



PERFORMANCE ADDITIVES

## TECHNICAL DATA SHEET

# Magnesium Oxide (Selection and Function in Rubber Compounding)

Stan-Mag® Magnesium Oxide products are specifically manufactured and tested for use in the rubber industry. Magnesium oxide, also known as magnesia, is used both as a curative for chloroprene compounds and an acid acceptor in halogenated polymer systems.

### Magnesia in Chloroprene Rubber (Neoprene®):

Magnesia selection for use in chloroprene compounds influences processibility, cure rate, and vulcanizate performance. Grades suitable for these applications are not ground, but precipitated, calcined, and very active. Iodine number is an indicator of activity. In general, the higher the magnesia activity, the greater the processing safety and the better the vulcanizate properties.

Magnesium oxide functions by scavenging the chloride ions resulting from the cross-linking reaction. The degree and the rate at which it removes the by-product chloride ion from the field of action have a significant effect on the vulcanization process.

### Magnesia in Fluoroelastomers:

Acid acceptors are necessary in compounded fluorocarbon elastomers since they serve to neutralize hydrogen fluoride generated during the cure or on extended aging at high temperature.

Magnesium Oxide	Activity	Fluoroelastomer Cure System
Stan-Mag® 112	Low	General-purpose diamine cures
Stan-Mag® MLW	High	General-purpose bisphenol cures.
Stan-Mag® AG	Very High	General-purpose bisphenol cures.
Stan-Mag® DS-2	Very High	General-purpose bisphenol cures.

Note: The low activity is to be used for general-purpose diamine cures, high is not better for this situation.

### Magnesia in other Halogenated Elastomers:

Stan-Mag® Magnesium oxide products are also beneficial in a variety of other halogenated polymer systems, including Halobutyls (CIIR, BIIR), Chlorinated Polyethylene (CM), Chlorosulfanated Polyethylene (CSM, Hypalon®) and Epichlorohydrin Rubber (CO, ECO). In these polymer systems, the MgO acts as scorch retarder and/or a stabilizer by scavenging chlorine, thereby significantly increasing the service life of the final product.

Understanding the function and use of magnesia makes it easier to choose the correct one for a particular application. When looking for a good, general purpose MgO, Stan-Mag MLW would be the powder of choice for cost and performance.

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<u>Powder</u>	<u>Specific Surface Area, M2/g</u>	<u>Activity in Neoprene®</u>	<u>Description</u>
Stan-Mag® 112	28 – 49.0	Low	Calcined MgO
Stan-Mag® MLW	95 – 125	High	Calcined MgO
Stan-Mag® AG	150 Min.	Very High	High Surface Area
Stan-Mag® DS-2	130 – 200	Very High	High surface Area

### Handling Concerns:

Exposure to atmospheric moisture and carbon dioxide, even briefly, can cause a considerable loss in activity. They convert the oxide to the hydroxide and the carbonate, neither of which functions as a stabilizer or acid acceptor. Therefore, it is important to protect magnesia in moisture-proof air-tight containers or a protected, predispersed form until it is added to the compound. Bulk Stan-Mag® powders are shipped polyethylene-lined kraft paper bags and should be left closed until used and then tightly resealed.

The binder used in Stan-Mag® predispersions coats all of the magnesia particles with a protective film which prevents the rapid deterioration of activity which is characteristic of the powder forms of magnesium oxide when exposed to the atmosphere. This binder also improves the rate and degree of dispersion attained in rubber compounds. Thus, even though the binder is a diluent for the magnesia, it has been observed that the predispersed forms often provide similar scorch protection to the powder. Therefore, in all but the most critical formulations, Stan-Mag® predispersions may be substituted for the powder forms of magnesium oxide at equal concentrations.

<u>Predispersions</u>	<u>MgO Content</u>	<u>Binders</u>	<u>Activity in Neoprene®</u>	<u>Physical Form</u>
Stan-Mag® Bar	65%	Petroleum Oil	High	3 lb Solid Bar
Stan-Mag® Mini-Beads	63%	Petroleum Oil	High	Free Flowing Mini-Beads
Stan-Mag® Bead	63%	Petroleum Oil	High	Free Flowing Beads
Stan-Mag® DS-2-Bar	57%	Petroleum Oil	Very High	3 lb Solid Bar
Stan-Mag® DS-2 Mini-Beads	65%	Petroleum Oil	Very High	Free Flowing Mini-Beads
Stan-Mag® Super Bar	60%	Petroleum Oil	Very High	3 lb Solid Bar
Stan-Mag® MBZ	* 65%	Petroleum Oil	Very High	Free Flowing Powder

\*Note: Stan-Mag® MBZ is a co-dispersion of Magnesia and Zinc Oxide designed to be used at 3 – 5 parts in chloroprene rubber and it replaces all magnesium oxide and zinc oxide in a formulation.

(Neoprene® and Hypalon® are both registered trademarks of the Dupont Company.)

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