

CLOW CANADA 2017		04/01/18
	Brigadier Fire Hydrant Operation & Maintenance	Revision: Release 5
		Approved: Rick Benoit

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Brigadier Fire Hydrant Operation and Maintenance Manual



M67 Brigadier / M93 Brigadier / McAvity M67 Dry Barrel Fire Hydrant Operation and Maintenance Manual

Table of Contents

Introduction/Description/Certifications	3-4
3D/2D Parts Illustration & Bill of Materials.....	5-10
Receiving & Handling/Storage.....	11
Identification of Fire Hydrants.....	12-16
McAvity Hydrant Interchangeability Table.....	17
Chronology of Clow Hydrants.....	18
Special Hydrants.....	19
Heritage Style Hydrant.....	19
Ductile Iron Flanged Elbow	19
Monitor Hydrant 3D Explosion	20
In-Line Chamber (Deep D.O.B. Hydrants 14'+) 3D Explosion	21
On-Line Hydrant 3D Explosion	22
Fire Hydrant Ordering Specifications Checklist.....	23
Installation & Testing.....	24
Tools Required for Maintenance/Repair.....	24-27
Pre-Assembled Fire Hydrant Repair Kits	28-32
Instructions for Extending.....	33
Regular Maintenance Procedures.....	34-37
Repair Procedures	37
Hydra-Lube Operating Nut Conversion Kit	37-39
Complete Upper Body & Stem Conversion Kit	40-41
Plugging A Self Draining Hydrant	42
Changing Nozzles	43-44
Troubleshooting Guide	45-46
Warranty.....	47-48

M67 Brigadier / M93 Brigadier / McAvity M67 Dry Barrel Fire Hydrant Operation and Maintenance Manual



Clow Canada's Brigadier fire hydrant incorporates several new design features and improved components for increased performance in firefighting, along with greater durability, economy and convenience. These hydrants are manufactured in Canada to the highest standards of quality. Every unit is hydrostatically tested in accordance with ULC/FM procedure before leaving the Clow factory.

Lubrication is assured through the Brigadier's unique Hydra-lube™ mechanism. The Brigadier can be rotated to any position during or after installation without disturbing the internal working mechanism. The rugged Brigadier fire hydrant stands up easily to traffic damage. It is designed for easy upkeep, repair and replacement of parts; its internal assembly can be removed and replaced in 20 minutes, without excavation. Alternative design options and accessories serve a wide range of municipal and industrial needs. The Brigadier's advantages include:

- ✓ **Complete inter-changeability with previous M-67 and M-59-M model hydrants**
- ✓ **Conforms to AWWA C502 specifications**
- ✓ **All hydrants are ULC listed & FM approved**
- ✓ **Efficient compression-type hydrant**

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- ✓ **Factory-lubricated operating mechanism effectively O-ring sealed for long and efficient operation**
- ✓ **Very low opening and closing torques**
- ✓ **Automatic drainage**
- ✓ **Available quick connect Storz hose & pumper connections**
- ✓ **Positive sealing with O-rings at operating nut, operating housing, bronze casing and seat**
- ✓ **Durable and positive seating**
- ✓ **Easy multiple positioning**
- ✓ **Safety stem coupling and four safety segments**
- ✓ **Internal parts easily removed -bury easily increased ·**
- ✓ **Threaded hose and pumper nozzles -simple replacement if needed**

Clow Canada is committed to the manufacture and delivery of superior products, supported by superior services. Strict quality control measures govern every step of the manufacturing process, to ensure precision and consistency. We provide the knowledge, the technology and the products to serve industry's changing needs, efficiently and effectively. For more information about our products or services, please contact the Clow Canada sales office.

250 PSI



Factory Mutual Approved

APPROVED

HAMILTON, ONTARIO

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www.clowcanada.com



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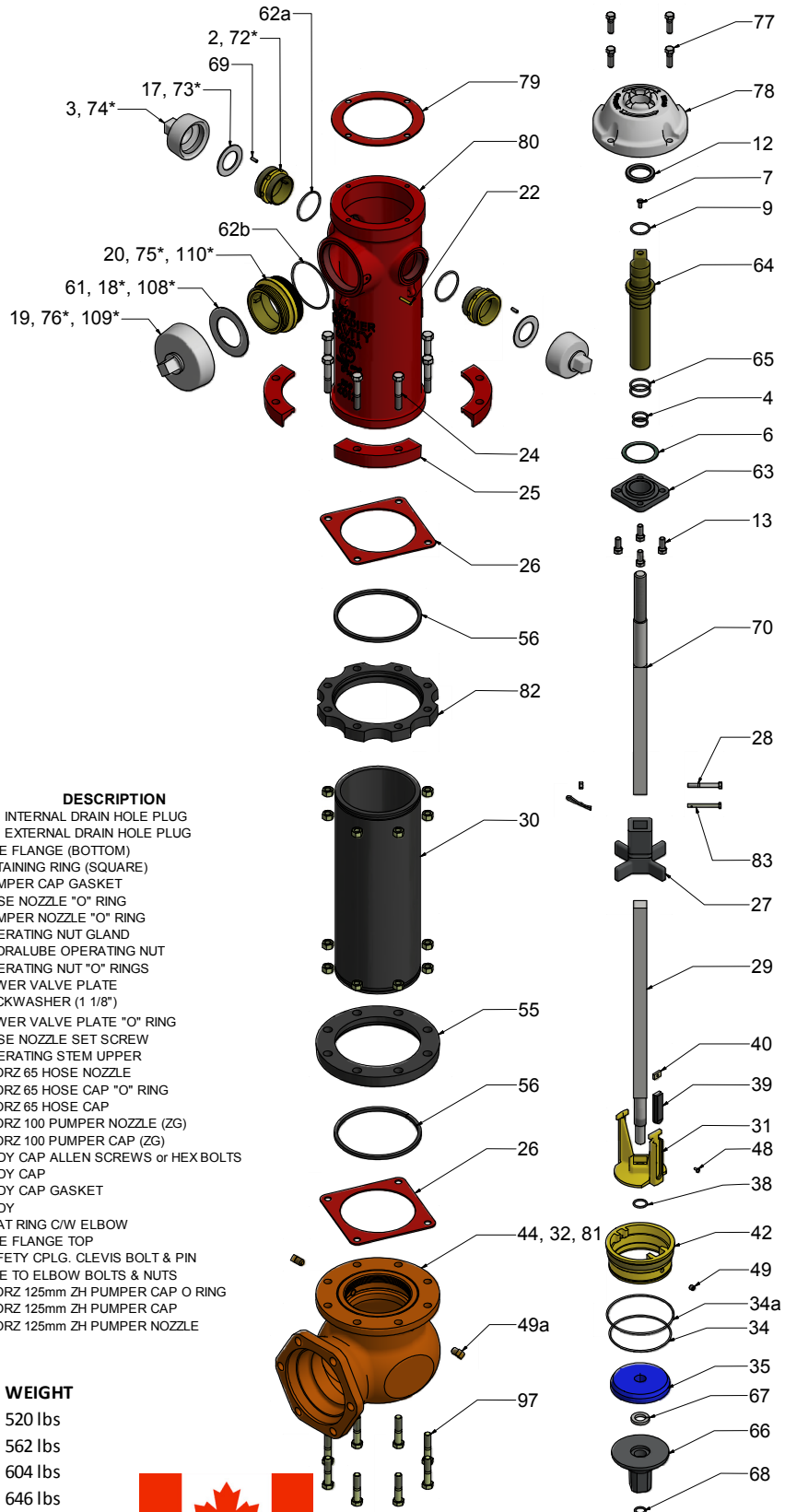
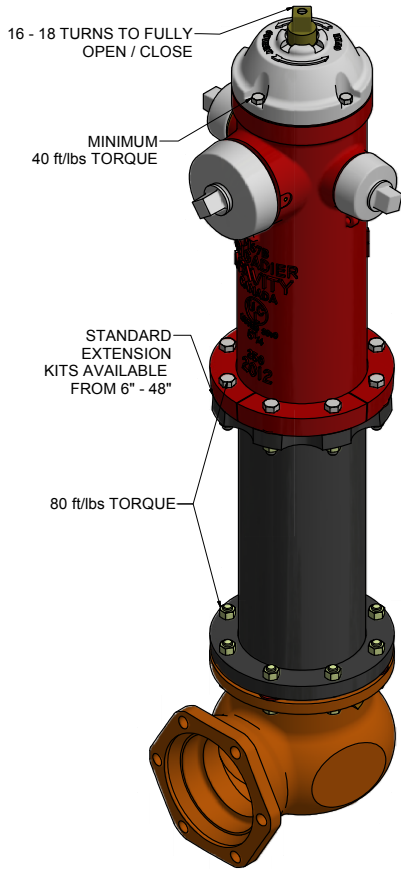
SALES DESK

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BRIGADIER

250 PSI FM APPROVED



REF #	DESCRIPTION
2	HOSE NOZZLE
3	HOSE NOZZLE CAP
4	HOUSING STEM "O" RINGS
6	HOUSING JOINT GASKET
7	OIL HOLE SCREW
9	OPERATING NUT "O" RING
12	OPERATING NUT BEARING
13	RET. GLAND HEX BOLT (1/2" x 1 1/4")
17	HOSE CAP GASKET
18	STORZ 100 PUMPER CAP "O" RING
19	PUMPER NOZZLE CAP
20	PUMPER NOZZLE
21*	PUMPER CAP CHAIN & "S" HOOK
22	PUMPER NOZZLE PIN
24	INTERSECTION BOLTS & NUTS
25	SAFETY FLANGE (SEGMENTS)
26	INTERSECTION GASKET
27	SAFETY COUPLING
28	SAFETY COUPLING BOLT & NUT
29	OPERATING STEM LOWER
30	INTERMEDIATE SECTION
31	DRIP VALVE
32	DRAIN HOLE LINING C/W ELBOW
34	SEAT "O" RING BOTTOM
34a	SEAT "O" RING TOP
35	MAIN VALVE DISC
38	MAIN VALVE "O" RING
39	DRIP VALVE FACING
40	HOLDING CLAMP
42	MAIN VALVE SEAT
44	ELBOW (STATE INLET REQUIRED)
48	HOLDING CLAMP SCREW

REF #	DESCRIPTION
49*	1/4" INTERNAL DRAIN HOLE PLUG
49a*	3/8" EXTERNAL DRAIN HOLE PLUG
55	PIPE FLANGE (BOTTOM)
56	RETAINING RING (SQUARE)
61	PUMPER CAP GASKET
62a	HOSE NOZZLE "O" RING
62b	PUMPER NOZZLE "O" RING
63	OPERATING NUT GLAND
64	HYDRALUBE OPERATING NUT
65	OPERATING NUT "O" RINGS
66	LOWER VALVE PLATE
67	LOCKWASHER (1 1/8")
68	LOWER VALVE PLATE "O" RING
69	HOSE NOZZLE SET SCREW
70	OPERATING STEM UPPER
72*	STORZ 65 HOSE NOZZLE
73*	STORZ 65 HOSE CAP "O" RING
74*	STORZ 65 HOSE CAP
75*	STORZ 100 PUMPER NOZZLE (ZG)
76*	STORZ 100 PUMPER CAP (ZG)
77	BODY CAP ALLEN SCREWS or HEX BOLTS
78	BODY CAP
79	BODY CAP GASKET
80	BODY
81	SEAT RING C/W ELBOW
82	PIPE FLANGE TOP
83	SAFETY CPLG. CLEVIS BOLT & PIN
97	PIPE TO ELBOW BOLTS & NUTS
108*	STORZ 125mm ZH PUMPER CAP O RING
109*	STORZ 125mm ZH PUMPER CAP
110*	STORZ 125mm ZH PUMPER NOZZLE

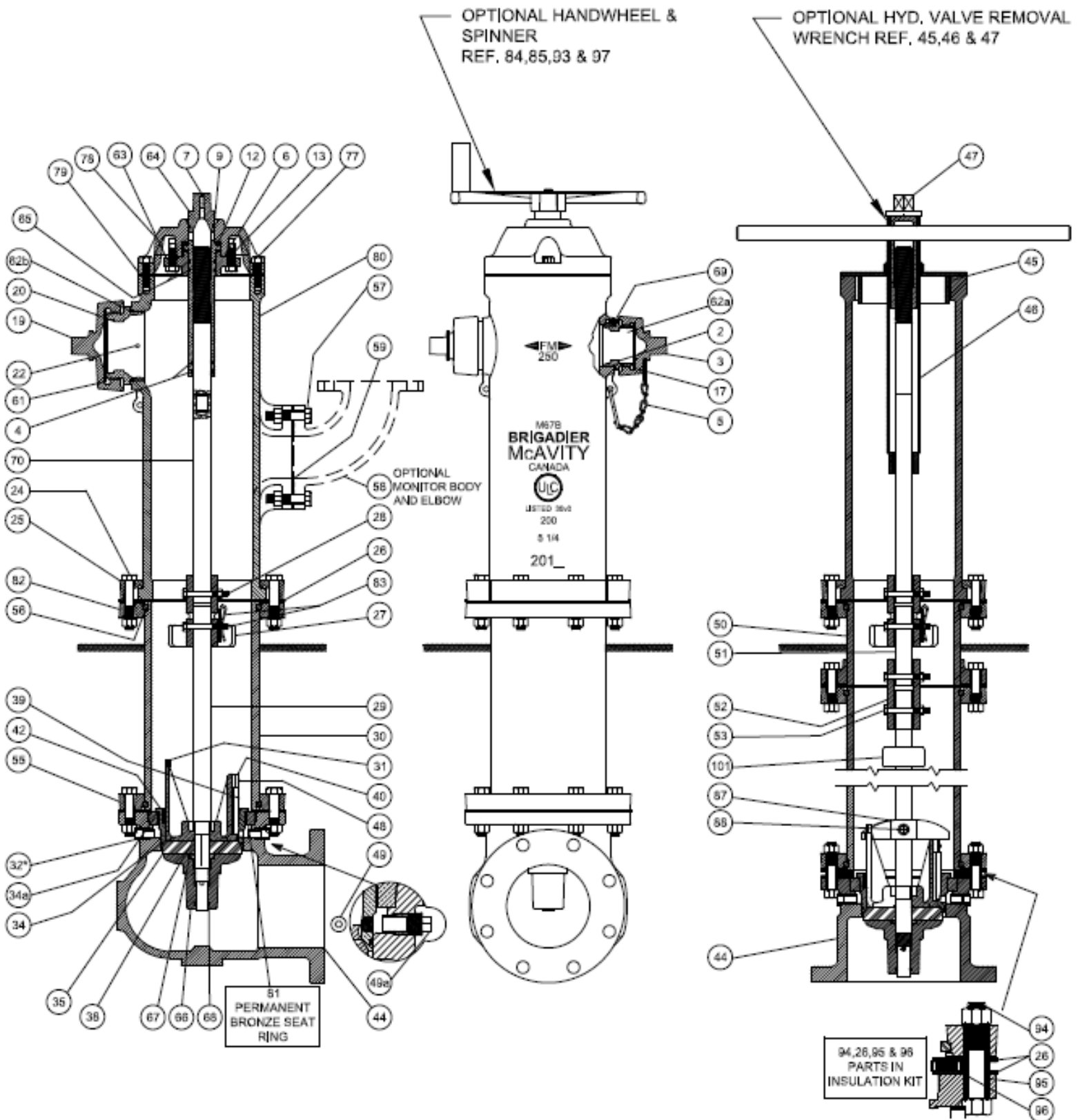
* OPTIONAL PARTS

HYDRANT DEPTH	WEIGHT
6 Feet	520 lbs
7 Feet	562 lbs
8 Feet	604 lbs
9 Feet	646 lbs

MADE IN CANADA



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IN SERVICE 1993 - PRESENT
ANSI/NSF 61 and ANSI/NSF 372
PRESSURE RATING - **UC** 200 PSI / **FM** 250 PSI

M67B BRIGADIER HYDRANT

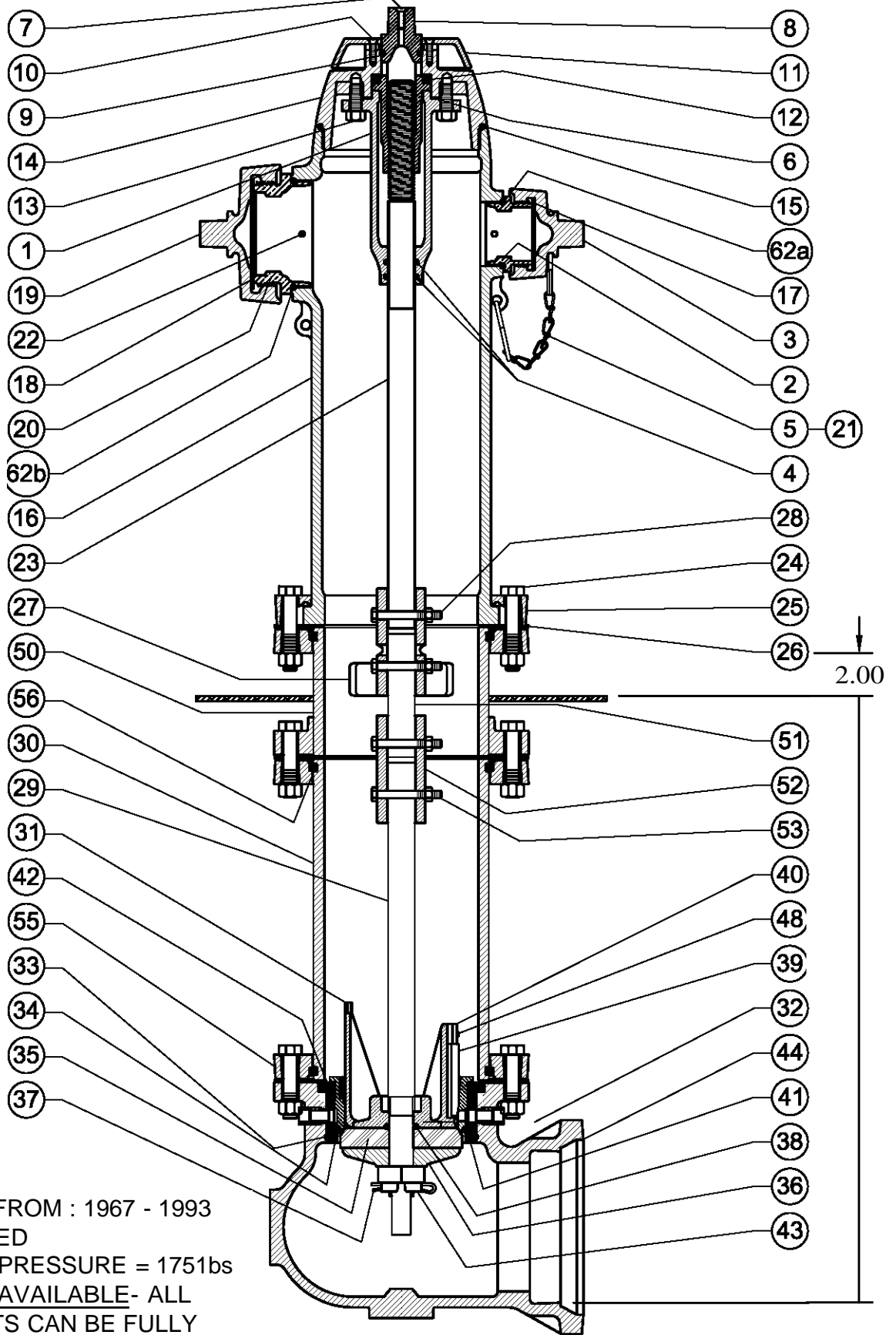
M67 / M93/ MONITOR & HERITAGE BRIGADIER HYDRANT PARTS LIST

[RETURN TO CONTENTS](#)

REF	DESCRIPTION	MATERIAL	REF	DESCRIPTION	MATERIAL
2	HOSE NOZZLE	COPPER ALLOY	72	63mm (2-1/2") Storz Hose Nozzle	BRASS
3	HOSE NOZZLE CAP	CAST IRON	73	Storz Hose Cap "O" Ring	BUNA - N
4	HOUSING STEM "O" RINGS	BUNA - N	74	63mm (2-1/2") Storz Hose Cap	CAST IRON
5	HOSE CAP CHAIN & "S" HOOK 2H1P	STEEL Z.P.	75	(4") 100 mm Storz Pumper Nozzle (SS)	18-8 STAINLESS STEEL
6	HOUSING JOINT GASKET	COMPRESSED NON-ASBESTOS	76	(4")Storz Pumper Cap	CAST IRON
7	OIL HOLE SCREW	BRASS	77	BODY CAP ALLEN SCREWS OR HEX BOLTS	18-8 STAINLESS STEEL
9	OPERATING NUT "O" RING	BUNA - N	78	BODY CAP	CAST IRON
12	OPERATING NUT BEARING	DELTRIN	79	BODY CAP GASKET	RED RUBBER
13	CAP SCREW 1/2" x 1 1/4"(RET. GLD. BOLTS)	STEEL Z.P.	80	BODY EPOXY COATED	CAST IRON
17	HOSE CAP GASKET	RED RUBBER	81*	SEAT RING	COPPER ALLOY
18	Storz Pumper Cap "O" Ring	BUNA - N	82	PIPE FLANGE (TOP)	CAST IRON
19	Pumper Cap	CAST IRON	83	SAFETY COUPLING CLEVIS BOLT & PIN	STEEL Z.P.
20	Pumper Nozzle	COPPER ALLOY	84	14" DIA. HANDWHEEL W/ SPINNER ASS'Y	CAST IRON
22	PUMPER NOZZLE PIN	BRASS	85	1/2"x3" BOLT W/SPINNER	18-8 STAINLESS STEEL
24	INTERSECTION BOLTS & NUTS	STEEL	87	ON-LINE SPIDER	CAST IRON
25	SAFETY FLANGE SEGMENTS	CAST IRON	88	HEX HD BOLT 3/8"X1-1/4" 18-8 SS	18-8 STAINLESS STEEL
26	INTERSECTION GASKET	RED RUBBER	90	125mm STORZ PUMPER NOZ EXT "O" RING	BUNA - N
27	SAFETY COUPLING	CAST IRON	91*	6" ONLINE CHAMBER - ANSI B16.1 FF FLG.	CAST IRON
28	SAFETY COUPLING BOLT & NUT (3/8"x3")	STEEL Z.P.	91*	8" ONLINE CHAMBER - ANSI B16.1 FF FLG.	CAST IRON
29	LOWER OPERATING STEM (6' bury)	STEEL	93	5/16"x1" HEX BOLT	STEEL Z.P.
30	INTERMEDIATE SECTION EPOXY CPATED	DUCTILE IRON	ASS'Y (95,95,96 & 26(x2)*	1/4" THICK - NORTHERN INSULATION KIT	PHENOLIC / RED RUBBER
31	DRIP VALV- ASS'Y (#S 31,39,40,48)	COPPER ALLOY (#31)	97	11/32"x1 1/2" FLAT WASHER	STEEL Z.P.
32*	DRAIN HOLE LINING	BRASS	101	ZINC ANODE	
34a	MAIN VALVE SEAT "O" RING (UPPER)	BUNA - N	108	(5") 125mm STORZ PUMPER CAP "O" RING	BUNA - N
34	MAIN VALVE SEAT "O" RING (LOWER)	BUNA - N	109	(5") 125mm STORZ PUMPER CAP	CAST IRON
35	MAIN VALVE DISC	RUBBER or POLYURETHANE	110	(5") 125mm STORZ PUMPER NOZZLE	COPPER ALLOY
38	MAIN VALVE "O" RING	BUNA - N	67	MAIN VALVE LOCKWASHER	18-8 STAINLESS STEEL
39	DRIP VALVE RUBBER	RUBBER	68	LOWER VALVE PLATE "O" RING	BUNA - N
40	HOLDING CLAMP	PLASTIC	69	HOSE NOZZLE SET SCREW	18-8 STAINLESS STEEL

42	MAIN VALVE SEAT	COPPER ALLOY	70	UPPER OPERATING STEM	416 MX ST. STL.
44*	6" HYDRANT INLET FLG/TYTON/ MJ -	CAST IRON	71	(4") 100mm Storz Pumper Nozzle - brass	BRASS
45&46	INTERIOR WRENCH & GUIDE		72	63mm (2-1/2") Storz Hose Nozzle	BRASS
47	HOLDING NUT (CONFIRM LH OR RH)		73	Storz Hose Cap "O" Ring	BUNA - N
48	HOLDING CLAMP SCREW	BRASS	74	63mm (2-1/2") Storz Hose Cap	CAST IRON
49	1/4" INTERNAL DRAIN HOLE PLUG	BRASS	75	(4") 100 mm Storz Pumper Nozzle (SS)	18-8 STAINLESS STEEL
49a	3/8" EXTERNAL DRAIN HOLE PLUG	BRASS	76	(4")Storz Pumper Cap	CAST IRON
50	INTERSECTION EXTENSION @ GRADE	DUCTILE IRON	77	BODY CAP ALLEN SCREWS OR HEX BOLTS	18-8 STAINLESS STEEL
51	EXTENSION STEM @ GRADE	STEEL	78	BODY CAP	CAST IRON
52	ALIGNMENT COUPLING	CAST IRON	79	BODY CAP GASKET	RED RUBBER
53	EXTENSION STEM BOLT & NUT	STEEL Z.P.	80	BODY EPOXY COATED	CAST IRON
55	PIPE FLANGE (BOTTOM)	CAST IRON	81*	SEAT RING	COPPER ALLOY
56	RETAINING RING (SQUARE)	STEEL Z.P.	82	PIPE FLANGE (TOP)	CAST IRON
57	MONITOR BOLTS & NUTS (5/8"x2 3/4")	18-8 STAINLESS STEEL	83	SAFETY COUPLING CLEVIS BOLT & PIN	STEEL Z.P.
58	MONITOR ELBOW- 3" 90 DEG C110 D.I. FF FLG	CAST IRON	84	14" DIA. HANDWHEEL W/ SPINNER ASS'Y	CAST IRON
59	MONITOR ELBOW-GASKET	RUBBER	85	1/2"x3" BOLT W/SPINNER	18-8 STAINLESS STEEL
61	PUMPER CAP GASKET - SMALL	RUBBER	87	ON-LINE SPIDER	CAST IRON
	PUMPER CAP GASKET - LARGE	RUBBER	88	HEX HD BOLT 3/8"X1-1/4" 18-8 SS	18-8 STAINLESS STEEL
62a	HOSE NOZZLE "O" RING	BUNA - N	90	125mm STORZ PUMPER NOZ EXT "O" RING	BUNA - N
62b	PUMPER NOZZLE "O" RING	BUNA - N	91*	6" ONLINE CHAMBER - ANSI B16.1 FF FLG.	CAST IRON
63	OPERATING NUT RETAINING GLAND	CAST IRON	91*	8" ONLINE CHAMBER - ANSI B16.1 FF FLG.	CAST IRON
64	HYDRALUBE OPERATING NUT	COPPER ALLOY	93	5/16"x1" HEX BOLT	STEEL Z.P.
65	RETAINING GLAND "O" RINGS	BUNA - N	ASS'Y (95,95,96 & 26(x2)*	1/4" THICK - NORTHERN INSULATION KIT	PHENOLIC / RED RUBBER
66	LOWER VALVE PLATE	CAST IRON	97	11/32"x1 1/2" FLAT WASHER	STEEL Z.P.
67	MAIN VALVE LOCKWASHER	18-8 STAINLESS STEEL	101	ZINC ANODE	
68	LOWER VALVE PLATE "O" RING	BUNA - N	108	(5") 125mm STORZ PUMPER CAP "O" RING	BUNA - N
69	HOSE NOZZLE SET SCREW	18-8 STAINLESS STEEL	109	(5") 125mm STORZ PUMPER CAP	CAST IRON
70	UPPER OPERATING STEM	416 MX ST. STL.	110	(5") 125mm STORZ PUMPER NOZZLE	COPPER ALLOY
71	(4") 100mm Storz Pumper Nozzle - brass	BRASS			

*** PERMANENTLY ASSEMBLED PARTS SUPPLIED WITH ELBOW Ref. No. 44 / ** SUPPLIED AS ASSEMBLY ONLY**



MANUFACTURED FROM : 1967 - 1993
 ULC / FM APPROVED
 RATED WORKING PRESSURE = 1751bs
 CONVERSION KIT AVAILABLE- ALL
 REMOVABLE PARTS CAN BE FULLY
 UPGRADED TO THE CURRENT M67/M93
 BRIGADIER MODELS- WITHOUT
 EXCAVATING.

**M67HYDRANT
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McACIVITY M67 PARTS LIST

REF	DESCRIPTION	PRODUCT CODE
1	OPERATING HOUSING (now RETAINING GLAND W/ OP. NUT 63 & 64)	
2	HOSE NOZZLE	
2A	NOZZLE ORING	T8100214
3	HOSE CAP	
4	HOUSING STEM ORING	T8100207
6	HOUSING JOINT GASKET	T8107782
7	OIL HOLE SCREW	T8100131
8	DISCONTINUED SEE PART # 64 *OP NUT-SEE BELOW	F8100872
9	OPERATING NUT ORING	T8100210
10	BODY COVER SCREWS	T8100152
11	BODY COVER	O/L M8101508 O/R M8101509
12	NEEDLE BEARING	R8103346
13	HOUSING CAP SCREWS	T8100032
14	BODY CAP	M8101507
15	BODY CAP ORING	T8100221
16	UPPER BARREL 2H1P	THREADED BODY DISCONTINUED
17	HOSE CAP GASKET	T8107473
18	PUMPER CAP GASKET	T8100243 / T810244
19	PUMPER CAP	
20	PUMPER NOZZLE	
20A	PUMPER NOZZLE ORING	T8100217
22	NOZZLE PIN (SAME AS BRIGADIER)	F8100942
23	DISCONTINUED SEE PART #70 page 1	O/L A8104781
24	INTERSECTION BOLTS & NUT	R8103201
25	SAFETY FLANGE SEGMENTS	M8101510
26	INTERSECTION GASKET	T8100240
27	SAFETY COUPLING	M8101511
28	COUPLING BOLTS & NUT	SET OF 2 R8103200
29	LOWER STEM 6'0" BURY	M8101450
30	LOWER BARREL 6'0" BURY	A8104110
31	DRIP VALVE ASSEMBLED	F8100947
32	DRAIN HOLE LINER	1-13/32" T8100438 1-19/32" T8105965
33	SEAT CASING ORING	T8100220
34	LOWER SEAT ORING	T8100218
34A	UPPER SEAT ORING	T8100219
35	MAIN VALVE RUBBER - BUNA	T8100444
36	MAIN VALVE WASHER	M8100932
37	COTTER PIN	T8100139
38	MAIN VALVE ORING	T8100206
39	DRIP VALVE FACING	T8100443
40	DRIP VALVE FACING CLAMP	T8100442
41	SEAT CASING **OBSOLETE**	NOT OFFERED
42	MAIN VALVE SEAT	F8100933
43	MAIN VALVE LOCKNUT	F8100934
44	INLET BOOT (STATE JOINT TYPE)	
48	HOLDING CLAMP SCREW	T8100133
63	RETAINING GLAND	M8104776
64	HYDRALUBE OPERATING NUT	F8104760
70	UPPER OPERATING STEM	A8104781

RECEIVING & HANDLING /STORAGE

When **receiving** new fire hydrants, ensure the product received is correct and properly handled.

Check for damage during shipping

Check to ensure correct operating nuts & direction to open

Check to ensure nozzle thread configuration matches order (see photo page 13) Check to ensure depth of bury & inlet type / size are correct

(see drawing page 7 & 14)

Check to ensure smooth & free operation with 16 – 18 turns before installation. Check to ensure there are no loose bolts or nuts

When **handling & storing** fire hydrants please observe the following:



8'6" bury hydrants shown above

Hydrants range in length from 4' to 35' long in some cases. Special care must be taken during handing. Longer hydrants should always ship on a flatbed truck. Hydrants should never be dragged or dropped when moving.

Hydrants should be stored and moved on factory packaging when possible until ready for installation. Hydrants should be stored in closed position with all caps tightly secured & inlet boot facing down. Hydrants being stored for over 30 days should be protected further from the elements. Prior to installation hydrants must be re-inspected.

Please refer to page (23) for a checklist of important information to convey when **ordering** or communicating hydrant information.

DEPTH OF BURY

Clow Canada measures the depth of bury of fire hydrants in accordance with AWWA C502 which states "the length of bury is the distance measured to the nearest half foot from the bottom of the connecting pipe to the ground line of the hydrant". See illustration page 7.

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FIRE HYDRANT IDENTIFICATION



Note: Identification should always start with the year of manufacture. This will be clearly cast on the hydrant body, along with other important data.

HERITAGE STYLE HYDRANT – shown on the left above has a nostalgic McAvity shape but uses all current standard parts from 1996 to present (see page 6). Octagonal body & bonnet, hose & pumper caps are the only difference between this & the standard round body hydrant (above center).

This hydrant shares a common shape with the older McAvity M59 & M59M models but can be easily identified by the 4 ground line flange segments (#25).

M67B BRIGADIER / M93B BRIGADIER - shown center are the current standard Clow hydrants. Both models share standard internal & external parts (see page 6). The difference is the (# 80) upper barrel only, where the model name is clearly cast. This hydrant was introduced into service in 1995

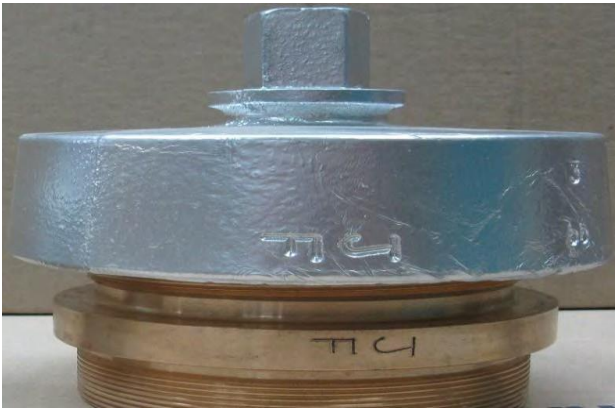
McAVITY M67 shown on the right (above) went into service in 1967. The parts breakdown is shown on Page 9 & 10. Although there have been many improvements over the years the original hydrants parts are largely interchangeable with the current design. When a major overhaul is required, M67 hydrants never need to be removed from the system by excavating, as hydrant conversion kits are available to replace 85% of the hydrant from the surface. Contact your Clow Canada sales representative for details or visit www.clowcanada.com to view instructional videos on converting old hydrants to New.

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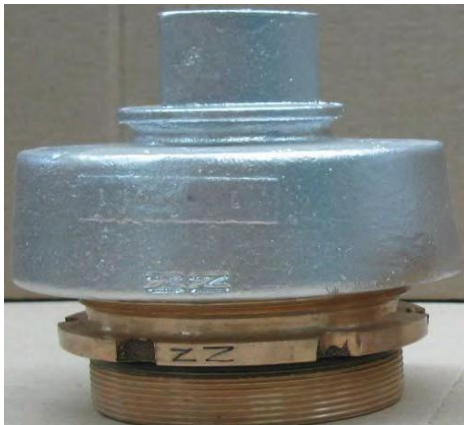
PUMPER & HOSE NOZZLE CONNECTIONS

In addition to the hydrant model & year of manufacture, it is critical to properly identify the hose nozzle and pumper nozzle thread specification.

Clow Canada identifies threads using a one or two letter code located on the hose and pumper Nozzle & caps.

Nozzle & cap code **must match** to ensure Proper fit.

These codes simplify the process purchasing replacement parts & complete hydrants.



Pictures above showing
Hose / pumper nozzle & matching cap.
STAMPING LOCATIONS



STORZ PUMPER & HOSE NOZZLE CONNECTIONS

Storz connections are increasingly popular & enable firefighting equipment to be attached to hydrants without the need for threaded connections.

Lugs are used to lock the nozzle to the attaching equipment. Standard Storz pumper nozzles are available in 100mm (4") & 125mm (5") and Storz hose nozzles are available in 62.5mm (2.5").



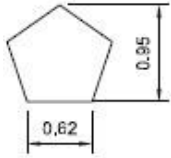
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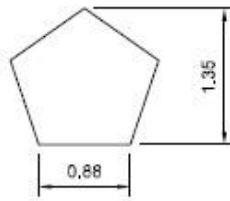
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COMMON OPERATING NUT SHAPES

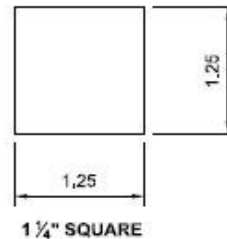
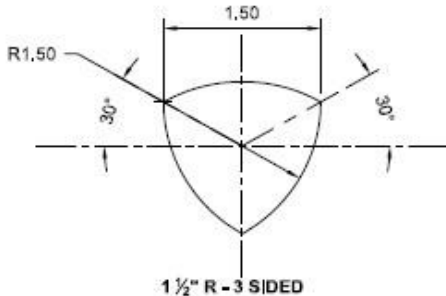
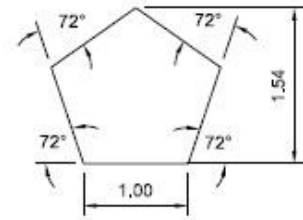
5/8"-5 SIDED
(1 1/8" - P)



7/8"-5 SIDED
(1 3/8" - P)

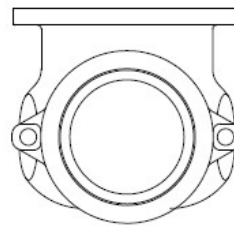
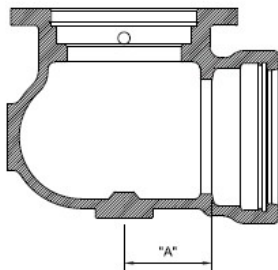


1"-5 SIDED
(1 1/2" - P)

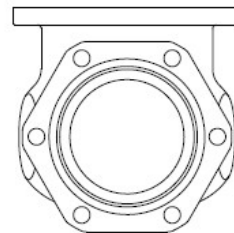
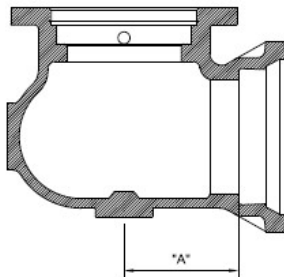


COMMON INLET STYLES

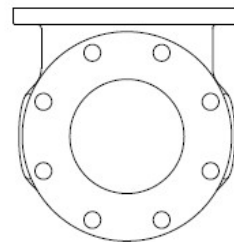
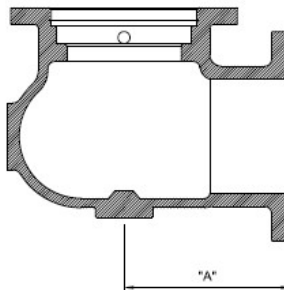
JOIN-TITE



MECHANICAL JOINT



FLANGED



STYLE & SIZE	DIMENSION "A"	
	6"	8"
JOIN-TITE	4.62	
MECHANICAL JOINT	6	7.5
FLANGED	8.75	

COMMON HYDRANT ELBOWS

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Flanged inlets are available in cast or ductile iron with 150 or 250 lb drilling

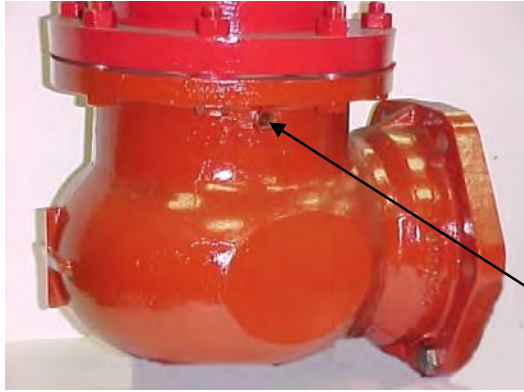


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AUTOMATIC DRAINING & PLUGGED FIRE HYDRANTS

Fire hydrants are available self-draining or non-draining (plugged).

When a hydrant is ordered plugged externally, two 3/8" NPT plugs are factory installed in the hydrant boot as shown below



2 plugs @ 180 degrees

Once the hydrant is buried this is a permanent condition.

CHANGING AUTOMATIC DRAINING HYDRANTS TO PLUGGED

Fire hydrants that have been installed as self-draining can be changed over to internally plugged, by adding a 1/4" NPT plug to the (#42) main valve seat. See page 42 for complete step by step procedure.

McAVITY HYDRANT INTERCHANGEABILITY

Refer to the interchangeability table on page 17 to see which parts are common between different models of McAvity hydrants from 1959 up to the present day.

The item numbers shown on the table are standardized across the latest M67 hydrant models (see drawings pages 8- 12).

A **yes** across the row would indicate the part is common to all hydrant models shown at the top.

Below are pictures of the M59 & M59M models (in service from 1959 – 1967)

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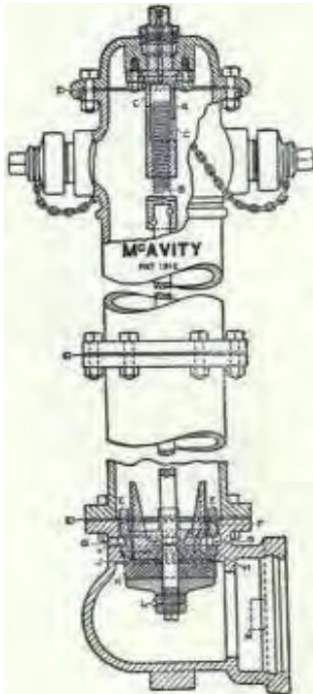
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F1g. M-59-M



McAVITY'S IMPROVED FIRE HYDRANT

Patented 1919

Adopted as Standard, August 1919

In the construction of our improved Fire Hydrant the most advanced methods of manufacturing and arrangement of detail have been adopted to meet the requirements of Water Works Superintendents in all parts of the country

A special and exclusive feature is the patented operating nut, which is of great importance in Canada or other countries where the temperature drops below freezing. In our new Hydrant this operating nut is made of a design that permits the water to flow freely thereby preventing freezing.

These Hydrants can be furnished with either of our special design of seats. Bronze to Iron or the Bronze to Bronze principal which is very clearly explained in detail in our number 40 catalogue which we shall be pleased to send upon application.

T. McAVITY & SONS, LIMITED

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McAVITY HYDRANT INTERCHANGEABILITY 1959 TO PRESENT

RETURN TO CONTENTS

ITEM	DESCRIPTION	MATERIAL	REMARKS	M67/M93	M67B	M67	M59M	M59
1	OPERATING HOUSING	CAST IRON	OBSOLETE (SEE #64)	NO	NO	YES	YES	NO
2	HOSE NOZZLE	BRONZE	GIVE THREAD SPEC.	YES	YES	YES	YES	YES
3	HOSE NOZZLE CAP	CAST IRON	THRD.SPEC & NUT SHAPE	YES	YES	YES	YES	YES
4	HOUSING STEM - O-RING	BUNA-N		YES	YES	YES	YES	YES
5	CHAIN	STEEL Z.P.	IF REQUIRED	YES	YES	YES	NO	NO
8	HOUSING JOINT GASKET			YES	YES	YES	YES	YES
7	OIL HOLE SCREW	BRASS		YES	YES	YES	YES	YES
8	OPERATING NUT	BRONZE	OBS.OLETE	NO	NO	YES	YES	NO
9	OP.NUT "O" RING	BUNA-N		YES	YES	YES	YES	YES
10	FLAT HD. SCREW Y.-20 X 5/16	BRASS		NO	YES	YES	NIA	NIA
11	BODY CAP COVER	CAST IRON	INDICATE OIL OR OIR	NO	YES	YES	NIA	NIA
12	OPERATING NUT BEARING	DELTRIN	REPLACES NEEDLE BEAR.	YES	YES	YES	YES	YES
13	HOUSING CAP SCREW	STEEL Z.P.		YES	YES	YES	YES	YES
14	BODY CAP	CAST IRON		NO	YES	YES	NO	NO
15	BODY CAP "O" RING	BUNA-N		NO	YES	YES	NO	NO
16	BODY	CAST IRON	SPECIFY OUTLETS REQD.	NO	YES	YES	NO	NO
17	HOSE CAP GASKET	RED RUBBER		YES	YES	YES	YES	YES
18	PUMPER CAP GASKET	RED RUBBER		YES	YES	YES	YES	YES
19	PUMPER NOZZLE CAP	CAST IRON	THRO. SPEC & NUT SHAPE	YES	YES	YES	YES	YES
20	PUMPER NOZZLE	BRONZE	GIVE THREAD SPEC	YES	YES	YES	YES	YES
21	CHAIN	STEEL Z.P.	IF REQUIRED	YES	YES	YES	NO	NO
22	HOSE & PUMP.NOZ. PIN	BRASS	H.NOZ. PIN OBSOLETE	NO	NO	YES	YES	YES

ITEM	DESCRIPTION	MATERIAL	REMARKS	M67/M93	M67B	M67	M59M	II III
47	HOLDING NUT	BRONZE		YES	YES	YES	YES	NO
48	HOLDING CLAMP SCREW	BRASS	COMES WITH #40	N/A	N/A	N/A	N/A	N/A
49	DRAIN HOLE PLUG	BRASS	IF REQUIRED (INT./ EXT.)	YES	YES	YES	YES	YES
50	INTERSECTION EXTENSION	DUCTILE IRON	STATE LENGTH	YES	YES	YES	YES	NO
51	EXTENSION STEM	STEEL	STATE LENGTH	YES	YES	YES	NO	NO
52	EXTENSION COUPLING	CAST IRON		YES	YES	YES	YES	NO
53	EXT. STEM BOLTS & NUTS	STEEL Z.P.		YES	YES	YES	YES	NO
54	INTERSECT. BOLTS & NUTS	STEEL Z.P.		YES	YES	YES	YES	YES
55	INTERSECTION FLANGE	CAST IRON		YES	YES	YES	YES	YES
56	RETAINING RING (SQUARE)	STEEL (CAD.PL)		YES	YES	NO	NO	NO
62A	HOSE NOZZLE "O" RING	BUNA-N		YES	YES	YES	YES	YES
62B	PUMPER NOZZLE "O" RING	BUNA-N		YES	YES	YES	YES	YES
63	OP. NUT RETAINING GLAND	CAST IRON		YES	YES	NO	NO	NO
64	HYDRALUBE OPER. NUT	BRONZE	NUT SHAPE, O/L OR O/R	YES	YES	NO	NO	NO
85	OPER NUT "O" RINGS	BUNA-N		YES	YES	NO	NO	NO
66	LOWERV"-VE PLATE	CAST IRON		YES	YES	NO	NO	NO
67	LOCKWASHER	STEEL Z.P.		YES	YES	NO	NO	NO
88	LOWER VL. PLATE "O" RING	BUNA-N		YES	YES	NO	NO	NO
69	HOSE NOZZLE SET SCREW	ST. STEEL		YES	YES	NO	NO	NO
70	UPPER STEM ASSEMBLY	ST. STEEL	INDICATE OIL OR OIR	YES	YES	NO	NO	NO
77	BODY CAP BOLTS	STEEL Z.P.	HEX. HEAD OR ALLAN HD.	YES	NO	NO	NO	NO
78	BOLTED BODY CAP	CAST IRON	INDICATE OIL OR OIR	YES	NO	NO	NO	NO
79	BODY CAP GASKET	RED RUBBER		YES	NO	NO	NO	NO
80	BODY (BOLTED STYLE)	CAST IRON	STATE OUTLETS REQD.	YES	NO	NO	NO	NO

23	UP. STEM WIBR. SLEEVE	STEEL	OBSOLETE	NO	NO	NO	NO	NO
24	INT. SECT. BOLTS & NUTS	STEEL Z.P.	8SETS	YES	YES	YES	YES	YES
25	SAFETY FLANGE	CAST IRON	4 SECTIONS (SEGMENTS)	YES	YES	NO	NO	NO
26	INT. SECTION GASKETS	RED RUBBER		YES	YES	YES	YES	YES
27	SAFETY COUPLING	CAST IRON		YES	YES	YES	NIA	N/A
28	SAFE. CPLG. BOLTS & NUTS	STEEL Z.P.		YES	YES	YES	NIA	N/A
29	LOWER STEM	STEEL	GIVE DEPTH OF BURY	YES	YES	YES	NO	NO
30	INTERMEDIATE SECTION	DUCTILE IRON	GIVE DEPTH OF BURY	YES	YES	YES	YES	NO
31	DRIP V"-VE COMPLETE	BRONZE	WIFACING & SCREWS	YES	YES	YES	YES	NO
32	DRAIN HOLE LINING	BRASS		YES	YES	NIA	NIA	N/A
33	SEAT CASING "ORING	BUNA-N	OBSOLETE	NO	YES	YES	NIA	N/A
34	SEAT "O" RING TOP & BTM.	BUNA-N		YES	YES	YES	YES	YES
35	MAIN V"-VE DISC	RUBBER/POLY		YES	YES	YES	YES	YES
36	MAIN V"-VE WASHER	CAST IRON	OBSOLETE (SEE #86)	NO	NO	YES	YES	YES
37	COTTER PIN	BRASS	OBSOLETE	NO	NO	YES	YES	YES
38	MAIN VALVE "O" RING	BUNA-N		YES	YES	YES	YES	NO
39	DRIP VALVE FACING			NIA	N/A	N/A	N/A	N/A
40	HOLDING CLAMP	PLASTIC	SEE #31	NIA	N/A	NIA	NIA	NIA
41	SEAT CASING	BRONZE	OBSOLETE (0/VAS WI#44)	NIA	NIA	N/A	NIA	N/A
42	MAIN V"-VE SEAT	BRONZE		YES	YES	YES	YES	NO
43	MAIN VALVE LOCKNUT	BRONZE	OBSOLETE (SEE #86)	NO	NO	YES	YES	YES
44	ELBOW	CAST IRON	INLET & SIZE REQUIRED	YES	YES	YES	YES	NO
45	GUIDE PLATE ASSEMBLY	STEEL		YES	YES	YES	YES	NO
46	INTERIOR WRENCH	STEEL		YES	YES	YES	YES	NO

SEAT RING	BRONZE	COMES WITH #44	YES	YES	NO	NO	NO
PIPE FLANGE (TOP)	CAST IRON		YES	YES	NO	NO	NO

NOTE: PART# 7 OIL HOLE SCREW AND PART #2 HOSE NOZZLE ARE INTERCHANGEABLE WITH #2-9651 OIL HOLE SCREW AND #2-9651 HOSE NOZZLE.

CHRONOLOGY OF CLOW HYDRANTS

<u>Hydrant Model</u>	<u>Shape</u>	<u>Year</u>
9651- #1 & 9651-#2	OCTAGONAL	1919/1960
9651- #1 & 9651- #2	ROUND	1919/1960
6431 #1 & #2	ROUND	1920/1960
9658 - 4"	OCTAGONAL	1930/1960
9658 - 5"	OCTAGONAL	1930/1960
965B - "O" RING STYLE	OCTAGONAL	1930/1960
M-59	OCTAGONAL	1959/1963
M-59	ROUND	1959/1963
M-59M	OCTAGONAL	1960/1967
M-59M	ROUND	1960/1967
D63 DAIGLE		1960/1966
9635 W WALL TYPE		1960/1994
9635 F FLUSH TYPE		1960/1994
D80 DAIGLE		1965/1980
D67 CONCORD DAIGLE		1967/1975
M-67 McAVITY (WITH OPERATING NUT HOUSING)	BULLET	1967/1994
M-67 McAVITY ON-LINE (WIOPERATING NUT HOUSING)	BULLET	1967/1994
D67M CONCORD		1967/1994
500 DROLET		1975
D67M E TRINIDAD		1980
D67M METRO		1980
D67M-P PREMIER (HYDRALUBE)		1994/-----
M-67 BRIGADIER THREADED CAP HYDRALUBE	BULLET	1993/1996
M-67 BRIGADIER ON-LINE HYDRALUBE		1993/1996
9635 W WALL TYPE HYDRALUBE		1993/2010
9635 F FLUSH TYPE HYDRALUBE		1993/2010
M-67B HERITAGE HYDRALUBE	ROUND& OCT.	1995/-----
M-93B HERITAGE HYDRALUBE	ROUND & OCT.	1995/-----
M-67B BRIGADIER BOLTED CAP HYDRALUBE	ROUND	1995/-----
M-93B BRIGADIER BOLTED CAP HYDRALUBE	ROUND	1995/-----

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SPECIAL HYDRANTS**MONITOR HYDRANT**

The Brigadier is available with monitor flange for use in industrial fire protection in pulp and paper mills, lumber yards or storage areas for inflammable materials. The hydrant's 3" (76mm) flanged outlet is faced and drilled to ANSI 125, suitable for connecting a long radius flanged elbow and standpipe for mounting a monitor nozzle. With the exception of the monitor elbow this hydrant uses ALL CURRENT STANDARD PARTS. It can also be supplied with:

The online chamber for mounting directly to the water main.
 An inline chamber for DEEP D.O.B. HYDRANTS 14' +
 A class 250 ductile iron flanged inlet for high pressure applications

IN-LINE CHAMBER (DEEP D.O.B. HYDRANTS 14' +) Clow Canada recommends all hydrants over 14' Bury be supplied with an in-line chamber (around the 12' mark) to make the hydrant more accessible & safe for maintenance. With depths of bury in the north regularly in the 15 – 20' + range, hydrant maintenance becomes unsafe or impossible without the assistance of heavy equipment. The inline chamber corrects this issue by moving the main valve components up to the usual bury depth and is available for all McAvity hydrants.

FLANGED ELBOWS – M67B BRIGADIER / M93B BRIGADIER are available with ASTM A536 ductile iron flanged elbows in class 125 and 250 for higher pressure applications.

ON-LINE HYDRANT - In many northern communities & on industrial sites hydrants must be attached directly to the water main by way of a tee. Clow supplies the M67B BRIGADIER / M93B BRIGADIER with either a 6" or 8" ANSI B16.1 flanged vertical chamber to facilitate this. With the exception of the online chamber this hydrant uses ALL CURRENT STANDARD PARTS. It can also be supplied with an inline chamber for DEEP D.O.B. HYDRANTS 14' +

HERITAGE STYLE HYDRANT – shown on page 12 has a nostalgic McAvity shape but uses all current standard parts from 1995 to present. Octagonal body & bonnet, hose & pumper caps are the only difference between this & the standard round body M67B hydrant. This hydrant shares a common shape with the older McAvity M59 & M59M models but can be easily identified by the 4 ground line flange segments (#25).

HYDRANT INSULATING KIT - When hydrants are buried in the frost line, a thermal break must be installed below the frost line, at the hydrant inlet. The flange isolation kit stops thermal conductivity through the hydrant into the piping system. This option is available on all hydrants.

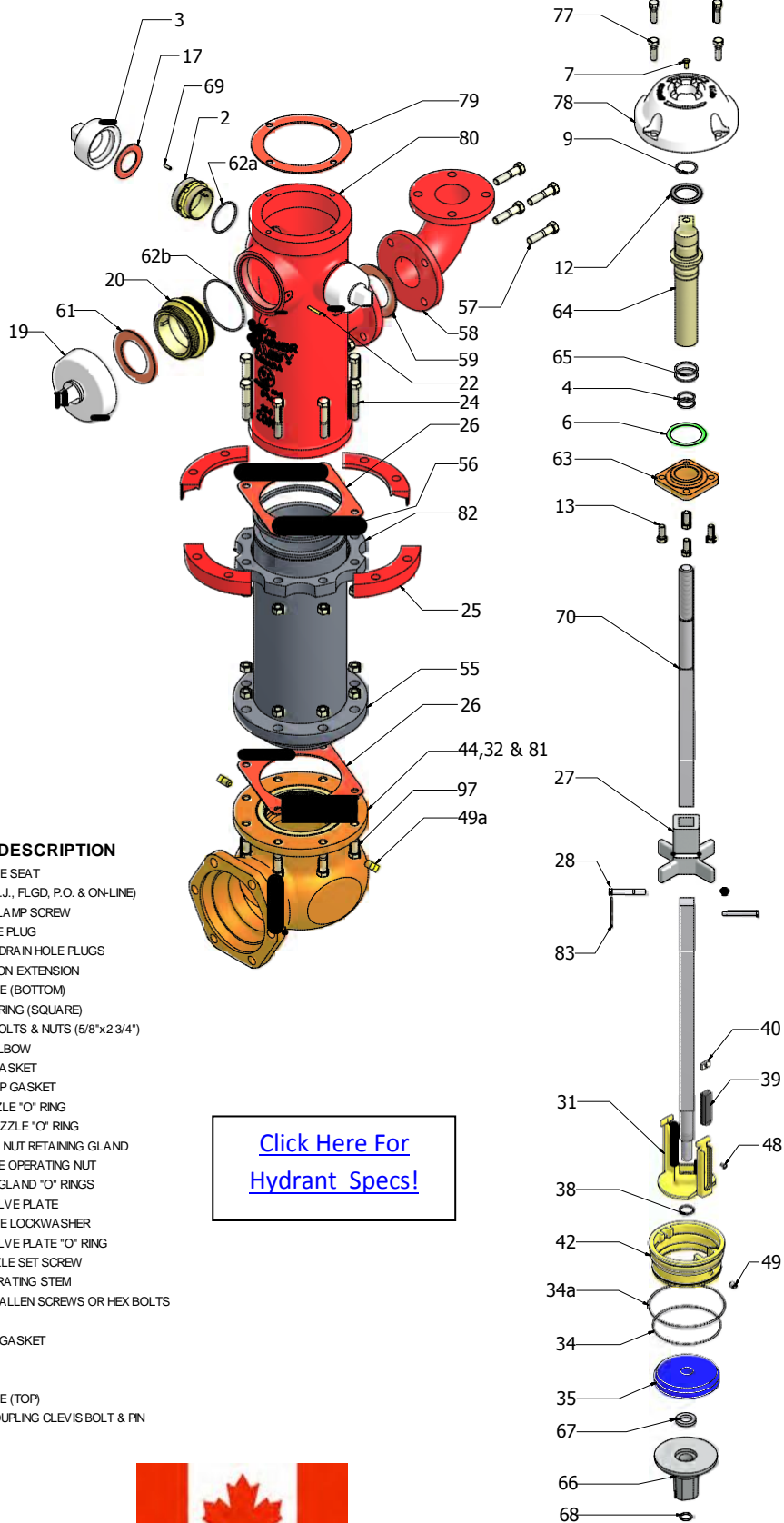
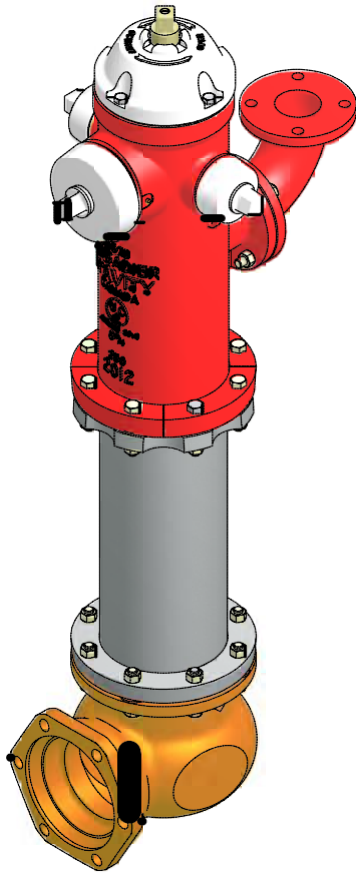
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CLOW CANADA

WITH MONITOR 250 PSI FM APPROVED



DESCRIPTION

- 2 HOSE NOZZLE
- 3 HOSE NOZZLE CAP
- 4 HOUSING STEM "O" RINGS
- 5 HOSE CAP CHAIN & "S" HOOK
- 6 HOUSING JOINT GASKET
- 7 OIL HOLE SCREW
- 9 OPERATING NUT "O" RING
- 12 OPERATING NUT BEARING
- 13 CAP SCREW 1/2" x 1 1/4"(RET. GLD. BOLTS)
- 17 HOSE CAP GASKET
- 19 PUMPER CAP
- 20 PUMPER NOZZLE
- 21 PUMPER CAP CHAIN & S HOOK
- 22 PUMPER NOZZLE PIN
- 24 INTERSECTION BOLTS & NUTS
- 25 SAFETY FLANGE SEGMENTS
- 26 INTERSECTION GASKET
- 27 SAFETY COUPLING
- 28 SAFETY COUPLING BOLT & NUT (3/8"x3")
- 29 LOWER OPERATING STEM
- 30 INTERMEDIATE SECTION
- 31 DRIP VALVE
- 32* DRAIN HOLE LINING
- 34a MAIN VALVE SEAT "O" RING (UPPER)
- 34 MAIN VALVE SEAT "O" RING (LOWER)
- 35 MAIN VALVE DISC
- 38 MAIN VALVE "O" RING
- 39 DRIP VALVE RUBBER
- 40 HOLDING CLAMP

DESCRIPTION

- 42 MAIN VALVE SEAT
- 44* ELBOW (M.L., FLGD, P.O. & ON-LINE)
- 48 HOLDING CLAMP SCREW
- 49 DRAIN HOLE PLUG
- 49a EXTERNAL DRAIN HOLE PLUGS
- 50 INTERSECTION EXTENSION
- 55 PIPE FLANGE (BOTTOM)
- 56 RETAINING RING (SQUARE)
- 57 MONITOR BOLTS & NUTS (5/8"x2 3/4")
- 58 MONITOR ELBOW
- 59 MONITOR GASKET
- 61 PUMPER CAP GASKET
- 62a HOSE NOZZLE "O" RING
- 62b PUMPER NOZZLE "O" RING
- 63 OPERATING NUT RETAINING GLAND
- 64 HYDRALUBE OPERATING NUT
- 65 RETAINING GLAND "O" RINGS
- 66 LOWER VALVE PLATE
- 67 MAIN VALVE LOCKWASHER
- 68 LOWER VALVE PLATE "O" RING
- 69 HOSE NOZZLE SET SCREW
- 70 UPPER OPERATING STEM
- 77 BODY CAP ALLEN SCREWS OR HEX BOLTS
- 78 BODY CAP
- 79 BODY CAP GASKET
- 80 BODY
- 81* SEAT RING
- 82 PIPE FLANGE (TOP)
- 83 SAFETY COUPLING CLEVIS BOLT & PIN

[Click Here For Hydrant Specs!](#)

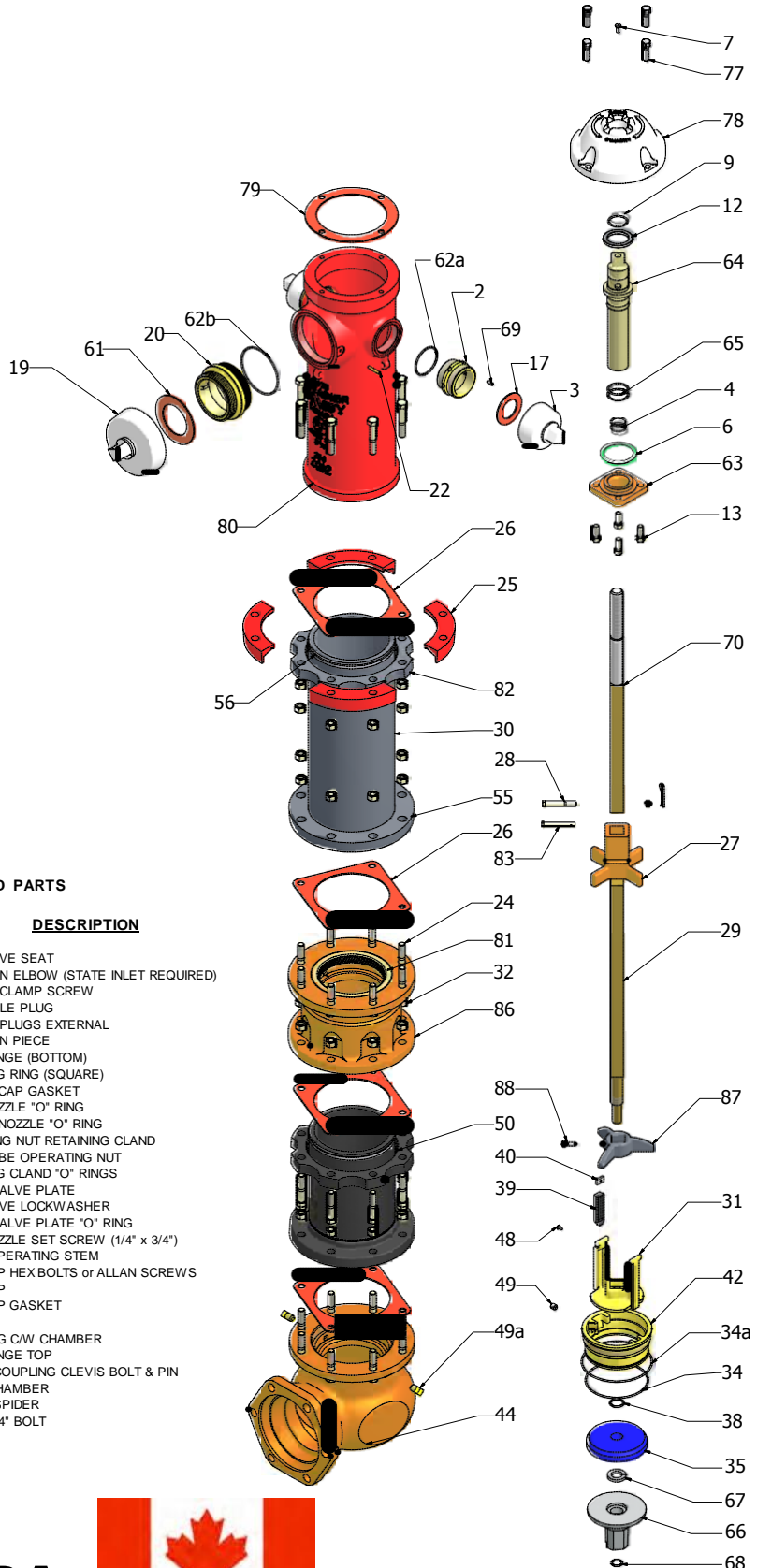
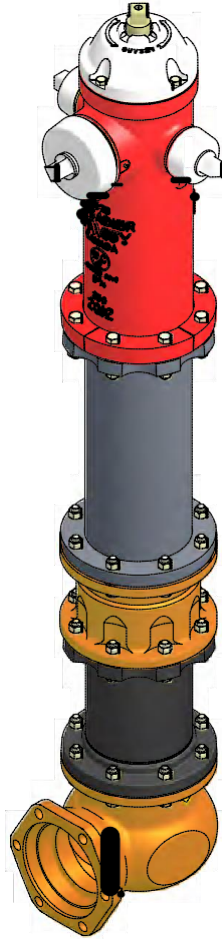
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IN-LINE HYDRANT 250 PSI FM APPROVED



M67B IN-LINE HYDRANT STANDARD PARTS

Ref No	DESCRIPTION	Ref No	DESCRIPTION
2	HOSE NOZZLE HOSE	42	MAIN VALVE SEAT
3	NOZZLE CAP HOUSING	44*	NON-DRAIN ELBOW (STATE INLET REQUIRED)
4	STEM "O" RINGS	48	HOLDING CLAMP SCREW
5	HOSE CAP CHAIN & "S" HOOK	49	DRAIN HOLE PLUG
6	HOUSING JOINT GASKET	49a	3/8" PIPE PLUGS EXTERNAL
7	OIL HOLE SCREW	50	EXTENSION PIECE
9	OPERATING NUT "O" RING	55	PIPE FLANGE (BOTTOM)
12	OPERATING NUT BEARING	56	RETAINING RING (SQUARE)
13	CAP SCREW (1/2" X 1 1/4")	61	PUMPER CAP GASKET
17	HOSE CAP GASKET	62a	HOSE NOZZLE "O" RING
19	PUMPER NOZZLE CAP	62b	PUMPER NOZZLE "O" RING
20	PUMPER NOZZLE	63	OPERATING NUT RETAINING CLAND
21	PUMPER CAP CHAIN & "S" HOOK	64	HYDRALUBE OPERATING NUT
22	PUMPER NOZZLE PIN	65	RETAINING CLAND "O" RINGS
24	INTERSECTION BOLTS & NUTS	66	LOWER VALVE PLATE
25	SAFETY FLANGE (SEGMENTS)	67	MAIN VALVE LOCKWASHER
26	INTERSECTION GASKET	68	LOWER VALVE PLATE "O" RING
27	SAFETY COUPLING	69	HOSE NOZZLE SET SCREW (1/4" x 3/4")
28	SAFETY COUPLING BOLT & NUT (3/8" X 3)	70	UPPER OPERATING STEM
29	OPERATING STEM LOWER	77	BODY CAP HEX BOLTS or ALLAN SCREWS
30	INTERMEDIATE SECTION	78	BODY CAP
31	DRIP VALVE	79	BODY CAP GASKET
32*	DRAIN HOLE LINING C/W CHAMBER	80	BODY
34a	SEAT "O" RING (TOP)	81*	SEAT RING C/W CHAMBER
34	SEAT "O" RING (BOTTOM)	82	PIPE FLANGE TOP
35	MAIN VALVE DISC	83	SAFETY COUPLING CLEVIS BOLT & PIN
38	MAIN VALVE "O" RING	86	IN-LINE CHAMBER
39	DRIP VALVE FACING	87	ON-LINE SPIDER
40	HOLDING CLAMP	88	3/8" x 1 1/4" BOLT

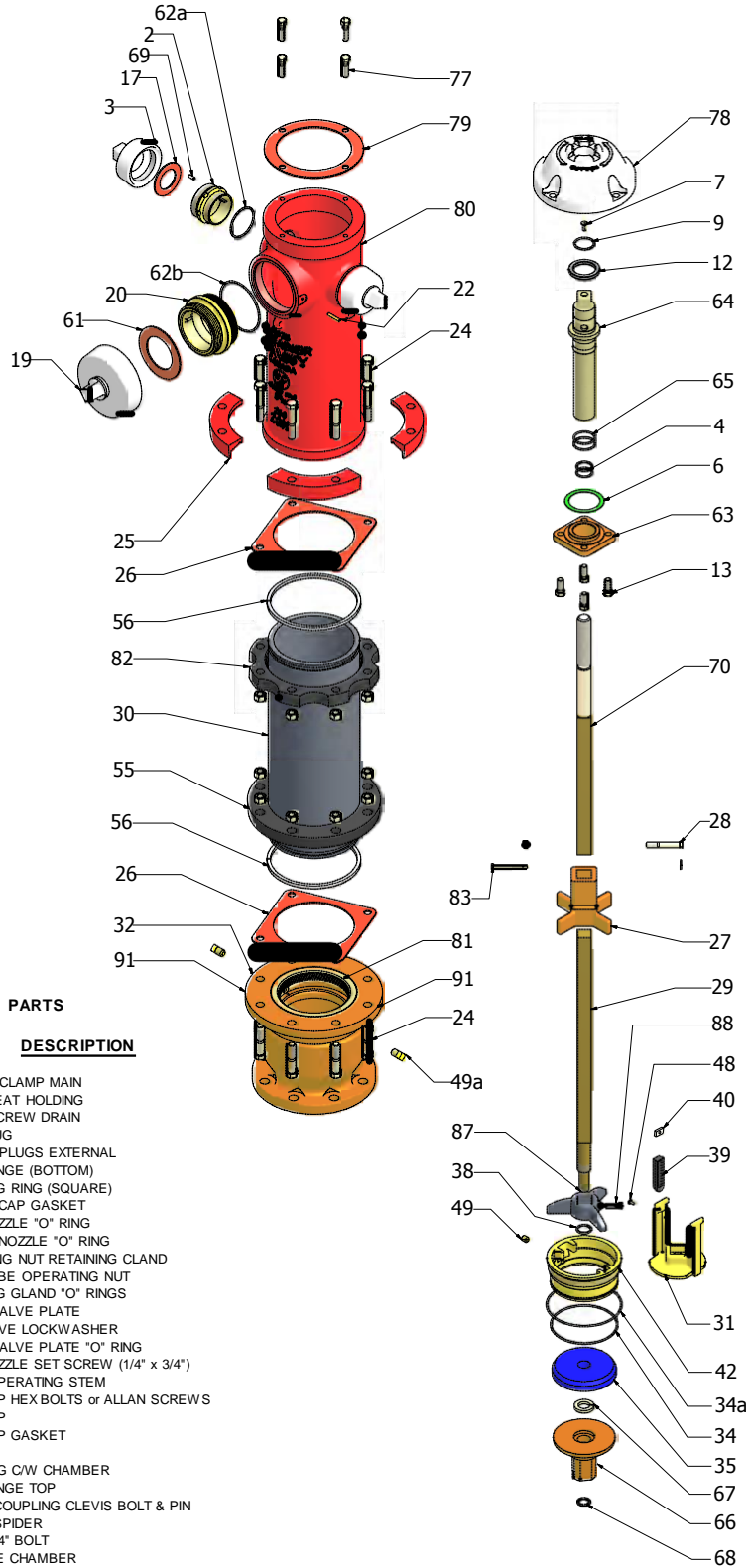
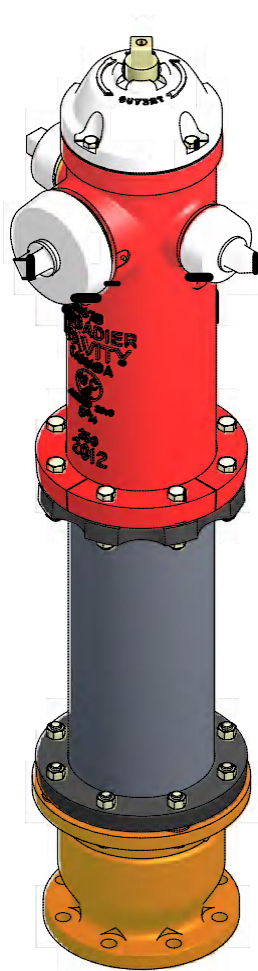
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6" ON-LINE HYDRANT 250 PSI FM APPROVED



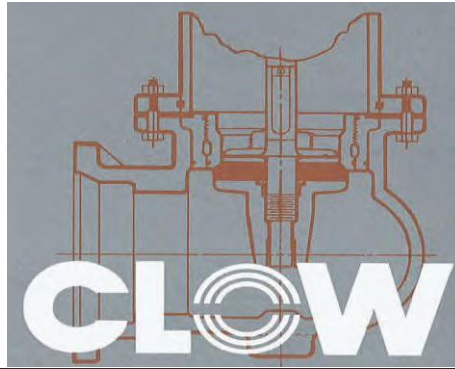
M67B 6" ON-LINE HYDRANT STANDARD PARTS

Ref No	DESCRIPTION	Ref No	DESCRIPTION
2	HOSE NOZZLE HOSE	40	HOLDING CLAMP MAIN
3	NOZZLE CAP HOUSING	42	VALVE SEAT HOLDING
4	STEM "O" RINGS	48	CLAMP SCREW DRAIN
5	HOSE CAP CHAIN & "S" HOOK	49	HOLE PLUG
6	HOUSING JOINT GASKET	49a	3/8" PIPE PLUGS EXTERNAL
7	OIL HOLE SCREW	55	PIPE FLANGE (BOTTOM)
9	OPERATING NUT "O" RING	56	RETAINING RING (SQUARE)
12	OPERATING NUT BEARING	61	PUMPER CAP GASKET
13	CAP SCREW (1/2" X 1 1/4")	62a	HOSE NOZZLE "O" RING
17	HOSE CAP GASKET	62b	PUMPER NOZZLE "O" RING
19	PUMPER NOZZLE CAP	63	OPERATING NUT RETAINING CLAND
20	PUMPER NOZZLE	64	HYDRALUBE OPERATING NUT
21	PUMPER CAP CHAIN & "S" HOOK	65	RETAINING GLAND "O" RINGS
22	PUMPER NOZZLE PIN	66	LOWER VALVE PLATE
24	INTERSECTION BOLTS & NUTS	67	MAIN VALVE LOCKWASHER
25	SAFETY FLANGE (SEGMENTS)	68	LOWER VALVE PLATE "O" RING
26	INTERSECTION GASKET	69	HOSE NOZZLE SET SCREW (1/4" x 3/4")
27	SAFETY COUPLING	70	UPPER OPERATING STEM
28	SAFETY COUPLING BOLT & NUT (3/8" X 3")	77	BODY CAP HEX BOLTS or ALLAN SCREWS
29	OPERATING STEM LOWER	78	BODY CAP
30	INTERMEDIATE SECTION	79	BODY CAP GASKET
31	DRIP VALVE	80	BODY
32*	DRAIN HOLE LINING C/W CHAMBER	81*	SEAT RING C/W CHAMBER
34a	SEAT "O" RING (TOP)	82	PIPE FLANGE TOP
34	SEAT "O" RING (BOTTOM)	83	SAFETY COUPLING CLEVIS BOLT & PIN
35	MAIN VALVE DISC	87	ON-LINE SPIDER
38	MAIN VALVE "O" RING	88	3/8" x 1 1/4" BOLT
39	DRIP VALVE FACING	91	6" ON-LINE CHAMBER

MADE IN CANADA



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Fire Hydrant Ordering Specifications Checklist

Fire Hydrant Style:

- 2 Hose Only
- 2 Hose 1 Pumper
- 2 Hose w/ Storz Pumper
- 2 Hose 1 Pumper + Monitor

Depth of Bury:

_____ Feet & _____ Inches

Extension at Grade:

- Yes
- No
- If Yes, Length? ___ Inches

Hose Nozzle Threads:

Pumper Nozzle Threads:

Operating Nut Size:

- 1 ¼" Square
- 1" 5-Sided
- 7/8" 5-Sided
- 1 ½" Triangle

Direction of Opening:

- Open Left (Counter Clock Wise)
- Open Right (Clock Wise)

Drains:

- Unplugged
- Plugged Internally
- Plugged Externally

Hydrant Chains:

- Yes
- No

Body Color:

Bonnet Color (Cap):

Hose Cap Color:

Pumper Cap Color:

Inlet (Boot) Size/Class:

- 6" Mechanical Joint
- 8" Mechanical Joint
- 6" Flanged (class 125)
- 6" Flanged (class 250)
- 6" Tyton (Push-on)
- 8" Online Chamber
- 6" Online Chamber

INSTALLATION & TESTING

****WARNING****

FIRE HYDRANTS SHOULD BE OPERATED, MAINTAINED & REPAIRED BY TRAINED AUTHORIZED PERSONS ONLY!

BEFORE ATEMPTING ANY INSTALLATION, REPAIRS OR MODIFICATIONS TO FIRE HYDRANTS CONNECTING WATERLINES MUST BE ISOLATED, DRAINED AND DEPRESSURIZED.

FAILURE TO OBSERVE BASIC SAFTEY GUIDELINES MAY RESULT IN SERIOUS INJURY.

- 1) Complete a receiving inspection as outlined on (page 11)
- 2) Ensure all dirt & debris is removed from inside the hydrant.
- 3) Local codes and standards should be followed for guideines on installing the hydrant in relation to curbs, sidewalks and roads.
- 4) The hydrant should be installed with adequate clearance for operation, and attaching hoses & other machinery.
- 5) Hydrants should be installed as plumb as possible.
- 6) Consult AWWA Manual M17 (INSTALLATION FIELD TESTING & MAINTENANCE OF FIRE HYDRANTS) for a comprehensive listing of procedures, tests and technical data relating to AWWA C502 hydrants.

TOOLS REQUIRED FOR MAINTENANCE / REPAIRS

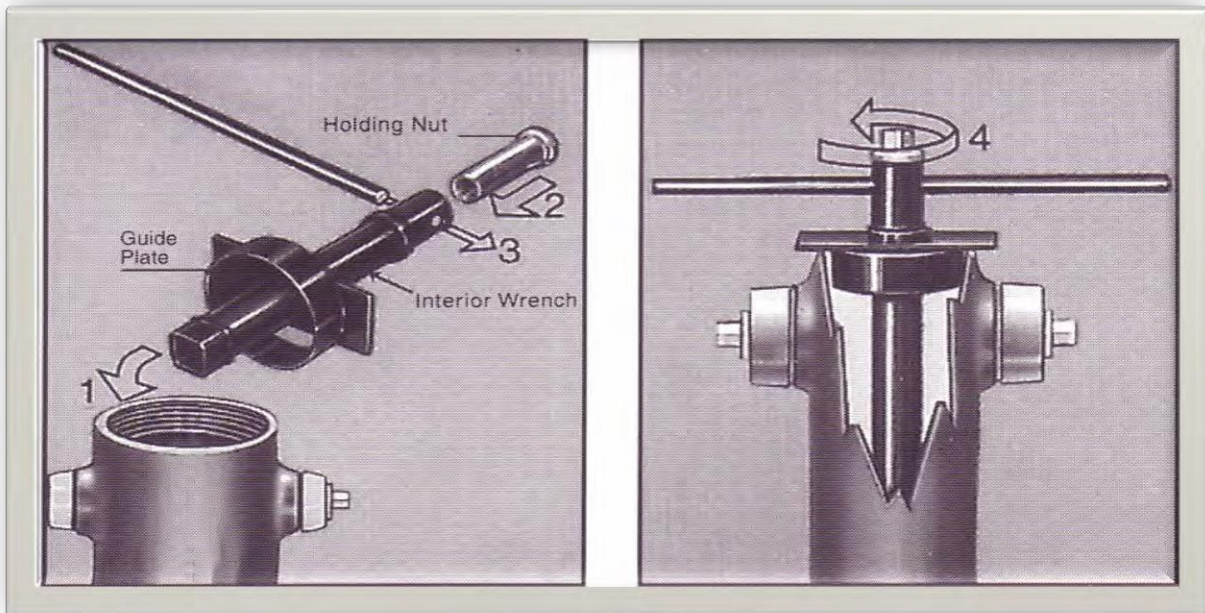


Clow hydrant operating wrench – fits all nut sizes on any fire hydrant.

McAvity

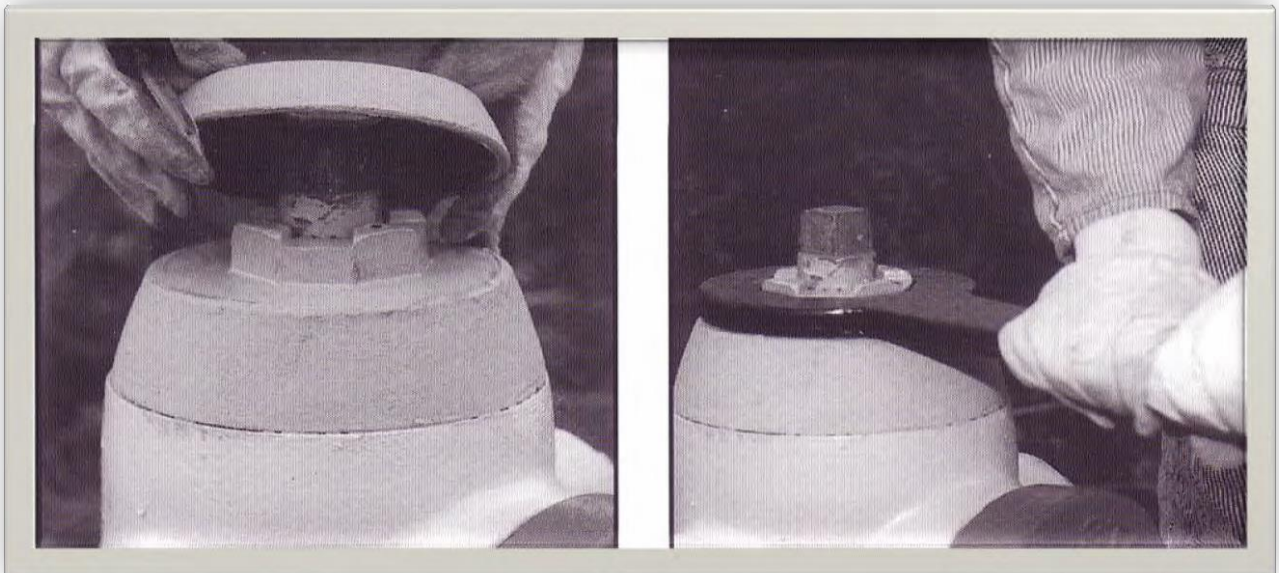
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Clow **Seat Removal Tool & Guide Plate** for use on all McAvity hydrants dating back to 1967. (M67 / M67B BRIGADIER / M93B BRIGADIER) check with sales for compatibility with other Clow Canada Hydrants.

The **Holding nut** is for use on all CLOW /McAvity hydrants dating back to 1967. The **Holding nut** must be ordered specifically for either **LEFT or RIGHT** hand open hydrants.



Clow's **Body Cap Wrench** is for use on McAvity M67 fire hydrants with the threaded on bonnet.

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Clow's standard **Pumper Nozzle Removal Tool** is available in Small, Medium, Large sizes

The size required depends on the 2 letter code stamped on the pumper nozzle.

LARGE		MEDIUM			SMALL	
VH	NF	OH	EG	JF	AH	CH
PF	SF	KF	FE	GE	DH	GH
XE	YE	HE	KE	LE	BF	BE
ND	OD	ME	OE	PE	DE	AJ
PD	SD	CD	ED	FD		
WD	YD	GD	HD	KD		
VD		DG	EF	VE		
		MF	AD	BD		



Clow's standard **Hose Nozzle Removal Tool** is available in Small & Large sizes.

The small size fits the X, Y, & Z, hose nozzle. The large size fits all other letter codes.

A	B	C	D	E	F	G
X	Y	Z	AA	BB	CC	JJ
LL	NN	SS	TT	VV	YY	ZZ



Clow's **STORZ Pumper Nozzle Removal Tool** is available for 100mm (4") and 125mm (5") STORZ pumper sizes.

This tool is designed for use on Clow hydrants with STORZ pumper connections.



Clow's **STORZ Hose Nozzle Removal Tool** is available for 63mm (2.5") STORZ hose size.

M67 /M67B BRIGADIER / M93B BRIGADIER STANDARD WRENCH SIZES & TOOLS REQUIRED

See page 6 for (item #'s)

FLAT HD SLOT BRASS SCREW (#7/10)

3/8" ALLEN WRENCH (#77)

3/4" SOCKET (#13 & #77)

3/16" ALLEN WRENCH (#69)

15/16" SOCKET (#24)

9/16" WRENCH (#53 & 28)

ADJUSTABLE CRESENT WRENCH(S) 12" LONG

PLIERS

¼ PUNCH

HAMMER

PIPE WRENCH

SCRAPER

PRE ASSEMBLED FIRE HYDRANT REPAIR KITS

HYDRA-LUBE OPERATING NUT & UPPER STEM ASSEMBLY / CONVERSION KIT

This kit replaces all internal above grade components

It takes older hydrants (1967 – 1994) and brings their above Grade working components up to current standards.

Consists of part numbers: 6/7/9/12/13/15/26/28/63/64/65/70

(From illustration page 6)



INLET COMPLETE

Consists of part numbers: 32/41/44 (from illustration page 6)

The 90 degree hydrant inlet is available with: class 125 flange / Tyton / Mechanical joint/ Class 250 flanged end connections in ductile or cast iron.

DRIP VALVE & SEAT COMPLETE

Consists of part numbers: 31/34&34a/38/39/40/42/48 (from illustration page 33)

Replaces all parts of the main valve assembly



LOWER STEM COMPLETE WITH DRIP VALVE & SEAT

Consists of part numbers:

27/28/29/31/34&34a/35/38/39/40/42/48/ 66/67/68/70 (from illustration page 32)

Replaces all removable below grade parts

FITTED UPPER BARREL WITH CAPS

Comes with all parts listed in the picture on the right.
(From illustration page 31)



BONNET ASSEMBLY COMPLETE

Consists of part numbers:
4/6/7/9/12/13/63/64/65/77/78/79
(From illustration page 31)
Includes bonnet (#78) & all internal above grade components (Except #70 upper stem)

TRAFFIC REPAIR KIT (with & without # 70 upper stem)

Consists of part numbers: (4 & 70 optional) 24/25/26/27/28 (from illustration page 6)
This kit contains all parts needed to remount the hydrant in the event of a collision that activates the ground line break feature.



UPPER BODY COMPLETE

The FITTED UPPER BARREL WITH CAPS / BONNET ASSEMBLY COMPLETE / TRAFFIC REPAIR KIT (with # 70 upper stem) = **UPPER BODY COMPLETE**

This replace all the assembled above grade components. See page 31.

CONVERSION KITS

The Complete Upper Body & Stem Conversion Kit is required to upgrade any old Clow (McAvity, Concord) compression style hydrant, to its equivalent new model.

This is done without excavating! The only remaining components are the old hydrant elbow & riser barrel.

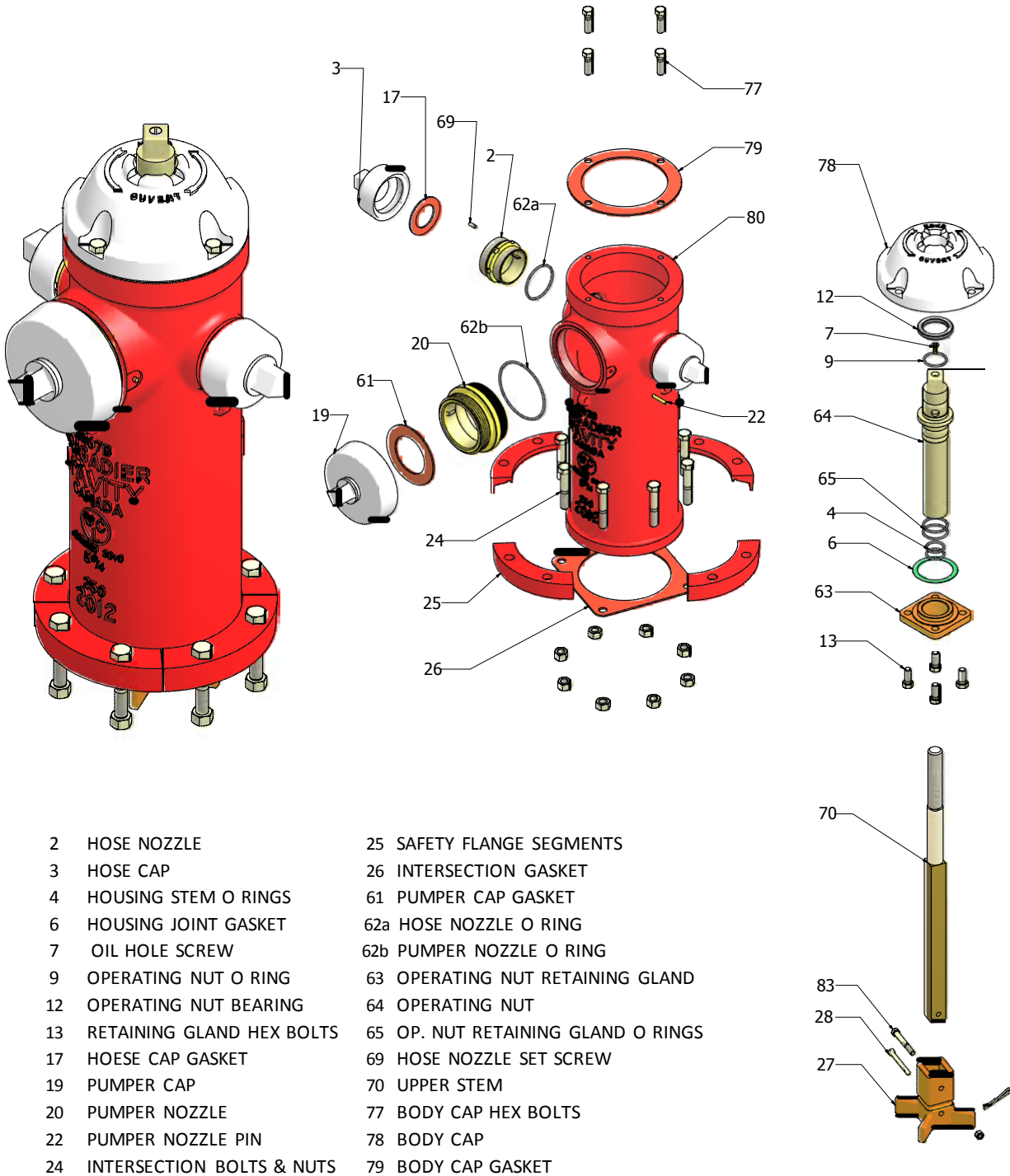
Below is a listing of available conversions:

#2 9651	to	M67 BRIGADIER
M59	to	M67 BRIGADIER
M59M	to	M67 BRIGADIER
C-61-A	to	M67 HERITAGE
D67	to	D67M PREMIER
D67M	to	D67M PREMIER
D63	to	D67M PREMIER
CANRON CT	to	D67M PREMIER
DURITE H-64	to	D67M PREMIER
DURITE H-67	to	D67M PREMIER
#1 – 9651	to	#1 – 9651 HERITAGE

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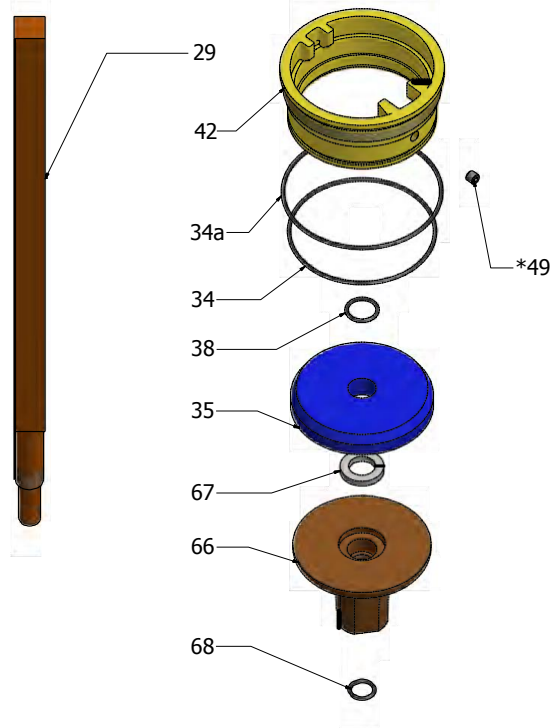
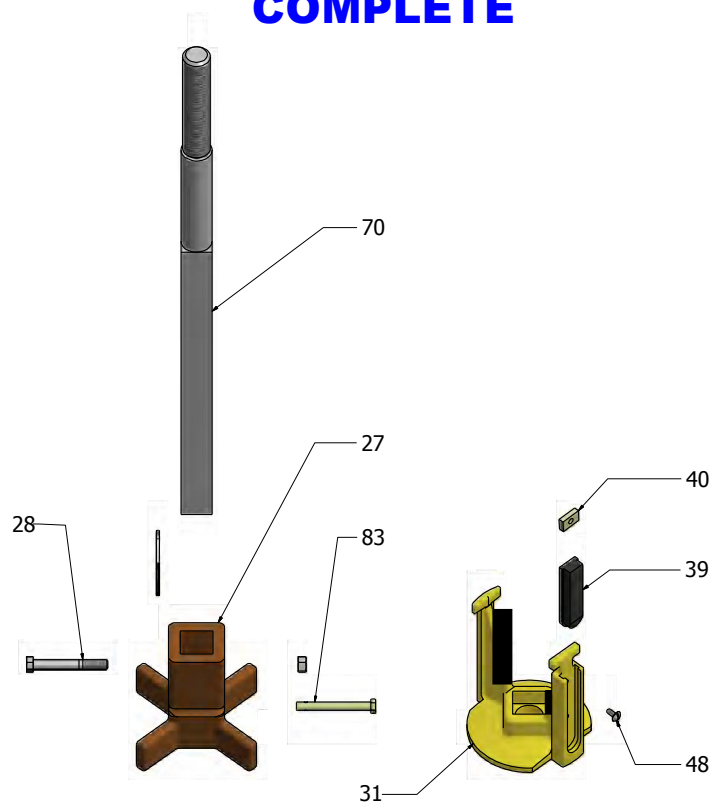
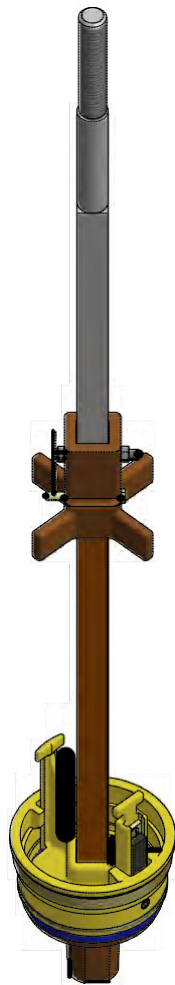
CLOW CANADA **BODY COMPLETE** WITH UPPER STEM



- | | | | |
|----|---------------------------|-----|---------------------------------|
| 2 | HOSE NOZZLE | 25 | SAFETY FLANGE SEGMENTS |
| 3 | HOSE CAP | 26 | INTERSECTION GASKET |
| 4 | HOUSING STEM O RINGS | 61 | PUMPER CAP GASKET |
| 6 | HOUSING JOINT GASKET | 62a | HOSE NOZZLE O RING |
| 7 | OIL HOLE SCREW | 62b | PUMPER NOZZLE O RING |
| 9 | OPERATING NUT O RING | 63 | OPERATING NUT RETAINING GLAND |
| 12 | OPERATING NUT BEARING | 64 | OPERATING NUT |
| 13 | RETAINING GLAND HEX BOLTS | 65 | OP. NUT RETAINING GLAND O RINGS |
| 17 | HOESE CAP GASKET | 69 | HOSE NOZZLE SET SCREW |
| 19 | PUMPER CAP | 70 | UPPER STEM |
| 20 | PUMPER NOZZLE | 77 | BODY CAP HEX BOLTS |
| 22 | PUMPER NOZZLE PIN | 78 | BODY CAP |
| 24 | INTERSECTION BOLTS & NUTS | 79 | BODY CAP GASKET |

CLOW CANADA

UPPER & LOWER STEM W/MAIN VALVE UNIT COMPLETE



REF#	DESCRIPTION
27	SAFETY COUPLING
28	SAFETY COUPLING BOLT & NUT
29	OPERATING STEM LOWER
31	DRIP VALVE
34	SEAT "O" RING BOTTOM
34a	SEAT "O" RING TOP
35	MAIN VALVE DISC (POLY or BLACK RUBBER)
38	MAIN VALVE "O" RING
39	DRIP VALVE FACING
40	HOLDING CLAMP
42	MAIN VALVE SEAT
48	HOLDING CLAMP SCREW
49	OPTIONAL DRAIN INTERNAL DRAIN PLUG
66	LOWER VALVE PLATE
67	LOCKWASHER 1 1/8"
68	LOWER VALVE PLATE "O" RING
70	UPPER STEM
83	CLEVIS BOLT & PIN

INSTRUCTIONS FOR EXTENDING THE McAVITY M67B / BRIGADIER HYDRANT

Components List

- | | |
|---|----------------------------------|
| 1 - #50 Extension Barrel with Threaded Flange | 1 - #82 Pipe Flange (Top) |
| 1 - #51 Extension Stem | 1 - #56 Retaining Ring |
| 2 - #26 Intersection Gaskets | 8 - Threaded Flange Bolts & Nuts |
| 1 - #52 Alignment Extension Coupling | 2 - #28 Coupling Bolts & Nuts |

For Safety's sake, please ensure that the water supply is turned off.

Step 1: Disassemble the upper barrel (Hydrant Body).

a) If extending a hydrant with a threaded body cap, unscrew body cap cover screws (2) #10, and remove body cap cover #11. Unscrew the body cap #14 anti-clockwise and unscrew the Hydralube nut #64 from the upper stem. Remove body cap assembly consisting of body cap, retaining gland and operating nut.

If extending a hydrant with bolt down body cap, remove the body cap bolts. Unscrew Hydralube nut #64 to remove the body cap #78.

- b) Remove bolts #24 from safety flange segments #25 and pipe flange (top) #82.
- c) Lift the body #16 / #80 off the intermediate section #30. The upper stem #23 / #70 is now protruding.
- d) Remove the safety coupling #27 from the lower stem #29 only, leaving the upper stem attached to the coupling.

Step 2: Install the Extension

- a) Assemble extension stem #51 to extension stem alignment coupling #52 and connect to lower stem #29.
- b) Replace gasket #26 affixed to intermediate section #30. Lower the extension barrel #50, with threaded flange facing the bottom, over the extension stem #51. (check threaded flange to ensure barrel portion is protruding). Align with gasket bolt holes and intermediate flange hole.
- c) Install threaded flange bolts & nuts and torque evenly between flanges to minimum 77ft. lbs. of torque.

Step 3: Re-assemble the upper barrel (Hydrant Body)

- a) Re-attach upper stem #23 / #70 to extension stem #51. Securely tighten bolts & nuts (or clevis bolt & pin)
- b) Place gasket #26 on to extension barrel #50. Replace body #16 / #80 on to extension barrel #50 and orient body to your requirements. Check if gasket is still centered.
- c) Assemble safety flange segments #25. Install and torque bolt & nuts evenly between flanges to a minimum of 77 ft/lbs. torque.
- d) Check interior of operating nut for O-ring damage. Replace if necessary. Liberally lubricate O-rings and threads, align cap assembly and slip over operating stem #23 / #70.
- e) For bolt down body caps, spin body cap assembly downwards until body cap meets hydrant body. Align bolt holes and screw in body cap bolts.
For threaded body caps, spin body cap assembly downwards and then tighten clockwise to a minimum of 60ft. lbs. torque using the body cap wrench. RE-assemble body cap cover #11 with cover screws #10.



REF.	DESCRIPTION	QTY.
24	INTERSECTION BOLTS & NUTS	16
26	INTERSECTION GASKET	2
50	EXTENSION PIECE	1
51	EXTENSION STEM	1
52	2 PIECE EXTENSION COUPLING	1
53	EXTENSION STEM BOLTS & NUTS	2
56	RETAINING RING	1
82	TOP FLANGE	2

REGULAR MAINTENANCE PROCEDURES

****Warning****

**FIRE HYDRANTS SHOULD BE OPERATED, MAINTAINED & REPAIRED BY TRAINED AUTHORIZED PERSONS ONLY!
BEFORE ATEMPTING ANY INSTALLATION, REPAIRS OR MODIFICATIONS TO FIRE HYDRANTS CONNECTING WATERLINES MUST BE ISOLATED, DRAINED AND DEPRESSURIZED.
FAILURE TO OBSERVE BASIC SAFTEY GUIDELINES MAY RESULT IN SERIOUS INJURY.**

Hydrant Maintenance Videos

<http://www.clowcanada.com>

The following maintenance procedures have been posted on the Clow Canada web site, AS VIDEOS for a complete visual aid for our end users. The text in the manual is synchronized with the online videos that can be found at the link below.

<http://www.clowcanada.com/english/Videos.html>

Hydrant maintenance

Hydra Lube operating nut conversion video

Complete Upper Body & Stem Conversion video

Hydrant Extension Video

Hydrant Plugging Video

For further assistance please contact us.

LUBRICATION

1. Hydrants should be able to be operated with one arm and an 18" long hydrant operating wrench (dry or under pressure). If this is not the case, the hydrant probably needs lubrication at the operating nut level.
2. Remove the lubrication screw (#7).
3. Lubricate with a food grade lubricant (good to -40 deg. C) after ensuring that the hydrant is in the closed position to prevent over filling.
4. Replace the lubrication screw.

HYDRANT MAINTENANCE

- 1) As part of a regular maintenance program Clow Canada recommends hydrants be inspected /serviced & operated on a bi annual basis. Once in the spring & once in the fall. For more details Consult AWWA Manual M17 (INSTALLATION FIELD TESTING & MAINTENANCE OF FIRE HYDRANTS).

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- 2) Before proceeding with hydrant maintenance, perform a visual inspection of the area ensuring proper height and good access to the hydrant.
- 3) Operate the hydrant.
- 4) Fully open and close the hydrant. Check for easy operation verifying that there are 16 to 18 turns to the fully open position.
- 5) Make sure the upper body and caps are in good condition.
- 6) Remove cap and attach hose or flow diffuser.
- 7) Flow the hydrant to flush debris.
- 8) In the case of this video, the water has been turned off at the main valve. The water flow should be consistent and not sporadic, which would indicate a blockage in the hydrant.
- 9) Now close the hydrant.
- 10) Check the drain feature. Place the palm of your hand over the open hose nozzle. There should be a slight vacuum.
- 11) Operate the hydrant dry, or with no pressure.
- 12) Close the secondary valve to shut off the water supply.
- 13) Open the hydrant fully to release the bonnet assembly& any residual water pressure.
- 14) Make sure there is easy operation and no water flow.

M67B & M93B BRIGADIER

- 15) Remove the bonnet bolts (#77).
- 16) Remove the bonnet assembly by fully opening (#64) operating nut to release (#70) upper stem.
- 17) Remove gasket (#79).

McAivity M67 (screw on bonnet)

- 18) Remove weather cap screws (#10).
- 19) Remove lubrication screw (#7).
- 20) Now remove the cover.
- 21) Next remove the bonnet, noting the sequence of parts for reassembly.



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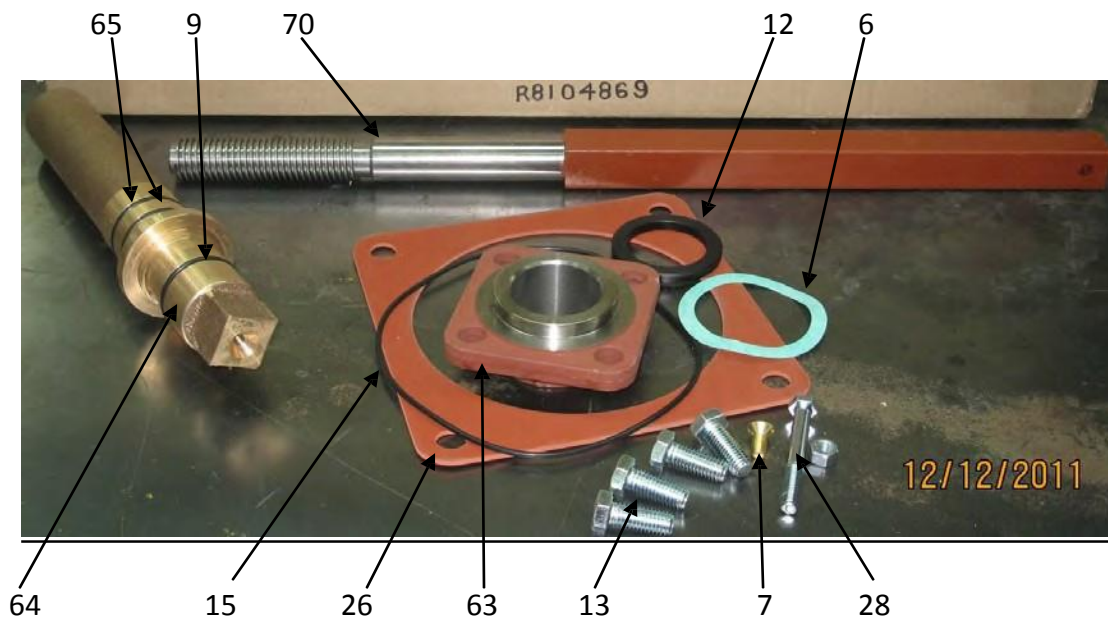
- 22) Check and replace the O-ring (#15).
- 23) Insert the interior wrench.
- 24) Thread the Holding Nut onto the upper stem.
- 25) Using a hydrant operating wrench draw hydrant closed, by threading holding nut fully on upper stem. This will prevent damage to the drip valve.
- 26) Insert torque bar & Unthread the Main Valve Seat - turn counter clockwise.
- 26) Remove the Interior Wrench and Holding Nut.
- 27) Now lift out the stem assembly safely. Rest the spider coupling on the top of the hydrant and re-grip.
- 28) Remove the main valve seat O-rings.
- 29) Disassemble the main valve (see illustration page 33).
- 30) Remove and replace the main valve O-ring #38
- 31) Replace the main valve disc #44.
- 32) Replace the main valve seat O-rings #34 UPPER & LOWER.



- 33) Reassemble the main valve.
- 34) Lubricate O-rings & complete seat with generous amount of grease to aid re-assembly. Remember to use food grade grease.
- 35) Reinsert the stem assembly.
- 36) Thread in the main valve seat by turning clockwise.
- 37) Insert the interior wrench.
- 38) Thread the holding nut onto the upper stem.
- 39) Draw the hydrant to the closed position to prevent damage to the drip lever.

- 40) Tighten the main valve seat.
- 41) Remove interior wrench and holding nut.
- 42) Reinstall the bonnet assembly.
- 43) Reattach the weather cap.
- 44) Remove the lubrication screw.
- 45) Insert the grease nipple.
- 46) Lubricate with a food grade lubricant (good to -40 deg. C) ensuring that the hydrant is in the closed position to prevent over filling.
- 47) Remove the grease nipple.
- 48) Replace the lubrication screw.
- 49) Reinstall the hose and pumper caps.
- 50) Open the secondary valve.
- 51) Now open the hydrant and check for leaks.

M67 Bell style housing to Hydra-lube Operating Nut Conversion



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*Below the kit is shown assembled in a (#78) bolt on bonnet.
It fits the (#14) threaded bonnet in the same manner*



- 1) Before performing the Hydra-lube Operating nut conversion, do a visual inspection ensuring proper height and good access to the hydrant.
- 2) Visual Inspection.
- 3) Close the secondary valve to shut off the water supply.
- 4) Open the hydrant fully to release the bonnet assembly & any residual water pressure.
- 5) Remove the cap to verify that there is no water flow.
- 6) Remove the weather cap screws (#10).
- 7) Remove the bonnet (#14) using Body Cap Wrench (page 22) and turning counter clockwise.
- 8) Check and replace the O-ring (#15).



- 9) Remove the operating nut housing (#1) by removing the four (#13) cap screws from under the bonnet.
- 10) Remove the old operating nut.
- 11) Remove the old bearing (#12).
- 12) Slide on the new bearing.
- 13) Lubricate the Hydra-lube operating nut (#64).
- 14) Insert the Hydra-lube operating nut.
- 15) Lubricate and install the new retaining gland (#63).
- 16) Insert the interior wrench.
- 17) Thread the holding nut onto the upper stem.

Above old M67 bell style operating nut housing & upper stem

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- 18) Using a hydrant operating wrench draw hydrant closed by threading holding nut fully on upper stem. This will prevent damage to the drip valve.
- 19) Insert torque bar & unthread the main valve seat by turning counter clockwise.
- 20) Remove the interior wrench and holding nut.
- 21) Now lift out the stem assembly safely. Rest the spider coupling on the top of the hydrant and re-grip.
- 22) Connect the new upper stem to the existing lower stem using (#27,28 & 83) spider coupling pins bolts & nuts.
- 23) Lubricate O-rings & complete seat with generous amount of grease to aid re-assembly. Lubricate with Purity FG2 Synthetic grease (a food grade lubricant)
- 24) Reinsert the stem assembly.
- 25) Thread in the main valve seat by turning clockwise.
- 26) Insert the interior wrench.
- 27) Thread the holding nut onto the upper stem.
- 28) Draw the hydrant to the closed position to prevent damage to the drip lever.
- 29) Tighten the main valve seat.
- 30) Now remove the interior wrench and holding nut.
- 31) Reinstall the bonnet with the new Hydra-lube operating nut.
- 32) Re-attach the body cap cover (#11).
- 33) Insert the grease nipple.
- 52) Lubricate with a food grade lubricant (good to -40 deg. C) ensuring that the hydrant is in the closed position to prevent over filling.
- 34) Remove the grease nipple.
- 35) Insert the lubrication screw (#7).
- 36) Reinstall hose and pumper caps.
- 37) Open the secondary valve.
- 38) Now open the hydrant and check for leaks.

Complete Upper Body & Stem Conversion Kit M67 to M67B Brigadier

- 1) The Complete Upper Body & Stem Conversion Kit is required to upgrade any old Clow (McAvity, Concord) compression style hydrant to its equivalent new model. This is done without excavating! The only remaining old components are the old hydrant elbow & riser barrel.
- 2) Before installing the complete upper body and stem conversion kit, perform a visual inspection ensuring proper height and good access to the hydrant.
- 3) Close the secondary valve to shut off water supply.
- 4) Open the hydrant to release any residual water pressure.
- 5) Remove the hose cap and verify that there is no water flow.
- 6) Remove the weather cap screws (#10).
- 7) Open the hydrant fully to release the bonnet assembly.
- 8) Remove the bonnet (#14) using bonnet body wrench and turning counter clockwise.
- 9) Insert the interior wrench.
- 10) Thread the holding nut onto the upper stem.
- 11) Using a hydrant operating wrench draw the hydrant closed by threading holding nut fully on the upper stem to prevent damage to the drip valve.
- 12) Insert torque bar & Unthread the main valve seat by turning counter clockwise.
- 13) Remove the interior wrench and holding nut.
- 14) Lift out stem assembly safely. Rest the spider coupling on top of hydrant and re-grip.
- 15) Remove the hose and pumper caps to reduce weight.
- 16) Loosen the bolts and remove the flange segments (#25).
- 17) Remove the upper body (#80). Gently rock back and forth to break the seal.
- 18) Remove old gasket material.
- 19) Position the new gasket.
- 20) Replace and align the new upper body.
- 21) Attach the new flange segments.

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- 22) Prepare the new stem assembly for installation.
- 23) "HIGBEE" cut threads are self-aligning
- 24) Lubricate O-rings & complete seat with generous amount of grease to aid re-assembly. Lubricate with a food grade lubricant (good to -40 deg. C).
- 25) Insert the new stem assembly.
- 26) Thread in the main valve seat by turning clockwise.
- 27) Insert the interior wrench.
- 28) Now thread the holding nut onto the upper stem.
- 29) Draw hydrant closed by threading holding nut fully on upper stem to prevent damage to the drip valve.
- 30) Tighten the main valve seat.
- 31) Remove the interior wrench and holding nut.
- 32) Position the new gasket (#79) and bonnet assembly.
- 33) Tighten the bonnet assembly leaving a ¼" gap to allow for easy alignment.
- 34) Insert (#77) bolts into the bonnet assembly.
- 35) Close the hydrant fully to engage the gasket.
- 36) Now tighten the bolts.
- 37) After lubricating, insert the (#7) lubrication screw.
- 38) Attach the hose and pumper caps.
- 39) Open the secondary valve.
- 40) Now open the hydrant and check for leaks.

M67 & M67B Brigadier Hydrant Plugging



McAvity M67 (screw on bonnet)

- 1) Before plugging a hydrant, perform a visual inspection ensuring proper height and good access.
- 2) Close the secondary valve to shut off water supply.
- 3) Open the hydrant to release any residual water pressure and check for easy operation verifying that there are 16 to 18 turns to the full open position.
- 4) Remove the hose cap to verify that there is no water flow.
- 5) Remove weather cap screws (#10).
- 6) Remove lubrication screw (#7).
- 7) Now remove the cover.
- 8) Next remove the bonnet, noting the sequence of parts for reassembly.
- 9) Check and replace the O-ring (#15).

M67B & M93B BRIGADIER

- 10) Remove the bonnet bolts (#77).
- 11) Remove the bonnet assembly by fully opening (#64) operating nut to release (#70) upper stem.
- 12) Remove gasket (#79).
- 13) Insert the interior wrench.
- 14) Thread the holding nut onto the upper stem.
- 15) Using a hydrant operating wrench draw hydrant closed by threading holding nut fully on upper stem. This will prevent damage to the drip valve.
- 16) Insert torque bar & unthread the main valve seat by turning counter clockwise.

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- 17) Remove the interior wrench and holding nut.
- 18) Lift out stem assembly safely. Rest the spider coupling on the top of hydrant and re-grip.
- 19) Locate the plug hole.
- 20) Insert tapered drain hole plug (#49).
- 21) Lubricate O-rings & complete seat with generous amount of grease to aid re-assembly.
Remember to use food grade grease.
- 22) Now reinsert the stem assembly.
- 23) Thread in the main valve seat by turning clockwise.
- 24) Insert the interior wrench.
- 25) Thread the holding nut onto the upper stem.
- 26) Draw hydrant to the closed position to prevent damage to the drip lever.
- 27) Tighten the main valve seat.
- 28) Now remove the interior wrench and holding nut.
- 29) Position the new gasket and bonnet assembly.
- 30) Tighten the bonnet assembly leaving a ¼" gap to allow for easy alignment.
- 31) Insert the bolts into the bonnet assembly.
- 32) Close the hydrant fully to engage the gasket.
- 33) Now tighten the bonnet bolts.
- 34) Reinstall the hose and pumper caps.
- 35) Open the secondary valve.
- 36) Open the hydrant and check for leaks.

Changing nozzles & Caps (standard or STORZ)

- 1) Close the secondary valve to shut off water supply.
- 2) Operate the hydrant to release any residual water pressure.
- 3) Remove cap & verify that there is no water flow.

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- 4) Using a hammer & punch knockout (#22) pin on standard pumper nozzle. (For hose nozzle remove #69 Allen set screw).
- 5) Remove the standard nozzle (see page 26 for all tools required).
- 6) Clean threads in hydrant body and lubricate. use food grade grease.
- 7) Insert new STORZ nozzle and tighten. (see page 26) Use new O-rings only.
- 8) Using 15/64" drill bit drill through inside wall of new Storz nozzle, through existing hole #22 pin was removed from (for hose nozzles a hole must be drilled through hydrant body & new Storz nozzle. Contact Clow sales for further assistance).
- 9) Insert new #22 (anti rotation) pin, ensuring an interference fit.
- 10) Pin head must be mushroomed as shown to retain pin in hole.
- 11) Apply lock tight & silicon to outside of body as required.
- 12) Install the new STORZ hose/ pumper caps.
- 13) Open the secondary valve.
- 14) Open the hydrant and check for leaks.

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TROUBLE SHOOTING

1. Problem: Hydrant stiff to operate

Possible cause:

- Improper installation of thrust bearing
- Frozen operating nut
- Insufficient lubrication

Solutions:

1. Thrust bearing (#12) must be installed above collar on (#64) op nut.
2. Older M67 hydrant with bell housing style op nut. – requires Hydralube op nut & upper stem upgrade (page 37).
3. Hydrant requires proper lubrication – see page 34.

2. Problem: Hydrant spins freely won't open or close

Possible cause:

- Broken ground line coupling or pin
- Lower stem damage

Solutions:

1. Check items #28 & 83 on page #6 for damage – follow procedure on page 33 to change.
2. Check lower stem for excessive corrosion allowing rounding / no engagement with drip valve. Follow procedure on page 42 to change.
3. For older models only retained with #43 nut (page 9) corroded bottom end of stem allows for total disengagement from operating nut. Lower stem must be replaced.

3. Problem: Water bypassing main valve, hydrant won't completely shut off

Possible cause:

- Stone or forging matter lodged in main valve disc
- Damaged O-rings in main valve seat

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Solutions:

1. Follow procedure on page 33 to Check items 3434a,35 & 38 (page #6) for damage – follow procedure on page 33 to change.

4. Problem: Lower stem main valve assembly wont thread into hydrant boot

Possible cause:

Damaged threads on main valve seat / seat ring

Solutions:

1. Call your local Clow Canada sales Representative for further assistance.
2. Check threads on #42 main valve seat, replace if required.

5. Problem: Flange segments crack while attaching upper body

Possible cause:

Uneven torque applied / over torqued bolts

Solutions:

1. Install and torque bolt & nuts evenly (using a cross tightening pattern) to a maximum of 80 ft. lb's torque.
2. Try applying tightening force to nut below flange.

6. Problem: HYDRANT LEAKS - from around operating nut, or (#7) oil hole screw / at caps /at ground line

Possible cause:

Faulty gaskets or O-rings at any of these locations.

Solutions:

1. Inspect O-ring & groove for damage, install new O-ring & clean groove.
2. Inspect gasket & seating surface for damage, clean & install new gasket.

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**CLOW CANADA**

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CLOW CANADA WARRANTY

Clow warrants that the goods furnished hereunder will be free from defects in material and workmanship under normal and customary use and maintenance for a period of ten years for Resilient Wedge Gate Valves and twelve years for Fire Hydrants and one year for all other product, from the earlier of date represented by the code cast on the goods or the date of purchase, provided the goods are installed and maintained according to Clow's instructions and applicable codes.

Hydrant paint and maintenance parts excluded from warranties beyond one year. The foregoing warranty does not cover failure of any part or parts manufactured by others, which shall be subject to the warranties of the manufacturers of said parts, and the foregoing warranty does not cover failure of any part or parts from external forces, including but not limited to earthquake, vandalism, vehicular or other impact, application of excessive torque to the operating mechanism or frost heave.

Should any Clow part or parts fail to conform to the foregoing warranty, Clow shall, upon prompt written notice thereof, repair or replace, F.O.B. point of manufacture, such defective part or parts.

Buyer shall, if requested, return the part or parts to Clow, transportation prepaid.

Buyer shall bear all responsibility and expense incurred for removal, reinstallation, and shipping in connection with any part supplied under the foregoing warranty. Repair or replacement as set forth shall be the buyers sole remedy, whether such claims are based on breach of warranty, negligence or other theories.

THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY OR FITNESS, IN NO EVENT SHALL CLOW CANADA BE RESPONSIBLE OR LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL LOSSES, DAMAGES OR EXPENSES.

Any claim by Buyer with reference to the goods sold hereunder for any cause shall be deemed waived by Buyer unless submitted to Clow in writing within thirty (30) days from the date Buyer discovered, or should have discovered any claimed breach.