Abstract
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Sidewall Sprinklers on Residential Balconies

Home grills have led to many home structure and outdoor fires. In multi-family occupancies, the model building codes have required an additional sprinkler beyond NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, requirements. The additional sprinkler is a sidewall-type located on porches or balconies to assist in controlling this type of fire. However, the sprinkler is permitted to be up to 14 inches below the deck, which in most cases is comprised of solid wood joists.

Should a fire occur, there are many variables that can affect the operation of the fire sprinkler when installed outdoors in a porch-type scenario. For example, wind and weather can play a major role in the ability of heat and smoke to travel to a sprinkler and allow it to operate. Other factors include, but are not limited to construction materials, ambient temperatures, fire location and the size and configuration of the porch including joist depths.

This phase of the research covers modeling a grill fire with a building that is Type V, combustible construction. NIST's Fire Dynamic Simulator (FDS) Version 5.0 has been used for the models. The ignition source for the modeled fire is a leak from a cracked or damaged hose on the grill. For this series tank explosion was not considered.

The primary goal has been to review the sprinkler operation times to address the concerns of delayed operation due to environmental conditions. Results have been determined with fixed test values for initial heat release rates and ventilation conditions among other variables. Real world situations may vary based on actual air flow and material conditions.

After all phases have been completed, including full scale fire testing, any changes deemed necessary will be proposed to the model building codes and sprinkler standards as appropriate.