Model formula for tire innerliner
60/40 Exxon™ chlorobutyl 1066, natural rubber blend

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Exxon™ chlorobutyl is readily blended with other materials to improve processibility or take advantage of material properties from other types of rubber.

Material	Units	Amount
Exxon chlorobutyl 1066	PHR (1)	60.00
Natural rubber (technically specified rubber L)	PHR	40.00
Carbon black N660	PHR	60.00
Naphthenic oil	PHR	8.00
Aromatic and aliphatic hydrocarbon resin blend	PHR	7.00
Phenolic tackifying resin	PHR	4.00
Stearic acid	PHR	2.00
Zinc oxide	PHR	1.00
Sulfur	PHR	0.50
Mercaptobenzothiazyl disulfide (MBTS)	PHR	1.50
Total (PHR)		**184.00**

Properties	Test method based on	Units and conditions	Typical values (2)
Mooney viscosity ML (1+4) at 100°C	ASTM D1646	MU, 100°C	45.3
Mooney scorch (tested at 125°C)	ASTM D1646		
Time to 5pt rise	ASTM D1646	minutes	28.3
Time to 10pt rise	ASTM D1646	minutes	35.2
Time to 20pt rise	ASTM D1646	minutes	44.8
MDR rheometer	ASTM D5289	160°C; 60 minutes; 0.5° arc	
M_l (minimum torque)	ASTM D5289	dNm	1.3
M_h (maximum torque)	ASTM D5289	dNm	7.3
M_h - M_l (delta torque)	ASTM D5289	dNm	6.0
Tc_{90} (time to 90% torque increase)	ASTM D5289	minutes	13.8

Model formula for an automobile tire innerliner
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Properties	Test method based on	Units and conditions [2]	Typical values [3]
MDR rheometer	ASTM D5289	180°C; 30 minutes; 0.5 deg. arc	
M_l (minimum torque)	ASTM D5289	dNm	1.1
M_h (maximum torque)	ASTM D5289	dNm	6.8
M_h - M_l (delta torque)	ASTM D5289	dNm	5.7
Tc_{90} (time to 90% torque increase)	ASTM D5289	minutes	3.7
Stress strain properties		cured Tc_{90} + 2 minutes at 160°C	
Tensile strength	ASTM D412	MPa	10.3
Elongation at break		%	682
Modulus 100%		MPa	1.3
Modulus 200%		MPa	2.5
Modulus 300%		MPa	3.8
Energy to break		joules	10.3
Tear strength (die B) peak load	ASTM D624	N	81.2
Tear strength (die B) tear resistance	ASTM D624	KN/m	42.5
ARES dynamic properties at 0 °C	ExxonMobil method	1 % strain, 10.0 Hz	
G′		MPa	9.28
G′′		MPa	4.41
Tan_delta			0.47
ARES dynamic properties at 60 °C		1 % strain, 10.0 Hz	
G′		MPa	4.38
G′′		MPa	0.82
Tan_delta			0.19
Rebound resilience	DIN 53512	%, 25°C	15.4
Hardness	ASTM D2240	shore A	48
Mocon oxygen permeability coefficient	ExxonMobil method	cc*mm (m^2-day-mmHg) at 60°C	1.8

1. Parts per hundred rubber.
2. Values given are typical and should not be interpreted as a specification.
3. Samples cured Tc 90 + 2 at 160°C.

Contact your ExxonMobil Chemical representative for more information:
butylrubber.com

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