



Fire Flow Requirements

What is Fire Flow? The water source maintained on site that is needed to control a fire in a building or group of buildings. This water supplements the water brought to the site by the local fire district.

What Structures Are Required To Have Fire Flow Available? Thurston County Ordinance Title 14.32.110 requires fire flow for all buildings other than R3 residential structures or U utility structure.

How is Fire Flow Determined? Fire flow is determined based on the fire area of each structure and the type of construction. Where the construction types are mixed, the more stringent will apply to the entire fire area. Fire area is the total square footage for all floor levels within the exterior walls, or horizontal projection of the roof of the building. Each portion of a building separated by a firewall may be considered a separate fire area when the firewall is built according to the International Building Code. Surcharges or credits in gallons per minute are also applied based on the occupancy of the structure.

What is a Fire Wall? A fire resistance-rated wall having no openings (party wall), which restricts the spread of fire and to allow the structure on either side of the wall to collapse without collapse of the wall. IFC Appendix B 104.2

Group	Fire Wall Rating in Hours	
A, B, E, H-4, I, R-1, R-2, U	3 ^a	a. Walls shall be not less than 2-hour fire-resistance rated where separating buildings of Type II or V construction. b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5.
F-1, H-3 ^b , H-5, M, S-1	3	
H-1, H-2	4 ^b	
F-2, S-2, R-3, R-4	2	

How is the Building Type Determined? Refer to the International Building Code for any exceptions and for a complete description of requirements. Walls may require increased protection in proximity to property line.

V B	Any materials allowed by the code.	Type III A	Two hour rated noncombustible walls. One hour constructions for all other components
V A	One-hour fire resistant throughout.	Type III B	Two hour rated exterior walls and A shafts. Other components - any materials allowed by the code.
Type II B	Noncombustible. May be constructed from steel, iron, concrete, or masonry.	Type IV	Heavy timber construction. Bearing exterior walls - two hour rated. Bearing interior walls - one hour rated or heavy timber
Type II A	One hour, noncombustible.	Type I B	Noncombustible. Two hour rated exterior walls; interior bearing, structural frame, and floor construction. Roof ceilings - one hour rated.
Type I A	Noncombustible. Three-hour rated exterior walls; interior bearing and structural frame; two-hour floor assemblies; and one and one half hour rated roof construction.		

Thurston County Permit Assistance Center

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What are the Occupancy Types? (For a more detailed description, see IBC Chapter 3)

<i>A 1</i>	: Assembly uses, usually with fixed seating. Theatres, concert halls, TV studios.
<i>A 2</i>	: Banquet halls, nightclubs, restaurants, taverns and bars
<i>A 3</i>	: Art galleries, lecture halls, churches, community halls, libraries, exhibition halls
<i>A 4</i>	: Skating arenas, swimming pools, tennis courts
<i>A 5</i>	: Bleachers and grandstands
<i>B</i>	: Office, professional or service type transactions, including storage of records and accounts
<i>E</i>	: Educational, Daycare
<i>F1</i>	: Moderate-hazard factory and industrial occupancies.
<i>F2</i>	: Low-hazard and industrial occupancies including facilities producing noncombustible or non-explosive materials which during finishing, packing or processing do not involve a significant fire hazard.
<i>H1, 2, 5</i>	: Hazardous occupancies with quantities of explosive materials that exceed those listed in Table 307.7(1), semiconductor facilities, and occupancies with quantities of health hazard materials exceeding those listed in Table 307.7(2).
<i>H3, 4</i>	: Hazardous occupancies with quantities of high fire or physical hazard materials that exceed those listed in Table 307.7(1).
<i>I1, 2, 3, 4</i>	: Institutional occupancies. Ex. Hospitals, healthcare, nursing homes and jails.
<i>M</i>	: Mercantile. Sale and display of merchandise involving stocks of goods, wares, or merchandise, incidental to such purposes and accessible to the public. Motor fuel dispensing canopies.
<i>R1</i>	: Hotels and apartment houses (buildings that contain 3 or more dwelling units Hotels, motels, and boarding houses for transient residence.
<i>R2</i>	: Apartment houses; convents; dormitories; non-transient hotels, motels boarding homes.
<i>R3</i>	: Town homes and one and two family dwelling units.
<i>S1</i>	: Repair garages and moderate hazard storage occupancies used for the storage of combustible materials that are not classified as an S2 or H occupancy.
<i>S2</i>	: Open parking garages and low hazard storage for noncombustible material without plastic pallets.
<i>U</i>	: Utility. Private garages, carports, sheds, and commercial, agricultural buildings, fences, tanks and towers.

Credits to Flow Requirements

Occupancy Type	Decrease by:
S2, I1, I2, I3, R1, R-2	25%
E (Daycare), A1, A2, A3, A4	20%
E, I4	15%
A5, B	10%

Surcharges to Flow Requirements

Occupancy Type	Increase by:
S1, M (fuel dispensing)	10%
H4, S1 (Aircraft and vehicle repair)	15%
H3	20%
H1, H2, H5	25%

Total Fire Area in Square Feet					
(Gallons per Minute Fire Flow)	Construction Type				
	I II-Fire Resistant	II A III A	IV Heavy Timber V A	II B III B	V B
500⁰	5500	3700	2600	2100	1600
750¹	7800	5000	3500	2700	2000
1000²	11100	6800	4700	3500	2400
1250³	15900	9300	6200	4500	2900
1500⁴	22750	12700	8200	5900	3600
1750	30200	17000	10900	7900	4800
2000	38700	21800	12900	9800	6200
2250	48300	24200	17400	12600	7700
2500	59000	33200	21300	15400	9400
2750	70900	39700	25500	18400	11300
3000	83700	47100	31100	21800	13400
3250	97700	54900	35200	25900	15600
3500	112700	63400	40600	29300	18000
3750	128700	72400	46400	33500	20600
4000	145900	82100	52500	42700	26300
4250	164200	92400	59100	42700	29300
4500	183400	103100	66000	47700	32600

For larger structures refer to Thurston County Ordinance Title 14.32.110

0: No additional surcharges or credits are applied to these square footages. No fire flow is required when 500 gallons per minute is required.

1: For buildings that do not require a surcharge to be added, the addition of a fire alarm system will reduce the fire flow so that no additional fire flow is required.

2: For buildings that do not require a surcharge to be added, the addition of a sprinkler system will reduce the fire flow so that no additional fire flow is required.

3: For buildings that do not require a surcharge to be added, the addition of a fire alarm and a sprinkler system will reduce the fire flow so that no additional fire flow is required.

4: For buildings that do not require a surcharge to be added, the addition of a fire alarm and a sprinkler system will reduce the fire flow so that no additional fire flow is required.

5: Automatic fire extinguishing systems shall also be provided where required by International Building Code Chapter 38 as modified by Thurston County Ordinance 14.20.50.

How can the Fire Flow be mitigated?

1. The fire flow for buildings protected with an automatic fire sprinkler system or a limited supply sprinkler system may reduce by 50% provided a UL listed central station monitors the system.
2. The fire flow for buildings protected with an approved automatic fire detection system including UL listed central station monitoring that is installed per International Building Code chapter 9 may be reduced an additional 250 gallons per minute.
3. Separate the buildings by the distance/protection of exterior walls as described in International Building Code Table 602.
4. Provide firewalls as described in the definitions.
5. Buildings that are protected by a full sprinkler system designed in accordance with a nationally recognized standard need only provide the required water supply for the system as designed, **provided** such system is not otherwise required to meet the requirements of the International Building Code or for UGA limits.

When is a Sprinkler System Required? An automatic sprinkler system shall be installed through out all new and substantially improved buildings exceeding 7,500 square feet, within the Lacey, Olympia, or Tumwater urban growth boundaries where a municipal water supply is available. Only **one** firewall may be used to reduce the need for a sprinkler system in the Urban Growth Areas.

An automatic sprinkler system shall be installed through out all new and substantially improved buildings exceeding 12,000 square feet in all other areas in Thurston County. Multiple firewalls may be used to reduce the need for a sprinkler system, but only up to 12,000 square feet.

There are other requirements for sprinkler systems that are unrelated to the need for fire flow see the International Building Code Chapter 9 for more information.

What is a Limited Supply Sprinkler System? An integrated system of piping and listed fire protection devices installed in accordance with nationally recognized standards connected to a water supply capable of providing the required density to the four most remote sprinkler heads. The system must be central station monitored. It may be used where the adjusted fire flow gpm is less than 1500 gpm.

How many minutes must the fire flow be available and at what pressure? Water must be provided for 60 minutes for 2000 gallons per minute or less and for 120 minutes for greater than 2000 gallons per minute. Water pressure shall not be less than 20 psi.

Worksheet

Construction Type	Fire Area	Fire Flow from Chart	Occupancy Type	Surcharge or credit	Sprinkler Deduction	Fire Alarm Deduction	Remaining Fire Flow*

* to be provided by onsite hydrant or water tank. Not required if the sprinklers are not required by TC code.

Fire hydrants and permanent or temporary access roads must be installed and approved by the fire marshal prior to any construction. Access roads shall be 20 foot wide x 13' –6" clear height all weather surface. Inside corners shall have a 25-foot radius. Roads shall be constructed to within 150 feet of the furthest point of the building.

I Still Have Questions...

For additional information, speak with the fire marshal office or the non-residential plans examiner. You may also review all Thurston County Codes online on the County website.