

Is there a recommendation how to handle DBT and DOT in IMDS?

The REACH REGULATION (EC) No 1907/2006 has several annexes. Besides Annex XIV, the “Authorisation List”, there is also Annex XVII – the list of restrictions. While Annex XIV allows the use of a chemical only in authorized cases, Annex XVII restricts the use of chemicals in dedicated applications.

Based on entry 20 of Annex XVII, some “Organostannic compounds” (often also called “organo tin compounds”) are restricted where “*the concentration in the article, or part thereof, is greater than the equivalent of 0.1 % by weight of tin.*”

(See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:138:0011:0013:en:PDF>)

Application of the restriction

- The restriction is currently in force and all of the listed exemptions have expired.
- The restriction applies for sale of goods to the general public, therefore vehicles and parts thereof must comply with this restriction.
- For Dibutyltin (DBT) compounds the restriction applies to vehicles and parts thereof.
- For Dioctyltin (DOT) compounds this restriction applies only for special applications.

The only DOT applications relevant for automobiles are:

- *Textile articles intended to come into contact with the skin*
- *Two-component room temperature vulcanisation moulding kits (RTV-2 moulding kits)*

Note:

- Articles and mixtures on stock, not meeting the threshold limits may NOT be sold or used anymore.
- This also includes articles containing parts thereof not meeting the threshold limits.

What does “part thereof” mean?

The agreed automotive industry interpretation for “parts thereof” is “each part which can reasonably be expected to be marketed to the general public”.

E.g. if we take a water pump, this can be sold as an assembly for series production or as spare part. This assembly also includes a washer, which again can be sold as a spare part. In this example, both the pump and the washer are parts thereof.

Recommendation from the IMDS Steering Committee and the ACEA REACH Task Force:

- **every part sent or received in IMDS, should comply with the restriction.**
- **each recipient company (i.e. every tier of the supply chain) check the top-level assembly node for the received part to ensure that the 0.1% by weight of tin threshold is not exceeded, before accepting the MDS (see diagram under examples).**

Note: Just because a material contains >0.1% DBT or DOT compounds does not mean it is restricted; therefore these data sheets should NOT automatically be rejected.

What does “the equivalent of 0.1 % by weight of tin” mean?

The concentration of tin refers to:

1. The whole article or part thereof (see definition above).
2. The concentration of tin in the DBT or DOT substance and then in the article or part thereof.

The calculation of the tin content in the substance (e.g. for DBTO) is done using the molecular weight of both tin and the substance.

As an example, one molecule of DBTO (chemical formula: C₈H₁₈OSn), consists of:

- 8 atoms of carbon (8 x 12.0107 g/mol = 96.09 g/mol)
- 18 atoms of hydrogen (18 x 1.00794 g/mol = 18.14 g/mol)
- 1 atom of oxygen (1 x 15.9994 g/mol = 16.00 g/mol)
- 1 atom of tin (1 x 118.710 g/mol = 118.71 g/mol)

The sum of all of the separate atoms: **248.94 g/mol.**

The molecular weight of tin: **118.71 g/mol.**

This data can be found on the Internet, e.g. <http://www.convertunits.com/molarmass/>

With the knowledge of the molecular weight of the substance (e.g. DBTO), you can calculate the content of tin in the substance using the formula:

$$\textit{content of tin in the substance} = \frac{\textit{molecular weight of tin (118.71g/mol)}}{\textit{molecular weight of tin substance}}$$

For this example:

$$\textit{content of tin in DBTO} = \frac{118.71}{248.94} = 0.477$$

Last step is to calculate the portion of tin in the article or part thereof. Just multiply the tin portion of the substance with the percentage of substance in the article or part thereof.

Is it likely that my parts are prohibited by this REACH Restriction?

No – in our experience the majority of automotive parts will contain less than 0.1% by weight of tin of DBT compounds, as we usually have large and heavy metal items, covered with a relatively small amount of tin containing paint which is our main application of DBT compounds.

Note: The greatest risk is for small parts that contain a heavily painted metal component.

Example

In the MDS entry below:

- 1) The component “ComponentExampleTin” weighs 100g
- 2) The material “MaterialExampleTin” weighs 1g
- 3) This material contains up to 1.5% Dibutyltin-oxide(DBTO)
 - a. This equates to 0.015g DBTO in the material
 - b. Portion of tin in DBTO is 0.477 (from calculation above)

The screenshot displays the MDS software interface. The top navigation bar includes 'Component Search', 'Ingredients', 'Supplier Data', 'Recipient data', 'Analysis', and 'MDS Request'. A search filter 'GADSL' is active. The left pane shows a tree view of components and materials, with 'ComponentExampleTin' selected. The right pane shows the 'Details' for this component, including 'Common Information', 'Dates', and 'Amounts and Weights'. The 'Amounts and Weights' section shows a measured weight per item of 100.0 g and a calculated weight per item of 100.0 g.

Calculation:

$$\% \text{ tin in the part} = \frac{(\text{tin portion of substance}) * (\text{weight of substance in material (g)})}{\text{weight of part (g)}} * 100$$

$$\% \text{ tin in the part} = \frac{0.477 * 0.015}{100} * 100 = 0.0072\%$$

i.e. – This application is OK and not restricted according to REACH Annex XVII