

Fire Hose Couplings and Fittings

The standardization of fire hose couplings and fittings that enable mutual aid capability between different jurisdictions throughout the province is a recognized need in the fire service. The following information is provided to inform those responsible for purchasing fire hose couplings and fittings of the regulations and the appropriate specifications, and to explain the conversion, if desired, to quick-connect couplings.

Standards for Fire Hose Couplings & Fittings

Purpose of Standards

To encourage fire departments, municipal officials and industry to maintain the existing levels of standardization of threaded fire hose couplings and fittings and to explain how to convert to quick-connect couplings, if desired, without detracting from current levels of standardization.

Background

Until approximately 1952 there were many different thread configurations for 65 mm (2 ½ inch) fire hose couplings and fittings. At that time the Alberta established the Alberta Mutual Aid Thread Regulation covering 65 mm (2 ½ inch) fire hose couplings and fittings. The Province also provided a traveling machine shop which visited every community which had fire fighting apparatus and fire hose and modified or replaced all 65 mm (2 ½ inch) threads to conform with the regulation. The regulation remained in force, with minor modifications, to accommodate metric measurement and new lightweight materials until 1986 when it was rescinded.

The Alberta Mutual Aid Thread Regulation did not apply to any of the other sizes of fire hose couplings and fittings. Despite lack of regulation all 38 mm (1 ½ inch) fire hose couplings and fittings have consistently been standardized throughout Canada and the United States as Straight Iron Pipe Thread (SIPT). This has worked well. Threads for fire hose couplings and fittings larger than 65 mm (2 ½ inch) have normally been NH (American National Fire Hose Connection Screw Thread). Some variations existed between manufacturers of fire apparatus, particularly on the large pumper ports and hard sleeve (suction) hose connections. The thread measurements on pumper ports, hard sleeve hose connections and hydrant pumper ports should be checked closely when ordering replacement items.

Since 1980 the use of quick-connect couplings of various designs have been a matter of increasing interest in Alberta. A separate portion of this document covers the specifications and considerations involved when converting to quick-connect couplings.

Specifications for Threaded Fire Hose Couplings and Fittings

When ordering threaded fire hose couplings and fittings you should make the description of the item specific enough to ensure compatibility. The following are requirements regarding the threads commonly in use:

- 38 mm (1 ½ inch) specify SIPT which stands for Straight Iron Pipe Thread;
- 65 mm (2 ½ inch) specify "Alberta Mutual Aid Thread." You may clarify it further by indicating the threads to be 8 TPI (threads per inch) with a major thread diameter of between 2.990 and 2.980 inches for male threads and 3.010 inches for female threads. For more detailed specifications see Schedule B; and
- for threads larger than 65 mm (2 inch) specify NH unless you specifically require some other thread form for compatibility with existing pumper or hydrant threads, e.g.: "Thibault" thread on an existing pumper.

Specifications for Quick-Connect Fire Hose Couplings & Fittings

For several years quick-connect couplings have been in use in the fire service, particularly on large diameter or high volume hose. The most common has been the "Storz" pattern coupling. At the request of both the Canadian Association of Fire Chiefs and the Association of Canadian Fire Marshals and Fire Commissioners, the Underwriters' Laboratories of Canada prepared a standard for all common sizes of quick-connect couplings, the standard is CAN/ULC-S543-M84, "Internal Lug Quick-Connect Couplings for Fire Hose."

Copies of the standard may be purchased from:

Underwriters' Laboratories of Canada
7 Crouse Road
Scarborough, Ontario, Canada
M1R 3A9
Phone: (416) 757-3611 FAX: (416) 757-9540 E-mail: ulcinfo@ulc.ca

The CAN/ULC-S543-M84 standard covers the following nominal sizes: 38 mm, 65 mm, 100 mm, 125 mm and 150 mm. These nominal sizes of couplings will be used on all common hose sizes. When ordering, specify the nominal size of the coupling or fitting and indicate that it must comply with CAN/ULC-S543-M84.

Considerations for Conversion to Quick-Connect Couplings

In the event that a fire department wishes to convert from threaded to quick-connect couplings and fittings, those responsible for implementing the change should consider the following:

- Will the change reduce the ability of the fire department to connect hoses to local hydrants or building sprinkler/standpipe connections;
- Will all the fire department apparatus be compatible, interconnect hoses, appliances, etc.; and
- Will all fire department apparatus be compatible with neighbouring fire departments, particularly those covered by mutual aid agreements.

Preparation for change to Quick-Connect Couplings

When considering a change to quick-connect couplings it will be necessary to prepare for a complete change of couplings or fittings of a particular size on each individual apparatus.

It is possible to phase in conversion, however, when several pieces of apparatus normally respond together it is advisable to convert all of these units at the same time, e.g.: two pumpers and an aerial or a pumper and tanker which respond together.

When converting 38 mm fire hose couplings and fittings, be prepared to convert not only the fire hose couplings but also the 38 mm discharge outlets, nozzles, wyes and any other appliances with 38 mm connections. Adapters should also be provided on the basis of one set for each 38 mm outlet on each piece of apparatus. A set of adapters is considered to mean two adapters with one being of the male threaded end type and the other of the female threaded end type, each with a quick-connect coupling on the other end.

When converting 65 mm fire hose couplings and fittings, use the same approach as for 38 mm discharge outlet on each piece of apparatus. Unless all fire hydrants are converted at the same time as the apparatus to quick-connect fittings, do not convert the female thread on hydrant gates or hydrant swivels.

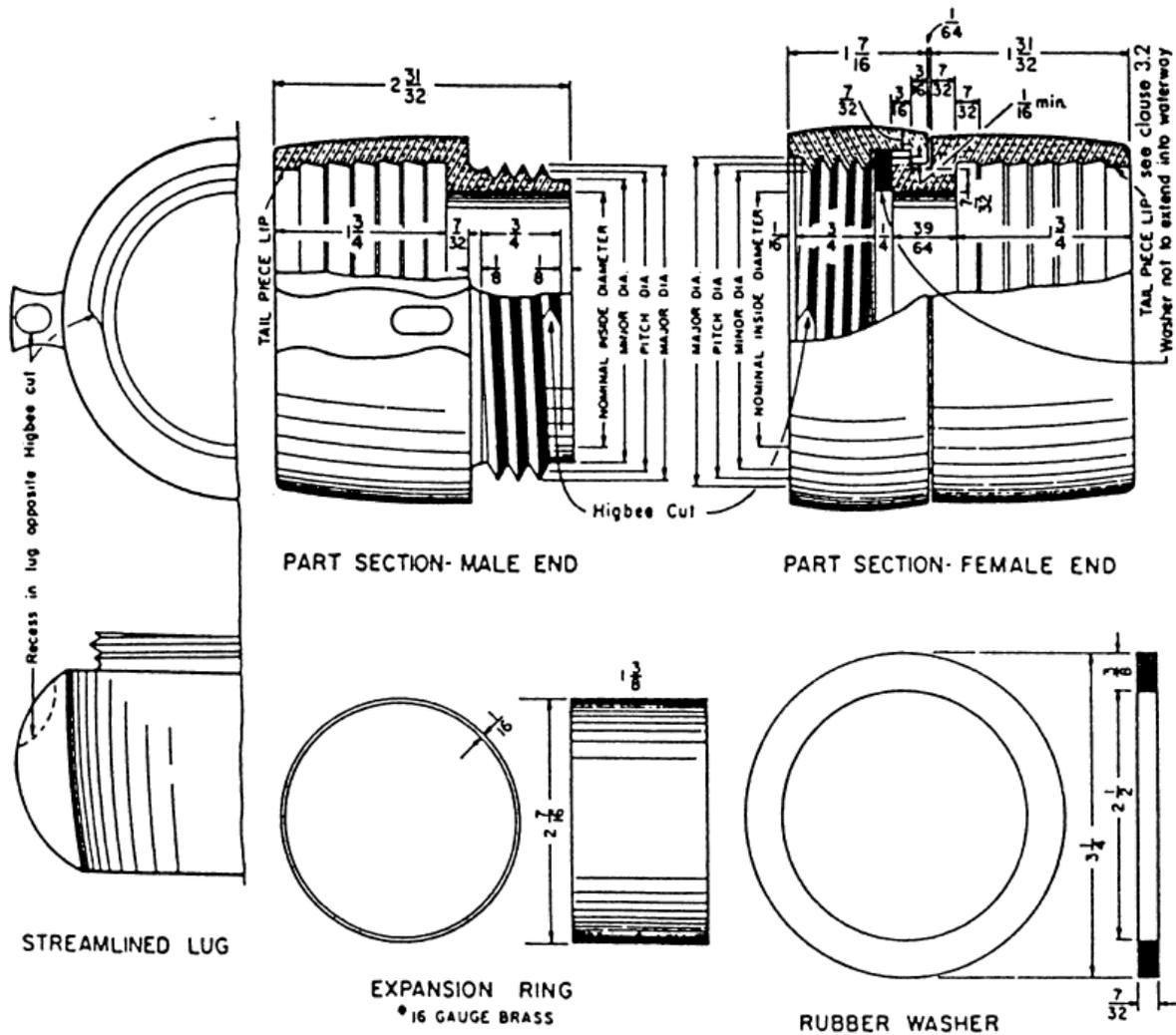
For minimal disruption all conversion activities should be thoroughly planned then implemented quickly. Keep your response requirements in mind at all times.

For sizes larger than 65 mm, adapters should be provided as necessary considering operational requirements.

Sale of Non-Compatible Fire Hose Couplings and Fittings

Any individual becoming aware of threaded or quick-connect fire hose couplings or fittings which are not in accordance with the Alberta Fire Code, is requested to report this to any Alberta Municipal Affairs & Housing office immediately.

SCHEDULE A



Note: All dimensions are given in inches

**ALBERTA MUTUAL AID THREAD FOR 65 mm (2 ½ INCH)
FIRE HOSE COUPLINGS AND FITTINGS**

1. (a) All couplings and fittings shall have a pilot or blank section at the outer end of the male thread and a blank recess at the outer end of the female thread.
(b) The outer ends of both male and female threads shall terminate by the "Higbee Cut" as shown on Schedule A.
(c) To allow for end-wise clearance, the female thread end shall be shorter than the male thread end.
(d) The outer edge of the male pilot end and the inside edge of the female end shall be slightly chamfered.
(e) All demountable couplings and fittings shall be fitted with streamlined key lugs.
2. (a) Hose couplings shall be made and finished in a professional manner throughout.
(b) Any swivel of the female section of a hose coupling shall turn freely by hand.
(c) All edges of a hose coupling shall be chamfered and free from burrs.
(d) In order to prevent the cutting of a hose, the tail piece of a house coupling shall have a rounded inner edge.
3. (a) The termination of the thread at the "Higbee Cut" at the outer ends of both male and female hose couplings shall be in line with one of the key lugs.
(b) The key lugs adjacent to the "Higbee Cut" shall be indented or marked in a manner which will provide easy indication, under any conditions, of the correct relative position of the thread ends when hose couplings are connected.
4. (a) All couplings and fittings shall comply with:
 - (i) the dimensions shown in Schedule A, and
 - (ii) the detailed thread dimensions shown in Schedule B.
(b) The calculation for determining thread form shall be in accordance with Schedule C.
5. The dimensions of the internal lip diameter and core diameter of a tail piece on both male and female hose couplings shall comply with the dimensions shown in Schedule D.
6. All hose couplings must meet the test requirements of ULC-S513, "Threaded Couplings for 1 ½ -and 2 ½ - inch Fire Hose, "for the following:
 - pull test;
 - compression test;
 - hardness test; and
 - corrosion resistance.
7. The weight of a complete set of assembled hose couplings comprising the male and female ends less expansion rings and washers shall not exceed 3 kg.

SCHEDULE B

DIMENSIONS IN INCHES FOR STANDARD THREAD									
Nominal Inside Diameter	Pitch	Major Diameter		Pitch Diameter		Minor Diameter		Threads per inch	Depth of Threads
		Max.	Min.	Max.	Min.	Max.	Min.		
Male Couplings									
2.500	0.125	2.990	2.980	2.909	2.899	2.828		8	0.081
Female Couplings									
2.500	0.125		3.010	2.939	2.929	2.858	2.848	8	0.081

DIMENSIONS IN MILLIMETRES FOR STANDARD THREAD									
Nominal Inside Diameter	Pitch	Major Diameter		Pitch Diameter		Minor Diameter		Threads per inch	Depth of Threads
		Max.	Min.	Max.	Min.	Max.	Min.		
Male Couplings									
63.5	03.18	75.95	75.69	73.89	73.63	71.83		3.15	02.06
Female Couplings									
63.5	03.18		76.45	74.65	74.40	72.59	72.34	3.15	02.00

**SCHEDULE C
ALL MEASUREMENTS IN INCHES**

Thread form shall be calculated as follows:

Thread form = Sixty Degree (60°) Truncated Vee

n = number of threads to the inch

p = pitch of thread

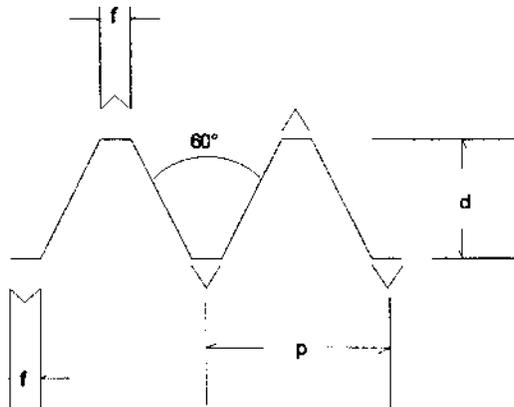
d = depth of thread

f = flat or truncation of thread

$$p = \frac{1}{n} = \frac{1}{8} = 0.125"$$

$$d = 0.649p = \frac{0.6495}{n} = \frac{0.6495}{8} = 0.081"$$

$$f = \frac{p}{8} = \frac{1}{8 \times n} = \frac{1}{8 \times 8} = 0.015"$$



**SCHEDULE D
TAIL PIECE DIMENSIONS**

Lip Diameter Inches (Tolerance plus or minus $\frac{1}{64}$)	Core Diameter* Inches (Tolerance plus or minus $\frac{1}{64}$)
$2 \frac{5}{8}$	$2 \frac{11}{16}$
$2 \frac{11}{16}$	$2 \frac{3}{4}$
$2 \frac{3}{4}$	$2 \frac{13}{16}$
$2 \frac{27}{32}$	$2 \frac{29}{32}$
$2 \frac{15}{16}$	3
3	$3 \frac{1}{16}$
$3 \frac{3}{32}$	$3 \frac{5}{32}$
<p align="center">*Core diameter of the tail piece is measured from the top of the corrugation within the bowl at that point closest to the "back-up washer."</p>	

NOTES:

1. Hose bowl sides shall be parallel.