



## Special Edition

High Temperature Concerns - The Other Side of the Coin  
Recent articles highlighting the concerns of elevated temperature may have unnecessarily alarmed some members of the fire sprinkler community. The intention of the previous articles was twofold; to provide cautionary advice regarding sprinklers exposed to elevated temperature and to dispel inaccurate information being perpetuated about non-fire operations of sprinklers. While those articles discussed the exposure of ordinary temperature rated sprinklers to elevated ambient temperature there were some important facts that were unintentionally omitted. The inexact nature of the science used to define the temperature thresholds relates to both the conservatism of sprinkler listings and of the installation standards.

First, requirements for the shipping of sprinklers are not specifically addressed by NFPA 13. Sprinkler manufacturers provide requirements for storage and handling of sprinklers prior to installation. Each sprinkler manufacturer has their own defined methodology for manufacturing, shipping and handling. Each manufacturer has refined its individual processes based on their experience, which spans many decades. As a result, each manufacturer should be considered the expert when it comes to their individual product(s) and, as such, they should be consulted for guidance when temperature concerns are raised.

Second, UL 199, Standard for Automatic Sprinklers for Fire Protection Service, includes a "High Temperature - Test for Uncoated Sprinklers." This test exposes 145°F (63°C) to 170°F (77°C) temperature rated sprinklers to 125°F (52°C) for 90 days; similarly, 135°F (57°C) to 140°F (60°C) temperature rated sprinklers are exposed to 120°F (49°C) for 90 days. The tested sprinklers are then evaluated for operational compliance. Thus, UL Listed sprinklers include some tolerance for exposure to temperatures exceeding 100°F (56°C), which alleviates most concerns of elevated temperature during shipping



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of sprinklers. Cover plates for concealed sprinklers typically have a lower temperature classification than sprinklers and as a result some manufacturers choose to use exposure or temperature indicators for shipping of these components.

Third, both ordinary and intermediate temperature classification sprinklers tested in accordance with UL 199 must activate within  $\pm 3.5\%$  of the marked nominal temperature. This results in a small overlap at the boundaries of these temperature classification ranges. Sprinklers having an ordinary temperature classification at the higher end of the allowable temperature range (nominally 165°F (74°C)) and sprinklers having an intermediate temperature classification at the lower end of the allowable range (nominally 175°F (79°C)) could have the same activation temperature when tested. The 100°F (56°C) maximum ceiling temperature permitted by NFPA 13 is likely very conservative for ordinary temperature sprinklers at the upper end of the range (e.g. 165°F(74C), while intermediate temperature sprinkler at the lower end of the range (e.g. 175°F(79°C) can be exposed to a maximum ceiling temperature up to 150°F (66°C) even though both could theoretically have the same tested activation temperature.

Fourth, in speaking with representatives of several sprinkler manufacturers, concern for exposure to high ambient temperatures appears to vary from manufacturer to manufacturer. Sprinklers may have unique design, construction, or quality control features that impact sensitivity to temperatures most commonly experienced during shipping and in installed locations.

Finally, the fire sprinkler industry has an exemplary track record of protecting life and property. The industry strives to limit unintended operations and with tens of millions of sprinklers installed each year, reported instances of unintended operations are an exceedingly small fraction of the number of sprinklers installed.

## Concealed Spaces: Part 1

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