

## Dymalink® 1100

### An Effective Anti-Reversion Agent for Sulfur Vulcanization



#### Benefits

- Efficient anti-reversion agent
- Maintains properties without requiring reformulation
- Improves tear and flexural fatigue properties

#### Additional Information

MSDS/TDS: Dymalink® 1100

#### Description

Dymalink® 1100 is a multifunctional acrylate specially formulated to provide maximum reversion resistance. Unlike other anti-reversion agents, the addition of Dymalink 1100 to sulfur-cured compounds has a minimal impact on cured properties and requires little or no reformulation.

Since it reacts at the point of reversion, Dymalink 1100 maintains crosslink density and prolongs the useful lifetime of the product. Use Dymalink 1100 in reversion-prone compounds containing natural rubber, polyisoprene or polybutadiene. Dymalink 1100 contains no amines to adversely affect brass adhesion.

The features and typical physical properties for Dymalink 1100 are shown below.

Table 1

Product Features		
Product	Description	Features
Dymalink 1100	Acrylic Ester Dispersion	<ul style="list-style-type: none"> <li>• Effective anti-reversion agent</li> <li>• Amine-free</li> <li>• Minimal reformulation required</li> </ul>

Table 2

Typical Properties			
Product	Form	Specific Gravity @ 25 °C	Activity, %
Dymalink 1100	Powder dispersion	1.353	72.5

# TECHNICAL UPDATE

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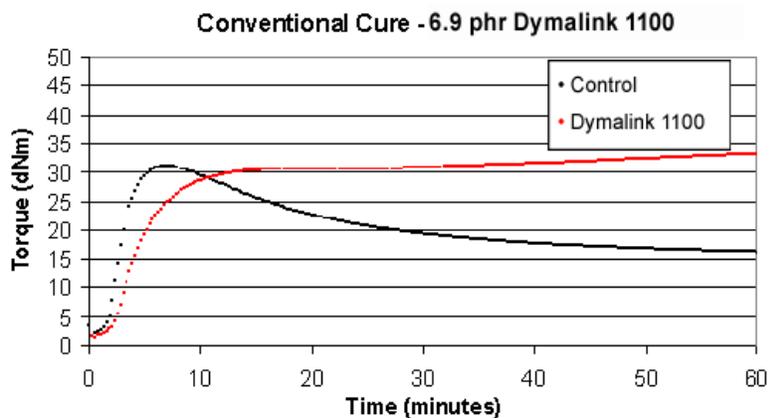
Compound formulations for conventional and semi-efficient vulcanizations are presented below. The anti-reversion agent is added at 6.9 phr. Higher sulfur-to-accelerator ratios promote polysulfidic crosslinks and subsequent reversion.

Table 3

Natural Rubber Test Formulations		
Component	Conventional, phr	Semi-Efficient, phr
Natural Rubber (CV-60)	100.0	100.0
Carbon Black (N330)	50.0	50.0
Zinc Oxide	5.0	5.0
Stearic Acid	1.5	1.5
Anti-Reversion Agent	<b>6.9</b>	<b>6.9</b>
Antioxidant	1.0	1.0
Sulfur	2.5	1.2
Accelerator (TBBS)	0.6	1.6

Dymalink 1100 provides reversion resistance in both conventional and semi-efficient vulcanizations. Initial cure states (MH @ t90) are equivalent, indicating that Dymalink 1100 has little impact on optimally cured properties. However, Dymalink 1100 forms additional crosslinks at the onset of reversion to maintain torque and network integrity as shown in Figures 1 and 2 below.

Figure 1

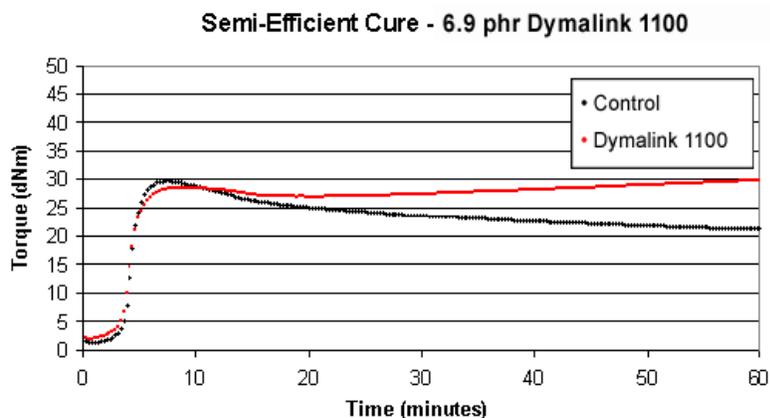


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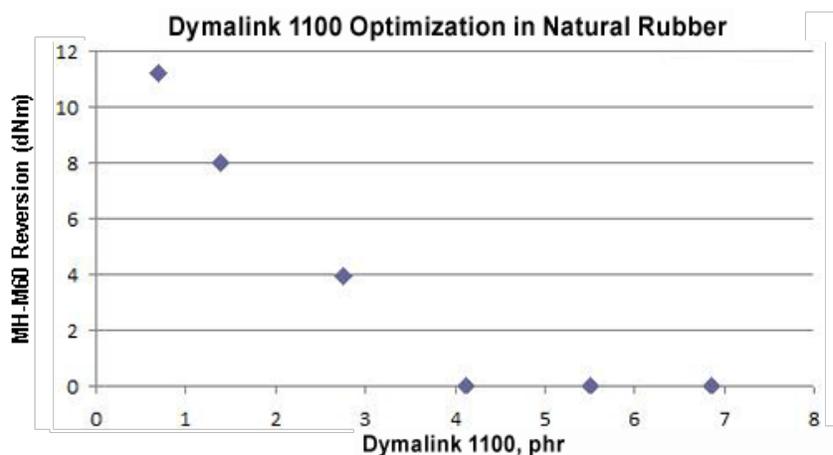
Figure 2



Ideal anti-reversion agents do not alter optimal cure properties and provide the least amount of change upon reversion. Compared to a variety of available anti-reversion products, Dymalink 1100 maintains physical properties most effectively when tested in the reverted state.

The loading of Dymalink 1100 should be optimized for formulation differences, including elastomer type, cure package components, and sulfur level. Using natural rubber and a conventional cure package, reversion resistance as a function of Dymalink 1100 loading is shown in Figure 3 below.

Figure 3

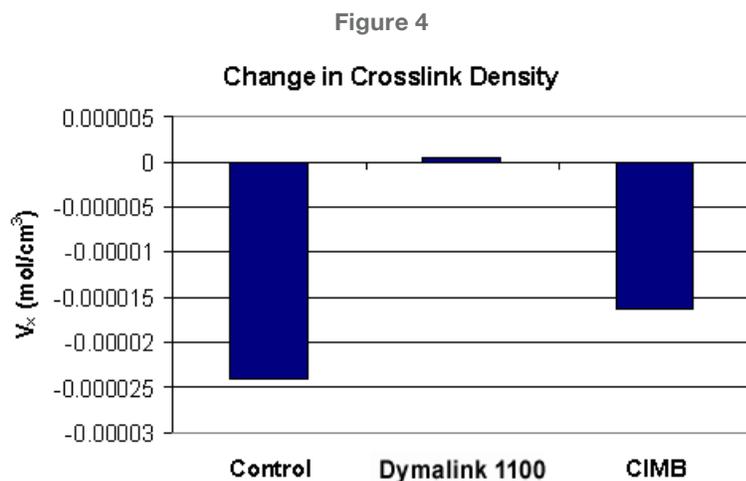


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Swelling experiments were performed to evaluate the crosslink density in both the optimally cured and reverted states. Dymalink 1100 maintains crosslink density under reversion conditions, while a popular anti-reversion agent, 1,3-bis(citraconimidomethyl) benzene (CIMB), loses a considerable amount of network integrity, as shown in Figure 4.



Key benefits of Dymalink 1100 are presented below.

### Benefits Summary

Dymalink 1100 provides the following benefits:

- excellent reversion resistance
- minimal impact on optimally cured properties
- reacts under conditions leading to reversion and maintains crosslink density
- liquid form improves processing

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