



FIRE FLOW ASSESSMENT

Applicable design guidelines:

1. Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection, 2020
2. Ottawa Design Guidelines - Water Distribution (2010) ISTB-2018-02
3. Technical Bulletin ISTB-2021-03

STEP A - Determine the type of construction

Type of construction	Coefficient (C)	Value selected (C)
Fire-resistive construction (> 3 hours)	0.6	0.8
Non-combustible construction	0.8	
Ordinary construction	1.0	
Wood frame construction	1.5	

STEP B - Determine the floor area

Floor / Level	Floor area per level (sq. ft.)	Floor area per level (m ²)
Gross floor area (GFA) ground level	248,581	23094
Total floor area (A)	248,581	23094

STEP C - Determine the height in storeys

Floor / Level	Number of storeys	Percent of floor area considered
Ground level	3	100%
Height in storeys	3	

STEP D - Determine base fire flow (round to nearest 1,000 L/min)

$$F = 220C\sqrt{A}$$

Where:

F is the required fire flow in L/min

C is the coefficient related to the type of construction, and;

A is the total floor area of the building in m²

Coefficient related to type of construction (C) = 0.8

Floor area considered (A) = 69282 m²

REQUIRED (BASE) FIRE FLOW (F) = 46,000 L/min (rounded to nearest 1,000 L/min)



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STEP E = Determine the increase or decrease for occupancy and apply to Step D (Step D x Step E, do not round)

Occupancy Class	Occupancy factor	Value selected (C)
Non-combustible	0.75	1.0
Limited combustible	0.85	
Combustible	1.00	
Free burning	1.15	
Rapid burning	1.25	

REQUIRED (BASE) FIRE FLOW (F) = 46,326 L/min (not rounded)

STEP F - Determine the decrease, if any, for automatic sprinkler protection and apply to value in Step D above (do not round)

Sprinkler system design	Sprinkler design charge	Value selected (C)	Total charge
Automatic sprinkler system conforming to NFPA standards	-30%	Yes	-30%
Standard water supply	-10%	Yes	-10%
Fully supervised system	-10%	Yes	-10%
Additional reduction - adjacent buildings sprinklerd	-25%	No	0%
Total charge for sprinkler system			-50%

DECREASE FOR SPRINKLER PROTECTION = 23,163 L/min (not rounded)

STEP G - Determine the total increase for exposures and apply to value in Step D above (do not round)

Façade	Separation distance (m)	Length-height factor of exposed wall (m-storeys)	Assumed construction of exposed wall of adjacent	Total change (%)
North façade	> 30	N/A	N/A	0%
East façade (fire/party wall)	> 30	N/A	N/A	0%
South façade	> 30	N/A	N/A	0%
West façade	> 30	N/A	N/A	0%
Total charge for exposures				0%

INCREASE FOR EXPOSURES = 0 L/min (not rounded)

STEP H - Determine fire flow including all increases and reductions (Step E + Step F + Step G, round to nearest 1,000 L/min)

TOTAL REQUIRED FIRE FLOW (RFF) =

<u>23,000</u>	L/min (rounded to nearest 1,000 L/min)
<u>383</u>	L/s
<u>6076</u>	USGPM



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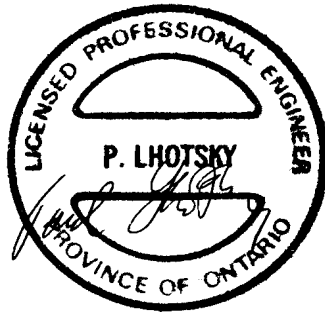
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STEP I - Additional adjustemnt for engineering judgement. Justification: Reduction for ESFR sprinkler: 25%

TOTAL REQUIRED FIRE FLOW (RFF) =	17,000	L/min (<i>rounded to nearest 1,000 L/min</i>)
	283	L/s
	4491	USGPM

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0 to 3 = 25%
3.1 to 10 = 20%
10.1 to 20 = 15%
20.1 to 30 = 10%
30 + = 0%