IZM/EE-Toolbox:
TPI-Calculator

Fraunhofer Institut
Zuverlässigkeit und
Mikrointegration

What is the TPI Calculator?

The TPI-Calculator is a fast, easy to use tool that calculates the toxicological potential of substances based on legal maximum threshold values and categories. The TPI (Toxic Potential Indicator) methodology is a module of the IZM/EE-Toolbox developed by Fraunhofer IZM. Together with our customers we use the IZM/EE-Toolbox for fast and cost-effective environmental and design for environment evaluations.

For more information about the IZM/EE-Toolbox and the TPI methodology, please visit our website at http://www.pb.izm.fhg.de/ee/070_services/ or give us a call (Phone +49(0)30/46403-130).

What do I need to use the TPI calculator?

Although the toxicological evaluation of a substance is rather simple and fast, some information about the substance is required. You need information about the Maximum Admissible Concentration (MAK), EU carcinogenicity or Technical Guidance Concentration (TRC), and the R-phrases and the (German) Water Hazard Classes.

If any of the above categories applies to a substance traded in the industry, you find all relevant information on the accompanying safety data sheet. Furthermore, all information about the classification of a substance is available through the MAC and BAT (biological admissible tolerance limits) tables, edited by the Professional Association and the Deutsche Forschungsgemeinschaft (DFG)[1], [2]. You will also find the information in the GESTIS material database on the internet: http://www.hvbg.de/d/bia/fac/zesp/zesp.htm

How can I enter the required information into the TPI calculator?

The data input fields for R-phrases, WGK, EU Carcinogenicity, MAK and TRK are positioned in the lower area of the TPI-calculator (figure 1)
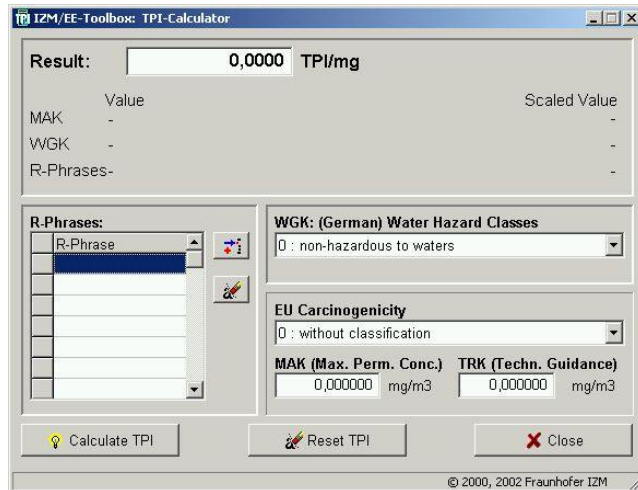
Figure 1: IZM EE-Toolbox: TPI Calculator window

ENTERING R-PHRASES

The input field for R-phrases is positioned at the lower left. Click on the upper button (the one with the little blue arrow and red cross) to enter R-phrases. A pop-up window appears with the list of R-phrases. Select one R-phrase and click on „OK". The selected R-phrase is added to the list. Repeat this procedure for each additional R-phrase.

If you want to delete R-phrases, select one R-phrase from the list and click on the lower button (the one with the little red and yellow eraser).

ENTERING (GERMAN) WATER HAZARD CLASS (WGK)

The input field for the WGK is positioned at the middle right. A click on the arrow on the right opens a drop down menu. Select the required class with a click.

ENTERING EU-CARCINOGENICITY, MAK OR TRK

The input field for EU-Carcinogenicity, MAK and TRK is positioned at the lower right. The EU-Carcinogenicity can be selected via a drop down menu (similar to WGK). The MAK and TRK values can be entered directly in the appropriate fields. If all values are not available, simply leave the corresponding fields unchanged.

CALCULATING THE TPI

If you have entered all available information, click on the button „Calculate TPI". The result is indicated in the upper area of the window. It shows the TPI/mg of the substance and how the MAK, WGK and R-phrases contribute to the value of the result.

What does the result stand for?

The calculated result is shown in TPI/mg (Toxicological Potential Indicator per milligram). The value ranges from „0" (substance with no known hazard) to „100" (extremely toxic substance). This evaluation enables the classification of substances according to their toxicological potential.

At the Fraunhofer IZM we use the TPI evaluation as one tool out of a set of instruments in the IM/EE-Toolbox. We want to help our customers to improve environmental and design aspects of their products according to our customers' targets and the requirements of the product.

You want to know more about the IZM/EE-Toolbox? Please visit our web pages at www.izm.fraunhofer.de/...Department Environmental Engineering.

If you need further information about the IZM/EE-Toolbox, or have any comments or questions, please contact:

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[1] BIA-Report: Gefahrstoffliste; Hauptverband der gewerblichen Berufsgenossenschaften; St. Augustin

[2] Deutsche Forschungsgemeinschaft: MAK- und BAT-Werte-Liste; VCH Verlagsgesellschaft; Weinheim