

U.S. Fire Administration / National Fire Academy

Coffee Break Training

Topic: Measuring Sprinkler Sensitivity

Learning objective: The student shall be able to explain sprinkler Response Time Index (RTI).

In NFPA 13, *Standard for the Installation of Sprinkler Systems*, sprinkler operating elements are characterized as “fast response” or “standard response,” depending upon their RTI.

The RTI for a specific model sprinkler is measured by plunging test samples into a heated-air wind tunnel and determining how quickly the operating element releases.

The RTI is calculated using the sprinkler element’s operating time, operating temperature, air temperature, and velocity of the wind tunnel and a conductivity factor between the heat responsive element and the sprinkler test oven.

RTI values are expressed by multiplying meters by seconds and raising the product to the one-half power: the lower the value, the faster the response.

Sprinkler Response Category	RTI (ms) ^{0.5}
Fast Response	50 or less
Special Response	More than 50, less than 80
Standard Response	80 or greater

“Fast response” sprinklers include Residential, Quick Response, Early Suppression Fast Response, Quick Response Extended Coverage and the not-yet-developed Quick Response Early Suppression. All other sprinklers are classified as “standard response.” The International Standards Organization (ISO) recognizes the “special response” category, but NFPA 13 does not.



For additional information, refer to the NFPA *Fire Protection Handbook*; NFPA 13, *Standard for the Installation of Sprinkler Systems*; or search the World Wide Web, keywords “Response Time Index.”