

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 and/or the placing on the market of mixtures and/or articles.

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 as complex objects, articles and parts thereof must comply with this restriction.
- For Dibutyltin (DBT) compounds the restriction applies to articles 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?

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 on the integral part of the article to ensure that the 0.1 % weight of tin threshold is not exceeded, before accepting the MDS (see further explanation below).

The restriction on Organotin was introduced under the Marketing and Use Directive 76/769/EWG in 2008. The article definition under this directive was considering an article as the finally assembled parts (today: complex object) and a part thereof was meant to be a smaller marketable component (e.g. spare

parts) or at most the smallest component (today: article). This initial intention of the Marketing and use Directive has changed when the Organotin restriction was then transferred to REACH Annex XVII and later on when the article definition under REACH was overruled by the General Court (also known as O5A, once an article always an article).

Today the article under REACH already is the smallest component and a “part thereof” could also be understood as the part of the smallest article which is the individual homogenous material (i.e. the painting).

In this context, the ECHA Q&A specifies “If a restriction entry refers to ‘parts of articles’, this should be understood as referring to an integral part of an article.”

The experts from the REACH TF have discussed this interpretation guidance but were not able to finally conclude, mainly due to the still very unclear definition.

For the reason that the original intention of the Marketing and Use Directive aimed to restrict marketable articles which are seen today under REACH as “complex objects” and not their homogenous materials, it was however considered to be legally defensible that “Parts thereof” under the Marketing and Use Directive can be linked to “articles” under REACH.

In conclusion, it has to be defined by each company whether the spirit of the original law is more important than the letter of the law and in this particular case, whether the calculation of the 0.1% threshold has to be applied based on the weight of the smallest article or on its homogenous materials.

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: $C_8H_{18}OSn$), consists of:

- 8 atoms of carbon ($8 \times 12.0107 \text{ g/mol} = 96.09 \text{ g/mol}$)
- 18 atoms of hydrogen ($18 \times 1.00794 \text{ g/mol} = 18.14 \text{ g/mol}$)
- 1 atom of oxygen ($1 \times 15.9994 \text{ g/mol} = 16.00 \text{ g/mol}$)
- 1 atom of tin ($1 \times 118.710 \text{ g/mol} = 118.71 \text{ g/mol}$)

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:

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

For this example:

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

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?

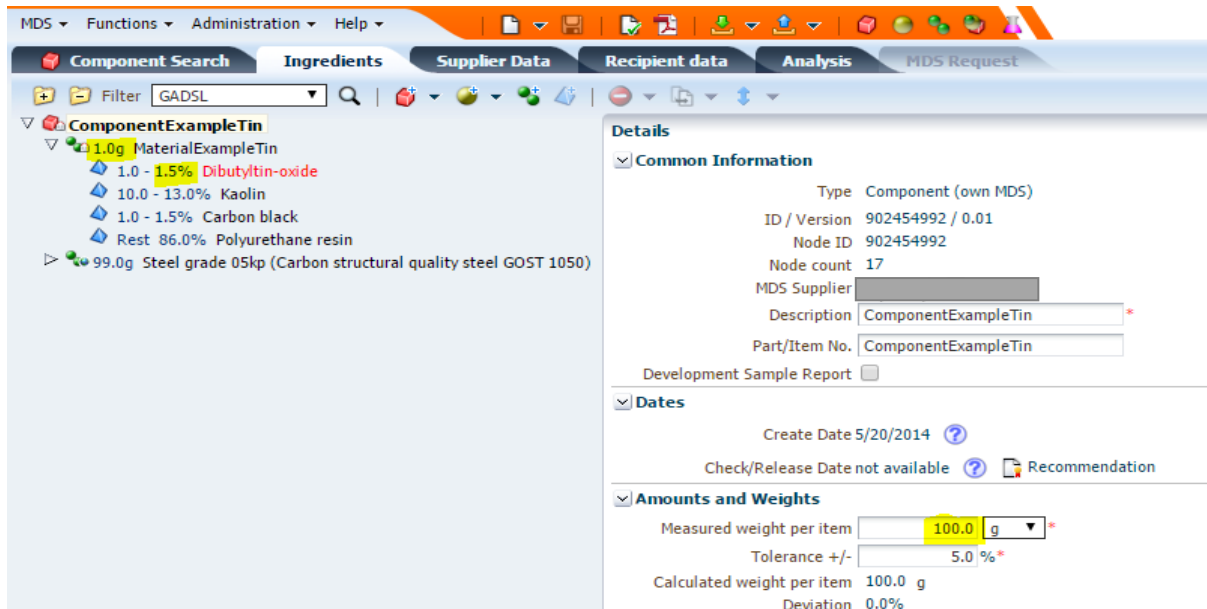
No – in our experience the majority of automotive parts and their articles will contain less than 0.1% by weight of tin of DBT compounds, as we usually have large and heavy metal items, covered with a relatively small amount of tin containing paint which is our main application of DBT compounds. In addition, the used paint as the initial mixture falls already under this restriction.

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)



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