

Baerlocher Additives for PVC  
**Organotin Stabilizers**



we add character to plastics

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## **we add character to plastics**

The Baerlocher Group of Companies is one of the world's leading suppliers of additives for the plastics industry with a strong focus on PVC.

Baerlocher has extensive technology and market know-how drawn from more than 190 years of company history.

Additives play a crucial role in determining processing properties as well as product quality and character. Baerlocher offers a broad range of additives for polymers suitable for various industries.

Baerlocher is your global partner for Ca-based solutions and metal soaps.

By developing and supplying innovative additives, Baerlocher enables the plastics industry worldwide to manufacture high-quality and sustainable products.

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Global presence and more than 1200 employees worldwide make sure that we are always close to the customer. Future-oriented, we are continuously investing in research and development. Our innovative power results from the creativity of our in-house scientists and technical experts. Baerlocher has R&D facilities in Germany (Munich-Unterschleissheim), France (Marseille), Italy (Lodi), the United States (Dover, Cincinnati) and India (Dewas).

Environmentally sound production processes as well as the safety and protection of people and environment are key corporate goals. As a globally active group of companies we are aware of our responsibility, regardless of time or place. We are committed to the principles of "Responsible Care": Our quality management is certified to ISO 9001 and our environmental management system to ISO 14001, encouraging our employees to work together in a responsible way. This policy will not least benefit our customers.

### Baerlocher products

<b>BAEROPAN</b>	<b>BAEROCID</b>
<b>BAEROSTAB</b>	<b>BAEROCIN</b>
<b>BAEROPOL</b>	<b>CEASIT</b>
<b>BAEROLUB</b>	<b>ZINCUM</b>
<b>BAEROPHOB</b>	

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# Organotin Stabilizers

Organotin compounds used as PVC stabilizers are based on tetravalent tin. Physical and chemical properties depend on the nature and ratio of the chemical groups linked to the tin atom. In this regard, the organic substituents can be attached to the central tin through a carbon atom and in this case we speak of alkyl tin or, especially in our case, of butyl and octyl tin derivatives. This carbon-tin linkage has little influence on the stabilising performance of the final compound but determines the toxicological characteristics of the final molecule. Other organic groups are bound to the tin through sulphur (organotin mercaptides) or oxygen (organotin carboxylates) atoms. This part of the molecule is the one effectively responsible for the mechanism of PVC stabilization and determines the behaviour of the stabilizer itself during processing and its subsequent activity in the service life of the finished products. As a general rule, valid for all above mentioned types of organotin compounds, we can summarize their behaviour as PVC stabilizers, when compared to the possible alternatives, as follows:

- All organotin stabilizers are very effective, and thus can be used at quite low dosages, normally below two parts per hundred parts of resin (phr).
- Organotin stabilizers allow a high degree of transparency in PVC articles, which is of particular interest in packaging and in some building applications.
- Organotin mercaptides impart excellent early colour and colour hold in the most difficult processing of plasticized and rigid PVC.
- Certain compounds, in particular octyl tin derivatives, have a very low toxicity and good migration resistance in rigid PVC, making them suitable and sanctioned by most national legislations as stabilizers for PVC in food contact applications or for potable water pipes and fittings.
- Organotin compounds are effective in all types of PVC (suspension, emulsion and mass polymerised grades, including many copolymer mixtures). This is of benefit to processors who have to deal with many types of PVC from different sources.
- The sulphur-free organotin carboxylates, and in particular tin maleates, confer excellent light stability to finished goods intended for outdoor applications. They are however less efficient as heat stabilizers than the sulphurcontaining organotin mercaptides.
- All organotin stabilizers have good compatibility with all other types of additives used in PVC, such as lubricants, impact modifiers and so on, which minimises possible processing problems such as plate-out of incompatible compounds on the processing equipment.

In this presentation, the product range of Baerlocher organotin stabilizers will be divided into three main groups (mercaptides, carboxylates and mercaptide/carboxylates), each of them split into butyl tin and octyl tin. It is important to remark that, in addition to the standard and well-known products presented below, many other special products exist in the Baerlocher portfolio. In order to solve specific problems custom-tailored special products can also be developed.



## **Baerlocher PVC Additives**

- **high-performance**
- **tailor-made**
- **quality-controlled**
- **future-orientated**
- **cost-efficient**

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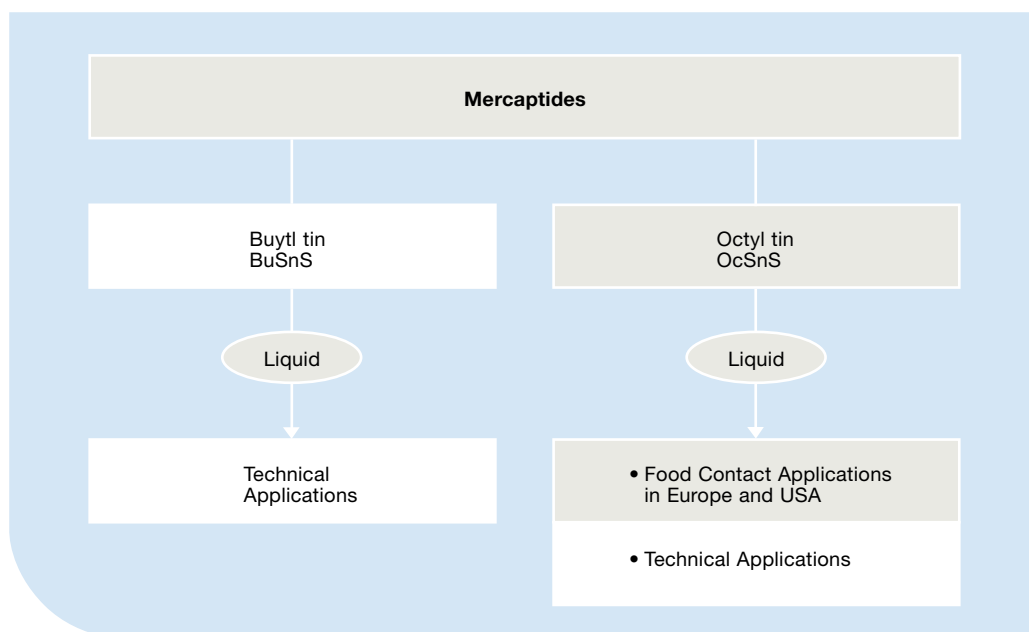
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# Mercaptides

## Butyl tin mercaptides

These are liquid products which show excellent heat stability and transparency in all kinds of technical PVC applications, such as rigid sheets, profiles for building purposes and injection moulded items. Butyl tin mercaptides impart only limited light stability to finished goods. They also have a typical odour that is often noticeable during processing and, although rarely, in the final products. With regard of this, special “S” grades of particularly reduced odour are available. Please, ask one of Baerlocher’s representatives for further information.



### Baerostab M 25

Standard liquid butyl tin mercaptide of high effectiveness. This product imparts outstanding heat stability and clarity to mass and suspension PVC. It is particularly recommended as stabilizer for fluidised bed powders.

### Baerostab M 25 S

Odour improved version of Baerostab M 25.

### Baerostab M 170

Liquid butyl tin mercaptide modified with an external lubricant. This product has been developed for crystal clear and pigmented extrusion of rigid sheets and profiles where it displays good initial colour, colour hold and dynamic heat stability. Further applications of Baerostab M 170: calendering of flexible and rigid film and sheeting, stabilization of emulsion PVC and injection moulding of compounds based on VC/VA copolymers.

### Baerostab M 1

Liquid butyl tin mercaptide with low mono alkyltin content. This product has been developed for extrusion and injection moulding of compounds based on C-PVC or anyway where a long heat stability is required.

## Octyl tin mercaptides

### 1. Non-tox applications

#### Important notice

Non-tox products: A group of stabilizers composed of those components approved by the different regulations as substances in PVC intended to come into contact with foodstuffs. For detailed pieces of information please contact one of Baerlocher's representatives.

The grades of the OM 700 series comply with the European Regulation 10/2011/EC and with FDA regulations. Almost every product of the OM 700 series is available as a special "S" grade with reduced odour but still maintains the registered composition. The improvement of its odour characteristic is subject to continuous research work.

#### **Baerostab OM 700/Baerostab OM 700 S**

Liquid octyl tin mercaptide, efficient solution for stabilization of rigid PVC food packaging.

#### **Baerostab OM 710/Baerostab OM 710 S**

This organotin mercaptide is our standard for the stabilization of rigid calendered sheets, crystal clear and pigmented, to be used for the vacuum thermo-forming of food packaging. Its outstanding early colour, transparency and easy processing have been confirmed by successful application at the most demanding processors.

#### **Baerostab OM 710 N**

Liquid octyl tin mercaptide particularly suitable for use with mass PVC types, as well as applications where long term dynamic heat stability is required. Typical applications are therefore the blow moulding of hollow bodies and bottles and the injection moulding of fittings for potable water pipes. Standard product for pharma blister packs.

#### **Baerostab OM 1400**

This is a liquid stabilizer/lubricant one-pack based on liquid octyl tin mercaptide. It imparts excellent early colour and transparency as well as easy processing and is suitable exclusively for the calendering of crystal clear and opaque rigid sheets for the vacuum thermo-forming of food packaging and clear PVC boxes.

#### **Baerostab OM 104**

Liquid octyl tin mercaptide with a low mono alkyltin content . It is particularly suitable for use with C-PVC types, as well as applications where long term dynamic heat stability is required. Typical applications are therefore the extrusion of pipes and the injection moulding of fittings for potable water pipes.

## Methyl tin mercaptides

#### **Baerostab MTS 1200**

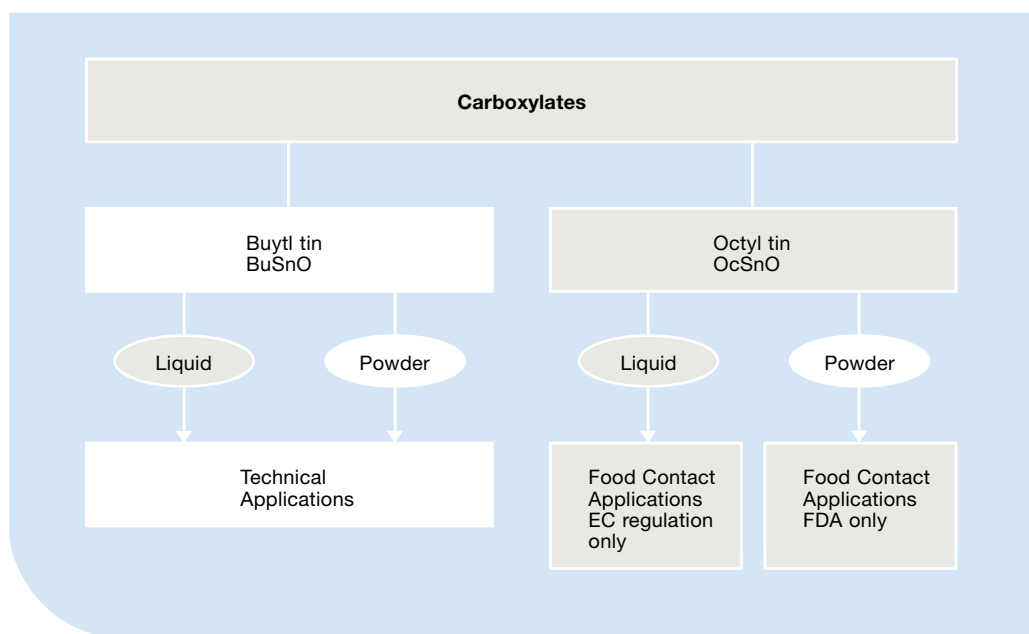
This methyltin mercaptide is suitable for the stabilization of rigid calendered sheets, crystal clear and pigmented, to be used for the vacuum thermo-forming of food packaging. Its outstanding early colour, transparency and easy processing have been confirmed by successful application at the most demanding processors.



# Carboxylates

## Butyl tin carboxylates

Most of the stabilizers of this family are derivatives of maleic acid esters bound to butyl tin groups. As with all organotin carboxylates, their efficiency as heat stabilizers during the processing of PVC is lower than that of organotin mercaptides. On the other hand, this group of products allows excellent light and weather resistance of finished articles intended for outdoor applications. They do not impart any odour to the finished rigid or flexible articles, which is of particular interest in blown films for technical packaging. Butyltin carboxylates are allowed to be used inside European Union only till 31st December 2014 (for certain outdoor applications).



## Baerostab MS

Butyl tin in powder form. This product exhibits very good heat stability and weatherability in rigid and semi-rigid PVC formulations. It is used in:

- extrusion of film,
- extrusion of rigid crystal clear outdoor profiles with high ageing stability,
- stabilization of thermoplastics where halogenated flame retardants are used.

## Baerostab MSL

Liquid butyl tin maleate, with high tin content. This stabilizer is the standard for the extrusion of crystal clear, rigid flat and corrugated sheets for roofing.

## **Octyl tin carboxylates**

### **Baerostab MSO**

Octyl tin maleate in powder form sanctioned by the U.S. FDA for the stabilization of rigid PVC for food packaging. The product is used in the manufacture of rigid blown films to be used for packaging. Although its heat stability is inferior to that of octyl tin mercaptides, Baerostab MSO is odourless in the finished article and displays easy printability and welding of the finished foils.

### **Baerostab MSO/L S**

This product is a liquid octyl tin maleate sanctioned by European Regulation 10/2011/EC for the stabilization of PVC for food packaging. Baerostab MSO/L S is widely used in the manufacture of rigid blown films to be used for packaging. Although its heat stability is inferior to that of octyl tin mercaptides, Baerostab MSO/L S is odourless in the finished article and displays easy printability and welding of the finished foils.

This stabilizer can be also used for stabilization of PVC shrink blown film intended for technical applications like “display PVC films” as alternative to BuSnO stabilizers.



# Octyl tin Mercaptides/Carboxylates

## **Baerostab OM 62 B**

Liquid octyl tin mercaptide/carboxylate with high metal content, suitable for the most demanding plastisol applications. This stabilizer is has been designed for the stabilization of plastisol for textile coating like tarpaulins. For its particular composition, this stabilizer imparts excellent heat stability good light resistance.

## **Baerostab OM 36**

Pure octyl tin mercaptopropionate in powder form. For its high tin metal content this product is a very powerful PVC stabilizer. Being a solid product with a melting point above 100 °C, it is particularly recommended for the stabilization of rigid PVC and its alloys with other thermoplastic polymers where superior mechanical properties and high heat distortion temperatures of the finished product are of primary importance. Transparent as well as pigmented articles with a Vicat temperature above 80 °C can be extruded or moulded with low addition levels of Baerostab OM 36. Furthermore, Baerostab OM 36 is particularly suitable for the calendaring of sheets which require a very good printability, also after storage of the sheets, e.g. sheets for credit cards.

# Organotin Stabilizers for Halogenated Flame Retardants

## **Baerostab MS and Baerostab MS 15**

Butyl tin maleates in powder form. Baerostab MS is pure butyl tin maleate, whereas Baerostab MS 15 is formulated with antioxidants. These products have been designed for the stabilization of halogenated flame retardants used in thermoplastics like ABS and polyolefin. Baerostab MS and Baerostab MS 15 are also suitable for stabilising CPE and C-PVC.

Butyltin carboxylate are allowed to be used inside European Union only till 31st December 2014 (for certain outdoor applications).

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from our webpage:**

**Baerlocher Additives for PVC**

- Extrusion and Injection Moulding
- Cables and Wires
- Calendered Films and Sheets
- Lead Stabilizers
- Lubricants
- Plastisol
- Sheets and Foamed Profiles

**Baerlocher Special Additives**

- Metallic Stearates

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