



## ORGANOTIN COMPOUNDS

**Other Names** Tin organic compounds  
Organostannic compounds

**CAS Number** Substance

**Various** Dibutyltin (DBT)

**Various** Dioctyltin (DOT)

**Various** Monobutyltin (MBT)

*List continued in "Additional Information"*

**May Be Found In**

- PVC
- PU coatings
- Polyester
- Plastic trims
- Textiles
- Leather
- Screen prints
- Biocides and pesticides

**Organotin compounds (organotins) are substances composed of tin directly bound to different organic groups. Generally, the mono-, di-, or tri-substituted organotins have the most applications to the apparel and footwear industry.**

### Uses in the Supply Chain

Organotins are often used as a heat stabilizer in polyvinyl chloride (PVC), catalyst in the production of polymeric materials, such as polyurethane (PU)-coated fabrics, or in plastisol prints, rubber, adhesives etc. They may also be used as biocides or preservatives in textiles, leathers and synthetic leathers like PU as well as pesticides. Silicone-based finishes (e.g. for elastomeric properties and water repellency) may also contain organotins. The most common application in apparel and footwear supply chains are plastic trims, screen prints, and PU-coated fabrics.<sup>1</sup>

### Why Organotins are Restricted

- Legislation in major markets around the world restricts the presence of organotins in finished products.
- Some organotins are classified as persistent, bioaccumulative, toxic, very persistent and very bioaccumulative.
- Certain organotins can be toxic to aquatic life.
- Some organotins may act as immunotoxins.
- Certain compounds are endocrine disruptors and pose toxicity to reproduction.<sup>1,2</sup>
- Chemical hazard information for many chemicals can be found at the following external databases:
  - GESTIS Substance Database: [Here \(external link\)](#)
  - US National Library of Medicine: [Here \(external link\)](#)
  - USA EPA Occupational Chemical Database: [Here \(external link\)](#)

### Sourcing Compliant Materials from Your Suppliers

- Contact your suppliers and explain that you require their manufactured materials to be compliant with the current AFIRM RSL limits.<sup>3</sup>
- Require suppliers to submit a confirmation of material compliance or a test report from a third-party laboratory.
- When materials are received, consider risk-based testing to ensure current AFIRM RSL limits are met.
- Share this information sheet with your material suppliers so they have full visibility and understand your sourcing requirements.
- Pay special attention to suppliers of PVC materials as organotins are often used to stabilize PVC production.
- Pay special attention to PU materials, including synthetic leather and coatings, as organotins are commonly used as catalysts during PU production.
- Self-cross-linking silicone or polyester polymers may contain organotins used as catalysts during production.
- Leather and textiles treated with biocides may also contain organotins.



## Sourcing Compliant Formulations from Your Chemical Suppliers

- For all formulations, request SDS documentation that meets current GHS requirements.
- Contact your suppliers and explain that you require formulations to be compliant with the ZDHC MRSL limits whenever applicable.<sup>4</sup>
- Discuss with your chemical supplier whether any safer alternatives are available that are suitable substitutes for your production needs.
- Prior to procuring any formulation, the chemical properties must be reviewed to ensure that proper protective equipment, chemical storage facilities, facility engineering controls, and associated treatment/disposal facilities are appropriate for the chemical(s).

## Safer Alternatives

The following substances have been identified as examples of safer alternatives and may be suitable for your production needs. Any chosen alternative must be ZDHC MRSL compliant whenever applicable.

- Calcium-zinc stabilizers may be used in the form of metal carboxylates. These stabilizers are suitable for production of products with a high degree of clarity, good mechanical properties, excellent organoleptic properties, and good weatherability.
- Organic-based stabilizers are calcium-zinc stabilizers with zinc nearly or completely replaced with organic co-stabilizers. Benefits of these stabilizers include low migration, low odor, low VOC emissions, good initial color, and excellent transparency.
- Bismuth, titanate, titanium, and zirconium catalysts can be used for PU production.
- Titanate catalysts can be used for polyester production, but may change material properties/aesthetic.

## Additional Information

- Visit ECHA's Candidate List of substances of very high concern to view dossiers for many restricted substances <https://echa.europa.eu/candidate-list-table>.
- Impact assessment of potential restrictions on the marketing and use of certain organotin compounds – <http://publications.europa.eu/en/publication-detail/-/publication/424ac720-5954-4382-8f3b-5aff32170484>

Continued list of CAS numbers and substance names from first page:

CAS Number	Substance
Various	Tricyclohexyltin (TCyHT)
Various	Trimethyltin (TMT)
Various	Trioctyltin (TOT)
Various	Tripropyltin (TPT)
Various	Tributyltin (TBT)
Various	Triphenyltin (TPhT)

## References

<sup>1</sup> Hohenstein Institute & Textile Exchange. (2017). Chemical Snapshots – Organotin Compounds. Revision 0.2. Retrieved March 17, 2017.

<sup>2</sup> European Commission Scientific Committee on Health and Environmental Risks (2006). Revised Assessment of the Risks to Health and the Environment Associated with the Use of the Four Organotin Compounds: TBT, DBT, DOT and TPT. Retrieved August 15, 2017, from [http://ec.europa.eu/health/ph\\_risk/committees/04\\_scher/docs/scher\\_o\\_047.pdf](http://ec.europa.eu/health/ph_risk/committees/04_scher/docs/scher_o_047.pdf)

<sup>3</sup> Apparel and Footwear International RSL Management Group (Ed.). (2018, January 31). Restricted Substances List (RSL). Retrieved <http://afirm-group.com/afirm-rsl/>

<sup>4</sup> Manufacturing Restricted Substances List (Publication). (2015, December). Retrieved <http://www.roadmapzero.com/programme/manufacturing-restricted-substances-list-mrsl-conformity-guidance/>