



RFDS 3.00 FIRE FLOW

3.1: Fire Flow Determination (effective December, 1, 2014)

The following are guidelines for the determination of required fire flow in the City of Redmond. Required fire flow demand is that amount of water which must be continuously provided at a minimum of 20 psi to a project site for firefighting purposes and shall not include domestic flow. Reference the "RFDS Basic Flow Chart" for the required duration of fire flow.

3.1.1; Guidelines for the calculation of required fire flow

3.1.1.1 The Redmond Fire Department Standard "Required Fire Flow Calculation Form" shall be used in conjunction with these guidelines to determine required fire flow. Each step shall be followed in order. Round off decimals as you follow each step. Round down the final figure to the 10s place.

3.1.1.2 The RFDS "Basic Fire Flow Chart" shall be used to obtain the basic flow figure. Area shall be based on Gross Area as used by the Redmond Building Division and as follows.

Gross Area: The gross area means the total area of all floors, measured from the exterior face, outside dimensions or exterior column line of a building, including basements, cellars and balconies, but not including unexcavated areas. Where walls and columns are omitted in the construction of a building, such as an open shed or marquee, the exterior wall of the open side or sides, for the purpose of calculating gross area, will be the edge of the roof, including gutters."

3.1.1.3 A building with 50% or greater residential occupancy (except SFR, 1 or 2 dwellings) adds a 10% surcharge.

3.1.1.4 Buildings with fire sprinkler systems throughout are given a 50% credit.

3.1.1.5 Exposure Surcharge in Buildings without Automatic Fire Sprinklers. Generally, a percentage is calculated for each of four sides/directions.

The distance to other buildings on the same property or to property lines of adjacent property that may be built upon shall be considered the exposure distance. Where a property line is adjacent to a public right of way (i.e. street or railroad) the exposure distance may be taken to the property line on the opposite side of the right of way. The Fire Marshal may assess additional surcharges for exposures not identified above where in his opinion these would require the expenditure of water resources during a fire incident (i.e. stands of trees, equipment, combustible material or vehicle storage).

3.1.1.5.1 Basements, mezzanines, and parking garages shall be included as part of the total building area. A basement with sides greater than 50% below grade shall not accrue an exposure surcharge for that floor.



If there is a 3 hour or greater horizontal (floor/ceiling) separation above the Type IA construction and approved interior standpipe throughout the area above and below may be considered two separate buildings for fire flow purposes. No exposure factor will be calculated between these two buildings.

3.1.1.5.2 Structures divided into separate fire areas by a fire wall, as defined and installed by the Building Code, shall have each fire area calculated separately. No exposure surcharge shall be added for the portion of a building separated by such a fire wall.

3.1.1.6 Fire barrier walls may be used for credit under section 3.1.1.14, below.

3.1.1.7 Structures separated by 10 feet or less shall be considered as one building for fire flow calculation.

3.1.1.8 One and two family homes (3,600 square feet or less) in residential developments shall be considered to have a required fire flow of 1,500 gpm (1,000 gpm when all homes within the development are fire sprinkler equipped). For one and two family homes 3,601 square feet or more, use the "Form for the Calculation of Required Fire Flow".

3.1.1.9 One and two family homes located in areas of the City identified by City of Redmond Water Department as having less than 1500gpm available, may use the following formula to determine required fire flow.

$$\text{Available gpm} \times 2.4 \text{ square feet} = \text{maximum gross area of structure}$$

3.1.1.10 In SFR developments which are allowed to use wood shingles, a surcharge of 250 gpm is added. In SFR developments where a structure to structure distance is allowed to be 10 feet or less a surcharge of 250 gpm is added.

3.1.1.11 Total commercial fire flow should not exceed 3,500 gpm.

3.1.1.12 The Fire Marshal shall determine what other credits or features may be allowed, if any, and amount; or if design changes (i.e. building area reduction, exposure distance increases, or a change in construction type) shall be required. "Other" credits should not exceed 25%.

3.1.1.13 Where multiple buildings are located on one site the fire flow provided to the site shall not be less than the largest required fire flow.

3.1.1.14 Where future buildings or phases are anticipated the required fire flow shall be based upon the future build out. Where this is not possible or is undesirable the project developer assumes the responsibility for all future improvements necessary to provide additional fire flow prior to the additional phase or construction.



Required Fire Flow Calculation Form

PROJECT: _____ Date: _____

LOCATION: _____

DEVELOPER: _____ PHONE: _____

ARCHITECT: _____ PHONE: _____

BUILDING CONSTRUCTION TYPE: IA, IB, IIA, IIB, IIIA, IIIB, IV, VA, VB (circle one)

Number of stories: ___/___ Footprint area: _____ Mezzanines/partial floors _____

TOTAL GROSS AREA: _____

All Commercial & Single Family 3,600 square feet or greater

1. Obtain the basic flow from the RFDS Basic Flow Chart for the identified Construction type and gross area: Basic Flow: _____
2. Add 10% if residential use is > 50% (except SFR) x 1.1 _____
3. For fire sprinklers subtract 50% x 0.5 _____
4. Exposure Surcharge in Buildings without Fire Sprinklers, multiply by 1.00 to 1.75*
 (*To determine the exposure factor add a percentage for each of four directions. Use the conversion table to convert distance to percent, and then add the percent to the previous total.*)

Conversion Table

<u>Feet = %</u>	<u>Feet = %</u>
0'-10' = 25%	N = _____ = _____
11'-25' = 20%	E = _____ = _____
26'-40' = 15%	W = _____ = _____
41'-80' = 10%	S = _____ = _____
81'-120' = 5%	Subtotal: _____ (.75 maximum)
	X 1. _____ = _____

Other surcharge or credit (Explain): _____

TOTAL REQUIRED FIRE FLOW: _____

FIRE FLOW AVAILABLE PER PUBLIC WORKS: _____

Single Family Residential Developments (<3,600 square foot homes):

1. No Fire Sprinklers = 1500 gpm / All Fire Sprinklers = 1000 gpm _____
2. Wood shingles allowed in the development **add** 250 gpm _____
3. Less than 10 feet allowed between structures **add** 250 gpm _____

TOTAL REQUIRED FIRE FLOW: _____

FIRE FLOW AVAILABLE PER PUBLIC WORKS: _____



RFDS BASIC FIRE FLOW CHART

(Effective July 1, 2010)

Fire Flow (GPM)	Type IA, IB	Type IIA, IIIA, IV	Type IIB, IIIB, VA	Type VB	Fire Flow (GPM)	Duration (Hydrants)
1500	0-22,700	0 - 12,700	0 - 8,200	0 - 3,600	1500	2 (1)
1750	22,701 - 30,200	12,701 - 17,000	8,201 - 10,900	3,601 - 4,800	1750	2 (1)
2000	30,201 - 38,700	17,001 - 21,800	10,901 - 13,900	4,801 - 6,200	2000	2 (2)
2250	38,701 - 48,300	21,801 - 27,200	13,901 - 17,400	6,201 - 7,700	2250	2 (1)
2500	48,301 - 59,000	27,201 - 33,250	17,401 - 21,300	7,701 - 9,400	2500	2 (3)
2750	59,001 - 70,900	33,251 - 39,700	21,301 - 25,500	9,401 - 11,300	2750	2 (3)
3000	70,901 - 83,700	39,701 - 47,100	25,501 - 30,100	11,301 - 13,400	3000	3 (3)
3250	83,701 - 97,700	47,101 - 54,900	30,101 - 35,200	13,401 - 15,600	3250	3 (4)
3500	97,701 - 112,700	54,901 - 63,400	35,201 - 40,600	15,601 - 18,000	3500	3 (4)
3750	112,701 - 128,700	63,401 - 72,400	40,601 - 46,400	18,001 - 20,600	3750	3 (4)
4000	128,701 - 145,900	72,401 - 82,100	46,401 - 52,500	20,601 - 23,300	4000	4 (4)
4250	145,901 - 164,200	82,101 - 92,400	52,501 - 59,100	23,301 - 26,300	4250	4 (5)
4500	164,201 - 183,400	92,401 - 103,100	59,101 - 66,000	26,301 - 29,300	4500	4 (5)
4750	183,401 - 203,700	103,101 - 114,600	66,001 - 73,300	29,301 - 32,600	4750	4 (5)
5000	203,701 - 225,200	114,601 - 126,700	73,301 - 81,100	32,601 - 36,000	5000	5 (5)
5250	225,201 - 247,700	126,701 - 139,400	81,101 - 89,200	36,001 - 39,600	5250	5 (6)
5500	247,701 - 271,200	139,401 - 152,600	89,201 - 97,700	39,601 - 43,400	5500	5 (6)
5750	271,201 - 295,900	152,601 - 166,500	97,701 - 106,500	43,401 - 47,400	5750	5 (6)
6000	295,901 - greater	166,501 - greater	106,501 - 115,800	47,401 - 51,500	6000	6 (6)
6250			115,801 - 125,500	51,501 - 55,700	6250	6 (7)
6500			125,501 - 135,500	55,701 - 60,200	6500	6 (7)
6750			135,501 - 145,800	60,201 - 64,800	6750	6 (7)
7000			145,801 - 156,700	64,801 - 69,600	7000	7 (7)
7250			156,701 - 167,900	69,601 - 74,600	7250	7 (8)
7500			167,901 - 179,400	74,601 - 79,800	7500	7 (8)
7750			179,401 - 191,400	79,801 - 85,100	7750	7 (8)
8000			191,401 - greater	85,101 - greater	8000	8 (8)

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