



## STANDARD 14.7.5

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### HIGH-PILED COMBUSTIBLE STORAGE

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*Please note that the District assumes no liability for any damages incurred directly or indirectly as a result of any errors, omissions, or discrepancies between this standard and any applicable law. It is the sole responsibility of the person or persons conducting any work pursuant to this standard to ensure their work complies with any and all applicable codes, ordinances, and regulations.*

#### CHAPTER 1 ADMINISTRATION

**1.1 Scope.** This standard provides the general requirements for all high-piled combustible storage within the jurisdiction of Ventura County Fire Protection District (VCFPD). This standard shall be used in conjunction with the specific conditions contained in the Ventura County Fire Code (VCFC), the 2010 California Building Code (CBC), NFPA 13-2010, and any other applicable standards. The following material-specific requirements shall also apply:

- (1) Aerosols shall be in accordance with VCFC Chapter 28
- (2) Flammable and combustible liquids shall be in accordance with VCFC Chapter 34
- (3) Hazardous materials shall be in accordance with VCFC Chapter 27
- (4) Storage of combustible paper records shall be in accordance with NFPA 13
- (5) Storage of combustible fibers shall be in accordance with VCFC Chapter 29
- (6) Storage of miscellaneous combustible material shall be in accordance with VCFC Chapter 3

**1.2 Purpose.** This standard was developed to provide the requirements for the protection of high-piled combustible storage (HPS) for a variety of commodities. The following requirements will ensure that appropriate measures have been taken to provide safety to the public and that the required protection of these commodities has been designed for the appropriate level of hazard as required by the VCFC.

**1.3 Responsibility.** All individuals and companies with high-piled combustible storage shall be responsible for obtaining operational permits as required by the Ventura County Fire Code.

**1.4 Permit.** An operational permit shall be required as set forth in the Ventura County Fire Code. All permits will be issued following plan approval and completion of corresponding inspections of the HPS installation. VCFC permits for high piled storage shall be renewed annually, or upon a change in commodity or configuration. A previously approved HPS plan may be used for renewing permits, unless changes in the storage configuration and/or commodity result in the need for a new plan review, update and/or approval.

**1.4.1 Permit Application.** An application for a HPS permit shall automatically become invalid unless an inspection for such operation permit is conducted within 6 months of submittal.

**1.5 Technical Assistance.** Due to the complexity of the designs specified within the VCFC and adopted standards, it is often necessary to obtain the service of a fire protection design professional to assist with developing a protection scheme that meets the requirements of both the business and the Ventura County Fire Code.

## CHAPTER 2 DEFINITIONS

**2.1 General.** The following words and terms shall, for the purposes of this standard and permit requirements of the VCFC, have the meanings shown herein.

**2.2 Array.** The configuration of storage. Characteristics considered in defining an array include the type of packaging, flue spaces, height of storage and compactness of storage.

**2.3 Array, Closed.** A storage configuration having a 6-inch or smaller vertical flue space width that restricts air movement through the stored commodity.

**2.4 Bin Box.** A five-sided container with the open side facing an aisle. Bin boxes are self-supporting or supported by a structure designed so that little or no horizontal or vertical space exists around the boxes.

**2.5 Commodity.** A combination of products, packing materials and containers.

**2.6 Expanded Plastic.** A foam or cellular plastic material having a reduced density based on the presence of numerous small cavities or cells dispersed throughout the material.

**2.7 Extra-High-Rack Combustible Storage.** Storage on racks of Class I, II, III or IV commodities which exceed 40 feet in height and storage on racks of high-hazard commodities which exceed 30 feet in height.

**2.8 High-Piled Combustible Storage.** The storage of combustible materials in closely packed piles, on pallets or combustible materials on pallets, in racks, or on shelves where the top of storage is greater than 12 feet in height. High-piled combustible storage (commonly referred to as "HPS") also includes 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.

**2.9 Encapsulated Storage.** Products wrapped on six sides with plastic. Fire sprinkler water is not able to penetrate into the commodity if it is encapsulated. Typically, encapsulated products require a higher level of fire sprinkler protection.

**2.10 Non-Encapsulated Storage.** Products which may be wrapped on four or five sides, with the top remaining open to permit fire sprinkler water to penetrate within the pile.

**2.11 High-Piled Storage Area.** An area within a building which is designated, intended, proposed, or actually used for high-piled combustible storage.

**2.12 Manual Stocking Methods.** Stocking methods utilizing ladders or other non-mechanical equipment to move stock.

**2.13 Mechanical Stocking Methods.** Stocking methods utilizing motorized vehicles or hydraulic jacks to move stock.

**2.14 Shelf Storage.** Storage on shelves less than 30 inches deep with the distance between shelves not exceeding 3 feet vertically. For other shelving storage arrangements, see the requirements for rack storage.

**2.15 Solid Shelving.** Shelving that is solid, slatted or of other construction located in racks and which obstructs sprinkler discharge down into the racks.

**2.16 Ventura County Fire Code (VCFC).** The specified portions of the California Building Standards Codes known as California Code of Regulations, Title 24, Part 9, "California Fire Code (CFC)" as adopted by the State Fire Marshal (SFM) and; portions of The International Fire Code (IFC), 2009 Edition referenced by the California Building Standards Code and not adopted or modified by the SFM and; the VCFPD amendments contained in Ordinance 27 to the above-referenced codes.

## CHAPTER 3 GENERAL FIRE & LIFE-SAFETY PROVISIONS

**3.1 General.** Fire-protection and life safety features for high-piled storage areas shall be in accordance with VCFC Sections 2306.2 through 2306.10 and other nationally recognized standards approved by VCFPD.

**3.2 Extent and Type of Protection.** Where required by Table 2306.2, fire detection systems, smoke and heat removal, draft curtains, and fire sprinkler design densities shall extend 15' beyond the HPS area, or to a permanent partition. For fire protection of mixed commodities, the fire protection required by Table 2306.2 shall be for the most restrictive design requirements.

**3.3 Separation of High-Piled Storage Areas.** High-piled storage areas shall be separated from other portions of the building where required by Sections 2306.3.1 through 2306.3.2.2.

**3.4 Fire Detection Systems.** Where fire detection is required by VCFC Table 2306.2, an approved automatic fire detection system shall be installed throughout the high-piled storage area. The system shall be monitored and be in accordance with VCFC Section 907 & VCFPD Standard 14.7.3.

**3.5 Building Access.** Where building access is required by VCFC Table 2306.2, fire apparatus access roads shall be provided to within 150 feet of all portions of the exterior walls of the building used for high-piled storage.

***Exception:** Where fire apparatus access roads cannot be installed because of topography, railways, waterways, non-negotiable grades or other similar conditions, the fire code official is authorized to require additional fire protection.*

**3.5.1 Number of Doors Required.** Where access doors are required by VCFC Table 2306.2, a minimum of one access door shall be provided in each 100 lineal feet, or fraction thereof, of the exterior walls that face required fire apparatus access roads.

**3.5.2 Required Access.** Exterior doors and openings required by the CBC shall be maintained readily accessible for emergency access by the fire department.

**3.5.3 Maintenance of exterior doors and openings.** Exterior doors and their function shall not be eliminated. All required exit hardware shall be maintained.

**3.6 Smoke and Heat Removal.** Where smoke and heat removal is required by VCFC Table 2306.2, smoke and heat vents shall be provided in accordance with VCFC Section 910. Smoke and heat vents shall be listed and labeled to indicate compliance with UL 793. They shall be capable of being operated by approved automatic and manual means.

**3.7 Fire Department Hose Connections.** Where exit passageways are required by the California Building Code for egress, a Class I Standpipe System shall be provided in accordance with VCFC Section 905.

**3.8 Aisles.** Aisles providing access to exits and fire department access doors shall be provided in high-piled storage areas exceeding 500 square feet. Aisles separating storage piles or racks shall comply with NFPA 13 and VCFC Chapter 10.

**3.8.1 Aisles in Buildings with Sprinklers.** Aisles shall be a minimum of 44 inches wide. Aisles shall be a minimum of 96 inches wide in high-piled storage areas exceeding 2500 square feet in area, which are accessible to the public and designated to contain high-hazard commodities. Aisles shall be a minimum of 96 inches wide in areas accessible to the public where mechanical stocking methods are used per, VCFC 2306.9.1.1.

**3.8.2 Aisles in Buildings without Sprinklers.** Aisles shall be a minimum of 96 inches wide per, VCFC 2306.9.1.2.

**3.8.3 Clear Height.** The required aisle width shall extend from floor to ceiling. Rack structural supports and catwalks are permitted to cross aisles at a minimum height of 6 feet 8 inches above finished floor level, provided that such supports do not interfere with fire department hose stream trajectory, per VCFC 2306.9.2. No storage is permitted over aisle which include exit doors (i.e. No tunneling).

**3.8.4 Dead Ends.** Dead end aisles shall meet the minimum requirements contained in Chapter 10 of the VCFC, per VCFC 2306.9.3

**3.9 Portable Fire Extinguishers.** Portable fire extinguishers shall be provided in accordance with VCFC Section 906.

**3.10 Fire Sprinkler Systems.** When fire sprinklers are required by VCFC Table 2306.2, the CBC or if otherwise provided, the sprinkler system shall be installed in accordance with NFPA 13 and VCFPD Standard 14.7.2

**3.11 Curtain Boards.** When required by VCFC Table 2306.2, curtain boards shall be installed in accordance with VCFC 910.3.5.

## CHAPTER 4 CLASSIFICATIONS OF COMMODITIES

**4.1 General.** Commodities shall be classified as Class I, Class II, Class III, Class IV or High Hazard, in accordance with VCFC Chapter 23.

**4.2 Plastics.** Plastics shall be classified as Group A, B or C in accordance with VCFC 2303.7. To determine the proper commodity classification of products with limited quantities of Group A plastics in mixed commodities, use VCFC Figure 2303.7.4. This figure identifies the quantity of Group A plastics allowed to be stored in a package, carton or on a pallet without increasing the hazard and commodity classification.

## CHAPTER 5 DESIGNATIONS OF HIGH PILED STORAGE AREAS

**5.1 High-piled Storage Areas.** High-piled storage areas, and portions of high-piled storage areas intended for storage of a different commodity classification 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 different commodity class, shall be based on the highest hazard commodity class stored except as provided in VCFC Section 2304.2; designation based upon engineering analysis.

## CHAPTER 6 SOLID PILED AND SHELF STORAGE

**6.1 General.** Shelf storage, storage in solid piles, solid piles on pallets, and storage in bin boxes not exceeding five feet in any dimension shall be in accordance with VCFC 2306 and 2307.

## CHAPTER 7 RACK STORAGE

**7.1 General.** Rack storage shall be in accordance with VCFC sections 2306 and 2308. Racks with solid shelving having a greater than 32 square feet measured between approved flue spaces at all four edges of the shelf shall be in accordance with VCFC 2308.2.2.

**7.2 Flue spaces.** Flue spaces shall be provided in accordance with VCFC Table 2308.3, as required by 2308.3.

## CHAPTER 8 AUTOMATED STORAGE

**8.1 General.** Automated storage similar to carousel storage shall be in accordance with VCFC 2309.

## CHAPTER 9 SPECIALTY STORAGE

**9.1 General.** Record storage facilities used for rack or shelf storage of combustible paper records greater than 12 feet in height shall be in accordance with VCFC Section 2306, 2308 and NFPA 13. Palletized storage of records shall be in accordance with VCFC Section 2307.

## CHAPTER 10 HOUSEKEEPING AND MAINTENANCE

**10.1 General.** All fire and life safety equipment and systems required by the VCFC shall be maintained operable at all times. Equipment, devices, and systems shall be regularly tested in accordance with nationally recognized standards, manufacturers' recommendations, and adopted regulations. Non-required fire protection systems and equipment shall be inspected, tested and maintained.

**10.2 Clearance from Ignition Sources.** Clearance between ignition sources and the combustible storage shall be maintained in accordance with VCFC Section 305.

**10.3 No Smoking.** Smoking shall be prohibited. Approved "NO SMOKING" signs shall be conspicuously posted in accordance with VCFC Section 310.

**10.4 Maintaining Storage Heights.** A visual method of indicating the maximum allowable storage height shall be provided. Maximum storage height shall be identified by installing barriers, painting a line, posting signage, suspending objects from the roof structure not to obstruct sprinkler discharge or any other method approved by the fire code official.

**10.5 Aisle Maintenance.** When restocking is not being conducted, aisles shall be kept clear of storage, waste material and debris. Fire department access doors, aisles and exit doors shall not be obstructed. During restocking operations using manual stocking methods, a minimum unobstructed aisle width of 24 inches shall be maintained in 48 inch or smaller aisles, and a minimum unobstructed aisle width of one-half of the required aisle width shall be maintained in aisles greater than 48 inches. During mechanical stocking operations, a minimum unobstructed aisle width of 44 inches shall be maintained in accordance with VCFC 2306.9

**10.6 Flue Spaces.** Required flue spaces shall be maintained.

## CHAPTER 11 PLANS SUBMITTAL

**11.1 General.** Plans and specifications shall be submitted to VCFPD, Fire Prevention Bureau as indicated elsewhere in this document.

**11.1.1** Obtain any permits from the appropriate **Building & Safety Department** to install the racks or related fire protection equipment.

**11.2 Plans and Specifications Submittal.** At the time of building permit application for new structures designed to accommodate high piled storage, or for any request for a change of use or occupancy, and at the time of permit application for a storage permit, plans and specifications shall be submitted for review and approval. In addition to the information required by the CBC, the storage permit submittal shall include the information specified herein. Once approved, a copy of the approved plan shall be maintained on the premises.

**11.3 Submittal Requirements.** Submit a minimum of three sets of plans, Fire Prevention Bureau transmittal form, Ventura County Fire Protection District High-Piled Combustible Storage Permit Application Information (Form #13.5.6) and the appropriate fees to the Ventura County Fire Prevention Bureau located at 165 Durley Avenue, Camarillo CA 93010. Fire Prevention Counter hours are Monday through Friday, 8:00 a.m. to 5:00 p.m.

**11.4 Fees.** Appropriate fees can be found in the Ventura County Fire Protection District's Fee Schedule at <http://fire.countyofventura.org> or by calling the Fire Prevention Counter at (805)389-9738. Fees can be paid by check/money order, Visa or MasterCard. Plan Check fees include the original plan check and one re-check. Please ensure that all corrections are made prior to re-submittal to avoid additional fees. All fees shall be paid at the time of plan submittal.

**11.5 Plan Approval.** Plans will be checked and if approved, will be stamped "**Acceptable**", signed, and dated. The Fire Department will retain one set.

**11.6 Case Number.** The Fire Department has instituted the use of a "**Case Number**" for tracking all projects submitted for review. To provide faster customer service, please refer to your Case Number when contacting this Department. Your Case Number will also be listed on the Fire Department approved plans.

**11.7 Field Changes.** Field changes may require re-submittal of plans along with additional plan check fees.

## CHAPTER 12 PLANS SPECIFICATIONS

**12.1 Specifications.** Specifications for High Piled Storage shall be drawn with care by a trained person

**12.2 Size and Scale.** Plans shall be drawn on a minimum of 24" x 36" paper and shall be drawn to an indicated scale of not less than 1/8 inch = 1 foot.

**12.3 Plans.** The following items shall be included in all High Piled Storage plan specifications.

- (1) Scope of work for the project
- (2) Name of owner and/or occupant
- (3) Location of project, including parcel #, street, number, and city

- (4) Applicable codes and standards used for the design
- (5) Building occupancy classification

**12.3.1 Site Plan.** A scaled site plan that shows the entire building, including all fire access lanes, fire hydrants, fire department connection and fire sprinkler risers.

**12.3.2 Floor Plan.** A scaled floor plan of the building showing locations and dimensions of the HPS area, location of the racks and access doors to the storage area.

**12.3.3 Storage Heights.** The maximum proposed storage height for each designated storage area per array. This height is measured from the finished floor to the highest point of the commodity stored.

**12.3.4 Elevation Detail.** An elevation detail viewing the number of tiers within each rack, if applicable, and the commodity clearance between the top of storage and the sprinkler deflector and/or roof for each storage arrangement.

**12.3.5 Aisles.** Aisle dimensions between each storage array.

**12.3.6 Pile Volume.** Maximum pile volume for each storage array.

**12.3.7 Location of Commodities.** Location and classification of commodities shall be in accordance with VCFC. The designation of a HPS area, or portion thereof intended for storage of a different commodity class, shall be based on the highest hazard commodity class stored, unless an engineering analysis has been submitted for review and approval.

**12.3.8 Encapsulated Commodities.** Location of commodities which are banded or encapsulated.

**12.3.9 Access Doors.** Location of required fire department access doors.

**12.3.10 Flue Spaces.** Dimension and location of the transverse and longitudinal flue spaces.

**12.3.11 Occupancy Classification.** The occupancy classification as defined by CBC Chapter 3

**12.4 Fire Protection Systems Plans.** The following plans shall be submitted with HPS plans when applicable.

**12.4.1 Sprinkler Plans.** An approved fire sprinkler plan that includes scale drawings and hydraulic calculations designed to protect the specified hazard class of the stored commodity. The sprinkler plans shall include the sprinkler head temperature, orifice size, and the design density of the existing fire sprinkler system and/or proposed changes to the fire sprinkler system.

**12.4.2 Fire Alarm Plans.** An approved fire alarm plan that includes scale drawings. The alarm plans shall include the location of valves controlling the water supply of ceiling and in-rack sprinklers, type, location and specifications of fire detection equipment

**12.4.3 Smoke and Heat Removal.** The location, model, type and automatic link temperature of the automatic/manual release smoke vents and curtain board systems. Smoke and heat vents shall be listed and/or approved for their use and shall be labeled.

## CHAPTER 13 VERBATIM NOTES

**13.1 Verbatim Notes.** The following notes shall be completed and placed verbatim on the working HPS plans.

**13.1.1** An application for a HPS permit shall automatically become invalid unless an inspection for such operation permit is conducted within 6 months of submittal.

**13.1.2** A current Five-Year Inspection certification tag shall be affixed to the fire sprinkler system riser(s) and a copy of the inspection report shall be on file with this department per the VCFC and NFPA 25-2006 California Edition prior to issuance of a HPS permit.

## CHAPTER 14 INSPECTIONS

**14.1 General.** The inspection fee that is paid at the time of plan submittal will provide you with two inspections to complete the project. For projects that exceed this limit, inspection requests will not be accepted unless additional fees are paid prior to scheduling an inspection.

**14.2 Responsibility.** It is the responsibility of the installing contractor to be on the job site during the inspection with approved plans. Failure to do so will result in the cancellation of the inspection. Cancelled inspections will be counted as one inspection.

**14.3 Inspection Requests.** Inspection requests can only be taken from the installing contractor. Inspections shall be requested Monday through Friday prior to 3:00 p.m., one business day prior to inspection.

**14.4 Inspection Schedule.** It is the intent of the Ventura County Fire Prevention Bureau to perform inspections one business day after the inspection has been requested. However due to training requirements, meetings, emergency services and other scheduled and non-scheduled events it cannot be guaranteed that all inspections will be conducted the next business day.

**14.5 Schedule by Phone.** Call (805) 389-9744 one business day prior to inspection for scheduling an inspection. The inspection request line is open Monday through Friday between 8:00 a.m. and 3:00 p.m.

**14.6 Schedule by Fax.** Inspections can be scheduled via fax at (805) 388-4356. Ventura County Fire Prevention Bureau form FP13.1.3, found at <http://fire.countyofventura.org>, must be used to request inspections. Faxed inspection requests must be received prior to 3:00 p.m.

**14.7 Contact Information.** Be sure to leave your phone number, when you schedule an inspection by phone or fax, where the inspector can call you back, after 7:30 a.m. the day of the inspection, to notify you of your inspection time.

**14.8 Inspection Times.** Inspection times are approximate and may vary because of delays at previous inspections or emergency response by Fire Department personnel. Please allow time on either side of the inspection time for the inspector to arrive.

## CHAPTER 15 ACCEPTANCE TESTING

**15.1 Smoke and Heat Vents.** New construction shall only use listed and/or approved and labeled smoke vents as specified by VCFC 2306.7. Required smoke vents in existing structures (constructed under the 1998 or previous codes) shall be inspected for proper operation (manual & automatic) and proper link temperature by an independent qualified contractor. Non-required existing vents shall be treated as a required vent.

**15.1.1 Inspection Report.** An inspection report by the inspecting contractor shall be provided to VCFPD prior to plan approval. The report at a minimum shall identify the year the building was constructed, a listing of all vents inspected, the fusible link temperature rating, the presence of a manual release mechanism, and the operational status of each vent. Prior to submitting the report to VCFPD all identified deficiencies must be corrected and included within the report.



**15.1.2 Manual Release Devices.** If the smoke vents do not contain manual release devices, and VCFPD determines that the manual release devices were not specifically required at the time of construction or during any previously approved high piled storage use, then manual release devices will not be required. VCFPD staff will evaluate all other conditions on a case by case basis during the review process. If this requirement is placed, VCFPD staff will indicate the requirement adjacent to the approval stamp on the final approved plans for the proposed operation. The vent inspection report shall be copied onto the plans prior to VCFPD plan approval.