

ORANGE COUNTY FIRE AUTHORITY

Community Risk Reduction

1 Fire Authority Road, Building A, Irvine, CA 92602 www.ocfa.org 714-573-6100

High-Piled Combustible Storage



Guideline G-01

Serving the Cities of Aliso Viejo • Buena Park • Cypress • Dana Point • Garden Grove • Irvine • Laguna Hills • Laguna Niguel • Laguna Woods
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Santa Ana • Stanton • Tustin • Villa Park • Westminster • Yorba Linda and Unincorporated Areas of Orange County

High-Piled Combustible Storage

PURPOSE

1. The intent of this guideline is to provide the Orange County Fire Authority (OCFA) specific requirements for the protection of high-piled storage (HPS), based on, and in addition to, Chapter 32 of the 2022 California Fire Code (CFC), the 2022 California Building Code (CBC), 2022 NFPA 13, and locally adopted ordinances enforced by OCFA. The following requirements will clarify OCFA's expectations regarding the measures required by code, which require more detailed explanations.

SCOPE

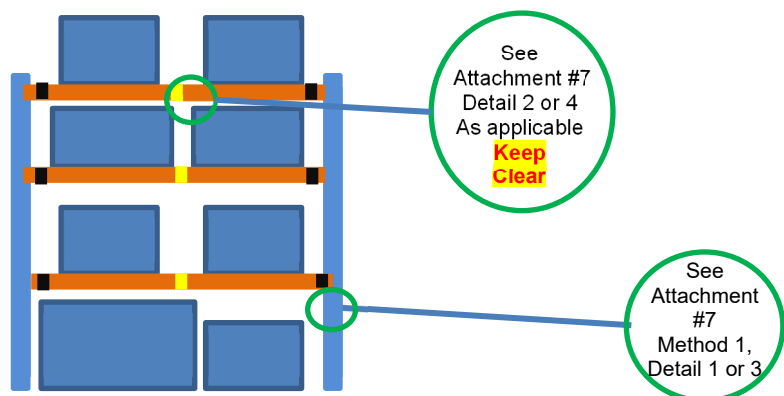
2. This guideline provides the OCFA specific requirements for all HPS within the jurisdiction of the OCFA.

SUBMITTAL REQUIREMENTS

3. Refer to OCFA Guideline A-02 for the current plan submittal requirements.
In addition to the other plans submittal requirement listed in this guideline and CFC 3201.3, Attachment 9 shall be completed and copied onto the plan.

RACK FLUE SPACES

- 4.1 Requirements for flue spaces within the rack storage are provided in CFC Table 3208.3. Single and double row racks shall be equipped with a transverse flue space. A mechanical means shall be provided to maintain the transverse flue space at the uprights (Attachment 7).
- 4.2 The device and its installation method shall be identified on the plan. Transverse flue spaces between uprights shall be marked with a 3 or 6 inch yellow strip on the load beam with words in red that read, "Keep Clear," as indicated below. Durable vinyl tape, paint, or other methods as approved by OCFA may be used. (CFC 3208.3)



- 4.3 Double-row racks shall be equipped with a pallet stop along the longitudinal flue space (when required per CFC Table 3208.3) at each level above the lowest tier. The stop along the longitudinal flue space shall be steel and shall extend a minimum of 4 inches above the shelf or cross member, or other method (i.e., 9-gauge chain link) approved

by the fire code official (CFC 3208.3; see Attachments 1-5 & 8). The device and its installation method shall be identified on the plan. For double row racks, where products are hand-stacked, chain link shall be securely attached to the rear of both racks. The chain link shall be a minimum of 12 gauge. Attachment method shall be in compliance with Figure 3208.3 (Attachment 6) or other methods as approved by the fire code official.

Note: Regardless of the design of the pallet stop, the flue space shall be measured from the back of the pallet stop to the back of the pallet stop (see Attachment 8).

4.4 Transverse flue space is measured as the distance between the loads, not the distance between the racks. A flue space's net width is a measure of its gross width minus any horizontal obstructions, such as rack uprights, located within the flue space.



Unless ACCEPTABLE

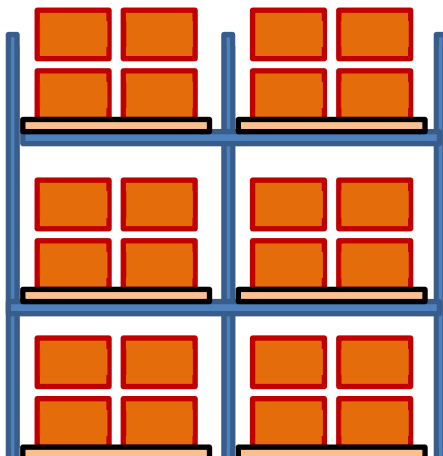


ACCEPTABLE METHOD

STORAGE HEIGHT LIMIT

5. A physical method of visually indicating the maximum allowable storage height shall be provided (CFC 3205.7). Provide a detail on the plan of the method that will be used.

DO NOT STORE ABOVE THE YELLOW LINE



Note: As required by the fire code official, a visual method of indicating the maximum allowable storage height shall be provided. (CFC 3205.7)

TECHNICAL ASSISTANCE

Due to the complexity of the designs specified within the CFC and adopted standards, it may be necessary to obtain the service of a fire protection design professional to assist with developing a design that meets the requirements of the CFC and NFPA 13.

STANDARD HIGH-PILED STORAGE NOTES



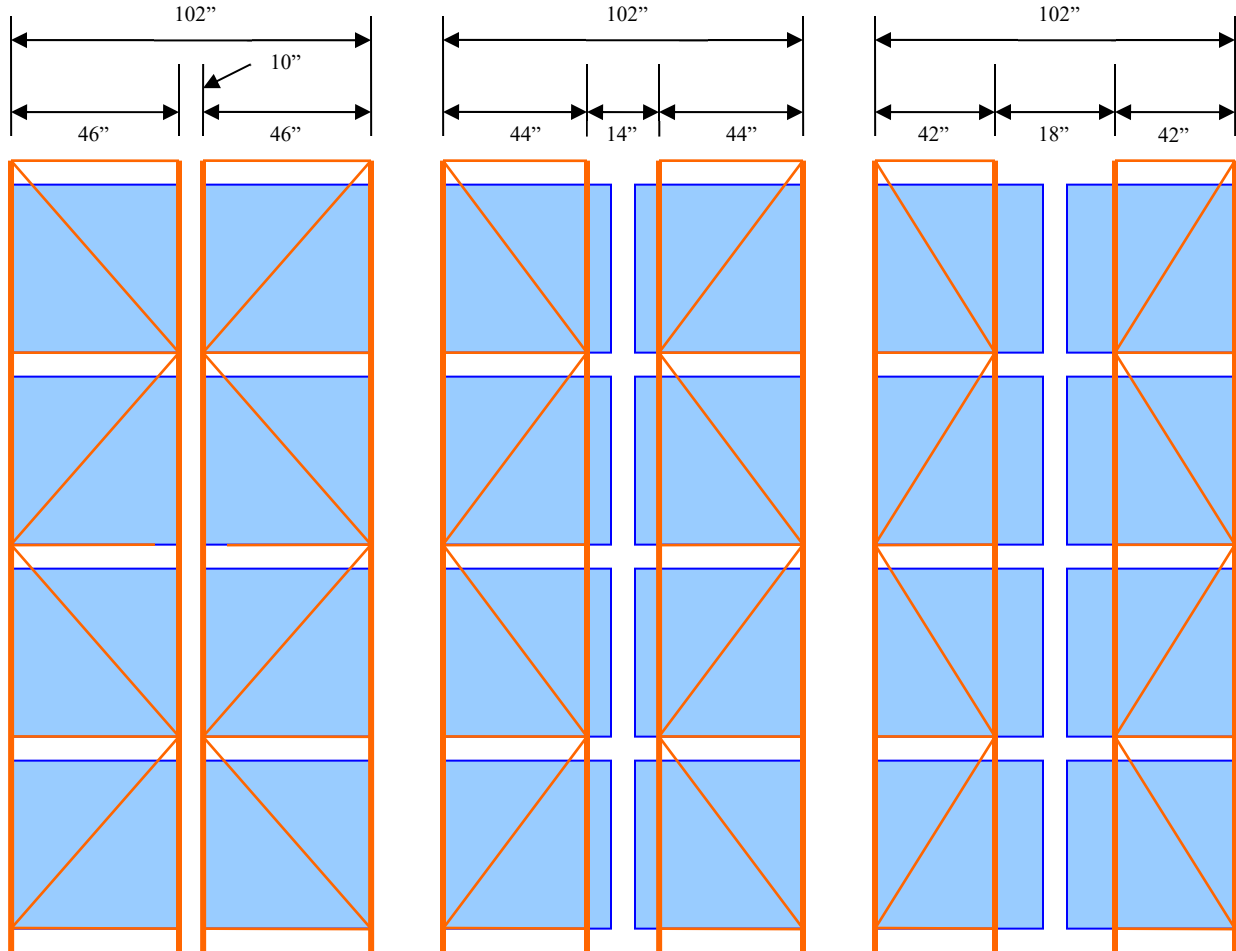
ORANGE COUNTY FIRE AUTHORITY NOTES FOR HIGH-PILED STORAGE

PLACE THE FOLLOWING NOTES VERBATIM ON THE PLAN UNDER "FIRE DEPARTMENT NOTES":

- Fire Department inspection required. Schedule 2 days in advance, @714-573-6150.
- A CFC permit is required for HPS and will be issued by an OCFA inspector.
- Locations and classifications of extinguishers shall be in accordance with CFC 906.2 and Chapter 3, Title 19 CCR and placement is subject to the approval of the fire inspector.
- Storage, dispensing or use of any flammable/combustible materials and other hazardous materials shall comply with CFC regulations.
- Exit doors shall be openable from the inside without the use of a key or any special knowledge or effort.
- Modification to fire sprinkler and alarm systems shall comply with 2022 NFPA 13 and 72. A separate plan submittal is required.
- Fire sprinkler systems and all control valves shall be monitored by a U. L. listed central alarm station or be supervised per 2022 CFC Chapter 9. A separate plan submittal is required for the installation of the monitoring system.
- Fire apparatus access roads shall be unobstructed. Access gates shall be approved prior to installation and shall be in compliance with CFC 504 and OCFA guidelines.

ATTACHMENT 1

LOAD BEAM CONFIGURATION NOT REQUIRING PALLET STOPS



NOTES:

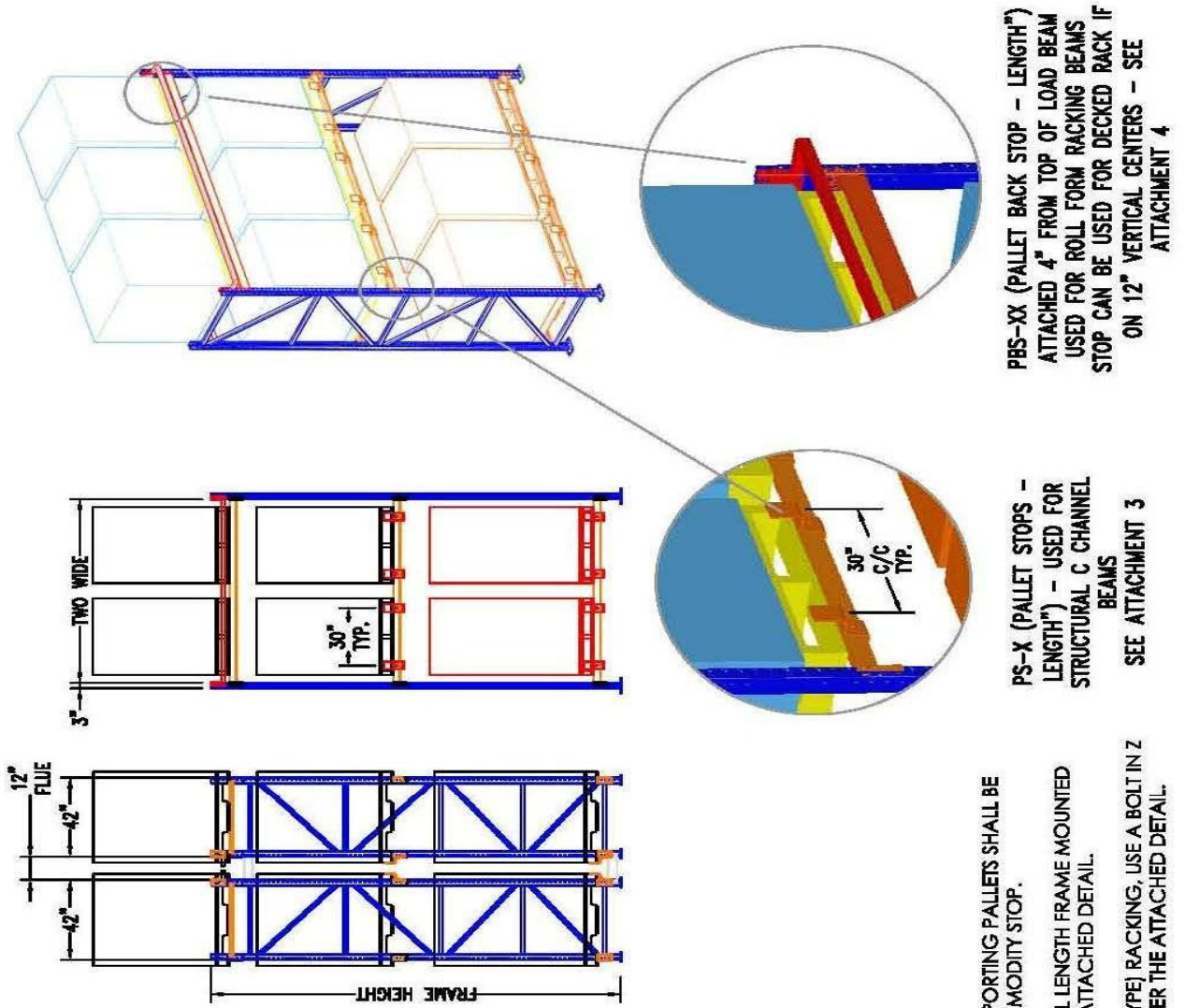
1. MAXIMUM PALLET DEPTH 48"
2. STORAGE ON LOAD BEAM ONLY, NO SHELVING, WIRE MESH GRATING, OR PALLET SUPPORTS.
3. 6" FLUE SPACE SHALL BE MAINTAINED AT ALL TIMES.
4. CHANGE TO THE STORAGE CONFIGURATION REQUIRES PRIOR OCFA APPROVAL.

NOTES:

1. WHEN 42" UPRIGHTS ARE UTILIZED WITH AN 18" ROW SPACER AND A TYPICAL 48"x40" PALLET IS USED, NO PALLET STOPS ARE REQUIRED.
2. WHEN 44" UPRIGHTS ARE UTILIZED WITH A 14" ROW SPACER AND A TYPICAL 48"x40" PALLET IS USED, NO PALLET STOPS ARE REQUIRED.
3. WHEN 46" UPRIGHTS ARE UTILIZED WITH A 10" ROW SPACER AND A TYPICAL 48"x40" PALLET IS USED, NO PALLET STOPS ARE REQUIRED.

ATTACHMENT 2

STORAGE CONFIGURATION REQUIRING PALLET STOPS



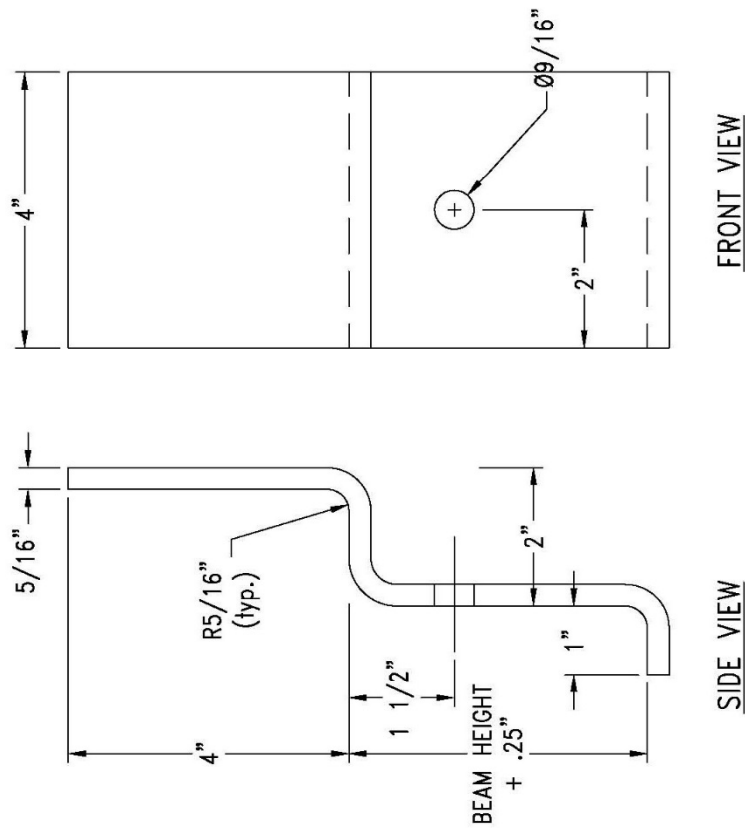
PBS-XX (PALLET BACK STOP - LENGTH¹)
 ATTACHED 4" FROM TOP OF LOAD BEAM
 USED FOR ROLL FORM RACKING BEAMS
 STOP CAN BE USED FOR DECKED RACK IF
 ON 12" VERTICAL CENTERS - SEE
 ATTACHMENT 4

PS-X (PALLET STOPS - LENGTH¹) - USED FOR STRUCTURAL C CHANNEL BEAMS
 SEE ATTACHMENT 3

NOTES:
 RACKS WITH OPEN SHELVES SUPPORTING PALLETS SHALL BE PROVIDED WITH A PALLET / COMMODITY STOP.
 FOR ROLL FORM RACKING A FULL LENGTH FRAME MOUNTED SUPPORT IS TO BE USED PER THE ATTACHED DETAIL.
 FOR STRUCTURAL (C-CHANNEL TYPE) RACKING, USE A BOLT IN Z TYPE SUPPORT ON 30" CENTERS PER THE ATTACHED DETAIL.

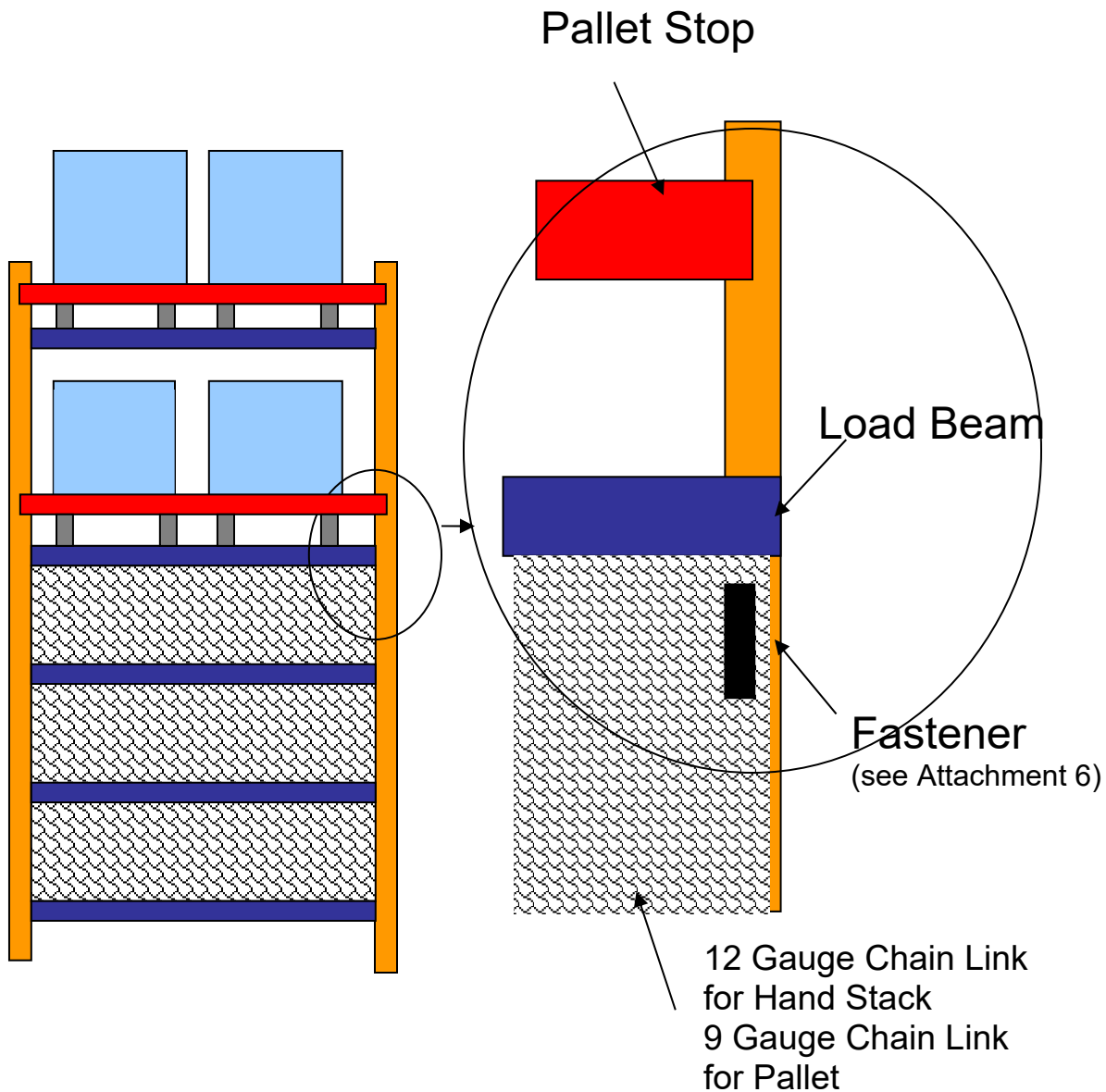
ATTACHMENT 3

STRUCTURAL "C" CHANNEL BEAM DETAIL



ATTACHMENT 5

STORAGE CONFIGURATION FOR HAND STACK RACK



NOTES:

HAND STACKING/PICKING RACKS: HAND STACKING NON-PALLETIZED AREAS SHALL BE PROVIDED WITH A MEANS TO ENSURE THAT THE FLUE SPACES ARE MAINTAINED. HAND STACK LOCATION WILL BE SECURED FLUSH TO THE REAR COLUMN OF EACH FRAME AS SHOWN IN ATTACHED DETAIL (SEE ATTACHMENT 6 FOR CHAIN LINK).

9 Gauge Chain Link Fence for Pallet Loads.

12 Gauge Chain Link for Hand Stack Loads.

ATTACHMENT 6

CHAIN LINK ATTACHMENT METHOD DETAIL

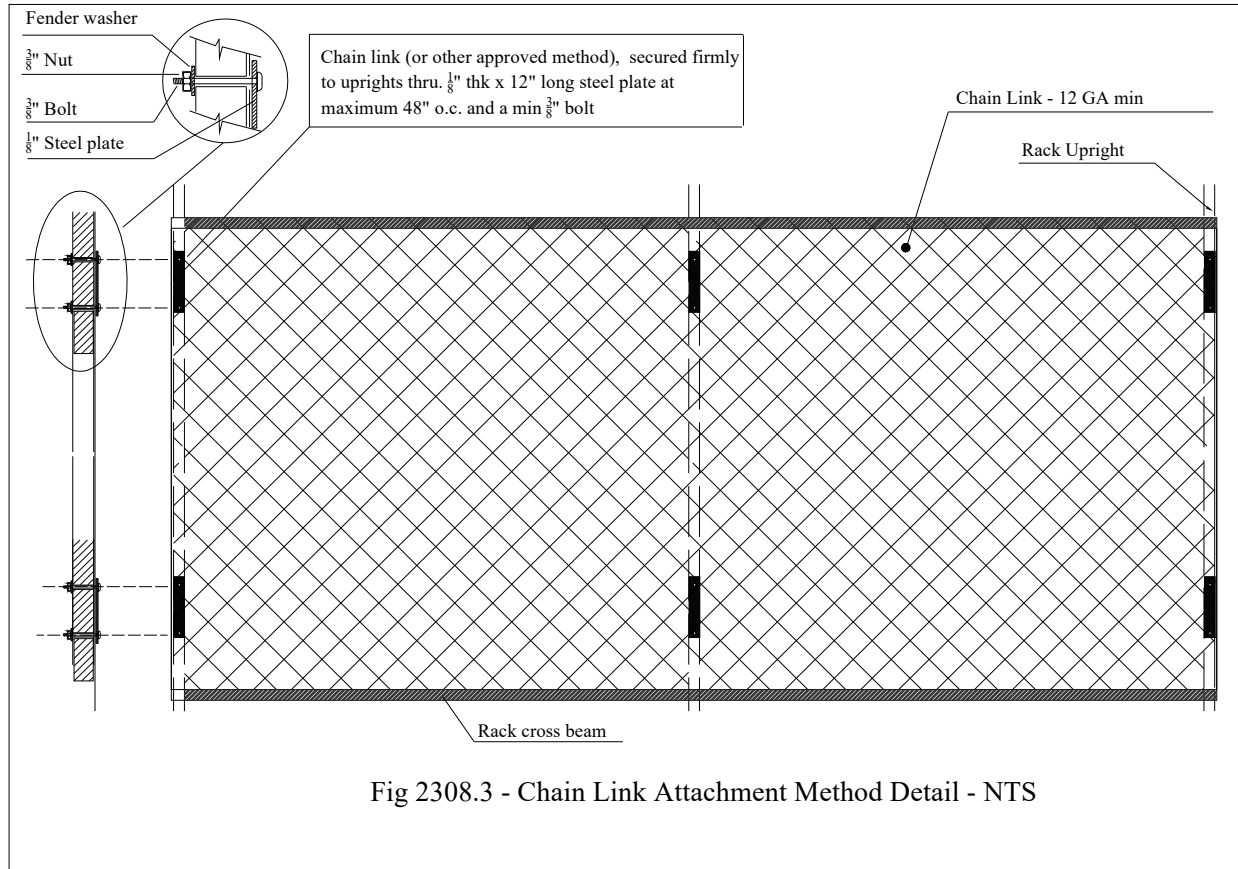
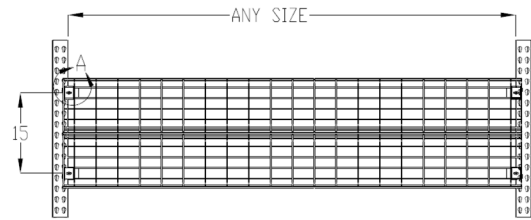
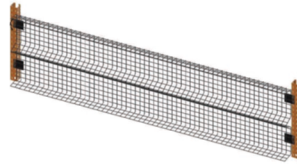


Fig 2308.3 - Chain Link Attachment Method Detail - NTS

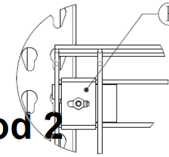
ATTACHMENT 7



Method 1



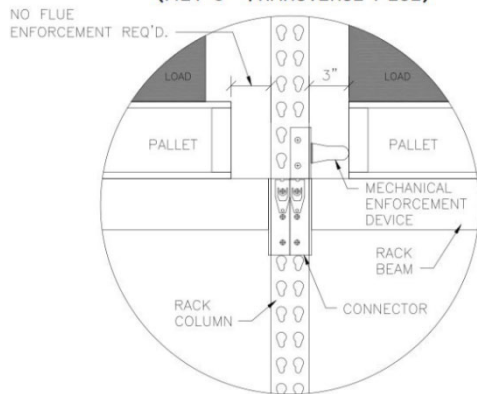
Method 2



AISLE SHIELD

DETAIL 1

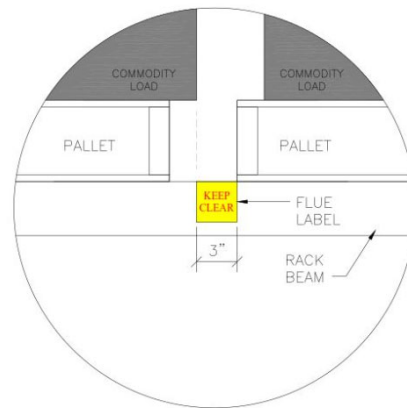
**MECHANICAL ENFORCEMENT DEVICE AT RACK COLUMN
(NET 3" TRANSVERSE FLUE)**



NOTE: TO BE USED WITH DETAIL 2 ONLY

DETAIL 2

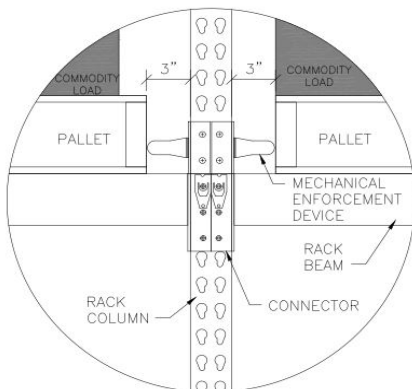
**3" TRANSVERSE FLUE LABEL
BETWEEN PALLET LOADS**



NOTE: TO BE USED WITH DETAIL 1 ONLY

DETAIL 3

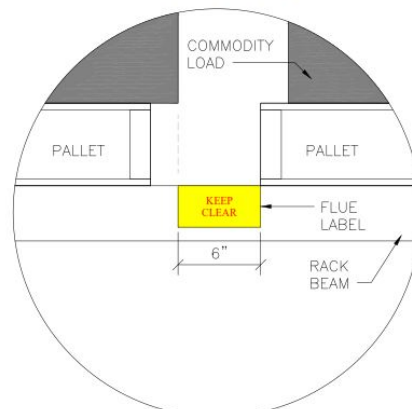
**MECHANICAL ENFORCEMENT DEVICE AT RACK COLUMN
(NET 6" TRANSVERSE FLUE)**



NOTE: TO BE USED WITH DETAIL 4 ONLY

DETAIL 4

**6" TRANSVERSE FLUE LABEL
BETWEEN PALLET LOADS**

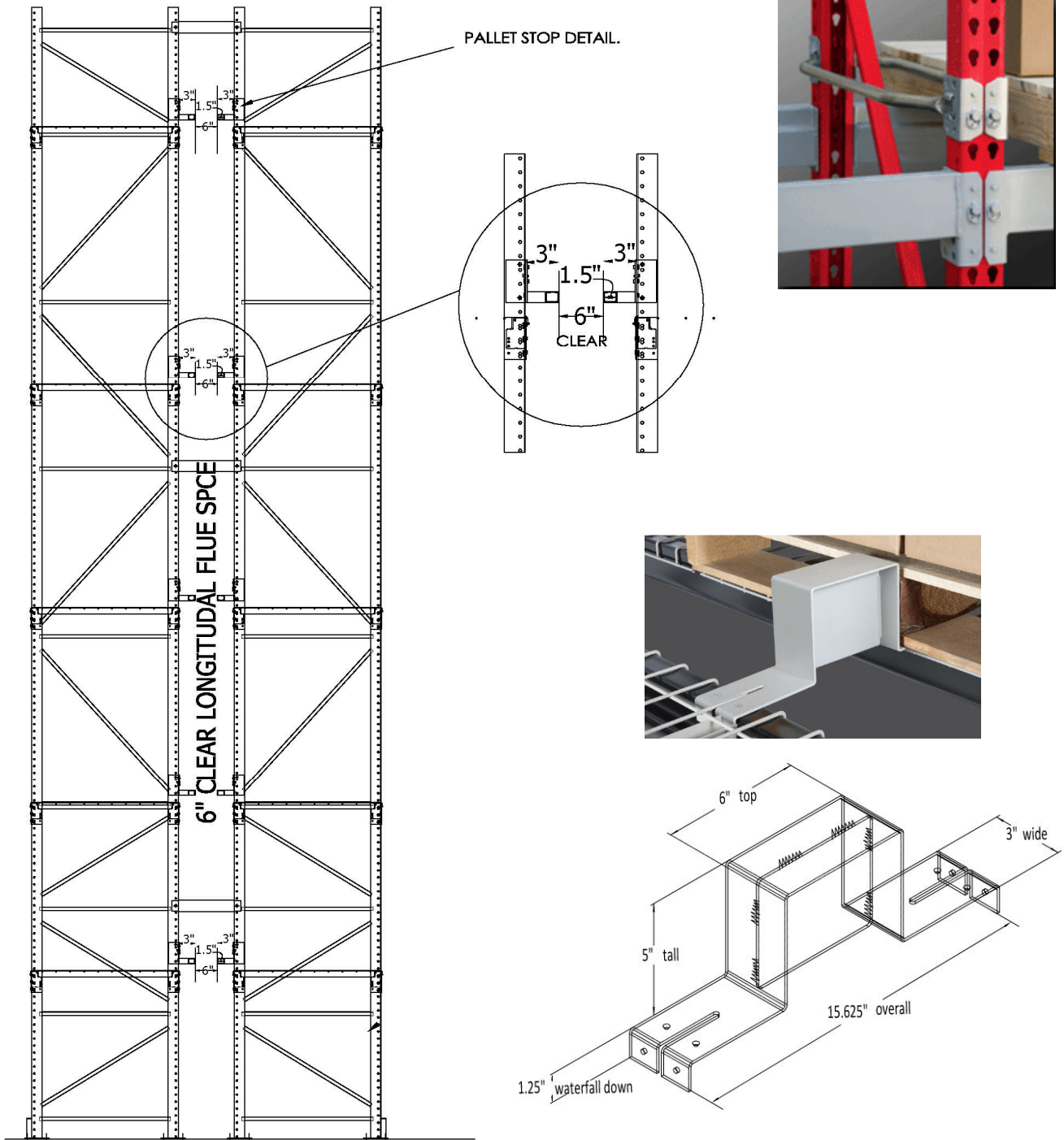


NOTE: TO BE USED WITH DETAIL 3 ONLY

ATTACHMENT 8

Pallet Stop

Longitudinal Flue Clear Space



ATTACHMENT 9 (HPS Summary)

The following form shall be completed for each storage configuration and/or storage area. The completed form shall be copied onto the HPS plans for all projects within OCFA jurisdiction:

- Commodity classification: (Fill in commodity description at the bottom of page.)
 - Class: I II III IV High Hazard
 - Plastics: Group A Group B Group C
 - Cartoned Free flowing Expanded Unstable Encapsulated Non-encapsulated
 - Other _____
- Area designated in the building and used for high piled storage is _____ sq.ft.
- Maximum permitted storage height (solid pile _____ ft. rack _____ ft.)
- Roof/ceiling height: maximum _____ ft.; minimum _____ ft.
- Minimum distance between top of storage and sprinklers _____ ft.
- The following storage methods are employed at this facility:
 - Solid pile storage Palletized Single-row rack Double-row rack Multi-row rack
 - Other _____
- Rack storage shelf: Load beam only Wire mesh Wood slates Solid (shelf area _____ sq.ft.)
 - Other (Describe): _____
- Smoke/heat vents required? Yes No
 - Operation of smoke/heat vents (if applicable)
 - Manual Automatic via fusible link which releases at _____ °F
 - (Note: New installations require manual & automatic release)
 - Inspection report shall indicate which vents were tested
- Draft curtains required? Yes No
- **Required Fire Sprinkler Details:** Standard/CMDA ESFR CMSA Other _____
 - K _____ Temp rating _____ °F Pendent Upright
 - Design _____ gpm/sq.ft. over _____ sq.ft. or _____ heads @ _____ psi
 - Requiring _____ gpm @ _____ psi at BOR Other _____ ; Hose _____ gpm
 - Maximum of _____ sq.ft. per fire sprinkler
- In-rack sprinklers required? Yes No
 - There is/are _____ level(s) of in-rack fire sprinkler protection.
 - Design _____ heads @ _____ gpm psi
- Column protection required? Yes No Protection method: _____
- The aisles between the racks shall be maintained at _____ feet.
- Fire Doors required? Yes No
- Flue Spaces required? Yes No
- Flue space between racks shall be maintained a minimum of:
 - Transverse _____ inches clear Must be vertically aligned (for storage >25')
 - Longitudinal _____ inches clear
- Pallet Stops Required? Yes No
 - Longitudinal pallet stop configuration:
 - Chain link Roll form "C" channel Other _____
 - Transverse Flue Pallet Stop configuration:
 - Mechanical means (flue keepers, etc.) Load beam markings "Keep Clear" (labels, stickers, etc.)
 - Hand Stack? Yes No # of tiers: _____ Chain link required? Yes No
- Idle pallet floor storage? Yes No Max height _____ ft. wood; Max height _____ ft. plastic
 - Idle pallets are **NOT** permitted to be stored in the racks.
- Storage configuration and height delineated by indication on floor or walls and/or ceiling. Yes No
- Additional conditions: _____

Are there any hazardous materials stored in the High Piled Storage Area?

- Yes - Provide the Service Request (SR#) for the approved hazardous material review - SR# _____
- No - Provide a note on the plans stating, "No hazardous material storage allowed without OCFA approval."

Commodity description, including packaging materials (if no packaging state "No Packaging"): _____
