

# Model formulation for automotive exhaust hanger Exxon™ chlorobutyl grade 1066

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The exhaust hanger on a vehicle must withstand very intense environmental conditions while maintaining flexibility and dampening vibrations. Exxon™ chlorobutyl is an excellent material to meet these requirements in order to maintain your exhaust system and prevent component failure.

Material	Units	Amount
Exxon chlorobutyl grade 1066	PHR <sup>(1)</sup>	100.00
Carbon black, N330	PHR	40.00
Naphthenic oil	PHR	10.00
Magnesium oxide	PHR	0.20
Stearic acid	PHR	1.00
Zinc dibutyldithiocarbamate (ZDBC)	PHR	1.50
Mercaptobenzothiazole disulfide (MBTS)	PHR	2.00
Zinc oxide	PHR	5.00
<b>Total (phr)</b>		<b>159.70</b>

Properties	Test method based on	Units and conditions <sup>(2)</sup>	Typical values <sup>(3)</sup>
Mooney viscosity ML1+4	ASTM D1646	MU at 100°C	53.7
Mooney viscosity ML1+8	ASTM D1646	MU at 100°C	52.3
<b>Mooney scorch</b>			
Minimum viscosity	ASTM D1646	MU at 125°C	40.9
Time to 1 pt rise	ASTM D1646	Minutes	10.1
Time to 5 pt rise	ASTM D1646	Minutes	18.8
Time to 10 pt rise	ASTM D1646	Minutes	23.6
Time to 35 pt rise	ASTM D1646	Minutes	30.2
<b>MDR rheometer</b>		160°C; Arc 0.5°	
ML (minimum torque)	ASTM D5289	dN.m	1.7
MH (maximum torque)	ASTM D5289	dN.m	5.7
MH-ML (ΔT)	ASTM D5289	dN.m	4.1
Tc2 (time to 2 torque unit increase)	ASTM D5289	Minutes	3.3
Tc10 (time to 10% torque increase)	ASTM D5289	Minutes	0.9
Tc50 (time to 50% torque increase)	ASTM D5289	Minutes	3.4
Tc90 (time to 90% torque increase)	ASTM D5289	Minutes	8.3
<b>MDR rheometer</b>		180°C; Arc 0.5°	
ML (minimum torque)	ASTM D5289	dN.m	1.5
MH (maximum torque)	ASTM D5289	dN.m	5.1
MH-ML (ΔT)	ASTM D5289	dN.m	3.6
Tc2 (time to 2 torque unit increase)	ASTM D5289	Minutes	1.3
Tc10 (time to 10% torque increase)	ASTM D5289	Minutes	0.5
Tc50 (time to 50% torque increase)	ASTM D5289	Minutes	1.2
Tc90 (time to 90% torque increase)	ASTM D5289	Minutes	2.4

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Properties	Test method based on	Units and conditions <sup>(2)</sup>	Typical values <sup>(3)</sup>
<b>ODR rheometer</b>		160°C; Arc 3.0°	
ML (minimum torque)	ASTM D2084	dN.m	11.2
MH (maximum torque)	ASTM D2084	dN.m	32.4
MH-ML ( $\Delta T$ )	ASTM D2084	dN.m	21.2
Tc2 (time to 2 torque unit increase)	ASTM D2084	Minutes	2.4
Tc50 (time to 50% torque increase)	ASTM D2084	Minutes	5.8
Tc90 (time to 90% torque increase)	ASTM D2084	Minutes	13.7
Tensile strength	ASTM D412	MPa	9.9
Elongation	ASTM D412	%	765
100% modulus	ASTM D412	MPa	0.8
200% modulus	ASTM D412	MPa	1.6
300% modulus	ASTM D412	MPa	2.9
Energy to break	ASTM D412	Joules	11.0
Hardness, shore A	ASTM D2240	Shore A	40
Tear strength (die-C)	ASTM D624	KN/m	33.3
<b>Aged 72 hours at 125°C</b>			
Tensile strength	ASTM D412	MPa	9.7
Elongation	ASTM D412	%	510
100% modulus	ASTM D412	MPa	1.3
200% modulus	ASTM D412	MPa	3.0
300% modulus	ASTM D412	MPa	5.2
Energy at break	ASTM D412	Joules	7.3
Hardness	ASTM D2240	Shore A	46
Tear strength (die-C)	ASTM D624	KN/m	31.4
<b>Aged 24 hours at 150°C</b>			
Tensile strength	ASTM D412	MPa	8.7
Elongation	ASTM D412	%	495
100% modulus	ASTM D412	MPa	1.2
200% modulus	ASTM D412	MPa	2.7
300% modulus	ASTM D412	MPa	4.7
Energy at break	ASTM D412	Joules	6.3
Hardness	ASTM D2240	Shore A	46
Tear strength (die-C)	ASTM D624	KN/m	25.6
Tension set	ExxonMobil method		
Extension 50%, 105°C for 5 hrs	ExxonMobil method	%	17.3
Compression set at 105°C / 24 hrs	ExxonMobil method		55.4
<b>Green strength</b>			
75% decay time	ExxonMobil method	Seconds	123.1
Green strength at 100%	ExxonMobil method	N/mm <sup>2</sup>	0.24

1. Parts per hundred rubber.

2. Samples cured 11 minutes at 160°C.

3. Values given are typical and should not be interpreted as a specification

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