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Solvay Acceptable Exposure Limits (SAELs)

February 2022

Industrial Function – Health, Safety and Environment

Occupational Exposure Limits (OELs)

- Occupational Exposure Limits (OELs) have been used for a long time as references in the evaluation and control of workplace exposures with the aim to protect workers against adverse effects when exposed to hazardous substances.
- OELs are airborne concentrations of substances below which it is believed that nearly all workers may be repeatedly exposed, day after day, without resulting in adverse health effects.
- OELs have been elaborated by scientific committees and adopted by authorities in most countries. They are since many years an important instrument to protect workers against chemical exposures.

Examples of national OELs:

- TLVs (Threshold Limit Values), USA
- VLE (Valeurs Limites d'Exposition), France
- AGW (Arbeitsplatzgrenzwert), Germany
- Valeurs limites d'expositions professionnelle, Belgium

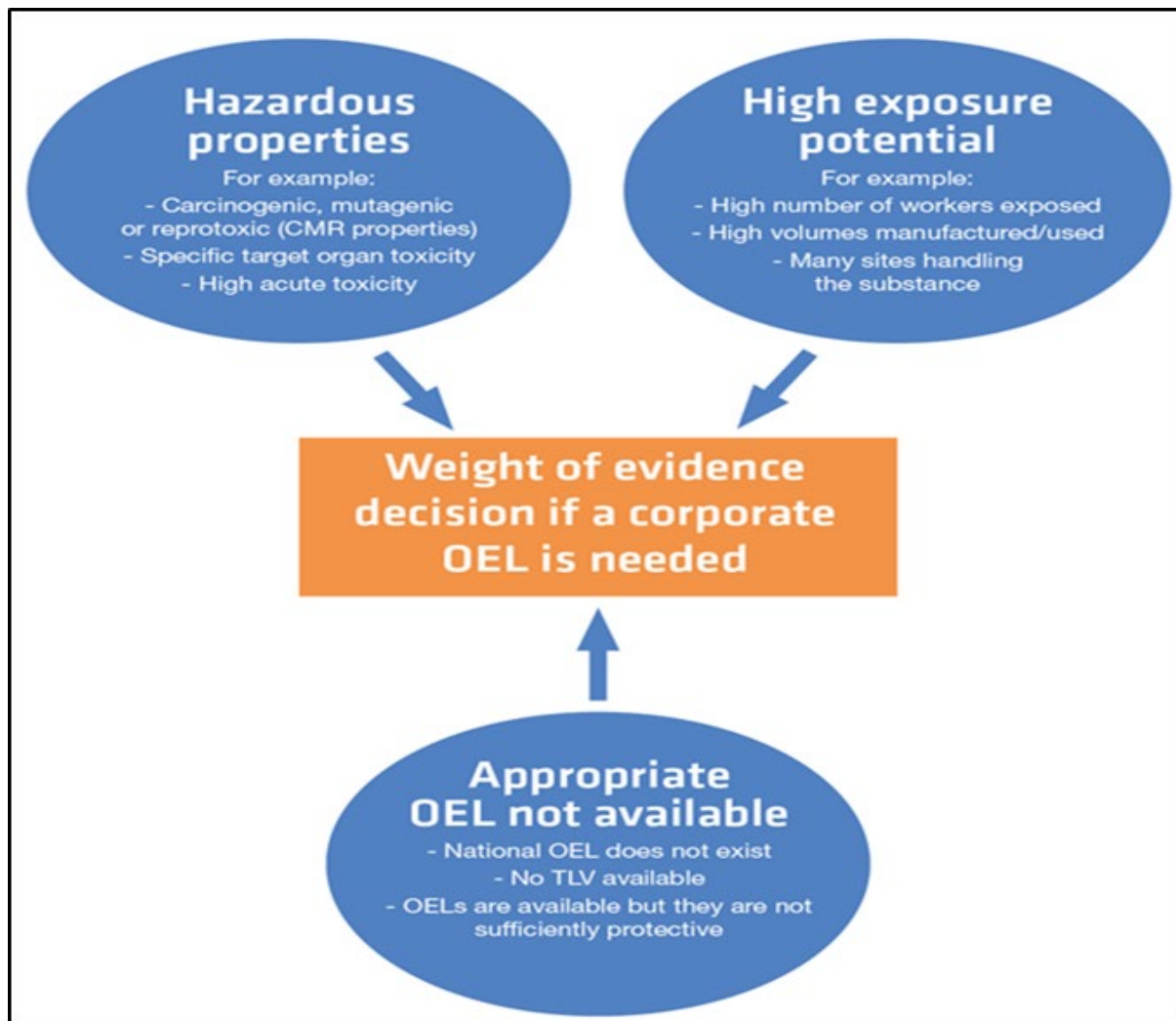
SAELs (Solvay Acceptable Exposure Limits)

- OELs may be outdated or may not be available for all substances, and therefore Solvay has established since a long time its own internal exposure limits which are called: **"Solvay Acceptable Exposure Limits" (SAELs)**.
- The adopted SAEL of a substance is implemented in all the sites of the Solvay Group where the substance is manufactured or used.
- SAELs are based on the evaluation of the most recent available hazard data and they are revised every 10 years or sometimes even earlier.
- For the inhalation route, three categories of SAELs can be specified:
 - **SAEL TWA**: the time-weighted average exposure limit - the maximum average concentration of a substance in air for a normal 8-hour working day and 40-hour week.
 - **SAEL STEL**: the short-term exposure limit - the maximum average concentration to which workers can be exposed for a short period (15 minutes)
 - **SAEL C**: the ceiling value - the concentration that should not be exceeded at any time.
- The units of SAELs are mg/m^3 and ppm (only for liquids and gases)

SAEL Committee

- SAELs are established by a SAEL Committee.
- The SAEL Committee members are working for HSE within the Industrial Function and the current members are:
 - ✓ *Albert Berends (toxicologist; HSE - Product Stewardship - TERA; chairman)*
 - ✓ *Blandine Doornaert (toxicologist; HSE - Product Stewardship - TERA)*
 - ✓ *Françoise Marcenac (industrial hygienist; HSE - EMEA)*
 - ✓ *Isabel Ortega (occupational physician; HSE - EMEA)*
 - ✓ *Susan Eastridge (industrial hygienist; HSE – North America)*
- In addition the colleagues from GBU's, IND-HSE and sites have an important role in the process for establishing SAELs.
- In general the SAEL Committee organizes 3 meetings per year: the involved colleagues from GBU's, IND-HSE and sites can participate in the meeting for discussions on specific substances.

Selection criteria for SAEs



How is a SAEL derived?

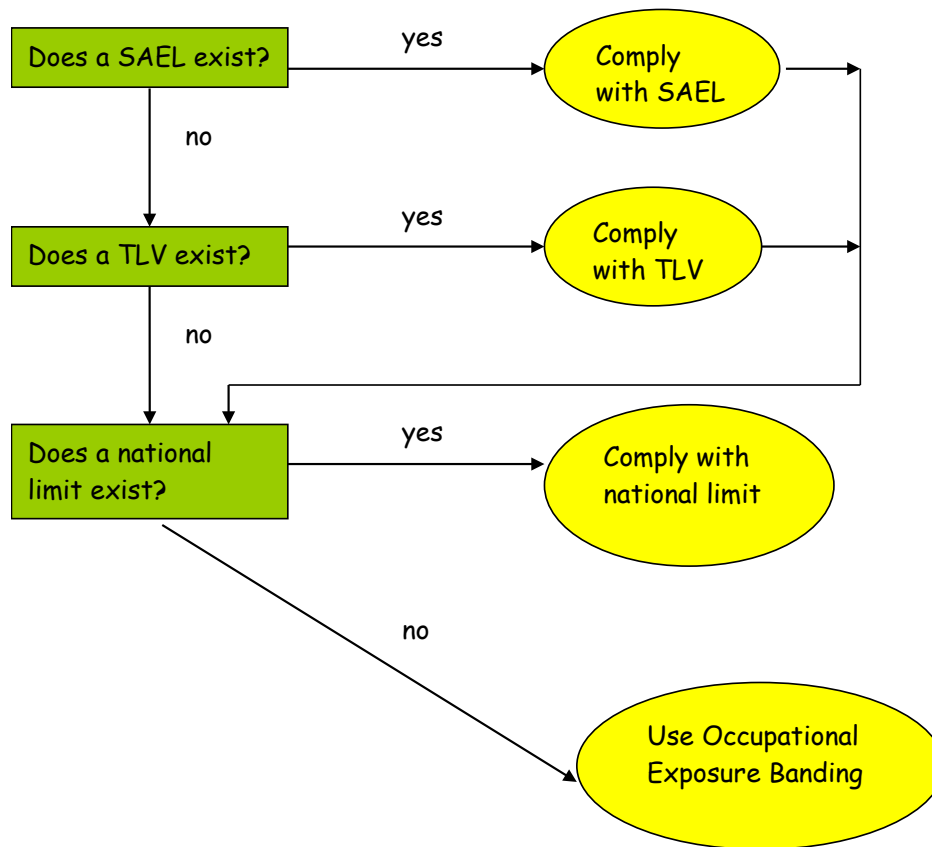
- In most cases SAELs are derived from experimental studies with animals but in exceptional cases human data can also be used.
- A distinction should be made between the mechanisms of action of the substances: 'substances with a threshold' or 'substances without a threshold'.
- For 'substances with threshold', the starting point for the calculation is most of the time a No Observed Adverse Effect Concentration (NOAEC). It is the highest concentration of a substance in the air which does not result in adverse effects on the animals during the study.
- Assessment factors (safety factors) are needed to derive the SAEL for workers. Reasons for "safety factors":
 - Workers may be more sensitive than animals
 - Workers can be exposed for whole their working life while the duration of the animal exposure is often much shorter
 - A difference between workers may exist with regard to their sensitivity to the substance
- For substances without threshold, the risk characterization is carried out by establishing the probability that an adverse effect may occur at a certain level.

SAEL development process

Several stages:

1. Discussion if a SAEL is needed (GBU will be informed)
2. Development of SAEL rationale and proposed SAEL value
Representatives of GBUs, IND-HSE and/or sites will be informed and consulted about the SAEL development process and they will be involved in the collection of worker exposure data. Sometimes an analytical method may need to be developed.
3. Notification of the proposed SAEL
Via a SAEL notification the relevant GBU and industrial sites will be informed formally about the proposed SAEL. First a draft version will be sent to the GBU contacts and afterwards all other stakeholders will be informed via the final notification. It may also be needed to collect additional worker exposure data.
4. Finalisation of the SAEL
The SAEL becomes adopted as soon as it is included in the "SAEL list". Furthermore the SAEL will be included in the Solvay safety data sheets in all countries.

Compliance with SAEs and OELs



Compliance with SAEs and OELs

- To know which limit is applicable in a certain country, the Solvay safety data sheet (section 8.1) of that specific country should be consulted.
- As indicated in the decision tree (see previous slide) the industrial sites of Solvay should always respect the SAE, the TLV and the national OEL applicable in the country.
- When no limit is available an Occupational Exposure Band (OEB) can be used to control the exposure to the substance.
- In order to ensure an appropriate control of occupational health risk to workers, IND-HSE, GBUs and industrial sites worldwide shall ensure compliance of their facilities and operations with the established SAEs and the applicable OELs according to Industrial Hygiene Group Requirements for Chemical Risk Assessment and Management (IND-HSE-IH-05-PRO).

More information

- SAEL website:
<https://wiki.solvay.com/pages/viewpage.action?pageId=25992673>
- Threshold Limit Values (TLVs) of American Conference of Governmental Industrial Hygienists (ACGIH) :
<https://www.acgih.org/science/tlv-bei-guidelines/policies-procedures-presentations/tlv-bei-position-statement/>
- International Labour Organization (ILO):
http://www.ilo.org/safework/info/WCMS_151534/lang--en/index.htm

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