

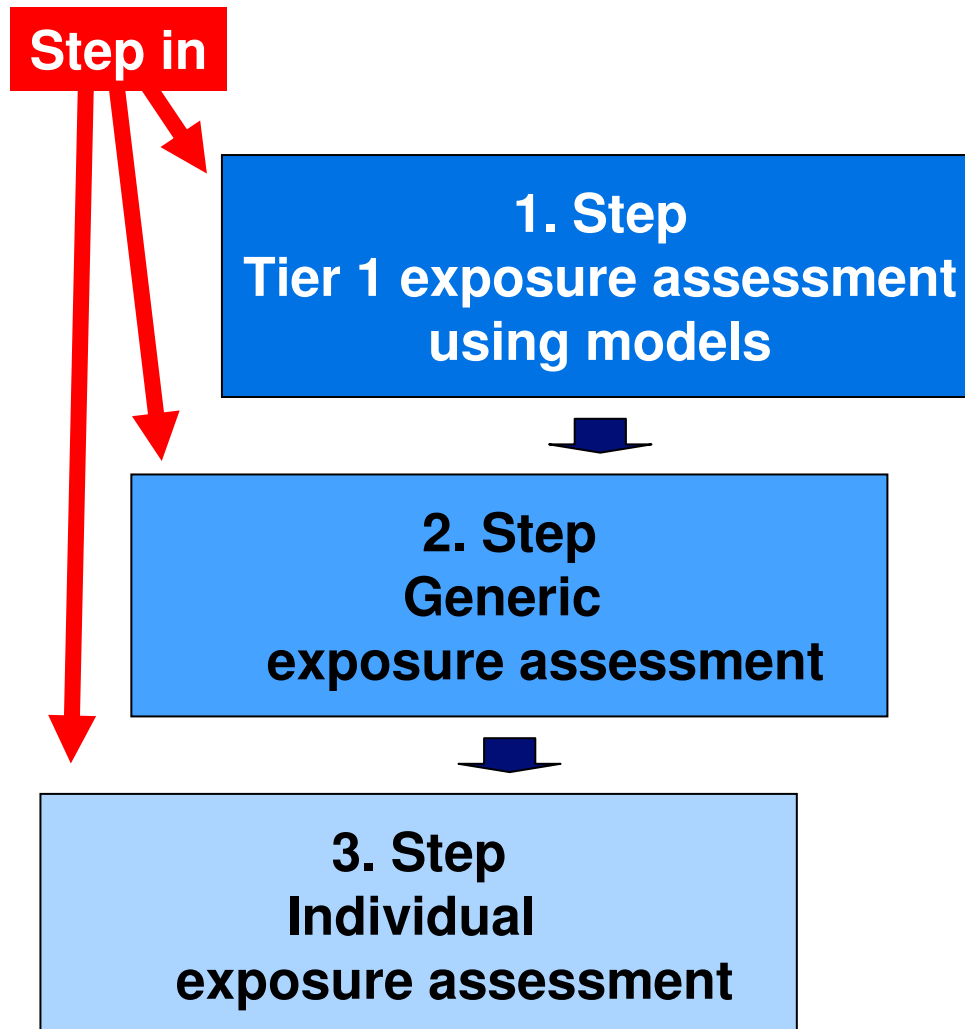
Tier 1 models for exposure assessment

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Example for a tiered approach



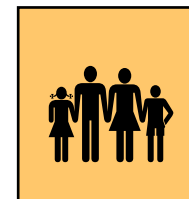
- **All 3-steps can be combined**
 - No need to perform all steps
 - Step-in and step out in all levels possible
- **Tier 1 can be started without questioning DU for its uses**
- **Exposure- / Risk-Assessment becomes more detailed and concrete from step 1 to 3**

Tiered approach in exposure assessment: If starting in 1st Tier

1. Step Tier 1 exposure assessment

Tools needed:

- Covering “all targets”
- Easy to use
- High degree of automation
- Conservative



What are the targets and which tools are covering them?

Occupational

- ECETOC TRA
(preferred by TGD)
- EMKG /
COSHH-BAuA
Tool
- Stoffenmanager
- RiskofDerm
(Tier 2)



Consumer

- ECETOC TRA
- EUSES
- E-Fast
- ConsExpo (Tier 2)



Environment

- ECETOC TRA
(based on TGD
Excel)
- TGD Excel
- EUSES
- E-Fast



Tools for generic exposure assessment – a comprehensive overview

EMKG

- + Easy to use
- + **Control guidance**
- + Transparent
- No PROCs
- Only 1 target
- Only inhalation
- No refinement



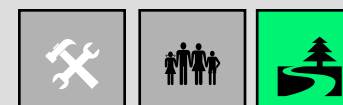
Stoffenmanager

- + Transparent
- + Based on measurements
- + Statistically verified output
- + **Very accurate**
- Only 1 target
- Only inhalation



TGD Excel

- + Transparent
- + Updated by and included in ECETOC TRA
- Only 1 target



Tools for generic exposure assessment – a comprehensive overview

ECETOC TRA

- + New descriptors
- + All 3 targets
- + Batch process
- + Transparent
- + Includes sector group information
- New version not finished yet



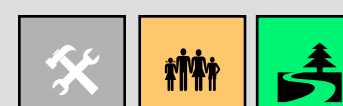
EUSES

- + PROCs add-on
- + 3 targets
- No ERCs yet
- Not easy to use in batch
- Not transparent



E-Fast

- + Several models
- + Easy to use
- + 2 targets
- No occupational exposure
- No batch
- Not transparent



Details on ECETOC TRA v2.0: Development finished in early 2009

Occupational

- Few values changed
- New descriptor system
- More RMMs



Consumer

- New descriptor system
- Exposure via air
- Short term exposure
- Max. exposure 24 h/day
- Includes ingestion



Environment

- Based on TGD Excel model
- New descriptor system
- Whole life-cycle
- Customer tool
- Include sector-specific ERCs


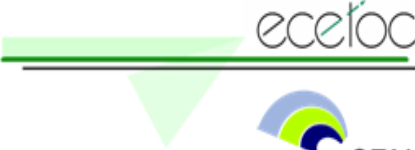


Backup

ECETOC TRA v2.0

Screenshot environment

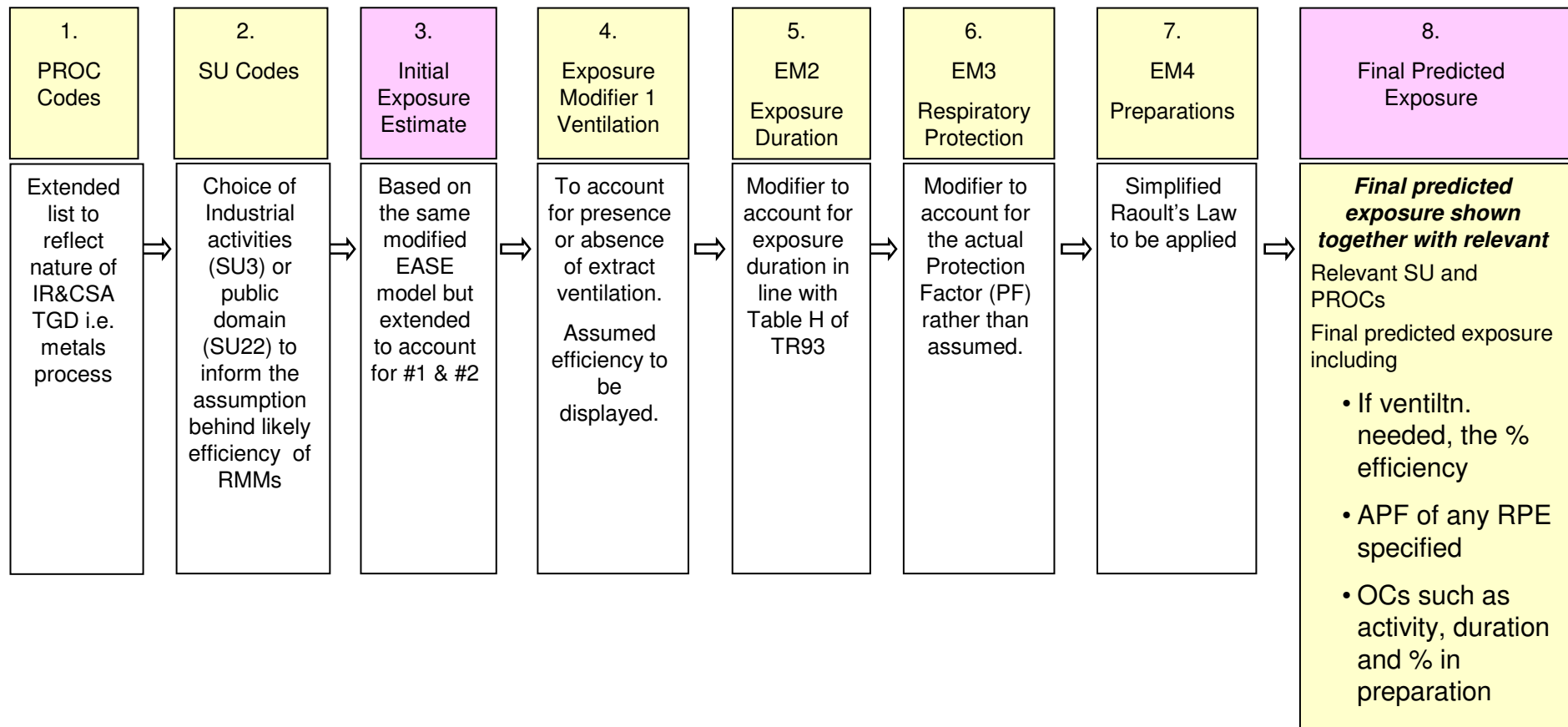
ECETOC TARGETED RISK ASSESSMENT MODEL AND CUSTOMER TOOL



1 RELEASE MODULE		
STEP 1	Identification of Substance	DO STEP 1
STEP 2	Assigning tonnages to the Substance	DO STEP 2
STEP 3	Identification of Lifecycle steps and associated tonnages	DO STEP 3
STEP 4	Release estimation for every life-cycle step This is done in separate worksheets 1 - 15, colour code	DO STEP 4
STEP 5	Summary of all releases for all life-cycle steps in a Summary table of Worksheet '1 Release Module',	DO STEP 5
2 INPUT to TGD MODEL		
STEP 6	Completing of necessary substance and model data	DO STEP 6
3 OUTPUT from TGD MODEL		
STEP 7	Checking of model output with respect to plausibility and feasibility for safety assessment and use in	DO STEP 7
4 CUSTOMER TOOL		
STEP 8	Check plausibility of Customer tool scenarios	DO STEP 8
5 EXIT		
STEP 9	Save work under new name and close the ECETOC tool 1. Excel menu File Save As [filename], then 2. Excel menu ECETOC tool Save and Exit, or use macro: 'SaveAndExit' (ctrl-e)	EXIT

ECETOC TRA v2.0

Update occupational



Default values and schemes

ECETOC TRA v1.0

EMKG

- + Very clear and user friendly structure
- + The output has been shown basically sound for a number of ES
- + Provides control strategies for a range of common tasks, e.g. mixing, filling
- + Control guidance sheets are available on the Internet
- The estimates are generic in nature and therefore uncertain to some extent.
- It is not possible to use the assessed exposure ranges as a basis for further iterations e.g. considering the duration of exposure (only the influence of short term exposure, i.e. < 15 min/day, is considered)
- Validation of the concept is limited
- Not suited for gases (handled or released)
- Should not be used for tasks where fumes are generated or where dusts are formed through abrasive techniques
- Not suited for CMR substances

Default values and schemes

ECETOC TRA v1.0

Stoffenmanager

- + Based on a published and partly validated scientific conceptual model of exposure
- + Clear and user friendly structure
- + Based on handling categories that largely resemble the “technical process in which the substance is used” that is required in the short title of the exposure scenarios under REACH
- + The output is based on statistical analyses of the relation between deterministic scores and several hundreds of real measured data
- + The link between Stoffenmanager model and an exposure database (STEAMbase) facilitates a regular update of the model calibration and expansion of the validity domain.
- + Previous versions of the full Stoffenmanager tool have been proven to be easy to understand and use for non-expert users

Default values and schemes

ECETOC TRA v1.0

Stoffenmanager

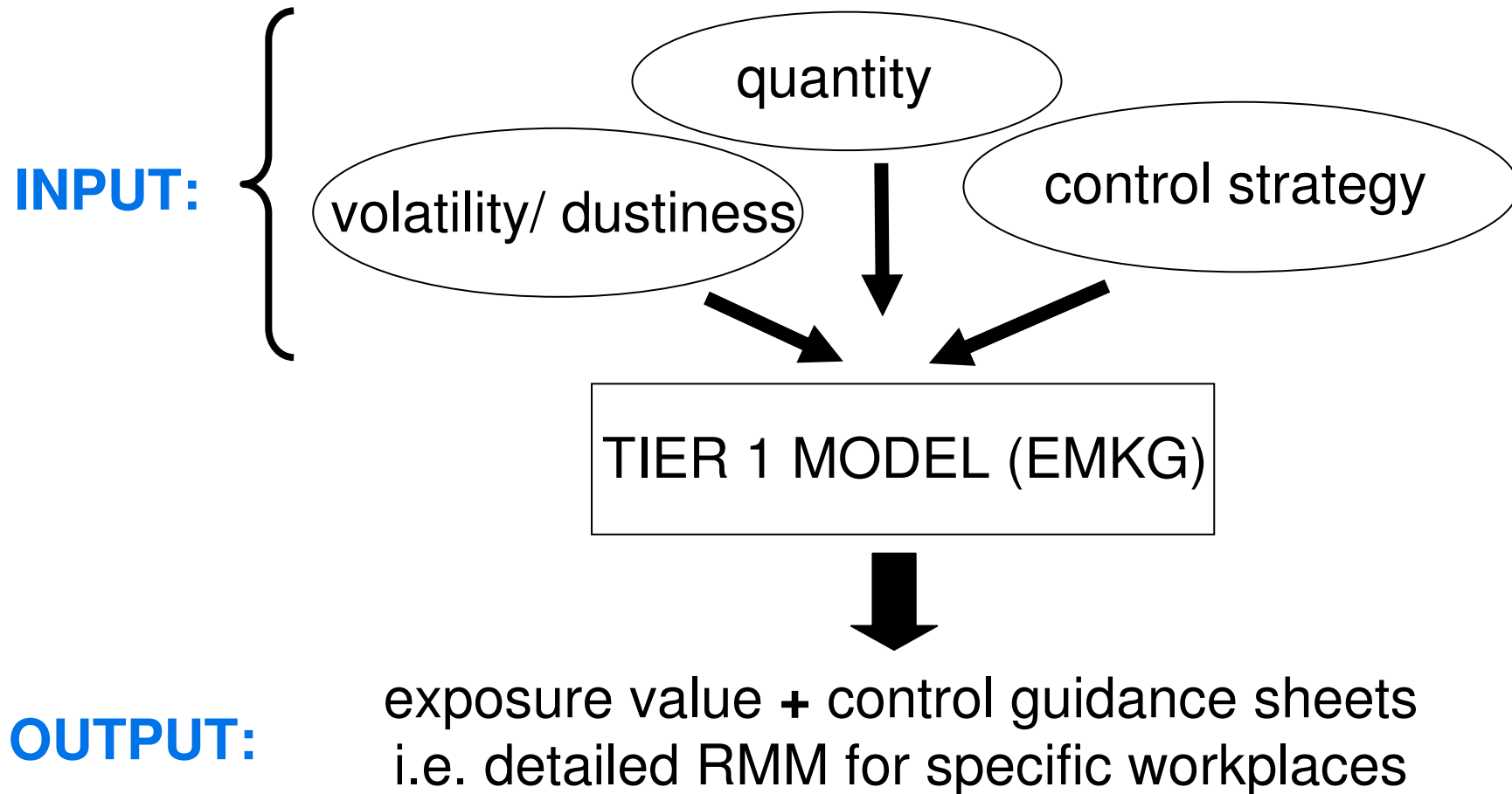
- Exposure to substances that actually are formed in the process cannot be estimated directly with the model, because their vapour pressure or dustiness and/or their percentage in a product cannot be estimated and the choice of “handling category” is not straightforward in these cases. This relates to substances emitted due to processes such as:
 - Combustion processes, such as welding, waste burning, etc.
 - Reaction processes that emit not well characterized reaction products, such as rubber fumes
- Choice of handling category is not always obvious, specifically if:
 - There is no direct manual handling of chemicals by the worker
 - A worker performs a succession of several activities in a short time frame
 - The examples given with the handling categories are not all-encompassing.
- Choice of dustiness category is not always obvious
- No direct influence of parameters such as use rate or ventilation rate
- No probabilistic use of input parameters possible yet

- Exposure assessment part of the EMKG
 - ➔ (“Einfaches Maßnahmenkonzept für Gefahrstoffe”,
Easy-to-use workplace control scheme for hazardous substances
Directive 67/548/EEC)
- Based on COSHH Essentials (“COSHH-BAuA-Tool“)
[evaluated e.g. in Tischer et al. 2003, Ann. occup. Hyg., 47/7, pp. 557-569]
- Modifications consider additional information
(short term/ long term exposure, treated area)
- Banding concept
(upper values of the exposure ranges are used)

EMKG-Expo-Tool: overview

- Only valid for inhalation exposure
- Only valid in connection with control guidance sheets
- Not valid for gases, fumes, dusts from abrasive techniques, CMR
- Spreadsheet version available on Helpdesk website:
<http://www.reach-helpdesk.de/en/Exposure/Exposure.html>

EMKG-Expo-Tool: overview



➤ **Strengths**

- Distribution of exposure → possibility to estimate different percentiles for vapours and inhalable dust
- Comprehensive set of input parameters with iterations possibilities (RMM, PPE)
- Quantitative exposure model is underpinned with measured data
- Model is validated with exposure data

➤ **Weaknesses**

- Not suitable for fibres, gases and hot work techniques
- Separate exposure assessment module not yet available online (will be available Dec 2008)