

Mark 78

Globe Style Control Valves

The Mark 78 pneumatic control valve is designed for accurate performance and simplified maintenance. This versatile product can be used on a variety of applications, including viscous/corrosive liquids, process gases or utility steam in process or utility service.

FUNCTION

The Mark 78 Globe Style Control Valve utilizes a cage retained seat design with unbalanced plug. The top entry cage design allows maintenance while the valve is in the line. The trim comes with stainless steel standard, or can easily accommodate special materials for maximum corrosion resistance. Threaded, welded, or flanged ends complete a truly versatile valve that covers a wide variety of applications from utility steam to process gases, to corrosive/viscous liquids.

FEATURES

- A top entry cage design — allows easy, in-line maintenance
- Optional soft seats — enables bubble-tight ANSI Class VI shutoff
- Characterized flow options — including linear, equal percentage, quick opening, or an equal-linear combination
- High capacity service — Cv's up to 60 (Kv's up to 51,6) in 2" (DN50) valves; Cv's up to 200 (Kv's up to 172) on 4" (DN100) valves
- Lift out seats — seats are not screwed in, and lift out of the valve body for easy access and quick maintenance
- Versatile use — can be used on a variety of applications including liquids, gases or steam

SPECIFICATIONS

Sizes

- 1/2" through 4" (DN15 to DN100)

End Connections

- Threaded (NPT, BSPT, BSPP)
- ANSI Flanges (150#, 300#)
- DIN Flanges (PN 10/16, PN 25/40)
- Companion Flanges (PN 10/16, PN 25/40)
- Integral Flanges (ANSI 150#, 300# – 1-1/2" - 4"; ANSI 600# – 3" - 4")

Body Materials

- Bronze: 1/2" - 2" only (DN15 - DN50)
- Carbon Steel: 1/2" - 4" (DN15 - DN100)
- Stainless Steel: 1/2" - 4" (DN15 - DN100)

Trim Materials

- 316 Stainless Steel: 1/2" - 2" (DN15 - DN50)
- 17-4Ph: 3" - 4" (DN80 - DN100)



SPECIFICATIONS

Seats

- Teflon/Stainless Steel
- Metal

O-Ring/Gasket

- Viton, EPDM: 1/2" - 2" (DN15 - DN50)
- For services from 350°F to 450°F (177°C to 232°C): flat compressed man-made fiber and spiral wound SST/TFE — 3" (DN80), 4" (DN100)
- For services from 450°F to 1000°F (232°C to 538°C): flat graphite and spiral wound SST/Graphoil — 3" (DN80), 4" (DN100)

Shutoff

- ANSI Class VI with soft seat
- ANSI Class IV with hard seat

Actuator

- Sizes: 35M, 55M, 85M, 140in², 240in²
- Signal Range: 3-15 psi (0,2-1,0 bar) standard (1/2" - 2"/DN15 - DN50); larger sizes vary by configuration
- Maximum Actuator Pressure: 45 psi (3,10 bar)
- Available with side or top mounted positioners. Positioner is required above 2" (DN50) for modulating duty
- Electric actuator available, consult factory

Flow Characteristic

- Equal percentage
- Linear
- Quick opening (below 3"/DN80)
- Equal-linear combination (below 3"/DN80)

Rangeability

- Equal percentage or equal-linear: 60:1
- Linear: 30:1

Recovery Factor, F_L: 0.9

Valve Capacity, Cv (Kv)

Plug Style	Cv (Kv) per Valve Seat Size						
	1/2" (DN15)	3/4" (DN20)	1" (DN25)	1-1/2" (DN40)	2" (DN50)	3" (DN80)	4" (DN100)
Equal Percentage	4.4 (3,8)	8.0 (6,9)	11.5 (9,9)	30 (26)	45 (39)	120 (103)	200 (172)
Linear	4.4 (3,8)	8.0 (6,9)	12.2 (10,5)	30 (26)	45 (39)	120 (103)	200 (172)
Equal - Linear	4.4 (3,8)	8.0 (6,9)	12.0 (10,3)	35 (30)	50 (43)	N/A	N/A
Quick Opening	4.6 (4,0)	9.0 (7,7)	12.7 (10,9)	40 (34)	60 (52)	N/A	N/A

Maximum Allowable ΔP, PSI (BAR)

(Flow -to-opn with 3-15 spring)

Actuator Size	Body Alloy	Valve Seat Size				
		1/2"	3/4"	1"	1-1/2"	2"
35M ATO	BRZ	400 (28)	225 (16)	125 (9)	N/A	N/A
	CS/SS	400 (28)	225 (16)	125 (9)	N/A	N/A
35M ATC	BRZ	500 (34)	375 (26)	225 (16)	N/A	N/A
	CS/SS	650 (45)	375 (26)	225 (16)	N/A	N/A
55M ATO	BRZ	500 (34)	350 (24)	225 (16)	80 (6)	40 (3)
	CS/SS	600 (41)	350 (24)	225 (16)	80 (6)	40 (3)
55M ATC	BRZ	500 (34)	500 (34)	350 (24)	120 (8)	60 (4)
	CS/SS	950 (66)	600 (41)	350 (24)	120 (8)	60 (4)
85M ATO	ALL	N/A	N/A	N/A	100 (7)	75 (5)
85M ATC	ALL	N/A	N/A	N/A	200 (14)	115 (8)
35M* ATO	BRZ	500 (34)	450 (31)	250 (17)	N/A	N/A
	CS/SS	800 (55)	450 (31)	250 (17)	N/A	N/A
35M* ATC	BRZ	500 (34)	500 (34)	450 (31)	N/A	N/A
	CS/SS	1000 (69)	750 (48)	450 (31)	N/A	N/A
55M* ATO	BRZ	500 (34)	500 (34)	450 (31)	160 (11)	80 (6)
	CS/SS	1000 (69)	700 (52)	450 (31)	160 (11)	80 (6)
55M* ATC	BRZ	500 (34)	500 (34)	500 (34)	240 (17)	125 (9)
	CS/SS	1000 (69)	1000 (69)	675 (47)	240 (17)	125 (9)
85M* ATO	ALL	N/A	N/A	N/A	200 (14)	150 (10)
85M* ATC	ALL	N/A	N/A	N/A	400 (28)	230 (16)
		3"			4"	
140in ² **	ALL	212 (15)			N/A	
240in ² **	ALL	N/A			95 (7)	
140in ² ***	ALL	381 (26)			N/A	
240in ² ***	ALL	N/A			270 (19)	
140in ² #	ALL	310 (21)			N/A	
240in ² #	ALL	N/A			150 (10)	

- * with a positioner supplying 40 psi (2,76 bar) to the actuator.
- ** ATC with positioner supplying 35 psi (2,41 bar) to actuator.
- *** ATC with positioner supplying 45 psi (3,10 bar) to actuator.
- # ATO with positioner supplying 40 psi (2,76 bar) to actuator.

Pressure Temperature Limits: 1/2" - 2" (DN15 - DN50)

Temperature Limits

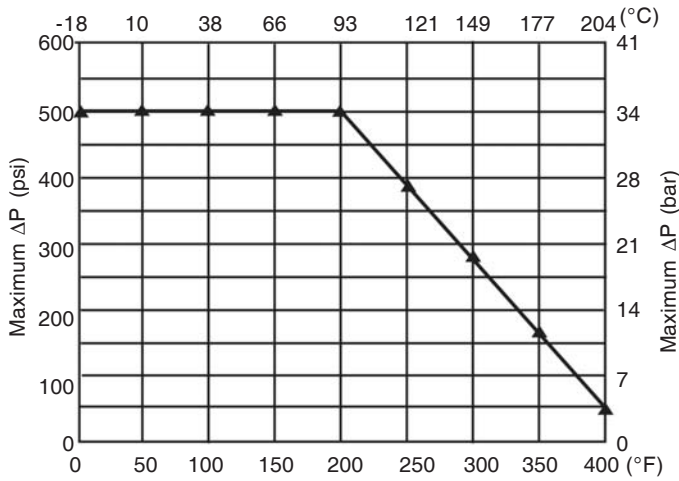
- Viton: -20°F to 400°F (-29°C to 204°C)
- EPDM: -40°F to 450°F (-40°C to 232°C)

Pressure/Temperature Ratings, Hard Seat

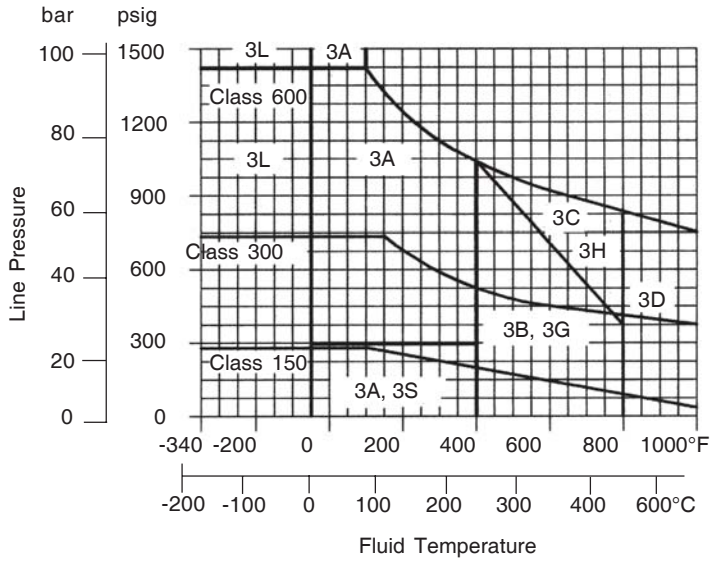
°F (°C)	-20 (-29)	100 (38)	200 (93)	300 (149)	400 (204)
PSI (bar) BRZ	500 (34)	500 (34)	475 (33)	425 (29)	375 (26)
PSI (bar) CS/SS	1000 (69)	1000 (69)	1000 (69)	1000 (69)	1000 (69)

SPECIFICATIONS

Pressure/Temperature Ratings, Soft Seat

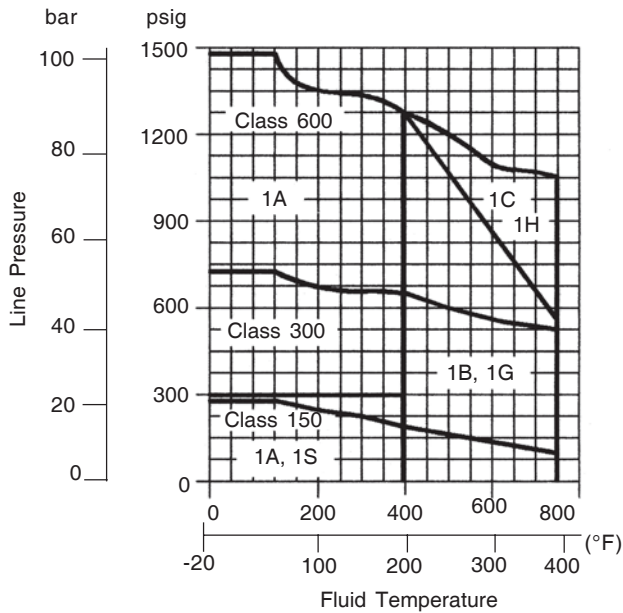


Stainless Steel Bodies

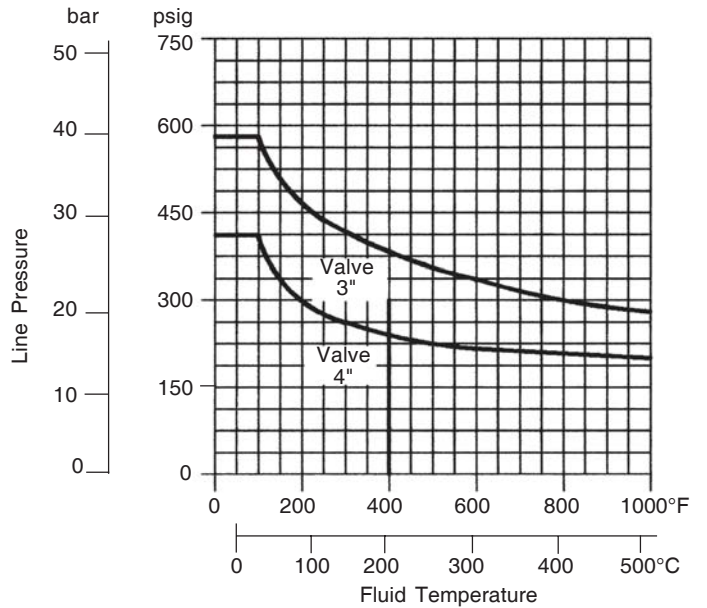


Pressure/Temperature Limits: 3" - 4" (DN80 - DN100)

Carbon Steel Bodies



Bellows Assembly



Use these charts to determine the material combination that meet your pressure temperature requirements per ANSI B16.34

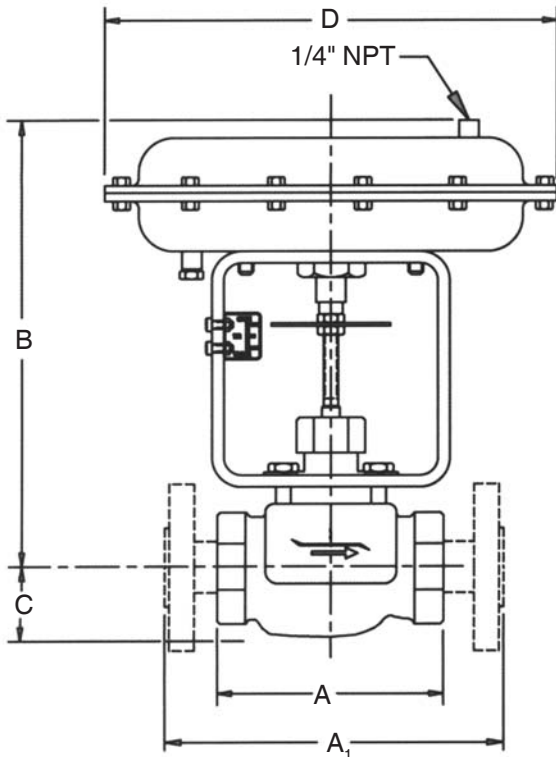
Notes to Table & Trim Charts:

- a. Standard structure for associated body material
- b. For service temperature above 400°F (204°C), contact your local representative
- c. For service temperatures above 1000°F (538°C), contact your local representative
- d. HFS = Hard Faced Stellite Alloy 6

Body Material	Structure Code	Bonnet	Guide Bushing	Stem	Plug & Seat	Packing
CS	1A (a)	Plain	Filled TFE	316SS	17-4 PH	TFE V-Rings
	1H	Plain	Filled TFE	316SS	316SS/HFS	Graphite & lantern ring
	1C	Extension	Filled TFE	316SS	316SS/HFS	TFE V-Rings & Graphite ring
	1SO (b)	Bellows Seal	Filled TFE	316SS	17-4 PH	316L SS bellows & TFE V-Rings
SST	3A (a)	Plain	Filled TFE	316SS	17-4 PH	TFE V-Rings
	3G	Plain	Filled TFE	316SS	17-4 PH	Graphite & lantern ring
	3B	Extension	Filled TFE	316SS	17-4 PH	TFE V-Rings & Graphite ring
	3H	Plain	Filled TFE	316SS	316SS/HFS	Graphite & lantern ring
	3C	Extension	Filled TFE	316SS	316SS/HFS	TFE V-Rings & Graphite ring
	3D	Extension	Filled TFE	316SS	316SS/HFS	Graphite & lantern ring
	3L	Extension	Filled TFE	316SS	316SS	TFE V-Rings
	3SO (b)	Bellows Seal	Filled TFE	316SS	17-4 PH	316L SS bellows & TFE V-Rings

DIMENSIONS

• 1/2" - 2" (DN15 - DN50)



■ Flanged Ends

Size	Actuator Size	ANSI Flange	Dimensions (Inches)				Weight (lbs.)
			A1	B	C	D	
1/2"	35M	150#	7.25	9.62	1.31	9.50	12
	55M		7.25	10.88	1.31	12.50	32
	35M	300#	7.50	9.62	1.31	9.50	14
	55M		7.50	10.88	1.31	12.50	34
3/4"	35M	150#	7.25	9.62	1.31	9.50	14
	55M		7.25	10.88	1.31	12.50	34
	35M	300#	7.62	9.62	1.31	9.50	16
	55M		7.62	10.88	1.31	12.50	36
1"	55M	150#	7.25	10.88	1.31	12.50	14
	85M		7.25	11.75	1.31	15.00	34
	55M	300#	7.75	10.88	1.31	12.50	16
	85M		7.75	11.75	1.31	15.00	36
1-1/2"	55M	150#	8.75*	13.00	2.18	12.50	51
	85M		8.75*	13.88	2.18	15.00	61
	55M	300#	9.25*	13.00	2.18	12.50	57
	85M		9.25*	13.88	2.18	15.00	67
2"	55M	150#	10.00	13.00	2.18	12.50	55
	85M		10.00	13.88	2.18	15.00	65
	55M	300#	10.50	13.00	2.18	12.50	59
	85M		10.50	13.88	2.18	15.00	69

* If bronze, the face-to-face will be 11.00" and not be ANSI standard

■ Threaded Ends

Size	Actuator Size	Dimensions (Inches)				Weight (lbs.)
		A	B	C	D	
1/2" & 3/4"	35M	4.50	9.62	1.31	9.50	10
	55M	4.50	10.88	1.31	12.50	30
1"	35M	4.50	9.62	1.31	9.50	10
	55M	4.50	10.88	1.31	12.50	30
1-1/2"	55M	6.75	13.00	2.18	12.50	45
	85M	6.75	13.88	2.18	15.00	55
2"	55M	6.75	13.00	2.18	12.50	45
	85M	6.75	13.88	2.18	15.00	55

■ Flanged Ends, Metric

Size (DN)	Actuator Size	Flange (PN)	Dimensions (mm)				Weight (kg)
			A1*	B	C	D	
15	35M	10/16/25/40	184	244	33	241	5,4
	55M		184	276	33	317	14,5
20	35M	10/16/25/40	184	244	33	241	6,3
	55M		184	276	33	317	15,4
25	35M	10/16/25/40	184	276	33	241	6,3
	55M		184	298	33	317	15,4
40	55M	10/16/25/40	279	330	55	317	23,1
	85M		279	353	55	381	27,7
50	55M	10/16/25/40	279	330	55	317	24,9
	85M		279	353	55	381	29,5

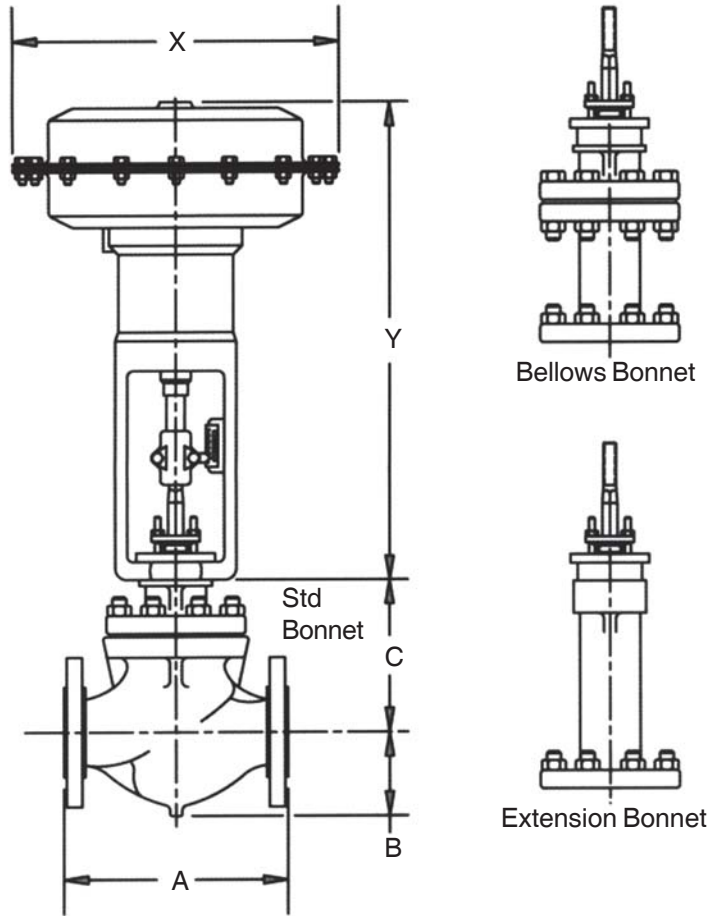
* Not per DIN 3202

■ Threaded Ends, Metric

Size (DN)	Actuator Size	Dimensions (mm)				Weight (kg)
		A	B	C	D	
15 & 20	35M	114	244	33	241	4,5
	55M	114	276	33	318	13,6
25	35M	114	276	33	241	4,5
	55M	114	298	33	318	13,6
40	55M	171	330	55	318	20,4
	85M	171	353	55	381	25,0
50	55M	171	330	55	318	20,4
	85M	171	353	55	381	25,0

DIMENSIONS

- 3 - 4" (DN80 - 100)



■ Flanged Ends

Dimensions	Ends	3"	4"
A	150#	11.75	13.88
	300#	12.50	14.25
	600#	13.25	15.50
B	150#	4.50	5.38
	300#	4.50	5.38
	600#	4.50	5.44
C	Plain	7.62	8.81
	Extended	16.25	17.44
	Bellows	17.25	23.00
X	ALL	17.00	22.00
Y	ALL	27.25	32.88
Wt. (lbs)	ALL	297	336

■ Flanged Ends, Metric

Dimensions	Ends	DN80	DN100
A	PN10/16 FE	298,5	352,4
	PN25/40 FE	317,5	362,0
	PN100 FE	336,6	393,7
B	PN10/16 FE	114,3	136,7
	PN25/40 FE	114,3	136,7
	PN100 FE	114,3	138,2
C	Plain	193,6	223,8
	Extended	412,8	443,0
	Bellows	438,2	584,2
X	ALL	431,8	558,8
Y	ALL	692,2	835,2
Wt. (kgs)	ALL	134,7	152,4

MK78 GLOBE STYLE CONTROL VALVE

Cv VERSUS TRAVEL CHART

Size	Characteristic	Cv	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/2"	Equal Percentage	4.4	0.01	0.1	0.3	0.4	0.7	1.0	1.5	2.1	3.0	4.4
	Linear	4.4	0.04	0.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0	4.4
3/4"	Equal Percentage	8	0.1	0.3	0.5	0.8	1.2	1.8	2.6	3.8	5.4	8.0
	Linear	8	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0
1"	Equal Percentage	11.5	0.2	0.4	0.7	1.1	1.7	2.6	3.8	5.4	7.8	11.5
	Linear	12.2	1.2	2.4	3.7	4.9	6.1	7.3	8.5	9.8	11.0	12.2
1-1/2"	Equal Percentage	30	0.4	1.0	1.8	2.9	4.5	6.7	9.8	14.2	20.4	30.0
	Linear	30	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0
2"	Equal Percentage	45	0.6	1.5	2.7	4.3	6.7	10.0	14.7	21.3	30.5	45.0
	Linear	45	4.5	9.0	13.5	18.0	22.5	27.0	31.5	36.0	40.5	45.0
3"	Equal Percentage	120	1.6	3.9	7.1	11.6	17.9	26.8	39.3	56.8	81.4	120.0
	Linear	120	12.0	24.0	36.0	48.0	60.0	72.0	84.0	96.0	108.0	120.0
4"	Equal Percentage	200	2.7	6.5	11.8	19.3	29.5	44.6	65.4	94.6	135.7	200.0
	Linear	200	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0

ORDER SCHEMATIC (1/2" - 2")

To specify a MK78 Globe Style Control Valve, build a model number by making a selection from each category in the Product Designator Coding System below.

1	2	3	4	5	6	7	8 & 9	10	11	12	13	14	15

1	Model	
	78	Standard
	78TP	Top Mounted Positioner

2	Size		
		Inches	DN
	050	1/2"	DN15
	075	3/4"	DN20
	100	1"	DN25
	125	1-1/4"	DN32
	150	1-1/2"	DN40
	200	2"	DN50

3	Body Material	
	BR	Bronze
	CS	Carbon Steel (WCB)
	S6	Stainless Steel (CF8M)

4	End Connections	
	PT	NPT
	BT	BSPT
	I5	150# IFE CS or SST valves > 1"
	F5	150# FE BR < 1-1/2"
	F7	PN10 FE
	F6	PN16FE
	BP	BSPP
	SW	FSW
	I3	300# IFE CS or SST valves > 1"
	F3	300# FE BR < 1-1/2"
	F8	PN25 FE
	F4	PN40 FE

5	Trim	
	BT	SST/Teflon Packing
	BB	SST/Teflon Braided Packing
	TS	316SS Teflon Packing
	BS	316SS Teflon Braided Packing

ORDER SCHEMATIC FOR MK78 1/2" - 2" (CON'T)

6		Plug and Seat
	A	Linear Hard
	B	Linear Soft
	C	Equal Percentage Hard
	D	Equal Percentage Soft
	E	Quick Open Hard
	F	Quick Open Soft
	G	Equal Linear Hard
	H	Equal Linear Soft

7		Cv (Kv)
	4	1.8 (1,5)
	5	2.5 (2,2)
	6	4.4 (3,8)
	7	4.6 (4,0)
	8	8.0 (6,9)
	M	9.0 (7,7)
	N	11.5 (9,9)
	P	12 (10)
	Q	12.2 (10,5)
	R	12.7 (10,9)
	9	15 (12,9)
	B	30 (25,8)
	V	35 (30,1)
	U	40 (34,4)
	W	45 (38,7)
	C	50 (43)
	1	60 (51,6)

8 & 9	Actuator Range		
		Range	Actuator
	A	3-15 Direct	3 35M
	B	3-15 Reverse	5 55M
	C	3-9 Direct	8 85M
	D	3-9 Reverse	
	E	9-15 Direct	
	F	9-15 Reverse	
	G	6-30 Direct	
	H	6-30 Reverse	

10		Diaphragm
	B3	BUNA-N 35M
	B5	BUNA-N 55M
	B8	BUNA-N 85M

11		Actuator
78	A3	Standard 35M
	A5	Standard 55M
	A8	Standard 85M
78TP	D3	Air-to-Close 35M
	D5	Air-to-Close 55M
	D8	Air-to-Close 85M
	R3	Air-to-Open 35M
	R5	Air-to-Open 55M
	R8	Air-to-Open 85M

12		Accessories
	00	None
	AR	Air Regulator

13		Action
	D	Air-to-Close
	R	Air-to-Open

14		I/P Option
	0	None
	3	I/P 35M ACT
	5	I/P 55M ACT
	8	I/P 85M ACT

15		O-Ring
	E	EPDM
	V	Viton

ORDER SCHEMATIC FOR MK78 3" - 4"

1	—	2	—	3	/	4	5	6	7	8	9	10	11

1	Model	
	78	Standard 3" - 4" (DN80 - DN100)

2	Size		
		Inches	DN
	300	3"	DN80
	400	4"	DN100

3	Body Material	
	CS	Carbon Steel (WCB)
	S6	Stainless Steel (CF8M)

4	Bonnet Style	
	P	Plain
	E	Extended
	B	Bellows

5	End Connections	
	BW	BWE Sch 40
	I5	150# IFE
	I3	300# IFE
	I6	600# IFE
	D1	PN10 IFE
	D6	PN16 IFE
	D2	PN25 IFE
	D4	PN40 IFE

6	Bonnet	
	SD	Standard

7	Packing	
	TF	Teflon V-Rings
	GR	Graphite
	EG	Enviro Graphite

8	Trim (Material of Plug and Seat Ring)	
	A	Standard =% TFE Gasket
	B	Standard Linear TFE Gasket
	C	316/316 =% TFE Gasket
	D	316/316 Linear TFE Gasket
	E	Standard =% Graphite Gasket
	F	Standard Linear Graphite Gasket
	G	316/316 =% Graphite Gasket
	H	316/316 Linear Graphite Gasket
	J	Standard Soft =% TFE Gasket
	K	Standard Soft Linear TFE Gasket
	L	316/316 =% TFE Gasket
	M	316/316 Soft Linear TFE Gasket

9	Cv (Kv)	
	H	48 (41,3)
	K	80 (68,8)
	L	120 (103,2)
	M	200 (172)

10	Actuator	
	R1	Reverse with SMP
	D1	Direct with SMP
	I1	Reverse with SMP-IP
	P1	Direct with SMP-IP
	1R	Reverse without SMP
	1D	Direct without SMP

11	Accessories	
	00	None
	LS	Limit switch with SMP
	NS	Limit switch without SMP
	HS	Limit switch with handwheel
	HW	SMP with handwheel
	IP	I/P without SMP

