



SUBJECT: Antimony Trioxide Substitutes

BULLETIN #: 1. March 28, 2011

HOW TO FIGHT THE HIGH PRICE OF ANTIMONY TRIOXIDE AND - GAIN SOME OTHER ADVANTAGES!

Are there substitutes for ATO (Antimony Trioxide) in PVC and other halogen-containing plastics?

The uniqueness of ATO is its ability to react to form powerful volatile flame inhibitory antimony trichloride or tribromide. So, if the formulation contains considerable flammable volatile material like typical PVC plasticizers, it is hard to totally dispense with ATO. Zinc stannates and zinc borates can partially substitute for ATO in some formulations. The substitution is best in systems with little or no plasticizer. There are even some cases where total substitution can be done, such as in rigid or semi-rigid PVC. There may be some less volatile plasticizers that would make it easier to replace ATO.

Can we drastically lower or eliminate the loading of ATO?

Customers have found that Marshall Additive Technologies' **C-TEC FRZ** series can do that. These products are inorganic compositions with reduced % of ATO, plus inorganic ingredients acting as carriers and activity boosters to substantially enhance the ATO content, and as a "bonus" reduce smoke. Even when the price of ATO was much lower, there were customers for the **C-TEC FRZ** series who enjoyed the price/performance advantage. The advantage has become increasingly greater.

We recently added a reduced % ATO product, **C-TEC SD200** with flame retardancy, smoke suppression, improved low temperature flexibility and cost advantages, and in the test formulation below, it gave the same oxygen index as ATO within experimental error.

Some data:

We selected a typical PVC riser cable formulation for some small-scale tests. The formulation was the following:

Component	Parts by Weight
PVC 102 i.v.	100
diisononyl phthalate plasticizer	45
tetrabromophthalate	8
antimony trioxide or alternative	10
alumina trihydrate (ATH)	70
Ca Zn stabilizer	4

The results were as follows:

With antimony trioxide	LOI= 39.4 and smoke (NBS, flaming) = 666-711
With C-TEC FRZ20S	LOI= 38.5 and smoke (NBS, flaming) = 312-330
With C-TEC SD200	LOI= 39.1 and smoke (NBS, flaming) = 355-388

Recommendation:

Evaluate **C-TEC FRZ20S** in your PVC formulation by replacing ATO at the same level. If favorable results are obtained, try **C-TEC FRZ8S**, **C-TEC SD200** or **C-TEC SD203** at the same level to reduce cost further. If results fall short, try **C-TEC FRZ30S** to meet your objective.

For Samples, Literature and Price Quotations: customercare@rjmarshall.com

Toll free phone: 800-338-7900 ext.221 Fax: 877-717-5577

The information contained in this Technical Bulletin is based upon data which The R.J. Marshall Company believes to be reliable. The R.J. Marshall Company assumes no responsibility for results obtained or damages incurred from use of this Technical Bulletin.

26776 W. 12 Mile Road, Southfield, MI 48034 P: 248-353-4100 F: 248-948-6460 www.rjmarshall.com