

化學品評估及分級管理工具箱

v2017

化學品評估及分級管理 宣導重點&策略

全面掌握、分層管理、多元評估、控制區分、科學為本
事業單位可依企業規模選擇適用的工具進行評估及分級管理！



具GHS健康危害
(19000種↑)

具容許暴露標準
(491種)

應實施監測
(91種)

中小企業：我國CCB工具、日本實施風險評估支援系統

大型企業：進階工具箱

英國COSHH要點、德國EMKG、新加坡SQRA、荷蘭Stoffenmanager、
歐洲ECETOC TRA

從事特別危害健康作業之勞工人數100人以上，或總勞
工人數500人以上：採樣分析或定量推估模式

依勞工作業環境監測實施辦法所定之監測及期程，實施
暴露評估，必要時輔以其他半定量或定量評估模式或工
具。

工具箱內容

- 英國物質健康危害控制要點（COSHH要點）
 - 德國工作場所危害物質管控計畫（EMKG）
 - 日本實施風險評估支援系統
- 與ILO CCB相似
- 新加坡評估職業暴露有害化學品半定量方法（SQRA）
 - 荷蘭物質管理線上工具（Stoffenmanager）
 - 歐洲針對性風險評估（ECETOC TRA）

德國工作場所危害物質管控計畫 (EMKG)

介紹

- 為德國職業安全與健康研究所（BAuA）提出之易使用於工作場所危害物質管控計劃。
- 適用於化學品物理狀態為固體及液體之評估。
- 有建置單機版工具及App供使用。

- EMKG 網頁：
 - https://www.baua.de/EN/Home/Home_node.html

所需參數及資料參考來源

| 屬性 | 參數 | 資料參考來源 |
|----|--------------|----------------|
| 危害 | GHS危害分類 | 安全資料表 (SDS) #2 |
| | 或：歐盟R-phrase | 安全資料表 (SDS) #2 |
| | 或：OEL標準 | 安全資料表 (SDS) #8 |
| 暴露 | 化學品使用量 | 作業現場資訊 |
| | 固體粉塵度/液體揮發度 | 安全資料表 (SDS) #9 |

方法流程/步驟



工具介面

The EMKG is divided into eight steps.

Steps one to four are dealing with risks resulting from inhalation and step five to seven with risks resulting from dermal contact. The final step is to check the effectiveness of the chosen protective measures. To pass through these eight steps it is necessary to have information about the hazardous substance from the Safety Data Sheet (SDS) and task-related information that can be obtained by visiting/inspecting the workplace. Hereafter the eight steps of the EMKG will be shortly presented.

Step 1: Hazard Group (HG) Inhalation

Start by determining the hazard group (for substances: by means of occupational exposure limit (OEL) or classification R-phrases/H-statements and for mixtures by means of classification R-phrases/H-statements).

See safety data sheet for this information (SDS sections: 2, 8)

| HAZARD GROUP | OEL according to TRGS 900 | | R-phrases, in case there is no OEL | HG | H-statements, in case there is no OEL |
|--------------|-----------------------------|------------------|---|----|---|
| | Solids (mg/m ³) | Liquids (ppm) | | | |
| 1 | OEL ≤ 10 | 50 < OEL ≤ 500 | No R-phrases R26, R27, R52, R57 | A | No Metastatement H319, H335, H336, H338 |
| 0.1 | OEL ≤ 1 | 5 < OEL ≤ 50 | R23, R22, R41, R68/20, R68/22 | B | H302, H332, H318, H373 |
| 0.01 | OEL ≤ 0.1 | 0.5 < OEL ≤ 5 | R23, R25, R28, R31, R34, R35, R40, R42, R62, R63, R68, R39/23, R39/25, R49/20, R49/22 | C | H301, H331, H314, H334, H341, H351, H361F, H361F3, H370, H372, EUH031 |
| 0.001 | OEL ≤ 0.001 | 0.05 < OEL ≤ 0.5 | R26, R28, R32, R61, R39/24, R39/26, R48/23, R48/25 | D | H300, H330, H340, H372, EUH032 |
| 0.001 | OEL ≤ 0.001 | OEL ≤ 0.05 | R45, R46, R48, R60 | E | H340, H350, H350, H360F |

Step 2: Release Group

Next, select the physical state (solid or liquid) and determine boiling point/vapor pressure for liquids or dustiness for solids. See safety data sheet for this information (SDS section: 9)

| | LOW | MEDIUM | HIGH |
|--|-------------------|---------------|------------------|
| Solids (dustiness) | | | |
| Liquids (boiling point* or vapor pressure) | more than 150°C | 30 to 150°C | less than 50°C |
| *Applies to work done at room temperature | less than 0.5 kPa | 0.5 to 25 kPa | more than 25 kPa |

Step 3: Quantity Group

Estimate the quantity used per task.

| | | |
|--------|-------------------|--|
| LOW | m/g | |
| MEDIUM | l/kg | |
| HIGH | m ³ /t | |

Step 4: Control Strategy Inhalation

By combining the three parameters hazard, release and quantity group you can derive a control strategy represented by control guidance sheets that describe measures for typical working activities. Please note that the protective measures in series 1xx have the meaning of minimum standards, which must always be implemented also for level 2 and 3.

| HAZARD GROUP | QUANTITY | RELEASE GROUP | | |
|--------------|----------|---------------|--------|------|
| | | LOW | MEDIUM | HIGH |
| A | LOW | 1xx | 1xx | 1xx |
| | MEDIUM | 1xx | 1xx | 1xx |
| B | LOW | 1xx | 1xx | 1xx |
| | MEDIUM | 1xx | 1xx | 1xx |
| C | LOW | 1xx | 1xx | 1xx |
| | MEDIUM | 1xx | 1xx | 1xx |
| D | LOW | 1xx | 1xx | 1xx |
| | MEDIUM | 1xx | 1xx | 1xx |
| E | LOW | 1xx | 1xx | 1xx |
| | MEDIUM | 1xx | 1xx | 1xx |

- Level 1: General ventilation = Control Guidance Sheets (CGS) 1xx
- Level 2: Engineering control = Control Guidance Sheets (CGS) 2xx
- Level 3: Containment = Control Guidance Sheets (CGS) 3xx
- Special expert advice

Step 1: Hazard Group Inhalation - **A** Step 2: Release Group - **MEDIUM** Step 3: Quantity Group - **MEDIUM** Step 4: A + MEDIUM + MEDIUM → Control Strategy (Level 1) Inhalation → CGS 1xx

EXAMPLE: Cleaning with acetone, OEL 500 ppm, liquid, boiling point 56°C, 2 litres used, R66 or EUH066, foreseen skin contamination only by spots, possibly long duration of skin contact

Step 5: Hazard Group Skin contact - **HA** Step 6: Effective area - **SMALL**, Duration of skin contact - **long** Step 7: HA + SMALL + long → Control Strategy (Level 1) → CGS 120

Step 5: Hazard Group (HG) Skin contact

Determine the hazard group for skin contact by classification (R-phrases/H-statements). If an employee works more than 2 hours in a moist environment or wears liquid-proof protective gloves or often cleans the hands intensively or disinfects them, please remember that this is „wet work“ and therefore the control guidance sheet 230 has to be taken into account.

| HAZARD GROUP | R-phrases | HG | H-statements |
|--|-----------|--|--------------|
| | | | |
| R38 | HB | H415 | |
| R21, R43, R49/21, R68/R21 | HC | H412, H417, H437, H439 | |
| R24, R34, R46, R39/24, R49/24, R62, R63, R68 | HD | H311, H314 (Skin Corr. 1B, 1C), H414, H415, H416, H417, H437 | |
| R24 and R34, R27, R35, R39/27, R45, R46, R61 | HE | H318, H314 (Skin Corr. 1A), H406, H410, H416 | |

Step 6: Contaminated area of skin contact

Estimate effective area that will be usually contaminated by the performed task. When determining the effective area of skin contact, do not take protective gloves or other personal protective equipment into account!

Effective area **SMALL** spots, splashes
Effective area **LARGE** hands, forearms

Duration of skin contact

Short-term contact: less than 15 minutes
Long-term contact: more than 15 minutes

Step 7: Control Strategy Skin contact

The measures against skin contact as additional measures are described as low, extended or high

| HG | Effective Area | Duration | Control Strategy Level | |
|----|----------------|----------|------------------------|----------|
| | | | Low | Extended |
| HA | SMALL | long | 1xx | 1xx |
| | LARGE | short | 1xx | 1xx |
| HB | SMALL | long | 1xx | 1xx |
| | LARGE | short | 1xx | 1xx |
| HC | SMALL | long | 1xx | 1xx |
| | LARGE | short | 1xx | 1xx |
| HD | SMALL | long | 1xx | 1xx |
| | LARGE | short | 1xx | 1xx |
| HE | SMALL | long | 1xx | 1xx |
| | LARGE | short | 1xx | 1xx |

- Level 1: Low need for measures: Basic safety precautions for skin contact: Control Guidance Sheet 1xx
- Level 2: Extended need for measures: Extended safety precautions for skin contact: Control Guidance Sheet 2xx
- Level 3: High need for measures: substitution, closed system

Step 8: Effectiveness check of protective measures

Implementation and effectiveness check of chosen control strategy:

- Control Guidance Sheets can be used as checklists
- Documentation of management and inspection results
- Functional capability of safety equipment and devices has to be checked on a regular basis

EMKG-products:
EMKG kompakt (pocket disc & hand card)
EMKG kompakt as smartphone app (Android and iOS)
EMKG software
More products and information on our web page www.baua.de/emkg