

KENTFIELD FIRE PROTECTION DISTRICT



Developed by
 Jim Galli, Battalion Chief
 Approved by
 Paul Smith, Fire Chief

Fire Protection Standard 500A

Field Formula for Calculating Required Fire Flows

Date: 1-1-04

Revision: _____

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This standard is promulgated pursuant to Section 10.301(c) of the Uniform Fire Code as adopted by the Kentfield Fire Protection District.

The basis for this standard is the 1974 edition of the “Guide for Determination of Required Fire Flow” as published by the Insurance Service Office. Modifications made to construction factors, occupancy charges and exposure charges were based on correlating those factors with construction and size factors in the Uniform Building Code.

The basic premise of the guide is that the “Basic Fire Flow” is equal to the square root of the total area of building multiplied by eighteen, multiplied by a factor based on the type of building construction used (table 500-1), multiplied by a factor based on the occupancy of building (table 500-2). Mathematically, the formula is thus:

$$FF = \sqrt{A \times 18 \times CF \times OF}$$

Additional factors will be applied to this “Basic Fire Flow” for 1) exposures – up to 75% additional charged based on the distances to adjacent buildings as given in Tables 500-3 and 500-4 and Figure 500-1; and 2) automatic fire protection – 50% credit if provided with an approved automatic fire sprinkler system or 15% credit if provided with an approved automatic fire detection system.

A format to assist you through the process is given as Figure 500-2

Table 500-1
 Building Construction Factors

<u>Construction Type</u>	<u>Construction Factor</u>
II – Concrete or Protected Steel	.80
II – Unprotected Steel	1.25
V – Wood Frame	1.40

Table 500-2
 Occupancy Factors

<u>Occupancy Type</u>	<u>Occupancy Factor</u>
A-1, A-2, A-2.1, A-3, A-4	1.065
B-1, B-2, B-3	.96
B-4	.75
E-1, E-2, E-3	.907

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H-1, H-2	1.25
H-3, H-4, H-5	1.117
I-1, I-2, I-3	1.223
R-1	1.065

Table 500-3
 Exposure Figures

Construction Type

<u>Percentage Openings</u>	<u>Concrete</u>	<u>Steel</u>	<u>Wood</u>
None	G	A	E
<25%	E	A	D
<50%	B	A	B
≥50%	A	A	A

The letter G in the above grid 0% at all times.
 All other letters refer to figure 500-1 graphs.

Table 500-4
 Area Separation Walls

<u>Percentage Openings</u>	<u>4 Hour Wall</u>	<u>2 Hour Wall</u>
None	0	10
<10%	8	15
<25%	15	20

Note: Openings 25% or greater equals all one fire area.

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Date: _____

Location: _____

1. Enter total area* of building: _____
2. Take the square root of line 1 and enter: _____
3. Multiply line 2 by 18 and enter: _____
- 4a. Enter the Uniform Building Code Construction type: _____
- 4b. Enter the Construction factor from Table 500-1: _____
- 4c. Multiply line 3 by line 4b and enter: _____
- 5a. Enter the Uniform Building Code Occupancy Group: _____
- 5b. Enter the occupancy factor from table 500-2: _____
- 5c. Multiply line 4c by line 5b and enter: _____
- 6a. Enter the distance to property lines, buildings, or area separation walls, whichever is closer:
N _____ S _____ E _____ W _____
- 6b. Enter the percent openings in the exposure as follows (None, <25%, <50%, >50%):
N _____ S _____ E _____ W _____
- 6c. Using Table 500-3, determine exposure letter:
N _____ S _____ E _____ W _____
- 6d. Using Table 500-4 or Figure 500-1, determine exposure factor:
N _____ S _____ E _____ W _____
- 6e. Add all directions of line 6d together and enter it. If the total is >.75, enter .75: _____
- 6f. Multiply line 5c by line 6e and enter: _____
- 7a. If building is not protected by an automatic protection enter 5c: _____
- 7b. If building is protected by an automatic fire alarm system, multiply line 5c by .50: _____
- 7c. If building is protected by an automatic sprinkler system, multiply line 5c by .50: _____
- 7d. Total calculated fire flow add 7a, 7b, or 7c and 6f together: _____

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- Notes: *The total area is the total floor area of all floors with the following exceptions:
- (1) In types I-FR and II-FR construction only the 3 largest successive floors need be considered.
 - (2) In R-1 occupancies only the 2 adjacent units that would create the largest fire flow need be considered.

If the buildings are not completely protected by the fire alarm or sprinkler systems, **no** credit should be given.

Calculated by _____