



Fire Underwriters Survey
A SERVICE TO INSURERS AND MUNICIPALITIES

c/o SCM Opta Information Intelligence

April 8th, 2016

Greater Sudbury Fire Services
239 Montee Principale, Unit 5
Azilda, ON
P0M 1B0

Attention: Trevor Bain, Fire Chief

Fire Underwriters Survey – Corporation of the City of Greater Sudbury

Fire Underwriters Survey is a national organization that represents more than 90 percent of the private sector and casualty insurers in Canada. Fire Underwriters Survey provides data to program subscribers regarding public fire protection for fire insurance statistical and underwriting evaluation.

Fire Underwriters Survey conducted an assessment for each area of the fire defenses primarily for fire insurance grading and classification purposes. The following letter provides a brief description of the grading process.

The Public Fire Protection Classification (PFPC) is a numerical grading system scaled from 1 to 10 that is used by Commercial Lines¹ insurers. Class 1 represents the highest grading possible and Class 10 represents an unrecognized level of fire protection, or fire protection beyond 5 km by road travel distance from the nearest responding fire station. The PFPC grading system evaluates the ability of a community's fire protection programs to prevent and control major fires that may occur in multi-family residential, commercial, industrial, institutional buildings, and course of construction developments.

Fire Underwriters Survey also assigns a second grade for fire protection. The second grading system, entitled Dwelling Protection Grade (DPG), assesses the protection available for small buildings such as single-family dwellings and is used by Personal Lines² insurers.

The DPG is a numerical grading system scaled from 1 to 5. One (1) is the highest grading possible and five (5) indicates little or no fire protection is present; Class 5 also represents fire protection beyond 8 km by road travel distance. This grading reflects the ability of a community to handle fires in small buildings such as single family dwellings and semi-detached dwellings.

We are pleased to inform that our analysis of the City of Greater Sudbury that our fire insurance classification assessment is complete. The following two tables outline past and present Public Fire Protection Classifications and the Dwelling Protection Grades attributed to the City of Greater Sudbury.

1 Commercial Lines: A distinction marking property and liability coverage written for business or entrepreneurial interests (includes institutional, industrial, multi-family residential and all buildings other than detached dwellings that are designated single-family residential or duplex) as opposed to Personal Lines.

2 Personal Lines: Insurance covering the liability and property damage exposures of private individuals and their households as opposed to Commercial Lines. Typically includes all detached dwellings that are designated single family residential or duplex.

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Table 1 – Public Fire Protection Classification (PFPC) Updates for the City of Greater Sudbury

SUB DISTRICT(S) and (contract protection areas)	PFPC Previous	PFPC 2016	COMMENTS
Sudbury Fire Station 1 (H.P.A)	4	4	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall.
Minnow Lake Fire Station 2 (H.P.A)	4	4	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall.
New Sudbury Fire Station 3 (H.P.A)	4	4	Fire Hall Protected – Commercial Lines insured properties within 5km of a fire hall but not within 150 m of a hydrant.
Long Lake Fire Station 4 (H.P.A)	4	4	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall.
Copper Cliff Fire Station 5 (H.P.A)	5	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Waters Fire Station 6 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Lively Fire Station 7 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Whitefish Fire Station 8 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Beaver Lake Fire Station 9 (F.P.A)	9	9	Fire Hall Protected – Commercial Lines insured properties within 5km of a fire hall but not within 150 m of a hydrant.
Azilda Fire Station 10 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall.
Chelmsford Fire Station 11 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall.
Dowling Fire Station 12 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall.
Vermillion Lake Fire Station 13 (F.P.A)	9	9	Fire Hall Protected – Commercial Lines insured properties within 5km of a fire hall but not within 150 m of a hydrant.
Levack Fire Station 14 (H.P.A)	5	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Val Caron Fire Station 15	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Val Therese Fire Station 16 (H.P.A)	6	4	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Hanmer Fire Station 17 (H.P.A)	6	4	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Capreol Fire Station 18 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Garson Fire Station 20 (H.P.A)	6	4	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Falconbridge Fire Station 21 (H.P.A)	4	7P	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Skead Fire Station 22 (F.P.A)	9	9	Fire Hall Protected – Commercial Lines insured properties within 5km of a fire hall but not within 150 m of a hydrant.

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Coniston Fire Station 23 (H.P.A)	6	6	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Wahnapitae Fire Station 24 (H.P.A)	6	5	Hydrant Protected – Commercial Lines insured properties within 150m of a hydrant and within 5 road km of a fire hall
Fire Hall Protected Area	9	9	Fire Hall Protected – Commercial Lines insured properties within 5km of a fire hall but not within 150 m of a hydrant.
Rest	10	10	Rest – Commercial Lines insured property beyond 5 km by road of a fire hall.

Table 2 – Dwelling Protection Grade (DPG) Updates for the City of Greater Sudbury

SUB DISTRICT(S) and (contract protection areas)	DPG Previous	DPG 2016	COMMENTS
Sudbury Fire Station 1 (H.P.A)	1	1	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Sudbury Fire Station 1 (F.P.A)	3B	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Minnow Lake Fire Station 2 (H.P.A)	1	1	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Minnow Lake Fire Station 2 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
New Sudbury Fire Station 3 (H.P.A)	1	1	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
New Sudbury Fire Station 3 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Long Lake Fire Station 4 (H.P.A)	3A	1	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Long Lake Fire Station 4 (F.P.A)	N/A	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Copper Cliff Fire Station 5 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall
Copper Cliff Fire Station 5 (F.P.A)	N/A	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Waters Fire Station 6 (H.P.A)	N/A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall
Waters Fire Station 6 (F.P.A)	N/A	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Lively Fire Station 7 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall
Lively Fire Station 7 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Whitefish Fire Station 8 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall
Whitefish Fire Station 8 (F.P.A)	3B	3B	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Beaver Lake Fire Station 9 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.

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Azilda Fire Station 10 (H.P.A)	2	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall
Azilda Fire Station 10 (F.P.A)	3B	3B	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Chelmsford Fire Station 11 (H.P.A)	2	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall
Chelmsford Fire Station 11 (F.P.A)	3B	3B	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Dowling Fire Station 12 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall
Dowling Fire Station 12 (F.P.A)	3B	3B	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Vermillion Lake Fire Station 13 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Levack Fire Station 14 (H.P.A)	2	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Levack Fire Station 14 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Val Caron Fire Station 15 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Val Caron Fire Station 15 (F.P.A)	3B	3B	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Val Therese Fire Station 16 (H.P.A)	2	2	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Val Therese Fire Station 16 (F.P.A)	3B	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Hanmer Fire Station 17 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Hanmer Fire Station 17 (F.P.A)	3B	3B	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Capreol Fire Station 18 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Capreol Fire Station 18 (F.P.A)	3B	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Garson Fire Station 20 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Garson Fire Station 20 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Falconbridge Fire Station 21 (H.P.A)	3A	5	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Falconbridge Fire Station 21 (F.P.A)	4	5	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Skead Fire Station 22 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Coniston Fire Station 23 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.

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Coniston Fire Station 23 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Wahnapitae Fire Station 24 (H.P.A)	3A	3A	Hydrant Protected – Personal Lines insured properties within 300m of a Fire Hydrant and within 8 road km of a fire hall.
Wahnapitae Fire Station 24 (F.P.A)	4	4	Fire Hall Protected – Personal Lines insured properties within 8 km of a fire hall but not within 300m of a hydrant.
Rest	5	5	Unprotected – Personal Lines insured properties further than 8 km by road of a fire hall.

As indicated in the table above, there are numerous stations that have received downgrades. Stations were downgrades are present reflect deficiencies within the fire insurance grading of Greater Sudbury, as it relates to Volunteer Rosters below 15 firefighters, and apparatus with a service life of over 20 years. Supporting documentation has been provided within the Appendices of this letter to assist the community in restoring their fire insurance classifications back to previous grades, should there be interest in doing so.

Please note that this letter is private and confidential. The underlying data of this report has been developed for fire insurance grading and classification purposes. This letter may be used by the stakeholders to assist in planning the future direction of fire protection services for the City of Greater Sudbury.

Please contact our office if there are any questions or comments regarding the intent or content found throughout this letter.

Robert Aguiar
Senior Public Fire Protection Specialist
Fire Underwriters Survey

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Appendix A

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TECHNICAL BULLETIN

FIRE UNDERWRITERS SURVEY™

A Service to Insurers and Municipalities

FIRE UNDERWRITERS SURVEY RECOMMENDED FREQUENCY OF FIRE PREVENTION INSPECTIONS

The frequency of fire prevention inspections for all occupancies should be specifically appropriate for the level of fire risk within the occupancy. The frequency of inspections will vary from one occupancy to another depending on:

1. Type of occupancy.
2. Occupant load.
3. Function.
4. Grade of hazard

As the fire risk increases, the frequency of inspections should also be increased.

The following table is a minimum frequency guideline for major occupancy classifications from the National Building Code of Canada.

<i>Group - Division National Building Code</i> Occupancy	Minimum Inspection Frequency
A-1	6 months
A-2	6 months
A-3	6 months
A-4	6 months
B-1	6 months
B-2	6 months
C	6 months
D	12 months
E	12 months
F-1	3 months
F-2	6 months
F-3	6 months

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Sample Customized Frequency Schedule

<i>Group - Division National Building Code Occupancy</i>	<i>Inspection Frequency</i>	<i>Group - Division National Building Code Occupancy</i>	<i>Inspection Frequency</i>
A-1 Movie Theaters Theaters	6 months 6 months	C Apartments Boarding Houses Hotels (Unsprinklered) Hotels (Sprinklered) Lodging Houses Motels Residential Schools	6 months 6 months 2 months 4 months 6 months 6 months 6 months
A-2 Bowling Alleys Churches Non-Residential Clubs Community Halls Dance Halls Exhibition Halls Gymnasiums Libraries Licensed Beverage Premises (Unsprinklered) Licensed Beverage Premises (Sprinklered) Museums Restaurants Schools Daycares Undertaker Premises	6 months 6 months 6 months 6 months 6 months 6 months 6 months 6 months 2 months 4 months 6 months 6 months 4 months 6 months 6 months	D Banks Barbers/Hairdressers Beauty Parlours Dental Offices Self-Services Laundries Medical Offices Offices Radio Stations Appliance Service/Rentals	12 months 12 months 12 months 12 months 12 months 12 months 12 months 12 months
A-3 Arenas Rinks Indoor Pools	6 months 6 months 6 months	E Department Stores Shops Stores Supermarkets	12 months 12 months 12 months 12 months
A-4 Stadiums	6 months	F-1 Feed Mills Spray Paint Booths	3 months 3 months
B-1 Jails Police Stations	6 months 6 months	F-2 Warehouses, Service Stations	12 months
B-2 Children's Custodial Homes Hospitals Nursing Homes	2 months 2 months 4months	F-3 Storage Garages, Medical Labs	12 months

For further information regarding frequency of fire prevention inspections for fire insurance grading purposes, please contact a Fire Underwriters Survey office.

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Appendix B

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TECHNICAL BULLETIN

FIRE UNDERWRITERS SURVEY™

A Service to Insurers and Municipalities

Insurance Grading Recognition of Used or Rebuilt Fire Apparatus

The performance ability and overall acceptability of older apparatus has been debated between municipal administrations, the public fire service and many others for years. Fire Underwriters Survey (FUS) has reviewed experiences across Canada and in other countries and has developed a standard for acceptance of apparatus as the apparatus becomes less reliable with age and use.

The public fire service is unique compared to other emergency services in that fire apparatus vehicles are not continuously in use. However, when in use, the apparatus is subject to considerable mechanical stress due to the nature of its function. This stress does not normally manifest itself on the exterior of the equipment. It is effectively masked in most departments by a higher standard of aesthetic care and maintenance. Lack of replacement parts further complicates long term use of apparatus. Truck and pump manufacturers maintain a parts inventory for each model year for a finite time. After that period, obtaining necessary parts may be difficult. This parts shortage is particularly acute with fire apparatus due to the narrow market for these devices.

Fire Underwriters Survey lengthy experience in evaluating fire apparatus indicates that apparatus should be designed to an acceptable standard. The standard that is accepted throughout Canada by Fire Underwriters Survey is the Underwriters' Laboratories of Canada (ULC) Standard S515 (most updated version) titled, "Automobile Fire Fighting Apparatus," which was adopted as a National Standard of Canada in September 2004. Alternatively, NFPA 1901, the Standard for Automotive Fire Apparatus (most updated version) is also accepted by Fire Underwriters Survey with respect to apparatus design. Fire apparatus should be built by recognized manufacturers and tested by a suitably accredited third party.

Fire apparatus should respond to first alarms for the first fifteen years of service. During this period it has reasonably been shown that apparatus effectively responds and performs as designed without failure at least 95% of the time. For the next five years, it should be held in reserve status for use at major fires or used as a temporary replacement for out-of-service first line apparatus. Apparatus should be retired from service at twenty years of age. Present practice indicates the recommended service periods and protocols are usually followed by the first purchaser. However, at the end of that period, the apparatus is either traded in on new apparatus or sold to another fire department. At this juncture, the unit may have one or more faults which preclude effective use for emergency service. These deficiencies include:

- a. Inadequate braking system
- b. Slow pick-up and acceleration
- c. Structurally weakened chassis due to constant load bearing and/or overloading
- d. Pump wear

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FUS has modified its application of the age requirement for used or rebuilt apparatus. Due to municipal budget constraints within small communities we have continued to recognize apparatus over twenty years of age, provided the truck successfully meets the recommended annual tests and has been deemed to be in excellent mechanical condition. The specified service tests are outlined below under the heading “Recommended Service Tests for Used or Modified Fire Apparatus”. Testing and apparatus maintenance should only be completed by a technician who is certified to an appropriate level in accordance with NFPA 1071, *Standard for Emergency Vehicle Technician Professional Qualifications*.

Insurance grading recognition may be extended for a limited period of time if we receive documentation verifying that the apparatus has successfully passed the specified tests. If the apparatus does not pass the required tests or experiences long periods of “downtime” we may request the municipal authority to replace the equipment with new or newer apparatus. If replacement does not occur, fire insurance grading recognition may be revoked for the specific apparatus which may adversely affect the fire insurance grades of the community. This can also affect the rates of insurance for property owners throughout the community.

Table 1 Service Schedule for Fire Apparatus For Fire Insurance Grading Purposes

Apparatus Age	Major Cities ³	Medium Sized Cities ⁴	Small Communities ⁵ and Rural Centres
0 – 15 Years	First Line Duty	First Line Duty	First Line Duty
16 – 20 Years	Reserve	2 nd Line Duty	First Line Duty
20 – 25 Years ¹	No Credit in Grading	No Credit in Grading or Reserve ²	No Credit in Grading or 2 nd Line Duty ²
26 – 29 Years ¹	No Credit in Grading	No Credit in Grading or Reserve ²	No Credit in Grading or Reserve ²
30 Years +	No Credit in Grading	No Credit in Grading	No Credit in Grading

¹ All listed fire apparatus 20 years of age and older are required to be service tested by recognized testing agency on an annual basis to be eligible for grading recognition. (NFPA 1071)

² Exceptions to age status may be considered in a small to medium sized communities and rural centres conditionally, when apparatus condition is acceptable and apparatus successfully passes required testing.

³ Major Cities are defined as an incorporated or unincorporated community that has:

- a populated area (or multiple areas) with a density of at least 400 people per square kilometre; AND
- a total population of 100,000 or greater.

⁴ Medium Communities are defined as an incorporated or unincorporated community that has:

- a populated area (or multiple areas) with a density of at least 200 people per square kilometre; AND/OR
- a total population of 1,000 or greater.

⁵ Small Communities are defined as an incorporated or unincorporated community that has:

- no populated areas with densities that exceed 200 people per square kilometre; AND
- does not have a total population in excess of 1,000.

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Table 2 Frequency of Listed Fire Apparatus Acceptance and Service Tests

	Frequency of Test					
	@ Time of Purchase New or Used	Annual Basis	@ 15 Years	@ 20 Years See Note 4	20 to 25 Years (annually)	After Extensive Repairs See Note 5
Recommended For Fire Insurance Purposes	Acceptance Test if new; Service Test if used & < 20 Years	Service Test	Acceptance Test	Acceptance Test	Acceptance Test	Acceptance or Service Test depending on extent of repair
Required For Fire Insurance Purposes	Acceptance Test if new; Service Test if used & < 20 Years	No Test Required	No Test Required	Acceptance Test	Acceptance Test	Acceptance or Service Test depending on extent of repair
Factor in FUS Grading	Yes	Yes	Yes	Yes	Yes	Yes
Required By Listing Agency	Acceptance Test	No	No	No	N/A	Acceptance Test
Required By NFPA See Note 6	Acceptance Test	Annual Service Test	Annual Service Test	Annual Service Test	Annual Service Test	Service Test

Note 1: See: 'Service Tests for Used or Rebuilt Fire Apparatus' for description of applicable tests

Note 2: Acceptance Tests consist of 60 minute capacity and 30 minute pressure tests

Note 3: Service Tests consist of 20 minute capacity test and 10 minute pressure test in addition to other listed tests

Note 4: Apparatus exceeding 20 years of age may not be considered to be eligible for insurance grading purposes regardless of testing. Application must be made in writing to Fire Underwriters Survey for an extension of the grade-able life of the apparatus.

Note 5: Testing after extensive repairs should occur regardless of apparatus age within reason.

Note 6: Acceptance Tests: See NFPA 1901, Standard for Automotive Fire Apparatus

Service Tests: See NFPA 1911, Standard for Service Tests of Fire Pump Systems on Fire Apparatus, Article 5.1

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SERVICE TESTS FOR USED OR MODIFIED FIRE APPARATUS

The intent of this document is to ensure that all used or modified fire apparatus, equipped with a pump or used for tanker service, essentially meet the requirements of Underwriters' Laboratories of Canada (ULC) "Standard for Automobile Fire Fighting Apparatus" S515-04 or subsequent (current) editions of the Standard. Full adherence with the following specified tests is recommended when purchasing used apparatus.

Weight Tests

Load Balance Test:

When fully laden (including a 460kg (1000 lbs) personnel weight, full fuel and water tanks, specified load of hose and miscellaneous equipment), the vehicle shall have a load balance of 22% to 50% of total vehicle mass on the front axle and 50% to 78% of this mass on the rear axle.

Distribution of mass of 33% and 67% respectively on the front and rear axles is preferable for a vehicle having dual rear tires or tandem rear axles.

For a vehicle having tandem rear axles and dual tires on each axle, a loading of between 18% and 25% on the front axle with the balance of mass on the rear axles is permissible.

Road Tests

Acceleration Tests:

- 2.1.1) From a standing start, the apparatus shall attain a true speed of 55 km/h (35 mph) within 25 seconds for Pumpers carrying up to 3,150 litres (700 gallons) of water.

For apparatus carrying in excess of 3,150 litres (700 gallons) or apparatus equipped with aerial ladders or elevating platforms, a true speed of 55 km/h (35 mph) in 30 seconds should be attained.

- 2.1.2) The vehicle should attain a top speed of at least 80 km/h (50mph).

Braking Test:

The service brakes shall be capable of bringing the fully laden apparatus to a complete stop from an initial speed of 30 km/h (20 mph) in a distance not exceeding 9 metres (30 feet) by actual measurement. The test should be conducted on a dry, hard surfaced road that is free of loose material, oil and grease.

Pump Performance Tests

Hydrostatic Test

Recent evidence of hydrostatic testing of the pump for 10 minutes at a minimum pressure of 3,400 kPa (500 psi). APPLICABLE TO NEW OR REBUILT PUMPS ONLY (see 3.3).

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Priming and Suction Capability Tests

Vacuum Test:

The pump priming device, with a capped suction at least 6 metres (20 feet) long, shall develop -75 kPa (22 inches of mercury) at altitudes up to 300 metres (1000 feet) and hold the vacuum with a drop of not in excess of 34 kPa (10 inches of mercury) in 10 minutes.

For every 300 metres (1000 feet) of elevation, the required vacuum shall be reduced 3.4 kPa (1 inch mercury).

The primer shall not be used after the 10-minute test period has been started. The test shall be made with discharge outlets uncapped.

Suction Capability Test:

The pump (in parallel or series) when dry, shall be capable of taking suction and discharging water with a lift of not more than 3 metres (10 feet) through 6 metres (20 feet) of suction hose of appropriate size, in not more than 30 seconds and not over 45 seconds for 6000 L/min (1320 Igpm) or larger capacity pumps. Where front or rear suction is provided on midship pumps, an additional 10 seconds priming time will be allowed. The test shall be conducted with all discharge caps removed.

Pump Performance

Capacity Test:

Consists of drafting water (preferably with a 10 feet lift) and pumping the rated capacity at 1000 kPa (150 psi) net pump pressure for a continuous period of at least 1 hour.

Pressure Test:

Under the same conditions as in 3.3.1 above pumping 50% of the rated capacity at 1700 kPa (250 psi) net pump pressure for at least ½ hour

For additional information on the above noted tests and test procedures, the following documents provide useful data:

- Underwriters Laboratories of Canada (ULC) publication titled S515 Standard for Automobile Fire Fighting Apparatus, latest edition.
- Fire Underwriters Survey (FUS) publication titled Fire Stream Tables and Testing Data latest edition.

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- International Fire Service Training Association (IFSTA) publication titled Fire Department Pumping Apparatus, latest edition.
- National Fire Protection Association (NFPA) 1901 Standard for Automotive Fire Apparatus, latest edition.
- National Fire Protection Association (NFPA) 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, latest edition.
- National Fire Protection Association (NFPA) 1912 Standard for Fire Apparatus Refurbishing, latest edition.

For further information regarding the acceptability of emergency apparatus for fire insurance grading purposes, please contact:

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Appendix C

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TECHNICAL BULLETIN

FIRE UNDERWRITERS SURVEY™

A Service to Insurers and Municipalities

LADDERS AND AERIALS: WHEN ARE THEY REQUIRED OR NEEDED?

Numerous standards are used to determine the need for aerial apparatus and ladder equipment within communities. This type of apparatus is typically needed to provide a reasonable level of response within a community when buildings of an increased risk profile (fire) are permitted to be constructed within the community.

Please find the following information regarding the requirements for aerial apparatus/ladder companies from the Fire Underwriters Survey Classification Standard for Public Fire Protection.

Fire Underwriters Survey

Ladder/Service company operations are normally intended to provide primary property protection operations such as:

- 1.) Forcible entry;
- 2.) Utility shut-off;
- 3.) Ladder placement;
- 4.) Ventilation;
- 5.) Salvage and Overhaul;
- 6.) Lighting.

Response areas with five (5) buildings that are three (3) stories or 10.7 meters (35 feet) or more in height, or districts that have a Basic Fire Flow greater than 15,000 LPM (3,300 IGPM), or any combination of these criteria, should have a ladder company. The height of all buildings in the community, including those protected by automatic sprinklers, is considered when determining the number of needed ladder companies. When no individual response area/district alone needs a ladder company, at least one ladder company is needed if the sum of buildings in the fire protection area meets the above criteria.

The needed length of an aerial ladder, an elevating platform and an elevating stream device shall be determined by the height of the tallest building in the ladder/service district (fire protection area) used to determine the need for a ladder company. One storey normally equals at least 3 meters (10 feet). Building setback is not to be considered in the height determination. An allowance is built into the ladder design for normal access. The maximum height needed for grading purposes shall be 30.5 meters

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Exception: When the height of the tallest building is 15.2 meters (50 feet) or less no credit shall be given for an aerial ladder, elevating platform or elevating stream device that has a length less than 15.2 meters (50 feet). This provision is necessary to ensure that the water stream from an elevating stream device has additional "reach" for large area, low height buildings, and the aerial ladder or elevating platform may be extended to compensate for possible topographical conditions that may exist. See Fire Underwriters Survey - Table of Effective Response (attached). Furthermore, please find the following information regarding communities' need for aerial apparatus/ladder companies within the National Fire Protection Association.

NFPA

Response Capabilities: The fire department should be prepared to provide the necessary response of apparatus, equipment and staffing to control the anticipated routine fire load for its community.

NFPA Fire Protection Handbook, 20th Edition cites the following apparatus response for each designated condition:

HIGH-HAZARD OCCUPANCIES (schools, hospitals, nursing homes, explosive plants, refineries, high-rise buildings, and other high-risk or large fire potential occupancies):

*At least four pumpers, **two ladder trucks** (or combination apparatus with equivalent capabilities), two chief officers, and other specialized apparatus as may be needed to cope with the combustible involved; not fewer than 24 firefighters and two chief officers.*

MEDIUM-HAZARD OCCUPANCIES (apartments, offices, mercantile and industrial occupancies not normally requiring extensive rescue or firefighting forces):

*At least three pumpers, **one ladder truck** (or combination apparatus with equivalent capabilities), one chief officer, and other specialized apparatus as may be needed or available; not fewer than 16 firefighters and one chief officer.*

LOW-HAZARD OCCUPANCIES (one-, two-, or three-family dwellings and scattered small businesses and industrial occupancies):

*At least two pumpers, **one ladder truck** (or combination apparatus with equivalent capabilities), one chief officer, and other specialized apparatus as may be needed or available; not fewer than 12 firefighters and one chief officer.*

In addition to the previous references, the following excerpt from the 2006 Ontario Building Code is also important to consider when selecting the appropriate level of fire department response capacity and building design requirements with regard to built-in protection levels (passive and active fire protection systems).

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Excerpt: National Building Code 2006

A-3 Application of Part 3.

In applying the requirements of this Part, it is intended that they be applied with discretion to buildings of unusual configuration that do not clearly conform to the specific requirements, or to buildings in which processes are carried out which make compliance with particular requirements in this Part impracticable. The definition of “building” as it applies to this Code is general and encompasses most structures, including those which would not normally be considered as buildings in the layman's sense. This occurs more often in industrial uses, particularly those involving manufacturing facilities and equipment that require specialized design that may make it impracticable to follow the specific requirements of this Part. Steel mills, aluminum plants, refining, power generation and liquid storage facilities are examples. A water tank or an oil refinery, for example, has no floor area, so it is obvious that requirements for exits from floor areas would not apply. Requirements for structural fire protection in large steel mills and pulp and paper mills, particularly in certain portions, may not be practicable to achieve in terms of the construction normally used and the operations for which the space is to be used. In other portions of the same building, however, it may be quite reasonable to require that the provisions of this Part be applied (e.g., the office portions). Similarly, areas of industrial occupancy which may be occupied only periodically by service staff, such as equipment penthouses, normally would not need to have the same type of exit facility as floor areas occupied on a continuing basis. It is expected that judgment will be exercised in evaluating the application of a requirement in those cases when extenuating circumstances require special consideration, provided the occupants' safety is not endangered.

The provisions in this Part for fire protection features installed in buildings are intended to provide a minimum acceptable level of public safety. It is intended that all fire protection features of a building, whether required or not, will be designed in conformance with good fire protection engineering practice and will meet the appropriate installation requirements in relevant standards. Good design is necessary to ensure that the level of public safety established by the Code requirements will not be reduced by a voluntary installation.

Firefighting Assumptions

The requirements of this Part are based on the assumption that firefighting capabilities are available in the event of a fire emergency. These firefighting capabilities may take the form of a paid or volunteer public fire department or in some cases a private fire brigade. If these firefighting capabilities are not available, additional fire safety measures may be required.

Firefighting capability can vary from municipality to municipality. Generally, larger municipalities have greater firefighting capability than smaller ones. Similarly, older, well established municipalities may have better firefighting facilities than newly formed or rapidly growing ones. The level of municipal fire protection considered to be adequate will normally depend on both

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the size of the municipality (i.e., the number of buildings to be protected) and the size of buildings within that municipality. Since larger buildings tend to be located in larger municipalities, they are generally, but not always, favoured with a higher level of municipal protection.

Although it is reasonable to consider that some level of municipal firefighting capability was assumed in developing the fire safety provisions in Part 3, this was not done on a consistent or defined basis. The requirements in the Code, while developed in the light of commonly prevailing municipal fire protection levels, do not attempt to relate the size of building to the level of municipal protection. **The responsibility for controlling the maximum size of building to be permitted in a municipality in relation to local firefighting capability rests with the municipality. If a proposed building is too large, either in terms of floor area or building height, to receive reasonable protection from the municipal fire department, fire protection requirements in addition to those prescribed in this Code, may be necessary to compensate for this deficiency.** Automatic sprinkler protection may be one option to be considered.

The municipality may, in light of its firefighting capability, elect to introduce zoning restrictions to ensure that the maximum building size is related to available municipal fire protection facilities. This is, by necessity, a somewhat arbitrary decision and should be made in consultation with the local firefighting service, who should have an appreciation of their capability to fight fires.

The requirements of Subsection 3.2.3 are intended to prevent fire spread from thermal radiation assuming there is adequate firefighting available. It has been found that periods of from 10 to 30 minutes usually elapse between the outbreak of fire in a building that is not protected with an automatic sprinkler system and the attainment of high radiation levels. During this period, the specified spatial separations should prove adequate to inhibit ignition of an exposed building face or the interior of an adjacent building by radiation. Subsequently, however, reduction of the fire intensity by firefighting and the protective wetting of the exposed building face will often be necessary as supplementary measures to inhibit fire spread.

In the case of a building that is sprinklered throughout, the automatic sprinkler system should control the fire to an extent that radiation to neighboring buildings should be minimal. Although there will be some radiation effect on a sprinklered building from a fire in a neighboring building, the internal sprinkler system should control any fires that might be ignited in the building and thereby minimize the possibility of the fire spreading into the exposed building. NFPA 80A, "Protection of Buildings from Exterior Fire Exposures," provides additional information on the possibility of fire spread at building exteriors.

The water supply requirements for fire protection installations depend on the requirements of any automatic sprinkler installations and also on the number of fire streams that may be needed at any fire, having regard to the length of time the streams will have to be used. Both these factors are largely influenced by the conditions at the building to be equipped, and the quantity and pressure of water needed for the protection of both the interior and exterior of the building must be ascertained before the water supply is decided upon. Acceptable water supplies may be a

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public waterworks system that has adequate pressure and discharge capacity, automatic fire pumps, pressure tanks, manually controlled fire pumps in combination with pressure tanks, gravity tanks, and manually controlled fire pumps operated by remote control devices at each hose station.

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