

What to expect from Revision 4 of GHS

The UN published the 4th biannual revision of the Globally Harmonized System of Classification and Labeling (GHS) in June 2011. The amendments to GHS primarily address “chemically unstable gases and non-flammable aerosols; further rationalization of precautionary statements, and further clarification of some of the criteria to avoid differences in their interpretation”.¹ The amendments are given in a 71-page document, ST-SG-AC10-38a3e², and are summarized here.

Chemically unstable gases

The definition of “chemically unstable gases” describes a “flammable gas that is able to react explosively even in the absence of air or oxygen.”

Chapter 2.2 is amended to “Flammable gases (including chemically unstable gases)

Two categories, A and B, are added to the classification methods for chemically unstable gases. The categories are used together with the Flammable gas categories 1 and 2, and carry only a new hazard statement, without new symbols nor signal words.

Table 2.2.3: Label elements for flammable gases (including chemically unstable gases)

	Flammable gas		Chemically unstable gas	
	Category 1	Category 2	Category A	Category B
Symbol	Flame	<i>No symbol</i>	<i>No additional symbol</i>	<i>No additional symbol</i>
Signal word	Danger	Warning	<i>No additional signal word</i>	<i>No additional signal word</i>
Hazard statement	Extremely flammable gas	Flammable gas	May react explosively even in the absence of air	May react explosively even in the absence of air at elevated pressure and/or temperature

The applicable precautionary statements are:

Flammable gases A,B (chemically unstable gases)

- P202 - Do not handle until all safety precautions have been read and understood.

Non-flammable aerosols

Chapter 2.3 is amended to “Aerosols” (instead of “flammable aerosols”).

¹ http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

² <http://live.unece.org/trans/main/dgdb/dgcomm/ac10rep.html>

A new hazard category, category 3, is added for non-flammable aerosols. NOTE that the GHS pictogram GHS04 (Gas; physical_label_07.png) does not apply to Category 3 aerosols although the UN transport symbol 2 (model 2.2; non-flammable, non-toxic gases) showing a gas bottle against a green background does apply.

“Table 2.3.1.: Label elements for flammable and non-flammable aerosols

	Category 1	Category 2	Category 3
Symbol	Flame	Flame	<i>No symbol</i>
Signal word	Danger	Warning	Warning
Hazard statement	Extremely flammable aerosol Pressurized container: May burst if heated	Flammable aerosol Pressurized container: May burst if heated	Pressurized container: May burst if heated

The applicable precautionary statements for the new category Aerosols, Category 3 are:

- P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- P251 - Do not pierce or burn, even after use. (*P251 as revised in Rev. 4*)
- P410 + P412 - Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Further rationalization of precautionary statements

Unknown Toxicity (Acute oral/dermal/inhalation)

The phrase for indicating the unknown acute toxicity (health) is revised to show the unknown toxicity by route of exposure and to indicate that the phrase concerns “acute” toxicity. The table below shows the Rev. 3 phrase and Rev. 4 phrase side-by-side for ease of comparison:

GHS Rev. 3	GHS Rev. 4
X% of the mixture consists of ingredient(s) of unknown toxicity	X% of the mixture consists of ingredient(s) of unknown acute (oral/dermal/inhalation) toxicity

New or Revised P-statements

Some P-statements have been revised for ease of comprehension or more efficient application. The table below shows the Rev. 3 phrase and Rev. 4 phrase side-by-side for ease of comparison:

GHS Rev. 3	GHS Rev. 4
P223 - Keep away from any possible contact with water, because of violent reaction and possible flash fire.	P223 – Do not allow contact with water.
P244 - Keep reduction valves free from grease and oil.	P244 - Keep valves and fittings free from oil and grease.

P251 - Pressurized container: Do not pierce or burn, even after use.	P251 - Do not pierce or burn, even after use.
P284 - Wear respiratory protection.	Two options now: <ul style="list-style-type: none"> • P284 – [In case of inadequate ventilation] wear respiratory protection. • P284 - Wear respiratory protection. <i>See also change to conditions of use below</i>
P310 - Immediately call a POISON CENTER or doctor/ physician.	P310 - Immediately call a POISON CENTER or doctor/ ... <i>See also change to conditions of use below</i>
P311 - Call a POISON CENTER or doctor/ physician.	P311 - Call a POISON CENTER or doctor/ ... <i>See also change to conditions of use below</i>
P312 - Call a POISON CENTER or doctor/ physician if you feel unwell.	P312 - Call a POISON CENTER or doctor/ ... if you feel unwell. <i>See also change to conditions of use below</i>
P340 - Remove victim to fresh air and keep at rest in a position comfortable for breathing.	P340 - Remove person to fresh air and keep comfortable for breathing.
P352 - Wash with plenty of soap and water.	P352 - Wash with plenty of water/...
P361 - Remove/Take off immediately all contaminated clothing.	P361 - Take off immediately all contaminated clothing.
P362 - Take off contaminated clothing and wash before reuse.	P362 - Take off contaminated clothing.
P363 - Wash contaminated clothing before reuse.	P362 - Take off contaminated clothing <u>plus</u> NEW phrase P364 – And wash it before reuse.
(none)	NEW phrase P364 – And wash it before reuse.
P378 - Use .? for extinction. <i>(Used in P370+P378)</i>	P378 - Use .? to extinguish.

New or Revised Conditions of Use

The conditions for use for some P-statements have been revised for ease of comprehension or more efficient application. The table below shows the Rev. 3 phrase and Rev. 4 phrase side-by-side for ease of comparison:

P-statement (Rev. 4 version)	GHS Rev. 3 Condition of use	GHS Rev. 4 Condition of use
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.	Manufacturer/supplier or the competent authority to specify applicable conditions.	Manufacturer/supplier or the competent authority to specify applicable conditions. <i>- may be omitted if P260 is given on the label</i>
P284 - [In case of inadequate ventilation] Wear respiratory protection.	Manufacturer/supplier or the competent authority to specify equipment.	Manufacturer/supplier or the competent authority to specify equipment. <i>- text in square brackets may be used if additional information is provided with the chemical at the point of use</i>

		<i>that explains what type of ventilation would be adequate for safe use.</i>
P310 - Immediately call a POISON CENTER or doctor/ ... <i>(Used in P301+P310)</i>	(none)	...Manufacturer/supplier or the competent authority to specify the appropriate source of emergency medical advice.
P311 - Call a POISON CENTER or doctor/ ... <i>(Used in P308+P311, P342+P311)</i>		...Manufacturer/supplier or the competent authority to specify the appropriate source of emergency medical advice.
P312 - Call a POISON CENTER or doctor/ ... if you feel unwell. <i>(Used in P301+P312, P304+P312)</i>		...Manufacturer/supplier or the competent authority to specify the appropriate source of emergency medical advice.
P352 - Wash with plenty water/... <i>(Used in P302+P352)</i>	(none)	...Manufacturer/supplier or the competent authority may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.
P332+P313 - If skin irritation occurs: Get medical advice/attention.	(none)	– <i>may be omitted when P333+P313 appears on the label</i>
P410 - Protect from sunlight. <i>(Used in P410+P403)</i>	(none)	- <i>may be omitted for gases filled in transportable gas cylinders in accordance with packing instruction P200 of the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, unless those gases are subject to (slow) decomposition or polymerisation, or the competent authority provides otherwise.</i>

Replaced P-statements

Some P-statements have been deleted and replaced by similar phrases.

- “P281 - Use personal protective equipment as required” is replaced by “P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection” in all applications.
- “P285 - In case of inadequate ventilation wear respiratory protection” is replaced by “P284 - [In case of inadequate ventilation] wear respiratory protection”.
- “P307 – IF exposed” and “P309 - IF exposed or if you feel unwell:” are replaced by “P308 - IF exposed or concerned:” in all applications. *(P307+P311 and P309+P311 are also affected)*
- “P322 - Specific measures (see supplemental first aid instructions on this label).” is replaced by “P321 - Specific treatment (see supplemental instructions on the administration of antidotes on this label).”
- “P341 - If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing” is replaced by P340 which formerly stated “Remove victim to fresh air and keep at rest in a position comfortable for breathing” but which has been amended to read “P340 - Remove person to fresh air and keep comfortable for breathing.”

- “P350 - Gently wash with plenty of soap and water” is replaced by “P352 - Wash with plenty of soap and water”.

The table below shows the effect on application of affected P-statements in Rev. 3 and Rev. 4 side-by-side for ease of comparison; only P-statements that have changed are shown (all others from Rev. 3 still apply):

Hazard classification	GHS Rev. 3 P-statement	GHS Rev. 4 P-statement
Explosives - Unstable explosive	P281 - Use personal protective equipment as required.	P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection.
Germ Cell mutagenicity 1A, 1B, 2	P281 - Use personal protective equipment as required.	P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection.
Carcinogenicity 1A, 1B, 2	P281 - Use personal protective equipment as required.	P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection.
Reproductive toxicity 1A, 1B, 2	P281 - Use personal protective equipment as required.	P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection.
STOT SE 1	P307 - IF exposed :	P308 - IF exposed or concerned:
STOT SE 2	P309 - IF exposed or if you feel unwell:	P308 - IF exposed or concerned:
Acute toxicity, dermal 1, 2, 3, 4	P302 + P350 - IF ON SKIN: Gently wash with plenty of soap and water. P322 - Specific measures (see supplemental first aid instructions on this label).	P302 + P352 - IF ON SKIN: Wash with plenty of soap and water. P321 - Specific treatment (see supplemental instructions on the administration of antidotes on this label).
Respiratory sensitization 1,1A,1B (Used in P304+P340)	P341 - If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing” is replaced by	P340 which formerly stated “Remove victim to fresh air and keep at rest in a position comfortable for breathing” but which has been amended to read “P340 - Remove person to fresh air and keep comfortable for breathing.”
Skin sensitization 1, 1A, 1B	P363 - Wash contaminated clothing before reuse.	P362 - Take off contaminated clothing <u>plus</u> NEW phrase P364 – And wash it before reuse.
Skin irritation 2	P362 - Take off contaminated clothing and wash before reuse.	P362 - Take off contaminated clothing <u>plus</u> NEW phrase P364 – And wash it before reuse.
Acute toxicity dermal 1, 2, 3 (Used in P303+P361+P353) (Used in NEW P361+P364, P362+P264)	P361 - Remove/Take off immediately all contaminated clothing <u>plus</u> P363 - Wash contaminated clothing before	P361 - Take off immediately all contaminated clothing <u>plus</u> NEW phrase P364 – And wash it before reuse.

	reuse.	
Acute toxicity dermal 4	P363 - Wash contaminated clothing before reuse.	P362 - Take off contaminated clothing <u>plus</u> NEW phrase P364 – And wash it before reuse.

Clarification of criteria to avoid differences in their interpretation

Mixtures are understood not to have data on **CMR effects**, and are normally classified based on the component thresholds.

Competent authorities may make the corrosive pictogram optional on **consumer products that are corrosive to metals** but not to skin and/or eyes.

It is repeatedly clarified that **aerosols** should not be classified as flammable gases, gases under pressure, flammable liquids, nor flammable solids.

Classification of **gases under pressure** is clarified. In particular the condition of @20°C applies to the receptacle pressure measurement.

The tables for classification and hazard communication elements related to CMR properties are amended to further clarify the differences and similarities of **Category 1A and Category 1B CMR** effects.

Other miscellaneous changes

References are updated for **oxidizing gases** to current revisions of test methods.

Competent authorities are given the option to specify the **unknown toxicity statements** for acute and aquatic toxicities either on the label or on the SDS, or both.

Possible Errata

On GHS Rev.4 page 20, P352 is assigned to acute toxicity, dermal 1, 2, 3, and 4. In GHS Rev. 3 page 25, P350 is assigned to acute toxicity, dermal 1 and 2. Nowhere in the GHS Rev. 4 is the requirement to apply P350 to Acute toxicity, dermal 1, 2 rescinded.