



Coffee Break Training - Fire Protection Series

Access and Water Supplies: Fire Flow Formulas: Part 10: Insurance Services Office Needed Fire Flow Formula: Occupancy Factor

No. FP-2013-45 November 5, 2013

Learning Objective: The student will be able to list the variables used in the Insurance Services Office (ISO) Needed Fire Flow (NFF) formula to establish the “occupancy factor.”

Recent Coffee Break Training items explained how to solve for the dimensionless “construction factor” variable, C_i , in the ISO NFF formula:

$$NFF_i = (C_i) (O_i) [1 + (X + P)]$$

Today, we introduce the occupancy factor variable, O_i , and how it affects the formula. In general, O_i addresses the combustibility of contents that may be found in all or a portion of the occupancy that is being evaluated for fire flow. As combustibility of contents increases, the water supply requirements increase as well. As discussed in Coffee Break Training 2013-36, the goal is to provide enough water to suppress the heat energy released by the fire and protect exposures.



These boxes, when full of pyrotechnics, would qualify as rapid or flash burning materials in the “occupancy factor” of the Insurance Services Office (ISO) Needed Fire Flow (NFF) formula.

The ISO formula uses five categories of combustibility of contents as shown in the following table. The classifications represent the effect of the combustibility of contents on the building structure.

Occupancy Combustibility Class	Contents Description	Occupancy Factor (O_i)
C-1	Non-combustible	0.75
C-2	Limited combustible	0.85
C-3	Combustible	1.00
C-4	Free-burning	1.15
C-5	Rapid or flash burning	1.25

Substituting the O_i factor for noncombustible and limited combustible contents into the NFF will lower the fire flow demand from the baseline calculation, while substituting the free- and rapid burning factors will increase the fire flow demand by as much as 25 percent compared to a moderately combustible (C-3) occupancy.

Next week’s Coffee Break Training will provide examples from the ISO “Guide for Determination of Needed Fire Flow” that correspond to the occupancy combustibility classes.

For more information on fire flow, you can take the National Fire Academy online class “Testing and Evaluation of Water Supplies for Fire Protection” (Q0218) at <http://1.usa.gov/12JypCa>. You can download the ISO “Guide for Determination of Needed Fire Flow” from www.iso.com.

