ExxonMobil

Model formula radial medium truck tire innerliner Exxon™ bromobutyl 2222 (70 PHR), natural rubber (30 PHR) blend

Energy lives here™



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

Material	Units	Amount
Exxon bromobutyl 2222	PHR (1)	70.0
Natural rubber TSR 20	PHR	30.0
Carbon black grade N660	PHR	60.0
Naphthenic oil	PHR	8.0
Aromatic & aliphatic hydrocarbon resin blend	PHR	7.0
Phenolic tackifying resin	PHR	4.0
Stearic acid	PHR	1.0
Zinc oxide	PHR	1.0
Sulfur	PHR	0.5
Benzothiazyl disulfide (MBTS)	PHR	1.25
Total (PHR)		**182.75**

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
Mooney scorch (tested at 125°C)	ASTM D1646		
Minimum viscosity	ASTM D1646	MU	35
Time to 5pt rise	ASTM D1646	minutes	14.5
Time to 10pt rise	ASTM D1646	minutes	17.2
MDR rheometer	ASTM D5289	160°C; 30 minutes; 0.5 deg. arc	
M_l (minimum torque)	ASTM D5289	dNm	1.4
M_h (maximum torque)	ASTM D5289	dNm	4.1
M_h - M_l (delta torque)	ASTM D5289	dNm	2.7
Tc_{10} (time to 10% torque increase)	ASTM D5289	minutes	1.4
Tc_{50} (time to 50% torque increase)	ASTM D5289	minutes	4.2
Tc_{90} (time to 90% torque increase)	ASTM D5289	minutes	18.6
Cure rate (peak rate)	ASTM D5289	dNm/min	0.5

Model formula radial medium truck tire innerliner
Exxon™ bromobutyl 2222 (70 PHR), natural rubber (30 PHR) blend

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	1.2
M_h (maximum torque)	ASTM D5289	dNm	3.9
M_h - M_l (delta torque)	ASTM D5289	dNm	2.7
Tc_{10} (time to 10% torque increase)	ASTM D5289	minutes	0.6
Tc_{50} (time to 50% torque increase)	ASTM D5289	minutes	1.3
Tc_{90} (time to 90% torque increase)	ASTM D5289	minutes	3.4
Cure rate (peak rate)	ASTM D5289	dNm/min	1.7
Stress strain properties		cure time[3] 20.6 minutes at 160°C	
Tensile strength	ASTM D412	MPa	8.8
Elongation at break	ASTM D412	%	760
Modulus 100%	ASTM D412	MPa	0.8
Modulus 200%	ASTM D412	MPa	1.7
Modulus 300%	ASTM D412	MPa	2.8
Energy to break	ASTM D412	joules	8.8
Tear strength (die B)	ASTM D624	kN/m	38
Hardness	ASTM D2240	shore A	38
Fatigue to failure (cycles)	ExxonMobil method	kilo cycles at 136% strain	554.0
Oxygen permeability coefficient at 40°C	ExxonMobil method	cc*mm (m^2-day- mmHg)	0.82
ARES dynamic properties at 0°C	ExxonMobil method	2% strain, 1.0 Hz.	
G'		MPa	4.3
G"		MPa	1.1
Tan_delta			0.26
ARES dynamic properties at 30°C	ExxonMobil method	2% strain, 1.0 Hz.	
G'		MPa	2.9
G"		MPa	0.43
Tan_delta			0.15
ARES dynamic properties at 0°C	ExxonMobil method	2% strain, 10.0 Hz.	
G'		MPa	5.7
G"		MPa	2.8
Tan_delta			0.49
ARES dynamic properties at 30°C	ExxonMobil method	2% strain, 10.0 Hz.	
G'		MPa	3.3
G"		MPa	0.65
Tan_delta			0.20

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.

©2018 ExxonMobil. ExxonMobil, the ExxonMobil logo, the interlocking "X" device and other product or service names used herein are trademarks of ExxonMobil, unless indicated otherwise. This document may not be distributed, displayed, copied or altered without ExxonMobil's prior written authorization. To the extent ExxonMobil authorizes distributing, displaying and/or copying of this document, the user may do so only if the document is unaltered and complete, including all of its headers, footers, disclaimers and other information. You may not copy this document to or reproduce it in whole or in part on a website. ExxonMobil does not guarantee the typical (or other) values. Any data included herein is based upon analysis of representative samples and not the actual product shipped. The information in this document relates only to the named product or materials when not in combination with any other product or materials. We based the information on data believed to be reliable on the date compiled, but we do not represent, warrant, or otherwise guarantee, expressly or impliedly, the merchantability, fitness for a particular purpose, freedom from patent infringement, suitability, accuracy, reliability, or completeness of this information or the products, materials or processes described. The user is solely responsible for all determinations regarding any use of material or product and any process in its territories of interest. We expressly disclaim liability for any loss, damage or injury directly or indirectly suffered or incurred as a result of or related to anyone using or relying on any of the information in this document. This document is not an endorsement of any non-ExxonMobil product or process, and we expressly disclaim any contrary implication. The terms "we," "our," "ExxonMobil Chemical" and "ExxonMobil" are each used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliate either directly or indirectly stewarded.

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

ExxonMobil
Energy lives here™