ASTM D3900	67.0	68.0
ENB Content, wt%	ASTM D6047	6.5	5.5

* ML 1+4 @ 150°C

Test Formulation

	S5890F	S590F-1	S590F-2	S590F-3
EPDM	100	100	100	100
FEF	120	120	145	160
CaCO ₃	50	50	62	70
P-6 Oil	105	105	130	145
WB-16	2	2	2	2
6C	2	2	2	2
ZnO	5	5	5	5
Stearic Acid	1	1	1	1
CaO	1	1	1	1
MBT(M)	1.5	1.5	1.5	1.5
Na-22(ETU)	0.9	0.9	0.9	0.9
TMTD(TT)	0.7	0.7	0.7	0.7
ZnBDC(BZ)	1.9	1.9	1.9	1.9
Sulfur	1.7	1.7	1.7	1.7
Total	392.7	392.7	454.7	492.7

* Unit: phr

Properties	Test Method	S5890F	S590F-1	S590F-2	S590F-3
Compound Mooney Viscosity ML 1+4 @ 100°C	ASTM D1646	47.7	52.0	46.4	45.1
Pre-vulcanization characteristics Large Rotor at 125°C	ASTM D1646				
Minimum Viscosity (Vm)		32.0	35.6	32.4	31.7
t'5 (min)		4.70	4.18	4.60	4.87
t'35 (min)		6.97	6.18	6.91	7.42
Δt30		2.27	2.00	2.31	2.55
Moving Die Rheometer (180°C/20min)	ASTM D5289				
M _L (lb-in)		1.23	1.44	1.28	1.25
M _H (lb-in)		12.26	12.92	11.74	11.10
t _{s2} (min)		0.50	0.46	0.51	0.54
t _{c50} (min)		0.69	0.64	0.71	0.75
t _{c90} (min)		4.53	4.44	4.52	4.41

Cured at 180°C for 7 min

Properties	Test Method	S5890F	S590F-1	S590F-2	S590F-3
Specific Gravity	ASTM D792	1.20	1.20	1.22	1.23
Hardness (shore A)	ASTM D2240	73	72	73	74
Tensile Strength (kgf/cm ²)	ASTM D412	133	146	129	110
Elongation (%)	ASTM D412	460	450	410	350
100% Modulus (kgf/cm ²)	ASTM D412	40	41	43	42

Heat Resistance

Properties	Test Method	S5890F	S590F-1	S590F-2	S590F-3
Hardness (Change Point)	ASTM D2240	+2	+3	+3	+3
Tensile Strength (Change %)	ASTM D412	+8	+2	+1	+11
Elongation (Change %)	ASTM D412	-24	-27	-32	-28

* After 70 hours oven aging at 120 °C per ASTM D573

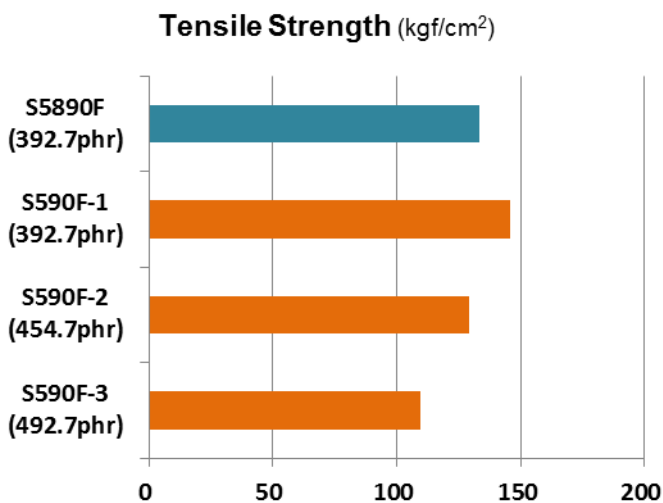
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Compression Set

Properties	Test Method	S5890F	S590F-1	S590F-2	S590F-3
Compression Set (%)	ASTM D395 (Method B)	50.2	47.2	48.9	49.4

* After 70 hours at 100 °C

Benefits in Mechanical Properties and Production Costs



Compare formulation S5890F with S590F-1, only change EPDM from S5890F to S590F, Tensile strength increased by 9%.

Formulation S590F-2, total 454.7 phr as increased almost 60 phr filler loading from formulation S590F-1, shows same level of tensile strength that of formulation S5890F.

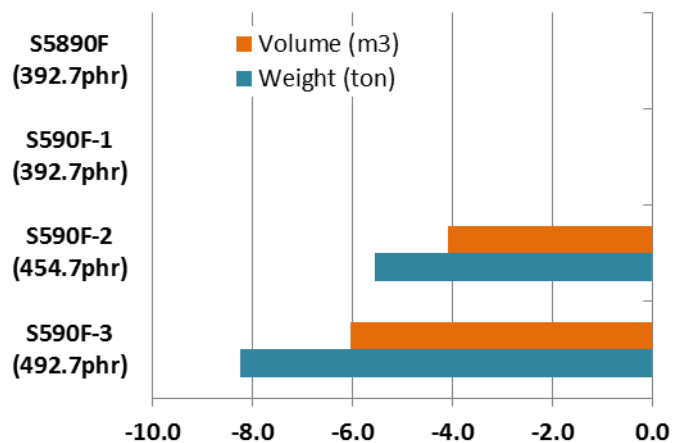
S590F-3, even though almost 500 phr formulation, still has relatively good tensile strength meeting normal automotive parts requirement over 100kgf/cm² and 300% elongation.

Estimating the production cost, in case 1, S590F price assumption applied that is same price with S5890F.

In general, production cost decrease as increase filler loading. With S590F-2, in same level of tensile strength as S5890F, production cost in weight can be reduced by 5.6%.

And also, with acceptable mechanical strength,

Case 1, Production Cost Change (%)



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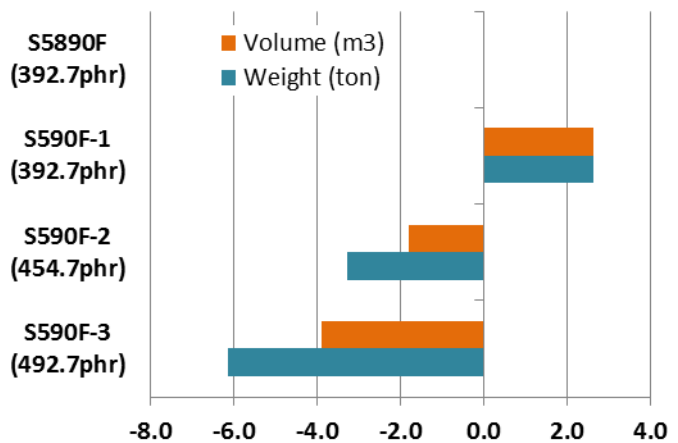
production cost dramatically going down to 8.2% reduction in formulation S590F-3.

In case 2, estimating the production cost, S590F price assumption applied that is 5% higher than S5890F.

Formulation S590F-1 is 2.6% expensive in both weight and volume per unit, but shows better mechanical properties than that of formulation S5890F.

With formulation S590F-2, production cost could be reduced by 3.3% in weight and 1.8% in volume with no damages in mechanical properties compare with formulation S5890F.

Case 2, Production Cost Change (%)



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