

Chesterfield Fire and EMS
Fire and Life Safety Division
Special Hazard Fire Protection Systems
(804) 748-1426
Fax: (804) 768-8766
www.chesterfield.gov/fire

SPECIAL HAZARD FIRE PROTECTION SYSTEMS

Flammable and Combustible Liquid Commodity Storage, Spray Operations and Dipping/Coating Operations NFPA 17 – 2002 Edition, NFPA 33 – 2007 Edition, NFPA 34 – 2007 Edition, International Building Code 2009 Edition, International Fire Code 2009 Edition

Project Name : _____
Project Address : _____
Building Permit # : _____ Date : _____
Code Edition: _____

All supporting documentation for items listed below is required for review. The checklist is based on the 2009 Edition of the International Building and Fire Codes.

GENERAL (All submissions shall include the following):

- A minimum of four copies of shop drawings, calculations, and submittal data shall be provided with a permit application permitting evaluation of the system design prior to installation.
- The permit application shall clearly designate the system as being required for compliance with Virginia Uniform Statewide Construction Code, or installed as an elective system at the discretion of the owner.
- Provide the business name and address where system will be installed. Where applicable include the associated project building permit number.
- Provide a description of occupancies and hazards being protected, designating whether the area is occupied, public accessibility, employee accessibility, or normally non-occupied.
- Provide the name, address, and telephone/fax numbers of the system designer.
- Provide the name, address, and telephone/fax numbers of the installing contractor.
- Provide the name, address, and telephone/fax numbers for the project general contractor, property owner, or realty representative.

- Plans are to be drawn to a uniform size and to a recognized scale.
- The floor plan shall indicate location of spray area/room/booth, flammable/combustible liquid storage, flammable/combustible liquid mixing/dispensing, distances between all openings and electrical equipment.
- The flammable/combustible liquid information shall be provided under owner's letterhead and signature. The documentation shall include the total inventory information including storage, cleaning, and waste material quantities, Material Safety Data Sheets for each product, type and size of commodity containers. International Building Code – Section 414 and 415 and the International Fire Code - Chapter 15 and 34. Do not submit Material Safety Data Sheets only. Flammable and combustible liquids are to be classified in accordance with the IBC/IFC (i.e. – Class IA Flammable Liquid, Class IIIB Flammable Liquid).

SPRAY OPERATIONS

Provide documentation for design method utilized to meet provisions of the International Building Code for application and/or storage of flammable/combustible liquids permitting evaluation of fire suppression system requirements in accordance with International Building Code – Section 307, Table 307.7(1), Section 415 and 416, International Fire Code – Chapter 15, NFPA-33 (2007 Edition) and NFPA 34 – (2007 Edition).

- Provide documentation for all buildings constructed as “High Hazard”. The information shall include but not be limited to the design of the automatic sprinkler system or fire suppression system, automatic fire detection system, spill and containment control, hazardous exhaust ventilation, and its associated emergency communication system with central station monitoring; International Building Code 903.2.11.6 and Table 903.2.11.6, 414.3, 414.5.3, 414.5.5, , 414.7, 414.7.3.
- Provide documentation of all buildings constructed under an occupancy classification other than High Hazard with storage of flammable/combustible liquids in accordance with “Control Area(s)” (not applicable to spray areas); International Building Code 414.2, Table 307.1(1).
- Provide documentation for all buildings constructed under an S-1 occupancy classification with storage of flammable/combustible liquids in accordance with NFPA 33 - “Spray Application Using Flammable and Combustible Materials” and the International Building Code 307.1 Exception 1.
- Provide documentation for the storage of flammable/combustible liquids utilizing a manufactured “Mixing Room” with quantities of less than 2 gallons/square foot and floor area not exceeding 150 square feet. Provide the total quantities of all flammable or combustible liquids stored including gun cleaner, paint mixing system, and waste. Totals are not to exceed 300 gallons; NFPA 33 – Section 8.3.5.

- Provide documentation for the storage of flammable/combustible liquids utilizing a site constructed “Mixing Room/Storage Room”. Provide the total quantities of all flammable/combustible liquids including gun cleaner, paint mixing system, and waste. Applicable when the amount exceeds the permissible quantities of IBC Table 307.1(1) - Control Room. Flammable/combustible liquid quantities of less than 300 gallons shall be stored in accordance with NFPA 30 – Flammable and Combustible Liquids Code.
- Provide documentation for the storage of flammable/combustible liquids not utilizing a “Mixing Room” and/or, the total quantities including gun cleaner, paint mixing system, and waste, when the quantity exceeds the permissible quantities of International Building Code - Table 307.1(1) - Control Room.
- The fire protection system for the spray paint area, room or booth shall be coordinated and interfaced with other fire protection system submittals for project. Interface requirements shall address door closure, air supply shut down to the spray apparatus, fuel shut down, where heating or baking is performed within the spray booth.
- The system submittal should utilize the appropriate checklist applicable to system, (utilize this checklist for Dry Chemical and CO₂ systems)
 - Fire Sprinkler System with additional NFPA 33 design items
 - Clean Agent Fire Extinguishing Systems
 - Fire Alarm System
- The plans shall indicate the electrical classification of the spray area, room or booth. NFPA 33 - Chapter 6 and NFPA 70 – The National Electrical Code.
- The construction and design of spray areas, rooms or booths shall comply with NFPA 33 – Chapter 5.
- Drying, curing or fusing apparatus used in conjunction with a spray application of flammable or combustible materials shall comply with NFPA 86 – Standard for Ovens and Furnaces (2007 Edition), the International Mechanical Code (2009 Edition) and the International Fire Code (2009 Edition).

Fire Protection Systems for Protection of Spray Paint Areas, Rooms or Booths

SPRINKLER SYSTEM - NFPA 33 – Section 9.4.1 through 9.4.7.2

The items listed below are specific sprinkler system provisions referenced by NFPA 33. The Fire Sprinkler System checklist shall be used for standard submittal requirements.

- Type of Sprinkler System to be installed.
 - Wet Pipe System
 - Dry Pipe System
 - Pre-Action System
 - Open-head Deluge System

- The minimum sprinkler system design for spray application of flammable or combustible liquids shall meet “Extra Hazard Group II” hydraulic design.
- The minimum sprinkler system design for spray application of Styrene Cross-Linked Composites (Glass Fiber-Reinforced Plastics) shall meet at least Ordinary Hazard Group II. NFPA 33 – Section 17-.3
- Each spray booth, including the exhaust duct protection, shall be under the control of an accessibly located, separate, listed indicating type control valve; NFPA 33- Section 9.4.5.
- Sprinkler heads shall be protected from accumulation of spray materials. The sprinklers shall be permitted to be covered only by cellophane bags having a thickness of 0.003 inches or less or by thin paper bags. NFPA 33 – Section 9.4.7.1.
- Auxiliary drains shall be provided for trapped pipe sections. NFPA 13 – Section 8.16.2.5.
- In addition to meeting the above sprinkler system design criteria, the sprinkler plans shall indicate compliance with the following sections based on the type of spray system in use.
 - Continuous Spray Application Systems – NFPA 33 – Section 9.2
 - Automatic Powder Application System – NFPA 33 – Section 9.7
 - Automated Liquid Electrostatic Spray System – NFPA 33 – Section 9.8

DRY CHEMICAL ABC TOTAL FLOODING SYSTEMS
NFPA 17 (2002 Edition), NFPA 33 (2007 Edition)

- The submitted plans shall be drawn to scale, include a plan view of the protected area showing the enclosure partitions, full and partial height; the agent distribution piping system including the location of the agent storage containers and amount of agent, piping and nozzle types; types of pipe hangers and rigid pipe supports; the detection system, the alarm device locations and mounting height. The plans shall also indicate the control system including all devices and schematic drawings of the wiring interconnection between the devices; the end of line resistors and their location; location of the controlled devices such as dampers and shutters and the location of the instructional signage. NFPA 17 – Section 10.2.1, 10.2.3, 10.2.3.1 and 10.2.3.2.
- The submittal plans shall include an isometric view of the agent distribution system indicating the length and diameter of each pipe segment; the flow calculations; the fittings including reducers, strainers and the nozzles including the make, model and size of each item. NFPA 17 – Section 10.2.3.
- The submitted plans shall indicate the flow rates of the nozzles for engineered systems. NFPA 17 – Section 10.2.3.1.
- The submitted plans shall indicate the provision of the required interlocks with the spray

area, room or booth doors with the spray system and the ventilation system. International Building Code – Section 904.3.3.

- The unprotected or uncloseable openings of a spray area, room or booth shall be protected in accordance with NFPA 17 – Sections 6.1 through 6.1.4 and 6.2.2.5 through 6.2.2.6.4. Calculations shall be provided to verify the protection required.
- The submitted plans shall identify areas requiring compensation for special conditions such as high ventilation rates or prevailing winds conditions that can adversely affect the extinguishing effectiveness of the system. NFPA 17 – Section 5.4.2.
- The submitted plans shall indicate when the proposed dry chemical system is to be used to protect any of the following conditions or arrangements:
 1. Hazards that are normally heated.
 2. Hazards that having flowing flammable or combustible fluids or gases.
 3. Hazards that have conveyors moving flammable or combustible materials or commodities.

When any of the above conditions exist, details shall be provided that indicate how the following are achieved:

1. Automatic shut-off of the power or the fuel supply on system discharge.
 2. Automatic means to ensure shut-off of the power and the fuel valves upon operation of the extinguishing system
 3. Automatic shut down of the conveyors that move flammable or combustible materials or commodities.
NFPA 17 – Sections 5.5.1, 5.5.2, 5.5.3.
- Documentation shall be provided that all emergency shut-off systems are fail-safe and require manual reset. The shut-off systems shall not reset without the dry chemical fire suppression system being restored to service. NFPA 17 – Sections 5.5.4 and 5.5.5.
 - If common exhaust ducts are utilized, the plans shall show fire protection of the common ducts in accordance with NFPA 17 – Section 9.3.4.1 (1) (2)
 - An audible and/or visual alarm device shall be provided for occupant notification of system operation; International Building Code 904.3.4, NFPA 17 – Section 5.7.3.
 - Ventilation systems, within the spray area, room or booth, shall be shutdown upon system activation and/or additional dry chemical agent shall be provided and calculated for the unenclosed opening(s) based on the percentage of the unenclosed opening. NFPA 17 – Sections 6.2.1 through 6.2.1.4 and Section 6.2.2.2.
 - The submitted plans and data shall provide details of the electrical/mechanical

equipment that is interfaced with the fire suppression system to initiate performance of control function(s) in accordance with the fire suppression system manufacturer's requirements. International Building Code 904.3.3, International Fire Code 1504.6.1.2.1 and NFPA 17 – Section 5.5.2 and 5.5.4.

- The submitted plans shall indicate the location, the mounting height and the method for manual activation of fire suppression system. International Building Code 904.11.1 and NFPA 17 – Sections 5.7.16, 5.7.1.7, 5.7.1.7.1 and 5.7.1.9.
- All electrical equipment shall be electrically classified for the hazard classification that it is located in. NFPA 33 – Chapter 6 and NFPA 70 – Section 505.
- An agent discharge test shall be performed prior to final acceptance. NFPA 17 – Section 10.4.3. The manufacturer's required guidelines for purging of system piping shall be noted on the plans. (*NEW*)

MIXING ROOMS ASSOCIATED WITH SPRAY APPLICATION OF FLAMMABLE OR COMBUSTIBLE MATERIALS

- Mixing rooms associated with the spray application of flammable or combustible liquids shall be constructed in accordance with the International Building and Fire Codes and NFPA 33 – Chapter 5. The submitted plans shall detail the construction of the mixing room and the materials used in the construction of the spray area, room or booth and the plans shall be submitted prior to construction or installation.
- The submitted plans shall show the location of the mixing room in relationship to the spray area, room or booth. Based on the location of the mixing room, the submitted plans shall indicate compliance with NFPA 33 – Section 8.3. The amount of flammable or combustible liquids to be stored in the mixing room shall be indicated on the plans in accordance with NFPA 33 – Section 8.3.3 through 8.3.6.
- Provide design and construction documents for all mixing rooms or areas. The documents shall include the following information:
 - The size of the mixing room.
 - The construction details and materials used for construction of the mixing room.
 - The method used for ventilation of the mixing room, including the exhaust and make-up air. Calculations shall be provided for verification of the ventilation system capacity.
 - The electrical classification for the mixing room shall be provided.
 - The classification, container size and number of containers of flammable

or combustible liquids to be stored in the mixing room and spray area shall be provided, if applicable.

- The details of the bonding and grounding equipment, for the transfer of flammable or combustible liquids in the mixing room, shall be provided.
- The submitted plans shall include the calculations for verification of the adequacy of the secondary containment capacity.

DIPPING AND COATING PROCESSES USING FLAMMABLE AND COMBUSTIBLE LIQUIDS - NFPA 34 – 2007 EDITION

- The submitted plans shall provide details of the construction and materials used for construction of the dip or the coating tank. If the tank is a manufactured tank, plans and specifications from the manufacturer shall also be provided. NFPA 34 – Chapter 5.
- The submitted plans shall be drawn on uniform sheets to a recognizable scale.
- The submitted plans shall indicate the location of the dipping or the coating tank within the building and shall show all adjacent exposures or operations. NFPA 34 – Chapter 4.
- The submitted plans shall indicate the capacity of the dipping or the coating tank. The capacity shall be based on the volume of the tank minus the free board area required by code.
- The submitted plans shall provide an elevation view of the dipping or the coating tank as well as a plan view. The plan shall clearly indicate if any portion of the tank is located below grade. NFPA 34 – Section 5.3.
- The submitted plans shall indicate the method being used to prevent tank overflow in the event of a fire in the tank that operates the building sprinklers located above the tank area. NFPA 34 – Section 5.4 (1), (2) and (3).
- Dipping or coating tanks with a liquid capacity greater than 150 gallons or a liquid surface area in excess of 10 square feet shall be equipped with a trapped overflow.
The submitted plans shall show the details of the size of the overflow pipe, its location in the tank and its discharge point. NFAP 34 – Section 5.6.1, 5.6.2 and 5.6.4.
- Dipping or coating tanks in excess of 500 gallons capacity shall be equipped with a bottom of the tank drain. The submitted plans shall indicate the size of the bottom drain, the method of activation of the bottom drain, both manual and automatic activation methods are required, and the location of the required closed, vented salvage tank. NFPA 34 – Sections 5.7, 5.7.1, 5.7.3, 5.7.4, Table 5.7.4,

5.8.3 and 5.8.4.

- The submitted plans shall provide the electrical hazard classification for the tank area and adjacent areas. NFPA 34 – Chapter 6 and NFPA 70 – Section 505.
- The submitted plans shall provide the details and calculations for the mechanical ventilation, for the confinement of the flammable or combustible liquid vapors, within a 5 foot area of the vapor source. NFPA 34 – Section 7.3.
- The submitted calculations and documentation provided shall verify that the concentration of exhaust vapor air stream does not exceed 25% of the Lower Flammable Limit. NFPA 34 – Section 7.3.
- The submitted plans shall include the wiring diagrams and the control equipment details to verify automatic shut down of the dipping or coating process, if the ventilation system fails. NFPA 34 – Section 7.3.2.
- The submitted plans shall indicate the location and the type of alarm device to be provided as required by NFPA 34 – Section 7.3.2.
- The submitted plans shall indicate the class, the quantity and the container size of the flammable or combustible liquids used in the dipping or coating process, including reserve supplies. This information shall be indicated for the process area and storage area in the vicinity of the process area. NFPA 34 – Sections 8.3 through 8.3.6.
- The submitted plans shall indicate the method of handling and dispensing of the flammable or combustible liquids at the final point of use. NFPA 34 – Section 8.5 and 8.6.
- The submitted plans shall indicate compliance with NFPA 34 – Section 9.5, “Notification and Interlocks”. The submitted plans shall include the mechanical, the electrical and the control plans and wiring diagrams to verify compliance.
- The submitted plans shall indicate the type of fire protection system to be used for the protection of the dipping or the coating tank. The fire protection plans shall include the tank construction plans or they shall be submitted simultaneously. Refer to the appropriate type of fire suppression system(s) check list for additional requirements.
- The submitted plans shall indicate if the fire protection system design for the dipping or coating process is based on NFPA 34 – Section 9.6 (Automatic Fire Protection for Small Dipping Processes) or NFPA 34 – Section 9.7 (Automatic Fire Protection for Enclosed Processes or Large Processes). The submitted plans shall contain sufficient detail to verify compliance with the selected method of protection.

- Acceptance testing of the selected fire suppression system will be in accordance with the specific fire suppression system standard. Refer to the appropriate type of fire suppression system(s) check list for additional requirements. (*NEW*)