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**COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS**

Sub-Committee of Experts on the
Transport of Dangerous Goods

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**ISSUES RELATING TO THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)**

Detailed Comments on the Proposal by the Netherlands in ST/SG/AC.10/C.3/2009/15

Transmitted by the Dangerous Goods Advisory Council

## Introduction

1. As indicated in ST/SG/AC.10/C.3/2009/49 which provided general comments on ST/SG/AC.10/C.3/2009/15, DGAC hereby provides detailed comments on that document in the attached annex. The document consolidates comments made by DGAC members. DGAC continues to hold the view that the existing text in the Model Regulations provides the appropriate level of information relative to classification for corrosive substances and recommends that the existing text be retained. DGAC provides these comments to improve understanding of why adoption of the text proposed in ST/SG/AC.10/C.3/2009/15 would be problematic.

2. Comments are arranged in a table format with the text proposed in -2009/15 presented on the left and DGAC comments, as appropriate, provided on the right.

# Annex

## Chapter 2.8

## Class 8 – Corrosive substances

| 2.8.1 Definitions | DGAC Comments |
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| Class 8 substances (corrosive substances) are substances which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy other goods or means of transport. | Existing TDG text of 2.8.1 – no comment. |
| *Skin corrosion* is the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours. | This addition is not necessary. This is already covered under the existing 2.8.2.5. This addition would cause confusion in that the terminology is different. The terminology in the existing 2.8.2.5 which uses the phrase "full thickness destruction of intact skin" is preferred. |
| A substance or a mixture that is *corrosive to metal* is a substance or a mixture which, by chemical action, will materially damage, or even destroy, metals. | This text is repetitive. It is similar to the phrase "will materially damage, or even destroy other goods or means of transport" in the current text above. The existing wording in 2.8.2.5 (c) (ii) is more precise – specifying the rate of corrosion. |

| 2.8.2 Assignment of packing groups | Comments |
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| 2.8.2.1 Substances and preparations of Class 8 are divided among the three packing groups according to their degree of hazard in transport as follows: | Existing TDG text – no comment. |
| (a) *Packing group I:* Very dangerous substances and preparations; | Existing TDG text – no comment. |
| (b) *Packing group II*: Substances and preparations presenting medium danger; | Existing TDG text – no comment. |
| (c) *Packing group III*: Substances and preparations presenting minor danger. | Existing TDG text – no comment. |
| 2.8.2.2 Allocation of substances listed in the Dangerous Goods List in Chapter 3.2 to the packing groups in Class 8 has been made on the basis of experience taking into account such additional factors as inhalation risk (see 2.8.2.3) and reactivity with water (including the formation of | Existing TDG text with the addition of the underlined text which is considered unnecessary. Corrosion of synthetic skin is an approximation of corrosive effects on human skin and should not be referred to. The term "synthetic skin" is not |

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| dangerous decomposition products). New substances, including mixtures, can be assigned to packing groups on the basis of the length of time of contact necessary to produce full thickness destruction of human or synthetic skin in accordance with the criteria in 2.8.3.4, which correspond to the GHS criteria for the classification for skin corrosion. Liquids, and solids, which may become liquid during transport and which are judged not to cause full thickness destruction of human skin, shall still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 2.8.6, which correspond to the GHS classification 'corrosive to metal'. | included in GHS, nor is there any established definition of what "synthetic skin" means.<br><br>Reference to OECD 404 is already made. It is not clear what benefit is provided by referencing the GHS. Rather than repeatedly noting the GHS throughout the Model Regulations, a single reference to the GHS in the introductory part of the UN Model Regulation is preferred. |
| 2.8.2.3 A substance or preparation meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists ($LC_{50}$) in the range of packing group I, but toxicity through oral ingestion or dermal contact only in the range of packing group III or less, shall be allocated to Class 8 (see note under 2.6.2.2.4.1). | Existing TDG text – no comment. |
| 2.8.2.4 In assigning the packing group to a substance in accordance with 2.8.2.2, account shall be taken of human experience in instances of accidental exposure. In the absence of human experience, the grouping shall be based on data obtained from experiments in accordance with OECD Guideline 404[1] or 435[2] or on surrogate information as described in 2.8.3.2. A substance, which is determined not to be corrosive in accordance with OECD Test Guideline 430[3] or OECD Test Guideline 431[4][5], may be considered not to be corrosive to skin for the purposes of these Regulations without further testing. | Existing TDG text with the addition of the underlined text. Recommend against adoption of the underlined text. The surrogate information referenced (i.e., 2.8.3.2) is from OECD 404 except that the "surrogate information" in 2.8.3.2 is not consistent with that shown in OECD 404 or even GHS. It omits consideration of negative results of skin irritation which is covered by references to OECD 430 and 431. |

[1] *OECD Guideline for the testing of chemicals No. 404 "Acute dermal irritation/Corrosion" 1992.*
[2] *OECD Guideline for the testing of chemicals No. 435 "In Vitro Membrane Barrier Test Method for Skin Corrosion" 2006.*
[3] *OECD Guideline for the testing of chemicals No. 430 "In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER)" 2004.*
[4] *OECD Guideline for the testing of chemicals No. 431 "In Vitro Skin Corrosion: Human Skin Model Test" 2004.*

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| 2.8.2.5 Packing groups are assigned to corrosive substances and mixtures in accordance with the following criteria: | Existing TDG text except a distinction is being made between substances and mixtures. 2.8.2.1 uses "substances and preparations" Note that 2.0.1.1 of the Model Regulations indicates that the term substances includes mixtures so that the change is unnecessary and confusing. The change should not be adopted. |

**Table 2.8.1 Assignment of Packing group to substances and mixtures based on Skin corrosive subcategory or metal corrosion category**

| | **Classification of substance or mixture:** | | **Comments:** |
|---|---|---|---|
| | | | Replacement of the existing text in 2.8.2.5 with Table 2.8.1 significantly complicates the understanding of the Class 8 classification scheme. Categories (1A, 1B, 1C) are not used in the TDG adding an unnecessary step and confusion. Under this proposal, the actual criteria are in Table 2.8.2 on pg. 11 – 6 pages away. The Table should not be adopted and the existing text should be retained. |
| **Packing group I** | Skin corrosive subcategory 1A | | |
| **Packing group II** | Skin corrosive subcategory 1B | | |
| **Packing group III** | Skin corrosive subcategory 1C | Corrosive to metal Category 1 | |

The classification criteria for skin corrosion are included in 2.8.3. (substances) and 2.8.4 (mixtures).

The classification criteria for corrosive to metal are included in 2.8.6.

### 2.8.3 Classification criteria for substances as skin corrosive

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| 2.8.3.1 The GHS harmonized system includes guidance on the use of data elements that are evaluated before animal testing for skin corrosion is undertaken. It also includes hazard categories for corrosion. | Suggest removal of this paragraph. This is taken from 3.2.2 of the GHS. It is information and has no regulatory significance. |
| 2.8.3.2 Several factors should be considered in determining the corrosion potential of chemicals before testing is undertaken. Existing human experience and data, including from single or repeated exposure, and animal observations and | This text is a complete extract of 3.2.2.1 of the GHS, which is a summarization of the Supplement to OECD 404. The supplement is presumably incorporated by reference to OECD 404. The content of |

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| data should be the first line of analysis, as they give information directly relevant to effects on the skin. In some cases enough information may be available from structurally related compounds to make classification decisions. Likewise, pH extremes like < 2 and > 11.5 may indicate skin effects, especially when buffering capacity is known, although the correlation is not perfect. Generally, such agents are expected to produce significant effects on the skin. If consideration of alkali/acid reserve suggests the substance may not be corrosive despite the low or high pH value, then further testing shall be carried out to confirm this, preferably by use of an appropriate validated *in vitro* method. It also stands to reason that if a chemical is highly toxic by the dermal route, a skin corrosion study may not be practicable since the amount of test substance to be applied would considerably exceed the toxic dose and, consequently, would result in the death of the animals. When observations are made of skin corrosion in acute toxicity studies and are observed up through the limit dose, additional testing would not be needed, provided that the dilutions used and species tested are equivalent. *In vitro* alternatives that have been validated and accepted may also be used to help make classification decisions. | the proposed paragraph is actually better explained in the OECD supplement. It is not necessary to include this text in the TDG. |
| All the above information that is available on a chemical should be used in determining the need for *in vivo* skin irritation testing. Although information might be gained from the evaluation of single parameters within a tier (see 2.8.3.3), e.g. caustic alkalis with extreme pH should be considered as skin corrosives, there is merit in considering the totality of existing information and making an overall weight of evidence determination. This is especially true when there is information available on some but not all parameters. Generally, primary emphasis should be placed upon existing human experience and data, followed by animal experience and testing data, followed by other sources of information, but case-by-case determinations are necessary. | Same comments as above. |

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| 2.8.3.3 | A *tiered approach* to the evaluation of initial information should be considered, where applicable (Figure 2.8.1), recognizing that all elements may not be relevant in certain cases. | Again, this section has been extracted, (for the most part) directly from GHS. This information is already presented in the Supplement to Test Guideline 404. There does not appear to be any valid reason to repeat this information in its entirety in the TDG.<br><br>Additionally, Step 5 goes directly from a negative in-vitro corrosion result to requiring an in-vivo corrosion test. Neither the GHS nor OECD 404 does this. There is an intermediate step (irritation testing). While this is a skin corrosion section, some mention should be made of this. |

**Figure 2.8.1: Tiered testing and evaluation of skin corrosion potential**

| Step | Parameter | Finding | Conclusion |
|---|---|---|---|
| **1a** | Existing human or animal experience [(f)] → | Corrosive → | Classify as corrosive [(a)] |
| | ↓ | Not corrosive | |
| | Not corrosive or no data ↓ | Corrosive | |
| **1b** | Existing human or animal experience → | → | No further testing, not classified |
| | ↓ | | |
| | No data ↓ | | |
| **2a** | Structure-activity relationships or structure-property relationships [(b)] → | → | Classify as corrosive [(a)] |
| | ↓ | | |
| | Not corrosive or no data ↓ | | |
| **3** | pH with buffering [(c)] → | pH $\leq$ 2 or $\geq$11.5 → | Classify as corrosive [(a)] |
| | ↓ | | |

Figure is 2.8.1 not needed and should not be added to TDG. It fails to give any indication as to packing group assignment.

| | | | | |
|---|---|---|---|---|
| | Not pH extreme or no data ↓ | Yes<br>Positive response | | |
| **4** | Existing skin data in animals indicate no need for animal testing [(d)] ↓<br>No indication or no data ↓ | → Corrosive response<br>Non-corrosive response | → | Possibly no further testing may be deemed corrosive |
| **5** | Valid and accepted in vitro skin corrosion test [(e)] ↓<br>Negative response or no data ↓ | → | → | Classify as corrosive [(a)] |
| **6** | *In vivo* skin corrosion test (1 animal) ↓<br>Negative response | → | → | Classify as corrosive [(a)]<br>→ No further testing, not classified |

**Comments**

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| *(a) Classify in the appropriate harmonized category, as shown in Table 2.8.2 below;* | The TDG uses Packing Groups not categories. The DG List should also be referenced for obtaining existing animal and human experience data. |
| *(b) Structure-activity and structure-property relationships are presented separately but would be conducted in parallel;* | This is already provided through reference to OECD 404. There is no need to introduce this in the TDG. |
| *(c) Measurement of pH alone may be adequate, but assessment of acid or alkali reserve is preferable; methods are needed to assess buffering capacity; If consideration of alkali/acid reserve suggests the substance may not be corrosive despite the low or high pH value, then further testing shall be carried out to confirm this, preferably by use of an appropriate validated in vitro method*; | At low concentrations metal corrosion becomes the determining factor e.g. sodium hydroxide. |
| (d) Pre-existing animal data should be carefully | Again this is already referenced in OECD |

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| reviewed to determine if in vivo skin corrosion/irritation testing is needed. For example, testing may not be needed when a test material has not produced any skin irritation in an acute skin toxicity test at the limit dose, or produces very toxic effects in an acute skin toxicity test. In the latter case, the material would be classified as being very hazardous by the dermal route for acute toxicity; it is moot whether the material is also irritating or corrosive on the skin. It should be kept in mind in evaluating acute skin toxicity information that the reporting of skin lesions may be incomplete, testing and observations may be made on a species other than the rabbit, and species may differ in sensitivity in their responses; | 404. There is no need to add this to existing TDG. |
| (e) Examples of internationally accepted validated in vitro test methods for skin corrosion are OECD Test Guidelines 430, 431 and 435; | These test methods are already recognized in the existing TDG text. |
| *(f) This evidence could be derived from single or repeated exposures.* | |

| **2.8.3.4** ***Corrosion subcategories*** | **Comments** |
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| 2.8.3.4.1 A single harmonized corrosion category is provided in Table 2.8.2 using the results of animal testing. A corrosive is a test material that produces destruction of skin tissue, namely, visible necrosis through the epidermis and into the dermis, in at least 1 of 3 tested animals after exposure up to a 4-hour duration. Corrosive reactions are typified by ulcers, bleeding, bloody scabs and, by the end of observation at 14 days, by discoloration due to blanching of the skin, complete areas of alopecia and scars. Histopathology should be considered to discern questionable lesions. | Since there are three packing group levels this language appears contradictory to the existing TDG system. There is no need to state this.<br>This text uses terminology not consistent with existing TDG terminology. Categories and subcategories vs. packing groups. It is confusing and could cause problems with existing training programs and other regulatory schemes.<br><br>For the underlined information, for the most part, the person performing the DG classification is not going to be the one making the determination as to whether the animal experienced a corrosive reaction or not. Generally, a trained toxicologist will be making that determination. The classifier will, at best, get a summary report stating length of exposure, length of observation, |

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| | and result. There is no reason to have this information present in the TDG. It is already present in OECD 404. |
| 2.8.3.4.2 Three subcategories are provided within the corrosive category (see Table 2.8.2): subcategory 1A - where responses are noted following up to 3 minutes exposure and up to 1 hour observation; subcategory 1B - where responses are described following exposure between 3 minutes and 1 hour and observations up to 14 days; and subcategory 1C - where responses occur after exposures between 1 hour and 4 hours and observations up to 14 days. The classification within a subcategory can be reached based on the results of *in vitro* (OECD 435) or *in vivo* testing (OECD 404). | Same comments as above. Except for the subcategory terminology, this information has already been presented in 2.8.2.5. |

**Table 2.8.2 Skin corrosive category and subcategories**

| **Category 1: Corrosive** | **Corrosive subcategories** | **Corrosive in ≥ 1 of 3 animals** | | The table should not be added to TDG. It describes categories instead of packing groups. |
|---|---|---|---|---|
| | | **Exposure** | **Observation** | |
| Corrosive | 1A | ≤ 3 minutes | ≤ 1 hour | |
| | 1B | > 3 minutes -- ≤ 1 hour | ≤ 14 days | |
| | 1C | > 1 hour -- ≤ 4 hours | ≤ 14 days | |

### 2.8.4 Classification criteria for mixtures as skin corrosive

| | **Comments** |
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| **2.8.4.1** ***Classification of mixtures when data are available for the complete mixture*** | The TDG does not distinguish between substances and mixtures. There no good reason to introduce this.<br><br>The suggested approach to testing found in the OECD 404 supplement would be valid regardless of whether one is dealing with a substance or a mixture. The only time this information may come in useful would be if you do not want to actually conduct the testing outlined in the supplement. |

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| 2.8.4.1.1 The mixture will be classified using the criteria for substances, and taking into account the testing and evaluation strategies to develop data for these hazard classes | |
| 2.8.4.1.2 Unlike other hazard classes, there are alternative tests available for skin corrosivity of certain types of chemicals that can give an accurate result for classification purposes, as well as being simple and relatively inexpensive to perform. When considering testing of the mixture classifiers are encouraged to use a tiered weight of evidence strategy as included in the criteria for classification of substances for skin corrosion to help ensure an accurate classification, as well as avoid unnecessary animal testing. **A mixture is considered corrosive if it has a pH of 2 or less or a pH of 11.5 or greater.** If consideration of alkali/acid reserve suggests the substance or-mixture may not be corrosive despite the low or high pH value, then further testing needs to be carried out to confirm this, preferably by use of an appropriate validated *in vitro* test. | The bolded **sentence** is far too sweeping, and does not appear in those words in OECD 404. Some classifiers may choose to stop there and take no account of the following text. |

**2.8.4.2** ***Classification of mixtures when data are not available for the complete mixture: Bridging principles***

| | **Comments** |
|---|---|
| 2.8.4.2.1 Where the mixture itself has not been tested to determine its skin corrosion, but there are sufficient data on the individual ingredients and similar tested mixtures to adequately characterize the hazards of the mixture, these data will be used in accordance with the following agreed bridging rules. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture without the necessity for additional testing in animals. | These sections are all based on the assumed split between substances and mixtures which is not really an issue for transport. These bridging principles were intended for toxic substances where the toxicity of several substances is assumed to be additive. This is not relevant to corrosive classification where components may actually cancel each others corrosive effects (e.g.; an acid and a base). |
| *2.8.4.2.2 Dilution*<br><br>If a mixture is diluted with a diluent which has an equivalent or lower corrosivity classification than the least corrosive original ingredient and which is not expected to affect the corrosivity of other ingredients, then the new | Dilution will ultimately lead to the material being regarded as not subject to the regulations. The regulations do not permit over classification. This methodology is not useful in terms of assigning packing groups.<br><br>This text appears to say, if you take a |

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| mixture may be classified as equivalent to the original mixture. Alternatively, the method explained in section 2.8.4.3 could be applied | corrosive material, and dilute it to a 3% in water solution, you would then classify as corrosive as the original material? This is inappropriate and would lead to over classification. For example, Phosphoric Acid solutions below 10% are not considered corrosive. |
| *2.8.4.2.3 Batching*<br><br>The corrosion potential of one production batch of a complex mixture can be assumed to be substantially equivalent to that of another production batch of the same commercial product and produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the toxicity of the batch has changed. If the latter occurs, new classification is necessary. | Batching is relevant to transport. It may be useful to include authorization to use the batching approach but this should be done in a section relevant to other hazard classification criteria in Chapter 2.0. Note the text refers to toxicity. |
| *2.8.4.2.4 Concentration of mixtures of the highest corrosion category*<br><br>If a tested mixture classified in the highest subcategory for corrosion is concentrated, a more concentrated mixture should be classified in the highest corrosion subcategory without additional testing. | The TDG do not require testing of each substance if a reasoned argument can be made. This approach is already used by classifiers. |
| *2.8.4.2.5 Interpolation within one* toxicity *category*<br>*For three mixtures with identical ingredients, where A and B are in the same corrosion toxicity category and mixture C has the same toxicologically active ingredients with concentrations intermediate to the concentrations of those ingredients in mixtures A and B, then mixture C is assumed to be in the same corrosion category as A and B.* | Note the text refers to "toxicity" and "toxicologically". While in the GHS, it is questioned whether "corrosion toxicity" is a correct term. The mixture classification methodology provided is flawed when applied to corrosive classification. |
| *2.8.4.2.6 Substantially similar mixtures*<br><br>Given the following:<br><br>(a) Two mixtures<br>(i) A +B | This bridging technique was intended for toxic substances, not corrosive substances. It is questioned if this is valid for corrosive substances. If B is water, the degree of dissociation (and the level of corrosivity) will depend on whether A and C are strong or weak acids. Consequently it is not certain |

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| (ii) C + B;<br><br>(b) The concentration of ingredient B is essentially the same in both mixtures;<br><br>(c) The concentration of ingredient A in mixture (i) equals that of ingredient C in mixture (ii);<br><br>(d) Data on corrosion for A and C are available and substantially equivalent, i.e. they are in the same hazard category and are not expected to affect the toxicity of B.<br><br>If mixture (i) is already classified based on test data, then mixture (ii) can be classified in the same category. | that the mixtures will have the same packing group. Or, if A and B are acids and C a base, C could have a neutralizing effect on B so that this approach would be invalid. |

**2.8.4.3** ***Classification of mixtures when data are available for all ingredients or only for some ingredients of the mixture***

| | **Comments** |
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| 2.8.4.3.1 In order to make use of all available data for purposes of classifying the skin corrosion hazards of mixtures, the following assumption has been made and is applied where appropriate in the tiered approach:<br><br>The "relevant ingredients" of a mixture are those which are present in concentrations of 1% (w/w for solids, liquids, dusts, mists and vapours and v/v for gases) or greater, unless there is a presumption (e.g. in the case of corrosive ingredients) that an ingredient present at a concentration of less than 1% can still be relevant for classifying the mixture for skin corrosion. | This is a general provision applicable to more than just corrosivity. If it is to be adopted in the TDG it should be included in Chapter 2.0. It is more relevant for toxicity determinations but in the case of corrosivity, the interest is whether the mixture as a whole has a certain performance. |
| 2.8.4.3.2 In general, the approach to classification of mixtures as corrosive to skin when data are available on the ingredients, but not on the mixture as a whole, is based on the theory of additivity, such that each corrosive ingredient contributes to the overall or corrosive | Additivity is not necessarily appropriate when you have a mixture made up of acids and bases. This approach is for purposes of assessing toxicity – not corrosivity. |

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| properties of the mixture in proportion to its potency and concentration. The mixture is classified as corrosive when the sum of the concentrations of such components exceeds a cut-off value/concentration limit. | |
| 2.8.4.3.3 Table 2.8.3 below provides the cut-off value/concentration limits to be used to determine if the mixture is considered to be a corrosive to the skin. | |

**Table 2.8.3: Concentration of ingredients of a mixture classified as Skin corrosive, that would trigger classification of the mixture as Skin corrosive.**

| **Sum of ingredients classified as:** | **Concentration triggering classification of a mixture as:** | | | **Comments:** This table should not be added to TDG. This approach was intended for toxic substances and its relevance to corrosive properties is highly questionable, especially in certain situations. The table is based on additivity which as discussed is not consistently relevant to corrosivity. |
|---|---|---|---|---|
| | **Skin corrosive** | | | |
| | **Category 1A** (see note below) | **Category 1B** | **Category 1C** | |
| | | | | |
| **Skin Category 1A** | ≥5% | | | |
| **Skin Category 1A + 1B** | | ≥5% | | |
| **Skin Category 1A + 1B + 1C** | | | ≥5% | |

***Note to Table 2.8.3****: The sum of all ingredients of a mixture classified as Skin Category 1A, 1B or 1C respectively, should each be ≥5% in order to classify the mixture as either Skin Category 1A, 1B or 1C. In case the sum of the Skin Category 1A ingredients is <5% but the sum of Skin Category ingredients 1A+1B is ≥ 5%, the mixture should be classified as Skin Category 1B. Similarly, in case the sum of Skin Category 1A+1B is <5% but the sum of Category 1A+1B+1C is ≥5% the mixture would be classified as Category 1C.*

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| 2.8.4.3.4 Particular care must be taken when classifying certain types of chemicals such as acids and bases, inorganic salts, aldehydes, phenols, and surfactants. The approach explained in 2.8.4.3.1 and 2.8.4.3.2 might not work given that many of such substances are corrosive at concentrations < 1%. For mixtures containing strong acids or bases the pH should be used as classification criteria (see 2.8.4.1.2) since pH will be a better indicator of corrosion than the concentration limits of Table 2.8.3. A mixture containing corrosive ingredients that cannot be classified based on the additivity approach shown in Table 2.8.3, due to chemical characteristics that make this approach unworkable, should be classified as Skin corrosive if it contains ≥ 1% of a corrosive ingredient. Classification of mixtures with ingredients for which the approach in Table 2.8.3 does not apply is summarized in Table 2.8.4 below. | Very complicated. What about corrosive materials with pH ~7? Recommend against adoption.<br><br>Use of pH has been discredited. It has been repeatedly proven that pH is not a valid indicator of corrosivity with mixtures. First, low concentration acid solutions with pH's of 1.5 or less, frequently do not meet the classification criteria for corrossivity to skin or metals. This text would classify them otherwise.<br>Second, while many surfactants may have been shown to be corrosive at concentrations of <1%, many more have been shown not to be.<br>Thirdly, UN1760 was retained in the TDG out of recognition that some corrosive substances are neither acids (pH less than 7) or bases (pH greater than 7).<br><br>This methodology will have the effect of many more substances being classified as corrosive even though they do not meet the base criteria, raising the possibility of the classification having little meaning. |

**Table 2.8.4**: **Concentration of ingredients of a mixture for which the additivity approach does not apply, that would trigger classification of the mixture as hazardous to skin**

| **Ingredient:** | **Concentration:** | **Mixture classified as: Skin** | **Comments:** Recommend against inclusion of the table. There is no benefit in that it does not result in assignment of a packing group. |
|---|---|---|---|
| **Acid with pH ≤ 2** | ≥ 1% | Category 1 | |
| **Base with pH ≥11.5** | ≥ 1% | Category 1 | |
| **Other corrosive (Category 1) ingredients for which additivity does not apply** | ≥ 1% | Category 1 | |

| | **Comments** |
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| 2.8.4.3.5 On occasion, reliable data may show that the skin corrosion of an ingredient will not be evident when present at a level above the generic concentration cut-off levels mentioned in Tables 2.8.3 – 2.8.4. In these cases the mixture could be classified according to that data (see also *Classification of Hazardous Substances and Mixtures* – Use of Cut-Off Values/Concentration Limits (UN Globally Harmonized system of Classification and Labelling of Chemicals paragraph 1.3.3.2)). On occasion, when it is expected that the skin corrosion of an ingredient will not be evident when present at a level above the generic concentration cut-off levels mentioned in Tables 2.8.3 and 2.8.4 testing of the mixture may be considered. In those cases the tiered weight of evidence strategy should be applied as described in 2.8.4.1.4 and illustrated in Figure 2.8.1. | This is not necessary. |

2.8.5 Decision Logic for skin corrosion/irritation

| | **Comments** |
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| In the UN Globally Harmonized system of Classification and Labelling of Chemicals Chapter 3.2, a decision logic is presented. This decision logic is not part of the harmonized classification system but is provided as additional guidance. It is strongly recommended that the person responsible for classification study the criteria before and during use of the decision logic | Not necessary. |

**2.8.6 Classification criteria for substance and mixtures corrosive to metal**

| | **Comments** |
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| A substance or a mixture, which is corrosive to metals, is classified in a single category for this class, using the testing in part III, sub-section 37 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, according to the following table: | The existing TDG text is preferred.<br><br>Other regulations also stipulate “or equivalent method”. |

**Table 2.8.5: Criteria for substances and mixtures corrosive to metal**

| **Category** | **Criteria** | |
|---|---|---|
| 1 | Corrosion rate on steel or aluminium surfaces exceeding 6.25 mm per year at a test temperature of 55 °C when tested on both materials (see note below). | **Comments:**<br>Use of category in place of packing group is confusing. Text is already provided text in existing 2.8.2.5(c). |

Note: Where an initial test on either steel or aluminium indicates the substance or mixture being tested is corrosive the follow-up test on the other metal is not required.

***2.8.6.1 Guidance***

| | **Comments** |
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| The corrosion rate can be measured according to the test method of sub-section 37.4 of the UN Recommendations on the Transport of Dangerous Goods, Manual of tests and Criteria. The specimen to be used for the test should be made of the following materials: | As previously stated there is no need for this text as existing TDG text covers this. |

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| (a) | For the purposes of testing steel, steel types S235JR+CR (1.0037 resp.St 37-2), S275J2G3+CR (1.0144 resp.St 44-3), ISO 3574, Unified Numbering System (UNS) G 10200, or SAE 1020. | |
| (b) | For the purposes of testing aluminium: non-clad types 7075-T6 or AZ5GU-T6. | |