F187–06/07
3404.2.8.12, 3404.2.8.17

Proponent: Richard S. Kraus, PSC Petroleum Safety Consultants, representing Petroleum Safety Consultants/American Petroleum Institute

Revise as follows:

3404.2.8.12 Liquid removal. Means shall be provided to recover liquid from the vault. Where a pump is used to meet this requirement, the pump shall not be permanently installed in the vault. Electric-powered portable pumps shall be suitable for use in Class I, Division 1 or Zone 0 locations, as defined in the ICC *Electrical Code*.

3404.2.8.17 Classified area. The interior of a vault containing a tank that stores a Class I liquid shall be designated a Class I, Division 1 or Zone 0 location, as defined in the ICC *Electrical Code*.

Reason: API 500 and NFPA 30 now incorporate the Zone classifications into their requirements. Much new equipment is now "Zone" classifies. This proposal does not change any technical requirement now contained in the code but reflects new terminology.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F188–06/07
3404.2.9.1 (New)

Proponent: Michael G. Kraft, Division of State Fire Marshal, State of Ohio

Add new text as follows:

3404.2.9.1 Existing installations. Existing aboveground tank installations, even if previously approved, that are determined to constitute a hazard by the fire code official, shall not be continued in service. Unsafe tanks shall be removed where required by the fire code official and in accordance with Sections 3404.2.14 through 3404.2.14.2.

Reason: For AST's that constitute a hazard, such as an underground tank being used above ground, a clear-cut authorization to remove is needed. These situations are different from an abandoned out of service tank, yet require similar mitigation, such that the removal of such an unsafe tank needs to be in accordance with the safeguards otherwise required.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F189–06/07
3404.3.2.1.1

Proponent: Lynne M. Kilpatrick, Fire Department, City of Seattle, WA

Revise as follows:

3404.3.2.1.1 Materials. Cabinets shall be listed in accordance with UL 1275. ~~, or constructed of approved wood or metal in accordance with the following:~~

~~1. Unlisted metal cabinets shall be constructed of steel having a thickness of not less than 0.044 inch (1.12mm)(18 gage). The cabinet, including the door, shall be double walled with 1.5-inch (38 mm) airspace between the walls. Joints shall be riveted or welded and shall be tight fitting.~~
~~2. Unlisted wooden cabinets, including doors, shall be constructed of not less than 1-inch (25 mm) exterior grade plywood. Joints shall be rabbeted and shall be fastened in two directions with wood screws. Door hinges shall be of steel or brass. Cabinets shall be painted with an intumescent-type paint.~~

Reason: The liquid storage cabinets are critical safety feature in the storage of flammable and combustible liquids. The use of these cabinets continues to be an option that provides the code official and owner's flexibility for where the liquids can be stored and the ability for smaller (120 gallons) amounts to be located within manufacturing areas. UL 1275 provides specific construction requirements for the cabinet, including sheet metal thickness, type joints, air space for the double walls, and venting to name a few. The standard includes a rigorous fire endurance test and leakage test. These add up to a cabinet that provides the needed protection features to justification doubling the maximum allowable quantity of a hazardous material in a control area as allowed in Table 2703.1.1 (1). The removal of the homemade wood cabinet highlights the importance of the

independent testing. Without the third party testing, the code official must evaluate the construction, materials, and design to ensure that the homemade cabinet meets the intent of this section. Such an evaluation can be very difficult after the cabinet is completed. Currently, UL 1275 has tested numerous metal and wood cabinets so that many are available on the market.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F190–06/07
3405.5.1

Proponent: Patrick A. McLaughlin, McLaughlin & Associates, representing Consumer Specialty Products Association

Revise as follows:

3405.5.1 Corridor installations. Where wall-mounted dispensers containing alcohol-based hand rubs are installed in corridors, they shall be in accordance with all of the following:

1. Level 2 and Level 3 aerosols containers shall not be allowed in corridors.
2. The maximum capacity of each Class I or II liquids dispenser shall be 41 ounces and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (.51 kg).
3. The maximum quantity allowed in a corridor within a control area shall be 10 gallons (37.85 L).
4. The minimum corridor width shall be 72 inches (1829 mm).
5. Projections into a corridor shall be in accordance with Section 1003.3.3.

Reason: The original proposal to allow limited quantities of Class I and II liquid alcohol rubs in corridors did not include aerosols because they were not addressed in the supporting documentation. This exclusion is appropriate for Level 2 and Level 3 aerosols but not Level 1. Level 1 aerosols are treated as ordinary combustibles by the Fire Code. The alcohol component is no different than that considered in the original approval. The concern of bursting is not relevant because the temperatures in the corridor that would result in a can burst would be so high that the corridor would already be untenable.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F191–06/07
3501.1, 3502.1, 3506 (New), 3201.1, 3204.3.1.1, 2209.3.2.5

Proponent: Larry Fluer, Fluer, Inc., representing Compressed Gas Association

1. Revise as follows:

CHAPTER 35
FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

SECTION 3501
GENERAL

3501.1 Scope. The storage and use of flammable gases shall be in accordance with this chapter. Compressed gases shall also comply with Chapter 30 and cryogenic fluids shall also comply with Chapter 32. Bulk hydrogen compressed gas systems ~~Gaseous~~ and bulk liquefied hydrogen gas systems shall also comply with NFPA 55.

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 606).
2. Liquefied petroleum gases and natural gases regulated by Chapter 38.
3. Fuel-gas systems and appliances regulated under the *International Fuel Gas Code*.
4. Hydrogen motor fuel-dispensing stations and repair garages and above ground hydrogen storage systems designed and constructed in accordance with Chapter 22.
5. Pyrophoric gases in accordance with Chapter 41.

3502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

Bulk Hydrogen Compressed Gas System. An assembly of equipment, consisting of but not limited to, storage containers, pressure regulators, pressure relief devices, vaporizers, manifolds, and piping, with a storage capacity of more than 400 ft3 (scf) (11 m3) of compressed hydrogen gas including unconnected reserves integral to the system. The bulk system terminates at the point where the gas supply, at service pressure, first enters the supply line. The containers are either stationary or portable, and the gas is stored as a compressed gas.

Bulk Liquefied Hydrogen Gas System. An assembly of equipment, consisting of but not limited to, storage containers, pressure regulators, pressure relief devices, vaporizers, manifolds, and piping, with a storage capacity of more than 39.7 gal (150 L) of liquefied hydrogen including unconnected reserves integral to the system. The bulk system terminates at the point where the gas supply, at service pressure, first enters the supply line. The containers are either stationary or portable, and the gas is stored as a cryogenic fluid.

2. Add a new Section 3506 by relocating Section 3204.4 to Section 3506.4 without changes and adding new Sections 3506.1, 3506.2 and 3506.3:

SECTION 3506
FLAMMABLE CRYOGENIC FLUIDS

3506.1 General. The storage and use of flammable cryogenic fluids shall be in accordance with Section 3506.2 through 3506.4.8.3 and Chapter 32.

3506.2 Limitations. Storage of flammable cryogenic fluids in stationary containers outside of buildings is prohibited within the limits established by law as the limits of districts in which such storage is prohibited (see Section 3 of the Sample Ordinance for Adoption of the *International Fire Code* on page v).

3506.3 Aboveground tanks for liquid hydrogen. Aboveground tanks for the storage of liquid hydrogen shall be in accordance with Section 3506.3.

3506.3.1 Construction of the inner vessel. The inner vessel of storage tanks in liquid hydrogen service shall be designed and constructed in accordance with Section VIII, Division 1 of the ASME *Boiler and Pressure Vessel Code* and shall be vacuum jacketed in accordance with Section 3506.3.2.

3506.3.2 Construction of the vacuum jacket (outer vessel). The vacuum jacket used as an outer vessel for storage tanks in liquid hydrogen service shall be of welded steel construction designed to withstand the maximum internal and external pressure to which it will be subjected under operating conditions to include conditions of emergency pressure relief of the annular space between the inner and outer vessel. The jacket shall be designed to withstand a minimum collapsing pressure differential of 30 psi (207 kPa).

3506.3.2.1 Vacuum level monitoring. A connection shall be provided on the exterior of the vacuum jacket to allow measurement of the pressure within the annular space between the inner and outer vessel. The connection shall be fitted with a bellows-sealed or diaphragm type valve equipped with a vacuum gauge tube that is shielded to protect against damage from impact.

~~**3204.4**~~ **3506.4 Underground tanks for liquid hydrogen.** Underground tanks for the storage of liquid hydrogen shall be in accordance with Sections ~~3204.4.1~~ 3506.4.1 through ~~3204.5.3~~ 3506.4.8.3.

~~**3204.4.1**~~ **3506.4.1Construction.** Storage tanks for liquid hydrogen shall be designed and constructed in accordance with ASME *Boiler and Pressure Vessel Code* (Section VIII, Division 1) and shall be vacuum jacketed in accordance with Section ~~3204.5~~ 3506.4.8.

~~**3204.4.2**~~ **3506.4.2 Location.** Storage tanks shall be located outside in accordance with the following:

1. Tanks and associated equipment shall be located with respect to foundations and supports of other structures such that the loads carried by the latter cannot be transmitted to the tank.
2. The distance from any part of the tank to the nearest wall of a basement, pit, cellar or lot line shall not be less than 3 feet (914 mm).
3. A minimum distance of 1 foot (1525 mm), shell to shell, shall be maintained between underground tanks.

~~**3204.4.3**~~ **3506.4.3 Depth, cover and fill.** The tank shall be buried such that the top of the vacuum jacket is covered with a minimum of 1 foot (305 mm) of earth and with concrete a minimum of 4 inches (102 mm) thick placed over the earthen cover. The concrete shall extend a minimum of 1 foot (305 mm) horizontally beyond the footprint of the tank in all directions. Underground tanks shall be set on firm foundations constructed in accordance with the *International Building Code* and surrounded with at least 6 inches (152 mm) of noncorrosive inert material, such as sand.

Exception: The vertical extension of the vacuum jacket as required for service connections.

~~3204.4.4~~ 3506.4.4 **Anchorage and security.** Tanks and systems shall be secured against accidental dislodgement in accordance with this chapter.

~~3204.4.5~~ 3506.4.5 **Venting of underground tanks.** Vent pipes for underground storage tanks shall be in accordance with Sections 2209.5.4 and 3203.3.

~~3204.4.6~~ 3506.4.6 **Underground liquid hydrogen piping.** Underground liquid hydrogen piping shall be vacuum jacketed or protected by approved means and designed in accordance with ~~this~~ Chapter 32.

~~3204.4.7~~ 3506.4.7 **Overfill protection and prevention systems.** An approved means or method shall be provided to prevent the overfill of all storage tanks.

~~3204.5~~ 3506.4.8 **Vacuum jacket construction.** The vacuum jacket shall be designed and constructed in accordance with Section VIII of ASME *Boiler and Pressure Vessel Code* and shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. Portions of the vacuum jacket installed below grade shall be designed to withstand anticipated soil, seismic and hydrostatic loading.

~~3204.5.1~~ 3506.4.8.1 **Material.** The vacuum jacket shall be constructed of stainless steel or other approved corrosion-resistant material.

~~3204.5.2~~ 3506.4.8.2 **Corrosion protection.** The vacuum jacket shall be protected by approved or listed corrosion-resistant materials or an engineered cathodic protection system. Where cathodic protection is utilized, an approved maintenance schedule shall be established. Exposed components shall be inspected at least twice a year. Maintenance and inspection events shall be recorded and those records shall be maintained on the premises for a minimum of three years and made available to the fire code official upon request.

~~3204.5.3~~ 3506.4.8.3 **Vacuum level monitoring.** An approved method shall be provided to indicate loss of vacuum within the vacuum jacket(s).

3. Revise as follows:

3201.1 Scope. Storage, use and handling of cryogenic fluids shall comply with this chapter. Cryogenic fluids classified as hazardous materials shall also comply with Chapter 27 for general requirements. Partially full containers containing residual cryogenic fluids shall be considered as full for the purposes of the controls required.

Exceptions:

1. Fluids used as refrigerants in refrigeration systems (see Section 606).
2. Liquefied natural gas (LNG), which shall comply with NFPA 59A.

Oxidizing cryogenic fluids, including oxygen, shall comply with NFPA 55.

Flammable cryogenic fluids, including hydrogen, methane and carbon monoxide, shall comply with NFPA 55 and Chapters 22 and 35 as applicable. Inert cryogenic fluids, including argon, helium and nitrogen, shall comply with CGA P-18.

3204.3.1.1 Location. Stationary containers shall be located in accordance with Section 3203.6. Containers of cryogenic fluids shall not be located within diked areas containing other hazardous materials.

~~Storage of flammable cryogenic fluids in stationary containers outside of buildings is prohibited within the limits established by law as the limits of districts in which such storage is prohibited (see Section 3 of the Sample Ordinance for Adoption of the *International Fire Code* on page v).~~

(Note: Deleted text here becomes new Section 3506.2)

4. Revise as follows:

2209.3.2.5 Liquefied hydrogen storage. Storage of liquefied hydrogen shall be in accordance with Chapter 32 and 35.

Reason: Part 1. NFPA 55 contains material specific provisions for “bulk” hydrogen systems. The term “bulk” has been added to direct the user to the applicable sections of the Standard. Two new definitions have been added to define “bulk liquefied” and “bulk compressed” gas systems where specific details surrounding such installations can be found.

Part 2. Chapter 32 was intended to be a generic chapter for cryogenic fluids. Material specific hazards were to be placed into the appropriate chapter based on the nature of the material. A code change was introduced into the last code cycle (F216-04/05 Fluer, representing CGA) to

relocate the requirements for liquid hydrogen tanks to Chapter 35, however, the necessary correlating changes and references were overlooked and the code change was rejected at the request of the proponent.

The provisions for liquid hydrogen have been proposed to be relocated without change from Chapter 32 to Chapter 35 and placed into a new Section 3506. Section 3506 is the only section in the chapter intended to apply to cryogenic fluids, and hydrogen is the sole cryogenic fluid provided for at this time. The general provisions of Chapter 32 address general design and safeguards. Section 3501.1 has been modified to require that Chapter 32 requirements be applied in addition to the requirements of Section 3506 while recognizing that there are also specific requirements in Chapter 22 that are applicable to service stations. The provisions for underground tanks for liquid hydrogen are applicable to industrial installations. They are not unique to service stations. Therefore, Chapter 35 is the logical choice for locating these provisions given the hazard specific approach to hazardous materials used by the IFC.

Section 3204.3.1.1, paragraph two contains material specific requirements applicable to flammable cryogens that have been relocated to new Section 3506.2 as Chapter 35 applies to flammable gases and cryogens.

Section 3506.3 has been added as a new section to address the requirements for tank construction in a more specific manner than that described by Section 2703.2.1. The requirements for construction for aboveground tanks parallel those found for underground tanks with the exception that the vacuum jacket (outer tank) is not required to be constructed to meet requirements of the ASME Boiler and Pressure Vessel Code. The vacuum jacket is designed to provide an insulated layer around the inner vessel through the use of vacuum and an insulating layer. It is also designed to contain and relieve a release of hydrogen should a leak occur in the annular space. The jacket is designed to a safety factor of two. For underground tanks, the safety factor is increased due to potential loading by the use of ASME requirements where the safety factor of three and a half is used.

The design criteria are found in newly published CGA Standard H-3-2006 Cryogenic Hydrogen Storage. The standard has not yet been submitted for approval into the ANSI process, however, it is available for use by those that seek to establish more detailed design requirements than would otherwise be available through the use of Section 2703.2.1. The minimum design requirements established by Section 3506.3 coupled with the general requirements of Chapter 32 applicable to all cryogens improve the code resulting in greater consistency and an increase in public safety.

Approval of this code change will maintain Chapter 32 as a generic chapter applicable to all cryogens while placing material specific requirements into the material specific chapters as desired.

Part 3. References are added to Chapter 22 and 35 as requirements for liquid hydrogen systems are also found in these chapters. Section 3204.3.1.1 has been moved to Section 3506.2 without change.

Part 4. Reference is made to Chapter 35 which contains requirements for underground tanks used for liquid hydrogen.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

F192–06/07

3503.1.1, 4003.1.1.3

Proponent: Jeffrey M. Shapiro, P.E., International Code Consultants, representing himself

Revise as follows:

3503.1.1 Special limitations for indoor storage and use. Flammable gases shall not be stored or used in Group A, ~~B,~~ E, I or R occupancies or in offices in Group B occupancies.

Exceptions:

1. Cylinders not exceeding a capacity of 250 cubic feet (7.08 m3) each at normal temperature and pressure (NTP) used for maintenance purposes, patient care or operation of equipment.
2. Food service operations in accordance with Section 3803.2.1.7.

4003.1.1.3 Oxidizing gases. Except for cylinders not exceeding a capacity of 250 cubic feet (7 m^3) each used for maintenance purposes, patient care or operation of equipment, oxidizing gases shall not be stored or used in Group A, ~~B,~~ E, I, or R occupancies or in offices in Group B occupancies..

The aggregate quantities of gases used for maintenance purposes and operation of equipment shall not exceed the maximum allowable quantity per control area listed in Table 2703.1.1(1).

Medical gas systems and medical gas supply cylinders shall also be in accordance with Section 3006.

Reason: The revision corrects an error dating back to the UFC provisions that served as the source for the original IFC during the drafting process. Code Change F169-00, which was approved several years ago, fully documented the history of the UFC error and corrected the regulated occupancy classes to be consistent with the code's intent. However, text to limit application of this restriction to offices in Group B was overlooked in F169-00. Staff pointed out the oversight last year, and this proposal is submitted to correct the problem. The current text prevents small laboratories or other non-office uses classified as Group B from having MAQ amounts of flammable or oxidizing gases, which was never intended.

Cost Impact: The code change proposal would reduce the cost of construction.

Public Hearing:	Committee	AS	AM	D
	Assembly:	ASF	AMF	DF

F193–06/07
Table 3504.2.1

Proponent: Paul J. Buehler, Jr., Plug Power, Inc.

Revise table as follows:

TABLE 3504.2.1
FLAMMABLE GASES – DISTANCE FROM STORAGE TO EXPOSURES

MAXIMUM AMOUNT PER STORAGE AREA (cubic feet)	MINIMUM DISTANCE BETWEEN STORAGE AREAS (feet)	MINIMUM DISTANCE TO LOT LINES OF PROPERTY THAT CAN BEBUILT UPON (feet) [a]	MINIMUM DISTANCE TO PUBLIC ALLEYS OR PUBLIC WAYS (feet) [a]	MINIMUM DISTANCE TO BUILDINGS ON THE SAME PROPERTY LINE		
				Nonrated construction or openings within 25 feet	2-hour construction and no openings within 25 feet	4-hour construction and no openings within 25 feet
0 – 4,225 [b, c]	5	5	5	5	0	0

a. (No change to current text)
b. Network Equipment Building Standards (NEBS) rated telecommunications cabinets or enclosures shall be permitted to be located within 5 feet (1520 mm) of outdoor hydrogen storage cabinets.
c. National Electrical Manufacturers Association (NEMA) rated outdoor transfer switches shall be permitted to be located within 5 feet (1520 mm) of outdoor hydrogen storage cabinets, provided that the device is no taller than 4 feet (1220 mm) above finished grade.

(Portions of table and footnotes not shown do not change)

Reason: Revise outdated material because current International Fire Code and NFPA 55 sections do not deal with the storage of bottled hydrogen out of doors inside cabinets, but rather only consider "naked" cylinders or indoor gas cabinets per Sections 2703.8.6 and 3006.2.3.

This amendment is to facilitate the placement of bottled hydrogen in proximity to low powered electrical equipment meeting only the highest standards of the telecommunications industry. This is superior to current code language because it deals with increasingly common use of a flammable gas in frequently encountered situations. Current work in the fuel cell industry has indicated that hydrogen fuel must fit into locations not anticipated in prior revisions to the codes. Therefore, the fuel cell industry is performing basic research and testing on fuel cells and the associated hydrogen storage. This testing has led to several conclusions: that hydrogen gas is not as flammable as once thought; and that methods of enclosure for telecommunications equipment have not been duly noted by existing codes. Therefore, this amendment attempts to include both of these facets into the upcoming code.

Substantiation: Cabinets meeting Telcordia NEBS criteria are certified for use in locations likely to encounter gun shot, brush fire, and/or earthquake hazards. Telecommunications equipment is also effectively sealed inside weather-proof and EMI rated cabinets. The enclosed telecommunications equipment is low power and is not an ordinary arc/spark hazard, although it is not usually considered to be intrinsically safe. Likewise, stored hydrogen cylinders located inside a cabinet meeting the same standards are protected from the same brush fire, gun shot and earthquake hazards as the telecommunications equipment.

Current hydrogen research by Swain and Tchouvelev has yielded data suggesting that hydrogen gas does not sink and pool, but rather dissipates upward quickly in open air. Furthermore, fully charged standard gas cylinders evacuate (blow down) in between 100 and 120 seconds. Thus, the exposure time is limited to this blow down period.

Current design Outdoor Hydrogen Storage Cabinets thus protect stored hydrogen in a manner which was not anticipated previously. Furthermore, there are other safeguards built into such cabinets. The stored hydrogen is connected to some device which consumes the hydrogen through the use of valves, regulators and piping.

A small or large leak internal to the Outdoor Hydrogen Storage Cabinet will result in a buoyant release of hydrogen gas through the ridge vent. Such a leak could be the result of a Pressure Relief Device (PRD) activation, or as the result of a plumbing failure at a weld or threaded connection, etc. The leaked hydrogen gas will then buoyantly exit at the elevation of the ridge vent, nominally 70+ inches above finished grade and dissipate into the atmosphere quickly. This is in stark contrast to a PRD release on a bottle not inside a container, which would result in hydrogen gas being expelled in a plane parallel to the long side of the bottle as jets in four directions.

Likewise, there are safeguards against leaks between the Outdoor Hydrogen Storage Cabinet and the hydrogen consuming device. In the event that there is a plumbing rupture, an excess flow valve operates which then sends the hydrogen up the vent stack for a sonic release. The vent stack is designed and oriented following CGA 5.5 guidelines. The amount of hydrogen expelled through the leaking hose will be just the amount in the plumbing in between the excess flow valve and the consuming device. One such Outdoor Hydrogen Storage Cabinet utilizes ¼" diameter tubing (6.35 mm) with a length of approximately 124 inches (3149.6 mm), rendering a volume of 6.1 cubic inches (99.75 cm^3).

Assume that the majority of the plumbing is internal to the Outdoor Hydrogen Storage Cabinet except for the last 6 inches (152.4 mm) and that in the worst case the connection hose is essentially on the ground or very close to the ground. Thus, if a 5 foot (1524 mm) radius were to be drawn around such a hose, it would depict a hemisphere (as the hose is near to the ground). The volume of such a hemisphere is 452,389 cubic inches (7,414,655 cm^3). Therefore, the volume of expelled hydrogen is 1.34×10^{-7} % of the hemisphere's volume; this is clearly less than 4% LFL in free air.

Bibliography:
International Journal of Hydrogen Energy 30 (2005) 1447 – 1455, M.R. Swain, et.al, *Ignition of lean hydrogen – air mixtures*
"An Experimental Investigation into the Ignition of Leaking Hydrogen", M.R. Swain, Unpublished
Telcordia GR-487-CORE, *Generic Requirements for Electronic Equipment Cabinets*
"Hydrogen Clearance Distances", Stuart Energy Systems Corporation, 12 Sep 2004

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F194–06/07
3506 (New), 3502.1 (New)

Proponent: Larry Fluer, Fluer, Inc., representing Compressed Gas Association

1. Add new section as follows:

SECTION 3506
METAL HYDRIDE STORAGE SYSTEMS

3506.1 General requirements. The storage and use of metal hydride storage systems shall be in accordance with Sections 3501, 3503, 3504, 3505 and 3506. Those portions of the system that are used as a means to store or supply hydrogen shall also comply with Chapters 27 and 30 as applicable.

3506.1.1 Classification. The hazard classification of the metal hydride storage system, as required by Section 2701.2.2, shall be based on the hydrogen stored without regard to the metal hydride content.

3506.1.2 Listed or approved systems. Metal hydride storage systems shall be listed or approved for the application and designed in a manner that prevents the addition or removal of the metal hydride by other than the original equipment manufacturer.

3506.1.3 Containers, design and construction. Compressed gas containers, cylinders and tanks shall be designed and constructed in accordance with Section 3003.2.

3506.1.4 Service life and inspection of containers. Metal hydride storage system cylinders, containers or tanks shall be inspected, tested and requalified for service at not less than five year intervals.

3506.1.5 Marking and labeling. Marking and labeling of cylinders, containers, tanks and systems shall be in accordance with Section 3003.4 and the following:

3506.1.5.1 System marking. Metal hydride storage systems shall be marked with the following.

1. Manufacturer's name.
2. Service life indicating the last date the system can be used.
3. A unique code or serial number specific to the unit.
4. System name or product code that identifies the system by the type of chemistry used in the system.
5. Emergency contact name, telephone number or other contact information, and
6. Limitations on refilling of containers to include rated charging pressure and capacity.

3506.1.5.2 Valve marking. Metal hydride storage system valves shall be marked with the following:

1. Manufacturer's name.
2. Service life indicating the last date the valve can be used, and
3. Metal hydride service in which the valve can be used, or a product code that is traceable to this information.

3506.1.5.3 Pressure relief device marking. Metal hydride storage system pressure relief devices shall be marked with the following:

1. Manufacturer's name.
2. Metal hydride service in which the device can be used, or a product code that is traceable to this information, and
3. Activation parameters to include temperature, pressure or both.

3506.1.5.3.1 Pressure relief devices integral to container valves. The required markings for pressure relief devices that are integral components of valves used on cylinders, containers and tanks shall be allowed to be placed on the valve.

3506.1.5.4 Pressure vessel markings. Cylinders, containers and tanks used in metal hydride storage systems shall be marked with the following:

1. Manufacturer's name.
2. Design specification to which the vessel was manufactured.
3. Authorized body approving the design and initial inspection and test of the vessel.
4. Manufacturer's original test date.

5. Unique serial number for the vessel.
6. Service life identifying the last date the vessel can be used, and
7. System name or product code that identifies the system by the type of chemistry used in the system.

3506.1.6 Temperature extremes. Metal hydride storage systems, whether full or partially full, shall not be exposed to artificially created high temperatures exceeding 125°F (52°C) or subambient (low) temperatures unless designed for use under the exposed conditions.

3506.1.7 Falling objects. Metal hydride storage systems shall not be placed in areas where they are capable of being damaged by falling objects.

3506.1.8 Piping systems. Piping, including tubing, valves, fittings and pressure regulators, serving metal hydride storage systems shall be maintained gas tight to prevent leakage.

3506.1.8.1 Leaking systems. Leaking systems shall be removed from service.

3506.1.9 Refilling of containers. The refilling of listed or approved metal hydride storage systems shall be in accordance with the listing requirements and manufacturers' instructions.

3506.1.9.1 Industrial trucks. The refilling of metal hydride storage systems serving powered industrial trucks shall be in accordance with Section 309.

3506.1.9.2 Hydrogen purity. The purity of hydrogen used for the purpose of refilling containers shall be in accordance with the listing and the manufacturer's instructions.

3506.1.10 Electrical. Electrical components for metal hydride storage systems shall be designed, constructed, and installed in accordance with the *ICC Electrical Code*.

3506.2 Portable containers or systems. Portable containers or systems shall comply with Section 3506.2.1 through 3506.2.2.

3506.2.1 Securing containers. Containers, cylinders and tanks shall be secured in accordance with Section 3003.5.3.

3506.2.1.1 Use on mobile equipment. Where a metal hydride storage system is used on mobile equipment the equipment shall be designed to restrain containers, cylinders or tanks from dislodgement, slipping or rotating when the equipment is in motion.

3506.2.1.2 Motorized equipment. Metal hydride storage systems used on motorized equipment shall be installed in a manner that protects valves, pressure regulators, fittings and controls against accidental impact.

3506.2.1.2.1 Protection from damage. Metal hydride storage systems including cylinders, containers, tanks and fittings shall not extend beyond the platform of the mobile equipment.

3506.2.2 Valves. Valves on containers, cylinders and tanks shall remain closed except when containers are connected to closed systems and ready for use.

2. Add new definitions as follows:

3502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

METAL HYDRIDE STORAGE SYSTEM. A closed system consisting of a group of components assembled as a package to contain metal-hydrogen compounds for which there exists an equilibrium condition where the hydrogen-absorbing metal alloy(s), hydrogen gas, and the metal-hydrogen compound(s) co-exist and where only hydrogen gas is released from the system in normal use.

METAL HYDRIDE. A generic name for compounds composed of metallic element(s) and hydrogen.

Reason: A definition and a statement for classification of metal hydride storage systems were added to the 2004 Supplement with the approval of F181-03/04 (ICC Ad Hoc Committee for Hydrogen Gas and Texaco/Ovonic Hydrogen). The definition and classification statement were removed by actions taken under code change F236-04/05 (G. Victor, City of Glendale, AZ). Public comments issued by proponents Boucard (Energy Conversion Devices, Inc.) and Shine, (Jadoo Power systems) to overturn the committee action under F236-04/05 were rejected by the membership during the final code action hearings.

The text as it appeared in the 2004 supplement that was later removed was as follows:

METAL HYDRIDE STORAGE SYSTEM. A system for the storage of hydrogen gas absorbed in solid material.

3503.1.6 Hydrogen gas absorbed in solids. The hazard classification of the metal hydride storage system, as required by Section 2701.2.2, shall be based on the hydrogen stored without regard to the metal hydride content.

3503.1.6.1 Listed system. Metal hydride storage systems shall be listed for the application and designed in a manner that prevents the removal of the metal hydride.

The committee approved the deletion of the above text based on the fact that it leads the code official to believe that there are listed systems available when, in fact there were none. In addition, standards for testing and listing of the systems were not yet final. In support of the action to strike the language from the code the committee suggested, in pertinent part, that until such time as there were listing standards…"it would be better if the code included, in codified form, the safeguards that are currently used by the industry for the systems that are currently in use in the field."

The code change now proposed by the Compressed Gas Association (CGA) is an effort to bring the parties to consensus in a manner that recognizes the presence of these unique systems, and to place fundamental requirements in the code to address their use.

The technical argument presented by the ICC Hydrogen Ad Hoc Committee and Texaco/Ovonic Hydrogen under F181-03/04 regarding the classification of containers used to absorb hydrogen was valid. Specifically, the primary hazard of the container is its hydrogen content, and not the metal hydride solid which is used as an absorbent. The weakness in the approach may have been the lack of clear direction regarding requirements for the construction of the vessels used to contain the metal hydride and the absorbed hydrogen gas as well as confusion as to the intent of the proponents with respect to how to apply the code to these containers.

In the last code cycle a new section was added to Chapter 30 that specifies the design and construction of cylinders, containers and tanks used to hold compressed gases (Section 3003.2). The code change proposal requires that containers be designed to meet requirements of DOTn 49 CFR or ASME Boiler and Pressure Vessel Code, Section VIII. The use of these design requirements will ensure that the containers used to contain the metal hydride are of robust construction. Containers meeting the reference standards are required to meet specified tests for impact, fire, drop and other physical hazards to ensure that they do not rupture due to events where they are exposed to common physical abuse.

Placement into Chapter 35 places these materials under the requirements of Chapter 30 (Compressed Gases). See 3501.1. In doing so, all of the requirements attendant to compressed gas containers, cylinders and tanks apply thereby alleviating some of the expressed concerns regarding the nature of the containers to be used as well as specialized controls such as pressure relief systems, valves and fittings. In addition, under the requirements of proposed Section 3506.1 the systems are required to comply with the requirements of Chapter 27. The oddity is that based on the classification as a flammable gas only and the provisions other physical or health hazard categories including that of pyrophoric, water reactive, or other hazards will not apply.

The closest analogy that can be made with respect to the code approach in treating the hazard is that of acetylene, a compressed gas that is dissolved in acetone or dimethylformamide. These solvents are Class IB flammable liquid and Class II combustible liquids respectively. However, in practice it is the flammable gas hazard that is regulated, and the solvent into which the gas is absorbed has not been independently assessed. The established reason for doing this is that the control strategy for the compressed gas hazard is suitable for that of the solvent hazard.

The control strategy for metal hydride systems, therefore, is heavily dependent on the control strategy for all compressed gases. However, a number of the control procedures have been drawn into Chapter 35 in order to focus on fundamental controls that might otherwise be missed by code users. In addition provisions have been added to address refilling of containers including containers that may be used on powered industrial trucks (now included in the code in Section 309).

The early use of these systems has been as a means to supply power attendant to portable equipment. Specific safeguards have been included to address the security of containers in mobile as well as motorized equipment. Fundamental controls for motorized equipment have been drawn in part from NFPA 505 Powered Industrial Trucks (Referenced in Chapter 45) as used for LPG.

There may be other controls that may be developed over time for systems of this nature, however, a starting point is needed to recognize this new technology and a fundamental set of controls can accommodate the need.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F195–06/07
3602.1

Proponent: Tom Christman, Caryville, TN, representing himself

Delete definition and substitute as follows:

3602.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

~~**MAGNESIUM.** The pure metal and alloys, of which the major part is magnesium.~~

COMBUSTIBLE METAL: Any metal composed of distinct particles or pieces, regardless of size, shape, or chemical composition, that will burn.

Reason: The change in definition will address all combustible metals and not be limited to magnesium. Many combustible metals are currently being used in general industry. The current wording of the section is restrictive in that it only addresses one of the combustible metals, magnesium. The hazards of other combustible metals are well known. The primary hazards of combustible metals are fire and explosions. The change in the definition and the follow-up proposal to revise Section 3606 would help to ensure that the hazards associated with combustible metals in general are being mitigated.

The change in definition from Magnesium to Combustible Metal will serve the IFC well by addressing the hazards associated with all combustible metals. The current definition is limited to one metal and its primary alloys. The potential for a fire/explosion with the other combustible metals is as likely to happen as it is with magnesium. The change in definition scope will allow the IFC to address the fire and explosion potential of many combustible metals rather than just magnesium.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F196–06/07
3605.1, 3605.2 (New)

Proponent: Tom Christman, Caryville, TN, representing himself

1. Revise as follows:

3605.1 General. The use of flammable solids in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(1) or 2703.1.1(3) shall be in accordance with Sections 2701, 2703, 2705 and this chapter. ~~The use of magnesium shall be in accordance with Section 3606.~~

2. Add new text as follows:

3605.2 Combustible metals. The use of combustible metals shall be in accordance with Section 3606.

Reason: The revised wording of the section will provide a broader scope than just the use of magnesium. The new wording will ensure that guidelines for the mitigation of hazards associated with combustible metals are included in the IFC.

The current wording of the section only provides a limited scope to one combustible metal, magnesium. The revised wording of the section will provide a scope that will include other commonly used combustible metals that present similar fire and explosion hazards as do magnesium. The adding of the new section number is added for editorial clarity and user convenience.

The fire and explosion hazards associated with other combustible metals not identified in the current edition of the IFC are similar in nature to those hazards posed by magnesium. The changing of the wording for this section will increase the scope of the IFC to cover other combustible metals that also pose hazards to the employees, employers, and to the general public. If the hazards of magnesium are sufficient enough to address them in Section 3606, it would also be appropriate to address similar fire and explosion hazards of other combustible metals that are commonly used. These other combustible metals are frequently found in small machine shops, fabrication facilities, recycling plants, and other second or third hand users of the combustible metals. The hazards associated with combustible metals are not general understood outside of the primary producers of the metals. It is important to propagate the knowledge of known hazards of combustible metals throughout the jurisdiction where such metals are being used, processed, stored, recycled, etc.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F197–06/07
3606

Proponent: Tom Christman, Caryville, TN, representing himself

Delete and substitute as follows:

SECTION 3606
MAGNESIUM

~~**3606.1 General.** Storage, use, handling and processing of magnesium, including the pure metal and alloys of which the major part is magnesium, shall be in accordance with Chapter 27 and Sections 3602.2 through 3606.8.~~

~~**3606.2 Storage of magnesium articles.** The storage of magnesium shall comply with Sections 3606.2.1 through 3606.4.3.~~

~~**3606.2.1 Storage of greater than 50 cubic feet.** Magnesium storage in quantities greater than 50 cubic feet (1.4m3) shall be separated from storage of other materials that are either combustible or in combustible containers by aisles. Piles shall be separated by aisles with a minimum width of not less than the pile height.~~

~~**3606.2.2 Storage of greater than 1,000 cubic feet.** Magnesium storage in quantities greater than 1,000 cubic feet (28 m^3) shall be separated into piles not larger than 1,000 cubic feet (28 m^3) each. Piles shall be separated by aisles with a minimum width of not less than the pile height. Such storage shall not be located in nonsprinklered buildings of Type III, IV or V construction, as defined in the *International Building Code*.~~

~~**3606.2.3 Storage in combustible containers or within 30 feet of other combustibles.** Where in nonsprinklered buildings of Type III, IV or V construction, as defined in the *International Building Code*, magnesium shall not be stored in combustible containers or within 30 feet (9144 mm) of other combustibles.~~

~~**3606.2.4 Storage in foundries and processing plants.** The size of storage piles of magnesium articles in foundries and processing plants shall not exceed 1,250 cubic feet (25 m^3). Piles shall be separated by aisles with a minimum width of not less than one-half the pile height.~~

3606.3 Storage of pigs, ingots and billets. The storage of magnesium pigs, ingots and billets shall comply with Sections 3606.3.1 and 3606.3.2.

3606.3.1 Indoor storage. Indoor storage of pigs, ingots and billets shall only be on floors of noncombustible construction. Piles shall not be larger than 500,000 pounds (226.8 metric tons) each. Piles shall be separated by aisles with a minimum width of not less than one-half the pile height.

3606.3.2 Outdoor storage. Outdoor storage of magnesium pigs, ingots and billets shall be in piles not exceeding 1,000,000 pounds (453.6 metric tons) each. Piles shall be separated by aisles with a minimum width of not less than one-half the pile height. Piles shall be separated from combustible materials or buildings on the same or adjoining property by a distance of not less than the height of the nearest pile.

3606.4 Storage of fine magnesium scrap. The storage of scrap magnesium shall comply with Sections 3606.4.1 through 3606.4.3.

3606.4.1 Separation. Magnesium fines shall be kept separate from other combustible materials.

3606.4.2 Storage of 50 to 1,000 cubic feet. Storage of fine magnesium scrap in quantities greater than 50 cubic feet (1.4 m3) [six 55-gallon (208 L) steel drums] shall be separated from other occupancies by an open space of at least 50 feet (15 240 mm) or by a fire barrier constructed in accordance with the *International Building Code*.

3606.4.3 Storage of greater than 1,000 cubic feet. Storage of fine magnesium scrap in quantities greater than 1,000 cubic feet (28m3) shall be separated from all buildings other than those used for magnesium scrap recovery operations by a distance of not less than 100 feet (30 480 mm).

3606.5 Use of magnesium. The use of magnesium shall comply with Sections 3606.5.1 through 3606.5.8.

3606.5.1 Melting pots. Floors under and around melting pots shall be of noncombustible construction.

3606.5.2 Heat-treating ovens. Approved means shall be provided for control of magnesium fires in heat treating ovens.

3606.5.3 Dust collection. Magnesium grinding, buffing and wire brushing operations, other than rough finishing of castings, shall be provided with approved hoods or enclosures for dust collection which are connected to a liquid-precipitation type of separator that converts dust to sludge without contact (in a dry state) with any high-speed moving parts.

3606.5.3.1 Duct construction. Connecting ducts or suction tubes shall be completely grounded, as short as possible, and without bends. Ducts shall be fabricated and assembled with a smooth interior, with internal lap joints pointing in the direction of airflow and without unused capped side outlets, pockets or other dead-end spaces which allow an accumulation of dust.

3606.5.3.2 Independent dust separators. Each machine shall be equipped with an individual dust-separating unit.

Exceptions:

1. One separator is allowed to serve two dust-producing units on multiunit machines.
2. One separator is allowed to serve not more than four portable dust-producing units in a single enclosure or stand.

3606.5.4 Power supply interlock. Power supply to machines shall be interlocked with exhaust airflow, and liquid pressure level or flow. The interlock shall be designed to shut down the machine it serves when the dust removal or separator system is not operating properly.

3606.5.5 Electrical equipment. Electric wiring, fixtures and equipment in the immediate vicinity of and attached to dust-producing machines, including those used in connection with separator equipment, shall be of approved types and shall be approved for use in Class II, Division 1 hazardous locations in accordance with the ICC *Electrical Code*.

3606.5.6 Grounding. Equipment shall be securely grounded by permanent ground wires in accordance with the ICC *Electrical Code*.

3606.5.7 Fire-extinguishing materials. Fire-extinguishing materials shall be provided for every operator performing machining, grinding or other processing operation on magnesium as follows:

~~1. Within 30 feet (9144 mm), a supply of extinguishing materials in an approved container with a hand scoop or shovel for applying the material; or~~
~~2. Within 75 feet (22 860 mm), a portable fire extinguisher complying with Section 906.~~

~~All extinguishing materials shall be approved for use on magnesium fires. Where extinguishing materials are stored in cabinets or other enclosed areas, the enclosures shall be openable without the use of a key or special knowledge.~~

~~**3606.5.8 Collection of chips, turnings and fines.** Chips, turnings and other fine magnesium scrap shall be collected from the pans or spaces under machines and from other places where they collect at least once each working day. Such material shall be placed in a covered, vented steel container and removed to an approved location.~~

3606.1 Combustible metals. Storage, use, handling, and processing of combustible metals shall be in accordance with the requirements of NFPA 484.

Reason: The proposed change will provide as broader scope for addressing the hazards of combustible metals in general rather than having a limited scope of just magnesium that is currently address by the IFC.

The current scope of Section 3606.2 is limited to address the hazards of magnesium. There are several other common combustible metals that being used within general industry. Other combustible metals include: aluminum, alkali metals (lithium, sodium, potassium, sodium/potassium (NaK)), niobium, tantalum, titanium, and zirconium. The hazards of these combustible metals are as important to address as are the hazards of magnesium. The proposed change would provide a means to supply the necessary mitigating requirements to designer, operators, and enforcement officials to ensure that combustible metals are use, stored, handled, and processed in a safe manner.

Combustible metals are becoming common place in many jurisdictions. All of the combustible metals pose hazards to employees, employers, and the general public if safety precautions are not implemented. Primary manufacturers of the metals must ensure the safety of their facility for continued operations. Primary producers are usually regulated very closely by insurance requirement. Secondary users of combustible metals are generally not as aware of the hazards of the combustible metals and therefore may not incorporate necessary safety requirements into the design and operations of facilities. This has resulted in fires and explosions that were unnecessary and more importantly preventative.

The IFC currently addresses the hazards associated with magnesium. The proposed change for Section 3606.2 would recognize that hazards exist for all of the combustible metals and that they must be mitigated to ensure the safety of employees, employers, and the general public. The proposed change to the section would reference NFPA 484, Combustible Metals. This Standard addresses the specific hazards for aluminum, alkali metals, magnesium, niobium, tantalum, titanium, and zirconium. The referenced Standard also provides two important chapters. One chapter provides general requirements for other metals that are known or found to be combustible. A chapter is also provided that outlines the necessary testing requirements to determine if a metal, given a specific particle size, is classified as a combustible metal.

The revised wording of Section 3606.2 also provided for common set of requirements for combustibles metals that are processed. When combustible metals are processed, some of the operations produce either dust or powder as a product or produce was is more commonly known as fugitive dust. Most producers are very careful to control dust or powder that is a produce because of lost revenue from the lost product. However, fugitive dust is generally a housekeeping issue that many times does not get the attention that is needed to prevent an accident. The IFC has recognized this hazard and it is addressed in Section 1304.1. The requirement reads: “The fire code official is authorized to enforce applicable provisions of the codes and standards listed in Table 1304.1 to prevent and control dust explosions. Table 1304.1 references NFPA 484, Combustible Metals. If the fire code official is authorized to enforce the Standard then it would be reasonable to expect that designers and operators of such facilities would be expected to follow the same set of requirements that the IFC gives to the fire code official to enforce.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F198–06/07
3704.2.2.7

Proponent: Jennifer Bower, Orange County, CA, Fire Authority, representing North/South Fire Prevention Officers

Revise as follows:

3704.2.2.7 Treatment systems. The exhaust ventilation from gas cabinets, exhausted enclosures and gas rooms, and local exhaust systems required in Sections 3704.2.2.4 and 3704.2.2.5 shall be directed to a treatment system. The treatment system shall be utilized to handle the accidental release of gas and to process exhaust ventilation. The treatment system shall be designed in accordance with Sections 3704.2.2.7.1 through 3704.2.2.7.5 and Section 510 of the *International Mechanical Code*.

Exceptions~~s~~: ~~1.~~ Highly toxic and toxic gases—storage. A treatment system is not required for cylinders, containers and tanks in storage when all of the following controls are provided:

~~1.~~1. Valve outlets are equipped with gas-tight outlet plugs or caps.
~~1.~~2. Handwheel-operated valves have handles secured to prevent movement.
~~1.~~3. Approved containment vessels or containment systems are provided in accordance with Section 3704.2.2.3 .

~~2. Toxic gases—use. Treatment systems are not required for toxic gases supplied by cylinders or portable tanks not exceeding 660 gallons (2 498 L) liquid capacity when the following are provided:~~
~~2.1. A gas detection system with a sensing interval not exceeding 5 minutes.~~

2.2. An approved automatic-closing fail-safe valve located immediately adjacent to cylinder valves. The fail-safe valve shall close when gas is detected at the permissible exposure limit (PEL) by a gas detection system monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room. The gas detection shall comply with Section 3704.2.2.10 .

Reason: We proposed that the California State Fire Marshal in the adoption of the 2006 California Fire Code, delete Exception 2 of IFC Section 3704.2.2.7 Treatment Systems. It is our feeling that although Exception 1 utilizes new and available technologies, Exception 2 substantially reduces Community and Emergency Responder Safety. Elimination of abatement or containment systems for Toxic Gases reduces the current standard of care and exposes the local community to extraordinary Health Hazards. Although the utilization of a modern shut off valve is a positive step, there are toxic leak paths that exist around the valve and through other appurtenances.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F199–06/07
3704.2.2.7

Proponents: Kent Miller, representing City of Stockton, CA Fire Department, Paul Inouye, representing City of Milpitas, CA Fire Department & Ron Keefer, City of Menlo Park, CA Fire Department

Revise as follows:

3704.2.2.7 Treatment systems. The exhaust ventilation from gas cabinets, exhausted enclosures, gas rooms and local exhaust systems required in Sections 3704.2.2.4 and 3704.2.2.5 shall be directed to a treatment system. The treatment system shall be utilized to handle the accidental release of gas and to process exhaust ventilation. The treatment system shall be designed in accordance with Sections 3704.2.2.7.1 through 3704.2.2.7.5 and Section 510 of the *International Mechanical Code*.

Exceptions:

1. Highly toxic and toxic gases—storage. A treatment system is not required for cylinders, containers and tanks in storage when all of the following controls are provided:
   1.1. Valve outlets are equipped with gas-tight outlet plugs or caps.
   1.2. Handwheel-operated valves have handles secured to prevent movement.
   1.3. Approved containment vessels or containment systems are provided in accordance with Section 3704.2.2.3.
2. Toxic gases—use. Treatment systems are not required for toxic gases supplied by cylinders or portable tanks not exceeding 1,700 pounds (772 kg) water capacity when the following are provided:
   2.1. A gas detection system with a sensing interval not exceeding 5 minutes.
   2.2. An approved automatic closing fail safe valve located immediately adjacent to cylinder or portable tank valves. The fail-safe valve shall close when gas is detected at the PEL by a gas detection system monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room. The gas detection system shall comply with Section 3704.2.2.10.

Reason: Attached are two Aloha dispersion models for chlorine, one for a 150-pound cylinder and the second for a one-ton container. A leak from a 1/8-inch hole in a pipe (very conservative hole) is assumed. The model predicts that IDLH levels would be reached for up to 118 and 125 yards respectively. This would occur if the shut off valve required in Section 3704.2.2.7 of the 2003 ICC failed. If the valve operated as designed, there would still be at least a 5 minute interval with the chlorine being released at its' fastest rate due to cylinder pressure; extrapolating this produces an IDLH atmosphere approximately 17yards and 12 yards from the leak point in the first 5 minutes. I have discounted any dilution from local exhaust that may be required due to minimal exhaust rate.

With our current level of protection (2001CFC) a treatment system is required to perform such that at point of discharge no level shall exceed ½ IDLH, this will occur if shutoff valve or monitoring system operates or not.

Monitoring systems and shutoff valves have failed and with the current ICC, no mitigating measures will be performed. Even if the systems perform as designed, you will still have an IDLH atmosphere for at least 5 minutes in an area adjacent to the leak source. With our current level of protection you have the monitoring system, shutoff valve and treatment system mitigation that provides automatic mitigation in the event of sensor or valve failure.

It is our feeling that although Exception 1 utilizes new and available technologies, Exception 2 substantially reduces Community and Emergency Responder Safety. Elimination of abatement or containment systems for Toxic Gases reduces the current standard of care and exposes the local community to extraordinary Health Hazards. Although the utilization of a modern shut off valve is a positive step. There are toxic leak paths that exist around the valve the through other appurtenances.

This proposed change does not duplicate or overlap the Building Standards.

This proposed change simply maintains the current Standard of Care.

This Change is in the public interest by continuing to provide community safety in the event of a Toxic gas release.

The cost to the public is negligible and consistent with the current safeguards.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F200–06/07
3705.1

Proponents: Kent Miller, representing City of Stockton, CA Fire Department; Paul Inouye, representing City of Milpitas, CA Fire Department; Ron Keefer, City of Menlo Park, CA Fire Department

Revise as follows:

3705.1 Scope. Ozone gas generators having a maximum ozone-generating capacity of 0.5 pound (0.23 kg) or more over a 24-hour period shall be in accordance with this section.

Exceptions~~:~~ ~~1.~~ Ozone-generating equipment used in Group R-3 occupancies.
~~2. Ozone-generating equipment used in Group H-5 occupancies.~~

Reason: This proposal will delete exception #2 that exempts H-5 Occupancies from the safeguards required by this Section for Ozone Gas generating equipment. Since the semiconductor industry uses Ozone Gas generators, which is a Fire Code defined Highly Toxic Gas, they should be included in the safeguards provided by this Section of the Code. It simply retains the Standard of Care that now exists. The specific requirements for ozone will require additional safeguards that would not otherwise be in H-5 occupancy.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F201–06/07
3802.1 (New)

Proponent: Jakki MacLean, Yakima County Washington Fire Protection Bureau, representing Washington State Association of Fire Marshals

1. Add new definition as follows:

3802.1 Definition. The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

LP-GAS CONTAINER. Any vessel, including cylinders, tanks, portable tanks, and cargo tanks, used for transporting or storing LP-gases.

2. Wherever the term "Container" appears in Chapter 38, revise it to "LP-gas container"

Reason: The proposed definition will solve correlation problems between NFPA 58 and the IFC as they exist with the definition of "container," and the different forms that it can take. Placing the definition in Section 3802 will apply specifically to LP-gases and supersede the general definition used in Chapter 27.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F202–06/07
3806.1

Proponent: Bruce Swiecicki, National Propane Gas Association

Revise as follows:

3806.1 Attendants. Dispensing of LP-gas shall be performed by a qualified attendant. A container shall only be filled by its owner or with the written permission of its owner.

Reason: The purpose of the proposed change is to require LP-gas containers to be filled only by the owner of the container or with the owner's permission.

Prior to filling a propane container, either a cylinder or ASME tank, the container and system must undergo a visual inspection to ensure they are suitable for continued service. It is common practice in the propane industry for ASME tanks to be leased to customers, rather than the customer owning the tank. Because the propane marketer that owns the tank is more likely to spend the time needed to ensure that the tank is in suitable condition and the system can continue in service, the proposed change should have a positive impact on the safe operation of LP-gas systems.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F203–06/07

4001.1, 4003.1, 4003.1.1, 4003.2, 4004.1, 4004.2 through 4004.2.4, 3201.1, 4006 (New)

Proponent: Larry Fluer, Fluer, Inc., representing Compressed Gas Association

Revise as follows:

4001.1 Scope. The storage and use of oxidizing materials ~~oxidizers~~ shall be in accordance with this chapter and Chapter 27. Compressed gases shall also comply with Chapter 30.

4003.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of oxidizing materials ~~oxidizers~~ in amounts not exceeding the maximum allowable quantity per control area indicated in Section 2703.1 shall be in accordance with Sections 2701, 2703, 4001 and 4003. Oxidizing gases shall also comply with Chapter 30.

4003.1.1 Special limitations for indoor storage and use by occupancy. The indoor storage and use of oxidizing materials ~~oxidizers~~ shall be in accordance with Sections 4003.1.1.1 through 4003.1.1.3.

4003.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of oxidizing materials ~~oxidizers~~ in amounts exceeding the maximum allowable quantity per control area indicated in Section 2703.1 shall be in accordance with Chapter 27 and this chapter.

4004.1 Indoor storage. Indoor storage of oxidizing materials ~~oxidizers~~ in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(1) shall be in accordance with Sections 2701, 2703, 2704 and this chapter.

4004.2 Outdoor storage. Outdoor storage of oxidizing materials ~~oxidizers~~ in amounts exceeding the maximum allowable quantities per control area set forth in Table 2703.1.1(3) shall be in accordance with Sections 2701, 2703, 2704 and this chapter. Oxidizing gases shall also comply with Chapter 30.

4004.2.1 Distance from storage to exposures for liquid and solid oxidizers. Outdoor storage areas for liquid and solid oxidizers shall be located in accordance with Table 4004.1.2.

4004.2.2 Distance from storage to exposures for oxidizing ~~oxidizer~~ gases. Outdoor storage areas for oxidizing ~~oxidizer~~ gases shall be located in accordance with Table 4004.2.2.

4004.2.2.1 Oxidizing cryogenic fluids. Outdoor storage areas for oxidizing cryogenic fluids shall be located in accordance with Chapter 32.

4004.2.3 Storage configuration for liquid and solid oxidizers. Storage configuration for liquid and solid oxidizers shall be in accordance with Tables 4004.1.7(1) through 4004.1.7(4).

4004.2.4 Storage configuration for oxidizing ~~oxidizer~~ gases. Storage configuration for oxidizing ~~oxidizer~~ gases shall be in accordance with Table 4004.2.2.

TABLE 4004.2.2

OXIDIZING ~~OXIDIZER~~ GASES— DISTANCE FROM STORAGE TO EXPOSURES[a]

QUANTITY OF GAS STORED (cubic feet at NTP)	DISTANCE TO A BUILDING NOT ASSOCIATED WITH THE MANUFACTURE OR DISTRIBUTION OF OXIDIZING ~~OXIDIZER~~ GASES OR PUBLIC WAY OR LOT LINE THAT CAN BE BUILT UPON (feet)	DISTANCE BETWEEN STORAGE AREAS (feet)
0-50,000	5	5
50,001-100,000	10	10
100,001 or greater	15	10

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3.

a. The minimum required distances shall not apply when fire barriers without openings or penetrations having a minimum fire-resistance rating of 2 hours interrupt the line of sight between the storage and the exposure. The configuration of the fire barrier shall be designed to allow natural ventilation to prevent the accumulation of hazardous gas concentrations.

3201.1 Scope. Storage, use and handling of cryogenic fluids shall comply with this chapter. Cryogenic fluids classified as hazardous materials shall also comply with Chapter 27 for general requirements. Partially full containers containing residual cryogenic fluids shall be considered as full for the purposes of the controls required.

Exceptions:

1. Fluids used as refrigerants in refrigeration systems (see Section 606).
2. Liquefied natural gas (LNG), which shall comply with NFPA 59A.

Oxidizing cryogenic fluids, including oxygen, shall comply with NFPA 55 and Chapter 40 as applicable.
Flammable cryogenic fluids, including hydrogen, methane and carbon monoxide, shall comply with NFPA 55.
Inert cryogenic fluids, including argon, helium and nitrogen, shall comply with CGA P-18.

CHAPTER 40
OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS

2. Add new text as follows:

SECTION 4006
OXIDIZING CRYOGENIC FLUIDS

4006.1 General. The storage and use of oxidizing cryogenic fluids shall be in accordance with Section 4006 and Chapter 32.

Reason: The term "oxidizer" is used inconsistently throughout the code. "Oxidizing materials" is not a defined term, rather it includes solids, liquids and gases. An example can be seen in Table 105.6.21. Revisions have been made to resolve the use of the term in Sections 4001.1, 4003.1, 4003.1.1, 4003.2 and 4004.1 where appropriate as a means for consistency. The creation of a definition was considered, but felt not to be necessary as when specific requirements are to be applied to solids and liquids the term has conventionally been that of oxidizer, e.g., oxidizer solids and liquids or oxidizer Class 3, etc.

The term "oxidizing gas" as defined in Section 4002.1 is used to differentiate and establish requirements for gases separate from those used for solids and liquids. Clarification is needed to bring consistency in use of the term to Section 4004.2. The change in terminology is not intended to alter requirements and is offered as clarification to avoid misapplication of the code.

Chapter 32 is a generic chapter for all cryogenic fluids. The material specific chapters contain material specific provisions based on hazard class. The term oxidizer is generally used to describe solid and liquid materials; however, Chapter 40 contains provisions for oxidizing gases as well. Changing the title to reflect the Chapter content is user friendly. The requirements for oxidizing fluids found in the present code are limited to the generic requirements of Chapter 32, however, the establishment of a section for oxidizing cryogenic fluids is appropriate and parallel to a proposal that proposes similar organization for flammable cryogens to be placed into Chapter 35.

A code change to address the use of liquid oxygen (LOX), an oxidizing cryogenic fluid, for home health care has been introduced by other parties into the 06/07 code cycle. Establishing Section 4006 under the major heading of oxidizing cryogenic fluids provides a structure under which specific requirements may be developed.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F204–06/07
4002.1

Proponent: Larry Fluer, Fluer, Inc., representing Compressed Gas Association

Revise definition as follows:

4002.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

OXIDIZING GAS. A gas that can support and accelerate combustion of other materials more than air does.

Reason: As currently written air itself would be regulated as an oxidizing gas subject to the requirements of Chapter 40 including the Maximum Allowable Quantity per Control Area Tables. Air or compressed air should not trigger the need to establish a Group H3 Occupancy. The intent of the code is to regulate as oxidizing gases those materials that are more vigorous oxidizers than normal air. The normal oxygen content of air at sea level is 20.95% oxygen.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F205–06/07
4006 (New), 4002.1, 3001.1

Proponents: John Anicello, Airgas, Inc.; Greg Rogers, South Kitsap Fire & Rescue, representing ICC Joint Fire Service Review Committee

1. Add new text as follows:

SECTION 4006
LIQUID OXYGEN IN HOME HEALTH CARE

4006.1 General. The storage and use of liquid oxygen (LOX) in home health care shall comply with Sections 4006.2 through 4006.10.3.

4006.2 Information and instructions to be provided. The supplier of liquid oxygen shall provide the user with the following information in written form:

1. Manufacturer's instructions for operation of the containers used and labeling.
2. Locating containers away from ignition sources, exits, electrical hazards and high temperature devices.
3. Restraint of containers to prevent falling.
4. Requirements for transporting containers.
5. Safeguards to be followed when containers are refilled.

4006.3 Liquid oxygen home care containers. Liquid oxygen home care and ambulatory containers in Groups I-1, I-4, R-3 Residential Care/Assisted Living Facilities and R-4 occupancies shall be stored, used and filled in accordance with Sections 4006, 3203.1 and 3203.2.

4006.4 Manufacturer's instructions and labeling. Containers shall be stored, used and operated in accordance with the manufacturer's instructions and labeling.

4006.5 Locating containers. Containers shall not be located in areas:

1. Where they can be overturned due to operation of a door,
2. Where they are in the direct path of egress,
3. Subject to falling objects,
4. Where they may become part of an electrical circuit, or
5. Where open flames and high temperature devices can cause a hazard.

4006.6 No smoking. Smoking shall be prohibited in rooms or areas where liquid oxygen is in use.

4006.7 Signs. A sign stating "OXYGEN NO SMOKING" shall be posted in the room or area where the liquid oxygen home care container(s) is stored or used and liquid oxygen ambulatory containers are filled.

4006.8 Restraining containers. Containers shall be restrained while in storage or use to prevent falling caused by contact, vibration or seismic activity. Containers shall be restrained by one of the following methods:

1. Restraining containers to a fixed object with one or more restraints.
2. Restraining containers within a framework, stand or assembly designed to secure the container.
3. Restraining containers by locating a container against two points of contact like the walls of a corner of a room or a wall and a secure furnishing or object like a desk.

4006.9 Container movement. Containers shall be transported by use of a cart or hand truck designed for such use.

Exceptions:

1. Liquid oxygen home care containers equipped with a roller base.
2. Liquid oxygen ambulatory containers are allowed to be hand carried.

4006.10 Filling of containers. The filling of containers shall be in accordance with Sections 4006.10 through 4006.10.3.

4006.10.1 Filling of home care containers. Liquid oxygen home care containers shall be filled outdoors.

4006.10.1.1 Incompatible surfaces. A liquid oxygen compatible drip pan shall be provided under home care container fill connections during the filling process in order to protect against liquid oxygen spillage from coming into contact with combustible surfaces, including asphalt.

4006.10.2 Filling of ambulatory care containers. The filling of liquid oxygen ambulatory containers is allowed indoors where the supply container is designed to fill them and written instructions are provided by the container manufacturer.

4006.10.3 Open flames and high temperature devices. The use of open flames and high temperature devices shall be in accordance with Section 2703.7.2.

2. Add new definitions as follows:

4002.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

LIQUID OXYGEN HOME CARE CONTAINER. A container used for liquid oxygen not exceeding 15.8 gallons (60 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9, the United States Food, Drug and Cosmetic Act that is intended to deliver gaseous oxygen for therapeutic use in a home environment.

LIQUID OXYGEN AMBULATORY CONTAINER. A container used for liquid oxygen not exceeding 0.396 gallons (1.5 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9, the United States Food, Drug and Cosmetic Act that is intended for portable therapeutic use and to be filled from its companion base unit (a liquid oxygen home care container).

OXIDIZING CRYOGENIC FLUID. An oxidizing gas in the cryogenic state.

3. Revise as follows:

3001.1 Scope. Storage, use and handling of compressed gases in compressed gas containers, cylinders, tanks and systems shall comply with this chapter, including those gases regulated elsewhere in this code. Partially full compressed gas containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required.

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 606).
2. Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 22, NFPA 52 and the *International Fuel Gas Code*.

Cutting and welding gases shall also comply with Chapter 26.

Cryogenic fluids shall ~~also~~ comply with Chapter 32. Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 57 and NFPA 59A.

Compressed gases classified as hazardous materials shall also comply with Chapter 27 for general requirements and chapters addressing specific hazards, including Chapters 35 (Flammable Gases), 37 (Highly Toxic and Toxic Materials), 40 (Oxidizers) and 41 (Pyrophoric).

LP-gas shall also comply with Chapter 38 and the *International Fuel Gas Code*.

Reason:
1. Chapter 40: A typical liquid oxygen home care container holds up to 15.8 gallons of liquid oxygen (LOX). The ambulatory containers are typically limited to 1.5 gallons or less. These containers include in their design all appurtenances such as regulators, gauges, piping and controls and require no external piping other than the application of disposable breathing apparatus.

A code change (F215-04/05) was initially submitted by Mr. Hal Key, City of Mesa, AZ to address the subject. This code change was not approved, however, a substantial public comment was issued by Mr. John Anicello, Airgas, Inc. for consideration at the annual meeting. The public comment was disapproved at the request of the proponent to allow for further study and consideration. The code change has now been further revised based on input from the ICC/IAFC Western/Canadian Code Action Committee and discussion with other liquid oxygen suppliers.

This proposal is designed to establish controls for LOX into a section of Chapter 40 instead of Chapter 32, Cryogenic Fluids because Chapter 32 is a generic chapter that provides general provisions for all cryogens and has only limited application to liquid oxygen in homecare. Liquid oxygen is

regulated by Chapters 32 and 40. As a cryogen LOX is not regulated by Chapter 30. Part 1 of the proposal is designed to resolve what might be a conflict by referring the user to Chapter 32 when cryogens are involved.

2. Chapter 40 definitions: Part 2 of the proposal provides the general provisions for storage and use of liquid oxygen home care and ambulatory containers as defined in two new definitions to be added to Chapter 40. A key aspect in the definitions are the containers are medical devices as classified by the Federal Food and Drug Administration and always intended for therapeutic use.

Use in all occupancies requires that the supplier furnish written information to the user under the requirements of Section 4006.1. Specific provisions applicable to I-1, I-4, R-3 Residential Care/Assisted Living facilities and R-4 occupancies are addressed in Section 4006.2 and the sections that follow. The requirements establish general safeguards including but not limited to locating containers, restraining containers, distance to exposures such as ignition sources, and high temperature devices, container movement and filling. The permit quantity of 10 gallons is unchanged.

The definitions and Part 4 of the proposal provide a reference to the US Code, Title 21 – Federal Food, Drug and Cosmetic Act that defines medical devices. LOX containers used as medical devices are unique in that they are intended for therapeutic use only, and not intended for use in industrial applications.

As the population ages the use of LOX is expected to increase. Approval of this code change will enhance public safety by establishing minimum requirements surrounding its use in the occupancies where the material is most frequently encountered. In addition it requires that the suppliers provide a reasonable level of information containing safeguards to be applied by the users. The code change fills a void in the code which has been characterized by a growing concern and "need to know" emanating from the code enforcement community.

3. 3001.1: Compressed gases in the cryogenic state are regulated under Chapter 32

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

F206–06/07

4104.1, 4104.2, 4105.3, 4106, 604.2.12, Table 903.2.13, Chapter 45

Proponent: Larry Fluer, Fluer, Inc., representing Compressed Gas Association

1. Revise as follows:

4104.1 Indoor storage. Indoor storage of pyrophoric materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(1), shall be in accordance with Sections 2701, 2703, 2704 and this chapter.

The storage of silane gas and gas mixtures with a silane concentration of ~~2~~ 1.37 percent or more by volume, shall be in accordance with ~~Section 4106~~ CGA G-13.

4104.2 Outdoor storage. Outdoor storage of pyrophoric materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(3) shall be in accordance with Sections 2701, 2703, 2704 and this chapter.

The storage of silane gas, and gas mixtures with a silane concentration of ~~2~~ 1.37 percent or more by volume, shall be in accordance with ~~Section 4106~~ CGA G-13.

4105.3 Silane gas. The use of silane gas, and gas mixtures with a silane concentration of ~~2~~ 1.37 percent or more by volume, shall be in accordance with ~~Section 4106~~ CGA G-13.

2. Delete section without substitution:

~~**SECTION 4106**~~
~~**SILANE GAS**~~

~~**4106.1 General requirements.** The storage and use of silane gas and gas mixtures with a silane concentration of 2 percent or more by volume, in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(1) or 2703.1.1(3), shall be in accordance with this section.~~

~~**4106.1.1 Building construction.** Indoor storage and use of silane gas shall be within a room or building conforming to the *International Building Code*.~~

~~**4106.1.2 Flow control.** Compressed gas containers, cylinders and tanks containing silane gas, and gas mixtures with a silane concentration of 2 percent or more by volume, shall be equipped with reduced flow valves equipped with restrictive flow orifices not exceeding 0.010 inch (0.254 mm) in diameter. The presence of the restrictive flow orifice shall be indicated on the valve and on the container, cylinder or tank by means of a label placed at a prominent location by the manufacturer.~~

~~Exceptions:~~

1. ~~Manufacturing and filling facilities where silane is produced or mixed and stored prior to sale.~~
2. ~~Outdoor installations consisting of permanently mounted cylinders connected to a manifold, provided that the outlet connection from the manifold is equipped with a restrictive flow orifice not exceeding 0.125 inch (3.175 mm) in diameter and the setback distance to exposures is not less than 40 feet (12 192 mm). Footnote a of Table 4104.2.1 shall not apply.~~

~~4106.1.3 Valves.~~ ~~Container, cylinder and tank valves shall be constructed of stainless steel or other approved materials. Valves shall be equipped with outlet fittings in accordance with CGA V-1.~~

~~4106.2 Indoor storage.~~ ~~Indoor storage of silane gas, and gas mixtures with a silane concentration of 2 percent or more by volume, shall be in accordance with Section 4104.1 and Sections 4106.2.1 through 4106.2.3.~~

~~4106.2.1 Fire protection.~~ ~~When automatic fire-extinguishing systems are required, automatic sprinkler systems shall be used.~~

~~4106.2.2 Exhausted enclosures or gas cabinets.~~ ~~When provided, exhausted enclosures and gas cabinets shall be constructed as follows:~~

1. ~~Exhausted enclosures and gas cabinets shall be in accordance with Sections 2703.8.5 and 2703.8.6, respectively.~~
2. ~~Exhausted enclosures and gas cabinets shall be internally sprinklered.~~
3. ~~The velocity of ventilation across unwelded fittings and connections on the piping system shall not be less than 200 feet per minute (1.02 m/s).~~
4. ~~The average velocity at the face of the access ports or windows in the gas cabinet shall not be less than 200 feet per minute (1.02 m/s) with a minimum velocity of 150 feet per minute (0.76 m/s) at any point of the access port or window.~~

~~TABLE 4104.2.1~~
~~PYROPHORIC GASES—DISTANCE FROM STORAGE TO EXPOSURES[a]~~

(Delete entire contents of table)

~~For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832m3.~~

~~a. The minimum required distances shall be reduced to 5 feet when protective structures having a minimum fire resistance of 2 hours interrupt the line of sight between the container and the exposure. The protective structure shall be at least 5 feet from the exposure. The configuration of the protective structure shall allow natural ventilation to prevent the accumulation of hazardous gas concentrations.~~

~~4106.2.3 Emergency power.~~ ~~The ventilation system shall be provided with an automatic emergency power source in accordance with Section 604 and designed to operate at full capacity.~~

~~4106.3 Outdoor storage.~~ ~~Outdoor storage of silane gas, and gas mixtures with a silane concentration of 2 percent or more by volume, shall be in accordance with Section 4104.2 and Sections 4106.3.1 through 4106.3.4.~~

~~4106.3.1 Volume.~~ ~~The maximum volume for each nest shall not exceed 10,000 cubic feet (283.2 m^3) of gas.~~

~~4106.3.2 Aisles.~~ ~~Storage nests shall be separated by aisles a minimum of 6 feet (1829 mm) in width.~~

~~4106.3.3 Separation.~~ ~~Storage shall be located a minimum of 25 feet (7620 mm) from lot lines, public streets, public alleys, public ways, means of egress or buildings.~~

~~4106.3.4 Weather protection.~~ ~~The clear height of overhead construction provided for sheltering of outdoor storage shall not be less than 12 feet (3658 mm).~~

~~4106.4 Indoor use and dispensing.~~ ~~The indoor use and dispensing of silane gas and gas mixtures with a silane concentration of 2 percent or more by volume, in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(1) shall be in accordance with Sections 4105 and this section.~~

~~4106.4.1 Exhausted enclosures or gas cabinets.~~ ~~When provided, exhausted enclosures and gas cabinets shall be installed in accordance with Section 4106.2.2.~~

~~4106.4.2 Remote manual shutdown.~~ ~~A remotely located, manually activated shutdown control shall be provided outside each gas cabinet.~~

~~**4106.4.3 Emergency power.** The ventilation system shall be provided with an approved automatic emergency power source in accordance with Section 604 and designed to operate at full capacity.~~

~~**4106.4.4 Purge panels.** Automated purge panels shall be provided.~~

~~**4106.4.4.1 Purge gases.** Purging of piping and controls located in gas cabinets or exhausted enclosures shall only be performed using a dedicated inert gas supply that is designed to prevent silane from entering the inert gas supply. The use of nondedicated systems or portions of piping systems is allowed on portions of the venting system that are continuously vented to atmosphere. Devices that could interrupt the continuous flow of purge gas to the atmosphere shall be prohibited.~~

~~**Exception:** Manufacturing and filling facilities where silane is produced or mixed.~~

~~**4106.4.4.2 Venting.** Gas vent headers or individual purge panel vent lines shall have a continuous flow of inert gas. The inert gas shall be introduced upstream of the first vent or exhaust connection to the header.~~

~~**4106.4.4.3 Purging operations.** Purging operations shall be performed by means ensuring complete purging of the piping and control system before the system is opened to the atmosphere.~~

~~**4106.5 Outdoor use and dispensing.** The outdoor use and dispensing of silane gas, and gas mixtures with a silane concentration of 2 percent or more by volume, exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(3) shall be in accordance with Sections 4105, 4106.4 and 4106.5.1.~~

~~**4106.5.1 Outdoor use weather protection.** When overhead construction is provided for sheltering outdoor use areas containing silane gas, or gas mixtures with a silane concentration of 2 percent or more by volume, the use areas shall be provided with approved automatic fire-extinguishing system protection.~~

3. Delete without substitution:

~~**604.2.13 Pyrophoric materials.** Emergency power shall be provided for occupancies with silane gas in accordance with Sections 4106.2.3 and 4106.4.3.~~

4. Revise table as follows:

TABLE 903.2.13
ADDITIONAL REQUIRED FIRE-EXTINGUISHING SYSTEMS

SECTION	SUBJECT
~~4106.2.2~~	~~Exhaust enclosures or gas cabinets for silane gas~~

(Portions of table not shown do not change)

5. Add standard to Chapter 45 as follows:

Compressed Gas Association (CGA)

CGA G13-06 Storage and Handling of Silane and Silane Mixtures

Reason: (Items 1. and 2.) The Compressed Gas Association (CGA) proposed the introduction of a CGA standard (then P-32) to be adopted into the IFC with code change F174-00 (2000) for the regulation of the pyrophoric gas silane. When first introduced, the First Edition of the standard had not gone through the ANSI process, and therefore, it was not in a form that could be accepted into the I-Codes. Since that time CGA has responded and has developed the Section Edition of the document, now designated as G-13. The publication of the 2006 Edition of G-13 has undergone the ANSI review process. Comments received from users, producers, and regulatory officials were evaluated by CGA's technical committee and modifications were made to address technical issues and concerns raised in the evaluation process under the published procedures of ANSI.

The use of silane continues to be a major raw material in the production of silicon in various forms as consumed by the semiconductor and solar energy industries. The unique character of this material and the need for specialized controls became apparent to the regulatory community as a result of fires and explosions that occurred in the early use of this material. As the use of the material grew, the CGA engaged an independent testing laboratory to test large scale releases such as those that may be encountered should release occur from a large high pressure bulk source. The flammable range of the material has been established by testing from a low of 1.37% to a high of 96%. The material has also been studied in some detail by SEMATECH, the semiconductor industry's research consortium and by Factory Mutual Insurance an insurer of highly protected risk entities. CGA's technical committee has considered the output of these other organizations throughout the development of the standard beginning with the first edition and continuing into this second edition of the standard. References to pertinent studies are provided in Chapters 18 and 19 of the document.

The standard has been prepared to present a control strategy to address the supply of this material up until the first point at which the user assumes control. CGA G-13 replaces IFC Section 4106. There is no intent for the G-13 standard to replace the requirements of IFC Chapter 18 for H-5 Occupancies. Areas where overlap may occur include requirements for gas cabinets when they are used and special care has been taken to avoid the creation of conflicts to include having the user community represented in the ANSI canvass process.

The requirements of the IFC for silane have been reviewed and compared to requirements of CGA G-13. The table below reflects the comparison based on the subjects addressed by the IFC. CGA G-13 is a fifty (50) page document that addresses the subject in a comprehensive manner. As a result there are a considerable number of elements addressed by the standard that are not reflected in the table below, however, the

purpose of the table was to demonstrate to the reader that NOTHING IS BEING LOST by the deletion of Section 4106, rather there is much being gained as the control strategies have been developed to address systems and circumstances not envisioned when the provisions for the gas were crafted into the IFC.

IFC Section	Subject	G-13 Section Referenced	Comments
4106.1	General requirement when silane exceeds the MAQ	1	G-13 applies to cylinder systems in quantities exceeding 0.5 standard cubic feet up to and including bulk gas systems that might be found in ISO modules, tube trailers and other mobile supply units that may be located on site to act as a bulk source of supply.
4106.1.1	Requires buildings to be constructed in accordance with the building code.	various	The use of local and state building codes are referenced in various sections of the document. However, it is assumed that the local building code will apply. Specific references are made to construction elements to be in accord with state and local building codes including walls (section 6.3.2.1), penetrations and opening protection (6.3.2.2), explosion control (7.5), mixed occupancies and detached buildings (7.8.1)
4106.1.2	Requirement for flow control by means of a reduced flow orifice of 0.010" diameter	10.2.4.1	RFO required for non-bulk sources of 0.010" diameter. For bulk sources the diameter is 0.125" (Section 10.2.4.2). The concept of the use of an RFO has been developed in detail to address large distribution systems, the use of valve manifold boxes (VMB) and similar systems. In addition tables have been provided to balance various RFO sizes to required minimum flow rates to achieve control through dilution ventilation systems. The use of the term RFO appears not less than 20 times in the document.
4106.1.3	Requirements for valve construction and compliance for outlet fittings to conform to CGA V-1	5.1	Cylinders are required to conform to requirements of DOT which in turn references CGA standards. The CGA V-1 standard is listed as a reference publication.
4106.2	General requirement for storage to comply with 4106.2	2.1	The scope of the standard applies to storage as well as to use.
4106.2.1	Fire protection limited to sprinkler systems (water required)	12	Fire protection systems are discussed in detail to include the use of deluge systems for bulk supplies and warnings against the use of Halon ™ or inerting agents such as carbon dioxide.
4106.2.2	Requirements for gas cabinets. • Construction to be in accordance with Chapter 27 • Sprinklered • flow velocity across fittings in cabinet • control velocity at openings in cabinets	various	Sprinklers are required in gas cabinets (12.3.1); control velocity across unwelded fittings is addressed (13.2.2); minimum flow requirements are specified (13.2.3). The control velocity is not specified, rather dilution volumes and ratios required based on the use of reduced flow orifices is the method of control to avoid explosion, both attended and unattended operations are provided with requirements (Tables 5 and 6).
4106.2.3	Ventilation system to be on emergency power at full flow.	Table 7 and Table 8	Mechanical systems are to be provided with Emergency Power
4106.4.4	Automated purge panels required.	15.1	Purging may be either manual or automatic given the fact that the standard covers manufacturing as well as user sites in systems from large to small.
4106.4.4.1	Purge gas required to be: • dedicated and protected against backflow • non-dedicated systems allowed on vents that go to the atmosphere • continuous in the vent system to atmosphere	15	Dedicated source (15.2) Protection against backflow (15.2.2)
4106.4.4.2	Purge gas flow to be continuous in gas vent headers, and • purge gas to be introduced upstream of the first silane connection to a header	Figure 9	Required
4106.4.4.3	Systems to be purged prior to opening to atmosphere.	8.1.3	Required
4106.5	Outdoor use to be in accordance with Section 4106.4 and 4106.5.1	Chapter 6	Detailed requirements provided. Also provided for throughout the document. In concept the document addresses bulk and nonbulk uses indoors and outdoors.
4106.5.1	Areas built as "weather protection" required to be sprinklered.	12.2.2	Requirements for sprinkler system

(Item 3) Emergency Power is required for all mechanical equipment in Tables 7 and 8 of CGA G-13.
(Item 4) Fire protection, by sprinkler systems, is required by Section 12 of CGA G-13.

(Item 5) CGA G-13 is a comprehensive document developed to establish storage and use requirements for bulk and non-bulk silane systems under conditions that parallel those established by the code, e.g., storage, use, indoor, outdoor, etc. The document was developed by a technical committee under the auspices of the Compressed Gas Association and accepted by ANSI through the use of the ANSI canvass process. Users, manufacturers, enforcers and special experts were included in the review process.

Cost Impact: The code change proposal will increase the cost of construction in some circumstances, depending on the location and configuration of the system intended (bulk, non-bulk, indoor, outdoor) as the engineering controls required by the standard are more comprehensive than those required by the existing code. This is due in part to the code being limited in its scope.

Analysis: Results of review of the proposed standard(s) will be posted on the ICC Website by August 20, 2006.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F207–06/07
Chapter 45

Proponent: Standards writing organizations as listed below.

Revise as follows:

ASTM	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959
Standard reference number	Title
D 56-05 ~~02a~~	Test Method for Flash Point by Tag Closed Tester
D 86-05 ~~04b~~	Test Method for Distillation of Petroleum Products at Atmospheric Pressure
D 93-05a~~02a~~	Test Method for Flash Point by Pensky-Martens Closed Cup Tester
D 3278-(2004)e01 ~~96~~	Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus
E 84-05e01 ~~04~~	Test Method for Surface Burning Characteristics of Building Materials

BHMA	Builders Hardware Manufacturers' Association 355 Lexington Avenue, 17th Floor New York, NY 10017-6603
Standard reference number	Title
A156.10-05 ~~99~~	American National Standard for Power Operated Pedestrian Doors

CGA	Compressed Gas Association 4221 Walney Road Chantilly, VA 20151-2923
Standard reference number	Title
C-7 (2004) (~~2000~~)	Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers
P-18 (2006) (~~1992~~)	Standard for Bulk Inert Gas Systems ~~at Consumer Sites~~
S-1.1(2005) (~~2002~~)	Pressure Relief Device Standards – Part 1- Cylinders for Compressed Gases
S-1.2(2005) ((~~1995~~)	Pressure Relief Device Standards – Part 2- Cargo and Portable Tanks for Compressed Gases
S-1.3(2005) (~~1995~~)	Pressure Relief Device Standards – Part 3- Stationary Storage Containers for Compressed Gases
V-1-(2005) (~~2002~~)	Compressed Gas Cylinder Valve Outlet and Inlet Connections

NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA 02269-9101
Standard reference number	Title
11-05 ~~02~~	Low-, Medium-, and High-Expansion Foam
12-05 ~~00~~	Carbon Dioxide Extinguishing Systems

32-04 ~~00~~	Drycleaning Plants
35-05 ~~99~~	Manufacture of Organic Coatings
51A-~~01~~ 06	Acetylene Cylinder Charging Plants
52-06 ~~02~~	Vehicular Fuel System Code
59A-06 ~~01~~	Production, Storage and Handling of Liquefied National Gas (LNG)
101-06 ~~03~~	Life Safety Code
110-05 ~~02~~	Emergency and Standby Power Systems
111-05 ~~01~~	Stored Electrical Energy Emergency and Standby Power Systems
120-04 ~~99~~	Fire Prevention and Control in Coal ~~Preparation Plants~~ Mines
211-06 ~~03~~	Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances
241-04 ~~00~~	Safeguarding Construction, Alteration, and Demolition Operations
286-06 ~~00~~	Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
303-06 ~~00~~	Fire Protection Standards for Marinas and Boatyards
409-04 ~~01~~	Aircraft Hangars
430-04 ~~00~~	Storage of Liquid and Solid Oxidizers
484-06 ~~02~~	Combustible Metals~~, Metal Powders and Metal Dusts~~
495-06 ~~01~~	Explosive Materials Code
498-06 ~~01~~	Safe Havens and Interchange Lots for Vehicles Transporting Explosives
505-06 ~~02~~	Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations
654-00 ~~06~~	Prevention of Fire & Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids
701-04 ~~99~~	Methods of Fire Tests for Flame Propagation of Textiles and Films
703-06 ~~00~~	Fire Retardant ~~Impregnated~~ Treated Wood and Fire Retardant Coatings for Building Materials
750-06 ~~03~~	Water Mist Fire Protection Systems
1123-06 ~~03~~	Fireworks Display
1124-06 ~~03~~	Manufacture, Transportation, Storage and Retail Sales of Fireworks and Pyrotechnic Articles
1126-06 ~~01~~	Use of Pyrotechnics Before a Proximate Audience
2001-04 ~~00~~	Clean Agent Fire Extinguishing Systems

UL	Underwriters Laboratories 333 Pfingsten Road Northbrook, IL 60062
Standard reference number	Title
217-97	Single and Multiple Station Smoke Alarms-with Revisions through ~~January 2004~~ August 2005
268-1996	Smoke Detectors for Fire Protective Signaling Systems—with Revision through ~~January 1999~~ October 2003
300-05 ~~96~~	Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas— ~~with Revisions through December 1998~~
793-03 ~~97~~	Standard~~s~~ for Automatically Operated Roof Vents For Smoke and Heat with Revisions through April 2004
864-03	Standard for Control Units and Accessories for Fire Alarm Systems — with Revisions through ~~October 1998~~ July 2005
900-04 ~~94~~	Air Filter Units~~—with Revisions Through October 1999~~
1275-2005 ~~94~~	Flammable Liquid Storage Cabinets~~—with Revisions through March 1997~~
1363-96	Standard for Relocatable Power Taps—with Revisions through ~~July 2004~~ February 2006
2208-2005 ~~96~~	Solvent Distillation Units~~ with Revisions through August 2001~~
2335-01	Fire Tests of Storage Pallets—with Revisions through ~~May 2002~~ September 2004

Reason: The *ICC Code Development Process for the International Codes* (Procedures) Section 4.5* requires the updating of referenced standards to be accomplished administratively, and be processed as a Code Proposal. In May 2005, a letter was sent to each developer of standards that are referenced in the I-Codes, asking them to provide ICC with a list of their standards in order to update to the current edition. Above is the list received of the referenced standards under the maintenance responsibility of the International Fire Code Committee.

***4.5 Updating Standards:** The updating of standards referenced by the Codes shall be accomplished administratively by the appropriate code development committee in accordance with these full procedures except that multiple standards to be updated may be included in a single proposal.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F208–06/07

Chapter 45, 2605.4, 3003.2, 3203.4.3, 3203.8, 3301.1, 3301.1.3, 3301.3, 3302.1, 3406.5.1.15

Proponent: Larry Fluer, Fluer, Inc., representing Compressed Gas Association

1. Revise Chapter 45 as follows:

DOTn U.S. Department o f Transportation
Office of Hazardous Material Standards
400 7th Street, Southwest
Washington, DC 20590

Standard reference number	Title	Referenced in code section number
33 CFR Part 154 — 1998	Facilities Transferring Oil or Hazardous Material in Bulk	3406.8
33 CFR Part 155 — 1998	Oil or Hazardous Material Pollution Prevention Regulations for Vessels	406.8
33 CFR Part 156 — 1998	Oil and Hazardous Material Transfer Operations	3406.8
~~49 CFR – 1998~~	~~Transportation~~	~~2605.4, 3302.1~~
~~49 CFR Part 1 – 1999~~	~~Transportation~~	~~3203.4.3, 3203.8~~
49 CFR Part 172— ~~1999~~ 2005	Hazardous Materials Tables, Special Provisions, Hazardous Materials Communications, Emergency Response Information and Training Requirements	3304.6.5.2
49 CFR Part 173— ~~1999~~ 2005	Shippers — General Requirements for Shipments and Packagings	3306.3
49 CFR Part 173.137— ~~1999~~ 2005	Shippers — General Requirements for Shipments and Packagings: Class 8 — Assignment of Packing Group	3102.1
~~49 CFR Parts 100-178 – 1994~~	~~Hazardous Materials Regulations~~	~~3301.1, 3301.1.3, 3301.3, 3406.5.1.15~~
49 CFR Parts 100 to 185 - 2005	Hazardous Materials Regulations	2605.4, 3003.2, 3203.4.3, 3203.8 , 3301.1, 3301.1.3, 3301.3, 3302.1, 3406.5.1.15

2. Revise as follows:

2605.4 Acetylene gas. Acetylene gas shall not be piped except in approved cylinder manifolds and cylinder manifold connections, or utilized at a pressure exceeding 15 pounds per square inch gauge (psig) (103 kPa) unless dissolved in a suitable solvent in cylinders manufactured in accordance with DOTn 49 CFR Part 178. Acetylene gas shall not be brought in contact with unalloyed copper, except in a blowpipe or torch.

3003.2 Design and construction. Compressed gas containers, cylinders and tanks shall be designed, fabricated, tested, marked with the specifications of manufacture and maintained in accordance with regulations of DOTn 49 CFR, Parts 100-~~178~~ 185 or the ASME *Boiler and Pressure Vessel Code*, Section VIII.

3203.4.3 Identification of containers. Stationary containers shall be identified with the manufacturing specification and maximum allowable working pressure with a permanent nameplate. The nameplate shall be installed on the container in an accessible location. The nameplate shall be marked in accordance with the ASME *Boiler and Pressure Vessel Code* or DOTn 49 CFR Parts 100-185.

3203.8 Service and repair. Service, repair, modification or removal of valves, pressure relief devices or other container appurtenances, shall comply with Sections 3203.8.1 and 3203.8.2 and the ASME *Boiler and Pressure Vessel Code*, Section VIII or DOTn 49 CFR Parts 100-185.

3301.1 Scope. The provisions of this chapter shall govern the possession, manufacture, storage, handling, sale and use of explosives, explosive materials, fireworks and small arms ammunition.

Exceptions:

1. The Armed Forces of the United States, Coast Guard or National Guard.
2. Explosives in forms prescribed by the official United States Pharmacopoeia.

3. The possession, storage and use of small arms ammunition when packaged in accordance with DOTn packaging requirements.
4. The possession, storage, and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of explosive materials by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.
6. Special industrial explosive devices which in the aggregate contain less than 50 pounds (23 kg) of explosive materials.
7. The possession, storage and use of blank industrial-power load cartridges when packaged in accordance with DOTn packaging regulations.
8. Transportation in accordance with DOTn 49 CFR Parts 100-~~178~~ 185.
9. Items preempted by federal regulations.

3301.1.3 Fireworks. The possession, manufacture, storage, sale, handling and use of fireworks are prohibited.

Exceptions:

1. Storage and handling of fireworks as allowed in Section 3304.
2. Manufacture, assembly and testing of fireworks as allowed in Section 3305.
3. The use of fireworks for display as allowed in Section 3308.
4. The possession, storage, sale, handling and use of specific types of Division 1.4G fireworks where allowed by applicable laws, ordinances and regulations, provided such fireworks comply with, CPSC 16 CFR, Parts 1500 and 1507, and DOTn 49 CFR, Parts 100-~~178~~ 185, for consumer fireworks.

3301.3 Prohibited explosives. Permits shall not be issued or renewed for possession, manufacture, storage, handling, sale or use of the following materials and such materials currently in storage or use shall be disposed of in an approved manner.

1. Liquid nitroglycerin.
2. Dynamite containing more than 60-percent liquid explosive ingredient.
3. Dynamite having an unsatisfactory absorbent or one that permits leakage of a liquid explosive ingredient under any conditions liable to exist during storage.
4. Nitrocellulose in a dry and uncompressed condition in a quantity greater than 10 pounds (4.54 kg) of net weight in one package.
5. Fulminate of mercury in a dry condition and fulminate of all other metals in any condition except as a component of manufactured articles not hereinafter forbidden.
6. Explosive compositions that ignite spontaneously or undergo marked decomposition, rendering the products of their use more hazardous, when subjected for 48 consecutive hours or less to a temperature of 167°F (75°C).
7. New explosive materials until approved by DOTn, except that permits are allowed to be issued to educational, governmental or industrial laboratories for instructional or research purposes.
8. Explosive materials condemned by DOTn.
9. Explosive materials containing an ammonium salt and a chlorate.
10. Explosives not packed or marked as required by DOTn 49 CFR, Parts 100-~~178~~ 185.

Exception: Gelatin dynamite.

3302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

EXPLOSIVE. 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, igniters and display fireworks, 1.3G (Class B, Special).

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 other than consumer fireworks, 1.4G (Class C, Common) by the hazardous materials regulations of DOTn 49 CFR Parts 100-185.

3406.5.1.15 Tank vehicle and tank car certification. Certification shall be maintained for tank vehicles and tank cars in accordance with DOTn 49 CFR, Parts 100-~~178~~ 185.

Reason: The DOT revises the Hazardous Materials Regulations (HMR) annually. The annual cycle for revisions to Title 49 occurs in October. 49 CFR in its entirety is found under Title 49 Transportation, Volume 2, Chapter 1 – Research and Special Programs Administration, Department of Transportation, Parts 100 through 185 under Subtitle B – Other Regulations Relating to Transportation. A similar code change was submitted in the last code cycle, and a question was raised by a committee member regarding what was new in Parts 179 through 185. Part 179 is titled Specifications for tank cars; Part 180 is titled Continuing qualification and maintenance of packagings, Parts 181 through 185 are designated as Reserved (meaning there is no content at present); however, the use of the full title to include Parts 100 through 185 is how the document is described and listed by the US Government Printing Office, and as accessed by electronic means.

The use of DOT references in the IFC refer the user to Federal Regulations which use is mandatory. As such the general reference found in the code to the HMR is a pointer or an index to point the user in the right direction to obtain detailed regulatory requirements.

General references to "Transportation" (meaning the HMR) have been combined under the last row in the table to eliminate redundancy. The code change proposal is being submitted to update the reference to the most recent Federal publication. By the time this code change is processed the regulations will have again been revised.

As a result of issuing the 2005 update to 49 CFR, correlating changes are proposed to Sections 2605.4, 3003.2, 3102.1, 3203.4.3, 3203.8, 3301.1, 3301.1.3, 3301.3, 3302.1, 3304.6.5.2, 3406.5.1.15. Specific substantiating statements for each of the aforementioned changes to the sections referenced are as follows:

Section 2605.4: Part 178 is titled Specifications for Packagings. Specifications for cylinders are found in Subpart C to Part 178.

Section 3003.2: Part 179 contains specifications for cargo tank cars, tank car tanks including multi-unit tank car tanks. Part 180 contains requirements for the Continuing Qualification and Maintenance of Packagings.

Section 3102.1: The reference in Chapter 45 has been updated to the 2005 edition of the CFR. There are no changes proposed to Section 3102.1.

Section 3203.4.3: Stationary cryogenic containers are typically constructed to ASME Boiler and Pressure Vessel Code requirements. DOT regulations typically apply to containers that are used in the transportation phase. In some instances DOT containers have been viewed as stationary containers, for example, when connected to piping systems serving fixed facilities. 49CFR178 addresses Specifications for Packagings. General requirements in Section 178.35(f) specify the types of markings that are required along with their placement. Subsection 178.338 provides requirements for specification MC-338 cargo tanks. Marking requirements are found in 178.338-18.

Section 3203.8: From a practical standpoint service and repairs of valves, pressure relief devices and appurtenances on cryogenic vessels is done in accordance with nationally recognized standards including those published by the Compressed Gas Association. When repairs are done on containers manufactured to ASME or DOT specifications prescriptive provisions are applied based on the specifications of manufacture.

Section 3301.1, Item 8: The listed reference to Parts 100-178 of the 1994 Edition of the CFR is obsolete. A general reference to Parts 100-185 – 2005 updates the code with a current reference.

Section 3301.1.3: The listed reference to Parts 100-178 of the 1994 Edition of the CFR is obsolete. A general reference to Parts 100-185 – 2005 updates the code with a current reference.

Section 3301.3, Item 10: The listed reference to Parts 100-178 of the 1994 Edition of the CFR is obsolete. A general reference to Parts 100-185 – 2005 updates the code with a current reference.

Section 3302.1 (Explosive): 49CFR specifies the materials classified as explosives. The use of the terminology is found within several different sections of 49CFR including Parts 171, 172 and 173. The all encompassing reference to DOTn 49CFR Parts 100 – 185 correlates with the general reference listed in the existing code, e.g., DOTn 49 CFR without changing the intent of the reference.

Section 3304.6.5.2: 49CFR172.504 specifies the general placarding requirements for explosive materials. There are no changes proposed to Section 3304.6.5.2.

Section 3406.5.1.15: Tank vehicle and tank car certification. The reference to Parts 100 to 178 is obsolete. Specifications for cargo tank motor vehicles are found in Section 178 and specifications for tank cars are found in Section 179.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F209–06/07
Chapter 45 (IBC Chapter 35)

Proponent: Kevin Kelly, National Fire Sprinkler Association

Revise as follows:

CHAPTER 45
REFERENCED STANDARDS

NFPA

13-~~02~~ 07 Installation of Sprinkler Systems

13D-~~02~~ 07 Installation of Sprinkler Systems in One- and Two-family Dwellings and Manufactured Homes

13R-~~02~~ 07 Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in Height

Reason: Editorial. It is important to reference the 2007 editions of NFPA 13, 13D and 13R as this edition has improved seismic criteria and has clarified storage requirements.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis:
1. The standards promulgator, NFPA, did not request an update to the current 2002 edition of the subject standards. ;
2. The edition of the standards requested by this proposal was not available for review at the time of publication of the monograph.;
3. The standards will be updated in the following codes in the sections noted: IRC: NFPA 13, referenced in Section R317.1, Exception 1 and IEBC: NFPA 13R, referenced in Section 704.2.5, Exception 5. ;

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F210–06/07
Chapter XX (New)

Proponent: Greg Rogers, South Kitsap Fire & Rescue, representing ICC Joint Fire Service Review Committee

Add new chapter as follows:

CHAPTER XX
MARINAS

SECTION XX01
SCOPE

XX01.1 Scope. Marina facilities shall be in accordance with this chapter.

XX01.1.1 Plans and approvals. Plans for marina fire-protection facilities shall be approved prior to installation. The work shall be subject to final inspection and approval after installation.

SECTION XX02
DEFINITIONS

XX02.1 Definitions. The following words and terms shall, for the purpose of this chapter and as used elsewhere in this code, have the meanings shown herein.

FLOAT. A floating structure normally used as a point of transfer for passengers and goods, or both, for mooring purposes.

MARINA. Any portion of the ocean or inland water, either naturally or artificially protected, for the mooring, servicing or safety of vessels and shall include artificially protected works, the public or private lands ashore, and structures or facilities provided within the enclosed body of water and ashore for the mooring or servicing of vessels or the servicing of their crews or passengers.

PIER. A structure built over the water, supported by pillars or piles, and used as a landing place, pleasure pavilion or similar purpose.

VESSEL. Watercraft of any type, other than seaplanes on the water, used or capable of being used as a means of transportation. Included in this definition are non transportation vessels such as houseboats and boathouses.

WHARF. A structure or bulkhead constructed of wood, stone, concrete or similar material built at the shore of a harbor, lake or river for vessels to lie alongside of, and piers or floats to be anchored to.

SECTION XX03
GENERAL PRECAUTIONS

XX03.1 Combustible debris. Combustible debris and rubbish shall not be deposited or accumulated on land beneath marina structures, piers or wharves.

XX03.2 Sources of ignition. Open-flame devices used for lighting or decoration on the exterior of a vessel, float, pier or wharf shall be approved.

XX03.3 Flammable or combustible liquid spills. Spills of flammable or combustible liquids at or upon the water shall be reported immediately to the fire department or jurisdictional authorities.

XX03.4 Rubbish containers. Containers with tight fitting or self closing lids shall be provided for the temporary storage of combustible trash or rubbish.

XX03.5 Electrical equipment. Electrical equipment shall be installed and used in accordance with its listing and Section 605 and NFPA 303, Chapter 3 as required for wet, damp and hazardous locations.

XX03.6 Berthing and storage. Berthing and storage shall be in accordance with NFPA 303, Chapter 5.

SECTION XX04
FIRE-PROTECTION EQUIPEMENT

XX04.1 General. Piers, wharves with facilities for mooring or servicing five or more vessels, and marine motor vehicle fuel-dispensing stations shall be equipped with fire-protection equipment in accordance with Section XX04.

XX04.2 Standpipes. Marinas and boatyards shall be equipped throughout with standpipe systems in accordance with NFPA 303.

XX04.3 Access and water supply. Piers and wharves shall be provided with fire apparatus access roads and water-supply systems with on-site fire hydrants when required by the fire code official. Such roads and water systems shall be provided and maintained in accordance with Sections 503.2 and 508.

XX04.4 Portable fire extinguishers. One fire extinguisher for ordinary (moderate) hazard type, shall be provided at each required hose station. Additional fire extinguishers, suitable for the hazards involved, shall be provided and maintained in accordance with Section 906.

XX04.5 Communications. A telephone not requiring a coin to operate or other approved, clearly identified means to notify the fire department shall be provided on the site in a location approved by the code official.

SECTION XX05
MARINE MOTOR VEHICLE FUEL-DISPENSING STATIONS

XX05.1 Fuel- Dispensing. Marine motor vehicle fuel-dispensing stations shall be in accordance with Chapter 22.

Reason: It has been identified the IFC currently has no requirements for the general fire safety precautions or protection equipment for marinas. Because of the different environment that a marina presents in fighting fires, than a normal business, these facilities need to be specifically addressed in the IFC.

In the last three years the largest marina fires in the US caused over 67 million dollars in damage with the complete loss of 272 boats and houseboats. A perfect example of the need to address marinas in the IFC is the following incident:

$10 MILLION MARINA FIRE
Bohemia Bay, Maryland

FIRE PROTECTION CODES AND EQUIPMENT
There was no fire detection or sprinkler systems at Bohemia Bay. The marina structure was completed in October 1986. It was built under a Maryland code that did not require fire detection, fire sprinkler, or standpipe systems. In addition, there was no requirement for providing readily accessible areas for fire department drafting operations.

Portable fire extinguishers located on finger piers were the main fire protection equipment provided in the entire marina. As a result of persuasion by the local fire department, a two inch dry standpipe line running the length of docks 'D' and 'E' had been installed. (The adequacy of such standpipe lines should be questioned because of their small size and the location of hose outlets.) There was no standpipe on the pier with the fire. A new Maryland code was adopted, which incorporated the B.O.C.A. code. The B.O.C.A. code adopts NFPA Standard #303, Protection to Marinas, and will require all future structures of this type and use to be equipped with fire protection, fire suppression, and standpipe systems. They must also provide reliable and accessible sources of water for fire fighting.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

F211–06/07
Appendix B, Section B105.1

Proponent: Greg Rogers, South Kitsap Fire & Rescue, representing ICC Joint Fire Service Review Committee

Revise as follows:

B105.1 One- and two-family dwellings. The minimum fire-flow and flow duration requirements for one- and two-family dwellings having a fire-flow calculation area which does not exceed 3,600 square feet (344.5 m2) shall be 1,000 gallons per minute (3785.4 L/min) for 2 hours. Fire flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet (344.5m2) shall not be less than that specified in Table B105.1.

Reason: In Section B105.1 the required fire flow for one- and two-family dwellings not exceeding 3,600 square feet is 1,000 gallons per minute. There is not a flow duration associated with this required fire flow. Because these flow durations are used by water companies a fire flow duration should be required.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

F212–06/07
Appendix B, Table B105.1

Proponent: Steven L. Schoon, Golder Ranch Fire District, representing Arizona Fire Marshals Association

Revise table as follows:

TABLE B105.1
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS[a]

~~**a.** The minimum required fire flow shall be allowed to be reduced by 25 percent for Group R.~~

Reason: The purpose is deleting an unnecessary additional reduction in minimum required fire flow: Going back to the approved proposal F126-01, Appendix B, B105.2 Exception, was modified allowing a reduction in required fire flow of up to 50 percent, as approved, when the building is provided with an approved automatic sprinkler system. The proponent's reasoning was an effort to make the appendix consistent with the ISO *Guide for Determination of Required Fire Flow.* The approved proposal F239-02 added a footnote to Table B105.1 which reads, "a. The minimum required fire flow shall be allowed to be reduced by 25 percent for Group R." The proponent's reason was to include the additional 25 percent occupancy reduction factor for residential uses, as indicated in the ISO Guide.

Approved proposal F244-04/05 again modified Appendix B, B105.2 Exception, allowing a reduction in required fire flow of up to 75 percent, as approved, when the building is provided with an approved automatic sprinkler system. The proposal did not include the deletion of Footnote a. As printed in the 2006 IFC, the fire flow appears to allow a reduction of up to 75%, as approved, for an automatic sprinkler system and an additional 25% for Group R occupancies. Footnote a. needs to be removed from Table B105.1.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

F213–06/07
Appendix C, Table C105.1

Proponent: Greg Rogers, South Kitsap Fire & Rescue, representing ICC Joint Fire Service Review Committee

Revise as follows:

TABLE C105.1
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS
(No change to current Table contents)

a. (No change to current text)
b. Where streets are provided with median dividers which ~~can~~ cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.
c. through e. (No change to current text)

Reason: The current text makes no sense as it is written. It is clear that the intent of the note is to require hydrants on both sides of the street where high traffic volume or physical barriers would limit access to hydrants installed on one side only. Changing "can" to "cannot" will eliminate an obvious glitch that goes back to the 1994 UFC and beyond.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

F214–06/07
Appendix D, Section D105.3

Proponent: Greg Rogers, South Kitsap Fire & Rescue, representing ICC Joint Fire Service Review Committee

Revise as follows:

D105.3 Proximity to building. At least one of the required access routes meeting this condition shall be located so that the closest side of the lane is within a minimum of 15 feet (4572 mm) and a maximum of 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building as approved.

Exception: Where access routes for aerial fire apparatus cannot be installed because of location on property, topography, waterways, non-negotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.

Reason: The proposed code change is submitted to clarify where the distances given are to be measured from.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F215–06/07
Appendix F, Table F101.2

Proponent: Jeffrey M. Shapiro, P.E., International Code Consultants, representing himself

Revise as follows:

TABLE F101.2
FIRE FIGHTER WARNING PLACARD DESIGNATIONS
BASED ON HAZARD CLASSIFICATION CATEGORIES

HAZARD CATEGORY	DESIGNATION
Combustible liquid II	F2
Combustible liquid IIIA	F2
Combustible liquid IIIB	F1
Combustible dust	F4
Combustible fiber	F3
Cryogenic flammable	F4, H3
Cryogenic oxidizing	OX, H3
Explosive	R4
Flammable solid	F2
Flammable gas (gaseous)	F4
Flammable gas (liquefied)	F4
Flammable liquid IA	F4
Flammable liquid IB	F3
Flammable liquid IC	F3
Organic peroxide, UD	R4
Organic peroxide I	F4, R3
Organic peroxide II	F3, R3
Organic peroxide III	F2, R2
Organic peroxide IV	F1, R1
Organic peroxide V	~~Nonhazard~~ None
Oxidizing gas (gaseous)	OX
Oxidizing gas (liquefied)	OX
Oxidizer 4	OX
Oxidizer 3	OX
Oxidizer 2	OX
Oxidizer 1	None
Pyrophoric gases	F4
Pyrophoric solids, liquids	F3
Unstable reactive 4D	R4
Unstable reactive 3D	R4
Unstable reactive 3N	R3
Unstable reactive 2	R2
Unsable reactive 1	None
Water reactive 3	W, R3
Water reactive 2	W, R2
Water reactive 1	None
Corrosive	H3, COR
Toxic	H3
Highly toxic	H4

F—Flammable category.
R—Reactive category.
COR—Corrosive.
UD—Unclassified detonable material.

H—Health category.
W—Special hazard: water reactive.
OX—Special hazard: oxidizing properties.
4D—Class 4 detonable material.
3D—Class 3 detonable material.
3N—Class 3 nondetonable material.

Reason: Several years ago, code Change F81-01 deleted the entries in Table F101.2 for Oxidizer 1, Water reactive 1 and Unstable reactive 1 materials based on a determination that these materials did not warrant placarding. However Class V organic peroxides remained in the table with the designation "nonhazard." This inconsistency leaves code users wondering why all of the materials regulated by the IFC are included in the table except the three missing Class 1 categories. It makes more sense to include these categories in the table so that the table is complete, but then designate them as not requiring an NFPA 704 designation. Use of the term "none" is more appropriate than "nonhazard."

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

F216–06/07
Appendix H (New); IBC Appendix L (New)

Proponent: Kate Dargan, Assistant California State Fire Marshal, representing California Department of Forestry & Fire Protection, Office of the State Fire Marshal

THIS PROPOSAL IS ON THE AGENDA OF THE IFC AND THE IBC FIRE SAFETY CODE DEVELOPMENT COMMITTEES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IFC

Add new Appendix H as follows:

APPENDIX H
WILDLAND-URBAN INTERFACE FIRE AREA

The provisions of this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION H101
MATERIALS AND CONSTRUCTION METHODS FOR EXTERIOR WILDFIRE EXPOSURE

H101.1 Scope. This appendix applies to building materials, systems and or assemblies used in the exterior design and construction of new buildings located within a Wildland-Urban Interface Fire Area.

H101.2 Purpose. The purpose of this appendix is to establish minimum standards for the protection of life and property by increasing the ability of a building located in any Wildland-Urban Interface Fire Area to resist the intrusion of flame or burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses.

H101.3 Application. New buildings located in any Wildland-Urban Interface Fire Area as designated by the enforcing agency for which an application for a building permit is submitted shall comply with the provisions of this appendix.

H101.4 Alternates for materials, design, tests, and methods of construction. The enforcing agency is permitted to modify the provisions of this appendix for site-specific conditions. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted in accordance with the section H104. 1.

H102 New buildings located in any wildland-urban interface fire area. New buildings located in any Wildland-Urban Interface Fire Area as designated by the enforcing agency for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all the provisions of this appendix.

H103 Inspection and certification. Building permit applications and final completion approvals for buildings within the scope and application of this appendix shall comply with the following:

H103.1 The code official shall, prior to construction, provide the owner or applicant a certification that the building as proposed to be built complies with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this appendix.

H103.2 The code official shall, upon completion of construction, provide the owner or applicant with a copy of the final inspection report that demonstrates the building was constructed in compliance with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this appendix.

H103.3 Prior to building permit final approval the property shall be in compliance with the vegetation clearance requirements prescribed by the local code official.

H104. DEFINITIONS

H104.1 FIRE PROTECTION PLAN is a document prepared for a specific project or development proposed for a Wildland-Urban Interface Fire Area. It describes ways to minimize and mitigate potential for loss from wildfire exposure.

The Fire Protection Plan shall be in accordance with this appendix. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted. Only locally adopted ordinances shall apply.

H104.2 IGNITION-RESISTANT MATERIAL is any product which, when tested in accordance with ASTM E 84 for a period of 30 minutes, shall have a flame spread of not over 25 and show no evidence of progressive combustion. In addition, the flame front shall not progress more than 10½ feet (3200 mm) beyond the centerline of the burner at any time during the test.

Materials shall pass the accelerated weathering test and be identified as Exterior type, in accordance with ASTM D 2898 and ASTM D 3201. All materials shall bear identification showing the fire performance rating thereof. That identification shall be issued by a testing facility recognized by the code official.

H104.3 WILDFIRE is any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property, and or resources.

H104.4 WILDFIRE EXPOSURE is one or a combination of radiant heat, convective heat, direct flame contact and burning embers being projected by vegetation fire to a structure and its immediate environment.

H104.5 WILDLAND-URBAN INTERFACE FIRE AREA is a geographical area identified by the state or local code official to be at a significant risk from wildfires.

H104.6 Fire-Retardant-Treated Wood as defined in Section 2303.2 of the *International Building Code*.

H105. STANDARDS OF QUALITY

H105.1 General. Material, systems, and methods of construction used shall be in accordance with this appendix.

H105.2 Qualification by Testing. Material and material assemblies tested in accordance with the requirements of section H105 shall be accepted for use when the results and conditions of those tests are met. Testing shall be performed by a testing agency approved by the code official or identified by an approved report.

H105.3 Standards. The state fire marshal standards listed below and as referenced in this appendix are located in appendix Section H112.

SFM 12-7A-1, Exterior Wall Siding and Sheathing
SFM 12-7A-2, Exterior Window
SFM 12-7A-3, Under Eave
SFM 12-7A-4, Decking

H106 MATERIALS, SYSTEMS AND METHODS OF CONSTRUCTION

H106.1 Roofs general. Roofs shall comply with the requirements of this appendix and the IBC. Roofs shall have a roofing assembly installed in accordance with its listing and the manufacturer's installation instructions.

H106.2 Roof coverings. Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be fire-stopped with approved materials or have one layer of No. 72 ASTM cap sheet installed over the combustible decking.

H106.3 Roof valleys. When provided, valley flashings shall be not less than 0.016-inch (0.41 mm) (No. 28 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36 inches (914 mm) wide underlayment consisting of one layer of No. 72 ASTM cap sheet running the full length of the valley.

H106.4 Roof gutters. Roof gutters shall be provided with the means to prevent the accumulation of leaves and debris in the gutter.

H107 ATTIC VENTILATION.

H107.1 General. When required, roof and attic vents shall resist the intrusion of flame and embers into the attic area of the structure, or shall be protected by corrosion resistant, non-combustible wire mesh with ¼ inch (6 mm) openings or its equivalent.

H107.2 Eave or cornice vents. Vents shall not be installed in eaves and cornices.

Exception: Eave and cornice vents may be used provided they resist the intrusion of flame and burning embers into the attic area of the structure.

H107.3 Eave protection. Eaves and soffits shall meet the requirements of SFM 12-7A-3 or shall be protected by ignition-resistant materials or noncombustible construction on the exposed underside.

H108 EXTERIOR WALLS

H108.1 General. Exterior walls shall be approved non-combustible or ignition-resistant material, heavy timber, or log wall construction or shall provide protection from the intrusion of flames and embers in accordance with standard SFM 12-7A-1.

H108.2. Exterior wall coverings. Exterior wall coverings shall extend from the top of the foundation to the roof, and terminate at 2 inch (50.8 mm) nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure.

H108.3. Exterior Wall Openings. Exterior wall openings shall be in accordance with this section.

H108.4. Exterior Wall Vents. Unless otherwise prohibited by other provisions of this code, vent openings in exterior walls shall resist the intrusion of flame and embers into the structure or vents shall be screened with a corrosion-resistant, non-combustible wire mesh with ¼ inch (6 mm) openings or its equivalent.

H108.5. Exterior Glazing and window walls. Exterior windows, window walls, glazed doors, and glazed openings within exterior doors shall be insulating-glass units with a minimum of one tempered pane, or glass block units, or have a fire resistance rating of not less than 20 minutes, when tested according to ASTM E 2010, or conform to the performance requirements of SFM 12-7A-2.

H108.6 Exterior door assemblies. Exterior door assemblies shall conform to the performance requirements of SFM 12-7A-1or shall be of approved non-combustible construction, or solid core wood having stiles and rails not less than 1-3/8 inches thick with interior field panel thickness no less than 1 1/4" thick, or shall have a fire resistance rating of not less than 20 minutes when tested according to ASTM E 2074.

Exception: Noncombustible or exterior fire retardant treated wood vehicle access doors are not required to comply with this chapter.

H109 DECKING, FLOORS AND UNDERFLOOR PROTECTION

H109.1 Decking surfaces. Decking, surfaces, stair treads, risers, and landings of decks, porches, & balconies where any portion of such surface is within 10 feet (3048 mm) of the primary structure shall comply with one of the following methods. The use of paints, coatings, stains, or other surface treatments are not an approved method of protection as required in this appendix:

1. Shall be constructed of Ignition Resistant Materials and pass the performance requirements of SFM 12-7A-4, Parts A and B.
2. Shall be constructed with heavy timber, exterior fire retardant treated wood or approved non-combustible materials.
3. Shall pass the performance requirements of SFM 12-7A-4, Part A,12-7A-5.7.5, 1 only with a net peak heat release rate of 25kW/sq-ft for a 40 minute observation period and:
   - 3.1. Decking surface material shall pass the accelerated weathering test and be identified as Exterior type, in accordance with Chapter 23 of the IBC and;
   - 3.2. The exterior wall covering to which the deck is attached and within 10 (3048 mm) feet of the deck shall be constructed of approved non-combustible or ignition resistant material.

Exception: Walls are not required to comply with this sub-section if the decking surface material conforms to ASTM E-84 Class B flame spread.

H110 UNDERFLOOR AND APPENDAGES PROTECTION

H110.1 Underside of appendages and floor projections. The underside of cantilevered and overhanging appendages and floor projections shall maintain the ignition-resistant integrity of exterior walls, or the projection shall be enclosed to grade.

H110.2 Unenclosed underfloor protection. Buildings shall have all underfloor areas enclosed to grade with exterior walls in accordance with this appendix.

Exception: The complete enclosure of under floor areas may be omitted where the underside of all exposed floors, exposed structural columns, beams and supporting walls are protected as required with exterior ignition-resistant material construction or be heavy timber.

H111 ANCILLARY BUILDINGS AND STRUCTURES

H111.1. Ancillary buildings and structures. When required by the enforcing agency ancillary buildings and structures and detached accessory structures shall comply with the provisions of this appendix.

H112 REFERENCED STANDARDS

ASTM	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959

Standard reference number	Title
ASTM D2898-94 (1999)	Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing
ASTM D3201-94 (2003)	Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Base Products
ASTM E 84-05e01	Test Method for Surface Burning Characteristics of Building Materials
ASTM E2010-01	Standard Test Method for Positive Pressure Fire Tests of Window Assemblies
ASTM E2074-00e1	Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Tes Hinged and Pivoted Swinging Door Assemblies
SFM	California Department of Forestry & Fire Prevention Office of the State Fire Marshal PO Box 944246 Sacramento, CA 94244-2450
SFM 12-7A-1	Exterior Wall Siding and Sheathing
SFM 12-7A-2	Exterior Window
SFM 12-7A-3	Under Eave
SFM 12-7A-4	Decking test standard

PART II – IBC FIRE SAFETY

1. Add new Appendix L as follows:

APPENDIX L
WILDLAND-URBAN INTERFACE FIRE AREA

The provisions of this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION L101
MATERIALS AND CONSTRUCTION METHODS FOR EXTERIOR WILDFIRE EXPOSURE

L101.1 Scope. This appendix applies to building materials, systems and or assemblies used in the exterior design and construction of new buildings located within a Wildland-Urban Interface Fire Area.

L101.2 Purpose. The purpose of this appendix is to establish minimum standards for the protection of life and property by increasing the ability of a building located in any Wildland-Urban Interface Fire Area to resist the intrusion of flame or burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses.

L101.3 Application. New buildings located in any Wildland-Urban Interface Fire Area as designated by the enforcing agency for which an application for a building permit is submitted shall comply with the provisions of this appendix.

L101.4 Alternates for materials, design, tests, and methods of construction. The enforcing agency is permitted to modify the provisions of this appendix for site-specific conditions. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted in accordance with the section L104.1.

L102 New buildings located in any wildland-urban interface fire area. New buildings located in any Wildland-Urban Interface Fire Area as designated by the enforcing agency for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all the provisions of this appendix.

L103 Inspection and certification. Building permit applications and final completion approvals for buildings within the scope and application of this appendix shall comply with the following:

L103.1 The code official shall, prior to construction, provide the owner or applicant a certification that the building as proposed to be built complies with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this appendix.

L103.2 The code official shall, upon completion of construction, provide the owner or applicant with a copy of the final inspection report that demonstrates the building was constructed in compliance with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this appendix.

L103.3 Prior to building permit final approval the property shall be in compliance with the vegetation clearance requirements prescribed by the local code official.

L104. DEFINITIONS

L104.1 FIRE PROTECTION PLAN is a document prepared for a specific project or development proposed for a Wildland-Urban Interface Fire Area. It describes ways to minimize and mitigate potential for loss from wildfire exposure.

The Fire Protection Plan shall be in accordance with this appendix. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted. Only locally adopted ordinances shall apply.

L104.2 IGNITION-RESISTANT MATERIAL is any product which, when tested in accordance with ASTM E 84 for a period of 30 minutes, shall have a flame spread of not over 25 and show no evidence of progressive combustion. In addition, the flame front shall not progress more than 10½ feet (3200 mm) beyond the centerline of the burner at any time during the test.

Materials shall pass the accelerated weathering test and be identified as Exterior type, in accordance with ASTM D 2898 and ASTM D 3201. All materials shall bear identification showing the fire performance rating thereof. That identification shall be issued by a testing facility recognized by the code official.

L104.3 WILDFIRE is any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property, and or resources.

L104.4 WILDFIRE EXPOSURE is one or a combination of radiant heat, convective heat, direct flame contact and burning embers being projected by vegetation fire to a structure and its immediate environment.

L104.5 WILDLAND-URBAN INTERFACE FIRE AREA is a geographical area identified by the state or local code official to be at a significant risk from wildfires.

L104.6 Fire-Retardant-Treated Wood as defined in Section 2303.2 of the *International Building Code*.

L105 STANDARDS OF QUALITY

L105.1 General. Material, systems, and methods of construction used shall be in accordance with this appendix.

L105.2 Qualification by testing. Material and material assemblies tested in accordance with the requirements of section L105 shall be accepted for use when the results and conditions of those tests are met. Testing shall be performed by a testing agency approved by the code official or identified by an approved report.

L105.3 Standards. The state fire marshal standards listed below and as referenced in this appendix are located in Section L112.

SFM 12-7A-1, Exterior Wall Siding and Sheathing
SFM 12-7A-2, Exterior Window
SFM 12-7A-3, Under Eave
SFM 12-7A-4, Decking

L106. MATERIALS, SYSTEMS AND METHODS OF CONSTRUCTION

L106.1 Roofs general. Roofs shall comply with the requirements of this appendix and the *International Building Code*. Roofs shall have a roofing assembly installed in accordance with its listing and the manufacturer's installation instructions.

L106.2 Roof coverings. Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be fire-stopped with approved materials or have one layer of No. 72 ASTM cap sheet installed over the combustible decking.

L106.3 Roof valleys. When provided, valley flashings shall be not less than 0.016-inch (0.41 mm) (No. 28 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36 inches (914 mm) wide underlayment consisting of one layer of No. 72 ASTM cap sheet running the full length of the valley.

L106.4 Roof gutters. Roof gutters shall be provided with the means to prevent the accumulation of leaves and debris in the gutter.

L107 ATTIC VENTILATION.

L107.1 General. When required, roof and attic vents shall resist the intrusion of flame and embers into the attic area of the structure, or shall be protected by corrosion resistant, non-combustible wire mesh with ¼ inch (6 mm) openings or its equivalent.

L107.2 Eave or cornice vents. Vents shall not be installed in eaves and cornices.

> **Exception:** Eave and cornice vents may be used provided they resist the intrusion of flame and burning embers into the attic area of the structure.

L107.3 Eave protection. Eaves and soffits shall meet the requirements of SFM 12-7A-3 or shall be protected by ignition-resistant materials or noncombustible construction on the exposed underside.

L108 EXTERIOR WALLS

L108.1 General. Exterior walls shall be approved non-combustible or ignition-resistant material, heavy timber, or log wall construction or shall provide protection from the intrusion of flames and embers in accordance with standard SFM 12-7A-1.

L108.2 Exterior wall coverings. Exterior wall coverings shall extend from the top of the foundation to the roof, and terminate at 2 inch (50.8 mm) nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure.

L108.3 Exterior wall openings. Exterior wall openings shall be in accordance with this section.

L108.4 Exterior wall vents. Unless otherwise prohibited by other provisions of this code, vent openings in exterior walls shall resist the intrusion of flame and embers into the structure or vents shall be screened with a corrosion-resistant, non-combustible wire mesh with ¼ inch (6 mm) openings or its equivalent.

L108.5 Exterior glazing and window walls. Exterior windows, window walls, glazed doors, and glazed openings within exterior doors shall be insulating-glass units with a minimum of one tempered pane, or glass block units, or have a fire resistance rating of not less than 20 minutes, when tested according to ASTM E 2010, or conform to the performance requirements of SFM 12-7A-2.

L108.6 Exterior door assemblies. Exterior door assemblies shall conform to the performance requirements of SFM 12-7A-1or shall be of approved non-combustible construction, or solid core wood having stiles and rails not less than 1-3/8 inches thick with interior field panel thickness no less than 1 1/4" thick, or shall have a fire resistance rating of not less than 20 minutes when tested according to ASTM E 2074.

> **Exception:** Noncombustible or exterior fire retardant treated wood vehicle access doors are not required to comply with this chapter.

L109 DECKING, FLOORS AND UNDERFLOOR PROTECTION

L109.1 Decking surfaces. Decking, surfaces, stair treads, risers, and landings of decks, porches, & balconies where any portion of such surface is within 10 feet (3048 mm) of the primary structure shall comply with one of the following methods. The use of paints, coatings, stains, or other surface treatments are not an approved method of protection as required in this appendix:

1. Shall be constructed of Ignition Resistant Materials and pass the performance requirements of SFM 12-7A-4, Parts A and B.
2. Shall be constructed with heavy timber, exterior fire retardant treated wood or approved non-combustible materials.
3. Shall pass the performance requirements of SFM 12-7A-4, Part A,12-7A-5.7.5, 1 only with a net peak heat release rate of 25kW/sq-ft for a 40 minute observation period and:
   - 3.1. Decking surface material shall pass the accelerated weathering test and be identified as Exterior type, in accordance with ASTM D 2898, ASTM D 3201and;
   - 3.2. The exterior wall covering to which the deck is attached and within 10 (3048 mm) feet of the deck shall be constructed of approved non-combustible or ignition resistant material.

Exception: Walls are not required to comply with this sub-section if the decking surface material conforms to ASTM E-84 Class B flame spread.

L110 UNDERFLOOR AND APPENDAGES PROTECTION

L110.1 Underside of appendages and floor projections. The underside of cantilevered and overhanging appendages and floor projections shall maintain the ignition-resistant integrity of exterior walls, or the projection shall be enclosed to grade.

L110.2 Unenclosed underfloor protection. Buildings shall have all underfloor areas enclosed to grade with exterior walls in accordance with this appendix.

Exception: The complete enclosure of under floor areas may be omitted where the underside of all exposed floors, exposed structural columns, beams and supporting walls are protected as required with exterior ignition-resistant material construction or be heavy timber.

L111 ANCILLARY BUILDINGS AND STRUCTURES

L111.1 Ancillary buildings and structures. When required by the enforcing agency ancillary buildings and structures and detached accessory structures shall comply with the provisions of this appendix.

L112 REFERENCED STANDARDS

ASTM	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959
Standard reference number	**Title**
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ASTM D3201-94 (2003)	Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Base Products
ASTM E 84-05e01	Test Method for Surface Burning Characteristics of Building Materials
ASTM E2010-01	Standard Test Method for Positive Pressure Fire Tests of Window Assemblies
ASTM E2074-00e1	Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Tes Hinged and Pivoted Swinging Door Assemblies
SFM	California Department of Forestry & Fire Prevention Office of the State Fire Marshal PO Box 944246 Sacramento, CA 94244-2450
SFM 12-7A-1	Exterior Wall Siding and Sheathing
SFM 12-7A-2	Exterior Window
SFM 12-7A-3	Under Eave
SFM 12-7A-4	Decking test standard

Reason: The estimated structural damage and destruction, and cost of response from three major federally-declared disasters over the past 12 years (1991 Oakland Hills, 1993 Southern California, 2003 Southern California) was $10 billion.

Wildland-Urban Interface Fires occur every year in California; in 2003 alone, the total number of structures destroyed or damaged was approximately 5,046. It has been determined that 74% of these losses were a result of the "California Fire Siege, 2003" as reported in, "The Story."

Those who lost their homes in past fires are applying for building permits today to build on the same property where their homes were destroyed. It is in the public's interest that these new building standards become enforceable in these Wildland-Urban Interface Fire Areas as quickly as possible to help mitigate the devastation that California experienced in 2003.

There is broad recognition that the adoption of building standards for exterior wildfire exposure protection:

1. Is appropriate public policy
2. Will achieve significant reduction in Wildland-Urban Interface fire losses in addition to those already realized as a result of the fire-resistive roofing regulations promulgated by the SFM over the past two decades, and
3. Is required (along with vegetation fuel management) because the majority of California interface fire loss occurs during interface fire disasters or conflagrations as describe above, and other methods of fire loss reduction have not historically been shown to be effective at reducing conflagration losses.

The public interest requires the adoption of these building standards. Because the property losses are great not only in California but throughout the United States where these Wildland-Urban Interface Fire Areas exist, residents and building owners are asking why this is happening and can it be stopped? In other words what can they do to responsibly and better protect their homes and business?

The resistance of ignition to building materials used in wildland urban interface situations is more important than the longer term fire resistance rating of those materials. Most building fire loss in wildland urban interface areas is a result of ember/brand intrusion or entrapment, or short term exposure to radiated heat or direct flame impingement. Building and property loss can be significantly reduced by simple changes to the design, construction methods and materials. Adding these factors to the UWIC formula allows more accurate determination of relative fire protection values.

GAO. 2005. "Protecting Structures during Wildland Fires"

National Association of Counties. 2005 Wildland-Urban Interface Resolution

League of California Cities & CSAC. 2004. "WUI Fires - A Collaborative Plan to Decrease Impacts on Public Health and Safety"

U.S. Congress. 2003. "Healthy Forest Restoration Act"

SFM 2005 "Interface Fire Research and Case Study Summary" WUI Building Standards Information Bulletin

SFM 2005 "California Interface Conflagrations – The Interface Fire Disaster Story" WUI Building Standards Information Bulletin

This code change proposal is consistent with the findings of the report commissioned by the California Department of Forestry & Fire Protection, Office of the State Fire Marshal which studied data from over 3000 structures burned in the 2003 Southern California wildfires [Fire At the Urban Wildland Interface – IFB Number 5CA334189/FCA – 05-6369 of 7-28-2004] which demonstrated that cost effective construction technologies – and underlying testing technology - exist which can substantially reduce the likelihood of sustained ignition of structures during UWI fire incidents. Likewise data from San Diego County also support these proposals in that areas which were tested by the 2003 fires where homes were constructed under recent local code provisions consistent with those being proposed for the ICC UWI Code displayed significantly higher survival rates than those built before those regulations were enacted.

Bibliography: Fire at the Urban Wildland Interface – IFB Number 5CA334189/FCA – 05-6369 of 7-28-2004

Cost Impact: There is a cost impact associated with the types of materials that may be used in a WUIFA

Analysis: The proposed appendix regulates the same subject matter as the *International Wildland-Urban Interface Cod*e (IWUIC) but if or how the appendix correlates with the IWUIC has not been explained in the proponent's reason statement. The IWUIC is a referenced code in current IBC Table 1505.1 and in IFC Section 304.1.2 and it is unclear as to what the proponent intends regarding the effect that adopting the appendices would have on the application of the IWUIC references.

PART I – IFC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IBC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

F217–06/07
Appendix H (New)

Proponent: Pat McLaughlin, McLaughlin & Associates, representing The Sherwin Williams Company

Add new appendix as follows: (Underline omitted for clarity)

APPENDIX H

HAZARDOUS MATERIALS MANAGEMENT PLANS AND HAZARDOUS MATERIALS INVENTORY STATEMENTS

(See IFC Sections 2701.5,1 and 2701.5.2)

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION 1 — SCOPE

Hazardous materials inventory statements (HMIS) and hazardous materials management plans (HMMP) which are required by the chief pursuant to Chapter 27 shall be provided for hazardous materials in accordance with Appendix H.

Exceptions:

1. Materials which have been satisfactorily demonstrated not to present a potential danger to public health, safety or welfare, based upon the quantity or condition of storage, when approved.
2. Chromium, copper, lead, nickel and silver need not be considered hazardous materials for the purposes of Appendix H unless they are stored in a friable, powered or finely divided state.

Proprietary and trade secret information shall be protected under the laws of the state or jurisdiction having authority.

SECTION 2 — HAZARDOUS MATERIALS INVENTORY STATEMENTS (HMIS)

2.1 When Required. A separate HMIS shall be provided for each building, including its appurtenant structures, and each exterior facility in which hazardous materials are stored.

The hazardous materials inventory statement shall list by hazard class all hazardous materials stored. The hazardous materials inventory statement shall include the following information for each hazardous material listed:

1. Hazard class.
2. Common or trade name.
3. Chemical name, major constituents and concentrations if a mixture. If a waste, the waste category.
4. Chemical Abstract Service number (CAS number) found in 29 Code of Federal Regulations (C.F.R.).
5. Whether the material is pure or a mixture, and whether the material is a solid, liquid or gas.
6. Maximum aggregate quantity stored at any one time.
7. Storage conditions related to the storage type, temperature and pressure.

2.2 Changes to HMIS. An amended HMIS shall be provided within 30 days of the storage of any hazardous materials which changes or adds a hazard class or which is sufficient in quantity to cause an increase in the quantity which exceeds 5 percent for any hazard class.

SECTION 3— HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP)

3.1 General. Applications for a permit to store hazardous materials shall include an HMMP standard form or short form in accordance with Section NO TAG and shall provide a narrative description of the operations and processes taking place at the facility. See Figure A-H-1.

3.2 Information Required. The HMMP standard form shall include the information detailed in Section 3.2.

3.2.1 General Information. General information, including business name and address, emergency contacts, business activity, business owner or operator, SIC code, number of employees and hours, Dunn and Bradstreet number, and signature of owner, operator or designated representative.

3.2.2 General site plan. A general site plan drawn at a legible scale which shall include, but not be limited to, the location of buildings, exterior storage facilities, permanent access ways, evacuation routes, parking lots, internal roads, chemical loading areas, equipment cleaning areas, storm and sanitary sewer accesses, emergency equipment and adjacent property uses. The exterior storage areas shall be identified with the hazard class and the maximum quantities per hazard class of hazardous materials stored. When required by the chief, information regarding the location of wells, flood plains, earthquake faults, surface water bodies and general land uses within 1 mile (1.609 km) of the facility boundaries shall be included.

3.2.3 Building floor plan. A building floor plan drawn to a legible scale which shall include, but not be limited to, hazardous materials storage areas within the building and shall indicate rooms, doorways, corridors, means of egress and evacuation routes. Each hazardous materials storage facility shall be identified by a map key which lists the individual hazardous materials, their hazard class and quantity present for each area.\

3.2.4 Hazardous materials handling. Information showing that activities involving the handling of hazardous materials between the storage areas and manufacturing processes on site are conducted in a manner to prevent the accidental release of such materials.

3.2.5 Chemical capability and separation. Information showing procedures, controls, signs or other methods used to ensure separation and protection of stored materials from factors which could cause accidental ignition or reaction of ignitable, reactive or incompatible materials in each area.

3.2.6 Monitoring program. Information including, but not limited to, the location, type, manufacturer's specifications, if applicable, and suitability of monitoring methods for each storage facility when required.

3.2.7 Inspection and recording keeping. Schedules and procedures for inspecting safety and monitoring and emergency equipment. The permittee shall develop and follow a written inspection procedure acceptable to the chief for inspecting the facility for events or practices which could lead to unauthorized discharges of hazardous materials. Inspections shall be conducted at a frequency appropriate to detect problems prior to a discharge. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.

3.2.8 Employee training. A training program appropriate to the types and quantities of materials stored or used shall be conducted to prepare employees to safely handle hazardous materials on a daily basis and during emergencies. The training program shall include:

1. Instruction in safe storage and handling of hazardous materials, including maintenance of monitoring records.
2. Instruction in emergency procedures for leaks, spills, fires or explosions, including shutdown of operations and evacuation procedures, and
3. Record-keeping procedures for documenting training given to employees.

3.2.9 Emergency response. A description of facility emergency procedures is to be provided.

3.3 HMMP Short Form—(Minimal Storage Site). A facility shall qualify as a minimal storage site if the quantity of each hazardous material stored in one or more facilities in an aggregate quantity for the facility is 500 pounds (227 kg) or less for solids, 55 gallons (208.2 L) or less for liquids, or 200 cubic feet (5.7 m^3) or less at NTP for compressed gases and does not exceed the threshold planning quantity as listed in 40 C.F.R., Part 355, Sections 302 and 304. The applicant for a permit for a facility which qualifies as a minimal storage site is allowed to file the short form HMMP. Such plan shall include the following components:

1. General facility information,
2. A simple line drawing of the facility showing the location of storage facilities and indicating the hazard class or classes and physical state of the hazardous materials being stored,
3. Information describing that the hazardous materials will be stored and handled in a safe manner and will be appropriately contained, separated and monitored, and
4. Assurance that security precautions have been taken, employees have been appropriately trained to handle the hazardous materials and react to emergency situations, adequate labeling and warning signs are posted, adequate emergency equipment is maintained, and the disposal of hazardous materials will be in an appropriate manner.

SECTION 4 — MAINTENANCE OF RECORDS

Hazardous materials inventory statements and hazardous materials management plans shall be maintained by the permittee for a period of not less than three years after submittal of updated or revised versions. Such records shall be made available to the chief upon request.

FIGURE A-H-1
SAMPLE FORMAT
HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP) INSTRUCTIONS

SECTION I—FACILITY DESCRIPTION

1.1 Part A

1. Fill out Items 1 through 11 and sign the declaration.
2. Only Part A of this section is required to be updated and submitted annually, or within 30 days of a change.

1. 2 Part B — General Facility Description (Site Plan)

1. Provide a site plan on 8 ½-by 11-inch (215 mm by 279 mm) paper, using letters on the top and bottom margins and numbers on the right and left side margins, showing the location of all buildings, structures, chemical loading areas, parking lots, internal roads, storm and sanitary sewers, wells, and adjacent property uses. Indicate the approximate scale, northern direction and date the drawing was completed.
2. List all special land uses within 1 mile (1.609 km).

1.3 Part C — Facility Storage Map (Confidential Information)

1. Provide a floor plan of each building on 8 ½- by 11-inch (215 mm by 279 mm) paper, using letters on the top and bottom margins and numbers on the right and left side margins, with approximate scale and northern direction, showing the location of each storage area. Mark map clearly “Confidential—Do not disclose” for trade-secret information as specified by federal, state and local laws.
2. Identify each storage area with an identification number, letter, name or symbol.
3. Show the following:
   - 3.1. Accesses to each storage area.
   - 3.2. Location of emergency equipment.
   - 3.3. The general purpose of other areas within the facility.
   - 3.4 Location of all aboveground and underground tanks to include sumps, vaults, below-grade treatment systems, piping, etc.
4. Map key. Provide the following on the map or in a map key or legend for each storage area:
   - 4.1. A list of hazardous materials, including wastes.
   - 4.2. Hazard class of each hazardous waste.
   - 4.3. The maximum quantity for hazardous materials.
   - 4.4. Include the contents and capacity limit of all tanks at each area and indicate whether they are above or below ground.
   - 4.5. List separately any radioactives, cryogens and compressed gases for each facility.
   - 4.6. Trade-secret information shall be listed as specified by federal, state and local laws.

SECTION II — HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS)

2.1. Part A — Declaration

Fill out all appropriate information.

2.2.1 Part B—Inventory Statement

1. You must complete a separate inventory statement for all waste and nonwaste hazardous materials. List all hazardous materials in alphabetical order by hazard class.
2. Inventory Statement Instructions

Column	Information Required
1.	Provide hazard class for each material.
2.	Nonwaste. Provide the common or trade name of the regulated material.
3.	Waste. In lieu of trade names, you may provide the waste category.
3.	Provide the chemical name and major constituents and concentrations, if a mixture.
4.	Enter the chemical abstract service number (CAS number) found in 29 C.F.R. For mixtures, enter the CAS number of the mixture as a whole if it has been assigned a number distinct from its constituents. For a mixture that has no CAS number, leave this item blank or report the CAS numbers of as many constituent chemicals as possible.

5. Enter the following descriptive codes as they apply to each material. You may list more than one code, if applicable.

P = Pure
M = Mixture
S = Solid
L = Liquid
G = Gas

6. 6.1. Provide the maximum aggregate quantity of each material handled at any one time by the business. For underground tanks, list the maximum volume [in gallons (liters)] of the tank..

6.2. Enter the estimated average daily amount on site during the past year.

7. Enter the units used in Column 6 as:

LB = Pounds
GA = Gallons
CF = Cubic Feet

8. Enter the number of days that the material was present on site (during the last year).

9. Enter the storage codes below for type, temperature and pressure.

Type

A = Aboveground Tank
B = Belowground Tank
C – Tank inside Building
D = Steel Drum
E = Plastic or Nonmetallic Drum
F = Can
G = Carboy
H = Silo
I = Fiber Drum
J = Bag
K = Box
L = Cylinder
M = Glass Bottle or Jug
N = Plastic Bottles or Jugs
O = Tote Bin
P = Tank Wagon
Q = Rail Car
R = Other

Temperature

4 = Ambient
5 = Greater than Ambient
6 = Less than Ambient, but not Cryogenic [less than -150°F (-101.1°C)]
7 = Cryogenic conditions [less than -150°F (-101.1°C)]

Pressure

1 = Ambient (Atmospheric)
2 = Greater than Ambient (Atmospheric)
3 = Less than Ambient (Atmospheric)

10. For each material listed, provide the SARA hazard class as listed below. You may list more than one class. These categories are defined in 40 C.F.R. 370.3.

Physical Hazards

F = Fire
P = Sudden Release of Pressure
R = Reactivity

Health Hazards
I = Immediate (Acute)
D = Delayed (Chronic)

11. Waste Only. For each waste, provide the total estimated amount of hazardous waste handled throughout the course of the year.

SECTION III—SEPARATION AND MONITORING

3. 1 Part A—Aboveground

Fill out Items 1 through 6, or provide similar information for each storage area shown on the facility map. Use additional sheets as necessary.

3.2 Part B—Underground

1. Complete a separate page for each underground tank, sump, vault, below-grade treatment system, etc.
2. Check the type of tank and method(s) that applies to your tank(s) and piping, and answer the appropriate questions. Provide any additional information in the space provided or on a separate sheet.

SECTION IV — WASTE DISPOSAL

Check all that apply and list the associated wastes for each method checked.

SECTION V — RECORDING KEEPING
Include a brief description of your inspection procedures. You are also required to keep an inspection log and recordable discharge log, which are designed to be used in conjunction with routine inspections for all storage facilities or areas. Place a check in each box that describes your forms. If you do not use the sample forms, provide copies of your forms for review and approval.

SECTION VI — EMERGENCY-RESPONSE PLAN

1. This plan should describe the personnel, procedures and equipment available for responding to a release or threatened release of hazardous materials that are stored, handled or used on site.
2. A check or a response under each item indicates that a specific procedure is followed at the facility, or that the equipment specified is maintained on site.
3. If the facility maintains a more detailed emergency-response plan on site, indicate this in Item 5. This plan shall be made available for review by the inspecting jurisdiction.

SECTION VII — EMERGENCY RESPONSE TRAINING PLAN

1. This plan should describe the basic training plan used at the facility.
2. A check in the appropriate box indicates the training is provided or the records are maintained.
3. If the facility maintains a more detailed emergency-response training plan, indicate this in Item 4. This plan shall be made available for review by the inspecting jurisdiction.

PART A—GENERAL INFORMATION

1. Business Name:_____Phone:_____

   Address:_____

2. Person Responsible for the Business:

Name	Title	Phone
_____	_____	_____

3. Emergency Contacts:

Name	Title	Home Number	Work Number
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4. Person Responsible for the Application/Principal Contact:

Name	Title	Phone
_____	_____	_____

5. Property Owner:

Name	Address	Phone
_____	_____	_____

6. Principal Business Activity: _____

7. Number of Employees: _____

8. Number of Shifts: _____

9. Hours of Operation: _____

10. SIC Code: _____

11. Dunn and Bradstreet Number: _____

12. Declaration

I certify that the information above and on the following parts is true and correct to the best of my knowledge.

Signature:_____ Date _____

Print Name:_____ Title:_____

(Must be signed by owner/operator or designated representative)

PART B—GENERAL FACILITY DESCRIPTION/SITE PLAN

(Use grid format below.)

Special land uses within 1 mile (1. 609 km):_____

_____ ____

_____

PART C—FACILITY MAP

(Use grid format below.)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1															1
2															2
3															3
4															4
5															5
6															6
7															7
8															8
9															9
10															10
11															11
12															12
13															13
14															14
15															15
16															16
17															17
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	

BUSINESS NAME		DATE
ADDRESS	CITY	PAGE____ OF ____