VIKING® | DESIGN DATA | FOAM CHAMBERS

1. PRODUCT NAME
Foam Maker
Model MCS - Steel, Type B
Model MCSS, Stainless Steel, Type B

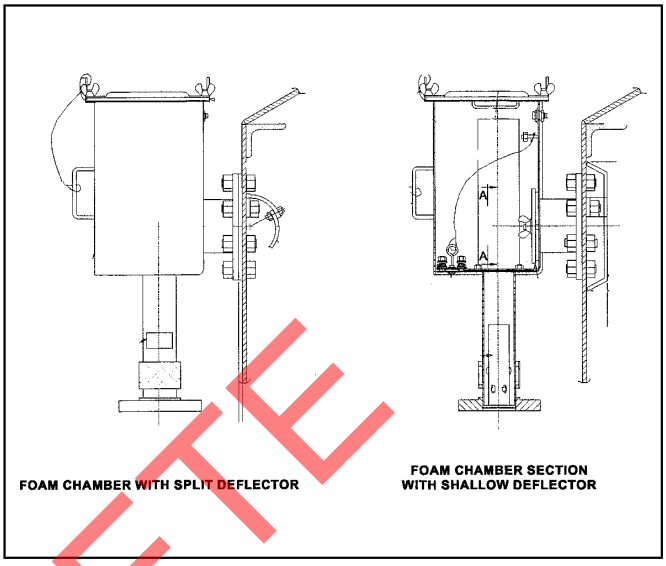
2. MANUFACTURER
National Foam
P O Box 270
Exton PA 19341 U.S.A.
Telephone: (610) 363-1400
Fax: (610) 524-9073

3. PRODUCT DESCRIPTION
The MCS or MCSS Type B Foam Maker and Foam Chamber is designed to introduce expanded foam directly onto the surface of a flammable or combustible liquid for fire extinguishment and/or vapor suppression. Classified as a Type II discharge device in accordance with NFPA Standard 11, foam chambers deliver low expansion foam directly onto the fuel surface with a minimum of foam submergence and fuel agitation. Minimizing submergence and agitation, increases the effectiveness of the foam blanket, resulting in more efficient operation, and superior extinguishing capabilities. Foam chambers have the added advantage of directly all their flow directly onto the product surface regardless of weather conditions, for the most effective utilization of foam resources. Foam chambers have a long history of timely and safe control of numerous incidents.
Foam chambers are compatible with all types of foam concentrate; protein, fluoroprotein, AFFF, and AR-AFFF. They are generally installed on the side wall of vertical storage tanks above the maximum product level. Piping coupled to the unit can be linked to a fixed foam proportioning system, or terminated a safe distance from the tank, where foam solution can be delivered via mobile fire apparatus or portable foam proportioning equipment.

4. TECHNICAL DATA
Materials of Construction:
Body: Carbon Steel or Stainless Steel
Jet/Receiver: Brass
Deflector: Carbon Steel or Stainless Steel
Drain Assembly: Stainless Steel
Gaskets: Buna N Elastomer
Vapor Seal Cartridge: SS/Graphite/Viton
Wing Nuts: Brass w/SS Washer
Internal Studs and Nut: Stainless Steel
Air Strainer: Stainless Steel
Finish:
Foam Chamber Body and Deflector: Abrasive blast to SSPC-SP6. Chemical wash, rinse and seal. Oven baked fusion coated polyester, 3 mils DFT
All Other Components: Natural Finish
Stainless Steel Models are Natural Finish

5. FEATURES
- Four sizes
- Superior Foam Quality
- 25% Lower Operating Pressure
- Tool Free Maintenance
- Corrosion Resistant Polyester Finish
- Remote Vapor Leakage Detector Capability

6. APPROVALS AND LISTINGS
- U.L. Listed



7. OPERATION
MCS or MCSS Type B Foam Chambers produce foam by introducing air into the foam solution stream. Foam solution can be delivered to the foam chamber in a variety of ways as previously noted. The inlet of the foam maker is fitted with a factory installed high efficiency venturi jet, which is designed to draw air into the foam solution stream. The high efficiency jet produces superior quality foam, and results in operating pressures 25% lower than previously possible, now a slow as 30 PSI (2.1 Bar). Lower operating pressure means foam solution piping can be smaller, resulting in lower installed cost.
Air is drawn into the foam maker through a series of annular holes located around the integral foam maker. To prevent obstruction, the air inlet holes are protected by a stainless steel screen selected with a perforation size designed to exclude most known nesting birds and insects. The open area of the screen is designed to be not less than the total area of the foam maker air inlet holes.
The aerated foam solution then passes through a series of precisely designed mechanical agitation devices which maximize foam expansion, and enhance drainage time. The expanded foam then passes into the foam chamber body which is designed to further enhance expansion, and reduce the velocity of the foam stream prior to discharge onto the product surface.
The foam chamber is fitted with a frangible vapor seal located just upstream of the discharge pipe connected to the storage tank. The vapor seal prevents the escape of product vapors to atmosphere and/or foam system piping. The exclusive location of the vapor seal in the discharge piping, also prevents the escape of product into the foam chamber in the event of an overfill situation.
The flow of expanded foam ruptures the vapor seal at a predetermined pressure, allowing the foam to enter the tank. As the foam exits the foam chamber, it impacts the deflector which is designed to direct the flow against the wall of the tank to reduce the amount of foam submergence into the product, as well as dispersing it to each side for more complete coverage.

Replaces page 304a-e dated March 1, 2001. (Changed Model Numbers to National Foam, updated picture on front page, added words Min./Max. to ordering chart and added dimension chart.)

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8. SPECIFICATIONS

The entire assembly shall consist of the foam chamber body with integral foam maker, factory installed integral venturi stylejet, deflector mounting hardware, and gaskets. A lifting lug designed to support the weight of the assembly shall be provided. Incorporated into the foam maker body shall be a plugged connection to allow the access and/or attachment of vapor detection equipment to detect the level of vapors within the foam maker body. The foam deflector shall be available in split or shallow configurations, and shall be suitable for welding or bolting. The foam chamber body shall contain a frangible vapor seal positioned to prevent condensation and product vapors from entering the foam chamber body. The vapor seal shall be designed to rupture between 10 and 25 PSI (0.7 to 1.7 bar) at the inlet connection, and be removable with the use of tools. The vapor seal shall be fully self contained cartridge design, and shall not require adhesives, sealants, or loose gaskets to accomplish sealing. Access to the frangible vapor seal shall be accomplished through a removable top cover, without the use of tools or the need to remove retaining nuts. All nuts shall be designed to be captive to prevent loss.

All cover and vapor seal retaining hardware shall consist of stainless steel studs with brass nuts to resist galling, seizing, and corrosion. All carbon steel parts shall be abrasive blasted and coated with a fused polyester powder finish.

The foam maker and foam chamber shall be U.L. Listed for operation as low as 30 PSI (2.1 bar).

It shall be possible to test the foam maker and foam chamber assembly by removing the lid. Testing shall be accomplished with the vapor seal installed, and without damaging the seal. During testing the vapor seal shall prevent test solution from entering the storage tank. No external sealing devices shall be necessary to accomplish testing. A drain shall be provided in the bottom of the foam chamber to allow draining test solution. The drain shall be operable without tools, and shall not be threaded.

9. INTERCHANGEABILITY

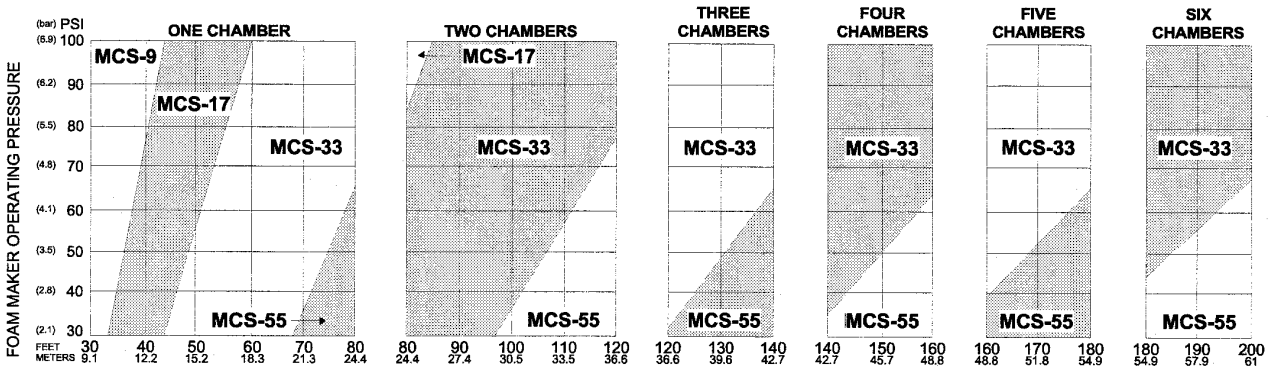
MCS or MCSS Type B Foam Makers and Foam Chambers are dimensionally equivalent to prior Model MCS or MCSS and MCS or MCSS Type A Foam Makers and Foam Chambers. All customer connection points are identical, eliminating the need for piping modifications when replacing earlier versions. Orifice plates and vapor seals from previous models are not compatible with MCS or MCSS Type B.

10. SELECTION

MCS or MCSS Type B Foam Makers and Foam Chambers are available in four sizes to suit most requirements. Refer to the Viking Engineering and Design Manual, and the applicable design standards and local codes to determine the required flow rate for the application. Refer to the capacity charts in Figure 2, and select the size of the unit that contains the desired flow rate within the shaded area. If the flow rate falls within the range of more than one unit, either size may be utilized. The size of the orifice is based on the flow and pressure parameters determined by the designer. Generally, the higher the operating pressure, the better the quality of foam produced. The better the foam quality, the more efficient the operation. Therefore, it is beneficial to utilize the highest operating pressure economically feasible. Specify flow rate and inlet pressure when ordering.

Deflectors are available in split or shallow configurations. The split deflector is designed to accommodate most installations, and can be installed from outside the tank. Shallow deflectors are intended for use when the tank is fitted with a floating roof which may pass over the deflector, minimizing possible damage to the roof seals. Shallow deflectors must be installed from inside the tank. All deflector mounting hardware is included.

Fig. 1 Foam Chamber Selection Guide
Based on Cone Roof Tanks 0.10 GPM/SQ. FT. (4.1 L/MIN/SQ.M.) Application Rate



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ORDERING INFORMATION

VIKING PART NUMBER	VIKING MODEL NUMBER	ORIFICE SIZE	DESCRIPTION	DEFLECTOR STYLE
F02203/0504	MCS-9 Type B	0.504 Min.	Foam Chamber Assembly, 2-1/2" inlet, 38-154 gpm	Split
F02203/0760	MCS-9 Type B	0.760 Max.	Foam Chamber Assembly, 2-1/2" inlet, 38-154 gpm	Split
F02204/0504	MCS-9 SS Type B	0.504 Min.	Foam Chamber Assembly, Stainless Steel 2-1/2" inlet, 38-154 gpm	Split
F02204/0760	MCS-9 SS Type B	0.760 Max.	Foam Chamber Assembly, Stainless Steel 2-1/2" inlet, 38-154 gpm	Split
F02290/0504	MCS-9 Type B	0.504 Min.	Foam Chamber Assembly, 2-1/2" inlet, 38-154 gpm	Shallow
F02290/0760	MCS-9 Type B	0.760 Max.	Foam Chamber Assembly, 2-1/2" inlet, 38-154 gpm	Shallow
F02291/0504	MCS-9 SS Type B	0.504 Min.	Foam Chamber Assembly, Stainless Steel 2-1/2" inlet, 38-154 gpm	Shallow
F02291/0760	MCS-9 SS Type B	0.760 Max.	Foam Chamber Assembly, Stainless Steel 2-1/2" inlet, 38-154 gpm	Shallow
F02205	--		Future assembly, Split Deflector MCS-9 Type B	--
F02292	--		Future assembly, Split Deflector MCS-9 Type B, Stainless Steel	--
F02206	--		Future assembly, Shallow Deflector MCS-9 Type B	--
F02293	--		Future assembly, Shallow Deflector MCS-9 Type B, Stainless Steel	--
F02207	--		Vapor Seal MCS-9 Type B, Graphite/Rubber	--
F02208/0721	MCS-17 Type B	0.721 Min.	Foam Chamber Assembly, 3" inlet, 76-286 gpm	Split
F02208/1051	MCS-17 Type B	1.051 Max.	Foam Chamber Assembly, 3" inlet, 76-286 gpm	Split
F02209/0721	MCS-17 SS Type B	0.721 Min.	Foam Chamber Assembly, Stainless Steel 3" inlet, 76-286 gpm	Split
F02209/1051	MCS-17 SS Type B	1.051 Max.	Foam Chamber Assembly, Stainless Steel 3" inlet, 76-286 gpm	Split
F02294/0721	MCS-17 Type B	0.721 Min.	Foam Chamber Assembly, 3" inlet, 76-286 gpm	Shallow
F02294/1051	MCS-17 Type B	1.051 Max.	Foam Chamber Assembly, 3" inlet, 76-286 gpm	Shallow
F02295/0721	MCS-17 SS Type B	0.721 Min.	Foam Chamber Assembly, Stainless Steel 3" inlet, 76-286 gpm	Shallow
F02295/1051	MCS-17 SS Type B	1.051 Max.	Foam Chamber Assembly, Stainless Steel 3" inlet, 76-286 gpm	Shallow
F02210	--		Future assembly, Split Deflector MCS-17 Type B	--
F02296	--		Future assembly, Split Deflector MCS-17 Type B, Stainless Steel	--
F02211	--		Future assembly, Shallow Deflector MCS-17 Type B	--
F02297	--		Future assembly, Shallow Deflector MCS-17 Type 17, Stainless Steel	--
F02212	--		Vapor Seal MCS-17 Type B, Graphite/Rubber	--
F02213/0980	MCS-33 Type B	0.980 Min.	Foam Chamber Assembly, 4" inlet, 158-647 gpm	Split
F02213/1530	MCS-33 Type B	1.530 Max.	Foam Chamber Assembly, 4" inlet, 158-647 gpm	Split
F02214/0980	MCS-33 SS Type B	0.980 Min.	Foam Chamber Assembly, Stainless Steel 4" inlet, 158-647 gpm	Split
F02214/1530	MCS-33 SS Type B	1.530 Max.	Foam Chamber Assembly, Stainless Steel 4" inlet, 158-647 gpm	Split
F02298/0980	MCS-33 Type B	0.980 Min.	Foam Chamber Assembly, 4" inlet, 158-647 gpm	Shallow
F02298/1530	MCS-33 Type B	1.530 Max.	Foam Chamber Assembly, 4" inlet, 158-647 gpm	Shallow
F02299/0980	MCS-33 SS Type B	0.980 Min.	Foam Chamber Assembly, Stainless Steel 4" inlet, 158-647 gpm	Shallow
F02299/1530	MCS-33 SS Type B	1.530 Max.	Foam Chamber Assembly, Stainless Steel 4" inlet, 158-647 gpm	Shallow
F02215	--		Future assembly, Split Deflector MCS-33 Type B	--
F02300	--		Future assembly, Split Deflector MCS-33 Type B, Stainless Steel	--
F02216	--		Future assembly, Shallow Deflector MCS-33 Type B	--
F02301	--		Future assembly, Shallow Deflector MCS-33 Type 17, Stainless Steel	--
F02217	--		Vapor Seal MCS-33 Type B, Graphite/Rubber	--
F02218/1457	MCS-55 Type B	1.457 Min.	Foam Chamber Assembly, 6" inlet, 315-1037 gpm	Split
F02218/1987	MCS-55 Type B	1.987 Max.	Foam Chamber Assembly, 6" inlet, 315-1037 gpm	Split
F02219/1457	MCS-55 SS Type B	1.457 Min.	Foam Chamber Assembly, Stainless Steel 6" inlet, 315-1037 gpm	Split
F02219/1987	MCS-55 SS Type B	1.987 Max.	Foam Chamber Assembly, Stainless Steel 6" inlet, 315-1037 gpm	Split
F02302/1457	MCS-55 Type B	1.457 Min.	Foam Chamber Assembly, 6" inlet, 315-1037 gpm	Shallow
F02302/1987	MCS-55 Type B	1.987 Max.	Foam Chamber Assembly, 6" inlet, 315-1037 gpm	Shallow
F02303/1457	MCS-55 SS Type B	1.457 Min.	Foam Chamber Assembly, Stainless Steel 6" inlet, 315-1037 gpm	Shallow
F02303/1987	MCS-55 SS Type B	1.987 Max.	Foam Chamber Assembly, Stainless Steel 6" inlet, 315-1037 gpm	Shallow
F02220	--		Future assembly, Split Deflector MCS-55 Type B	--
F02304	--		Future assembly, Split Deflector MCS-55 Type B, Stainless Steel	--
F02221	--		Future assembly, Shallow Deflector MCS-55 Type B	--
F02305	--		Future assembly, Shallow Deflector MCS-55 Type 17, Stainless Steel	--
F02222	--		Vapor Seal MCS-55 Type B, Graphite/Rubber	--

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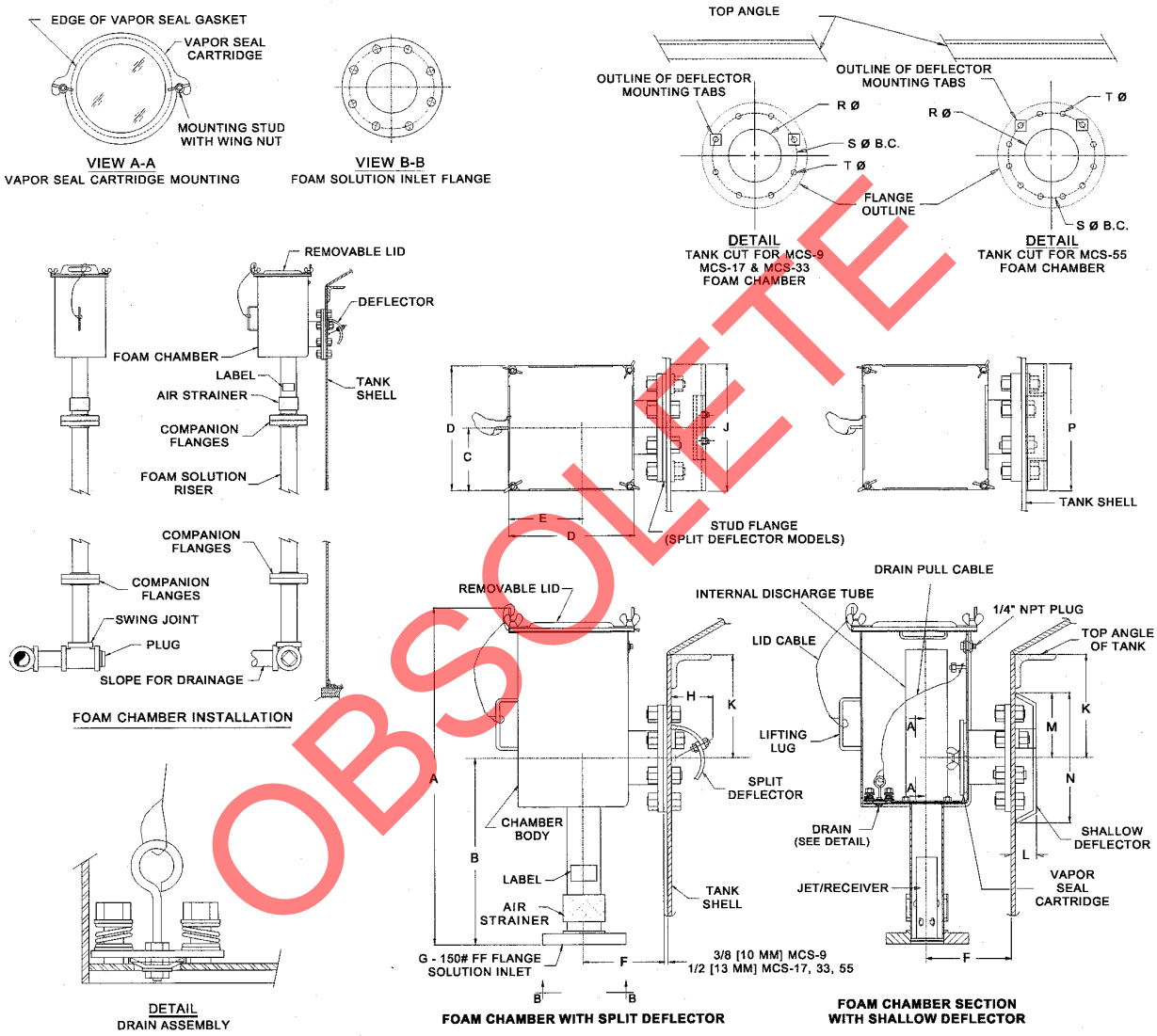

DIMENSION CHART

TYPE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	WEIGHT
MCS-9 Type B	29-1/2 (479)	15-1/4 (387)	5-1/2 (140)	11 (279)	6-1/2 (165)	7 (178)	2-1/2 (64)	4 (102)	12 (305)	8 (203)	1-11/16 (43)	5-3/4 (146)	14-1/4 (362)	8-1/2 (216)	4-1/2 (114)	7-1/2 (191)	3/4 (19)	82 (37.2)
MCS-17 Type b	35-13/16 (910)	19-9/16 (497)	6-1/2 (165)	13 (330)	7-1/2 (191)	9 (229)	3 (76)	4-1/2 (114)	18 (457)	9-1/2 (241)	1-11/16 (43)	6-1/2 (165)	16 (406)	12 (305)	6-5/8 (168)	9-1/2 (241)	7/8 (22)	124 (56.2)
MCS-33 Type B	39-5/16 (999)	20-13/16 (529)	7-1/2 (191)	15 (381)	8-1/2 (216)	10 (254)	4 (102)	6 (152)	24 (610)	11 (279)	1-11/16 (43)	8 (203)	24-1/2 (622)	16 (406)	8-5/8 (219)	11-3/4 (296)	7/8 (22)	187 (84.8)
MCS-55 Type B	46-5/16 (1176)	25-7/16 (646)	8-1/2 (216)	17 (432)	8-1/2 (216)	12 (305)	6 (152)	6-3/4 (171)	30 (762)	12 (305)	3-1/2 (89)	9 (229)	23-1/4 (591)	20 (508)	10-3/4 (273)	14-1/4 (362)	1 (25)	283 (128.4)

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Figure 2
FLOW RANGE CHARTS MCS or MCSS TYPE B FOAM MAKERS & FOAM CHAMBERS

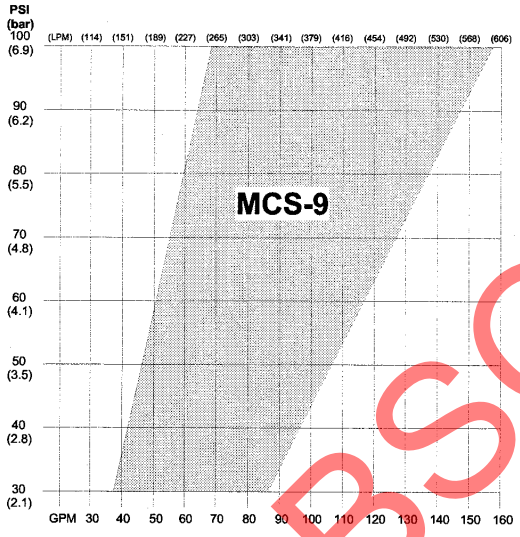
After determining the required foam solution delivery rate for an installation, the proper size chamber is selected and its solution orifice size is calculated by the following formula:

$d=(Q/29.8\ K\ P^{1/2})^{1/2}$ where:

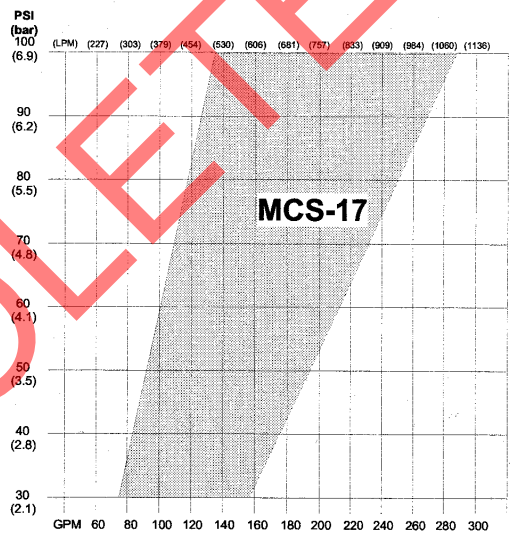
d = orifice diameter in inches
Q = solution flow in gpm
P = pressure at orifice inlet in psi
K = orifice jet coefficient

Orifice Jet Coefficient

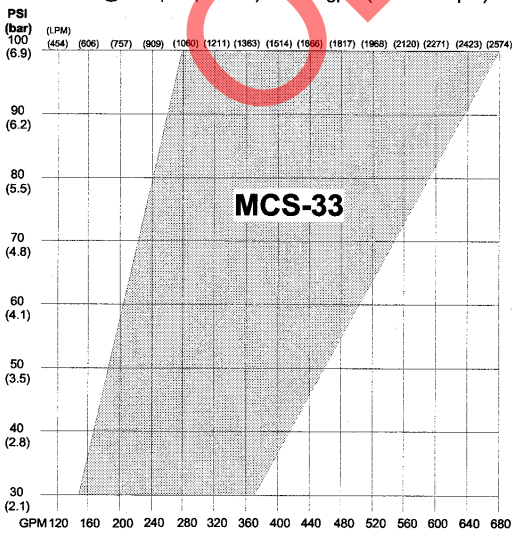
MCS-9, -9SS Type B	0.92
MCS-17, -17SS Type B	0.87
MCS-33, -33SS Type B	0.97
MCS-55, -55SS Type B	0.88



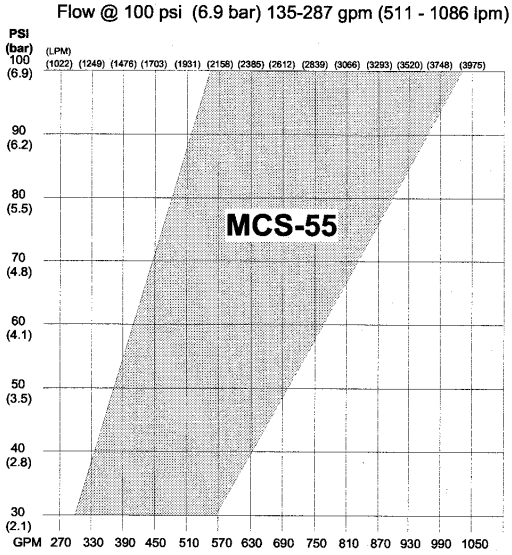
Flow @ 30 psi (2.1 bar) 38-87 gpm (144 - 329 lpm)
Flow @ 100 psi (6.9 bar) 69-158 gpm (261 - 598 lpm)



Flow @ 30 psi (2.1 bar) 74-157 gpm (280 - 594 lpm)
Flow @ 100 psi (6.9 bar) 135-287 gpm (511 - 1086 lpm)



Flow @ 30 psi (2.1 bar) 153 - 372 gpm (579 - 1408 lpm)
Flow @ 100 psi (6.9 bar) 279 - 679 gpm (1056 - 2570 lpm)



Flow @ 30 psi (2.1 bar) 304 - 567 gpm (1150 - 2146 lpm)
Flow @ 100 psi (6.9 bar) 557 - 1035 gpm (2108 - 3918 lpm)

Notes:
1. Solution flow can be specified for any flow/pressure combination within the shaded area.
2. Flow noted at 30 and 100 psi (2.1 & 6.9 bar) are flows achieved through the smallest & largest orifice available.