HIGH PILED STORAGE SUBMITTAL REQUIREMENTS FOR THE CITY OF MEMPHIS.

(Reference the 2021 International Fire Code and the 2019 Edition of NFPA 13 throughout this document)

A High Piled Storage Permit is required to use a building or space for the following:

1. Storage of combustible materials in closely packed piles.
2. Combustible Materials on pallets, in racks, or on shelves where the top of the storage is greater than 12 feet.
3. 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 six feet.

The following information is required at time of application for the High Piled Storage Permit to ensure a comprehensive review of your proposal.

Permitting Requirements:

1. Completed Application for Permit with check or money order in the amount of $100 made payable to the City of Memphis required for storage exceeding 500 square feet.
2. Submit 2 sets of plans (Pg. 8) and HPS Information (Pg. 5) for review by the Memphis Fire Prevention Bureau.

Plans:

The following is a list of information required on all plan submittals for review of high piled storage installations. Plans shall be drawn to scale and easily readable. The applicant is required to submit all of this information so an accurate and timely review may be performed. The below is required by the International Fire Code.

1. Floor plan of the building showing locations and dimensions of high piled storage areas.
2. Useable storage height for each storage area.
3. Number of tiers within each rack, if applicable.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. Maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with the International Fire Code (2021 Edition).
8. Location of commodities which are banded or encapsulated.
9. Location of required fire department access doors.
10. Type of fire suppression and fire detection systems.
11. Location of valves controlling the water supply of ceiling and in-rack sprinklers.
12. Type, location and specification of smoke removal and curtain board systems.
13. Dimension and location of transverse and longitudinal flue spaces.
14. Additional information regarding required design features, commodities, storage arrangement and fire protection features within the high piled storage area shall be provided at the time of permit.

Inspection:

Final approval is given by a field inspector after the facility has been inspected for compliance and field conditions. The inspector will review your plan submittal for completeness, accuracy, and field conditions and give approval once he or she is satisfied with the status. Call 901-636-5401 to schedule your inspection after plans are complete.

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In addition to the typical aforementioned high piled storage requirements, the following material-specific requirements shall apply. This list may not be exhaustive. Additional NFPA documents may need to be referenced as well.

1. Aerosols shall be in accordance with Chapter 51.
2. Flammable and combustible liquids shall be in accordance with Chapter 57.
3. Hazardous materials shall be in accordance with Chapter 50.
4. Storage of combustible paper records shall be in accordance with NFPA 13.
5. Storage of combustible fibers shall be in accordance with Chapter 37.
6. Storage of miscellaneous combustible Material shall be in accordance with Chapter 3.

HIGH PILED STORAGE SUBMITTAL GUIDELINE

Below are documents from the International Code Council on High Piled Storage that may be helpful:

Chapter 32 of the International Fire Code copy and paste into browser:
https://codes.iccsafe.org/public/document/IFC2021/chapter-32-high-piled-combustible-storage

ICC – High Pile Combustible Storage explanatory document (2012 IFC) (For Reference only)
http://shop.iccsafe.org/media/wysiwyg/material/4414S12.pdf

NOTE: Memphis is currently enforcing the 2021 International Fire Code. Any references refer to that document. The following comments go along with items 1 through 14 on High Piled Submittal Requirements and are from Chapter 32 of the Fire Code. The comments are **guides to completing items 1 through 14.**

1. Floor Plan
   a) Provide a complete floor plan with layout of where commodities are stored on racks or on floor. Provide maximum allowable storage heights as well as the square foot areas of storage. Plan must be to a scale.
   b) Also indicate if Building Access, (Table 3206.2), is required. If not, Why? See item 9 below.
2. Useable Storage Height
   a) Useable Storage Height is to top of storage, not top of racks. Basically, the maximum allowed height.
3. Rack information (Tiers, etc.)
   a) Provide type of rack i.e. – single, double, or multi-row. Type(s) of commodities in the racks
   b) Maximum storage height, types and width of flue spaces or if not required. (see Table 3208.3)
   c) Rack area in sq. ft. (include aisle areas sq. footage within the racks as the total rack storage area)
4. Commodity Clearance to sprinkler
   a) Also provide the ceiling height for each separate HPS area of the building.
5. Aisle Dimensions
   a) Provide all aisle dimensions in HPS areas.
6. Maximum Pile volume.
   a) Provide square footage
   b) Provide all lengths, widths and heights
   c) Provide Pile Volumes
7. Location and Classification of commodities
   a) See Section 3203 of the 2021 International Fire Code for classification of commodities.
   b) If any questions call the Fire Prevention Bureau at 901-636-5401 and choose the options for the Plans Review Department. Do not hesitate to ask for a ruling if any question. You can also ask your field inspector.
   c) See Figure 3203.7.4 for commodities mixed with plastic if necessary to classify a product or pallet.
8. Banded or encapsulated commodities
   a) Encapsulated commodities are those (generally on pallets) that have plastic or another impenetrable material on the top and all sides of a pallet or commodity.
9. Fire Department Access Roads and Access Doors
   a) See Table 3206.2 and Section 3206.6.
   b) 3206.6 - Where required, access roads shall be provided within 150 feet of all portions of the exterior walls of buildings used for HPS (see exception).
   c) 3206.1.1 – Where required, doors shall be provided every 100 lineal feet of the exterior walls that face required fire apparatus access roads.

10. Fire Suppression and Fire Detection Systems.
    a) Provide all pertinent information on any suppression/sprinkler systems and maintenance reports shall be on site. Annual and 5-year inspections are required for sprinklers as well as 5-year integrity on hydrants.
        i) Ceiling sprinkler density. Type of system: wet, dry, other.
        ii) In-rack sprinkler information and design, if applicable.
        iii) If an ESFR system, indicate and provide design parameters.
        iv) Sprinkler heads: type (extended or regular coverage, etc., K –factor, Head temperature, spacing and square footage, any other pertinent information).
        v) Location of systems on plans. (A maximum of 40,000 sq. ft. of HPS is allowed and 52,000 sq. ft. total per sprinkler system).
    b) Fire Detection systems.
        i) If building has a fire alarm system, indicate and show location of panel, as well as other system components.
        ii) Maintenance reports shall be on site.
11. Show all control/shut-off valves on plans.
12. Smoke Removal and Curtain Board systems.
    a) Show all components on plans, when necessary, a separate plan shall be submitted.
    b) Provide spacing dimensions and be sure it can be measured accurately by the scaling.
    c) Provide any pertinent design information.
    d) If a mechanical smoke removal system, location of fans, as well as vents, with any design information.
13. Transverse and longitudinal flue spaces. (See Table 3208.3 and NFPA 13)
14. Additional information.
    a) Provide any additional information not mentioned herein that will help in your design floor plan layout or that may be needed for the complexity of your HPS design.

NOTE: An exhaustive list of commodities may or may not be needed. For example, if the highest rated commodity is a Class IV, you may just be able to state what the product is and that it is a Class IV without a list of the other I through III Commodities. If your commodities contain plastics, per Figure 3203.7.4 it can have up to 15 per cent by weight and still be a class IV. See also Definition of Class III and Class IV commodities in NFPA 13. Additionally, per 3203, Class 1 through III products can contain a small amount of plastic. Plastics in a corrugated box can often be classified as a Class IV if the thickness of the box is sufficient. Other hazardous materials (or mixture of regular and hazardous) may require an exhaustive list requiring totals by weight or volume as required by Chapter 50, 57 or other chapters. The volume of information you need to provide depends on the complexity of the design.

ITEMS 1-6 (PAGE 2)

These items are in the IFC and simply show that there are other items such as hazardous materials or aerosols for example that can come into play in a HPS situation. The complexity can be from simple to very complex. NFPA has many documents and some of them will need to be referenced in a HPS situation. For example, Chapter 57 in the IFC covers Flammable and Combustible liquids. Much of the information in Chapter 57 comes from NFPA 30 the Flammable and Combustible Liquids Code. NFPA 30 is more in depth and may occasionally have to be referenced. Similarly, NFPA 30B covers the Manufacture and Storage of Aerosols and would need to be referenced where Chapter 51 of the IFC doesn't cover a subject.

High Piled Storage (HPS) Required Information

Name of Business _____

Address/zip _____

Contact Person _____ **Contact Phone Number** _____

The following information shall be provided with your application for a HPS permit:

Commodity Classification:

☐ I ☐ II ☐ III ☐ IV ☐ High Hazard ☐ Group A Plastic

Commodity description: _____

_____

_____

_____

☐ Cartoned ☐ Free Flowing ☐ Non-expanded ☐ Encapsulated ☐ Non-encapsulated

☐ Other (describe): _____

☐ The area designated in the building and used for high piled storage is _____ square feet.

CLASS _____ commodity, _____ square feet.

CLASS _____ commodity, _____ square feet.

CLASS _____ commodity, _____ square feet.

☐ The maximum permitted storage height (solid pile_____ rack_____)

The following storage methods are employed at this facility:

☐ Solid pile storage ☐ Palletized ☐ Single row rack ☐ Double row rack ☐ Multi-row rack

☐Rack storage shelf: ☐ N/A ☐ Load beam only ☐ Wire mesh ☐ Wood slats ☐ Plywood

☐ Other (describe): _____

☐ Minimum distance between top of storage and sprinkler _____ Ceiling Height _____

☐ Smoke vents required? ☐ Yes ☐ No

Operation of smoke vents (if applicable)

☐ **Manual**

☐ **Automatic** via fusible line which releases at _____ degrees F

(Note: New installations require manual and automatic release)

☐ Inspection report shall indicate which vents were tested

☐ Draft curtains required? ☐ Yes ☐ No

☐ Fire Doors required? ☐ Yes ☐ No

☐ Fire Department Access roads needed within 150 feet of all Bldg. portions ☐ Yes ☐ No

☐ The overhead fire sprinkler system utilizes the following heads:

☐ ESFR K_____ at _____ PSI with _____°F heads

☐ Standard Coverage Heads: K_____ ☐ Pendent ☐ Upright _____°F with a density of

_____ gpm over _____ sq. ft. spaced at a maximum of _____ sq. ft. per sprinkler

☐ The fire sprinkler system density and area of application for the storage area is _____ gpm over _____ sq. ft.

☐ In rack sprinklers required ☐ Yes ☐ No _____ Levels are required

☐ The aisles between the racks are maintained at _____ feet

☐ Flue Spaces required? ☐ Yes ☐ No

☐ Flue space between racks shall be maintained at _____ ft. _____ in.

Transverse _____ "clear. ☐ must be vertically aligned (for storage > 25')

Longitudinal _____ "clear.

☐ Column protection required?

☐ Storage configuration and height delineated by indication on Racks or Walls ☐ Yes ☐ No

□ Additional Conditions

Commodity Classification – commodities can be classified by using the International Fire Code chapter 32.

Commodity Description – include the type of material what it is made out of and how packaged (in a box, on pallet, etc.). If a commodity is encapsulated this should be included.

Free Flowing – means if the carton or covering catches on fire the material is such that it will flow out freely and have a smothering effect on the fire.

Non-expanded – Non-expanded is not porous. Expanded plastic is such that it is very porous therefore would burn more quickly.

Encapsulated - means wrapped on all sides and top with an impermeable material.

The maximum permitted storage height – this should be obtained from NFPA 13 or other documents and the various charts therein to determine how high storage on racks or storage on the floor is permitted.

On the NFPA website NFPA.ORG you may be able to view some versions of NFPA 13. Some editions are downloadable for a fee however.

Rack storage shelf – describe the type of shelf the commodities sit on. This is most often wire mesh but can be slats or solid shelving.

Minimum Distance from top of storage to sprinkler for regular storage this is 18" and ESFR it is 36"

Smoke vents required? – see Table 3206.2 in 2021 IFC. If required, then either mechanical vents or a full smoke exhaust system can be provided. Annual inspections are required.

Draft curtains required? - see Table 3206.2 in 2021 IFC. Note draft curtains are not to be used under ESFR systems.

Fire Doors required? - see Table 3206.2 in 2021 IFC

Fire Department Access roads needed? - see Table 3206.2 in 2021 IFC

Sprinkler Heads – there should be extra sprinklers for every type of sprinkler used at the location. One should be able to obtain info from the onsite sprinkler heads. Alternatively, one can go online to the sprinkler manufacturer's website and get additional information if needed.

Fire Sprinkler Density – this should be on a hydraulic placard on the sprinkler riser. ESFR usually states it has 12 heads at a certain psi. Other typical system designs are usually a certain gpm/a certain square footage. Old pipe schedule systems will not have a hydraulic design placard.

In-rack sprinklers required? – again NFPA 13 or other documents will reveal whether in-rack sprinklers are required or not. FM designs are accepted as well as NFPA 13 designs and will often specify whether they are required.

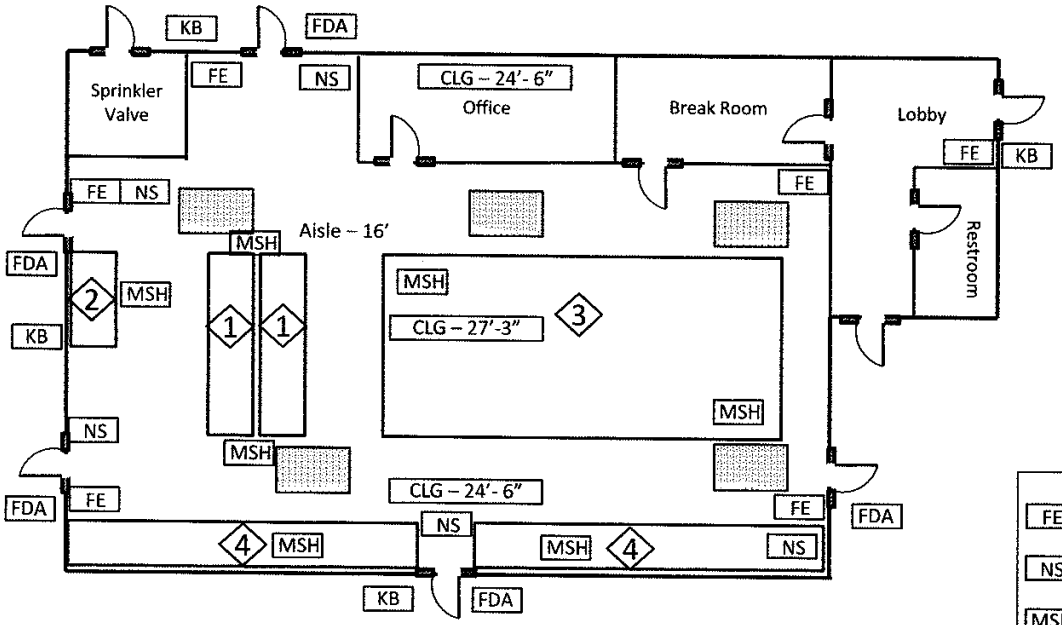
Aisle widths – NFPA 13 reveals this often in the design charts, but sometimes other places. Also, the 2021 IFC Chapter 32 specifies aisle widths.

Flue Spaces required? - see Table 3208.3 in the 2021 IFC. NFPA 13 also addresses flue spaces.

Column protection required? – This is addressed in NFPA 13.

Height delineated by indication on floors or walls? – In most cases delineation will be required to mark the maximum storage height. A stick or other device protruding above the racks or other methods may be acceptable in lieu of floor or wall marking. Get with your field inspector for final approval of maximum storage height markings.

Sprinkler System Information				
Encapsulated Storage	Density / Area	Temperature of Heads	ESFR Heads	Aisle Width
No	0.2 / 2000	165°	No	8 ft
NFPA 13 or 231 design curve and reduction information.				



Scale 1/8" = 1'

This is an example of the completed plan. Remember you are responsible for the plan creation and providing all the relevant information as it pertains to your business.

Notes:

1. Rack Storage – Double Row Racks – Class IV Commodity
   Max Storage Height is 15 feet
   Transverse flue space is 6 inches.
   Longitudinal flue space is not required.
2. Rack Storage – Single Row Racks – High-Hazard Storage –
   Max Storage Height is 15 feet, Limited to 120 sq./ft.
   Transverse flue space is 3 inches.
   Longitudinal flue space is not required.
3. Pile Storage – Class III Commodity using wood crates –
   Max Storage Height is 17.5 feet,
   Maximum pile dimension is 100 ft.
4. Shelf Storage – Class III Commodity – Open record storage
   Max Storage Height is 17.5 feet

1. Building Square Footage: 23,000
2. High-Piled Combustible Storage Square Footage: 13, 500
3. Fire extinguishers: Rating 4A: 40B: C
4. Fire department access doors are required.
5. Heat and smoke ventilation is required.

Symbol Legend

FE	Fire Extinguisher, 4A: 40B: C
NS	No Smoking Signs
MSH	Maximum Storage Height
FDA	Fire Department Access Door
KB	Fire Department Key Box
CLG – xx'-xx"	Ceiling Height
	Automatic Smoke/Heat Vents

Code and Standards:

SFPC: (Edition Year)
NFPA 13: (Edition Year)

Designer Company Name
Company Address

Drawn By: Date:

Location Name – Tenant
Location Address w/ Suite Number

High-Piled Storage Plan	HPS-001