

Area Classification Within Typical Thermal Spray Booths

Area Classification is the categorization of areas or zones by regulatory agencies based on the concentration of flammable gas hazards present in the work area or zone. Area classifications determine the types of ignition sources that are permitted in these areas.

Adequate ventilation, either natural or forced, is the key to diluting and sweeping away gases that might leak and cause a hazard. Most ventilation systems have sufficient flow rates to greatly reduce the flammable gas hazards and associated spray booth classified areas if implemented with appropriate safeguards

Typical thermal spray ventilation systems have air flow rates in the multiple thousands of cubic feet per minute (cfm). Maximum airflow is used during process operation and a lower rate is set (typically $\frac{1}{2}$ to $\frac{1}{4}$ flow) while employees are involved in the booth. The actual airflow should be monitored by the system and interlocked such that no hazardous gases are allowed to flow into the booth area should ventilation flow fall below a set value. The low flow setting should be chosen to more than adequately dilute an accidental full flow of process gas.

NFPA 497 specifically permits reduction or elimination of classified areas in cases where forced ventilation has sufficient flow to ensure dilution of any leaked gas to below $\frac{1}{4}$ of the gases lower explosive limit and if the ventilation has sufficient safeguards. Still it is prudent to declare small areas, typically a 12 inch radius around gas carrying components, as Class I, Division II and avoid electronics with ignition sources from being installed in these areas.

Adequate forced ventilation, properly interlocked with process gases and regularly tested through a documented scheduled maintenance program, is the key to meeting regulatory requirements. This is important so that critical electrical equipment such as robots, turntables and controls, which may not be rated for hazardous locations, can be used within thermal spray booths. The document "Thermal Spray Booth Design Guidelines" published by the ASM Thermal Spray Society has additional information on area classification as well as a list of other publications dealing with this and other important safety topics.

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