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### **Fire Sprinkler Information for Storage per the 2007 NFPA 13, Ch. 12 and OFC Ch. 23**

For the designer and AHJ, general storage for high piled storage has been addressed by NFPA in Chapter 12 and the Oregon Fire Code in Chapter 23. Included are several forms that can assist during plan review to prepare for engineering a fire sprinkler or racking design. The designer should complete the associated forms and provide them as supporting documentation attached to the designed plans.

Even small storage rooms in an office building could require a higher density design than Light Hazard, because the room could be filled with shelves or racks of archived records. Since most buildings or tenants use storage rooms the fire plans examiner will need to know what is being stored in the storage room, how much quantity and how it is stored.

#### **Plan requirements per Oregon Fire Code 2301.3:**

- Floor plan of the building showing locations and dimensions of new and existing high piled storage areas.
- Show the required Exit Path on the plans in the high piled storage area per OSSC Ch. 10.
- If cross aisles are required for exit egress, **NO STORAGE IS ALLOWED ABOVE**. Storage is allowed above cross aisles (tunnels) between racks if they are not a REQUIRED egress path. Structural supports and catwalks are allowed.
- Show location on plans of: Exit signs; Emergency Egress Lighting; fire alarm horn/strobes and manual fire alarm pull stations.
- Additional Exit signage and fire system equipment may be required after racking is installed.
- Usable storage height for each storage area (fill out attached forms with code sections). Signs shall be installed as follows:
  1. Install permanent plastic or metal WHITE signs with a minimum of 3" black letters on every other rack end stating:  
**MAX STORAGE HEIGHT: X'**
  2. Mount signs between 80" – 96".
- Number of tiers within each rack, if applicable.
- Show longitudinal and transverse flue space per OFC 2308.3. Provide signs as follows:
  1. Install permanent plastic or metal WHITE signs with a minimum 2" black letters on each rack end stating:  
**Longitudinal FLUE SPACE: X"**  
**Transverse FLUE SPACE: X"**  
**KEEP CLEAR AT ALL TIMES**
  2. Mount signs between 66" – 72".
- Commodity clearance between top of storage and fire sprinkler deflector for each storage arrangement.
- Aisle dimensions between each storage array.
- Maximum pile volume for each storage array.
- Location and classification of commodities which are banded or encapsulated.
- Identify required fire department access doors. Racking is not allowed above these doors.
- Type of fire suppression and fire detection systems.
- Location of valves controlling the water supply of ceiling and in-rack sprinklers.
- Type, location and specifications of smoke removal and curtain board systems.
- Additional information regarding required design features, commodities, storage arrangement and fire protection features within the high piled area shall be provided at the time of the permit submittal as required by the Fire Code Official.



## Storage Design Information

**Miscellaneous Storage and Class I-IV Storage Up To 12 ft. and Group A Plastics, Tires, Rolled Paper, and Pallets Up To 12 ft.**

Type of Storage: \_\_\_\_\_ pallet, \_\_\_\_\_ solid pile, \_\_\_\_\_ shelf, \_\_\_\_\_ bin box, \_\_\_\_\_ rack

Entire Storage Design Based on Worst Case Commodity Class: Y or N or as a Mixed Commodity Y or N  
 if Based as a Mixed Commodity is the Design Approach as Lower Commodity Class \_\_\_\_\_ or Commodity Segregation \_\_\_\_\_ in Accordance with 5.6.1.2

Permit # \_\_\_\_\_ Business Address: \_\_\_\_\_ Date: \_\_\_\_\_

Rack ID or Area ID from Floor Plan	Storage Height	Ceiling Height and Ceiling Slope	Commodity Class	Rack: Number of Levels	In-Rack Sprinkler: Y or N If Y, Provide Reference	Sprinkler: Wet or Dry	Sprinkler Used: Std, Lrg Drop, ESFR	Sprinkler Temp: 165 F or 286 F	Sprinkler K-factor	Sprinkler Cover-age Area	Design Area and Density	Ceiling Design Curve Used: Provide Reference	Design Adjustments: Provide Code Reference and Percentage

**Commodity Class and Type of Storage:** The commodity class should be determined from the product inventory provided by the architect or owner. The inventory should describe the product, provide the weight or package volume of the amount of plastic or rubber, how the product is packaged, if stacked on wood or the type of plastic pallet, and if encapsulated or not. This information must accompany this code study so the plan reviewer can verify the commodity classification. State type of storage i.e., pallet, shelf, bin box, or rack.

**Column Legend:** If the entire storage area is going to use the worst case commodity class still provide a row of design information. Also, use NA if a column is not applicable.

**Rack ID or Area ID:** the architectural floor plans should have designated the rack or storage locations and the inventory commodity classification for each rack or storage area. From that information denote in this column the designation of the rack or area to be covered by the sprinkler design specified in the same row of the code study. Provide a copy of the architectural floor plan that shows rack and its commodity class.

**Commodity Class:** The commodity class should be determined from the product inventory provided by the design professional. The inventory should describe the product, provide the weight or package volume of the amount of plastic or rubber, how the product is packaged, if stacked on wood or the type of plastic pallet, and if encapsulated or not. This information must accompany this code study so the plan reviewer can verify the commodity classification.

**Sprinkler (Sprinkler) Used: Standard, Large Drop, ESFR, or Other:** designate which sprinkler will be used and its listing sheet must accompany this code study.

**Ceiling Design Curve Used:** Provide the NFPA code reference, Table, and associated Figure reference from which your design is based.

**Design Adjustments:** Provide the NFPA code reference, Table, and associated Figure reference and the adjustment percentage from which your design adjustments are taken. These design adjustment percentages are related to storage height, dry or wet system, encapsulated or not, extra in-rack sprinklers, and footnotes.

**In-Rack Sprinkler if Y, Provide Reference:** Provide the NFPA code reference, Table and associated Figure reference used for the in-rack sprinkler design.

# Storage Design Information

Storage Up To 25 ft.

Type of Storage: \_\_\_\_\_ pallet, \_\_\_\_\_ solid pile, \_\_\_\_\_ shelf, \_\_\_\_\_ bin box, \_\_\_\_\_ rack

Entire Storage Design Based on Worst Case Commodity Class: Y or N or as a Mixed Commodity Y or N

If Based as a Mixed Commodity is the Design Approach as Lower Commodity Class \_\_\_\_\_ or Commodity Segregation \_\_\_\_\_ in Accordance with 5.6.1.2

Permit # \_\_\_\_\_ Address: \_\_\_\_\_ Date: \_\_\_\_\_

Rack ID or Area ID from Floor Plan	Storage Height	Ceiling Height and Ceiling Slope	Commodity Class and Type of Storage	Encapsulated Y or N	Aisle: 4' or 8'	Rack: Single, Double, or Multi-	Rack Shelf: Solid, Slatted, Not Solid	In-Rack Sprinkler: Y or N if Y, Provide Reference	Sprinkler: Wet or Dry	Sprinkler Used: Std, Lig Drop, ESFR	Sprinkler Temp	Sprinkler K-factor:	Sprinkler Coverage Area	Design Area and Density	Ceiling Design Curve Used: Provide Reference	Design Adjustments: Provide Code Reference and Percentage

**Commodity Class and Type of Storage:** The commodity class should be determined from the product inventory provided by the architect or owner. The inventory should describe the product, provide the weight or package volume of the amount of plastic or rubber, how the product is packaged, if stacked on wood or the type of plastic pallet, and if encapsulated or not. This information must accompany this code study so the plan reviewer can verify the commodity classification. State type of storage i.e., pallet, shelf, bin box, or rack.

**Column Legend:** If the entire storage area is going to use the worst case commodity class still provide a row of design information. Also, use NA if a column is not applicable.

**Rack ID or Area ID:** the architectural floor plans should have designated the rack or storage locations and the inventory commodity classification for each rack or storage area. From that information denote in this column the designation of the rack or area to be covered by the sprinkler design specified in the same row of the code study. Provide a copy of the architectural floor plan that shows rack and its commodity class.

**Commodity Class:** The commodity class should be determined from the product inventory provided by the design professional. The inventory should describe the product, provide the weight or package volume of the amount of plastic or rubber, how the product is packaged, if stacked on wood or the type of plastic pallet, and if encapsulated or not. This information must accompany this code study so the plan reviewer can verify the commodity classification.

**Sprinkler (Spktr) Used: Standard, Large Drop, ESFR, or Other:** designate which sprinkler will be used and its listing sheet must accompany this code study.

**Calling Design Curve Used:** Provide the NFPA code reference, Table, and associated Figure reference from which your design is based.

**Design Adjustments:** Provide the NFPA code reference, Table, and associated Figure reference and the adjustment percentage from which your design adjustments are taken. These design adjustment percentages are related to storage height, dry or wet system, encapsulated or not, extra in-rack sprinklers, and footnotes.

**In-Rack Sprinkler If Y, Provide Reference:** Provide the NFPA code reference, Table and associated Figure reference used for the in-rack sprinkler design.

# Storage Design Information

Storage Greater Than 25 ft.

Type of Storage: \_\_\_\_\_ pallet, \_\_\_\_\_ shelf, \_\_\_\_\_ bin box, \_\_\_\_\_ rack  
 Entire Storage Design Based on Worst Case Commodity Class: Y or N or as a Mixed Commodity Y or N

If Based as a Mixed Commodity is the Design Approach as Lower Commodity Class \_\_\_\_\_ or Commodity Segregation \_\_\_\_\_ In Accordance with 5.6.1.2

Permit # \_\_\_\_\_ Business \_\_\_\_\_ Address: \_\_\_\_\_ Date: \_\_\_\_\_

Rack ID or Area ID from Floor Plan	Storage Height	Celling Height and Celling Slope	Commodity Class and Type or Storage	Encapsulated Y or N	Aisle: 4' or 8'	Rack: Single, Double, or Multi-	Rack Shelf: Solid, Slatted, Not Solid	In-Rack Sprinkler: Y or N If Y, Provide Reference	Sprinkler: Wet or Dry	Sprinkler Used: Std, Lrg Drop, ESFR	Sprinkler Temp: 165 F or 286 F	Sprinkler K-factor:	Sprinkler Coverage Area	Design Area and Density	Ceiling Design Curve Used: Provide Reference	Design Adjustments: Provide Code Reference and Percentage

**Commodity Class and Type of Storage:** The commodity class should be determined from the product inventory provided by the architect or owner. The inventory should describe the product, provide the weight or package volume of the amount of plastic or rubber, how the product is packaged, if stacked on wood or the type of plastic pallet, and if encapsulated or not. This information must accompany this code study so the plan reviewer can verify the commodity classification. State type of storage i.e., pallet, shelf, bin box, or rack.

**Column Legend:** if the entire storage area is going to use the worst case commodity class still provide a row of design information. Also, use NA if a column is not applicable.

**Rack ID or Area ID:** the architectural floor plans should have designated the rack or storage locations and the inventory commodity classification for each rack or storage area. From that information denote in this column the designation of the rack or area to be covered by the sprinkler design specified in the same row of the code study. Provide a copy of the architectural floor plan that shows rack and its commodity class.

**Commodity Class:** The commodity class should be determined from the product inventory provided by the design professional. The inventory should describe the product, provide the weight or package volume of the amount of plastic or rubber, how the product is packaged, if stacked on wood or the type of plastic pallet, and if encapsulated or not. This information must accompany this code study so the plan reviewer can verify the commodity classification.

**Sprinkler (Sprinkler) Used: Standard, Large Drop, ESFR, or Other:** designate which sprinkler will be used and its listing sheet must accompany this code study.

**Ceiling Design Curve Used:** Provide the NFFPA code reference, Table, and associated Figure reference from which your design is based.

**Design Adjustments:** Provide the NFFPA code reference, Table, and associated Figure reference and the adjustment percentage from which your design adjustments are taken. These design adjustment percentages are related to storage height, dry or wet system, encapsulated or not, extra in-rack sprinklers, and footnotes.

**In-Rack Sprinkler If Y, Provide Reference:** Provide the NFFPA code reference, Table and associated Figure reference used for the in-rack sprinkler design.