

**Committee of Experts on the Transport of Dangerous Goods
and on the Globally Harmonized System of Classification
and Labelling of Chemicals**

4 November 2014

**Sub-Committee of Experts on the
Transport of Dangerous Goods**

Forty-sixth session

Geneva, 1–9 December 2014

Item 8 (g) of the provisional agenda

**Issues relating to the Globally Harmonized System
of Classification and Labelling of Chemicals:
corrosivity criteria**

**Sub-Committee of Experts on the Globally Harmonized
System of Classification and Labelling of Chemicals**

Twenty-eighth session

Geneva, 10–12 (a.m.) December 2014

Item 2 (d) of the provisional agenda

**Classification criteria and related hazard
communication: work of the TDG-GHS working group
on corrosivity criteria**

**Proposal for revision of Chapter 2.8 of the Model Regulations
(Examples and additional information)**

Transmitted by the European Chemical Industry Council (CEFIC)

Introduction

1. During the discussion on the harmonization of the classification criteria for class 8 with GHS, CEFIC was asked to provide examples and additional information to support and justify the proposed way forward. This is provided in this paper. CEFIC separated their proposal for the text of revised chapter and this additional information to avoid a too lengthy paper.
2. CEFIC asked their member companies to provide detailed information on the composition of the mixtures which are already today classified as class 8 to evaluate the additional general concentration limit. As already stated in (TDG, 43rd session) INF.26 - INF.9 (GHS, 25th session), without an additional general concentration limit most mixtures (ca. 80%) would be assigned to packing group I. There was agreement in the discussions that this is not wanted. The now provided figures support this first approach.
3. The proposed general concentration limit is based on one hand on the existing Specific Concentration Limits (SCL) for substances and mixtures listed by name and assigned to packing group I. The range for these SCL range from 37% to 70%.
4. On the other hand the analysis of the member industries of CEFIC showed that the additional general concentration limit needs to be higher than 5%, as it is currently in GHS, if the assignment of packing group I shall be reserved to really highly corrosive mixtures in future as well. CEFIC would like to stress that these mixture are today shipped under the safe conditions of other packing groups and that assignment of nearly 80% of all corrosive mixtures to packing group I would lower the awareness of the people involved in the transport. The distribution of packing groups in class 8, which has been communicated before in INF.26 (43rd session) - INF.9 (GHS, 25th session) has been verified by the new analysis.

5. In Annex I there are examples listed on how the newly proposed alternative methods would work. The examples are based on the examples provided by the European Chemicals Agency (ECHA) in their «Guidance on the application of the CLP criteria» (http://echa.europa.eu/documents/10162/13562/clp_en.pdf, version 4, November 2013). Although this is not related to GHS, the main difference between CLP (Regulation EC No 1252/2008) and GHS for this class is the list of legally binding classifications, which is valid in the European Union. But this is also the benefit of these examples, as the substances listed by name in the UN Model Regulations are also used for the calculations as listed. Beside that the Annex VI of the CLP regulation (which is the list of the legally binding classifications) contains also Specific Concentration Limits (SCL), so this is comparable as well. The first 3 examples (with purple headers of the tables) are the original examples from ECHA, the examples with orange headers of the tables are the examples for the revised text of the chapter 2.8 as provided in the separately submitted INF paper. (INF.15, TDG 46th session – INF.7, GHS 28th session).

Annex I

“Guidance on the Application of the CLP Criteria” (Version 4.0 – November 2013)

The guidance provided by ECHA shows 3 examples for the assessment of classification in regard to Corrosion /Irritation to skin based on the information of the ingredients. These examples are shown below (headers marked in purple). The numbering is the numbering of the ECHA Guidance on the Application of the CLP Criteria, it starts with example 4, as the previous examples are applicable for substances and not for mixtures.

3.2.6.2. Examples of mixtures fulfilling the criteria for classification

Where the mixture is made up of ingredients with no assigned Specific Concentration Limits (SCLs), the appropriate summation(s) and generic concentration limits from CLP Annex I, Table 3.2.3 should be used.

Example 4 (CLP regulation 1252/2008): Mixture without extreme pH, with ingredients with no assigned SCLs

Ingredient	Skin corrosion / irritation classification	Concentration (% w / w)	SCL
Surfactant A	Skin Cat 2	1.8	Not assigned
Substance B	Not Classified	0.5	
Substance C	Skin Cat 2	5.4	Not assigned
Substance D	Not Classified	4	
Acid	Skin Cat 1A	2	Not assigned
Water	Not Classified	86.3	

pH of the mixture is 9.0 - 10.0, thus extreme pH provisions do not apply. The mixture contains a Surfactant and an Acid but neither are corrosive/irritant below 1% (as identified by the absence of SCLs in either CLP Annex VI or the Classification and Labelling Inventory). Additivity is considered to apply.

Substance B, Substance D and water can be disregarded as they are not classified for skin corrosion/irritation.

The mixture contains 2% Acid, the only ingredient classified as Skin Corr. Cat 1. As this is below the 5% GCL, the mixture is not classified Skin Corr. Cat. 1 but is classified Skin Irrit. Cat. 2 ($\geq 1\%$ but $< 5\%$).

Example 5 (CLP regulation 1252/2008): Mixture without extreme pH, with ingredients with SCLs

Ingredient	Skin corrosion / irritation classification	Concentration (% w / w)	SCL
Surfactant A	Skin Cat 2	3.8	Not assigned
Substance B	Not Classified	0.5	
Base E	Skin Cat 1B	5.4	$C \geq 10\%$; Skin Cat 1B $5\% \leq C < 10\%$: Skin Cat 2
Substance D	Not Classified	4	
Substance F	Skin Cat 1B	2	Not assigned
Water	Not Classified	84.3	

pH of the mixture is 10.5 – 11.0, thus extreme pH provisions do not apply. The mixture contains a Surfactant and a Base but none are corrosive/irritant below 1% (as identified by absence of specific concentration limits in either CLP Annex VI or the Classification and Labelling Inventory). Additivity is considered to apply.

Substance B, Substance D and water can be disregarded as they are not classified for skin corrosion/irritation.

SCLs are neither assigned to Substance F nor Surfactant A, thus GCLs apply for these ingredients. SCLs are assigned to Base E (see Section 3.2.3.2.3.2 of this Guidance, Application of SCLs when applying the additivity approach).

Skin Cat 1:

$(\% \text{ Substance F/GCL}) + (\% \text{ Base E/SCL}) = (2/5) + (5.4/10) = 0.94 \rightarrow < 1$, thus the mixture is not classified as Skin Corr. Cat 1

Skin Cat 2:

$(\% \text{ Substance F/GCL}) + (\% \text{ Base E/SCL}) + (\% \text{ Surfactant A/GCL}) = (2/1) + (5.4/5) + (3.8/10) = 3.46$ which is > 1 , thus the mixture is classified Skin Irrit. Cat. 2

Example 6 (CLP regulation 1252/2008): Mixture without extreme pH, with ingredients with SCLs

Ingredient	Skin corrosion / irritation classification	Concentration (% w / w)	SCL
Surfactant C	Skin Cat 2	0.4	Not assigned
Surfactant G	Skin Cat 2	3.0	Not assigned
Surfactant A	Skin Cat 2	0.7	Not assigned
Substance H	Skin Cat 1A	3.0	C ≥ 70%; Skin Cat 1A 50% ≤ C < 70%: Skin Cat 1B 35% ≤ C < 50%: Skin Cat 2
Substance D	Not Classified	2	
Water	Not Classified	90.9	

pH of the mixture is: 2.5 – 3.0, thus extreme pH provisions do not apply. The mixture contains three Surfactants but none are corrosive/irritant below 1% (as identified by the absence of specific concentration limits in either CLP Annex VI or the Classification and Labelling Inventory) Additivity is considered to apply.

Substance D and water can be disregarded as they are not classified for skin corrosion/irritation. Also Surfactant C and Surfactant A can be disregarded as both are present below 1%.

No SCL is assigned to Surfactant G, thus GCL apply for this ingredient.

Skin Cat 1:

The mixture contains 3% Substance H, the only ingredient classified as Skin Corr. Cat. 1. As this is below the 50% SCL for Substance H, the mixture is not classified as Skin Corr. Cat. 1.

Skin Cat 2:

$(\% \text{ Substance H/SCL}) + (\% \text{ Surfactant G/GCL}) = (3/35) + (3/10) = 0.39$ which is < 1, thus the mixture is not classified Skin Irrit. Cat. 2.

Examples for transport of Dangerous Goods classification to class 8

The following examples are illustrating how the classification according the revised text of chapter 2.8, including an additional generic concentration limit and using the information for the ingredients would work. The following examples are given:

- Example 1 (TDG): Mixture without extreme pH, without ingredients assigned to SCLs
- Example 2 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs
- Example 3 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs
- Example 4 (TDG): Mixture without extreme pH, without ingredients assigned to SCLs
- Example 5 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs
- Example 6 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs
- Example 7 (TDG): Mixture with extreme pH, without ingredients assigned to SCLs
- Example 8 (TDG): Mixture with extreme pH, without ingredients assigned to SCLs
- Example 9 (TDG): Mixture with extreme pH, without ingredients classified as class 8

SCL = Specific concentration limit as listed in chapter 3.2 of the UN Model Regulations

Example 1 (TDG): Mixture without extreme pH, without ingredients assigned to SCLs

Ingredient	Skin corrosion / irritation classification	Concentration (% w / w)	SCL
Surfactant A	not class 8	1.8	
Substance B	not class 8	0.5	
Substance C	not class 8	5.4	
Substance D	not class 8	4	
Acid	class 8 PG I	2	Not assigned
Water	not class 8	86.3	

pH of the mixture is not an extreme pH, which means it is not < 2 and not > 11.5 → thus extreme pH provisions do not apply.

The mixture contains Surfactants and an Acid but these components are not corrosive below 1% (as identified by the absence of SCLs in TDG and other regulations dealing with classification of chemicals).

Additivity is considered to apply.

Check if class 8 is applicable:

The mixture contains 2% Acid, the only ingredient classified as class 8. As this is below the 5% GCL, the mixture is **not classified as skin corrosive class 8**.

Example 2 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs

Ingredient	Skin corrosion / irritation classification	Concentration (% w / w)	SCL
Surfactant A	not class 8	3.8	
Substance B	not class 8	0.5	
Base E	class 8 PG II	5.4	$C \geq 10\%$; Class 8 PG II
Substance D	not class 8	4	
Substance F	class 8 PG II	2	Not assigned
Water	not class 8	84.3	

pH of the mixture is 10.5 – 11.0, thus extreme pH provisions do not apply.

The mixture contains a Surfactant and a Base but these components are not corrosive below 1% (as identified by the absence of SCLs in TDG and other regulations dealing with classification of chemicals).

Additivity is considered to apply.

Check if class 8 is applicable:

$(\% \text{ Substance F/GCL}) + (\% \text{ Base E/SCL}) = (2/5) + (5.4/10) = 0.94 \rightarrow < 1$, thus the mixture is **not classified as skin corrosive class 8**.

Example 3 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs

Ingredient	Skin corrosion / irritation classification	Concentration (% w / w)	SCL
Surfactant C	not class 8	0.4	
Surfactant G	not class 8	3	
Surfactant A	not class 8	0.7	
Substance H	class 8 PG I	6	$C \geq 70\%$; class 8 PG I $50\% \leq C < 70\%$: class 8 PG II
Substance D	not class 8	2	
Water	not class 8	87.9	

pH of the mixture is: 2.5 – 3.0, thus extreme pH provisions do not apply.

The mixture contains three Surfactants but these components are not corrosive below 1% (as identified by the absence of SCLs in TDG and other regulations dealing with classification of chemicals).

Additivity is considered to apply.

Check if class 8 is applicable.

The mixture contains 3% Substance H, the only ingredient classified as class 8 PG I. As this is below the 50% SCL for Substance H, the mixture is **not classified as skin corrosive class 8**.

Example 4 (TDG): Mixture without extreme pH, without ingredients assigned to SCLs

Ingredient	Skin corrosion classification	Concentration (% w / w)	SCL
Surfactant A	not class 8	9	
Substance C	class 8 PG I	34	Not assigned
Substance E	not class 8	14.2	
Base B	class 8 PG I	17	Not assigned
Base D	class 8 PG III	6	Not assigned
Water	not class 8	19.8	

pH of the mixture is: 10.8 – 11.2, thus extreme pH provisions do not apply.

The mixture contains one Surfactant and two Bases but these components are not corrosive below 1% (as identified by the absence of SCLs in TDG and other regulations dealing with classification of chemicals).

Additivity is considered to apply.

Check if class 8 is applicable

% Substance C + % Base B + % Base D = 34 + 17 + 6 = 57 → > 5 thus the mixture has to be assigned to class 8

or

(% Substance C/GCL) + (% Base B/GCL) + (% Base d/GCL) = 34/5 + 17/5 + 6/5 = 11.4 → > 1 thus the mixture has to be assigned to class 8

Check if class 8 PG I is applicable:

(% Substance C/GCL) + (% Base B/GCL) = (34/50) + (17/50) = 1.02 → > 1, thus the mixture has to be **assigned to class 8 PG I**.

Example 5 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs

Ingredient	Skin corrosion classification	Concentration (% w / w)	SCL
Surfactant B	class 8 PG I	3.2	C ≥ 60%; class 8 PG I 20% ≤ C < 60%: class 8 PG II 5% ≤ C < 20%: class 8 PG III
Surfactant C	not class 8	0.7	
Substance E	class 8 PG III	26.3	C ≥ 25%; class 8 PG III
Substance F	class 8 PG II	14.1	Not assigned
Substance G	not class 8	4	
Water	not class 8	51.7	

pH of the mixture is: 5.5 – 7.5, thus extreme pH provisions do not apply.

The mixture contains two Surfactants but these components are not corrosive below 1% (as identified by the absence of SCLs in TDG and other regulations dealing with classification of chemicals).

Additivity is considered to apply.

Check if class 8 is applicable

(% Surfactant B/SCL) + (% Substance E/SCL) + (% Substance F/GCL) = (3.2/5) + (26.3/25) + (14.1/5) = 4.512 → > 1, thus the mixture has to be assigned to class 8

Check if class 8 PG I is applicable:

(% Surfactant B/SCL) = (3.2/60) = 0.053 → < 1, thus the mixture has not to be assigned to class 8 PG I.

Check if class 8 PG II is applicable:

(% Surfactant B/SCL) + (% Substance F/GCL) = (3.2/20) + (14.1/15) = 1.1 → > 1, thus the mixture has to be assigned to class 8 PG II.

Example 6 (TDG): Mixture without extreme pH, with ingredients assigned to SCLs

Ingredient	Skin corrosion classification	Concentration (% w / w)	SCL
Substance E	not class 8	22	
Acid A	class 8 PG II	9.2	C ≥ 50%; class 8 PG II 10% ≤ C < 50%: class 8 PG III
Acid B	not class 8	12.6	
Surfactant G	class 8 PG III	4.8	C ≥ 25%; class 8 PG III
Substance F	class 8 PG II	2.1	Not assigned
Water	not class 8	49.3	

pH of the mixture is: 2.8 – 4.5, thus extreme pH provisions do not apply.

The mixture contains one Surfactant and two Acids but these components are not corrosive below 1% (as identified by the absence of SCLs in TDG and other regulations dealing with classification of chemicals).

Additivity is considered to apply.

Check if class 8 is applicable

(% Acid A/SCL) + (% Substance F/GCL) + (% Surfactant G/SCL) = (9.2/10) + (2.1/5) + (4.8/25) = 1.53 → > 1, thus the mixture has to be assigned to class 8.

Check if class 8 PG I is applicable:

Since none of the ingredients is assigned to class 8 PG I, the mixture has not to be assigned to class 8 PG I.

Check if class 8 PG II is applicable:

(% Acid A/SCL) + (% Substance F/GCL) = (9.2/50) + (2.1/15) = 0.324 → < 1, thus the mixture has not to be assigned to class 8 PG II.

Check if class 8 PG III is applicable:

(% Acid A/SCL) + (% Substance F/GCL) + (% Surfactant G/SCL) = (9.2/10) + (2.1/5) + (4.8/25) = 1.53 → > 1, thus the mixture has to be **assigned to class 8 PG III**.

Example 7 (TDG): Mixture with extreme pH, without ingredients assigned to SCLs

Ingredient	Skin corrosion classification	Concentration (% w / w)	SCL
Surfactant A	not class 8	14.6	
Substance C	not class 8	0.5	
Substance D	not class 8	37.2	
Substance E	not class 8	3	
Base K	Class 8 PG I	12.7	Not assigned
Water	not class 8	32	

pH of the mixture is: 12.8 – 13.4 and acid/alkaline reserve cannot be considered, thus extreme pH provisions apply.

Since Base K is assigned to class 8 PG I and the General Concentration Limit as listed in table 2.8.5 is exceeded (5%) → the mixture has to be **assigned to class 8 PG I**.

Example 8 (TDG): Mixture with extreme pH, without ingredients assigned to SCLs

Ingredient	Skin corrosion classification	Concentration (% w / w)	SCL
Substance M	not class 8	15.2	
Substance N	not class 8	0.2	
Substance O	not class 8	9.1	
Acid J	Class 8 PG II	4.3	Not assigned
Surfactant L	not class 8	8.3	
Water	not class 8	62.9	

pH of the mixture is: 1.2 – 1.4 and acid/alkaline reserve cannot be considered, thus extreme pH provisions apply.

Since Acid J is assigned to class 8 PG II and the General Concentration Limit as listed in table 2.8.5 is exceeded (3%) → the mixture has to be **assigned to class 8 PG II**.

Example 9 (TDG): Mixture with extreme pH, without ingredients classified as class 8

Ingredient	Skin corrosion classification	Concentration (% w / w)	SCL
Substance B	not class 8	3.7	
Surfactant D	not class 8	2.1	
Substance F	not class 8	0,2	
Acid G	not class 8	28.7	
Substance H	not class 8	4.3	
Water	not class 8	61.0	

pH of the mixture is: 1.1 – 1.7 = extreme pH

Since none of the ingredients is assigned to class 8, the mixture is **not classified as skin corrosive class 8**.