



flow data

Cv Values for Valves

Fig. Nos.	VALVE SIZE														
	½	¾	¾	1½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
GATES															
S & T-22	.5	2	4.9	9.1	22	40	65	95	175						
S & T-180	-	5.6	10.7	17.6	32	50	95	130	220						
S & T-111-113-131-133 134-135-136-174-176	-	5.6	10.7	17.6	32	54	97	135	230	337	536	710	960	1,525	2,250
(T & F-617-619-667-669 607-609) (CS-102-103 302-303-602-603) (F-637-639-DI-102)									215	335	510	710	945	1,525	2,250
JBES															
S & T-211 (BWY)-235Y 275Y	.61	1.16	2.2	3.64	6.65	11.1	20	28	48	70	111	-	198		
T-275-B	-	1.16	2.21	3.64	6.65	11.1	20	28	48	70	111				
F-718-(CS-132-133 332-333-632-633 (738))									45	70	105	-	195	315	465
CHECKS															
S & T-413-433-473 (Swing)	-	1.3	2.5	4.8	14.3	24	43	60	102	150	238	315	435	675	1,000
S & T-480 (Poppet)	-	-	3.70	6.86	16.3	30	49	72	130						
F-908 (Swing)									150	243	356	-	665	1,073	1,584
T & F-918-968-938 (Swing)									137	221	327	-	605	975	1,440
W-900-W (Wafer)									48	77	135	-	270	450	720
F-910-960 (Poppet)											155	-	278	350	625
W-910-960 (Poppet)									66	88	130	-	228	350	620



Liquid Flow:

$$Q = C_v \sqrt{\frac{\Delta P}{S}} \quad \text{or} \quad \Delta P = S \left(\frac{Q}{C_v} \right)^2$$

where... Q = flow rate (gallons per minute)
 ΔP = pressure drop across valve (psi)
 S = specific gravity of media

This equation is good for turbulent flow and for liquids with viscosities near that of water.
 (Cv is defined as the flow in GPM that a valve will carry with a pressure drop of 1.0 psi when the media is water at 60°F.) (The specific gravity of water is 1 (one).)

Gas Flow:

$$Q = 1360 C_v \sqrt{\frac{\Delta P \times P_1}{S T}}$$

where... Q = gas flow (SCFH—std. cu. ft./hr)
 S = specific gravity of gas (air = 1.0)
 T = temp—degrees Rankine (°F + 460)
 ΔP = pressure drop across valve (psi)
 P₁ = upstream pressure (psia) absolute

NOTE: ΔP must be less than .5 P₁ (Flow is critical when ΔP is greater than .5 P₁.)

(THROTTLING FACTORS)

For throttling use with disc partially open. Multiply Cv by factor.
 Note: Gate valves are not throttled.

Percent Open																		
8	10	12	14	16	18	20	24	0	10	20	30	40	50	60	70	80	90	100

150 6,700 9,925 13,800 18,375 23,600 29,600 43,570

	0	.35	.65	.90	.93	.96	.98	.99	1.00	1.00	1.00
	0	.03	.035	.06	.1	.16	.24	.32	.47	.68	1.00
860 1,390	0	.35	.65	.90	.93	.96	.98	.99	1.00	1.00	1.00

2,937 4,730 6,985

2,670 4,300 6,350

1,450 2,650 4,100 5,300 8,000 11,000 14,000 25,000

1,115 1,770 2,500 3,280 4,150 5,175 6,400 9,300

900 1,450

WARNING

The Fluid Flow factors contained herein are calculated values. They are therefore approximations and cannot be used for highly critical flow or pressure drop calculations. For very precise flow measurements, tests must be conducted on any valve mentioned within this catalog.

NIBCO INC., ELKHART, INDIANA

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LITTLE GIANT**LITTLE GIANT® MAGNETIC DRIVE CENTRIFUGAL PUMPS**

Attn: Chuck
803-777-8265
From: Day

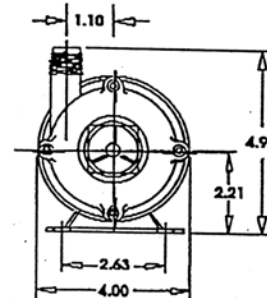
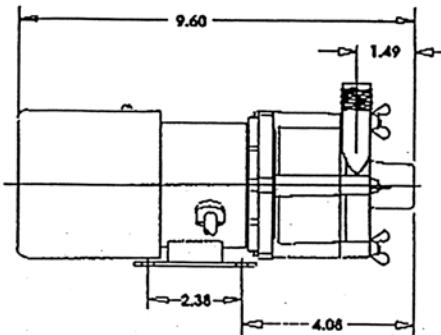
MD-SC Series Model 3-MD-SC**Description:**

Thermally protected open fan-cooled motor with ball bearings. 6' power cord with 3-prong molded plug. (230V version has no plug.)

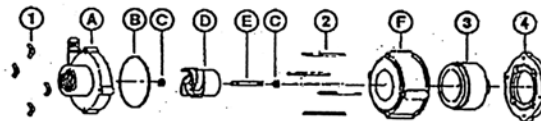
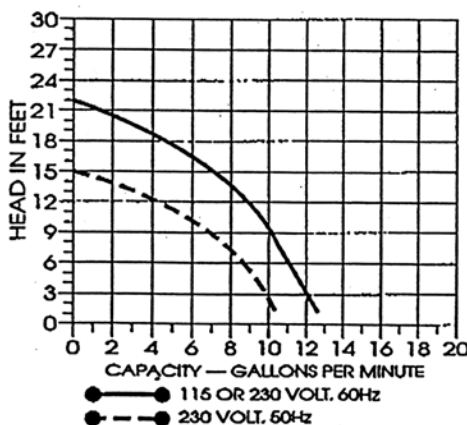
Fluid System Design Parameters:

- Specific Gravity - Up to 1.1.
- Ambient Air Temperature - Up to 77°F (25°C).
- Fluid Temperature - Up to 150°F (66°C).

NOTE: Consult your local distributor or the factory for applications with higher ambient temperatures, specific gravities, and viscosities.



NOTE: Designs and dimensions may vary for various reasons (i.e. type of motor). This information should be used as general guide rather than an unqualified guarantee. Specifications are subject to change without prior notice.



Welded Parts	Materials of Construction
A	Glass-filled Polypropylene Volute
B	Buna-N® (Nitrile) O-ring
C	Ceramic Thrust Washers
D	Glass-filled Polypropylene Impeller Assembly
E	Ceramic Shaft
F	Glass-filled Polypropylene Magnet Housing

Item No.	Part Description
1	Nut
2	Stud, Collared
3	Drive Magnet Assembly
4	Mounting Bracket

Model No.	Catalog No.	Wgt. (lbs.)	Intake Size (in.)	Disch. Size (in.)	HP.	RPM	Volts	PH	Heiz	Watts	Amps	Type	UL	CSA
3-MD-SC	581503	8.2	3/4 FNPT	1/2 MNPT	1/12	3100	115	1	60	180	2.4	Open FC	UR	C-CS
3-MD-SC	581513	8.2	3/4 FNPT	1/2 MNPT	1/12	3000	220-240	1	60	181	1.2	Open FC	UR	C-CS
3-MD-SC	581576	7.7	3/4 FNPT	1/2 MNPT	1/12	2600	220-240	1	50	205	1.7	Open FC	UR	NO
3-MD-SC	581597	2.0	3/4 FNPT	1/2 MNPT										

Pump Head Less Motor



FORM 99S404 2/95 Rev. New
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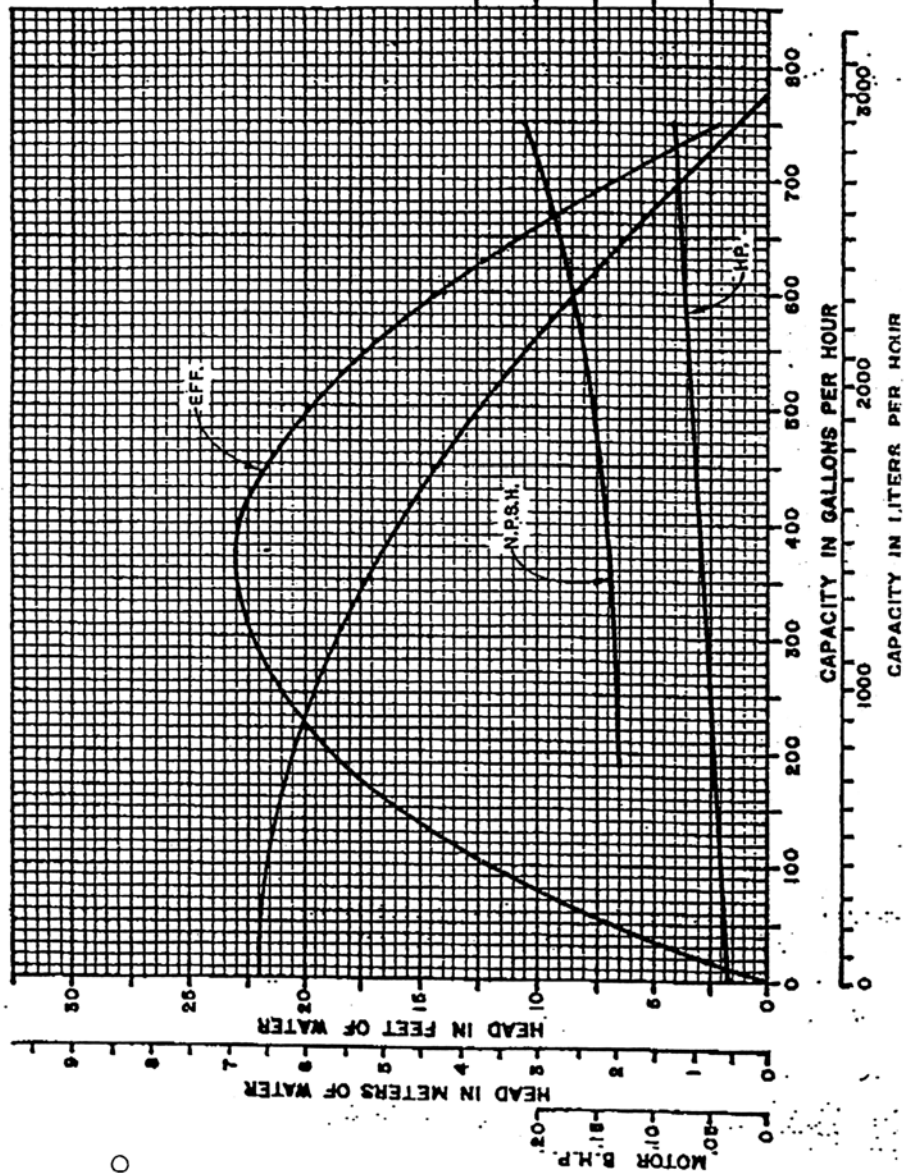
Post-It Fax Note	7671	Date	1-5-97	# of pages	2
To	CHUCK	From	Charlie Littley		
	Univ. of S.C.	Co.	Little Giant Pump		
Phone	803-777-9574	Phone	405-947-2511, Ex. 208		
Fax	803-777-8265	Fax	405-947-8720		

EFFICIENCY %

N.P.S.H. IN FEET OF WATER

N.P.S.H. IN METERS OF WATER

3-MD-SC/HC
PERFORMANCE CURVES
115 OR 230 VOLT 60 CYCLE



LITTLE GIANT® MAGNETIC DRIVE CENTRIFUGAL PUMPS

ENGINEERED FOR EXCELLENCE

MD-SC Series Model 5-MD-SC

FOR SEMI-CORROSIVE SOLUTIONS AND CHEMICALS



Description:

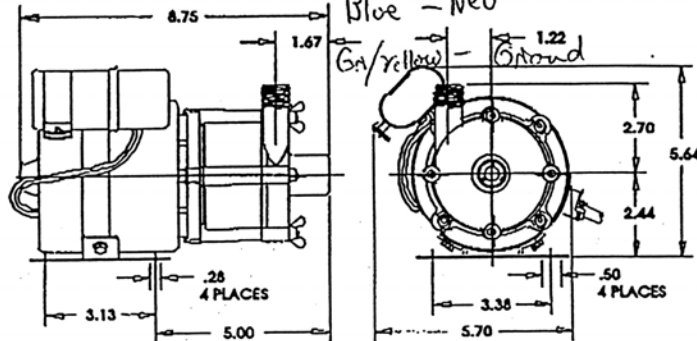
Thermally protected open fan-cooled permanent split capacitor motor with sleeve bearings. 6' power cord with 3-prong molded plug. (230V version has no plug.)

Fluid System Design Parameters:

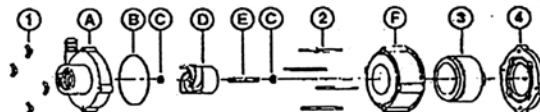
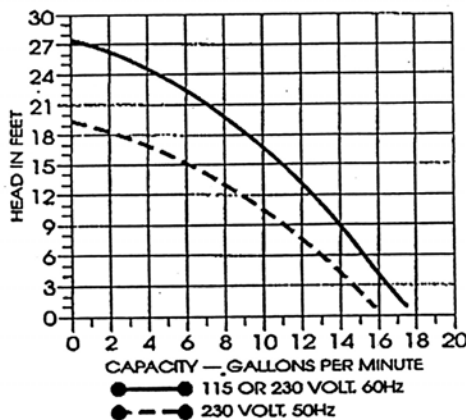
- Specific Gravity - Up to 1.1
- Ambient Air Temperature - Up to 77°F (25°C)
- Fluid Temperature - Up to 160°F (66°C)

NOTE: Consult your local distributor or the factory for applications with higher ambient temperatures.

• No gravities, and viscosities.



NOTE: Designs and dimensions may vary for various reasons (i.e. type of motor). This information should be used as general guide rather than an unqualified guarantee. Specifications are subject to change without prior notice.



Welded Parts	Materials of Construction
A	Glass-filled Polypropylene Volute
B	Buna-N® (Nitrile) O-ring
C	Ceramic Thrust Washers
D	Glass-filled Polypropylene Impeller Assembly
E	Ceramic Shaft
F	Glass-filled Polypropylene Magnet Housing

Item No.	Part Description
1	Nut
2	Stud, Colored
3	Drive Magnet Assembly
4	Mounting Bracket

Model No.	Catalog No.	Wgt. (lbs.)	Intake Size (in.)	Disch. Size (in.)	HP	RPM	Volts	PH	Hertz	Watts	Amps	Type	UL	CSA
5-MD-SC	583503	9.25	1 FNPT	1/2 FNPT	1/8	3000	115	1	60	208	2.0	Open FC PSC	UR	C-CSA
5-MD-SC	583513	9.25	1 FNPT	1/2 MNPT	1/8	2400/2500	220/240	1	50/60	200/240	1.0/1.1	Open FC PSC	UR	C-CSA
5-MD-SC	583598	2.0	1 FNPT	1/2 MNPT										

PUMP HEAD LESS MOTOR



FORM 995406 2/95 Rev. New

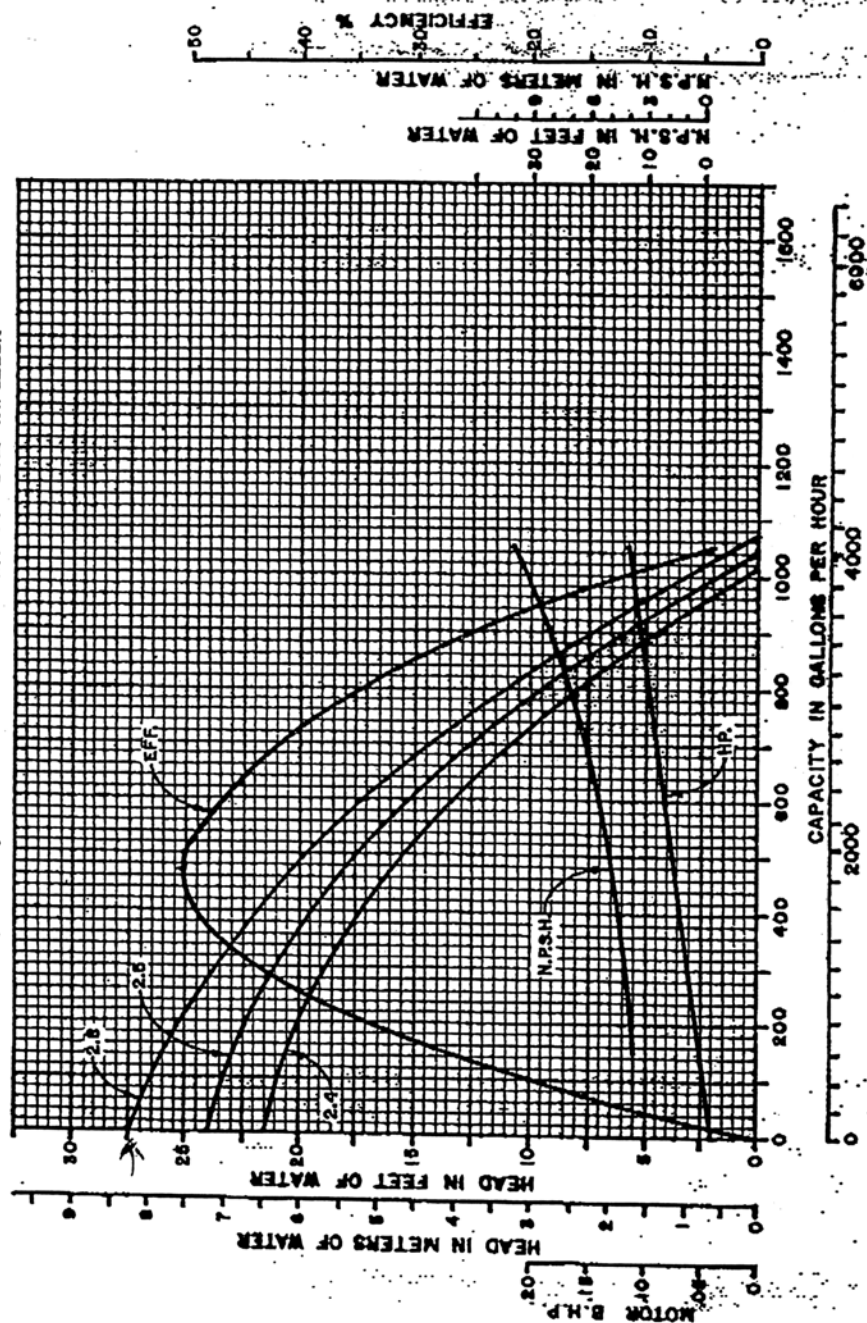
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5-MD-SC/HC PERFORMANCE CURVES 115 OR 230 VOLT 60 CYCLE

NOTES:
1. PERFORMANCE SHOWN WITH 2.8", 2.6", 2.4" DIAMETER IMPELLERS
2. HP, N.P.S.H., EFFICIENCY SHOWN FOR 2.8" DIAMETER IMPELLER



Little Giant® Pump Specifications

MODEL	CAT. NO.	INTAKE SIZE	DISC. SIZE	MOTOR										MOTOR TYPE	MAX. PSI	SHUT OFF HEAD (FT.)	GALLONS PER MINUTE				DIMENSIONS			WT. PKD. LBS.
				VOLTS	HP	RPM	PH	IN	WATTS	AMPS	1"	2"	3"				1 1/2"	HT.	WD.	LG.				
MD SERIES SPECIFICATIONS																								
1-AA-MD	580001	1/2" O.D.	1/2" O.D.	115	60	3250	1	1/200	10	.4	OPEN	235	6.4	2.7	1.7	-	-	-	-	-	3.72	2.4	4.73	2.33
1-AA-MD	580002	1/2" O.D.	1/2" O.D.	230	60	3000	1	1/200	20	.12	OPEN	235	5.4	2.7	1.7	-	-	-	-	-	3.72	2.4	4.73	2.33
1-MD	580002	1/2" O.D.	1/2" O.D.	115	60	3450	1	1/70	60	.78	OPEN FC	4.8	10.6	3.0	2.8	0.3	-	-	-	-	5.0	4.0	8.8	4.0
1-MD	580012	1/2" O.D.	1/2" O.D.	230	60	3000	1	1/70	100	.88	OPEN FC	4.8	10.6	3.0	2.8	0.3	-	-	-	-	5.0	4.0	8.8	4.0
2-MD	580002	1/2" FNPT	1/2" MNPT	115	60	3100	1	1/100	100	1.6	OPEN FC	8.3	14.6	8.5	7.8	5.5	-	-	-	-	5.0	4.0	8.8	8.25
2-MD	580012	1/2" FNPT	1/2" MNPT	230	60	3000	1	1/100	100	.84	OPEN FC	8.3	14.6	8.5	7.8	5.5	-	-	-	-	5.0	4.0	8.8	6.25
3-MD	581002	1/2" FNPT	1/2" MNPT	115	60	3300	1	1/200	105	1.4	OPEN FC	7.1	16.3	8.8	8.1	6.5	2.5	-	-	-	5.0	4.0	8.8	7.5
3-MD-X	581030	5/8" O.D.	5/8" O.D.	115	60	1550	1	1/50	87	.84	OPEN FC	3.0	7.0	5.8	5.0	-	-	-	-	-	5.25	3.8	7.7	6.2
3-MD-X	581031	5/8" O.D.	5/8" O.D.	115	60	3000	1	1/25	126	1.65	OPEN FC	8.2	18.0	7.6	7.2	6.0	3.0	-	-	-	5.25	3.8	7.7	7.0
TE-3-MD	581012	1/2" FNPT	1/2" MNPT	230	60	3200	1	1/20	115	.8	TEFC	7.1	16.3	9.6	9.1	8.5	7.5	-	-	-	6.0	4.0	8.6	8.0
4-MD	582002	1/2" FNPT	1/2" MNPT	115	60	3350	1	1/12	213	2.4	OPEN FC	10.2	23.7	11.5	11.0	8.1	6.5	5.0	-	-	5.0	4.0	8.8	8.25
4-MD	582012	1/2" FNPT	1/2" MNPT	230	60	2500	1	1/12	212	1.4	OPEN FC	10.2	23.7	11.5	11.0	8.1	6.5	5.0	-	-	5.0	4.0	8.8	8.25
5-MD	583002	1/2" FNPT	1/2" MNPT	115	60	3250	1	1/8	200	2.1	PSC OPEN FC	15.0	34.6	15.1	14.6	12.5	10.6	-	-	-	5.7	5.7	8.6	9.25
5-MD	583012	1/2" FNPT	1/2" MNPT	230	60	2500	1	1/8	240	1.1	PSC OPEN FC	15.0	34.6	15.1	14.6	12.5	10.6	-	-	-	5.7	5.7	8.6	9.25
MD-SC SERIES SPECIFICATIONS																								
1.5-MD-SC	580201	3/4" FNPT	1/4" MNPT	115	60	3100	1	1/105	80	1.1	OPEN FC	5.4	12.6	5.4	5.0	2.7	-	-	-	-	4.5	3.5	7.5	4.5
PE-1.5-MD-SC	580204	1/2" FNPT	1/4" MNPT	115	60	3000	1	1/105	83	0.9	ENCAP.	5.5	12.6	5.4	5.0	2.7	-	-	-	-	3.75	4.02	7.5	5.0
2-MD-SC	580503	1/2" FNPT	1/2" MNPT	115	60	2800	1	1/25	108	1.43	OPEN FC	8.3	14.6	8.5	7.8	5.5	-	-	-	-	5.0	4.0	8.8	8.25
2-MD-SC	580513	1/2" FNPT	1/2" MNPT	230	60	3000	1	1/100	100	0.64	OPEN FC	8.3	14.6	8.5	7.8	5.5	-	-	-	-	5.0	4.0	8.8	6.25
2-MD-X-SC	580509	1" FNPT	1" MNPT	115	60	3000	1	1/25	110	1.5	OPEN FC	3.5	8.1	12.8	10.7	-	-	-	-	-	5.25	4.0	9.3	6.25
3-MD-SC	581504	3/4" FNPT	1/2" MNPT	115	60	3200	1	1/15	90	0.8	TEPSC	7.8	18.0	11.5	10.8	8.3	4.0	-	-	-	4.0	4.0	11.4	9.2
3-MD-X-SC	581509	1" FNPT	1" MNPT	115	60	3200	1	1/15	100	0.9	TEPSC	8.1	14.0	18.3	16.7	11.5	-	-	-	-	5.21	4.0	11.73	9.2
3-MD-SC	581503	3/4" FNPT	1/2" MNPT	115	60	3100	1	1/12	180	2.4	OPEN FC	8.5	21.9	12.5	11.8	10.0	7.1	-	-	-	5.0	4.0	8.6	8.2
3-MD-SC	581513	3/4" FNPT	1/2" MNPT	230	60	3000	1	1/12	181	1.2	OPEN FC	8.5	21.9	12.5	11.8	10.0	7.1	-	-	-	5.0	4.0	8.6	8.2
3-MD-SC	581576	3/4" FNPT	1/2" MNPT	230	50	2600	1	1/12	205	1.7	OPEN FC	8.5	15.0	10.4	8.8	7.0	-	-	-	-	5.0	4.0	8.6	7.7
4-MD-SC	582503	1" FNPT	1/2" MNPT	115	60	3000	1	1/10	185	1.7	OPEN FC PSC	10.5	24.3	14.2	13.6	11.8	9.2	-	-	-	4.9	5.5	9.75	9.0
4-MD-X-SC	582508	1" FNPT	1" MNPT	115	60	3280	1	1/10	145	1.3	OPEN FC PSC	7.4	17.0	22.1	20.4	15.0	5.2	-	-	-	5.21	5.13	8.92	8.0
TE-4-MD-SC	582514	1" FNPT	1/2" MNPT	230	60	3000	1	1/10	150	0.7	TEFC PSC	10.5	24.3	14.2	13.6	11.8	9.2	-	-	-	5.0	5.5	10.8	9.75
TE-5-MD-SC	584504	1" FNPT	1/2" MNPT	115	60	3450	1	1/8	325	3.0	TEFC PSC	12.7	29.3	20.0	18.2	17.0	14.3	-	-	-	7.3	5.2	11.2	19.0
5-MD-SC	583503	1" FNPT	1/2" MNPT	115	60	3000	1	1/8	208	2.0	OPEN FC PSC	11.9	27.5	17.5	16.5	14.0	10.8	-	-	-	5.64	5.7	8.75	9.25
5-MD-SC	583513	1" FNPT	1/2" MNPT	230	60	2500	1	1/8	240	1.1	OPEN FC PSC	11.9	27.5	17.5	16.5	14.0	10.8	-	-	-	5.64	5.7	8.75	9.25
TE-5.5-MD-SC	585504	1" FNPT	3/4" MNPT	115	60	3450	1	1/8	325	3.0	TEFC	18.0	42.0	-	33.0	20.5	28.0	-	-	-	7.0	8.71	14.4	28.0
TE-6-MD-SC	586504	1" FNPT	3/4" MNPT	230	60	3450	1	1/2	340	7.8	TEFC	22.0	51.0	-	38.0	24.5	34.0	-	-	-	7.0	8.71	14.4	29.0
MD-HC SERIES SPECIFICATIONS																								
2-MD-HC	580603	1/2" FNPT	1/2" MNPT	115	60	3100	1	1/100	105	1.7	OPEN FC	8.3	14.6	8.5	7.8	5.5	-	-	-	-	5.0	4.0	8.8	7.0
2-MD-HC	580613	1/2" FNPT	1/2" MNPT	230	60	2000	1	1/100	100	0.64	OPEN FC	8.3	14.6	8.5	7.8	5.5	-	-	-	-	5.0	4.0	8.8	7.0
3-MD-HC	581603	3/4" FNPT	1/2" MNPT	115	60	3100	1	1/12	180	2.4	OPEN FC	8.5	21.9	12.5	11.8	10.0	7.1	-	-	-	5.0	4.0	8.6	8.8

APPENDIX (SECTION A)

FLOW & PRESSURE CHARTS & CONVERSIONS

- Flow & Pressure Charts
- Heads and Equivalent Pressure Conversions
- Pressure Conversions
- Flow Rate Conversions

DETERMINING INSIDE DIAMETER OF TUBING

The I.D. of tubing is set by flow requirements, permissible pressure drop and maximum allowable velocity. To aid in selecting the proper I.D. of tubing for liquid flow, Charts 1 through 10 are provided on the following pages. Charts 11 through 20 are provided for sizing tubing for gas flow.

These charts give pressure drop for 100 feet of tubing for both water and air flow. By using the formula provided, it is also possible to obtain the pressure drop of fluids other than water and gas.

To allow for pressure drops in bends and fittings, the equivalent lengths in Table A can be used when obtaining equivalent length of tubing for pressure drop calculations. To obtain equivalent length of tubing, total all straight lengths and then add lengths for each bend, elbow or tee from Table A.

EQUIVALENT FEET OF STRAIGHT TUBE

Tubing O.D. (In.)	90° Elbow (ft.)	90° Bend (ft.)	180° Bend (ft.)	45° Bend (ft.)	Tee Branch (ft.)
1/4	1	1/2	1	1/2	1
3/8	1-1/2	1/2	1	1/2	1-1/2
1/2	2	1/2	1	1/2	2
5/8	2-1/2	1	2	1/2	2-1/2
3/4	3	1	2	1/2	3
1	4-1/2	1	2	1/2	4-1/2
1-1/4	5	2	4	1	5
1-1/2	6	2	4	1	6
2	9	2	4	1	9

Table A