



# Coffee Break Training - Fire Protection Series

## Access and Water Supplies: Fire Flow Formulas: Part 17: Insurance Services Office Needed Fire Flow Formula Example

No. FP-2013-53 December 31, 2013

**Learning Objective:** The student will be able to calculate the Insurance Services Office (ISO) Needed Fire Flow (NFF) formula for a specific building.

We have spent several weeks explaining the variables of the ISO NFF formula. Now we will provide an example based on a typical three-story, 3,600 square foot, nonsprinklered office building using the ISO formula:

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

Where:

NFF<sub>i</sub> = Needed Fire Flow in gallons per minute

C<sub>i</sub> = construction factor, including effective area

O<sub>i</sub> = occupancy factor

X + P = exposures and communication (openings) factor



Using this three-story, nonsprinklered masonry office building as an example, this structure has an Insurance Services Office (ISO) needed flow of 750 gallons per minute (gpm).

**You may need to refer to the recent Coffee Break Training bulletins FP-2013-39 through FP-2013-51 to review the values inserted in the variables.**

To solve for C<sub>i</sub> using Construction Class 2 (joisted masonry) and an effective area of 3,600 square feet, use the formula:

$$C_i = 18 \times 1 \times \sqrt{(3600)}$$

$$C_i = 18 \times 1 \times (60)$$

$$C_i = 1,080$$

$$C_i = 1,000 \text{ (rounded to the nearest 250 gallons per minute (gpm))}$$

The office-type occupancy factor, O<sub>i</sub>, is C-2 (limited combustible) and is assigned the value of 0.85.

The building has no exposures on any of the four sides: two streets and two blank masonry walls without openings. Therefore, the exposures and openings value, X + P, is zero.

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

$$NFF_i = (1,000) (0.85) [1 + (0 + 0)]$$

$$NFF_i = (1,000) (0.85) (1)$$

$$NFF_i = 850 \text{ gpm}$$

**ISO NFF<sub>i</sub> = 750 (rounded to the nearest 250 gpm)**

Next week, we will look at the “International Fire Code®” fire flow calculation method.

For more information on fire flow, you can take the NFA Online class “Testing and Evaluation of Water Supplies for Fire Protection” (Q0218) at <http://1.usa.gov/12JypCa>.



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