New Westminster

511 Royal Avenue
New Westminster BC
V3L 1H9

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Spray Booths Installation Requirements

Fire & Rescue Services – Fire Protection Division – 604.519.1004

The purpose of this bulletin is to define the installation requirements for Spray Booths to comply with the City of New Westminster Building and Fire Bylaws and the B.C. Building and Fire Code regulations.

Drawing Requirements

- Three sets of drawings are required to be submitted for review, comment and approval. All drawings are to be neat, drawn to scale and of draftsman quality.
- Floor plans, drawings and sections are to be drawn to include the following details:
    - Sealed by a Professional Engineer and include Letters of Assurance (Schedules B1 & B2)
    - Details of duct, booth and hood construction, sizes, and clearances;
    - Location of booth, duct and exhaust outlet, including adjacent buildings and property lines;
    - Exhaust make-up air, booth size, and equipment specifications'
    - Details of methods used to maintain fire separations where required, and
    - Fire suppression details.

Permits Required

- Building (booth, penetration of fire separations, etc.)
- Plumbing (water supply, drainage, etc.)
- Electrical (interlocks, exhaust fan motor, lighting, etc.) Contact the Provincial Electrical Safety Branch at 604-660-0885 for further information regarding permit requirements.
- Sprinkler (fire suppression system)

Definitions

- A Spray Area is an open shop area that houses an exhaust hood for the removal of paint spray and includes:
    - The interior of spray booths and rooms;
    - The area within 6 meters of a spray booth not separated by a vapour tight separation,
    - The interior of ducts exhausting from spraying processes, and
    - Any area in the direct path of spraying operations.
- A Spray Booth is a mechanically ventilated structure provided to enclose or accommodate a spraying operation, to confine and limit the escape of spray, vapour, and residue, and to safely conduct or direct them to an exhaust system.
- Spray booths are manufactured in a variety of forms including, Cross Flow, Semi-Downdraft, Downdraft with Pit, and Downdraft with Raised Floor.

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General

- When coating materials containing volatile and flammable solvents are sprayed within a building, a potentially hazardous situation may be created if there is no mechanical ventilation to remove the combustible and flammable vapours, mists, residues or deposits.
- Approved paint arrestors and/or after filters shall also be provided to capture any hazardous or particulate matters in the exhaust air before discharging to the outdoors. They are to be non-combustible, or conform to CAN4-S111-M95 and be removable.
- Spray areas shall be illuminated by fixed lighting units, which are constructed so as to prevent the accumulation of deposits or combustible residues near any hot surface.
- No equipment, which has open flames or produces sparks (i.e. welding or grinding equipment), shall be used within or near the spray area or booth.
- “No smoking” and “Keep Spark and Open Flame Away” signs are to be provided
- No spraying is to be conducted outside of the area or booth

Booth Construction

- A spray booth is to be constructed of a steel frame covered with minimum 1.14 mm of sheet steel, or be of equivalent non-combustible construction.
- The interior surfaces of spray areas shall be smooth, and designed to prevent pocketing of residues, and to facilitate ventilation and cleaning.
- All walls, ceilings, and floors within a spray booth or room are to be constructed of non-combustible materials.
- A clear space of 900 mm (36 inches) is to be provided around a paint spray booth, in accordance with good engineering practice – NFPA33 – “Standard for Spray Application Using Flammable or Combustible Materials” – 2003 edition.
- All metal parts of the spray booth, exhaust ducts, and piping systems that convey flammable or combustible liquids are to be electrically bonded and grounded.
- In no case may the average face velocity (calculated assuming the booth is empty and in the direction of air flow) across the cross-sectional area be less than 0.5 m/s

Ventilation

- Mechanical ventilation with sufficient air movement to prevent dangerous flammable vapour or powder concentrations shall be provided in all spraying areas in conformance with the B.C. Fire Code.
- All spray areas shall be provided with mechanical ventilation sufficient to:
  - Confine and remove flammable or combustible vapours or mists to a safe location;
  - Maintain the concentration of flammable or combustible vapours or mists in the exhaust stream below 25% of the lower explosive limit (LEL) of the flammable vapour, and
  - Confine and control combustible residues, dusts, or deposits.

- Mechanical ventilation is required to be capable of exhausting at least 18 m^3/h per metre of room area, but not less than 250m^3/h.

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- Mechanical ventilation is to be kept in operation at all times while spraying operations are being conducted. An electrical interlock is required to prevent spray finishing without use of the ventilation system.
- Proper air balancing of the ventilation system is required in order to ensure that the system will perform as designed.
- Air is to be uniformly distributed to provide ventilation at all working levels and areas.
- An equivalent volume of make-up (replacement0 air, provided by mechanical means, is also required to replace the volume of air exhausted through the booth or spray booth
- The exhaust stack of the paint spray exhaust system must be carefully designed and located so that re-entry of exhaust contaminants into the building, or nearby building (through make-up air intake or windows) shall be avoided.
- The exhaust air outlet discharge point shall be located not less the 1.8 m (6 feet) from any combustible exterior wall or roof.
- The exhaust air outlet shall not discharge in the direction of any combustible construction or unprotected opening within 7.5 m (25 feet)
- Ventilation air inlets, where the flammable vapour being removed is heavier than air, are to be located on a wall no higher than 300 mm (12 inches) from the floor. At least one make-up air inlet is to be located near the opposite wall.
- Ventilation air inlets, where the flammable vapour being removed is lighter than air, are to be located on a wall no lower than 300 mm (12 inches) from the ceiling. At least 1 make-up air inlet is to be located near the opposite wall.

Exhaust Air

- Exhaust ducts shall be constructed of steel and shall be substantially supported by steel supports.
- Exhaust ducts for spray booths are not to be used for any other appliance or fixture
- Exhaust ducts require access doors for cleaning at each change in direction, and every 6 metres (20 feet)
- All ducts are to maintain a clearance of 450 mm (18 inches) from unprotected combustible materials.
- The exhaust fan is not to be located in the spray area, or is to be an approved non-ferrous unit.

Fire Protection

- Paint spraying booths and rooms must be separated from all other major occupancies by a fire separation having a fire resistance rating of at least one hour.
- Spray coating operations need not be separated from the remainder of the building provided that the building is sprinklered and the operation is confined to a spray booth.
- Where automatic sprinklers are provided, the installation shall be designed and installed in accordance with the applicable N.F.P.A. standards, B.C. Building and Fire Codes.
- Prior to recommending acceptance, a member of the New Westminster Fire & Rescue Services, Fire Protection Division is to witness a practical test of the fire suppression system and mechanical interlocks in accordance with the approved drawings.
- Portable fire extinguishers are required as per the B.C. Fire Code.

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Paint / Solvent Storage and Mixing

- When mixing of paints or solvents is performed in a separate room, the room must be ventilated as outlined above.
- Where a separate room is not provided, mixing of paint shall be done under a local exhaust hood designed to remove all flammable vapours.
- Paints and solvents must be stored in an approved storage cabinet, or in a separate well ventilated room. This room must be separated from the remainder of the building by a one hour fire separation. Cabinets and rooms are to be “labeled” as per the B.C. Fire Code.
- The amount of flammable liquids stored in the spraying area is not to exceed one day’s supply.