



Western Berks Fire Department Training Bulletin

Calculating Basic Fire Flow

Training Bulletin #: 008-14

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Purpose Statement

This training bulletin has been developed to provide information on calculating the basic fire flow needed to contain and extinguish a fire.

Scope Statement

This training bulletin applies to all members and employees of the Western Berks Fire Department.

Background

In order to provide the Incident Commander and/or pump operator with an estimate of how much water will be required to effectively confine and extinguish a structure fire, a number of formulas are available to provide this information. Unfortunately, several of these are complex in nature and difficult to do without a calculator. The Basic Fire Flow Formula, also known as the NFA formula is simple and in most cases can be done without the use of a calculator.

Basic Formula

Needed Fire Flow (NFF) = Length x Width / 3 x Percentage of Fire Involvement

Examples

- To calculate the needed fire flow for the entire building involved in fire:

$$\text{NFF} = 30' \times 50' / 3$$

$$\text{NFF} = 1500' / 3$$

$$\text{NFF} = 500 \text{ GPM}$$

- To calculate the needed fire flow for a portion (25%) of the building on fire:

$$\text{NFF} = 30' \times 50' / 3 * 25\%$$

$$\text{NFF} = 1500' / 3 * 25\%$$

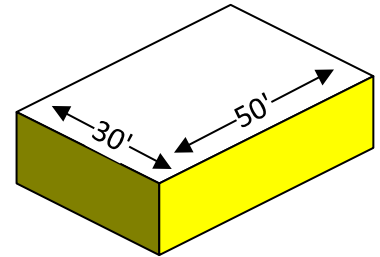
$$\text{NFF} = 500 \text{ GPM} * 0.25$$

$$\text{NFF} = 125 \text{ GPM}$$

- To calculate the needed fire flow for a multi-story building with a portion involved on several floors: Simply multiply the percent involved times the number of floors involved. In the example above where 25% of the building is involved, if there are 2 stories involved in fire, the Needed Fire Flow would be;

$$\text{NFF} = 125 \text{ GPM} * 2 \text{ stories involved}$$

$$\text{NFF} = 250 \text{ GPM for a 2 story building with 25\% involved.}$$



Exposures

The NFA formula also takes into consideration the exposures which are affected by the fire. Both internal exposures (additional floors above the fire) and external exposures (buildings adjacent to the involved structure) are assigned a percentage of 25% for each floor and each side that has an exposure.

Examples

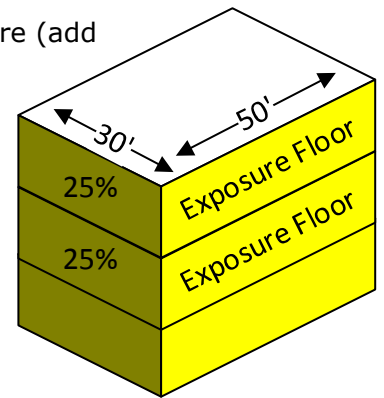
- This example shows the exposure of two additional floors above the fire (add 25% for each floor) to the Needed Fire Flow.

$$\text{NFF} = 30' \times 50' / 3 + .50$$

$$\text{NFF} = 1500' / 3$$

$$\text{NFF} = 500 \text{ GPM} + .25\% \text{ for each floor (125)}$$

$$\text{NFF} = 750 \text{ GPM}$$



- This example shows exposures on the B & C side of the structure (add 25% for each side with an exposure) to the Needed Fire Flow.

$$\text{NFF} = 120' \times 80' / 3$$

$$\text{NFF} = 3200 + (.50 \times 3200)$$

$$\text{NFF} = 3200 + 1600$$

$$\text{NFF} = 4800 \text{ GPM}$$

