MagPro
By Brucite+

Recommendations

MagPro® for pneumatic tires

Description and application

The product under the trademarks MagPro® 150 and MagPro® 170 is high surface area magnesium oxide obtained by indirect calcination of milled natural magnesium hydroxide.

MagPro® is a white powder containing approx. 95 % of magnesium oxide. Specific surface area is quite high: 150 m^2/g for the MagPro® 150 and 170 m^2/g for the MagPro® 170. It has a stable particle size distribution.

MagPro® is used as an effective acid acceptor, scorch controller, curing agent and heat stabilizer in the production of rubber technical products based on halogenated rubbers:

- pneumatic tire inner liners based on bromobutyl rubbers (BIIR);
- truck tire inner tubes based on chlorobutyl rubbers (CIIR).

How does MagPro® work?

MgO is typically added in the above rubbers at 0.5–4 phr (special cases up to 10 phr) or at about 0.2 % of the total compounding batch weight.

As a conclusion, MgO is typically compounded in rubbers that contain halogen (–Cl, –Br, –F) or nitrogen-carbon bonds (e.g., nitrile). A vulcanization activator is also present in all rubber compounds - usually zinc oxide. Irrespectively of the complexity of the corresponding action mechanisms, usually MgO’ s role is fulfilled upon reaction with acids and/or their corresponding metal salts:

$MgO + 2HX \rightarrow MgX_2 + H_2O$

$MgO + ZnX_2 \rightarrow MgX_2 + ZnO$

где X = –Cl, –Br, –F, –CN

ZnX_2 is very strong Lewis acid; it acts as a crosslinking catalyst facilitating the formation of C-C between different chains (crosslinking) at increased temperatures.

Whatever the case is, the formation of ZnX_2 is hindered by the presence of MgO either during mixing or during crosslinking, dampening in this way the overall curing rate resulting in greater processing stability.

For being used in manufacturing of rubber cables, MgO must have a high surface activity, preferably a specific surface area greater than 130 m^2/g. The higher the value, the higher the safety of processing and the properties of the vulcanizate.

The time before vulcanization begins is directly related to the activity of magnesium oxide in the rubber formulation, the larger the surface area of magnesium oxide, the longer it is for the same formulation. As an approximate guideline, the faster vulcanization occurs, the higher MgO activity should be used.

Application

Table 1. Chlorobutyl rubbers (CIIR). Heat-resistant truck innertube compound

Function	Ingredients	Tradename	Dosage, phr
Rubber	CIIR Rubber	EXXON 1066	100.0
Reinforcing filler	Carbon black, precipitated silica, china clay	Carbon black N660	75.0
Plasticizers	Aromatic or naphthenic oils	Dyoctyl Sebacate, DINP, DIDP	28.0
Acid acceptor, curing agent	High active MgO	MagPro® 150	0.5
Curing activator	Zinc Oxide	ZnO	5.0
Curing accelerator	Zinc DiBenzylthiocarbamate	ZBEC	2.0
		Total	**210.5**

Typical formulations for the manufacturing of technical rubber products based on halogenated rubbers are presented onwards.

Curing conditions: *17 min. at 160° C.*

Typical properties:

- *Tensile Strength 7,7 MPa.*
- *Elongation 530%.*
- *Hardness 42 Shore A.*

Application

Table 2. Bromobutyl rubber (BIIR). Tire innerliner compound

Function	Ingredients	Tradename	Dosage, phr
Rubber	BIIR Rubber	EXXON 2222	100.0
Reinforcing filler	Carbon black, precipitated silica, china clay	N660	60.0
Plasticizer	Naphthenic oils	Vivatec 200	8.0
Plasticizer	Aromatic, aliphatic oils	Tudalen 5138	7.0
Tackifier	Phenolic tackifying resin	Koresin	4.0
Processing aids	Stearic acid		2.0
Acid acceptor, curing agent	High active MgO	MagPro® 150	0.5
Curing activator	Zinc Oxide	ZnO	1.0
Curing agent	Sulphur		0.5
Curing accelerator	Mercaptobenzothiazyl disulfide	Vulkacit DM	1.5
		Total	**184.5**

Curing conditions: *16 min. at 160° C.*

Typical properties:

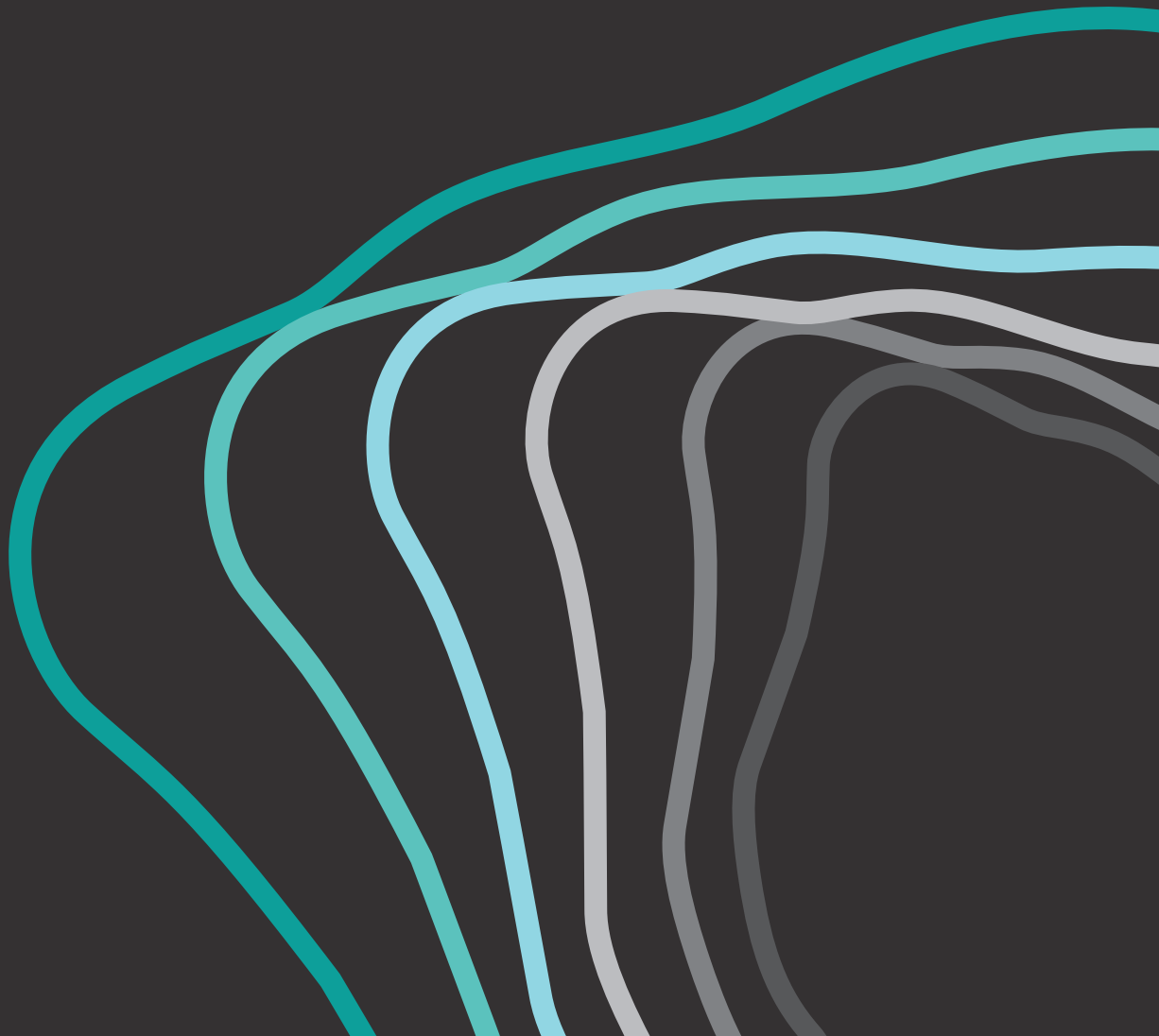
- *Tensile Strength 8,7 MPa.*
- *Elongation 790 %.*
- *Hardness 39 Shore A.*

MagPro® advantages for manufacturing of technical rubber products

- Effective acid scavenger, scorch controller, curing agent and heat stabilizer for halogen containing rubber compounds.
- Does not contain critical impurities — sulfates and chlorides.
- Precise and stable particle size distribution.
- Easy substitution in the formulations — MagPro® is replaced in a ratio of 1:1 by weight with the previously used type of active magnesium oxide.
- The best price/surface area ratio in the market.
- Wide range of packaging solutions (1 MT big-bags, 20 kg PE bags, pre-weighted 1 kg low melt EVA sachets).
- Safe in transportation, storage, production.
- Stable quality.

By choosing MagPro® products you ensure best technical support for application of product and receive a possibility to develop a custom solution with individual properties.

Please contact us via request form.



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