

## 1.1. The EU CLP

The CLP is the Regulation on the Classification, Labelling and Packaging of substances and mixtures. This Regulation aligns the previous EU legislation on Classification and Labelling of Substances (Dangerous Substances Directive DSD, 67/548/EEC) and Preparations (Dangerous Preparations Directive DPD 1999/45/EC) to the UN GHS.

The CLP Regulation was published in the Official Journal on 31 December 2008 and entered into force on 20 January 2009. According to the Regulation, the deadline for substance classification according to the new rules is December 2010, while for mixtures the deadline is June 1, 2015. The CLP Regulation will ultimately replace the existing rules for Classification and Labelling of substances and preparations (DSD and DPD) after this transitional period.

The legal text of the CLP can be found on: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008R1272:EN:NOT>

The guidance developed by ECHA for the application of the CLP criteria can be found on:

[http://guidance.echa.europa.eu/docs/guidance\\_document/clp\\_en.htm?time=1282299273](http://guidance.echa.europa.eu/docs/guidance_document/clp_en.htm?time=1282299273)

This guidance includes specific guidance for the environmental classification of metals and metal compounds.

An overview of the mixture rules for the different hazard endpoints according to CLP and DPD can be found below for human health and the environment:

### 1.1.1 Human health

a) according to CLP

| Endpoint                          | Method | Concentration Limits                                                    |                                                                                       |                                 |                                   |
|-----------------------------------|--------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|-----------------------------------|
|                                   |        | Cat. 1                                                                  | Cat. 2                                                                                | Cat. 3                          | Cat. 4                            |
| Acute toxicity                    | Sum    | $0 < ATE_{mix}^{(*)} \leq 5$                                            | $5 < ATE_{mix}^{(*)} \leq 50$                                                         | $50 < ATE_{mix}^{(*)} \leq 300$ | $300 < ATE_{mix}^{(*)} \leq 2000$ |
| Skin corrosion/irritation         | Sum    | Skin corr cat. 1A, 1B or 1C $\geq 5\%$<br>( $H_2SO_4$ : $C \geq 15\%$ ) | $1\% \leq$ Skin corr cat. 1A, 1B or 1C $< 5\%$<br>( $H_2SO_4$ : $5\% \leq C < 15\%$ ) |                                 |                                   |
|                                   |        |                                                                         | Skin irr cat. 2 $\geq 10\%$<br>( $NiSO_4$ : $C \geq 20\%$ )                           |                                 |                                   |
|                                   |        |                                                                         | (10* Skin corr cat. 1A, 1B, 1C) + Skin irr cat. 2 $\geq 10\%$                         |                                 |                                   |
| Serious eye damage/eye irritation | Sum    | Eye effects cat. 1 or Skin corr cat. 1A,                                | $1\% \leq$ Eye effects cat. 1 or Skin corr cat. 1A, 1B, 1C $<$                        |                                 |                                   |

|                                                    |        |                                                                                              |                                                                                                                                                   |                                             |  |
|----------------------------------------------------|--------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--|
|                                                    |        | 1B, 1C ≥ 3%                                                                                  | 3%<br>(H <sub>2</sub> SO <sub>4</sub> : 5% ≤ C < 15%)                                                                                             |                                             |  |
|                                                    |        | Skin corr cat. 1A, 1B, 1C + eye effects cat. 1 ≥ 3%                                          | Eye effects cat. 2 ≥ 10%                                                                                                                          |                                             |  |
|                                                    |        |                                                                                              | (10* Eye effects cat. 1) + Eye effects cat. 2 ≥ 10%                                                                                               |                                             |  |
|                                                    |        |                                                                                              | 1% ≤ Eye effects cat. 1 + Skin corr cat. 1A, 1B, 1C < 3%                                                                                          |                                             |  |
|                                                    |        |                                                                                              | 10* (Skin corr cat. 1A, 1B, 1C + Eye effects cat. 1) + Eye effects cat. 2 ≥ 10%                                                                   |                                             |  |
| Respiratory or skin sensitisation                  | Min. 1 | ≥ 1%<br>(NiSO <sub>4</sub> : C ≥ 0,01%)                                                      | NR                                                                                                                                                |                                             |  |
| Germ cell mutagenicity                             | Min. 1 | cat. 1A or 1B ≥ 0,1%                                                                         | cat. 2 ≥ 1%                                                                                                                                       |                                             |  |
| Carcinogenity                                      | Min. 1 | cat. 1A or 1B ≥ 0,1%<br>(CdSO <sub>4</sub> and CoSO <sub>4</sub> : C ≥ 0,01%)                | cat. 2 ≥ 1%                                                                                                                                       |                                             |  |
| Reproductive toxicity                              | Min. 1 | cat. 1A or 1B ≥ 0,3%                                                                         | cat. 2 ≥ 3%<br>(CS <sub>2</sub> : C ≥ 1%)                                                                                                         |                                             |  |
| Specific target organ toxicity – single exposure   | Min. 1 | cat. 1 ≥ 10%                                                                                 | 1% ≤ cat. 1 < 10%                                                                                                                                 | cat. 3 ≥ 20%<br>(CrO <sub>3</sub> : C ≥ 1%) |  |
|                                                    |        |                                                                                              | cat. 2 ≥ 10%                                                                                                                                      |                                             |  |
| Specific target organ toxicity – repeated exposure | Min. 1 | cat. 1 ≥ 10%<br>(CdSO <sub>4</sub> : C ≥ 7%; CS <sub>2</sub> and NiSO <sub>4</sub> : C ≥ 1%) | 1% ≤ cat. 1 < 10%<br>(CdSO <sub>4</sub> : 0,1% ≤ C < 7%; CS <sub>2</sub> : 0,2% ≤ C < 1%; NiSO <sub>4</sub> : 0,1% ≤ C < 1%; CdS: 0,1% ≤ C < 10%) |                                             |  |
|                                                    |        |                                                                                              | cat. 2 ≥ 10%<br>(Pb compounds: C ≥ 0,5%; Hg compounds: C ≥ 0,1%)                                                                                  |                                             |  |
| Aspiration hazard                                  | Sum    | cat. 1 ≥ 10%,<br>kin. visc. ≤ 22,5 mm <sup>2</sup> /s (40°C)                                 | NR                                                                                                                                                |                                             |  |

<sup>(\*)</sup> ATE<sub>mix</sub> = {Σn C<sub>i</sub>/ATE<sub>i</sub>}<sup>-1</sup> \* 100

where  $C_i$  = concentration of ingredient i (% w/w or % v/v)

i = the individual ingredient from 1 to n

n = the number of ingredients

ATE<sub>i</sub> = Acute Toxicity Estimate of ingredient i

= 0,5 for ingredient with acute tox cat. 1

= 5 for ingredient with acute tox cat. 2

= 100 for ingredient with acute tox cat. 3

= 500 for ingredient with acute tox cat. 4

b) According to the Dangerous Preparations Directive 1999/45/EC 1999/45/EC

| Endpoint                                       | Method | Concentration Limits                                                                       |                                                                                                             |                                                                                                    |                                                                                                                                                  |
|------------------------------------------------|--------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Acute toxicity</i>                          | Sum    | $T^+ \geq 7\% \Rightarrow T^+$                                                             | $1\% \leq T^+ < 7\% \Rightarrow T$                                                                          | $0,1\% \leq T^+ < 1\% \Rightarrow X_n$                                                             |                                                                                                                                                  |
|                                                |        |                                                                                            | $T \geq 25\% \Rightarrow T$                                                                                 | $3\% \leq T < 25\% \Rightarrow X_n$                                                                |                                                                                                                                                  |
|                                                |        |                                                                                            |                                                                                                             | $X_n \geq 25\% \Rightarrow X_n$<br>(CS <sub>2</sub> : $C \geq 10\%$ ; Pb compounds: $C \geq 1\%$ ) |                                                                                                                                                  |
| <i>Corrosion/ irritation and damage to eye</i> | Sum    | $C, R35 \geq 10\% \Rightarrow C, R35$<br>(H <sub>2</sub> SO <sub>4</sub> : $C \geq 15\%$ ) | $5\% \leq C, R35 < 10\%$ AND<br>$C, R34 > 0\% \Rightarrow C, R34$                                           | $C, R35 < 5\% \Rightarrow X_i, R41$                                                                | $1\% \leq C, R35 < 5\%$ AND<br>$X_i, R36/37/38 > 0\%$<br>$\Rightarrow X_i, R36/37/38$<br>(H <sub>2</sub> SO <sub>4</sub> : $5\% \leq C < 15\%$ ) |
|                                                |        |                                                                                            | $C, R34 \geq 10\% \Rightarrow C, R34$                                                                       | $C, R34 < 10\% \Rightarrow X_i, R41$                                                               | $5\% \leq C, R34 < 10\%$ AND<br>$X_i, R36/37/38 > 0\%$<br>$\Rightarrow X_i, R36/37/38$                                                           |
|                                                |        |                                                                                            |                                                                                                             | $X_i, R41 \geq 10\% \Rightarrow X_i, R41$                                                          | $5\% \leq X_i, R41 < 10\%$ AND<br>$X_i, R36 > 0\%$<br>$\Rightarrow X_i, R36/37/38$                                                               |
|                                                |        |                                                                                            |                                                                                                             |                                                                                                    | $X_i, R36/37/38 \geq 20\% \Rightarrow X_i, R36/37/38$                                                                                            |
| <i>Respiratory or skin sensitisation</i>       | Min. 1 | $R42 \geq 1\% \Rightarrow R42$                                                             | $R43 \geq 1\% \Rightarrow R43$<br>(NiSO <sub>4</sub> : $C \geq 0,01\%$ )                                    |                                                                                                    |                                                                                                                                                  |
| <i>Germ cell mutagenicity</i>                  | Min. 1 | cat. 1, $R46 \geq 0,1\% \Rightarrow$ cat. 1                                                | cat. 2, $R46 \geq 0,1\% \Rightarrow$ cat. 2                                                                 | cat. 3, $R68 \geq 1\% \Rightarrow$ cat. 3                                                          |                                                                                                                                                  |
| <i>Carcinogenicity</i>                         | Min. 1 | cat. 1, $R45$ or $R49 \geq 0,1\% \Rightarrow$ cat. 1                                       | cat. 2, $R45$ or $R49 \geq 0,1\% \Rightarrow$ cat. 2<br>(CdSO <sub>4</sub> and CoSO <sub>4</sub> : $C \geq$ | cat. 3, $R40 \geq 1\% \Rightarrow$ cat. 3                                                          |                                                                                                                                                  |

|                              |        |                                        |                                        |                                                                    |  |
|------------------------------|--------|----------------------------------------|----------------------------------------|--------------------------------------------------------------------|--|
|                              |        |                                        | 0,01%)                                 |                                                                    |  |
| <i>Reproductive toxicity</i> | Min. 1 | cat. 1, R60 or R61<br>≥ 0,5% => cat. 1 | cat. 2, R60 or R61<br>≥ 0,5% => cat. 2 | cat. 3, R62 or R63<br>≥ 5% => cat. 3<br>(CS <sub>2</sub> : C ≥ 1%) |  |

### 1.1.2 Environment

a) according to CLP

|                                         |     |                                                                                                                                                                           |                                                                                                                                                                                               |                                                                                                                                                                                                                    |                                                                                         |
|-----------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <i>Hazardous to aquatic environment</i> | Sum | M*cat. 1 ≥ 25%<br>=> acute or chron. cat. 1<br><br>note: M = 1<br>(CoSO <sub>4</sub> , CoO, CoS, CuSO <sub>4</sub> . 5H <sub>2</sub> O, Cu <sub>2</sub> O, ClCuO: M = 10) | (M*10* chron. cat. 1) + chron. cat. 2 ≥ 25%<br>=> chron. cat. 2<br><br>note: M = 1<br>(CoSO <sub>4</sub> , CoO, CoS, CuSO <sub>4</sub> . 5H <sub>2</sub> O, Cu <sub>2</sub> O, ClCuO: M = 10) | (M*100*chron. cat. 1) + (10*chron. cat. 2) + chron. cat. 3 ≥ 25%<br>=> chron. cat. 3<br><br>note: M = 1<br>(CoSO <sub>4</sub> , CoO, CoS, CuSO <sub>4</sub> . 5H <sub>2</sub> O, Cu <sub>2</sub> O, ClCuO: M = 10) | chron. cat. 1 + chron. cat. 2 + chron. cat. 3 + chron. cat. 4 ≥ 25%<br>=> chron. cat. 4 |
|-----------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|

b) According to the Dangerous Preparations Directive 1999/45/EC 1999/45/EC

|                                         |     |                                                                                                                                              |                                                                                                                                                             |                                                                                                                                                                 |  |
|-----------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <i>Hazardous to aquatic environment</i> | Sum | N, R50-53 ≥ 25%<br>=> N, R50-53<br>(CoSO <sub>4</sub> , CoO, CoS, CuSO <sub>4</sub> . 5H <sub>2</sub> O, Cu <sub>2</sub> O, ClCuO: C ≥ 2,5%) | 2,5% ≤ N, R50-53 < 25%<br>=> N, R51-53<br>(CoSO <sub>4</sub> , CoO, CoS, CuSO <sub>4</sub> . 5H <sub>2</sub> O, Cu <sub>2</sub> O, ClCuO: 0,25% ≤ C < 2,5%) | 0,25% ≤ N, R50-53 < 2,5%<br>=> N, R52-53<br>(CoSO <sub>4</sub> , CoO, CoS, CuSO <sub>4</sub> . 5H <sub>2</sub> O, Cu <sub>2</sub> O, ClCuO: 0,025% ≤ C < 0,25%) |  |
|                                         |     |                                                                                                                                              | N, R51-53 ≥ 25% => N, R51-53                                                                                                                                | 2,5% ≤ N, R51-53 < 25%<br>=> N, R52-53                                                                                                                          |  |
|                                         |     |                                                                                                                                              |                                                                                                                                                             | N, R52-53 ≥ 25%<br>=> N, R52-53                                                                                                                                 |  |