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ABSTRACT:
Article is a primer on fire suppression sprinkler selection for spaces with high ambient temperatures, like saunas and steam rooms.
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Sprinkler Selection In Saunas And Steam Rooms

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Summary

Fire suppression sprinklers are designed to release water when heat from fire is detected. Hot spaces like saunas and steam rooms present problems in sprinkler selection, as high ambient temperatures can cause sprinkler release.

This Tech Tips article is a primer on sprinkler selection for spaces with high ambient temperatures, like saunas and steam rooms.

Discussion

The Sprinkler Head: In essence, a T-fitting in a pipe with an orifice opening held closed by a thermally activated fuse consisting of a metal link that melts or liquid filled glass bulb that bursts. When a fire starts, its heat reaches the sprinkler heads closest to the fire causing the fuse or bulb to break, allowing the orifice to open and spray water on the fire. Fire sprinkler manufacturers have refined the technology so that "fusing temperature" at which the sprinkler opens can be closely calibrated, giving very repeatable fusing temperatures.

Typical Sprinkler Applications:
Typical sprinkler installations include upright sprinklers on top of pipes, pendant sprinklers through ceilings, and sidewall sprinklers mounted on walls. In finished spaces, many installations include recessed sprinklers, which are mounted in a cup and concealed in the ceiling. For recessed installations, flush caps are placed over the sprinkler heads. The caps placed over sprinkler heads are constructed with solder that melts at a lower temperature than the fusing temperature of the sprinkler head. These plates will fall off before the sprinkler releases.

Sprinkler spacing is mandated by code, based on the occupancy and type of hazard in the space. In commercial buildings, it is common to space sprinkler heads to cover 100 - 400 square feet (9 - 37 square meters).

For saunas and steam rooms, it is necessary to select a sprinkler head that includes the correct combination of fusing temperature, coverage area, configuration, and aesthetics to suit the code and Owner's requirements.
Saunas and Steam Rooms: Saunas and steam rooms are small spaces, usually less than 200 square feet (18 square meters). They typically operate at elevated temperatures approaching 180 deg. F for saunas and 120 deg. F for steam rooms, and can see considerable temperature fluctuation as the heater cycles and the door opens and closes. In some cases, saunas remain dry, but it is common to have high moisture levels in saunas, as well as steam rooms.

The simplest sprinkler head selection is a pendant sprinkler (Figure 1). These are readily available with Underwriters Laboratories (UL) or Factory Mutual Global (FMG) approval for elevated fusing temperatures.
For a sauna or steam room, a sprinkler head that fuses at a

temperature higher than the standard 135 deg. F (57 deg. C) is required. The higher fusing temperature one selects, the less likely there will be an unintended sprinkler release.

Saunas and steam rooms frequently have limited overhead clearance. They often have raised floors, which further reduces headroom. Finally, they have raised seating around the perimeter of the room.

These geometric considerations combine to render undesirable any design that includes a pendant sprinkler head sticking out of the ceiling. Generally, it's bad for business when clients are banging their heads on the sprinklers.

Sprinkler Head Selections: Recessed sprinkler heads (Figure 2) can be applied when a pendant head will not do, provided that there is a recessed head assembly that is UL or FMG approved for the required fusing temperature.

If the selected fusing temperature is above 290 deg. F (143 deg. C), it may be difficult to find a UL or FMG approved, recessed sprinkler head. Flush caps are not appropriate for elevated temperatures, as they fuse and fall off due to the elevated ambient temperature.

Sidewall sprinklers can be placed high on a wall, where they are unlikely to be in anyone's way, and still provide the coverage necessary to conform to code requirements. UL and FMG approved sidewall sprinklers are readily available.

How to Tell the Temperature at Which a Sprinkler will Fuse: Fusible elements are color coded to make it possible to tell the fusing temperature without inspecting the head.

Sprinklers With Fusible Links:

- Uncolored:	135 - 170 deg.F
- White:	175 - 225 deg.F
- Blue	250 - 300 deg.F
- Red	325 - 375 deg.F
- Green	400 - 475 deg.F
- Orange	500 - 575 deg.F

Sprinklers With Frangible Bulbs:

- Orange:	135 deg.F
- Red:	155 deg.F
- Yellow:	175 deg.F
- Green:	200 deg.F
- Blue:	250 - 300 deg.F
- Purple:	325 - 375 deg.F
- Black:	400 deg.F & Higher

Conclusion

Because sprinkler systems are often installed as design-build turnkey systems, design professionals can overlook the needs of specialty Fire Protection Contractors may not always realize that the box shown on the drawings as a sauna will require different sprinklers than the rest of the building.

Few things aggravate a Client more than an unintended sprinkler system release, so take that little bit of extra time to verify the sprinkler design submittals for specialty spaces. It can pay off with a happier Client.

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