SECURA INSURANCE COMPANIES

# Risk Management Bulletin

## Safety in Spray-Finishing Operations

When fuel, oxygen, and a source of ignition combine, combustion occurs. Too often, all three elements of the fire triangle exist near a spray-finishing operation. Paint, thinner, and spray residue constitute the fuel. Oxygen is present in the air, and sources of ignition include spark-producing electrical equipment, open flames, and hot surfaces. Put these all together under the right conditions, and the result could be a disaster.

Chances are good that this kind of disaster won't occur if accepted practices are followed for construction of spray booths and rooms, control of ignition sources, ventilation, fire protection, and handling and storage of flammable liquids.

**Construction**

To conform to standards, spray booths and rooms should be built by a qualified manufacturer or contractor. Only noncombustible construction materials should be used, such as steel, concrete, or masonry block. The interior surfaces should be smooth and easily cleaned. Metal spray booths should be electrically grounded. Plywood or glass is not acceptable since these materials will not contain a fire. Noncombustible corrugated steel sheeting is not recommended since it is not easily cleaned.

Interior surfaces should be kept free of accumulations of overspray since this overspray is highly flammable and can ignite spontaneously. Wall surfaces can be covered with fire-resistant paper to facilitate cleaning or coated with a commercial removable coating. Only nonsparking tools should be used for cleaning interiors of spray booths.

**Ignition Sources**

Since explosive concentrations of flammable vapors may be present around spray-finishing processes, common sense dictates that these areas be kept free of ignition sources, such as open flames, hot surfaces, and sparking electrical equipment. Ignition sources will most likely start a fire in what is considered a "hazardous area." The interior of booths and rooms, the interior of exhaust ducts, and any area in the direct path of flammable vapors are considered to be hazardous areas. Because of the potentially explosive atmosphere in these areas, only explosion-proof wiring is permitted.

Explosion-proof equipment is specifically designed to prevent arcs generated inside an enclosure from igniting flammable vapors in the surrounding area. Provision for adequate lighting is an important consideration in many spray areas. As an alternative to installing explosionproof lighting, the walls in the booth or room can be fitted with vapor-tight, wired, tempered glass. Bulbs can be located behind the walls or outside the booth or room.

**Ventilation**

The booth or room should be mechanically exhausted to provide an airflow sufficient to prevent fire or explosion. The exhaust system should be interlocked with the spray gun to ensure that the exhaust is running any time spraying is done. A cross-sectional airflow of 100 feet per minute is recommended in order to remove flammable vapors in a spray booth. Since exhaust equipment (such as fans) is a potential source of ignition, fan blades must be made of a nonsparking material. Unless a vane-axial fan fitted with an explosion-proof motor is used, the fan drive motor must be located outside of the ductwork. Class 11 fire-rated paint arrestor filters must be installed. Common fiberglass furnace filters are not an appropriate substitute. Regular replacement of filters is important because as overspray accumulates on the filters, ventilation efficiency decreases and the



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potential fire exposure increases. The exhaust fan motor should be an explosion-proof type, located outside the ductwork, with an enclosed belt drive to the fan.

**Fire Suppression**

The interior of booths and rooms, including the exhaust ducts, should be protected with a UL-listed automatic fire suppression system. If the building is provided with sprinklers, the sprinkler protection should be extended to the spray area. When sprinklers are installed only to protect the spray area, the local jurisdiction may allow connection to the domestic water supply. Spray area sprinkler control must be by a separate, self-indicating sub-control valve. In the event of a fire, closing this valve permits replacement of fused spray area heads without disabling the system plant-wide. Sprinkler heads and discharge nozzles can be protected from overspray by loosely covering them with a thin plastic sandwich bag. Paper bags and tissue paper are not recommended, since they reduce the level of radiant heat able to reach the head. This reduction in heat impingement will increase the head's response time and delay the application of water to a fire. Fully-charged portable fire extinguishers also should be provided in the immediate area.

**Flammable Liquids**

The quality of flammable liquids present in the sprayfinishing area should be limited to the amount needed for one shift. Liquids should be stored in UL-listed safety containers, not open buckets or glass bottles. Once in UL-listed safety containers, they also should be stored in UL-listed flammable liquid storage cabinets or a suitably constructed flammable liquid storage room.

Flammable liquid cabinets are designed to protect their contents in a fire for up to ten minutes. For a cabinet to provide this kind of protection, it must be constructed of at least 18-gauge steel, have riveted or welded joints, be of double-wall construction with a 1-1/2 inch air gap between the walls, have a door sill raised at least two inches from the bottom to contain spills, and be equipped with a door lock that catches at the top, bottom, and middle to prevent buckling.

When transferring liquids, static electricity may be generated. If a static discharge occurs while liquids are being transferred from a bulk supply to a portable container, the vapors present near the container head space will ignite explosively. This can be prevented by grounding the supply container and electrically bonding it to the portable container during the transfer, using a bonding metal-to-metal contact with the supply.

These are the basic guidelines needed for any spray-finishing operation involving flammable and combustible liquids. Adhering to all of these requirements will not only reduce the risk of fire, but lessen the potential for employee injury, plant closing, and down time due to fires and cleanup. Spray-finishing operations, whether in a booth or a room, need to be adequately protected and all associated hazards controlled.