

# Fire Code/GHS Crosswalk

Material Classification	Class	NFPA 400 (2022)* <sup>1</sup>	IFC (2021) <sup>2</sup>	OSHA HSC 2012 <sup>3</sup> GHS (Rev. 3)	Proposed OSHA HSC <sup>4</sup> GHS (Rev. 7)
<b>PHYSICAL HAZARDS</b>					
<b>Aerosol</b>			A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.	Aerosol means any non-refillable receptacle containing a gas compressed, liquefied or dissolved under pressure, and fitted with a release device allowing the contents to be ejected as particles in suspension in a gas, or as a foam, paste, powder, liquid or gas.  A flammable aerosol shall be classified in one of the two categories:	Aerosols, this means aerosol dispensers, are any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state. Aerosols are classified in one of three categories, depending on their flammable properties and their heat of combustion.
<b>Level 3</b>		<p><b>Metal Level 3 aerosol products;</b> Those products with a total chemical heat of combustion that is greater than 30 kJ/g (13,000 Btu/lb). [NFPA 30B:2019]</p> <p><b>Plastic Level 3 aerosol products;</b> Plastic aerosol 3 products shall be defined as those that meet one of the following criteria:                      (1) The base product has no fire point when tested in accordance with ASTM D92, <i>Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester</i>, and there is not more than 10 percent by weight flammable propellant.                      (2) The base product does not exhibit sustained combustion when tested in accordance with 49 CFR 173, Appendix H, "Method of Testing for Sustained Combustibility" or the <i>UN Recommendations on the Transport of Dangerous Goods</i>, and there is not more than 10 percent by weight flammable propellant.                      (3) The base product contains not more than 50 percent by volume (15.8 percent by weight) of flammable or combustible, water-miscible alcohols in an aqueous mix and there is not more than 10 percent by weight flammable propellant. [NFPA 30B:2019]</p>	Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30kJ/g).	<p><b>Flammable aerosol Category 1;</b> Contains ≥ 85% flammable components and the chemical heat of combustion is ≥ 30 kJ/g; or                      a) For spray aerosols, in the ignition distance test, ignition occurs at a distance ≥ 75 cm (29.5 in), or                      b) For foam aerosols, in the aerosol foam flammability test                      (i) the flame height is ≥ 20 cm (7.87 in) and the flame duration ≥ 2 s; or                      (ii) the flame height is ≥ 4 cm (1.57 in) and the flame duration ≥ 7 s.</p>	<p><b>H222, H229, Aerosol Category 1;</b> Contains ≥ 85% flammable components and the chemical heat of combustion is ≥ 30 kJ/g; or                      a) For spray aerosols, in the ignition distance test, ignition occurs at a distance ≥ 75 cm (29.5 in), or                      b) For foam aerosols, in the aerosol foam flammability test                      (i) The flame height is ≥ 20 cm (7.87 in) and the flame duration ≥ 2 s; or                      (ii) The flame height is ≥ 4 cm (1.57 in) and the flame duration ≥ 7 s.</p> <p>Note: Aerosols containing more than 1% flammable components or with a heat of combustion of at least 20 kJ/g, which are not submitted to the flammability classification procedures in this Appendix shall be classified as Category 1.</p>
<b>Level 2</b>		<p><b>Metal Level 2 aerosol products;</b> Those products with a total chemical heat of combustion that is greater than 20 kJ/g (8600 Btu/lb), but less than or equal to 30 kJ/g (13,000 Btu/lb).                      Exception: This shall not apply to Aerosol cooking spray products. [NFPA 30B:2019]</p>	Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20kJ/g), but less than or equal to 13,000 Btu/lb (30kJ/g).	<p><b>Flammable aerosol Category 2;</b> Contains &gt;1% flammable components, or the heat of combustion is ≥20 kJ/g; and                       (a) for spray aerosols, in the ignition distance test, ignition occurs at a distance ≥ 15 cm (5.9 in), or in the enclosed space ignition test, the                      (i) Time equivalent is ≤ 300 s/m<sup>3</sup>; or                      (ii) Deflagration density is ≤ 300 g/m<sup>3</sup>                      (b) For foam aerosols, in the aerosol foam flammability test, the flame height is ≥ 4 cm and the flame duration is ≥ 2 s and it does not meet the criteria for Category 1</p>	<p><b>H223, H229, Aerosol Category 2;</b> Contains &gt;1% flammable components, or the heat of combustion is ≥ 20 kJ/g; and                       a) for spray aerosols, in the ignition distance test, ignition occurs at a distance ≥ 15 cm (5.9 in), or in the enclosed space ignition test, the                      (i) Time equivalent is ≤ 300 s/m<sup>3</sup>; or                      (ii) Deflagration density is ≤ 300 g/m<sup>3</sup>                      b) For foam aerosols, in the aerosol foam flammability test, the flame height is ≥ 4 cm and the flame duration is ≥ 2 s and it does not meet the criteria for Category 1.</p>

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	Level 1	<p><b>Metal Level 1 aerosol products;</b> Those products with a total chemical heat of combustion that is less than or equal to 20 kJ/g (8600 Btu/lb). Exception: This shall not apply to Aerosol cooking spray products. [NFPA 30B:2019]</p> <p><b>Plastic Level 1 aerosol products;</b> Plastic aerosol 1 products shall be defined as those that meet one of the following criteria:(1) The base product has no fire point when tested in accordance with ASTM D92, <i>Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester</i>, and the propellant is nonflammable. (2) The base product does not exhibit sustained combustion when tested in accordance with 49 CFR 173, Appendix H, "Method of Testing for Sustained Combustibility" or the <i>UN Recommendations on the Transport of Dangerous Goods</i>, and the propellant is nonflammable. (3) The base product contains not more than 20 percent by volume (15.8 percent by weight) of ethanol or propanol, or mixtures thereof in and aqueous mix, and the propellant is nonflammable. (4) The base product contains not more than 4 percent by weight of an emulsified liquefied flammable gas propellant within an aqueous base, said propellant to remain emulsified for the life of the product. Where the propellant is not permanently emulsified the propellant shall be nonflammable. [NFPA 30B:2019]</p> <p><b>Aerosol cooking spray products;</b> Those aerosol cooking spray products that have a chemical heat of combustion that does not exceed 20 kJ/g (8600 Btu/lb) and contains not more than 18 percent by weight of flammable propellant. [NFPA 30B:2019]</p>	Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20kJ/g).	Not defined.	<b>H229, Aerosol Category 3;</b> The chemical does not meet the criteria for Categories 1 and 2. The chemical contains ≤1% flammable components (by mass) and has a heat of combustion < 20 kJ/g.
<b>Combustible dust</b>		A finely divided combustible particulate solid that presents a flash-fire hazard or explosion hazard when suspended in air or the process-specific oxidizing medium over a range of concentrations. [NFPA 652:2021]	Finely divided solid material which is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a US No. 40 standard sieve.	Not defined.	Finely divided solid particles of a substance or mixture that are liable to catch fire or explode on ignition when dispersed in air or other oxidizing media.
<b>Combustible liquid</b>			<p>A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:</p> <p>The category of combustible liquids does not include compressed gases or cryogenic fluids or liquids that do not have a fire point when tested in accordance with ASTM D92.</p>	Not defined.	Not defined.
	II	<b>Ignitable Class II.</b> Any liquid that has a flash point at or above 100°F (60°C) but below 200°F (93°C). [NFPA 30: 2021]	Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).	<b>Flammable liquid Category 3;</b> Flash point ≥23°C (73.4°F) and ≤60°C (140°F).	<b>H226, Flammable liquid Category 3;</b> Flash point ≥23°C (73.4°F) and ≤60°C (140°F).

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	<b>IIIA</b>	<b>Ignitable Class IIIA.</b> Any liquid that has a flash point at or above 140°F (60°C), but below 200°F (93°C). [NFPA 30: 2021]	Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).	<b>Flammable liquid Category 4;</b> Flash point >60°C (140°F) and ≤93°C (199.4°F).	<b>H227, Flammable liquid Category 4;</b> Flash point >60°C (140°F) and ≤93°C (199.4°F).
	<b>IIIB</b>	<b>Ignitable Class IIIB.</b> Any liquid that has a flash point at or above 200°F (93°C). [NFPA 30: 2021]	Liquids having closed cup flash points at or above 200°F (93°C).	Not defined.	Not defined.
<b>Combustible metal</b>		Any metal composed of distinct particles and pieces, regardless of size, shape or chemical composition, that will burn. [NFPA 484:2019]	Not defined. See Flammable solid.	Not defined. See Flammable solid.	Not defined. See Flammable solid.
<b>Compressed Gas</b>		A material or mixture of materials that: 1) Is a gas at 68°F (20°C) or less at an absolute pressure of 14.7 psia (101 kPa) of pressure, and 2) has a boiling point of 68°F (20°C) or less at an absolute pressure of 14.7 psia (101 kPa) and that is liquefied, nonliquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed gases until the pressure in the packaging exceeds 40.6 psi (280 kPa) at 68°F (20°C). [NFPA 55:2020]	A material or mixture of materials that: 1) Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure, and 2) Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C).  States of compressed gases: 1) <b>Nonliquefied compressed gases</b> are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). 2) <b>Liquefied compressed gases</b> are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). 3) <b>Compressed gases in solution</b> are nonliquefied gases that are dissolved in a solvent. 4) <b>Compressed gas mixtures</b> consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.	<b>Gases under pressure</b> are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. <b>H280, compressed gas;</b> Contains gas under pressure; May explode if heated: A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F).  <b>H280, liquefied gas;</b> Contains gas under pressure; May explode if heated: A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F).  <b>H280, dissolved gas;</b> Contains gas under pressure; May explode if heated: A gas which when under pressure is dissolved in a liquid phase solvent.	<b>Gases under pressure</b> are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. <b>H280, compressed gas;</b> Contains gas under pressure; May explode if heated: A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F).  <b>H280, liquefied gas;</b> Contains gas under pressure; May explode if heated: A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F).  <b>H280, dissolved gas;</b> Contains gas under pressure; May explode if heated: A gas which when under pressure is dissolved in a liquid phase solvent.
<b>Cryogenic fluid</b>		A fluid with a boiling point lower than -130°F (-90°C) at an absolute pressure of 14.7 psi (101.3 kPa). [NFPA 55:2020]	A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa)	<b>Gases under pressure</b> are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated.  <b>Refrigerated liquefied gas;</b> Contains refrigerated gas; May cause cryogenic burns or injury: A gas which is made partially liquid because of its low temperature.	<b>Gases under pressure</b> are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated.  <b>H281, refrigerated liquefied gas;</b> Contains refrigerated gas; May cause cryogenic burns or injury: A gas which is made partially liquid because of its low temperature.
	<b>Flammable</b>	Not defined.	A cryogenic fluid that is flammable in its vapor state.	<b>Category 1A;</b> Extremely flammable gas: Gases, which at 20°C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the	<b>H220, Category 1A;</b> Extremely flammable gas: Gases, which at 20°C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the

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				criteria for Category 1B	criteria for Category 1B.
				Category 1A includes Pyrophoric gases and Chemically unstable gases	Category 1A includes Pyrophoric gases and Chemically unstable gases
				Refrigerated liquefied gas would also apply	H281, refrigerated liquefied gas would also apply
<b>Oxidizing</b>	An oxidizing gas in the cryogenic state. [NFPA 55:2020]	An oxidizing gas in the cryogenic state.	An oxidizing gas in the cryogenic state.	<b>Category 1;</b> May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.  Refrigerated liquefied gas would also apply	<b>H270, Category 1;</b> May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.  H281, refrigerated liquefied gas would also apply
<b>Inert</b>	Not defined.	A fluid having a boiling point lower than –130°F (–89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).	A fluid having a boiling point lower than –130°F (–89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).	<b>Gases under pressure</b> are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied or liquefied and refrigerated.  <b>Liquefied gas:</b> A gas which when under pressure is partially liquid at temperatures above –50°C (–58°F). A distinction is made between:  (a) High pressure liquefied gas: a gas with a critical temperature between –50°C (–58°F) and +65°C (149°F); and  (b) Low pressure liquefied gas: a gas with a critical temperature above +65°C (149°F).  The critical temperature is the temperature above which a pure gas cannot be liquefied, regardless of the degree of compression.	<b>Gases under pressure</b> are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied or liquefied and refrigerated.  <b>Liquefied gas:</b> A gas which when under pressure is partially liquid at temperatures above –50°C (–58°F). A distinction is made between:  (a) High pressure liquefied gas: a gas with a critical temperature between –50°C (–58°F) and +65°C (149°F); and  (b) Low pressure liquefied gas: a gas with a critical temperature above +65°C (149°F).  The critical temperature is the temperature above which a pure gas cannot be liquefied, regardless of the degree of compression.
<b>Explosive</b>	Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion.	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters.  The term “Explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive by the hazardous materials regulations of DOT 49 CFR Parts 100–185.	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters.  The term “Explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive by the hazardous materials regulations of DOT 49 CFR Parts 100–185.	An <b>explosive chemical</b> 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 <b>pyrotechnic chemical</b> 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 <b>explosive item</b> is an item containing one or more explosive chemicals.  A <b>pyrotechnic item</b> is an item containing one or more pyrotechnic chemicals.	An <b>explosive chemical</b> 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 <b>pyrotechnic chemical</b> 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 <b>explosive item</b> is an item containing one or more explosive chemicals.  A <b>pyrotechnic item</b> is an item containing one or more pyrotechnic chemicals.

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				<p>An <b>unstable explosive</b> is an explosive which is thermally unstable and/or too sensitive for normal handling, transport, or use.</p> <p>An <b>intentional explosive</b> is a chemical or item which is manufactured with a view to produce a practical explosive or pyrotechnic effect.</p>	<p>An <b>unstable explosive</b> is an explosive which is thermally unstable and/or too sensitive for normal handling, transport, or use.</p> <p>An <b>intentional explosive</b> is a chemical or item which is manufactured with a view to produce a practical explosive or pyrotechnic effect.</p>
	<b>Unstable explosive</b>	Not defined.	Not defined.	<b>Unstable explosive;</b> Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.	<b>H200; Unstable explosive;</b> Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.
	<b>Div. 1.1</b>	Explosives that present a mass explosion hazard. [NFPA 495:2018; E.2]	Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.	Chemicals and items which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously);	<b>H201; Explosive Division 1.1;</b> mass explosion hazard: Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously)
	<b>Div. 1.2</b>	Explosives that present a projection hazard but not a mass explosion hazard. [NFPA 495:2018; E.2]	Explosives that have a projection hazard but not a mass explosion hazard.	Chemicals and items which have a projection hazard but not a mass explosion hazard;	<b>H202; Explosive Division 1.2;</b> severe projection hazard: Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard
	<b>Div. 1.3</b>	Explosives that present a fire hazard and either a minor blast hazard or a minor projection hazard, or both, but not a mass explosion hazard. [NFPA 495:2018; E.2]	Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	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 minor blast or projection effects or both;	<b>H203; Explosive Division 1.3;</b> fire, blast or projection hazard: Substances, mixtures, and articles 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 minor blast or projection effects or both;
	<b>Div. 1.4</b>	Explosive devices that present a minor explosion hazard, but do not contain more than 25 g (0.9 oz.) of a detonating material. [NFPA 495:2018; E.2]	Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.	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;	<b>H204; Explosive Division 1.4;</b> Substances, mixtures and articles which present no significant hazard: substances, mixtures and articles 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
	<b>Div. 1.5</b>	Very insensitive explosives that present a mass explosion hazard but are so insensitive that there is little probability of initiation or of transition from burning to detonation under normal conditions of transport. [NFPA 495:2018; E.2]	Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.	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;	<b>H205; Explosive Division 1.5;</b> Very insensitive substances or mixtures which have a mass explosion hazard: substances and mixtures 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.
	<b>Div. 1.6</b>	Extremely insensitive articles that do not have a mass explosion hazard, and articles that present a negligible probability of accidental initiation or propagation.	Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a	Extremely insensitive items which do not have a mass explosion hazard: items which contain only extremely insensitive detonating chemicals and	<b>Explosive Division 1.6;</b> Extremely insensitive items which do not have a mass explosion hazard: items which predominately contain extremely insensitive detonating chemicals and which demonstrate a

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		[NFPA 495:2018; E.2]	negligible probability of accidental initiation or propagation.	which demonstrate a negligible probability of accidental initiation or propagation	negligible probability of accidental initiation or propagation
<b>Flammable gas</b>	<b>Gaseous</b>	A material that is a gas at 20°C (68°F) or less at an absolute pressure of 101.325 kPa (14.7 psia), that is ignitable at an absolute pressure of 101.325 kPa (14.7 psia) when in a mixture of 13 percent or less by volume with air, or that has a flammable range at an absolute pressure of 101.325 kPa (14.7 psia) with air of at least 12 percent, regardless of the lower limit. [NFPA 55: 2020]	A material which is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] which: 1) Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air; or 2) Has a flammable range at 14.7 psia (101 kPa) with air of at least 12 percent, regardless of the lower limit.  The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.	<b>Flammable gas</b> means a gas having a flammable range with air at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi).  <b>Category 1;</b> Gases, which at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi): (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit.  <b>Category 2;</b> Gases, other than those of Category 1, which, at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi), have a flammable range while mixed in air.	A flammable gas is a gas having a flammable range with air at 20°C (68°F) and a standard pressure of 101.3kPa (14.7 psi).  <b>H220, H230, H231, H232, Flammable Gas Category 1A;</b> Gases, which at 20°C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B.  Category 1A includes Pyrophoric gases and Chemically unstable A and B gases.  <b>H221, Flammable Gas Category 1B;</b> Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: (a) a lower flammability limit of more than 6% by volume in air; or (b) a fundamental burning velocity of less than 10 cm/s.H280, compressed gas would also apply.  <b>H221, Flammable Gas Category 2;</b> Gases, other than those of Category 1A or 1B, which, at 20 °C (68 °F) and a standard pressure of 101.3 kPa (14.7 psi), have a flammable range while mixed in air.
	<b>Liquefied</b>	A liquefied compressed gas that, when under a charged pressure, is partially liquid at a temperature of 20°C (68°F) and is flammable. [NFPA 55: 2020]	A liquefied compressed gas which, under a charged pressure, is partially liquid at a temperature of 68°F (20°C) and which is flammable.	Not defined. See Gases under pressure.	Not defined. See Gases under pressure.
	<b>Liquefied petroleum (LP)</b>	Not defined.	A material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane (normal butane or isobutane) and butylenes.	Not defined. See Gases under pressure.	Not defined. See Gases under pressure.
<b>Flammable liquid</b>			A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:	<b>Flammable liquid</b> means a liquid having a flash point of not more than 93°C (199.4°F).	<b>Flammable liquid</b> means a liquid having a flash point of not more than 93°C (199.4°F).
	<b>IA</b>	<b>Ignitable Class IA.</b> Any liquid that has a flash point below 73°F (22.8°C) and a boiling point below 100°F (37.8°C). [NFPA 30: 2021]	Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).	<b>Category 1; Flash point &lt;23°C (73.4°F) and initial boiling point ≤35°C (95°F).</b>	<b>H224, Category 1;</b> Flash point <23°C (73.4°F) and initial boiling point ≤35°C (95°F).

# Fire Code/GHS Crosswalk

Material Classification	Class	NFPA 400 (2022)* <sup>1</sup>	IFC (2021) <sup>2</sup>	OSHA HSC 2012 <sup>3</sup> GHS (Rev. 3)	Proposed OSHA HSC <sup>4</sup> GHS (Rev. 7)
	<b>IB</b>	<b>Ignitable Class IB.</b> Any liquid that has a flash point below 73°F (22.8°C) and a boiling point at or above 100°F (37.8°C). [NFPA 30: 2021]	Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).	<b>Category 2;</b> Flash point <23°C (73.4°F) and initial boiling point >35°C (95°F).	<b>H225, Category 2;</b> Flash point <23°C (73.4°F) and initial boiling point >35°C (95°F).
	<b>IC</b>	<b>Ignitable Class IC.</b> Any liquid that has a flash point at or above 73°F (22.8°C) but below 100°F (37.8°C). [NFPA 30: 2021]	Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).	<b>Category 3;</b> Flash point ≥23°C (73.4°F) and ≤60°C (140°F).	<b>H226, Category 3;</b> Flash point ≥23°C (73.4°F) and ≤60°C (140°F).
<b>Flammable solid</b>		A solid substance, other than a substance defined as a blasting agent or explosive, that is liable to cause fire resulting from friction or retained heat from manufacture, that has an ignition temperature below 212°F (100°C), or that burns so vigorously or persistently when ignited that it creates a serious hazard.	A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.1 inch (2.5 mm) per second along its major axis.	<b>Flammable solid</b> means a solid which is a readily combustible solid, or which may cause or contribute to fire through friction. Readily combustible solids are powdered, granular, or pasty chemicals which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly.  <b>Category 1;</b> Burning rate test: Chemicals other than metal powders: (a) Wetted zone does not stop fire; and (b) Burning time <45 s or burning rate >2.2 mm/s Metal powders: burning time ≤5 min  <b>Category 2;</b> Burning rate test: Chemicals other than metal powders: (a) Wetted zone stops the fire for at least 4 min; and (b) Burning time <45 s or burning rate >2.2 mm/s Metal powders: burning time >5 min and ≤10 min Test Method for burning rate is provided in the UN TDG <i>Manual of Tests and Criteria</i> .	A <b>flammable solid</b> is a solid which is readily combustible, or may cause or contribute to fire through friction. A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, sub-section 33.2.1 of the Manual of Tests and Criteria, according to:  <b>H228, Category 1;</b> Burning rate test: Substances or mixtures other than metal powders: a) wetted zone does not stop fire; and b) burning time < 45 s or burning rate > 2.2 mm/s Metal powders: burning time ≤5 min  <b>H228, Category 2;</b> Burning rate test: Substances or mixtures other than metal powders: a) wetted zone stops the fire for at least 4 min; and b) burning time < 45 s or burning rate > 2.2 mm/s Metal powders: burning time > 5 min and ≤10 min
<b>Inert gas</b>		A nonreactive, nonflammable, noncorrosive gas such as argon, helium, krypton, neon, nitrogen, and xenon. [NFPA 55: 2020]	A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.	<b>Simple asphyxiant</b> means a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death. (In HCS 2012, not in GHS)	<b>Simple asphyxiant</b> means a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death. (In HCS 2012, not in GHS)
<b>Organic peroxide</b>	<b>Unclassified detonable</b>	Not defined.	<b>Unclassified detonable:</b> Organic peroxides that are capable of detonation. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.	<b>Organic peroxide</b> means a liquid or solid organic chemical which contains the bivalent -O-O- structure and as such is considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term organic peroxide includes organic peroxide mixtures containing at least one organic peroxide. Organic peroxides are thermally unstable chemicals, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: (a) Be liable to explosive decomposition; (b) Burn rapidly; (c) Be sensitive to impact or friction; (d) React dangerously with other substances	<b>Organic peroxide</b> means a liquid or solid organic chemical which contains the bivalent -O-O- structure and as such is considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term organic peroxide includes organic peroxide mixtures containing at least one organic peroxide. Organic peroxides are thermally unstable chemicals, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: (a) Be liable to explosive decomposition; (b) Burn rapidly; (c) Be sensitive to impact or friction; (d) React dangerously with other substances.

# Fire Code/GHS Crosswalk

Material Classification	Class	NFPA 400 (2022)* <sup>1</sup>	IFC (2021) <sup>2</sup>	OSHA HSC 2012 <sup>3</sup> GHS (Rev. 3)	Proposed OSHA HSC <sup>4</sup> GHS (Rev. 7)
				<b>Organic peroxide TYPE A;</b> Any organic peroxide which, as packaged, can detonate or deflagrate rapidly.	Organic peroxides shall be classified in one of the seven categories of "Types A to G" for this class, according to the following principles:  <b>H240, Type A;</b> Any organic peroxide which, as packaged, can detonate or deflagrate rapidly
I		Organic peroxide formulations that are more severe than a Class II but do not detonate, and that are characterized as "explosive in package" or by a very fast burning rate. Includes those characterized for transport as Type B, those characterized for transport as Type C and Type D with a large-scale burning rate equal to or greater than 300 kg/min, and those characterized for transport as Type C and Type D with a small-scale burning rate equal to or greater than 9.0 kg/min × m <sup>2</sup> unless the large-scale burning rate is less than 300 kg/min.	Describes those formulations that are capable of deflagration but not detonation.	<b>Organic peroxide TYPE B:</b> Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package.	<b>H241, Type B;</b> Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package.
II		<b>Class IIA.</b> Organic peroxide formulations that burn very rapidly and that present a severe reactivity hazard, and those characterized for transport as Type C and Type D with a large-scale burning rate equal to or greater than 140 kg/min but less than 300 kg/min and those characterized for transport as Type E with a large-scale burning rate equal to or greater than 140 kg/min. Includes those characterized as Type C and Type D if the small-scale burning rate is equal to or greater than 2.2 kg/min × m <sup>2</sup> , but less than 9.0 kg/min × m <sup>2</sup> and Type E if the small-scale burning rate is equal to or greater than 2.2 kg/min × m <sup>2</sup> .	Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard.	<b>Organic peroxide TYPE C:</b> Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion.	<b>H242, Type C;</b> Any organic peroxide possessing explosive properties when the chemical as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion.
		<b>Class IIB.</b> Organic peroxide formulations that burn very rapidly and that present a severe reactivity hazard, and those characterized for transport as Type C with a large-scale burning rate of less than 140 kg/min. Includes those characterized for transport as Type D and Type E with a large-scale burning rate equal to or greater than 60 kg/min but less than 140 kg/min, those characterized as Type C if the small-scale burning rate is less than 2.2 kg/min × m <sup>2</sup> , and those characterized as Type D and Type E if the small-scale burning rate is equal to or greater than 0.9 kg/min × m <sup>2</sup> but less than 2.2 kg/min × m <sup>2</sup> .	Not defined. See Class II.	<b>Organic peroxide TYPE D:</b> Any organic peroxide which in laboratory testing meets the following criteria: (i) Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) Does not detonate or deflagrate at all and shows a medium effect when heated under confinement.	<b>H242, Type D;</b> Any organic peroxide which in laboratory testing meets the criteria in (i), (ii), or (iii): (i) Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) Does not detonate or deflagrate at all and shows a medium effect when heated under confinement.
III		Organic peroxide formulations that burn rapidly and that present a moderate reactivity hazard. Includes those characterized for transport as Type D with a large-scale burning rate less than 60 kg/min, those characterized for transport as Type E with a large-scale burning rate equal to or greater than 10 kg/min but less than 60 kg/min, those characterized for transport as Type F with a large-scale burning rate equal to or greater than 10 kg/min, and those	Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.	<b>Organic peroxide TYPE E:</b> Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement.	<b>H242, Type E;</b> Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement.



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		characterized as Type D and Type E if the small-scale burning rate is less than 0.9 kg/min × m <sup>2</sup> , and those characterized as Type F irrespective of the small scale burning rate.			
	IV	Organic peroxide formulations that burn in the same manner as ordinary combustibles and present a minimal reactivity hazard. Includes those characterized for transport as Type E or Type F with a large-scale burning rate less than 10 kg/min.	Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.	<b>Organic peroxide TYPE F:</b> Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power.	<b>H242, Type F;</b> Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power.
	V	Organic peroxide formulations that burn with less intensity than ordinary combustibles or those that do not sustain combustion and that present no reactivity hazard, and those characterized for transport as Type G without additional subsidiary risks.	Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.	<b>Organic peroxide TYPE G:</b> Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable [self-accelerating decomposition temperature is 60°C (140°F) or higher for a 50 kg (110 lb) package], and, for liquid mixtures, a diluent having a boiling point of not less than 150°C (302°F) is used for desensitization. If the organic peroxide is not thermally stable or a diluent having a boiling point less than 150°C (302°F) is used for desensitization, it shall be defined as organic peroxide TYPE F.	<b>Type G;</b> Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C (140°F) or higher for a 50 kg (110 lb) package), and, for liquid mixtures, a diluent having a boiling point of not less than 150°C (302°F) is used for desensitization. If the organic peroxide is not thermally stable or a diluent having a boiling point less than 150°C (302°F) is used for desensitization, it shall be defined as organic peroxide TYPE F.
<b>Oxidizer</b>		Any solid or liquid material that readily yields oxygen or other oxidizing gas or that readily reacts to promote or initiate combustion of combustible materials and that can, under some circumstances, undergo a vigorous self-sustained decomposition due to contamination or heat exposure.	A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.	<b>Oxidizing solid</b> means a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.  <b>Oxidizing liquid</b> means a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.	<b>Oxidizing solid</b> means a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.  <b>Oxidizing liquid</b> means a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.
	4	An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock and that causes a severe increase in the burning rate of combustible materials with which it comes into contact.	An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock and that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.	<b>Oxidizing liquids Category 1:</b> Any chemical which, in the 1:1 mixture, by mass, of chemical and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of chemical and cellulose is less than that of a 1:1 mixture, by mass, of 50 percent perchloric acid and cellulose.  <b>Oxidizing solids Category 1:</b> Any chemical which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose.	<b>H271, Oxidizing liquid Category 1;</b> Any chemical which, in the 1:1 mixture, by mass, of chemical and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of chemical and cellulose is less than that of a 1:1 mixture, by mass, of 50 percent perchloric acid and cellulose.  <b>H271, Oxidizing solid Category 1;</b> Any chemical which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose.
	3	An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes into contact or a solid oxidizer classified as Class 3 when tested in accordance with the test protocol set forth in Section G.1.	An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.	<b>Oxidizing liquids Category 2:</b> Any chemical which, in the 1:1 mixture, by mass, of chemical and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 40 percent aqueous sodium	<b>H272, Oxidizing liquid Category 2;</b> Any chemical which, in the 1:1 mixture, by mass, of chemical and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 40 percent aqueous sodium

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				chlorate solution and cellulose; and the criteria for Category 1 are not met.	chlorate solution and cellulose; and the criteria for Category 1 are not met.
				<b>Oxidizing solids Category 2:</b> Any chemical which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met.	<b>H272, Oxidizing solid Category 2:</b> Any chemical which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met.
	2	An oxidizer that causes a moderate increase in the burning rate of combustible materials with which it comes into contact or a solid oxidizer classified as Class 2 when tested in accordance with the test protocol set forth in Section G.1.	An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.	<b>Oxidizing liquids Category 3:</b> Any chemical which, in the 1:1 mixture, by mass, of chemical and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65 percent aqueous nitric acid and cellulose; and the criteria for Categories 1 and 2 are not met. <b>Oxidizing solids Category 3:</b> Any chemical which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met.	<b>H272, Oxidizing liquid Category 3:</b> Any chemical which, in the 1:1 mixture, by mass, of chemical and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65 percent aqueous nitric acid and cellulose; and the criteria for Categories 1 and 2 are not met. <b>H272, Oxidizing solid Category 3:</b> Any chemical which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met.
	1	An oxidizer that does not moderately increase the burning rate of combustible materials with which it comes into contact or a solid oxidizer classified as Class 1 when tested in accordance with the test protocol set forth in Section G.1.	An oxidizer that does not moderately increase the burning rate of combustible materials.		
<b>Oxidizing gas</b>		A gas that can support and accelerate combustion of other materials.	Not defined. See Oxidizer.	<b>Category 1:</b> Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.	<b>H270, Category 1;</b> means any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.
<b>Pyrophoric</b>		A chemical with an autoignition temperature in air at or below 130°F (54.4°C).	A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54.4°C).	<b>Pyrophoric liquid</b> means a liquid which, even in small quantities, is liable to ignite within 5 min after coming into contact with air; <b>Category 1:</b> The liquid ignites within 5 min when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 min. <b>Pyrophoric solid</b> means a solid which, even in small quantities, is liable to ignite within 5 min after coming into contact with air; <b>Category 1:</b> The solid ignites within 5 min of coming into contact with air.	<b>H250, Pyrophoric liquid;</b> means a liquid which, even in small quantities, is liable to ignite within 5 min after coming into contact with air; <b>Category 1;</b> The liquid ignites within 5 min when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 min. <b>H250, Pyrophoric solid;</b> means a solid which, even in small quantities, is liable to ignite within 5 min after coming into contact with air; <b>Category 1;</b> The solid ignites within 5 min of coming into contact with air.
<b>Pyrophoric gas</b>		A gas with an autoignition temperature in air at or below 54.4°C (130°F).	Not defined. See Pyrophoric.	<b>Pyrophoric gas</b> means a chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130°F (54.4°C) or below. (In HCS 2012, not GHS)	<b>H232, Flammable gases, Category 1A Pyrophoric gas;</b> Flammable gases that ignite spontaneously in air at a temperature of 54°C (130°F) or below.  <i>Note: In the absence of data on its pyrophoricity, a flammable gas mixture should be classified as a</i>

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Material Classification	Class	NFPA 400 (2022)* <sup>1</sup>	IFC (2021) <sup>2</sup>	OSHA HSC 2012 <sup>3</sup> GHS (Rev. 3)	Proposed OSHA HSC <sup>4</sup> GHS (Rev. 7)
Unstable (reactive)	4	Materials are those that, in themselves, are readily capable of detonation, explosive decomposition, or explosive reaction at normal temperatures and pressures and include, among others, materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.	Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.	<p><b>Self-reactive chemicals</b> are thermally unstable liquid or solid chemicals liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes chemicals classified under this section as explosives, organic peroxides, oxidizing liquids or oxidizing solids. A self-reactive chemical is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.</p> <p><b>Self-reactive chemical TYPE A:</b> Any self-reactive chemical which can detonate or deflagrate rapidly, as packaged.</p> <p><b>Self-reactive chemical TYPE B:</b> Any self-reactive chemical possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package.</p>	<p><i>pyrophoric gas if it contains more than 1% (by volume) of pyrophoric component(s).</i></p> <p><b>Self-reactive chemicals</b> are thermally unstable liquid or solid chemicals liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes chemicals classified under this section as explosives, organic peroxides, oxidizing liquids or oxidizing solids. A self-reactive chemical is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.</p> <p><b>H240, Self-reactive chemical TYPE A;</b> Any self-reactive chemical which can detonate or deflagrate rapidly, as packaged.</p> <p><b>H241, Self-reactive chemical TYPE B;</b> Any self-reactive chemical possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package.</p>
	3	Materials are those that, in themselves, are capable of detonation, explosive decomposition, or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation, and include, among others, materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures.	Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures.	<p><b>Self-reactive chemical TYPE C;</b> Any self-reactive chemical possessing explosive properties when the chemical as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion.</p> <p><b>Self-reactive chemical TYPE D;</b> Any self-reactive chemical which in laboratory testing meets the following criteria: (i) Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) Does not detonate or deflagrate at all and shows a medium effect when heated under confinement</p>	<p><b>H242, Self-reactive chemical TYPE C;</b> Any self-reactive chemical possessing explosive properties when the chemical as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion.</p> <p><b>H242, Self-reactive chemical TYPE D;</b> Any self-reactive chemical which in laboratory testing meets the following criteria: (i) Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) Does not detonate or deflagrate at all and shows a medium effect when heated under confinement</p>
	2	Materials are those that readily undergo violent chemical change at elevated temperatures and pressures and include, among others, materials that exhibit an exotherm at temperatures less than or equal to 30°F (-1°C) when tested by differential scanning calorimetry.	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures.	<p><b>Self-reactive chemical TYPE E;</b> Any self-reactive chemical which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement.</p> <p><b>Self-reactive chemical TYPE F;</b> Any self-reactive chemical which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power.</p>	<p><b>H242, Self-reactive chemical TYPE E;</b> Any self-reactive chemical which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement.</p> <p><b>H242, Self-reactive chemical TYPE F;</b> Any self-reactive chemical which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power.</p>
	1	Materials are those that, in themselves, are normally stable, but that can become unstable at elevated temperatures and pressures and include among others, materials that change or decompose on exposure to air, light, or moisture and that	Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressure.		<p><b>H242, Self-reactive chemical TYPE G;</b> Any self-reactive chemical which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally</p>

# Fire Code/GHS Crosswalk

Material Classification	Class	NFPA 400 (2022)* <sup>1</sup>	IFC (2021) <sup>2</sup>	OSHA HSC 2012 <sup>3</sup> GHS (Rev. 3)	Proposed OSHA HSC <sup>4</sup> GHS (Rev. 7)
		exhibit an exotherm at temperatures greater than 30°F (-1°C), but less than or equal to 57°F (14°C), when tested by differential scanning calorimetry.			stable [self-accelerating decomposition temperature is 60°C (140°F) to 75°C (167°F) for a 50 kg (110 lb) package], and, for liquid mixtures, a diluent having a boiling point greater than or equal to 150°C (302°F) is used for desensitization. If the mixture is not thermally stable or a diluent having a boiling point less than 150°C (302°F) is used for desensitization, the mixture shall be defined as self-reactive chemical TYPE F.
Unstable (reactive) gas	4	Not defined. See Flammable gas and Unstable (reactive).	Not defined. See Flammable gas and Unstable (reactive).	A <b>chemically unstable gas</b> is a flammable gas that is able to react explosively even in the absence of air or oxygen. (In GHS, Rev.4; not HCS 2012)  <b>Category A:</b> Flammable gases which are chemically unstable at 20°C and a standard pressure of 101.3 kPa.	A <b>chemically unstable gas</b> is a flammable gas that is able to react explosively even in the absence of air or oxygen.  <b>H230, Flammable gases Category 1A, chemically unstable gas A:</b> Flammable gases which are chemically unstable at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi).
	3	Not defined. See Flammable gas and Unstable (reactive).	Not defined. See Flammable gas and Unstable (reactive).	<b>Category B:</b> Flammable gases which are chemically unstable at a temperature greater than 20°C and/or a pressure greater than 101.3 kPa.	<b>H231, Flammable gases Category 1A, chemically unstable gas B:</b> Flammable gases which are chemically unstable at a temperature greater than 20 °C (68 °F) and/or a pressure greater than 101.3 kPa (14.7 psi)..
Water-reactive	3	Materials whose heat of mixing is greater or equal to 600 cal/g.	Materials that react explosively with water without requiring heat or confinement.	<b>Chemicals which, in contact with water, emit flammable gases</b> are solid or liquid chemicals which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities. <b>Category 1;</b> Any chemical which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of chemical over any 1 minute.	<b>Chemicals which, in contact with water, emit flammable gases</b> are solid or liquid chemicals which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities. <b>H260, Category 1;</b> Any chemical which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of chemical over any 1 minute.
	2	Materials whose heat of mixing is at or above 100 cal /g and less than 600 cal/g.	Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture.	<b>Category 2;</b> Any chemical which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of chemical per hour, and which does not meet the criteria for Category 1.	<b>H261, Category 2;</b> Any chemical which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of chemical per hour, and which does not meet the criteria for Category 1.
	1	Materials whose heat of mixing is at or above 30 cal/g and less than 100 cal/g.	Materials that react with water with some release of energy, but not violently.	<b>Category 3;</b> Any chemical which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liter per kilogram of chemical per hour, and which does not meet the criteria for Categories 1 and 2.	<b>H261, Category 3;</b> Any chemical which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liter per kilogram of chemical per hour, and which does not meet the criteria for Categories 1 and 2.

## HEALTH HAZARDS

# Fire Code/GHS Crosswalk

Material Classification	Class	NFPA 400 (2022)* <sup>1</sup>	IFC (2021) <sup>2</sup>	OSHA HSC 2012 <sup>3</sup> GHS (Rev. 3)	Proposed OSHA HSC <sup>4</sup> GHS (Rev. 7)
Corrosive		A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.	A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOT 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.	<b>Corrosion Category 1:</b> A corrosive substance is a chemical that produces destruction of skin tissue, 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.  <b>Category 1A:</b> Corrosive in $\geq 1$ to 3 animals with an exposure time $\leq 3$ min and observation time $\leq 1$ hour. <b>Category 1B:</b> Corrosive in $\geq 1$ to 3 animals with an exposure time $> 3$ min and observation time $\leq 14$ days. <b>Category 1C:</b> Corrosive in $\geq 1$ to 3 animals with an exposure time $> 1$ hour $\leq 4$ hours and observation time $\leq 14$ days.	<b>Skin corrosion</b> refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture. <b>Category 1:</b> Destruction of skin tissue, namely, visible necrosis through the epidermis and into the dermis, in at least one tested animal after exposure $\leq 4$ h. <b>H314, Category 1A:</b> Corrosive responses in at least one animal following exposure $\leq 3$ min during an observation period $\leq 1$ h. <b>H314, Category 1B:</b> Corrosive responses in at least one animal following exposure $> 3$ min and $\leq 1$ h and observations $\leq 14$ days. <b>H314, Category 1C:</b> Corrosive responses in at least one animal after exposures $> 1$ h and $\leq 4$ h and observations $\leq 14$ days.
Corrosive Gas		A gas that causes visible destruction of or irreversible alterations in living tissue by chemical action at the site of contact. [NFPA 55:2020]	Not defined. See Corrosive.	Not defined. See Corrosive and Gases Under Pressure (OSHA HazCom 2012).	Not defined. See Corrosive and Gases Under Pressure (GHS Rev 7).
Highly toxic		A material that produces a lethal dose or lethal concentration that falls within any of the following categories: (1) a chemical that has a median lethal dose (LD50) of 50 mg/kg or less of body weight when administered orally to albino rats weighing between 200 g and 300 g each; (2) a chemical that has a median lethal dose (LD50) of 200 mg/kg or less of body weight when administered by continuous contact for 24 hours, or less if death occurs within 24 hours, with the bare skin of albino rabbits weighing between 2 kg and 3 kg each or albino rats weighing 200 g and 300 g each; (3) A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/L or less of mist, fume, or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 g and 300 g (0.44 lb and 0.66 lb) each.	A material which produces a lethal dose or lethal concentration which falls within any of the following categories: 1. A chemical that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each. 2. A chemical that has a median lethal dose (LD50) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each. 3. A chemical that has a median lethal concentration (LC50) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for one hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.	<b>Acute toxicity</b> refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.  <b>Oral Category 1:</b> LD50 $\leq 5$ mg/kg;  <b>Oral Category 2:</b> LD50 $> 5$ and $\leq 50$ mg/kg;  <b>Dermal Category 1:</b> LD50 $\leq 50$ mg/kg;  <b>Dermal Category 2:</b> LD50 $> 50$ and $\leq 200$ mg/kg.  <b>Inhalation - Gases Category 1:</b> LD50 $\leq 100$ ppmV ;  <b>Inhalation - Gases Category 2:</b> LD50 $> 100$ and $\leq 500$ ppmV;  <b>Inhalation - Vapors Category 1:</b> LD50 $\leq 0.5$ mg/L;  <b>Inhalation - Vapors Category 2:</b> LD50 $> 0.5$ and $\leq 2.0$ mg/L;  <b>Inhalation - Dusts and Mists Category 1:</b> LD50 $\leq 0.05$ mg/L;  <b>Inhalation - Dusts and Mists Category 2:</b> LD50 $> 0.05$ and $\leq 0.5$ mg/L;  <b>Inhalation - Dusts and Mists Category 3:</b> LD50 $> 0.5$ and $\leq 1.0$ mg/L.	<b>Acute toxicity</b> refers to those serious adverse health effects (i.e., lethality) occurring after a single or short-term oral or dermal or inhalation exposure to a substance or mixture.  <b>H300, Oral Category 1:</b> ATE $\leq 5$ mg/kg  <b>H300, Oral Category 2:</b> $> 5$ ATE $\leq 50$ mg/kg;  <b>H310, Dermal Category 1:</b> ATE $\leq 5$ mg/kg  <b>H310, Dermal Category 2:</b> $> 5$ ATE $\leq 200$ mg/kg.  <b>H330, Inhalation - Gases Category 1:</b> LD50 $\leq 100$ ppmV ;  <b>H330, Inhalation - Gases Category 2:</b> LD50 $> 100$ and $\leq 500$ ppmV;  <b>H330, Inhalation - Vapors Category 1:</b> LD50 $\leq 0.5$ mg/L;  <b>H330, Inhalation - Vapors Category 2:</b> LD50 $> 0.5$ and $\leq 2.0$ mg/L;  <b>H330, Inhalation - Dusts and Mists Category 1:</b> LD50 $\leq 0.05$ mg/L;  <b>H330, Inhalation - Dusts and Mists Category 2:</b> LD50 $> 0.05$ and $\leq 0.5$ mg/L;  <b>H331, Inhalation - Dusts and Mists Category 3:</b> LD50 $> 0.5$ and $\leq 1.0$ mg/L.

# Fire Code/GHS Crosswalk

Material Classification	Class	NFPA 400 (2022)* <sup>1</sup>	IFC (2021) <sup>2</sup>	OSHA HSC 2012 <sup>3</sup> GHS (Rev. 3)	Proposed OSHA HSC <sup>4</sup> GHS (Rev. 7)
				<b>Inhalation - Dusts and Mists</b> Category 4: LD50 >1.0 and ≤5.0 mg/L.	<b>H332, Inhalation - Dusts and Mists</b> Category 4: LD50 >1.0 and ≤5.0 mg/L.
<b>Toxic</b>		<p>A material that produces a lethal dose or a lethal concentration within any of the following categories:</p> <p>(1) a chemical or substance that has a median lethal dose (LD50) of more than 50 mg/kg but not more than 500 mg/kg of body weight when <b>administered orally</b> to albino rats weighing between 200 g and 300 g each;</p> <p>(2) a chemical or substance that has a median lethal dose (LD50) of more than 200 mg/kg but not more than 1000 mg/kg of body weight when <b>administered by continuous contact for 24 hours</b>, or less if death occurs within 24 hours, with the bare skin of albino rabbits weighing between 2 kg and 3 kg each;</p> <p>(3) a chemical or substance that has a median lethal concentration (LC50) in air of more than 200 parts per million but not more than 2000 parts per million by volume of gas or vapor, or more than 2 mg/L but not more than 20 mg/L, of mist, fume, or dust when <b>administered by continuous inhalation for 1 hour</b>, or less if death occurs within 1 hour, to albino rats weighing between 200 g and 300 g each.</p>	<p>A chemical falling within any of the following categories:</p> <ol style="list-style-type: none"> <li>1. A chemical that has a median lethal dose (LD50) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when <b>administered orally</b> to albino rats weighing between 200 and 300 grams each.</li> <li>2. A chemical that has a median lethal dose (LD50) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when <b>administered by continuous contact for 24 hours</b> (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.</li> <li>3. A chemical that has a median lethal concentration (LC50) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by <b>continuous inhalation for 1 hour</b> (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.</li> </ol>	<p><b>Acute toxicity</b> refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.</p> <p><b>Oral Category 3:</b> LD50 &gt;50 and ≤300 mg/kg;</p> <p><b>Oral Category 4:</b> LD50 &gt;300 and ≤2000 mg/kg;</p> <p><b>Dermal Category 3:</b> LD50 &gt;200 and ≤1000 mg/kg;</p> <p><b>Dermal Category 4:</b> LD50 &gt;1000 and ≤2000 mg/kg;</p> <p><b>Inhalation - Gases Category 2:</b> LD50 &gt;100 and ≤500 ppmV;</p> <p><b>Inhalation - Gases Category 3:</b> LD50 &gt;500 and ≤2500 ppmV;</p> <p><b>Inhalation - Gases Category 4:</b> LD50 &gt;2500 and ≤20000 ppmV;</p> <p><b>Inhalation - Vapors Category 3:</b> LD50 &gt;2.0 and ≤10.0 mg/L;</p> <p><b>Inhalation - Vapors Category 4:</b> LD50 &gt;10.0 and ≤20.0 mg/L;</p> <p><b>Inhalation - Dusts and Mists</b> Category 4: LD50 &gt;1.0 and ≤5.0 mg/L.</p>	<p><b>Acute toxicity</b> refers to those serious adverse health effects (i.e., lethality) occurring after a single or short-term oral or dermal or inhalation exposure to a substance or mixture.</p> <p><b>H331, Oral Category 3:</b> &gt;50 ATE ≤300 mg/kg;</p> <p><b>H332, Oral Category 4:</b> &gt;300 ATE ≤2000 mg/kg;</p> <p><b>H311, Dermal Category 3:</b> &gt;200 ATE ≤1000 mg/kg</p> <p><b>H312, Dermal Category 4:</b> &gt;1000 ATE ≤2000 mg/kg</p> <p><b>H330, Inhalation – Gases Category 2:</b> &gt;100 ATE ≤500 ppmV</p> <p><b>H331, Inhalation - Gases Category 3:</b> &gt;500 ATE ≤2500 ppmV;</p> <p><b>H332, Inhalation - Gases Category 4:</b> &gt;2500 ATE ≤20000 ppmV;</p> <p><b>H331, Inhalation - Vapors Category 3:</b> &gt;2.0 ATE ≤10.0 mg/L;</p> <p><b>H332, Inhalation - Vapors Category 4:</b> &gt;10.0 ATE ≤20.0 mg/L;</p> <p><b>H332, Inhalation - Dusts and Mists</b> Category 4: &gt;1.0 ATE ≤5.0 mg/L.</p>
<b>Toxic gas</b>		<p>A gas with a median lethal concentration (LC50) in air of more than 200 ppm, but not more than 2000 ppm by volume of gas or vapor, or more than 2 mg/L, but not more than 20 mg/L of mist, fume, or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 g and 300 g (0.44 lb and 0.66 lb) each.</p>	<p>Not defined. See Toxic.</p>	<p><b>Acute toxicity</b> refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.</p> <p><b>Inhalation - Gases Category 2:</b> LD50 &gt;100 and ≤500 ppmV;</p> <p><b>Inhalation - Gases Category 3:</b> LD50 &gt;500 and ≤2500 ppmV;</p> <p><b>Inhalation - Gases Category 4:</b> LD50 &gt;2500 and ≤20000 ppmV;</p>	<p><b>Acute toxicity</b> refers to those serious adverse health effects (i.e., lethality) occurring after a single or short-term oral or dermal or inhalation exposure to a substance or mixture.</p> <p><b>H330, Inhalation - Gases Category 2:</b> &gt;100 ATE ≤500 ppmV;</p> <p><b>H331, Inhalation - Gases Category 3:</b> &gt;500 ATE ≤2500 ppmV;</p> <p><b>H332, Inhalation - Gases Category 4:</b> &gt;2500 ATE ≤20000 ppmV;</p>

\*Unless a more specific NFPA Standard is referenced.

# Fire Code/GHS Crosswalk

References:

1. National Fire Protection Association. *NFPA 400, Hazardous Materials Code*. 2022.
2. International Code Council. *International Fire Code*. 2021.
3. Hazard Communication Standard, 29 C.F.R.1910.1200 (2012).
4. Hazard Communication Standard. Proposed Rule. 86 Fed. Reg. 9576-9831. February 16, 2021.