



# Coffee Break Training - Fire Protection Series

## Automatic Sprinklers: Residential Sprinkler Water Supplies

No. FP-2010-38 September 21, 2010

**Learning Objective:** The student shall be able to compute the minimum tank size needed for a residential sprinkler system in one- and two-family dwellings or townhouses.

The national model building codes for one- and two-family dwellings and townhouses now include requirements for residential sprinkler systems.

In those areas where the municipal-type water supply is inadequate or nonexistent, stored water supplies with electric pumps may provide the solution. The code official should be able to verify that the minimum tank capacity is adequate to supply the system.

The one- and two-family dwellings and townhouse residential sprinkler standards require the water supply to last for 7 minutes in a one-story dwelling less than 2,000 ft<sup>2</sup> (186 m<sup>2</sup>) and 10 minutes for dwellings more than one story or 2,000 ft<sup>2</sup> and larger.

To obtain the total stored water requirement, the calculations are simple arithmetical equations that multiply the flow from the required number of design sprinklers times the duration. The number of design sprinklers is based on the largest room size: if the largest room can be protected by a single sprinkler, the design number is one. Otherwise, two sprinklers flowing simultaneously must be used to compute the system demand.

The sprinkler flow data can be obtained from the sprinkler manufacturer's product and listing literature. Remember that the flow requirements may change depending upon sprinkler spacing and ceiling configurations. Generally, as spacing increases and ceiling slope increases, the required flow and pressure also increase. Although unlikely with current sprinkler designs, if the sprinkler does not have a specified flow from the listing information, use 13 gpm (49 Lpm) as a design value.

The following table provides some sample stored water requirements based on typical sprinkler characteristics.

Dwelling Size	Design Sprinklers	Flow rate (gpm/Lpm)	Duration (min)	Required total water supply (Gal/L)
One-story, less than 2,000 ft <sup>2</sup> (186 m <sup>2</sup> )	1	13/49	7	91/344
	2	13/49	7	182/688
One-story, more than 2,000 ft <sup>2</sup> (186 m <sup>2</sup> )	1	13/49	10	130/490
	2	13/49	10	260/980
More than one story or more than 2,000 ft <sup>2</sup> (186 m <sup>2</sup> )	1	13/49	10	130/490
	2	13/49	10	260/980



This 300-gallon (1,135 L) tank supplies a residential sprinkler system.

For additional information, refer to International Residential Code Standard P2904 or National Fire Protection Association (NFPA) 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.



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