

## **HIGH-PILED COMBUSTIBLE STORAGE GUIDELINES**

### **WHERE DEFINED:**

2006 IBC 413.1 says see the International Fire Code

2006 IBC 907.2.14 says see the International Fire Code

2006 IBC 910.2.2 says comply with IBC 413 and see the International Fire Code

Chapter 23 of the 2006 International Fire Code addresses High-Piled Combustible Storage

### **DEFINITION (From 2006 IFC Chapter 23)**

“Storage of combustible materials in closely packed piles or combustible materials on pallets, in racks, or on shelves where the top of storage is greater than 12-feet in height. When required by the fire code official, high-piled combustible storage also included certain high-hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets and similar commodities, where the top of storage is greater than 6-feet in height.”

### **DESIGN REQUIREMENTS FOR HIGH-PILED COMBUSTIBLE STORAGE**

There are a host of items that must be addressed to comply with all of the IFC regulations for High-Piled Combustible Storage; however the major categories are as follow:

- A. Automatic Fire Extinguishing System
- B. Fire Detection System
- C. Building Access
- D. Smoke and Heat Removal
- E. Draft Curtains
- F. Maximum Pile Dimension
- G. Maximum Permissible Storage Height
- H. Maximum Pile Volume

The requirements for these items vary by the size of the storage and the classification of the commodity. Probably the most important shortcut to understanding the basic requirements with which you must comply for any given project is Table 2306.2 of the International Fire Code. A copy of the 2006 IFC Table 2306.2 is attached to this document for your information and review. Take note that many jurisdictions have exceptions to the IFC requirements included in their building codes. You should consult an Architect or Fire Protection Engineer that is familiar with your jurisdiction to confirm the actual requirements that are enforced.

### **ATTACHMENT**

Table 2306.2 – General Fire Protection and Life Safety Requirements from the 2006 International Fire Code.

## HIGH-PILED COMBUSTIBLE STORAGE

### COMMODODITY CLASSIFICATION – Section 2303 of the 2006 IFC

**Class I Commodities** are essentially non-combustible products on wooden or nonexpanded polyethylene solid deck pallets, in ordinary corrugated cartons with or without single-thickness dividers, or in ordinary paper wrappings with our without pallets.

**Class II Commodities** are Class I products in slatted wooden crates, solid wooden boxes, multiple-thickness paperboard cartons or equivalent combustible packaging material with or without pallets.

**Class III Commodities** are commodities of wood, paper, natural fiber cloth, or Group C plastics or products thereof, with or without pallets.

**Class IV Commodities** are Class I, II, or III products containing Group A plastics in ordinary corrugated cartons and Class I, II, and III products, with Group A plastic packaging, with or without pallets. Group B plastics and free-flowing Group A plastics are also included in this class.

**High Hazard Commodities** are high-hazard products presenting special fire hazards beyond those of Class I, II, III, or IV. Group A plastics not otherwise classified are included in this class.

### CLASSIFICATION OF PLASTICS – Section 2303.7 of the 2006 IFC

**Group A** plastics are plastic materials having a heat of combustion that is much higher than that of ordinary combustibles, and a burning rate higher than that of Group B plastics.

**Group B** plastics are plastic materials having a heat of combustion and a burning rate higher than that of ordinary combustibles, but not as high as those of Group A plastics.

**Group C** plastics are plastic materials having a heat of combustion and a burning rate similar to those of ordinary combustibles.

**NOTE – The 2006 IFC contains lists of examples of each type of commodity and plastic.**

Increasing Hazard

Increasing Hazard

TABLE 2306.2  
GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA <sup>a</sup> (square feet) (see Sections 2306.2 and 2306.4)	ALL STORAGE AREAS (See Sections 2306, 2307 and 2308) <sup>b</sup>					SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 2307.3)		
		Automatic fire-extinguishing system (see Section 2306.4)	Fire detection system (see Section 2306.5)	Building access (see Section 2306.6)	Smoke and heat removal (see Section 2306.7)	Draft curtains (see Section 2306.7)	Maximum pile dimension <sup>c</sup> (feet)	Maximum permissible storage height <sup>d</sup> (feet)	Maximum pile volume (cubic feet)
I-IV	0-500	Not Required <sup>a</sup>	Not Required	Not Required <sup>e</sup>	Not Required	Not Required	Not Required	Not Required	Not Required
	501-2,500	Not Required <sup>a</sup>	Yes <sup>i</sup>	Not Required <sup>e</sup>	Not Required	Not Required	100	40	100,000
	2,501-12,000 Public accessible	Yes	Not Required	Not Required <sup>e</sup>	Not Required	Not Required	100	40	400,000
	2,501-12,000 Nonpublic accessible (Option 1)	Yes	Not Required	Not Required <sup>e</sup>	Not Required	Not Required	100	40	400,000
	2,501-12,000 Nonpublic accessible (Option 2)	Not Required <sup>a</sup>	Yes	Yes	Yes <sup>j</sup>	Yes <sup>j</sup>	100	30 <sup>f</sup>	200,000
	12,001-20,000	Yes	Not Required	Yes	Yes <sup>j</sup>	Not Required	100	40	400,000
	20,001-500,000	Yes	Not Required	Yes	Yes <sup>j</sup>	Not Required	100	40	400,000
	Greater than 500,000 <sup>g</sup>	Yes	Not Required	Yes	Yes <sup>j</sup>	Not Required	100	40	400,000
High hazard	0-500	Not Required <sup>a</sup>	Not Required	Not Required <sup>e</sup>	Not Required	Not Required	50	Not Required	Not Required
	501-2,500 Public accessible	Yes	Not Required	Not Required <sup>e</sup>	Not Required	Not Required	50	30	75,000
	501-2,500 Nonpublic accessible (Option 1)	Yes	Not Required	Not Required <sup>e</sup>	Not Required	Not Required	50	30	75,000
	501-2,500 Nonpublic accessible (Option 2)	Not Required <sup>a</sup>	Yes	Yes	Yes <sup>j</sup>	Yes <sup>j</sup>	50	20	50,000
	2,501-300,000	Yes	Not Required	Yes	Yes <sup>j</sup>	Not Required	50	30	75,000
	300,001-500,000 <sup>g, h</sup>	Yes	Not Required	Yes	Yes <sup>j</sup>	Not Required	50	30	75,000

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m<sup>3</sup>, 1 square foot = 0.0929 m<sup>2</sup>.

- a. When automatic sprinklers are required for reasons other than those in Chapter 23, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 2307 and 2308.
- b. For aisles, see Section 2306.9.
- c. Piles shall be separated by aisles complying with Section 2306.9.
- d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g when required by the fire code official. See also Chapters 28 and 34 for special limitations for aerosols and flammable and combustible liquids, respectively.
- e. Section 503 shall apply for fire apparatus access.
- f. For storage exceeding 30 feet in height, Option 1 shall be used.
- g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided when required by the fire code official.
- h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with the *International Building Code* shall be used to divide high-piled storage exceeding 500,000 square feet in area.
- i. Not required when an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 2307 and 2308.
- j. Not required when storage areas are protected by early suppression fast response (ESFR) sprinkler systems installed in accordance with NFPA 13.