# Fire Flow Requirements 2013

**What is Fire Flow?** The water source, maintained on site, 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, adopted on July 1, 2013, requires fire flow for all buildings except residential structures constructed under the International Residential Code or U occupancy structures.

**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. See Figure B105.1 on page 5.

**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] |
| 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 |

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.

**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.

***V A*** One-hour fire resistant throughout.

***Type II B*** Noncombustible. May be constructed from steel, iron, concrete, or masonry.

***Type II A*** One hour, noncombustible.

***Type III A*** Two hour rated noncombustible walls. One hour constructions for all other components

***Type III B*** Two hour rated exterior walls and A shafts. Other components - any materials allowed by the code.

***Type IV*** Heavy timber construction. Bearing exterior walls - two hour rated. Bearing interior walls - one hour rated or heavy timber

***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.

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

***A 1*** : Assembly uses, usually with fixed seating. Theatres, concert halls, TV studios.
***A 2*** : Banquet halls, nightclubs, restaurants, taverns and bars
***A 3*** : Art galleries, lecture halls, churches, community halls, libraries, exhibition halls
***A 4*** : Skating arenas, swimming pools, tennis courts
***A 5*** : Bleachers and grandstands
***B*** : Office, professional or service type transactions, including storage of records and accounts
***E*** : Educational, Daycare
***F1*** : Moderate-hazard factory and industrial occupancies.
***F2*** : 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.
***H1, 2, 5*** : 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).
***H3, 4*** : Hazardous occupancies with quantities of high fire or physical hazard materials that exceed those listed in Table 307.7(1).
***I1, 2, 3, 4*** : Institutional occupancies. Ex. Hospitals, healthcare, nursing homes and jails.
***M*** : 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.
***R1*** : Hotels and apartment houses (buildings that contain 3 or more dwelling units Hotels, motels, and boarding houses for transient residence.
***R2*** : Apartment houses; convents; dormitories; non-transient hotels, motels boarding homes.
***R3*** : Boarding homes, congregate living spaces.
***S1*** : Repair garages and moderate hazard storage occupancies used for the storage of combustible materials that are not classified as an S2 or H occupancy.
***S2*** : Open parking garages and low hazard storage for noncombustible material without plastic pallets.
***U*** : 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<br>II-Fire Resistant** | **II A<br>III A** | **IV Heavy Timber<br>V A** | **II B<br>III B** | **V B** |
| **500**[0] | 5500 | 3700 | 2600 | 2100 | 1600 |
| **750**[1] | 7800 | 5000 | 3500 | 2700 | 2000 |
| **1000**[2] | 11100 | 6800 | 4700 | 3500 | 2400 |
| **1250**[3] | 15900 | 9300 | 6200 | 4500 | 2900 |
| **1500**[4] | 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 | 37900 | 23300 |
| **4250** | 164200 | 92400 | 59100 | 42700 | 26300 |
| **4500** | 183400 | 103100 | 66000 | 47700 | 29300 |

***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.

**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 full coverage automatic fire detection system including UL listed central station monitoring may be reduced an additional 250 gallons per minute.
3. The buildings can be separate by the distance in proximity to an imaginary property line and protection of exterior walls and openings provided as described in IBC Table 602 and Chapter 7.
4. Provide firewalls to create separate structures that meet the allowable area to not require additional protection. A single fire wall in the urban growth areas and multiple fire walls in the rural county may be used to create separate structures to mitigate fire flow.
5. Buildings that are protected by a 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 in Addition to Fire Flow?**

- When specified in IFC Chapters 9 or Chapter 11 for specific occupancies,
- In all new and substantially improved structures that exceed 7,500 square feet in the urban growth areas and that exceed 12,000 square feet in the county.

**What is a Limited Supply Sprinkler System?** Limited water supply sprinkler system components are installed in accordance with NFPA 13, NFPA 13R or NFPA 13D as applicable to the occupancy type then connected to a water supply capable of providing the required density for the most remote four sprinkler heads. The system must be central station monitored. It may be used where the adjusted fire flow gpm is less than 500 gpm. See the handout on Limited Supply Systems for additional information.

**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 when the flow exceeds 500 gpm unless the sprinkler system is not otherwise required.

**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.

## Figure B105.1

**Find the fire flow required based on construction type, apply surcharge or credit for occupancy type on Table B105.1 .**

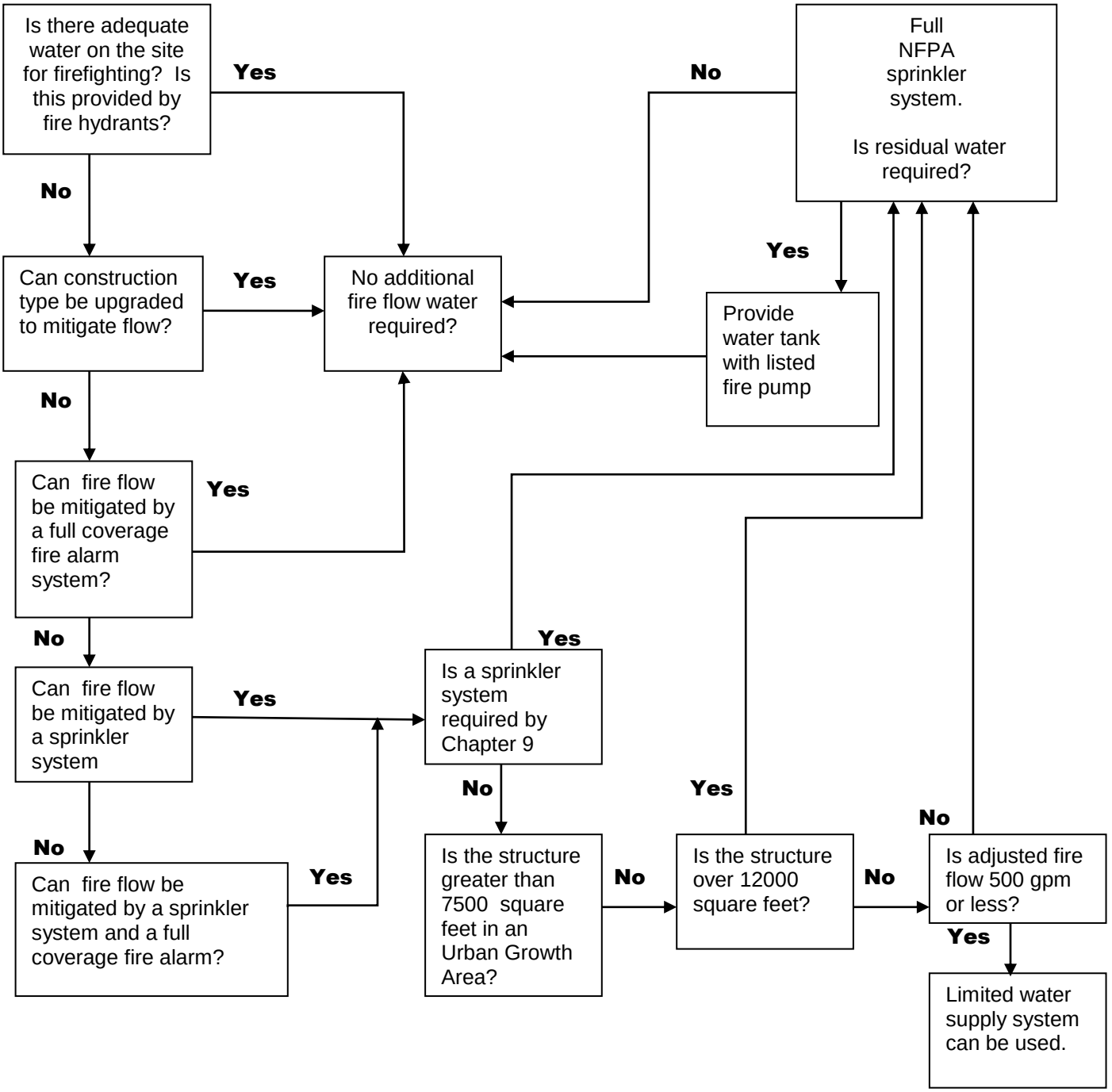

Table 507.6 Fire Pump Listing Determination

| Fire Pump Listing Determination | |
|---|---|
| Fire flow provided by water tanks with fire hydrants on site. | Yes |
| Sprinkler system served by municipal water[1] that can provide adequate pressure and duration. | No |
| Sprinkler system served by municipal water[1] that cannot provide adequate pressure and duration. | Yes |
| Sprinkler systems when adjusted fire flow exceeds 500 gpm, the system is required by IFC Chapter 9, the system is required, the structure is in an Urban Growth Area, or if the square footage exceeds 12,000 square feet. | Yes |
| Limited water supply systems and sprinkler systems where the adjusted fire flow is 500 gallons or less. | No |

[1](Group A and B water systems are not considered municipal water supplies)