



## **E-PLAN** E X A M

# High-Pile Combustible Storage & Rack Storage Application Checklist

The following checklist details all information required by state statutes and local ordinances detailing the requirements for submission as it associated with High Piled and Rack Storage as required by IBC 413 and IFC ch. 32.

### **Scope:**

A public building, structure or place of employment shall be designed by an architect or an engineer, except as provided under ss. [443.14](#) and [443.15](#), Stats. in accordance with SPS 361.20. Where high-piled combustible storage is proposed in a new building, the direct reference to the IFC comes from IBC Section 413. Where high-piled combustible storage is proposed in an existing building, it would be considered a level 2 alteration as it is a reconfiguration of space. All new construction elements, components, systems, and spaces shall comply with the IBC, in accordance with IEBC 801.3.

### **Required Information:**

The following shall be included on the plans to demonstrate compliance with IFC Chapter 32. The general requirements apply to all high-piled combustible storage, and the specific requirements only apply to the proposed type of storage:

### **General Requirements:**

- The commodity classification as determined by IFC 3203 shall be classified as Class I, II, III, IV or high hazard.
- Note: High-piled storage areas, and portions of high-piled storage areas intended for storage of a different commodity class than adjacent areas, shall be designed and specifically designated to contain Class I, Class II, Class III, Class IV or high-hazard commodities. The designation of a high-piled combustible storage area, or portion thereof intended for storage of a different commodity class, shall be based on the highest hazard commodity class stored except as provided in Section 3204.2.*
- All high-piled storage areas in the building and whether fire-resistance rated separation is provided between mixed occupancies, high-piled storage areas, or multiclass high-piled storage areas.
- Is an automatic sprinkler system to be provided as required in accordance with IFC 3207, 3208 and 3209.
- Is a fire detection, complying with IFC 3206.5, to be provided in accordance with IFC Table 3206.2
- Is building access, complying with IFC 3206.6, to be provided in accordance with IFC Table 3206.2.
- Is smoke and heat removal, complying with IFC 910, to be provided in accordance with IFC Table 3206.2.
- Is a Class I standpipe system, complying with IFC 905, to be provided to protect exit passageways for egress.
- Illustrate the location, width, and clear height of aisles complying with IFC 3206.9. Dead-end aisles shall comply with IFC 3206.9.3.
- The location of portable fire extinguishers required by IFC Section 906.
- If storage is automated, please verify whether carousel storage will be provided.
- If storage is used for a records storage facility, are combustible paper records being stored? If so to what extent.

### **Solid-Piled Storage, Shelf Storage, and Palletized Storage:**

- Pile dimensions, the maximum permissible storage height and pile volume permitted by IFC Table 3206.2.
- Provide the height of shelf storage where it's provided.
- Has a close array protection method has been selected for the design of the automatic sprinkler system?

### **Rack Storage:**

- Will the rack storage be placed on plastic shelves? Will the racks will be provided with or without solid shelving?
- Will the configuration of the rack(s) (single-row, double-row, or multi-row)?
- Are flue spaces required in accordance with IFC Table 3208.3?

### **Plan Review Fees:**

When plans for high-piled combustible storage are submitted, the plan review fee will be assessed in one of the following ways:

1. When the high-piled combustible storage is part of a larger new construction, alteration, or addition project; and the entire scope of work is submitted by the same registered design professional; then the total square footage of the space will be used to assess the plan review fee.
2. When the plans are limited to the high-piled combustible storage elements, the size of the storage area will be used to assess the plan review fee.
3. **Pre-manufactured and pre-engineered structural components submittals:**  
Structural component plans for steel racks shall be submitted with the plans, or as a separate plan. When the component plans are submitted with the plans, there will be no additional plan review fees assessed. When they are submitted separately, the fee for "structural plans and other component submittals" outlined in the municipality's fee schedule will apply.

#### **Appendix - Code References:**

### **SPS 361.03 Application.**

#### **(1) Standards.**

(a) The design and construction of public buildings and places of employment shall comply with s. [SPS 361.05](#), except as otherwise provided in chs. [SPS 361](#) to [366](#).

(b) The codes and standards that are referenced in this chapter, and any additional codes and standards which are subsequently referenced in those codes and standards, shall apply to the prescribed extent of each such reference, except as modified by this chapter.

**(15) Global Deletions For The International Codes.** Unless specifically applied by another department-written rule in chs. [SPS 361](#) to [366](#), the following requirements of the IBC, IEBC, IECC, IFC, IFGC, and IMC do not apply as rules of the department:

(a) All requirements that specify submittal and approval of construction documents, shop drawings or acceptance tests and records.

(b) All requirements that specify employing special inspectors or obtaining special inspections or structural observations.

(c) All requirements that mandate obtaining approval, acceptance or other direction from a building or fire code official.

**Note:** This paragraph does not delete options to obtain approval from the Department or its authorized agents for specific circumstances that differ from conditions which are more generally prescribed in the above-listed codes.

### **SPS 361.20 Responsibilities.**

#### **(2) Design.**

(a) Pursuant to ch. [443](#), Stats., a public building, structure or place of employment shall be designed by an architect or an engineer, except as provided under ss. [443.14](#) and [443.15](#), Stats.

(b) Pursuant to ch. [443](#), Stats., a component or a system, including an electrical system, a fire protection system, a heating ventilating and air conditioning system, or a plumbing system, for a public building, structure or place of employment shall be designed by an architect, engineer or a designer of engineering systems, except as provided under ss. [443.14](#) and [443.15](#), Stats.

### **SPS 361.30 Plan review and approval.**

#### **(1) Types of buildings.**

(a) Except as provided in par. (b), Table 361.30-1, and sub. (4), the construction of, the alteration of, or the addition to a public building or a place of employment may not commence unless plans for the project have been submitted to and approved by the department or its authorized representative in accordance with s. [SPS 361.31](#).

#### **(3) Types Of Building Components.**

(a) Except as provided in sub. (4), building component or system plans shall be submitted to and approved by the department or authorized representative prior to installation of the component or system, for each of the following type components or systems:

1. Pre-manufactured and pre-engineered structural components.
2. Heating, ventilating and air conditioning systems.
3. Fire protection systems.

(b) Component or systems plans shall be submitted in one of the following manners:

1. Included with the plans under sub. (1)(a).
2. Submitted as a separate plan for the component or system.

IBC Code Path:

**[BS] STORAGE RACKS.** Cold-formed or hot-rolled steel structural members which are formed into steel storage racks, including pallet storage racks, movable-shelf racks, rack-supported systems, automated storage and retrieval systems (stacker racks), push-back racks, pallet-flow racks, case-flow racks, pick modules and rack-supported platforms. Other types of racks, such as drive-in or drive-through racks, cantilever racks, portable racks or racks made of materials other than steel, are not considered storage racks for the purpose of this code.

#### **SECTION 413 - COMBUSTIBLE STORAGE:**

**413.1 General.** High-piled stock or rack storage in any occupancy group shall comply with the International Fire Code.

*This section alerts the code user to the specific high-piled combustible storage requirements contained in Chapter 32 of the IFC. High-piled storage presents a hazard above that of normal combustible storage. By increasing the height of the storage, the ability for a fire to grow and thrive is increased dramatically. Therefore, such storage requires special consideration with regard to arrangement and fire protection design features.*

*Chapter 32 of the IFC provides requirements for the high-piled storage of combustible materials regardless of the occupancy classification. High-piled storage can occur in many different occupancies, but is most typical in Group M, S and F occupancies.*

*High-piled storage of combustible materials includes solid-piled, palletized, shelf or rack storage where the top of storage is in excess of 12 feet (3658 mm) in height or 6 feet (1829 mm) for high-hazard commodities. Commodity classifications for all types of products, as well as fire protection requirements, are provided in Chapter 32 of the IFC and the high-piled storage provisions of NFPA 13.*

#### **SECTION 903 - AUTOMATIC SPRINKLER SYSTEMS**

[F] 903.2.7 Group M.

**[F] 903.2.7.1 High-piled storage.** An automatic sprinkler system shall be provided in accordance with the International Fire Code in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

#### **SECTION 905 - STANDPIPE SYSTEMS**

**[F] 905.1 General.** Standpipe systems shall be provided in new buildings and structures in accordance with Sections 905.2 through 905.10. In buildings used for high-piled combustible storage, fire protection shall be in accordance with the International Fire Code.

#### **SECTION 907 - FIRE ALARM AND DETECTION SYSTEMS**

**[F] 907.2.15 High-piled combustible storage areas.** An automatic smoke detection system shall be installed throughout high-piled combustible storage areas where required by Section 3206.5 of the International Fire Code.

*Section 3206.5 of the IFC requires an automatic fire detection system in high-piled combustible storage areas depending on the commodity class, the size of the high-piled storage area and the presence of an automatic sprinkler system. High-piled storage is the storage of Class I through IV commodities in piles, bin boxes, on pallets or in racks more than 12 feet (3658 mm) high or for high-hazard commodities stored higher than 6 feet (1829 mm). Chapter 32 of the IFC and NFPA 13 contain additional requirements for all high-piled storage conditions.*

#### **SECTION 910 - SMOKE AND HEAT REMOVAL**

**[F] 910.2.2 High-piled combustible storage.** Smoke and heat removal required by Table 3206.2 of the International Fire Code for buildings and portions thereof containing high-piled combustible storage shall be installed in accordance with Section 910.3 in unsprinklered buildings. In buildings and portions thereof containing high-piled combustible storage equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a smoke and heat removal system shall be installed in accordance with Section 910.3 or 910.4. In occupied portions of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the upper surface of the story is not a roof assembly, a mechanical smoke removal system in accordance with Section 910.4 shall be installed.

#### **SECTION 2209 - STEEL STORAGE RACKS**

**2209.1 Storage racks.** The design, testing and utilization of storage racks made of cold-formed or hot-rolled steel structural members shall be in accordance with RMI/ANSI MH 16.1. Where required by ASCE 7, the seismic design of storage racks shall be in accordance with Section 15.5.3 of ASCE 7.