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Amerex Industrial Systems Recommended Protection of Open Front Spray Booths with Crane Slots

Introduction

Crane slots in Open Front Paint Spray Booths (OFPSB) present a unique fire protection hazard. Listing agencies do not address openings in ceilings of spray booths, often leaving the fire protection strategy for these hazards to the authority having jurisdiction (AHJ). Amerex Corporation has conducted in-house fire testing in order to advise a consistent fire protection approach for crane slots.

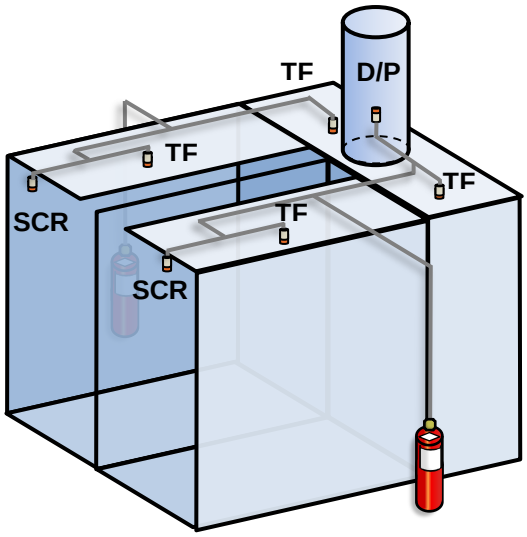
Testing at Amerex showed that a crane slot does not alter fire behavior when tested in accordance with UL 1254 specifications. The Amerex Industrial System remains effective within the current UL listed parameters when a crane slot is added to a testing module. Openings in the vertical plane of a booth are protected with the use of the listed screening nozzle. The addition of a screening nozzle for protection of a crane slot in the horizontal plane is not necessary.

Example fire protection

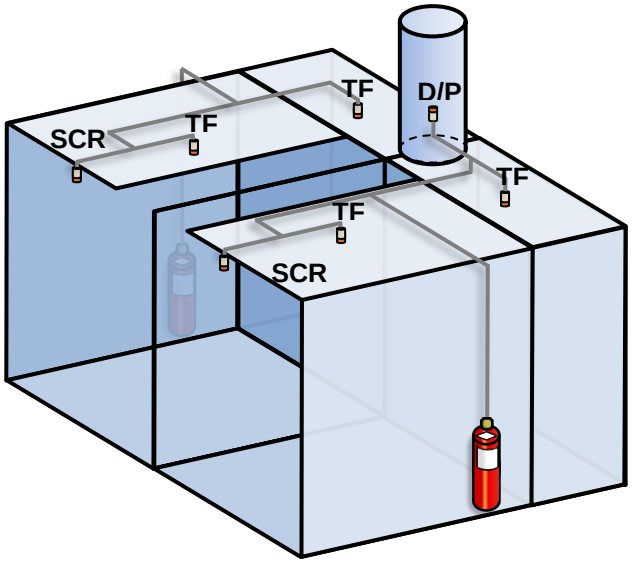
The real challenge with a crane slot is a fire suppression system design within the UL listed parameters. Amerex allows a 6 inch nozzle offset from the protected module edge for OFPSB protection. This offset cannot be measured from the edge of a slot when placing screening nozzles within a booth. The center of the screening nozzle represents the center of the maximum 8 foot protected front edge. No more than 4 feet from the center of the nozzle in either direction along the front opening can be adequately protected by a single screening nozzle.

A maximum OFPSB module of 8 feet wide x 8 feet long x 12 feet high can normally be protected with a single screening nozzle and a single total flood nozzle in the work area when placed in the center of the booth. If a crane slot 1 foot wide and 8 feet long is put in the middle of the booth ceiling, then the standard coverage is no longer adequate as placement for the nozzles in the center of the crane slot is impractical. Nozzles installed only on the right hand side of the slot would leave the left hand side with inadequate protection because the center of the protected module would be more than 4 feet from the left side of the 8 foot wide booth. The booth must be divided in half down the center of its width and a fire suppression system designed for a two module work area. In this instance, a booth with a 1 foot wide crane slot would require a total of 2 screening nozzles across the front of the booth and 2 total flood nozzles in the work area to remain within the UL listed parameters as shown in the following illustration.

This drawing shows a properly protected 8x8x12 OFPSB and 4 foot plenum with a crane slot centered in the width of the booth. In this system design, an “extra” TF nozzle is required by the three nozzle system parameters. The extra TF nozzle can be located in the work area or plenum.



Another scenario is a booth 16 feet wide x 8 feet long x 14 feet high. A booth of this size can be protected as two modules with 1 screening nozzle and 1 total flood nozzle in the work area in each module (for a total of 2 screening nozzles and 2 total flood nozzles). The addition of a 2 foot wide crane slot in the center of the booth will not affect nozzle placement as the center of each module is 4 feet from the center of the crane slot (module edge) and the booth edge. Thus, no additional protection is required in this scenario as shown in the illustration below.



Off-center slots, multiple crane slots, or slots that do not run the entire depth of the booth require careful consideration before designing an appropriate fire protection system. As with a crane slot in the center of the booth, additional screening nozzles and work area nozzles may be required to remain within the UL listed limitations.

Conclusion

The examples above show that a crane slot can provide a unique design challenge for the fire suppression system. The crane slot edge perpendicular to the screened edge is not to be used as the protected edge when considering nozzle placement. **It is required that Open Front Paint Spray Booths with a crane slot be protected within the Amerex Industrial System listing limitations. Screening nozzles across the horizontal crane slot are not needed. In the event an AHJ requires a screening nozzle it must be installed outside of the booth and point from the back of the booth to front.**