

CENTRAL MARIN FIRE DEPARTMENT



Developed by

Ruben Martin, Fire Marshal

Approved by

Scott Shurtz, Fire Chief

Fire Protection Standard 308

Application of Flammable Finishes

Date: 8-21-2017

Revision: 8-21-2017

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This standard has been developed pursuant to Chapter 24 of the California Fire Code as adopted by ordinance by the Central Marin Fire Department. It is intended that this standard be used as a guide for establishing a reasonable degree of fire and life safety in the application of flammable finishes inside buildings.

- I. A Fire Department Operational Use Permit is required to conduct spraying or dipping operations utilizing flammable or combustible liquids. The permit application and filing fee should be submitted to the Fire Prevention Division for processing.
- II. General Requirements:
 - a. Smoking shall be prohibited in any spray finishing or dipping area. "No Smoking" signs shall be installed so that they are clearly visible. Signs shall have letters at least 3" high with a $\frac{3}{4}$ " stroke, red and on a white background.
 - b. Exit signs shall be clearly posted above all required exit doors. Signs shall have letters at least 6" high with a $\frac{3}{4}$ " stroke, green and on a white background.
 - c. A minimum of two exit doors are required from all spraying or dipping areas. Doors shall be at least 36" wide and 6'8" high. Doors are to swing in the direction of exit travel. (Sliding, horizontal and rollup doors do not qualify as a required exit door.)
 - d. No lock or latch may be installed on a required exit door that requires the use of a key or any special knowledge or effort.
 - e. Where an exit door swings into a parking area or an area, which may be blocked by obstacles, a sign shall be posted on the door that states "Fire Exit. Do Not Block". Letters ARE TO BE AT LEAST 3" HIGH WITH A $\frac{3}{4}$ " STROKE. Letters are to be red and on a white background.
 - f. A minimum of one fire extinguisher with a minimum rating of 2A40BC shall be installed at a height of not less than 4": (to the bottom of the extinguisher) nor greater than 5" (to the top of the extinguisher) from the floor level. Travel distance to the fire extinguisher shall not exceed 30'.
 - g. Electric wiring and equipment shall conform to the provisions of this standard and otherwise be installed in accordance with the electrical code.

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III. Spray Finishing

A. Spray Booths

1. Spray finishing operations shall not be conducted in buildings used for assembly, educational, institutional or residential occupancies except in a room designed for the purpose, protected with an approved system of automatic sprinklers and separated vertically and horizontally from other areas by construction complying with the requirement of the building code.
2. In other occupancies, all spraying operations performed inside of a building shall be conducted in an approved spray booth, spraying area or spraying room approved for such use. Limited spraying areas for "touch-up" or "spot painting" may be approved, provided they meet the requirements of Fire Protection Standard No. 308A.
3. Spray booths shall be substantially constructed of steel not less than No. 18 gage (.044 inch) in thickness or other approved noncombustible materials.
4. The area of paint spray booth shall not exceed 1,500 square feet nor 10 percent of the basic area permitted for the major use of the building as set forth in the California Building Code.
5. The interior surfaces of spray booths shall be smooth and continuous without edges and otherwise designed to prevent pocketing of residue, to permit the free passage of exhaust air from all parts of the interior and to facilitate washing and cleaning without injury.
6. The floor shall be of noncombustible material or shall be covered with a noncombustible, non-sparking material of such character to facilitate the safe cleaning and removal of residue.
7. If installed, baffle plates shall be of a noncombustible material readily removable or accessible to facilitate cleaning and designed to provide an even flow of air through the booth and to prevent the deposit of overspray before it enters the exhaust duct. Such plates shall not be installed in the exhaust ducts.
8. Each spray booth having a frontal area of more than 9 square feet and which is not equipped with doors shall have a metal deflector or fire curtain not less than 4 1/3" deep installed at the upper outer edge of the booth over the booth opening.

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9. Each spray booth shall be separated from other operation by not less than 3' or by a wall or partition or by a greater distance as the Fire Marshal may require.
10. All portions of a spray booth shall be readily available for cleaning, and a clear space of not less than 3' shall be kept free of storage or combustible materials.
11. When spray booths are illuminated, it shall be done through heat-treated or hammered wire glass. Fixed lighting units only shall be used as a source of illumination, and panels shall be arranged so as to minimize breakage and so that normal accumulation of residue on the exposed surface of the panel will not be raised to a dangerous temperature by radiation or conduction from the source of illumination.

B. Dry-Type Overspray Collectors (Exhaust Air Filters)

1. Overspray dry filters or filter rolls, if installed in conventional dry-type spray booths, shall conform to (3) through (8) of this subsection.
2. The spraying operations shall be so designed, installed and maintained that the average air velocity over the open face of the booth (or booth cross section during spraying operations) shall be not less than 100 linear feet per minute. Dry spray booths equipped with a filter roll which is automatically advanced when the air velocity is reduced to that specified in this paragraph shall be arranged to cause shutdown of spraying operations if the filter roll fails to advance automatically. Visible gages or audible alarm devices shall be installed to indicate that the required air velocity is maintained.
3. All discarded filter pads shall be immediately removed to a safe, well detached location or placed in a water filled metal container and disposed of at the close of the day's operation.
4. The location of filters in a spray booth shall be so as not to reduce the effective booth enclosure of the articles being sprayed.
5. Space within spray booth on the downstream and upstream sides of filters shall be protected with approved automatic sprinklers.
6. Filters shall not be used when applying a spray material known to be highly susceptible to spontaneous heating and ignition.
7. Clean filters shall be noncombustible or of approved type.

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8. Filters shall not alternately be used for the application of lacquer and other materials such as varnish, stains and ground coats.

C. Electrical and Other Sources of Ignition

1. There shall be no open flame or spark producing equipment in any spraying area nor within 20' thereof, unless separated by a partition.
2. Space heating appliances, steam pipes or hot surfaces shall not be located in a spraying area where deposits of combustible residues may readily accumulate.
3. Unless specifically approved for locations containing both deposits of readily ignitable residue and explosive vapors, there shall be no electrical equipment in any spraying area whereon deposits of combustible residues may readily accumulate, except wiring in rigid conduit or boxes or fittings containing no taps, splices or terminal connections.
4. Electric wiring and equipment not subject to deposits of combustible residues but located in a spraying area shall be of explosion proof type approved for use in such hazardous location. Such area shall be considered a class 1, Division 1 hazardous location in accordance with the electrical code.
5. Electrical wiring, motors and other equipment outside of but within 20 feet of any spraying area and not separated therefrom by partitions shall not produce sparks under normal operating conditions. Such area shall be considered a class I, division 2 hazardous location in accordance with the electrical code.
6. Electric lamps outside of but within 20 feet of any spraying area and not separated therefrom by a partition shall be totally enclosed to prevent the falling of hot particles and shall be protected from physical damage by suitable guards or by location.
7. Portable electric lamps shall not be used in any spraying area during spraying operations. Portable electric lamps, if used during cleaning or repairing operations, shall be of the type approved for hazardous locations.
8. All metal parts of spray booths, exhaust ducts and piping systems conveying class I or II liquids shall be properly electrically grounded in accordance with the electrical code.

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D. Ventilation of Spray Booths

1. All spraying areas shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors.
2. Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and dry finishing material residue to be exhausted. The electrical equipment shall be interlocked with the ventilation of spraying area so that the equipment cannot be operated unless the ventilation fans are in operation.
3. Each spray booth shall have an independent exhaust duct system discharging to building exterior, except multiple cabinet spray booths in which identical spray finishing material is used with a combined frontal area of not more than 18 square feet may have a common exhaust. If more than one fan serves one booth, all fans shall be so interconnected that one fan cannot operate without operating all.
4. Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating element shall be nonferrous or non-sparking or the casing shall consist of or be lined with such material.
5. Belts shall not enter duct or booth unless belt and pulley within the duct or booth are tightly enclosed.
6. Exhaust ducts shall be constructed of steel having a thickness not less than indicated in the table below:

<u>Diameter of Duct</u>	<u>Minimum Thickness Sheet Gage</u>
8" or less	No. 24
Over 8" to 18" inclusive	No. 22
Over 18" to 30" inclusive	No. 20
Over 30"	No. 18

The discharge point for exhaust ducts in a paint spray booth shall be not less than 6 feet from adjoining combustible construction nor less than 25 feet from adjoining exterior wall openings.

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7. Air exhausted from spraying operations shall not be re-circulated.
8. The mechanical ventilation system shall have air intake ducts extended to pick up flammable vapor within 6 inches of the floor.

E. Storage and Handling of Flammable or Combustible Liquids

1. The storage and handling of flammable or combustible liquids shall be in accordance with Chapter 57, California Fire Code and shall also conform to the provisions of this standard.
2. Where the quantity of liquid in 5 gallon and smaller containers, other than original sealed containers, exceeds a total of 10 gallons, it shall be stored in a storage cabinet conforming to Fire Protection Standard No. 510A or in storage or mixing rooms conforming to Chapter 57, California Fire Code.
3. Original closed containers, approved portable tanks, approved safety cans, or a properly arranged system of piping shall be used for bringing flammable or combustible liquids into spray finishing areas. Open or glass containers shall not be used.
4. Containers supplying spray nozzles shall be of closed type or provided with metal covers kept closed. Containers not resting on floors shall be on noncombustible supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons capacity.
5. All containers or piping to which is attached a hose or flexible connection shall be provided with a shutoff valve at the connections. Such valves shall be kept shut when not in use.
6. Heaters shall not be located in spray booths nor other locations subject to the accumulation of deposits or combustible residue.
7. If flammable or combustible liquids are supplied to spray nozzles by positive displacement pumps, pump discharge line shall be provided with an approved relief valve discharging to pump suction or safe detached location.
8. When a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers, one of which shall be grounded. Piping systems for Class I or II liquids shall be permanently grounded.

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F. Fire Protection Equipment

1. All spray booths or spray rooms shall be protected by an approved automatic fire extinguishing system.

G. Operations and Maintenance

1. All spraying areas shall be kept free from the accumulation of deposits of combustible residues as practical, with cleaning conducted daily if necessary.
2. Scrapers, spuds or other such tools used for cleaning purposes shall be of non-sparking material.
3. Residue scraping and debris contaminated with residue shall be immediately removed from premises and properly disposed of.
4. The use of solvents for cleaning operations shall be restricted to Class II and Class III liquids, except solvents with flash points not less than those normally used in spraying operations may be used for cleaning spray nozzles and auxiliary equipment, provided such cleaning is conducted inside spray booths and ventilation equipment is operating during cleaning.
5. Spray booths shall not be alternately used for different types of coating materials where the combination of the materials may be conducive to spontaneous ignition, unless all deposits of the first used material are removed from the booth and exhaust ducts prior to spraying with the second.
6. Metal waste cans with a self-closing lid shall be provided wherever rags or waste are impregnated with finishing materials and all such rags or waste deposited therein immediately after use. The contents of waste cans shall be properly disposed of at least once daily and at the end of each shift.

H. Drying Apparatus

1. Dry apparatus shall, in addition to conforming with the requirements of this standard, comply with the applicable provisions of Chapter 30, California Fire Code, Industrial Ovens.
2. Spray booths, rooms or other enclosures used for spraying operations shall not alternately be used for the purpose of drying by any arrangement which will cause a material increase in the surface temperature of the spray booth, room or enclosure.

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3. Except as specifically provided in subsection 4, drying or baking units utilizing a heating system having open flames or which may produce sparks shall not be installed in a spraying area but may be installed adjacent thereto when equipped with an interlocked ventilating system arranged to:
 - a. Thoroughly ventilate the drying space before heating system can be started;
 - b. Maintain a safe atmosphere at any source of ignition;
 - c. Automatically shut down heating system in the event of failure of the ventilating system.
4. Automatically refinishing booths or enclosures, otherwise installed and maintained in conformity with this standard, may alternately be used for drying with portable infrared drying apparatus when conforming with the following;
 - a. The procedure shall be restricted to low volume, occasional spray application
 - b. Interior of spray enclosures shall be kept free of overspray deposits;
 - c. During spray operations, the drying apparatus and electrical connections and wiring thereto shall not be located within spray enclosure nor in any other location where spray residue may be deposited thereon;
 - d. Spraying apparatus, drying apparatus and ventilating system of spray enclosure shall be equipped with suitable interlocks so arranged that;
 - i. Spraying apparatus cannot be operated while drying apparatus in inside spray enclosure.
 - ii. Spray enclosure will be purged of spray vapors for a period of not less than three minutes before drying apparatus can be energized.
 - iii. Ventilating system will maintain a safe atmosphere within the enclosure during the drying process and drying apparatus will automatically shut off in the event of failure of the ventilating system.
 - e. All electrical wiring and equipment of drying apparatus shall conform to the provisions of this article and shall otherwise be installed in accordance with the provisions of the electrical code. Only equipment of a type approved for Class I, division 2 hazardous locations, in accordance with the electrical

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code shall be located within 18 inches of floor level. All metallic parts of drying apparatus shall be properly electrically bonded and grounded.

IV. Dip Tanks

A. Location of Dip Tank Operations

1. Dip tank operations shall not be conducted in buildings used for assembly, institutional or residential occupancies, except in a room designed for the purpose, protected with an approved system of automatic sprinklers and separated vertically and horizontally from other areas by construction complying with the provisions of the building code.
2. Required ventilating systems shall be so arranged that the failure of any ventilating fan shall automatically stop any dipping conveyor system.

B. Construction of Dip Tanks

1. Dip tanks, including drain boards if provided, shall be constructed of substantial noncombustible material and their supports shall be of heavy metal, reinforced concrete or masonry.
2. Dip tanks of over 150 gallons in capacity or 10 square feet in liquid surface area shall be equipped with a properly trapped overflow pipe leading to a safe location outside buildings.
3. The bottom of the overflow connection shall be not less than 6 inches below the top of the tank.
4. Dip tanks over 500 gallons in liquid capacity shall be equipped with bottom drains automatically and manually arranged to quickly drain tank in event of fire, unless the viscosity of the liquid at normal temperature makes this impractical. Manual operation shall be from a safely accessible location, Where gravity flow is not practicable, automatic pumps shall be provided.
5. Such drains shall be trapped and discharge to a closed, properly vented salvage tank or to a safe outside location.
6. Dip tanks utilizing a conveyor system shall be so arranged that in the event of fire the conveyor system shall automatically cease motion and required bottom drains shall open.

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C. Storage and Handling of Flammable or Combustible Liquids

The storage and handling of flammable or combustible liquids shall be in accordance with Section III E of this standard and Chapter 57, California Fire Code.

D. Electrical and Other Sources of Ignition

Electrical wiring and equipment and other sources of ignition shall be installed and maintained in accordance with Section III(c) of this standard and the National Electric Code.

E. Operations and Maintenance

1. Areas in vicinity of dip tanks shall be kept as clear of combustible stock as practicable and shall be kept entirely free of combustible debris.
2. When waste or rags are used in connection with dipping operations, metal waste cans, with self-closing lids, shall be provided and all impregnated rags or waste deposited therein immediately after use. The contents of waste cans shall be disposed of at the end of each shift by methods approved by the Chief.

F. Fire Protection Equipment

1. Dip tanks of over 150-gallon capacity or 10 square foot liquid surface area shall be protected by an approved automatic fire extinguishing system or dip tank covers conforming to Section IV (h) of this standard.
2. Dip tanks containing a liquid with a flash point below 110 degrees F. (when used in such manner that the liquid temperature may equal or be greater than its flash point from artificial or natural causes) shall conform to Section IF (g) (1) when having both a capacity of more than 10 gallons and a liquid surface area of more than 4 square feet.

G. Dip Tank Covers

1. Dip tanks shall be provided with a cover complying with the specifications of this section unless they are provided with approved automatic fire extinguishing equipment as specified in Section IV (g) (1) of this standard.
2. Covers arranged to close automatically in the event of fires shall be actuated by approved automatic devices and also shall be arranged for manual operations.

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3. Covers shall be of substantial noncombustible material or of tin clad type with enclosing metal applied with locked joints.
4. Chains or wire rope shall be used for cover support or operating mechanism where the burning of a cord would interfere with the action of a device.
5. Covers shall be kept closed when tanks are not in use.

H. Hardening and Tempering Tanks

1. Hardening and tempering tanks shall conform to Sections 2405.3 through 2405.3.3, 2405.4.2 and 2405.8 as well as to the following paragraphs of this section but shall be exempt from other provisions of Division III of this article.
2. Tanks shall be located as far as practicable from furnaces and shall not be located on or near combustible floors.
3. Tanks shall be provided with a noncombustible hood and vent or other equally effective means venting to outside of building to serve as a vent in case of fire. All such vent ducts shall be treated as flues and be kept away from combustible roofs or materials.
4. Tanks shall be equipped with a high temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches 50 degrees Fahrenheit below the flash point.
5. Hardening and tempering tanks of over 500 gallon capacity of 25 square foot liquid surface area shall be protected as specified in Section IV (5) (1) of this standard.
6. Air under pressure shall not be used to fill or to agitate oil in tanks.

I. Coating Operations

1. Flow coat operations shall conform to the requirements for dip tanks, considering the area of sump and any areas on which paint flows as the area of a dip tank.
2. Paint shall be supplied by a direct low pressure pumping arranged to automatically shut down in case of fire by means of approved heat actuated devices, or by a gravity tank not exceeding 10 gallons in capacity.

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3. The process of roll coating, spreading and impregnating in which fabric, paper or other materials is passed directly through a tank or trough containing Class I or II liquids, or over the surface of a roller that revolves partially submerged in a flammable liquid, shall conform to Chapter 24 of the California Fire Code.

4. Adequate arrangements shall be made to prevent sparks from static electricity by electrically bonding and grounding all metallic rotating and other parts of machinery and equipment and by the installation of static collectors or maintaining a conductive atmosphere by means such as high relative humidity.