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Frequently Asked Questions about Tin Stabilizers

What are organotins?

“Organotin” refers to a broad class of compounds, so named because they contain at least one bond between tin and carbon. Organotin compounds are versatile agents used in a variety of industrial applications, including as catalysts in polyurethane, polyester and silicone systems; and as heat stabilizers in PVC (vinyl) processing technology.

What are tin stabilizers?

Stabilizers are substances that are used to keep a compound or mixture from changing its form or chemical nature. Tin stabilizers, part of the broader class of organotins, are used in the processing of polyvinyl chloride (PVC or vinyl). These stabilizers are added because, for PVC to be processed into products, it must be heated to high temperatures that would normally cause the polymer to decompose. Heat stabilizers allow the polymer to be processed into usable products. There are many different types of tin stabilizers with different performance features. Contact suppliers for more specific information.

Are all organotins used as stabilizers?

No. Only some organotins are used as stabilizers for plastics: mono- (one tin-carbon bond) and di- (two tin-carbon bonds) alkyl-tin compounds. Tri-alkyl-tins are not used as stabilizers.

What products contain tin stabilizers?

Tin stabilizers have been used for more than 50 years in many vinyl applications, due to their safety, high performance and cost effectiveness. In North America, tin stabilizers are used primarily in rigid vinyl applications such as vinyl siding, pipe and fittings, and window profiles. They also are used in some packaging applications, including clear food and drink containers, food wrap, blister packaging for pharmaceuticals and thermoformed packaging. Some flexible products such as flooring, wallcovering and fabrics also contain tin stabilizers.

Is there a risk to consumers from these products?

No. These products have been extensively tested over the years by both the industry and by third parties. All available data indicates that there is no long-term health effect to consumers from the use of products containing tin stabilizers. In fact, several applications have been approved by regulatory agencies throughout the world, including the U.S. Food and Drug Administration (FDA) and NSF International.

Are tin stabilizers toxic?

Tin stabilizers are not toxic if used appropriately. All materials are toxic to some extent, if used improperly. Soap, for example, is toxic if enough is ingested. The issue is proper use. When tin stabilizers are used in plastic products, there is no concern for exposure to the consumer.

Is the use of tin stabilizers regulated by government agencies in any applications?

Yes. Certain tin stabilizers have been approved for many uses by regulatory agencies throughout the world. The National Sanitation Foundation (NSF) has approved the use of tin stabilizers in potable water pipe and the U.S. Food and Drug Administration (FDA) has approved the use of tin stabilizers for food contact applications. Regulatory agencies in Europe also have approved the use of tin stabilizers in indirect food contact applications throughout the European Union. There are very few restrictions on other uses, due to the safety of this product.

What is industry doing to ensure the safety of these products?

Industry has sponsored extensive health and environmental testing on these substances over the years and is committed to the ongoing study of its products. Information about these products has been submitted to the U.S. Environmental Protection Agency (EPA) and other pertinent regulatory agencies. Also, the industry is in the process of reviewing all data and conducting additional studies, where needed, to update information consistent with current standards. The members of TSA are committed to providing information to customers and the public. The member companies have embraced the principles of Responsible Care®, the chemical industry's commitment to continued improvement in all aspects of health, safety and environmental performance.

Why have organotins been banned in some countries?

Organotins as a broad category have not been banned. There is only one classification of organotin called trialkyltins that is restricted or banned in some countries. Certain trialkyltins – like tributyltin or triphenyltin – are unique among the organotins because they exhibit biocidal properties – that is, they can destroy harmful organisms. (Herbicides, for example, have biocidal properties.)

One particular substance, tributyltin (TBT) has come under close scrutiny, but it is never used as a stabilizer. Rather, TBT is used as an anti-foulant in marine paints. Paints containing TBT are applied to the portion of a ship's hull below the waterline to discourage marine animals and plants that would otherwise adhere to it. The restrictions are based on studies that show that TBT released from paint affects sensitive non-target organisms. Relatively high concentrations of TBT have been found in some highly localized areas of rivers, marinas and harbors partly due to historical misuse of the product. As a result, use of these substances has been restricted for more than 10 years.

On the other hand, the compounds used as tin stabilizers do not have biocidal properties, nor have they been banned by any countries.

If TBT is not used as a stabilizer, why are trace amounts found in vinyl products?

TBT is never used as a stabilizer in vinyl and it is not intentionally added to our products. However, trace amounts can sometimes be detected due to chemical impurities in certain stabilizers. These trace amounts of TBT – typically in parts per million or parts per billion in the finished article – do not pose a risk to human health. Because they are enclosed in the polymer, any exposure is insignificant.

Are tin stabilizers carcinogenic?

No. These compounds have been studied extensively. There is no indication that tin stabilizers are carcinogenic.

Are tin stabilizers endocrine disrupting chemicals?

Currently, there is considerable debate in the scientific community regarding the definition of what is commonly referred to as “endocrine modulation.” While a significant amount of data from different sources shows endocrine modulating activity in certain sensitive marine species with tributyltin and triphenyltin, these findings are not applicable to other organotin compounds, particularly those used as stabilizers. While this is an emerging area of research and there is no well-established test protocol to determine whether a substance is endocrine disrupting, it’s important to point out that there is no evidence of endocrine disrupting properties from organotin stabilizers.

Are there any third-party studies on these substances?

There are a number of independent studies by recognized authorities throughout the world, including the NSF International and, in Europe, the UBA (Germany’s equivalent of the U.S. Environmental Protection Agency) and BgVV (Germany’s federal institute for health protection of consumer and veterinary medicine). Study after study, by both industry and third parties, reveals no credible evidence that tin stabilizers pose a health risk for consumers who use products manufactured with these additives. Tin stabilizers have been safely used in vinyl products for more than 50 years. In fact, regulatory agencies like the U.S. Food and Drug Administration (FDA) and others throughout the world have approved the use of certain tin stabilizers in critical applications like food wrap and pipes that carry drinking water.

Are tin stabilizers persistent and bioaccumulative?

No. Studies show that tin stabilizers do not fit the criteria for persistent and bioaccumulative chemicals. The most commonly used commercial tin stabilizers have been thoroughly tested and shown to biodegrade to inorganic tin. Available data also shows these stabilizers to have a low potential for bioaccumulation.

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