

Huntington Beach Fire Department

Installation and Operation of Spray Booths

Installation of spray booths used for the application of flammable finish materials requires approval of both the Department of Planning and Building, and the Fire Department. Typical finishes considered flammable include: paints, stains, varnishes, lacquers, organic coatings, spraying of resin coatings, powder coating materials, and can include materials that create flammable dusts or vapor conditions. Open faced and closed spray booths are both acceptable, as are dry filter and water wash air filtration systems.

Non-spray application of flammable finish materials (hand coating with brush, roller or squeegee-type devices) does not require spray booth installation, but may require ventilation and an automatic fire suppression system to reduce the potential for vapors or airborne particulates to become concentrated above their flammable/combustible threshold (see *Huntington Beach Fire Code (HBFC) §3405.3.7, Rooms or Buildings for Quantities Exceeding the Maximum Allowable Quantity Per Control Area, for additional details*).

1. PLANS

- 1.1 Submit three sets of plans to the Department of Planning and Building showing the existing structure and the location of the spraying operation within the structure (either a spray booth, spraying room or spraying area). The plans should cover all modifications made to the building's electrical, structural, mechanical, and fire protection systems, other utilities, as well as spray booth-specific ventilation systems. Include the following information on or with the plans for any equipment or structures that will be installed. Catalog cuts may be included for pre-manufactured spray application systems.
 - Construction/fabrication materials including floors, walls and ventilation systems
 - Elevations and location of spray operation in the facility
 - Ventilation system with performance standards
 - Type of filtration system (dry filter panels, wash water system, etc.)
 - Spray system interlock structure
 - Fire suppression system
- 1.2 Spray booth installations require inspections for structural, mechanical, electrical, plumbing and fire systems, and will be included on the Building permit returned to you with the approved plans. Inspections can be arranged by calling the Department of Planning and Building or the Fire Department, as appropriate.

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2. LOCATIONS WHERE PERMITTED

- 2.1 Spray finishing operations conducted in assembly, institutional, residential, or educational institutions are required to be in a spray room constructed in accordance with the California Building Code (CBC), and must be equipped with an approved automatic sprinkler system.
- 2.2 Spray finishing in other types of operations must be conducted in a spray booth, spray room, or a limited spraying area approved for the type of material being used.
- 2.3 The size of spray booths in a building shall not exceed the lesser of 10% of the floor space of the building, or the basic area allowed for a Group H-2 occupancy without area increases, as set by the CBC. The maximum area of an individual spray booth shall not exceed the lesser of the aggregate size limit described above or 1,500 square feet. An exception is allowed for one spray booth of 500 square feet as long as the other installation requirements can be met (spacing, clearances, ventilation and duct work, etc).

3. PERMITS

- 3.1 Besides building permits for initial construction and installation, the Huntington Beach Fire Department (HBFD) requires an operating permit for conducting spraying operations using hazardous materials.
- 3.2 Completion of a Hazardous Materials Disclosure packet will be required for use and storage of hazardous materials if the quantities exceed 55 gallons of a liquid, 500 lbs. of a solid or 200 ft³ of a gas.
- 3.3 Other agencies may require you to obtain permits and impose other operating standards for spray booth installation and/or operation.
 - Orange County Health Care Agency – Hazardous waste management
 - South Coast Air Quality Management District – Air pollution control
 - Orange County Sanitation District – Wastewater disposal from industrial/commercial wastewater producing operations (e.g., wastewater from water wash air filtration systems, parts washing and cleaning).

4. SPRAY BOOTH CONSTRUCTION AND INSTALLATION

- 4.1 Booths must be constructed of non-combustible materials other than aluminum. Sheet metal used in booth construction must be a minimum of 18 gauge for single wall structures and 20 gauge for double walled structures. Sections of the booth are allowed to be sealed with latex-based sealants and/or caulks, provided the sealant will not react with the sprayed materials.

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- 4.2 Spray booths must be protected by an automatic fire protection system, including booths with water wash air filtration systems. The fire system shall provide coverage on both sides of the air filtration system and extend into exhaust plenums and exhaust ducts.
- 4.3 Automatic fire protection systems must be protected from overspray residue that can accumulate and impact sprinkler operation. Sprinkler heads may be protected by plastic bags (polyethylene or cellophane, 0.003 inches/0.76mm thick) or paper that will resist penetration by sprayed material residues.
- 4.4 Spray booth exit doors shall be a minimum of 2 feet 6 inches in width and 6 feet 8 inches in height.
- 4.5 Clearance of at least 3 feet shall be maintained on all exterior sides of a spray booth to allow for cleaning, maintenance and inspection. Lesser distances may be allowed if the surrounding wall/partition has a fire resistance rating of at least one hour and the booth can be adequately cleaned, maintained and inspected. In all cases, the clearance area must not be used for storage and must be kept free of combustible construction.
- 4.6 Interior surfaces shall be smooth to allow the free-flow of air through the booth, to prevent pocketing of residual overspray, and to facilitate cleaning of residues that build up on interior surfaces.
- 4.7 Electrical wiring shall be protected from flammable vapors or contact with flammable residues. Electrical wiring installed in the area adjacent to the spray area, within 5 feet horizontally and/or 3 feet vertically, shall be approved for use in that area (Class 1 - Division 1, or Class 2 - Division 2).
- 4.8 Floors shall be of non-combustible materials. Floors may be covered during spraying operations with thin paper or plastic to facilitate cleaning.
- 4.9 Glass panels used in booth lighting shall be made of heat resistant, hammered, or wired glass, and shall be sealed to prevent introduction of flammable vapors, dusts, or other residues behind the glass where they may be exposed to elevated temperatures or electrical appurtenances. Surface temperature of panels shall not exceed 200 °F at any time.
- 4.10 Interlocks shall be provided that link all the following components of the spraying system and will prevent booth operation if any are inoperable:
- Ventilation System
 - Booth Doors – Doors must be closed for booth to operate. Not applicable to approved open-faced booths; AND
 - Interior Spray Booth Temperature – Temperature not in excess of 200 °F or flash point of material being sprayed.

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- 4.11 If portable electric heating/drying equipment will be used in the booth, it must be integrated into the interlock system so that spraying cannot be performed when the heating/drying equipment is in use, the ventilation system is operational during the drying process, and heating/drying equipment will shut down if the booth's interior temperature rises above 200 °F.
- 4.12 Open-face spray booths shall be equipped with a deflector plate extending at least 4 ½ inches down over the top edge of the booth opening to prevent escape of airborne vapors/overspray.
- 4.13 Metal parts of a spray booth and the spray application system shall be grounded in accordance with the California Electrical Code. This includes the booth itself, exhaust ducts, piping systems used to convey flammable finish material, ventilation system components, lighting fixtures, spray application equipment and/or systems, material containers, work pieces, and work stands.
- 4.14 Welding/hot work and smoking shall be prohibited in spray booths, spray areas, and in areas adjacent to spraying operations that can contain flammable vapors (a minimum separation distance of 20 feet is suggested). **"NO SMOKING"** and **"NO WELDING"** signs shall be conspicuously posted in the area, and signs prohibiting welding/hot work shall be posted with the following warning:

NO WELDING

The use of welding or cutting equipment in or near this area is dangerous because of fire or explosion hazards. Welding and cutting shall only be done under the supervision of the person in charge.

5. VENTILATION SYSTEM(S) CONSTRUCTION AND INSTALLATION

- 5.1 Air recirculation systems are prohibited unless the system can be proven to reduce the flammable vapor concentration below 25% of the sprayed material's lower flammability limit at all times, and the system is alarmed to shut-down operations when the vapor concentration exceeds 25% of the sprayed material's lower flammability limit.
- 5.2 Dry ventilation/filtration systems must be compatible with the material(s) being sprayed. They are not allowed where spray residue would be susceptible to spontaneous ignition or heating, either by reaction with the filter media itself, reaction with other spray materials, or reaction with the residue of a different type of material.
- 5.3 Ventilation systems shall be equipped with access ports to allow for inspection and maintenance, including inspection and maintenance of baffles, deflectors, fan assemblies, and fire suppression system components.
- 5.4 Ventilation systems shall be equipped with automatic sprinkler systems or other approved fire suppression systems.

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- 5.5 Sprinkler heads shall be protected from the accumulation of overspray residues. Protection can be provided by loosely covering the heads with plastic bags or with thin paper resistant to penetration by the sprayed material.
- 5.6 Duct termination points shall be at least 10 feet above grade, 10 feet from wall and roof openings and exterior openings (30 feet if the discharged vapor is directed towards an opening in another building or structure), and 6 feet from exterior walls and roofs of other structures.
- 5.7 Duct termination points shall be kept free of obstructions except for deflectors used to prohibit entry of debris, or where the duct terminates in an approved air pollution control device.
- 5.8 Air velocity through the open face of the booth shall not be less than 100 feet per minute (0.51 meters per second). An air monitoring device must be installed to ensure that the required air velocity is maintained.
- 5.9 Baffle plates are allowed as long as they are readily accessible for cleaning and maintenance purposes. Baffle plates are also allowed in ventilation ducts as long as they are accessible for inspection and maintenance purposes, and are an integral part of the air filtration system (e.g., water wash filtration systems).
- 5.10 Multiple spray booths are allowed to have a common ventilation system provided all the following conditions are met:
- The same types of material, or compatible materials, are being used in each booth.
 - Each booth's exhaust duct is manifolded prior to commingling of vapors.
 - Each booth's exhaust duct, and the common ductwork, are all protected by separate automatic fire suppression system fittings (sprinkler heads or discharge nozzles).
 - Ventilation airflow within each booth meets or exceeds the airflow requirements when all booths are in operation.
 - When the booths' exhausts are connected to a treatment device used for air pollution control purposes.
- 5.11 Ventilation systems of spray booths used for the application of nitrocellulose finishing materials are not allowed to be interconnected with other spray finishing operations.

6. FLAMMABLE/COMBUSTIBLE MATERIALS HANDLING

- 6.1 General storage, use and handling of flammable or combustible liquids used in the spraying operation shall be in accordance with *HBFC Chapter 34, Flammable and Combustible Liquids*. The more common requirements covering flammable/

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combustible materials used in spray coatings operations (solvents, paints, coating materials) are as follows:

- 6.2 Flammable/combustible liquids in quantities over 10 gallons (aggregate) must be stored in a flammable liquids cabinet, or in a room designed for storage of flammable/combustible liquids, such as paint storage locker or paint mixing room.
- 6.3 Containers supplying flammable/combustible finishing materials to spray nozzles shall be kept closed at all times except when adding or removing material. Containers must be supported or resting on the floor of the spray area, not hand-held. Gravity feed systems shall have a maximum container capacity of 10 gallons.
- 6.4 Solvents used for cleaning of spray finishing equipment must be contained in a cleaning machine approved for such purpose, or within a spray booth. When solvent cleaning is performed inside a spray booth, either on spray coating equipment or the booth itself, the booth's ventilation system must be operating for the duration of cleaning operations.
- 6.5 Flammable/combustible finishing materials exceeding the amounts shown in Table 3405.3.8.2 below require storage in a flammable liquids cabinet or in an acceptable alternative storage facility such as a paint locker or paint room:

Table 3405.3.8.2	
Class of Material	Quantity (gallons)
Class IA	10
Class IB	15
Class IC	20
Combinations of Class IA, IB, IC <i>(not more than the quantity listed above for any specific Class I material)</i>	30
Class II	30
Class IIIA	80
Class IIIB	3,300

- 6.6 Waste containers (cans or drums) must be available to contain any hazardous materials or hazardous wastes removed from the booth. These include paints and other coatings, solvents, residues, waste filters, rags, paper or plastic sheeting, and solvents. Containers must be kept closed when not in use and must be labeled with their contents.
- 6.7 Valves shall be provided at both ends of a system delivering flammable/combustible finishing material. If the material is pumped using a positive displacement pump, the delivery system must be provided with a pressure relief valve that feeds back to the input/suction line or to a safe location.

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- 6.8 All parts of flammable finish transfer and/or application systems shall be grounded. Separate parts of the system shall be grounded to each other to reduce the potential for static discharge.
- 6.9 Storage of hazardous materials at a facility in excess of 55 gallons of liquid, 500 lbs. of a solid, or 200 ft³ of a gas (compressed or cryogenic), requires completion and submittal of a Fire Department Hazardous Materials Disclosure Packet.

7. ADDITIONAL REQUIREMENTS FOR POWDER COATING SYSTEMS

- 7.1 In general, powder coating systems shall comply with the standards of Sections 1 – 6 of this City Specification for general flammable finish spray application operations. Additional requirements are as follows:
- Ventilation systems for powder coating booths shall be sufficient to maintain coating booth atmosphere below ½ the minimum explosive concentration of the material being applied.
 - Powder coating operations shall be equipped with a supervised flame detection system that will react to flame detection within 0.5 seconds. The detection system shall cause the shutting down of energy supplies to any conveyor systems running through the booth, ventilation systems, powder application equipment (conveying, application and powder collection equipment), closing of dampers that connect the coating operations to the powder collection equipment (if they are separate systems), activation of the fire suppression system, and activation of an alarm system.
 - Parts preheating systems shall be adjustable so that the temperature of the parts being preheated, or the temperature of the system, if in close proximity to the spray booth, can be kept at a temperature below the ignition temperature of the powder coating material to be applied to the heated parts.
 - Drying, curing, fusion ovens and other equipment shall comply with *HBFC Chapter 21, Industrial Ovens*.
 - Curing ovens shall be equipped with interlocks to shut-down the oven should any part of the ventilation system fail (intake or exhaust air in either the burner or processing sections of the oven systems).

APPROVED: _____
Patrick McIntosh, Fire Chief

DATE: _____