



Coffee Break Training - Fire Protection Series

Access and Water Supply: Fire Flow Formulas: Part 3

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Learning Objective: The student will learn two fire flow formulas that Incident Commanders (ICs) can use in their size-up to compute flow demands.

There are at least five recognized fire flow calculation methods currently in use. Some are intended for preincident assessment of a community's flow rate; others are quick calculations for ICs who are faced with an emergency. The "community flow rate" calculations generally are meant for conflagration control rather than for a building fire or single room-and-contents event.

The two formulas discussed below can be applied during fire size-up.

Iowa State University Method

The Iowa State University (ISU) method was created in the 1950s after a series of fire studies in enclosed spaces. The ISU "Ideal Rate of Flow" formula is:

- Required fire flow (gallons per minute (gpm)) = $V \div 100$.
- V = the volume of the space that is on fire.

For example, an IC arrives at a burning noncombustible mercantile occupancy that measures 50 feet by 75 feet and is 12 feet (one story) tall. The IC quickly determines that the volume of the structure is 45,000 cubic feet. Using this number and the ISU formula, the required fire flow for this structure would be 450 gpm ($45,000 \div 100 = 450$).

National Fire Academy Formula

The National Fire Academy (NFA) formula, taught in NFA's "Managing Company Tactical Operations" classes, is similar to the ISU method but employs different values. The NFA fire flow formula is:

- Required fire flow (gpm) = $(\text{length} \times \text{width}) \div 3$.

Using the same example, an IC arrives at a burning mercantile occupancy that measures 50 feet by 75 feet and is one story tall. The IC quickly determines that the area of the structure is 3,750 square feet. Using this number and the NFA formula, the required fire flow for this structure would be 1,250 gpm ($3,750 \div 3 = 1,250$).

In the future, we will introduce the familiar Insurance Services Office needed fire flow formula.



The heavy fire involvement in this abandoned feed mill requires quick calculations to determine needed fire flow.



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