



Hazard Communication Information Sheet reflecting the US OSHA Implementation of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Produced by the SCHC-OSHA Alliance
GHS/HazCom Information Sheet Workgroup

Explosives

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How does OSHA's Hazard Communication Standard (HCS 2012) define explosives?





An *explosive chemical* is a solid or liquid chemical which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic chemicals are included even when they do not evolve gases. A *pyrotechnic chemical* is a chemical designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative self-sustaining exothermic chemical reactions. An *explosive item* is an item containing one or more explosive chemicals. A *pyrotechnic item* is an item containing one or more pyrotechnic chemicals. An *unstable explosive* is an explosive which is thermally unstable and/or too sensitive for normal handling, transport, or use. An *intentional explosive* is a chemical or item which is manufactured with a view to produce a practical explosive or pyrotechnic effect.


How does HCS 2012 classify explosives?

The class of explosives includes: a) explosive chemicals; b) explosive items, except devices containing explosive chemicals in such quantity or of such a character that their inadvertent or accidental ignition or initiation does not cause any effect external to the device either by projection, fire, smoke, heat or loud noise; and c) chemicals and items not included in a) and b) above which are manufactured with the view to producing a practical explosive or pyrotechnic effect.

Table 1 explains the classification criteria and shows some of the label elements for explosives. The precautionary statements are not included due to space limitations of this fact sheet. See HCS 2012 at 29 CFR 1910.1200 for complete information.

Table 1: Explosives Classification and Hazard Communication Elements

Hazard Category	Hazard Criteria	Label Elements
Unstable Explosives	An explosive which is thermally unstable and/or too sensitive for normal handling, transport, or use	Danger Unstable Explosive 
Division 1.1	Chemicals and items which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously)	Danger Explosive; mass explosion hazard 
Division 1.2	Chemicals and items which have a projection hazard but not a mass explosion hazard	Danger Explosive; severe projection hazard 
Division 1.3	Chemicals and items which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: (i) Combustion of which gives rise to considerable radiant heat; or (ii) Which burn one after another, producing	Danger Explosive; fire, blast or projection hazard 

	minor blast or projection effects or both	
Division 1.4	Chemicals and items which present no significant hazard: chemicals and items which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package	Warning Fire or projection hazard 
Division 1.5	Very insensitive chemicals which have a mass explosion hazard: chemicals which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions	Danger May mass explode in fire (No pictogram)
Division 1.6	Extremely insensitive items which do not have a mass explosion hazard: items which contain only extremely insensitive detonating chemicals and which demonstrate a negligible probability of accidental initiation or propagation	(No signal word) (No hazard statement) (No pictogram)

Additional classification considerations

Explosives are classified as unstable explosives or assigned to one of the six divisions identified in Appendix B.1.2 to HCS 2012 (29 CFR 1910.1200) in accordance with the three step procedure in Part I of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Revision 4. The first step is to ascertain whether the substance or mixture has explosive effects (Test Series 1). The second step is the acceptance procedure (Test Series 2 to 4) and the third step is the assignment to a hazard division (Test Series 5 to 7). The assessment whether a candidate for "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives (ANE)" is insensitive enough for inclusion as an oxidizing liquid (See Appendix B.13 to HCS 2012) or an oxidizing solid (See Appendix B.14 to HCS 2012) is determined by Test Series 8 tests.

Explosive properties are associated with the presence of certain chemical groups in a molecule, which can react to produce very rapid increases in temperature or pressure. The screening procedure is aimed at identifying the presence of such reactive groups and the potential for rapid energy release. If the screening procedure identifies the chemical as a potential explosive, the acceptance procedure is necessary for classification (See section 10.3 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Revision 4).

A chemical is not classified as explosive if:

- a) There are no chemical groups associated with explosive properties present in the molecule; or
- b) The substance contains chemical groups associated with explosive properties which include oxygen and the calculated oxygen balance is less than -200; or
- c) The organic substance or a homogenous mixture of organic substances contains chemical groups associated with explosive properties but the exothermic decomposition energy is less than 500 J/g and the onset of exothermic decomposition is below 500°C (932°F). The exothermic decomposition energy may be determined using a suitable calorimetric technique; or
- d) For mixtures of inorganic oxidizing substances with organic material(s), the concentration of the inorganic oxidizing substance is:
 - i. less than 15%, by mass, if the oxidizing substance is assigned to Category 1 or 2;
 - ii. less than 30%, by mass, if the oxidizing substance is assigned to Category 3.

To learn more...

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

The 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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