TECH Bulletin: Spray Booths

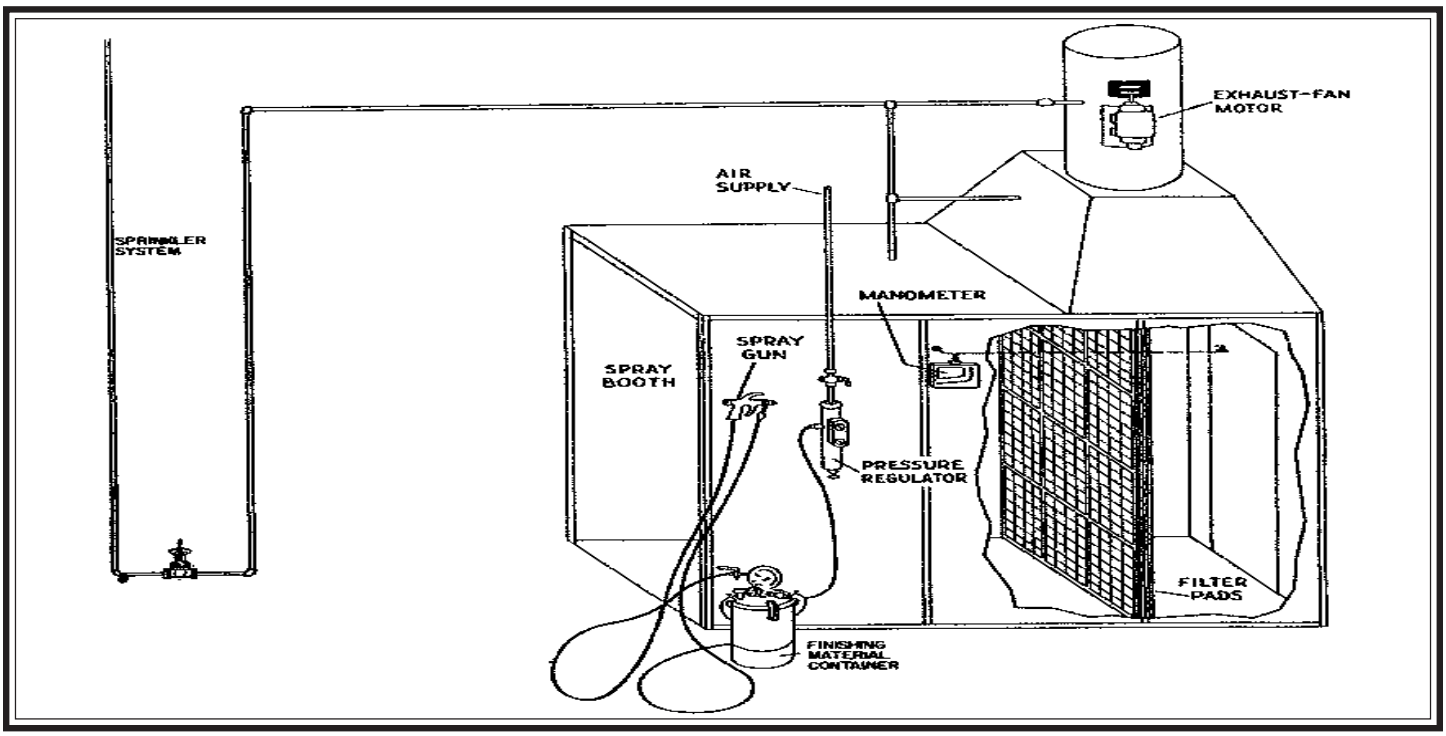
Frankenmuth MUTUAL INSURANCE COMPANY
A member of the Frankenmuth Financial Group

SPRAY BOOTH USING FLAMMABLE AND COMBUSTIBLE FINISHES

Spray application of flammable and combustible liquids presents a fire and explosion hazard, requiring specific controls. Even combustible liquids are readily ignited when suspended in the air as a fine mist. Overspray residue is often combustible, presenting a fire hazard during and after the spray application is complete.

Solvents, additives and materials in spray finishing processes are usually flammable or combustible. They are often toxic and may be reactive. Consult the Material Safety Data Sheet (MSDS) to determine the hazard level.

National Fire Protection Association (NFPA) Code #33 "Spray Application Using Flammable and Combustible Materials" is the nationally recognized code governing this process. Important provisions of the code are highlighted in this standard.



Typical arrangement of a dry filter spray booth

LOCATION

- Spray booths and associated operations such as mixing and setup areas should be located in designated plant locations away from spark producing or open flame equipment like welding, cutting, heat treating or heaters.
- Smoking should be strictly prohibited and signs should be posted.
- Flooring should be non-combustible and easy to clean

CONSTRUCTION

- Spray booths should be constructed of steel of #18 gauge.
- All areas of the booth should be accessible for maintenance and cleaning. Clean out and inspection doors should be prohibited in the exhaust duct for access to fan blades and fire sprinkler heads.
- The exhaust duct should run as direct as possible and should be well supported. A minimum clearance of 18" is needed from the duct to any combustible roof or other construction. This distance can be reduced to as little as three inches if protected in accordance with NFPA #33.

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SPRAY EQUIPMENT

- All spray equipment, mixers, pumps, etc. should be specifically designed and manufactured for flammable spray applications.
- Spray equipment should be interlocked with the booth system so that the equipment will not operate without the ventilation system working.

VENTILATION

- The exhaust ventilation system should provide a minimum linear airflow of 100 feet per minute across all booth openings.
- The exhaust fan should be solidly mounted, of non-sparking, nonferrous blades. The fan eclectic motor should be located outside the duct and suitable for hazardous locations.
- The ventilation system must be equipped with some type of noncombustible filter system. Mesh filters are more efficient than the baffle type, but must be periodically replaced. Mesh filters cannot be used when applying a spray material that is highly susceptible to spontaneous heating and ignition. Air flow meters (manometers) are highly recommended to indicate when filters require replacement. Metal baffle type filters are also used. One of the safest and most efficient is the water wash system, where the vapor laden air is drawn through a recirculating water curtain which traps the overspray particles. The water must be changed periodically per the manufacturer's instructions.

ELECTRICAL

- In general, no electrical equipment, switches, lights, etc. should be located inside a spray booth.
- Electrical wiring, lighting facilities and equipment located in the spray booth meet be Class I, Division I specifications of the National Electrical Code (NEC).
- Lights may be located above the spray booth, behind a substantial glass panel, which is sealed to prevent leakage of vapors or mist at the edges.
- All metal parts of the spray booth, duct, etc., must be electrically grounded to prevent static charges
- Electrical features located outside but immediately adjacent of the booth are to meet the following provision:
- If the ventilation system is interlocked with the spray equipment, areas 5 feet horizontally and 3 feet vertically from all openings shall meet Class I, Division 2 specifications of the NEC.
- If the ventilation system is not interlocked with spray equipment, areas 10 feet horizontally and 3 feet vertically from all openings shall meet Class I, Division 2 specifications of the NEC.

PROTECTION

- All spraying operations utilizing flammable or combustible materials must be protected by an automatic sprinkler system installed in the booth, behind the filters and in the exhaust duct. Installation should conform to NFPA Code #13.
- Sprinkler head coverage should not exceed 90 square feet per head and the water supply should deliver 25 psi operation pressure and have a separate control valve.
- Sprinkler heads should be covered with lightweight cellophane, polyethylene or paper bags to prevent the accumulation of overspray which would effect the operation of the sprinkler head.
- Where water is not available, dry chemical, CO2 and other extinguishing systems are acceptable if installed to code.