

Key Performance Advantages

- Ideal for TRGS 552 compliant rubber
- Does not contain nitrosamine



Synthetic Rubber

CHAINGUARD[®] I-15 SYNTHETIC RUBBER

CHAINGUARD[®] I-15 Superior Chain Terminator for Production of Rubber Compliant with Nitrosamine Regulation TRGS 552

TRGS 552 (Technische Regeln für Gefahrstoffe-Technical rules for hazardous substances) in Germany regulates certain N-nitrosamine compounds in rubber articles. N-nitrosodiethylamine (NDEA) is one of these nitrosamines.

Recent research completed by ANGUS Chemical Company (ANGUS) has shown that diethylamine (DEA), the precursor to NDEA, can be formed by degradation of a common chain terminator, N, N-diethylhydroxylamine (DEHA). In the presence of chelated iron, a typical activator in the production of emulsion styrene-butadiene and acrylonitrile-butadiene rubbers, DEHA was found to degrade partially to DEA.

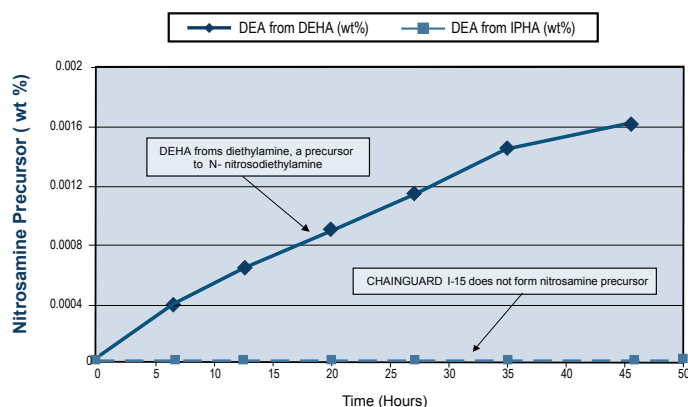
In laboratory experiments at ANGUS, aqueous DEHA was mixed with chelated iron in ratios representative of SBR emulsion polymerization formulation (Table 1). The system was maintained at 22° C and the concentrations of DEHA and DEA were monitored using gas chromatography. The results are reported in wt% obtained using calibration curves for DEHA and DEA.

Table 1

Ingredient	Wt%
Water (de-ionized, de-oxygenated)	99.960
DEHA at 0.05 ppm dosage (85% active)	0.030
Fe.EDTA	0.010

Formation of Nitrosamine Precursors

DEA forms relatively quickly under the conditions of this experiment. The amount of DEA formed steadily increases over time. It is therefore possible that this nitrosamine precursor may be present in SBR/NBR polymerization systems where chelated iron and DEHA are present. ANGUS has not confirmed this in its experiments. The laboratory experiment was repeated using CHAINGUARD I-15 Hydroxylamine and compared with DEHA. The results are reported in the graph below.



In consideration of the ANGUS experiments, CHAINGUARD I-15 is shown to be the superior choice for production of rubber compliant with the TRGS 552 regulation. CHAINGUARD does not contain nitrosamine precursors of concern in TRGS 552, nor will it form such precursors under foreseeable SBR/NBR polymerization conditions. CHAINGUARD brand chain-stopper has been used successfully for TRGS 552 compliant rubber for several years.

Product Stewardship

ANGUS encourages its customers to review their applications of ANGUS products from the standpoint of human health and environmental quality. To help ensure that ANGUS products are not used in ways for which they are not intended, ANGUS personnel will assist customers in dealing with environmental and product safety considerations. For assistance, product Safety Data Sheets, or other information, please contact your ANGUS representative at the numbers provided in this document. When considering the use of any ANGUS product in a particular application, review the latest Safety Data Sheet to ensure that the intended use is within the scope of approved uses and can be accomplished safely. Before handling any of the products, obtain available product safety information including the Safety Data Sheet(s) and take the necessary steps to ensure safety of use.

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