



Skin Corrosion / Irritation **March 2018**

How does OSHA’s Hazard Communication Standard (HCS 2012) define Skin Corrosion/ Irritation?

The hazard communication standard defines skin corrosion as 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. Corrosive reactions are typified by ulcers, bleeding, bloody scabs, and, by the end of the observation period at 14 days, by discoloration due to blanching of the skin, complete areas of alopecia (hair loss), and scars. Skin irritation Mean value of $\geq 2.3 \leq 4.0$ for erythema/eschar or for edema in at least 2 of 3 tested animals from gradings at 24, 48 and 72 hours after patch removal, or if reactions are delayed, from grades on 3 consecutive days after onset of skin reactions, or Inflammation that persists to the end of the observation period normally 14 days in at least 2 animals, particularly taking into account alopecia (limited area), hyperkeratosis, hyperplasia, and scaling; or In some cases where there is pronounced variability of response among animals, with very definite positive effects related to chemical exposure in a single animal but less than the criteria above.

How does HCS 2012 classify Skin Corrosion/ Irritation ?

The hazard communication standard defines skin irritation as the production of reversible damage to the skin following the application of a test substance for up to 4 hours.

Substance Classification

Classification of a substance is based on a review of all available information, including:

- Accumulated human and animal experience
- Information on structurally related compounds
- pH with buffering capacity (acid/alkali reserve)
- *Ex vivo/in vitro* testing data

Guidance on the tiered evaluation approach for skin corrosion and irritation is provided in Figure A.2.1 of the HCS 2012. Emphasis should be placed on 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.

The criteria for classification of Skin Corrosion/Irritation are as follows:

Table 1: Classification Criteria

Category	Corrosive sub-categories (only applies to some authorities)	Corrosive in ≥ 1 or 3 animals	
		Exposure	Observation
Corrosive			
Sub-Categories	1A	≤ 3 min	≤ 1 h
	1B	> 3 min ≤ 1 h	≤ 14 days
	1C	> 1 h ≤ 4 h	≤ 14 days
Irritant	2	Mean value of $\geq 2.3 \leq 4.0$ for erythema/eschar or for edema in at least 2 of 3 tested animals from gradings at 24, 48 and 72 hours after patch removal, or if	

		<p>reactions are delayed, from grades on 3 consecutive days after onset of skin reactions, or</p> <p>Inflammation that persists to the end of the observation period normally 14 days in at least 2 animals, particularly taking into account alopecia (limited area), hyperkeratosis, hyperplasia, and scaling; or</p> <p>In some cases where there is pronounced variability of response among animals, with very definite positive effects related to chemical exposure in a single animal but less than the criteria above.</p>
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Note: Subcategories align with transport packing groups I, II and III for Class 8

Table 2: Hazard Communication Label Elements of Skin Corrosion / Irritation

Category	Category 1 (A, B, C)	Category 2
Pictogram		
Signal Word	Danger	Warning
Hazard Statement	Causes severe skin burns and eye damage	Causes skin irritation

How is classification applied to mixtures?

Mixtures are classified for skin corrosion/irritation as follows:

1. Classify based on mixture test data (consider mixture pH as indicated above for substances).
2. Use bridging principles (dilution, batching, concentration, interpolation, substantially similar mixtures, and aerosols).
3. Classify based on additivity of the mixture ingredients:

Sum of ingredients classified as:	Concentration triggering classification of a mixture as		
	Skin Corrosive	Skin Irritant	
	Category 1	Category 2	
Skin Category 1	≥ 5%	≥ 1% but < 5%	
Skin Category 2		≥ 10%	
(10 × Skin Category 1) + Skin Category 2		≥ 10%	

Certain chemicals such as acids, bases, inorganic salts, aldehydes, phenols, and surfactants may not be classifiable using the additivity approach above. In these cases, the HCS 2012 recommends using the table below. For acids and bases, the pH may be a better indicator of the potential for skin corrosion (see Note, below).

Ingredient:	Concentration:	Mixture classified as: Skin
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
Other irritant (Category 2) ingredients for which additivity does not apply, including acids and bases	≥ 3%	Category 2

Notes

pH extremes like ≤ 2 and ≥ 11.5 may indicate strong local effects, especially in combination with assessment of acid or alkaline reserve, substances exhibiting such physio-chemical properties should be considered as leading to skin corrosion (Category 1). If acid/alkali reserve suggests that the mixture will not be corrosive despite low or high pH, further testing is needed for confirmation.

Alternative testing: The HCS2012 states that these methods must be validated in accordance with internationally agreed principles and criteria. Currently there are validated and accepted *in vitro* test methods for skin corrosion but there are not for skin irritation.

To learn more...

- OSHA: Hazard Communication : <https://www.osha.gov/dsg/hazcom/index.html>
- SCHC site: <http://www.schc.org/osha-alliance>

he information contained in this sheet is believed to accurately represent current OSHA HCS requirements. However, SCHC cannot guarantee the accuracy or completeness of this information. Users are responsible for determining the suitability and appropriateness of these materials for any particular application.

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