Healthy Workplaces Campaign 2018-19

Manage Dangerous Substances in the Workplace
HWC Summit 2019, Bilbao

European Agency for Safety and Health at Work

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Healthy Workplaces

Efficient Practices of Prevention in the German Chemical Industry
Today and Tomorrow

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on behalf of the VCI Working Group Industrial Hygiene

VERBAND DER CHEMISCHEN INDUSTRIE e.V.
WIR GESTALTEN ZUKUNFT.

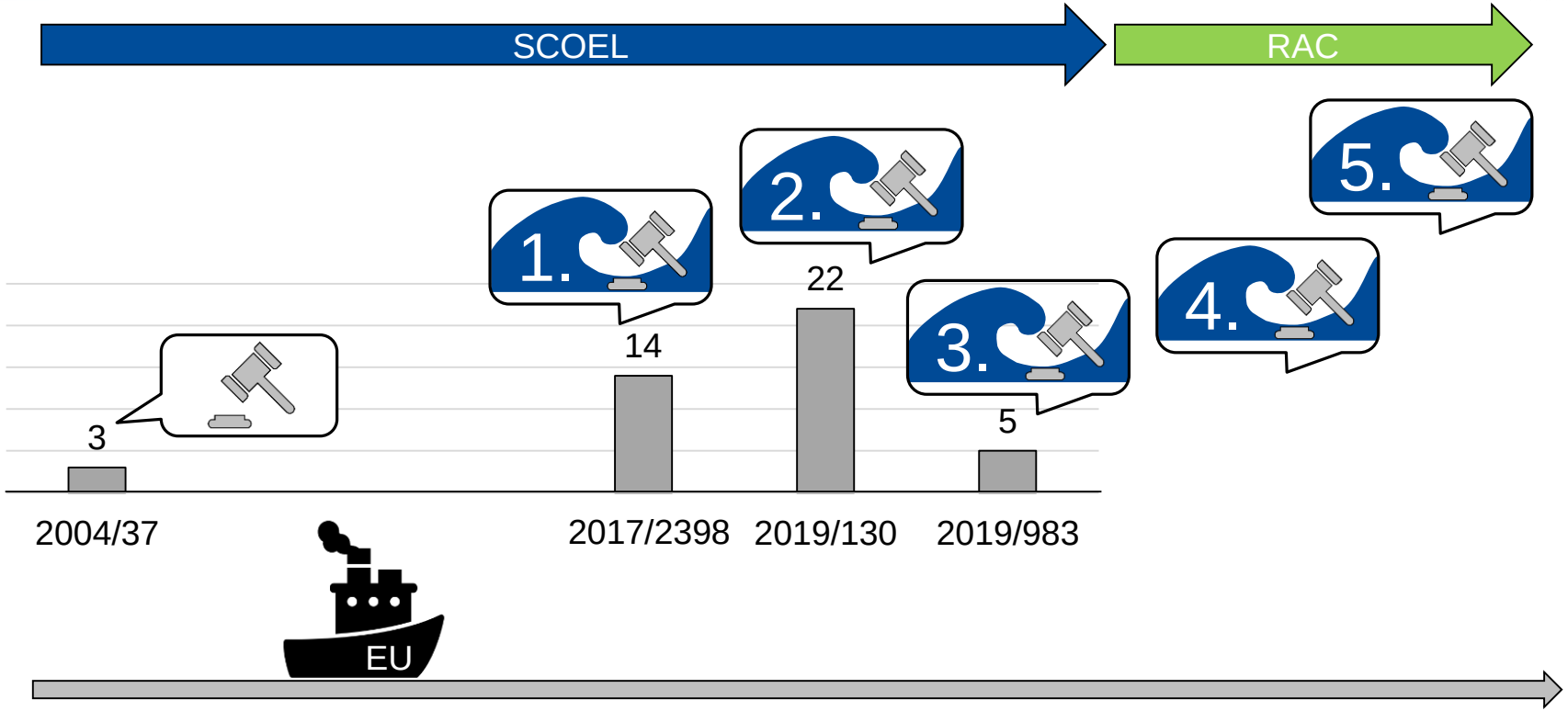
VCI

Agenda

- **Introduction**
- **Industrial Hygiene in Practice**
  - Fundamentals
  - Example of Good Practice
- **Challenges**
  - New and Decreasing European and National Binding Occupational Exposure Limit Values (BOELV)
  - Consequences for Exposure Assessment and Control Concepts
- **Conclusions**

BOELVs for Carcinogenic Substances

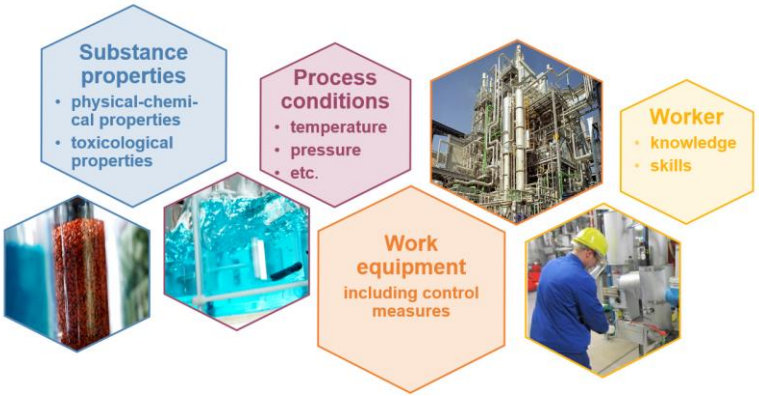
Numerous New or Revised BOELVs Derived in the Past 2 Years

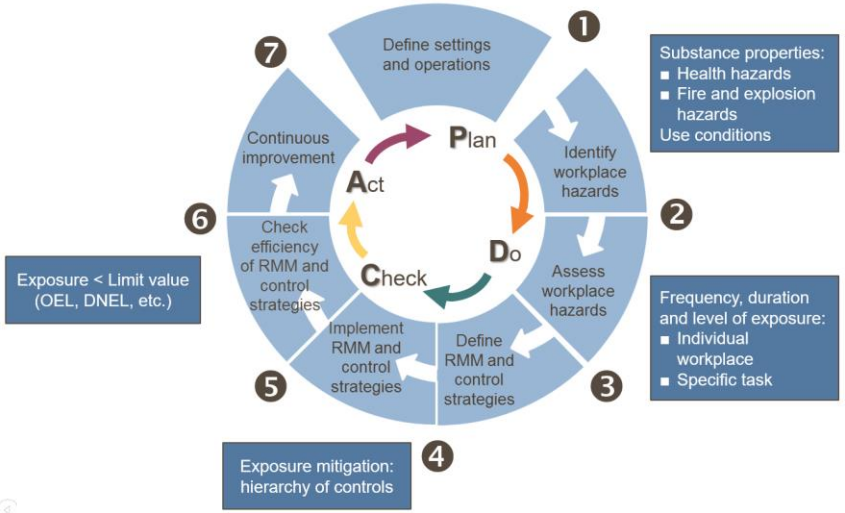


BOELV = Binding Occupational Exposure Limit Value

Industrial Hygiene in Practice

Risk Assessment: Crucial in Daily Practice





Risk assessment is the well-established tool and …

- requires comprehensive information about substance properties and exposure determinants.
- is the basis for suitable and efficient exposure control.

Industrial Hygiene in Practice

Hierarchy of Controls: Adequate Approach to Exposure Control

S

Substitution

- substitution preferred
- otherwise, risk has to be minimized

T

Technical Measures

constructional measures (segregation), technical ventilation, local exhaust ventilation, containment, etc.

O

Organisational Measures

- minimize frequency and duration of task
- minimize number of persons being exposed
- information/supervision and training

P

Personal Measures

- behaviour-based safety programs
- personal protective equipment

Industrial Hygiene in Practice (1/2)
Example: Connecting/Disconnecting Transfer Lines

Industrial Hygiene in Practice (2/2)

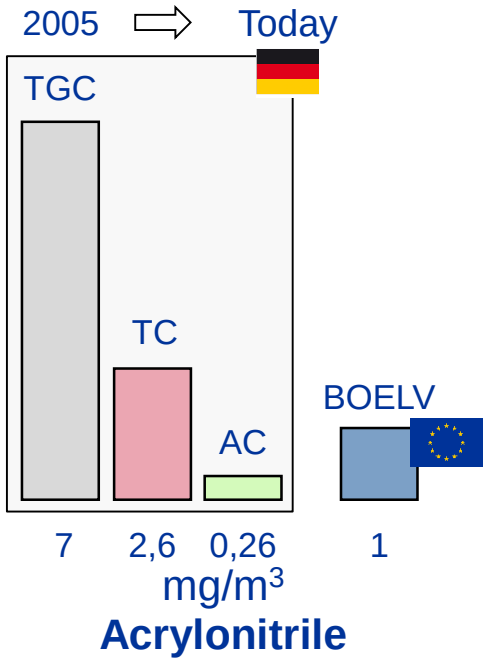
Example: Connecting/Disconnecting Transfer Lines

What Counts:

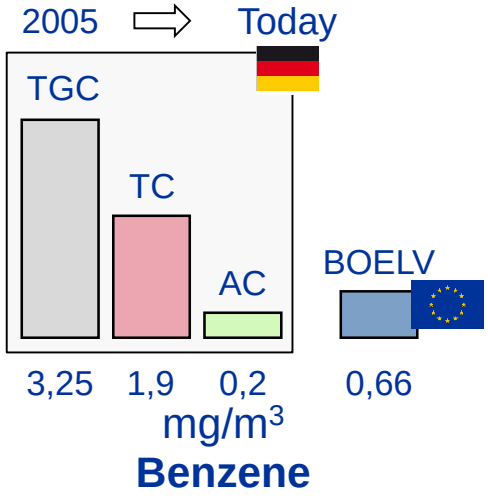
- Risk assessment in the workplace needs to take a holistic approach.
- All workplace hazards must be adequately controlled.
- Exposure routes are decisive for suitable control concepts.
- Exposure to a chemical substance may be less critical as other workplace hazards.
- Combination of different controls measures is usual.

Occupational Exposure Limits: Continuosly Decreasing over Time

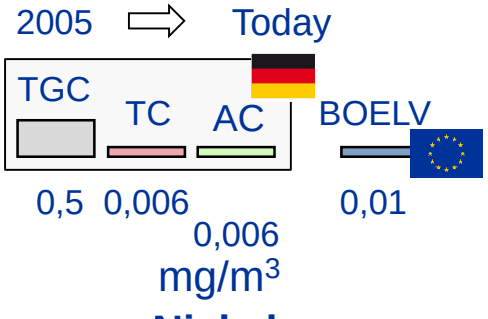
Examples: 2005 - Today



Acrylonitrile



Benzene

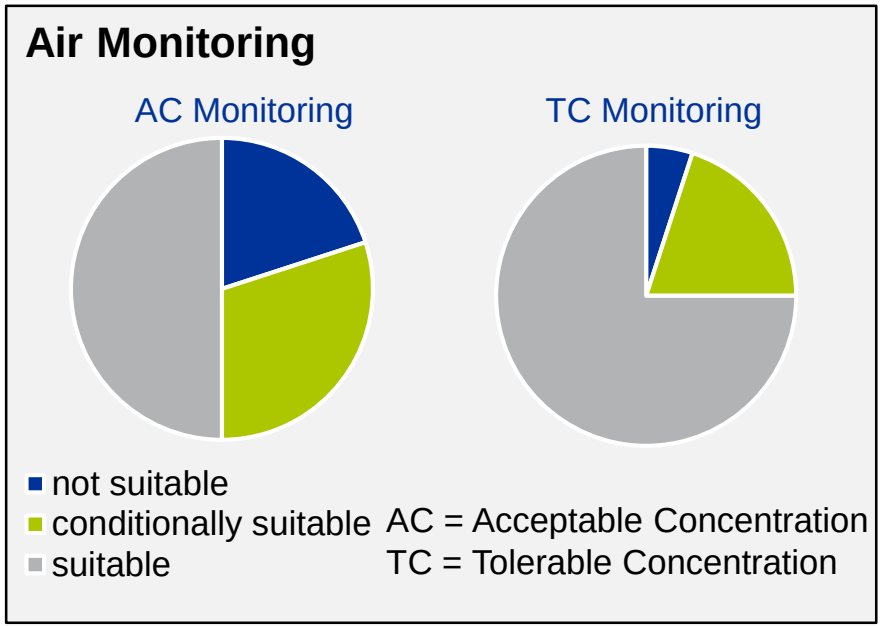


Nickel

(respirable fraction)

TGC = Technical Guidance Concentration
TC = Tolerable Concentration
AC = Acceptable Concentration
BOELV = Binding Occupational Exposure Limit Value

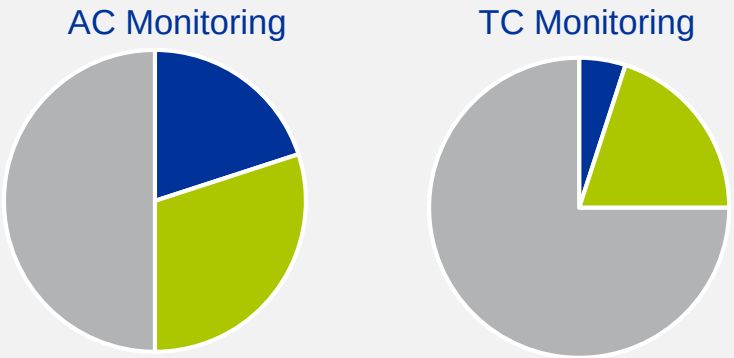
Experiences from the German Risk Acceptance Concept (1/3)



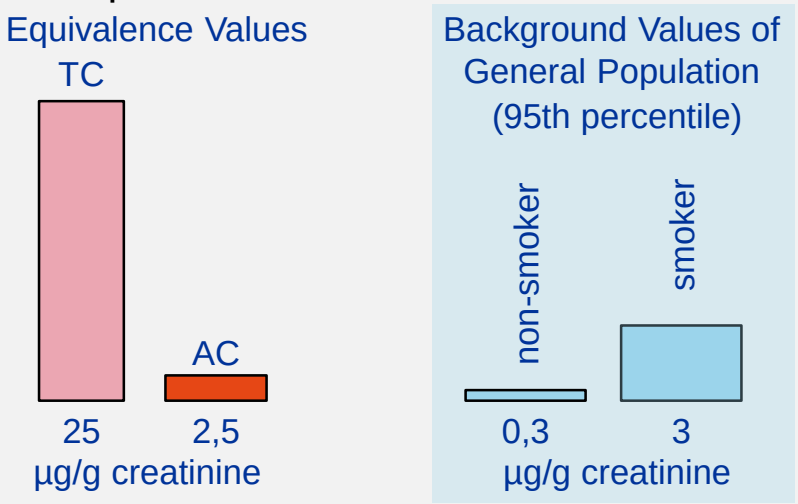
- Air monitoring methods must be improved to assess exposure against decreased threshold limit values.

Experiences from the German Risk Acceptance Concept (1/3)

Air Monitoring



Human Biomonitoring
Example Benzene

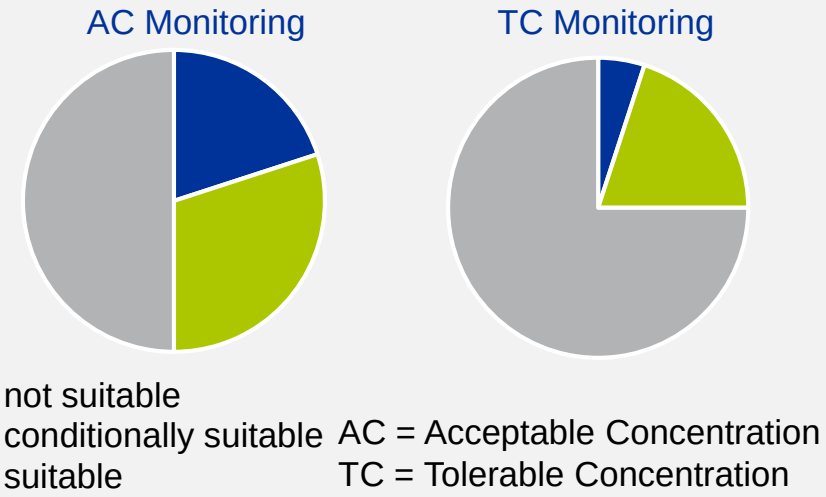


- Air monitoring methods must be improved to assess exposure against decreased threshold limit values.
- Limit of quantification of HBM method for benzene similar as the background values of the general population.

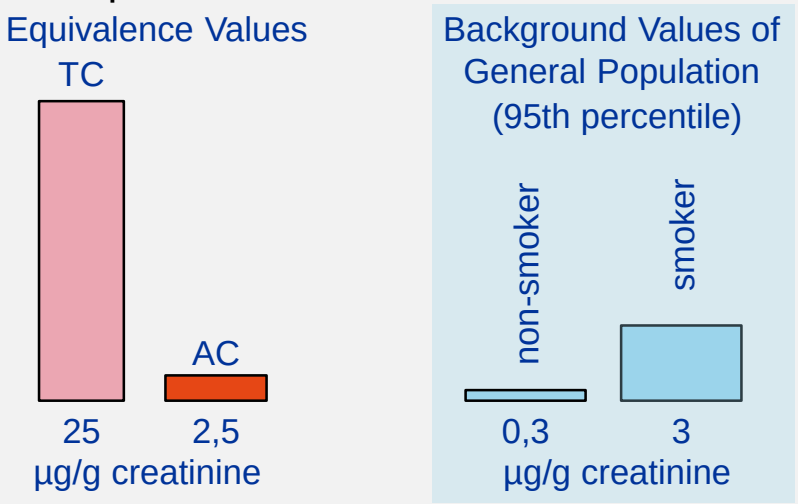
Experiences from the German Risk Acceptance Concept (1/3)

Consequence: Monitoring Methods Partly not Applicable Anymore

Air Monitoring



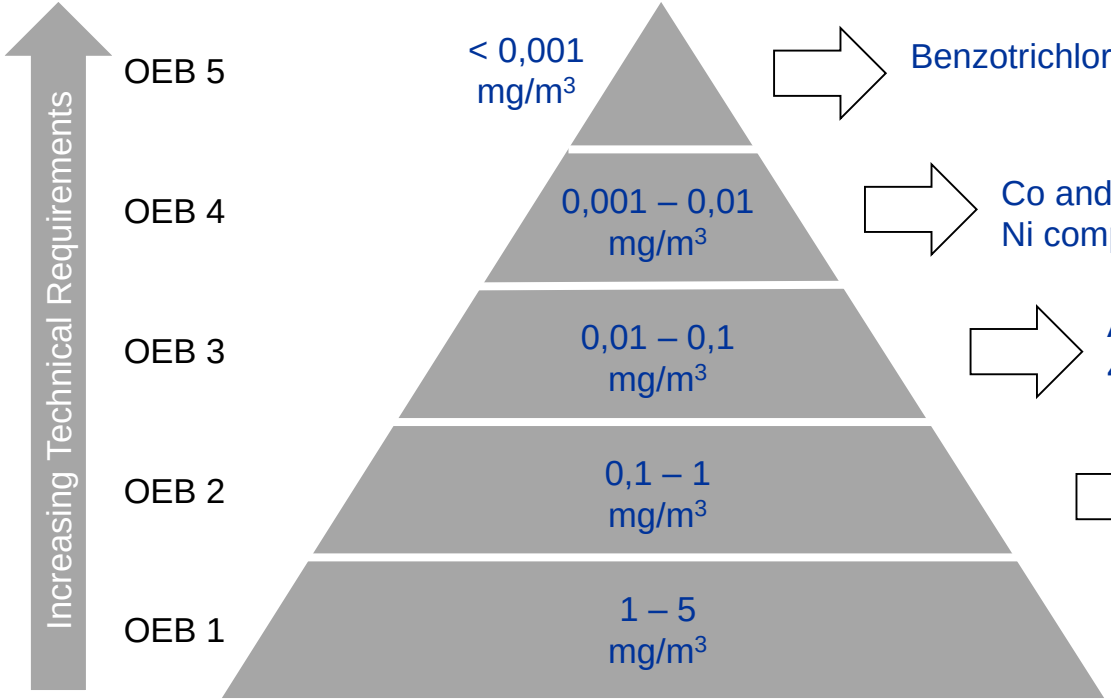
Human Biomonitoring
Example Benzene



- Air monitoring methods must be improved to assess exposure against decreased threshold limit values.
- Limit of quantification of HBM method for benzene similar as the background values of the general population.

Experiences from the German Risk Acceptance Concept (2/3)

Examples



Benzotrichloride, Cr(VI) compounds

Co and Co compounds, Ni compounds, Hydrazine

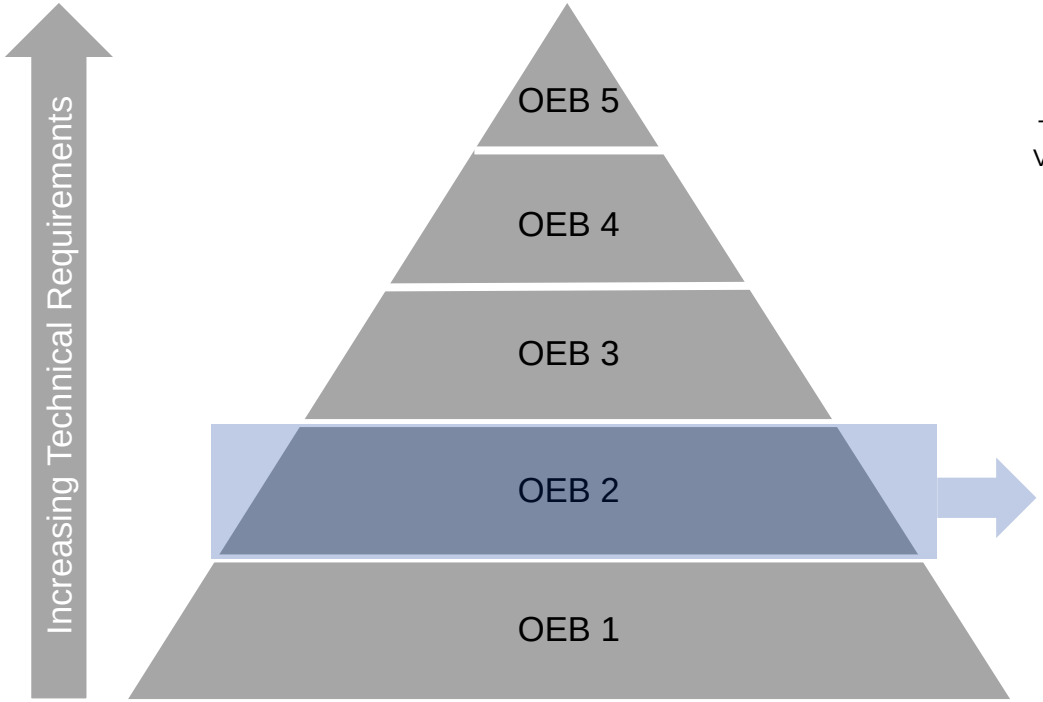
Acrylamide, 4,4´-Methylendianiline

1,3-Butadiene, 1,2-Dichloroethane, Ethylenoxide, 2-Nitro-propane

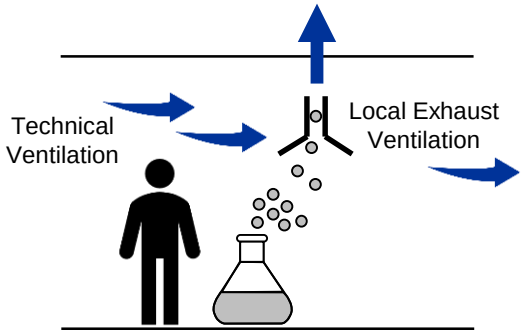
Caveat: Specific exposure situations for liquids not exhaustively reflected.

Experiences from the German Risk Acceptance Concept (3/3)

Consequence: OEB 1 and OEB 2 is Standard in Chemical Industry



Occupational
Exposure Band
(Pharmaceutical Industry)

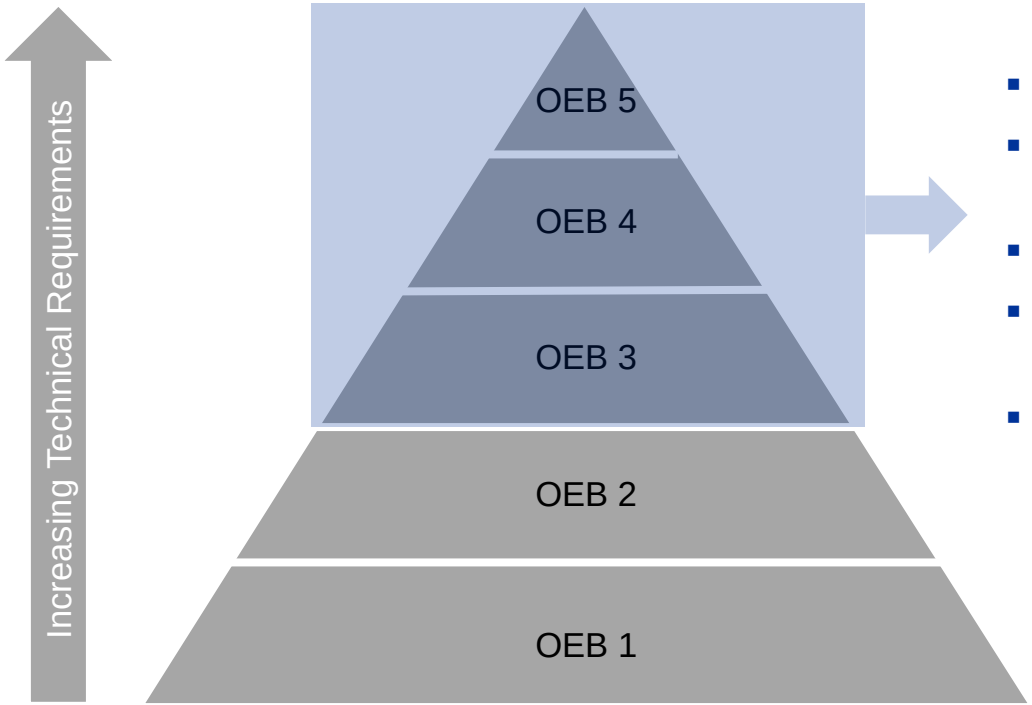


OEB 2 requires …

- technical ventilation
- local exhaust ventilation (LEV)
- often closed equipment

Experiences from the German Risk Acceptance Concept (3/3)

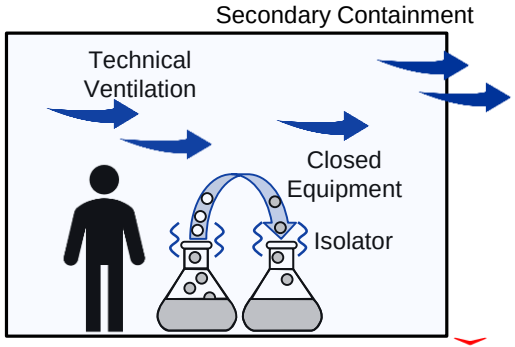
Consequence: OEB 3 - 5 Requires Technical High-End Solutions



Occupational
Exposure Band
(Pharmaceutical Industry)

OEB 3 or better requires …

- closed certified equipment
- in addition use of isolators at interfaces (OEB 4 and 5)
- technical ventilation
- additional ventilation (e.g. LEV, downflow booth, etc.)
- often secondary containment



Improving Primary Containment in Practice

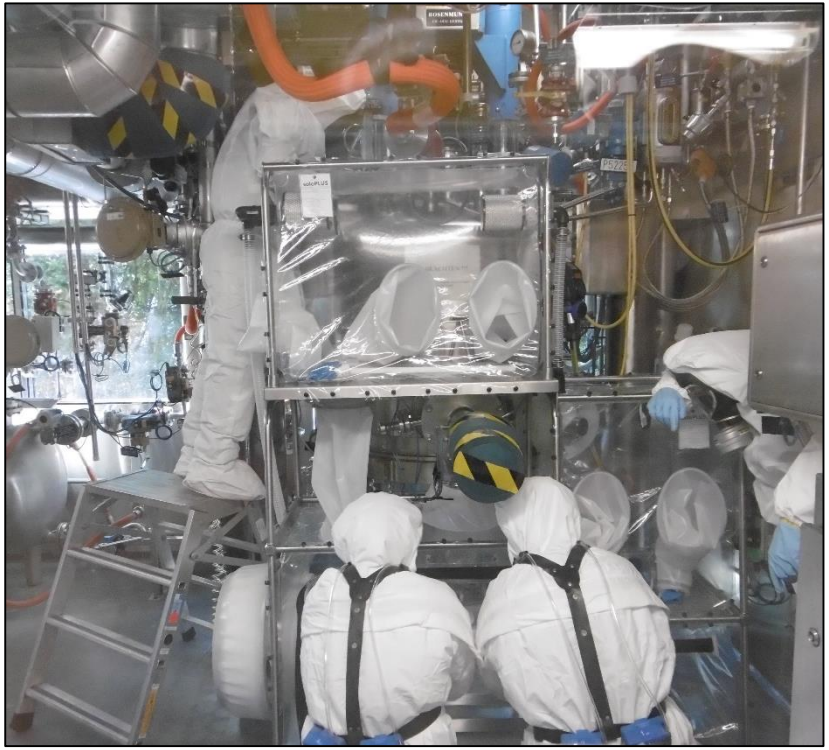
Example: Loading of Solids into Big Bags and Small Packages (OEB 3)

Big Bag Loading

Filling of Small Packages

Improving Primary Containment in Practice

Example: Dryer Equipped with Isolator (OEB 4)



Example from
Pharamceutical Industry

Conclusions

- Safety and Health is key for succesful and sustainable production in German chemical industry.
- We follow the hierarchy of controls and implement it.
- Continuously decreasing occupational exposure limit values however are very challenging and will lead us to the limits of feasibility.
- The results of impact analyses including technical feasibility must be considered in the process of setting occupational exposure limit values.
- Continuous improvement of monitoring methods and technical control measures are required.
- Improving primary containment does include R&D efforts of machine and equipment suppliers.
- Flexible combination of all types of controls including personal protective equipment is necessary and must be covered by European legislation.

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Disclaimer

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