

Building and Fire Research Laboratory



Residential Fire Sprinklers

In 1996, more than 3,000 people in the United States died due to fires in their homes. Residential fire sprinkler systems have proven themselves to be effective life safety systems. BFRL, with support from the U. S. Fire Administration, conducted experiments to quantify the effectiveness of residential sprinkler systems designed in accordance with NFPA 13D.

An example of these experiments is the following comparison of a "living room" fire, with and without residential sprinklers. Two rooms, each 3.7m (12 ft) X 2.4m (8 ft) high, were built in the Large Fire Research Facility at NIST. Both of the "living rooms" were furnished with a sofa, love seat, end table, lamp and carpeting. Room A had a smoke detector installed and Room B had both a smoke detector and a residential sprinkler system. A match was used to ignite the sofa. Within 40 seconds after ignition, the smoke detectors in each room activated. The fires in both rooms continued to grow. At 85 seconds the residential sprinkler activated in Room B.

As a result of the water spray from the sprinkler in Room B, the fire is suppressed and safe conditions are maintained. The fire in Room A continues to grow. Flash over occurs in Room A, 195 seconds after ignition, with temperatures exceeding 600 °C (1100 °F).

Times are in seconds from ignition. Select a picture to view a larger version.

