

## 2021 Flow Control Throttling Valve

### Application

The WellMark Throttling Valve is designed to function as a pressure control valve, and will handle pressure drops up to 4500 psi liquid and 2200 psi gas. It has been used widely in gas gathering systems to regulate flow, CO<sub>2</sub>, and steam injection systems, as well as in low, medium, and high-pressure separators.

### Features

- Anti-Cavitating Plug Design
- Manual or Electric Actuation
- "Y" or Angle Style Body: Carbon or Stainless Steel
- Multiple Orifice Sizes
- Low Torque at High Differential Pressure
- Wide C<sub>v</sub> Range: 3.2 - 95

### Operation

Most control valves operate similar to the nozzle on a garden hose. When the valve is set to a partially closed or choked position, the flow of fluid decreases in pressure and in turn increases in velocity. This high velocity stream causes two problems: mechanical erosion or wear and a highly destructive process called cavitation. After sustained use, these processes will result in premature valve failure.

The 2021 Series' unique throttling choke valve design remedies these self-destructive processes by channeling the fluid into a cylinder through opposing slots in its sides; thus, allowing each mini-stream to impinge on itself, changing the otherwise high-velocity laminar flow into a disrupted non-linear stream, eliminating the destructive effects of erosion and cavitation. The plug also provides extraordinary accurate control to less than 0.1%. The result is long valve life and highly reliable precision control.

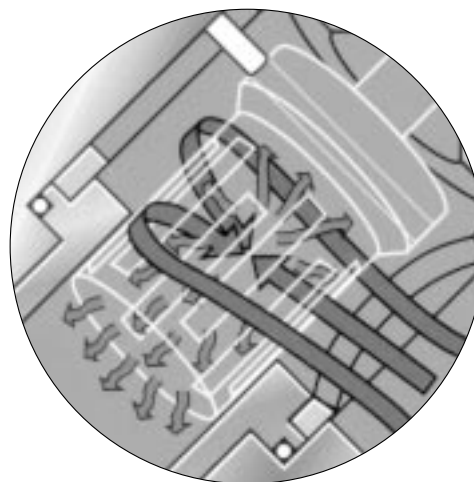
### Specifications

#### Size

1" .....	Series 2021-1
2" .....	Series 2021-2
3" .....	Series 2021-3
Working Pressure .....	5000 psi Max.
Max Pressure Drops .....	4500 psi Liquid 2200 psi Gas



Temperature .....	-20°F to +450°F Standard
Body Configuration .....	"Y", Angle (Top Entry)
End Connection .....	NPT, Socket-Weld, Flanged
Trim .....	Linear Cage
Flow Direction .....	Over & Under Plug
Repeatability .....	2%
Shut off .....	Bubble Tight @ Rated Pressure
Actuation .....	Manual Handwheel or Electric Actuation



Anti-Cavitating Plug Design

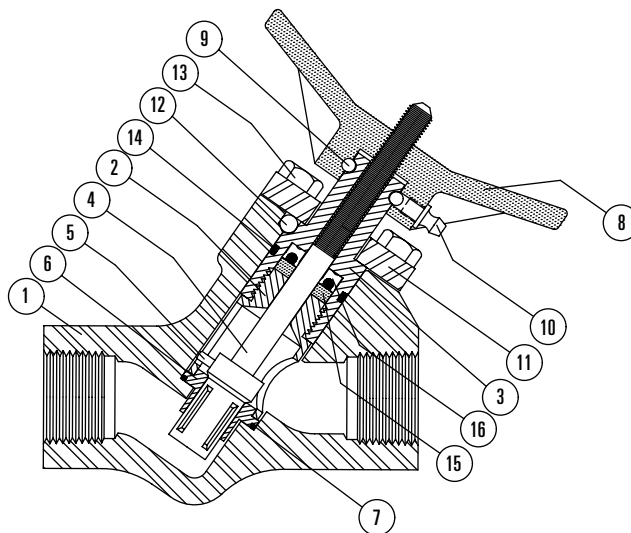


## 2021-1 Flow Control Throttling Valve (1" Manually Actuated)

### Parts List

Item	Description	Qty.	Part No.
1	BODY, "Y", STEEL WCB	1	05010-1997
	BODY, "Y", STAINLESS STEEL CF8M	1	05010-2003
2	LOWER CAGE, 303 STAINLESS STEEL	1	05010-1500
3	UPPER CAGE, 303 STAINLESS STEEL	1	05010-1567
4*	STEM & PLUG, (4) 1/16", 17-4PH	1	06500-0838
	STEM & PLUG, (4) 1/8", 17-4PH	1	06500-0820
5	PIN, 17-4PH	1	05010-2136
6*	SEAT, 17-4PH	1	05010-4504
7*	O-RING, TEFLON®	1	05000-2161
8	HANDLE, IRON	1	05010-1724
9	BALL, 440 STAINLESS STEEL	13	06000-0361
10	GREASE ZERK, STEEL PLATED	1	06000-0221
11	BONNET, STEEL	1	05010-2011
12	BALL, 440 STAINLESS STEEL	1	06000-0262
13	CAP SCREW, STEEL PLATED	4	05000-1874
14*	O-RING, BUNA-N	1	05000-0264
15*	SPACER, DELRIN	1	05010-8091
16*	POLY-PAK, MOLYTHANE	1	06000-0379

\*Recommended Spare Part



### Model and Part No.

Size	Model No.	Body Style/Material	Part No.
1"	1S-TYV(4)1/16	"Y", WCB	03000-0186
	1S-TYV(4)1/8	"Y", WCB	03000-0152
	1S-TSYV(4)1/16	"Y", CF8M	03000-0202
	1S-TSYV(4)1/8	"Y", CF8M	03000-0178

### Flow Data

Plug Orifice	C <sub>v</sub>	
	FTC	FTO
TYV FOUR (4) 1/8" SLOTS	5.3	5.3
TYV FOUR (4) 1/16" SLOTS	3.2	3.2

Seat Orifice: 5/8"

Stroke=.79 in.

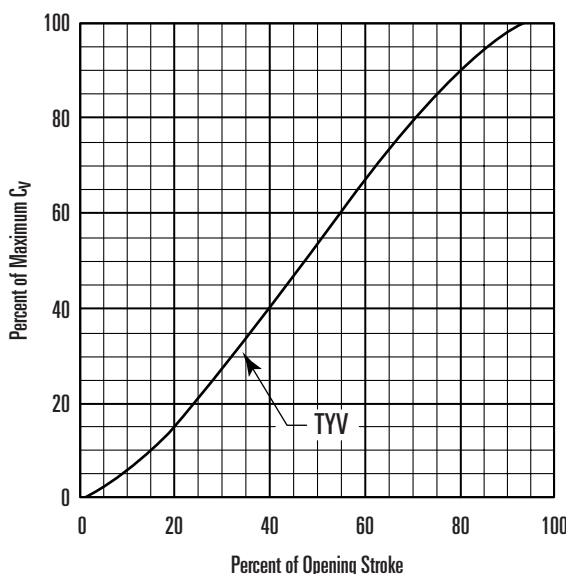
No. of Turns from 0 to Full Stroke: 12 1/2

Test Data per ISA S-75.02

### Maximum Capacity: Model 1S-TYV

Based on water @ 60°F in BBL's/Day

Model: 1S-TYV		
Slots	1/16	1/8
Flow	Both	Both
C <sub>v</sub>	3.2	5.3
ΔP, P <sub>sig</sub>		
10	340	570
25	540	900
50	770	1280
100	1090	1810
200	1550	2560
300	1900	3140
400	2190	3630
500	2450	4060
600	2680	4450
700	2900	4800
800	3100	5130
900	3290	5450
1000	3460	5740

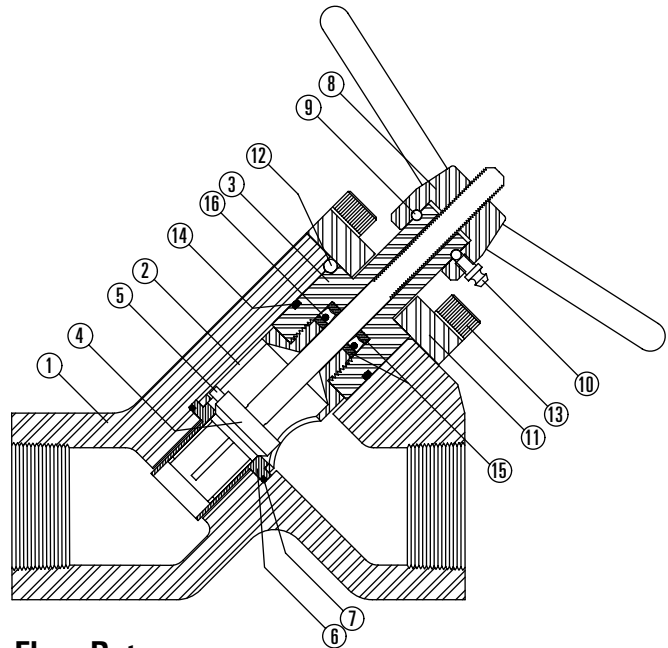


## 2021-2 Flow Control Throttling Valve (2" Manually Actuated)

### Parts List

Item	Description	Qty.	Part No.
1	BODY, 2" "Y", STEEL WCB	1	05010-3050
	BODY, 2" "Y", STAINLESS STEEL CF8M	1	05010-3043
	BODY, 2" ANGLE, STEEL WCB	1	05013-3361
	BODY, 2" ANGLE, STAINLESS STEEL CF8M	1	05013-3379
2	LOWER CAGE, 303 STAINLESS STEEL	1	05010-3241
3	UPPER CAGE, 303 STAINLESS STEEL	1	05010-3258
4*	STEM & PLUG, (4) 1/16" SLOTS, 17-4PH	1	06500-1349
	STEM & PLUG, (4) 1/8" SLOTS, 17-4PH	1	06500-0812
	STEM & PLUG, (6) 1/8" SLOTS, 17-4PH	1	06500-0804
	STEM & PLUG, (8) 1/8" SLOTS, 17-4PH	1	06500-0796
5	PIN, 17-4PH	1	05011-1723
6*	SEAT, 17-4PH	1	05010-3209
7*	O-RING, TEFLON®	1	05000-2112
8	HANDLE ASSEMBLY, 416 STAINLESS STEEL	1	06500-0325
9	BALL, 440 STAINLESS STEEL	16	06000-0361
10	GREASE ZERK, STEEL PLATED	1	06000-0221
11	BONNET, STEEL	1	05010-3225
12	BALL, 440 STAINLESS STEEL	1	06000-0262
13	CAP SCREW, 18-8 STAINLESS STEEL	4	05000-2021
14*	O-RING, BUNA-N	1	05000-2914
15	SPACER, DELRIN	2	05010-8646
16*	POLY-PAK, MOLYTHANE	1	06000-0353

\*Recommended Spare Parts



### Model and Part No.

Size	Model No.	Body Style/Material	Part No.
2"	2S-TYV(4)1/16	"Y", WCB	03002-0135
	2S-TAV(4)1/16	ANGLE, WCB	03002-0930
	2S-TYV(4)1/8	"Y", WCB	03002-0002
	2S-TAV(4)1/8	ANGLE, WCB	03002-0932
	2S-TYV(6)1/8	"Y", WCB	03002-0028
	2S-TAV(6)1/8	ANGLE, WCB	03002-0934
	2S-TYV(8)1/8	"Y", WCB	03002-0044
	2S-TAV(8)1/8	ANGLE, WCB	03002-0936
	2S-TSYV(4)1/16	"Y", CF8M	03002-0119
	2S-TSAV(4)1/16	ANGLE, CF8M	03002-0940
	2S-TSYV(4)1/8	"Y", CF8M	03002-0010
	2S-TSAV(4)1/8	ANGLE, CF8M	03002-0941
	2S-TSYV(6)1/8	"Y", CF8M	03002-0036
	2S-TSAV(6)1/8	ANGLE, CF8M	03002-0943
	2S-TSYV(8)1/8	"Y", CF8M	03002-0051
	2S-TSAV(8)1/8	ANGLE, CF8M	03002-0945

### Flow Data

Plug Orifice	C <sub>v</sub>	
	FTC	FTO
EIGHT (8) 1/8" SLOTS	15.3	19.0
SIX (6) 1/8" SLOTS	13.6	15.4
FOUR (4) 1/8" SLOTS	9.8	11.1
FOUR (4) 1/16" SLOTS	5.9	6.2

Seat Orifice: 1 1/8"

Stroke = 1.14 in.

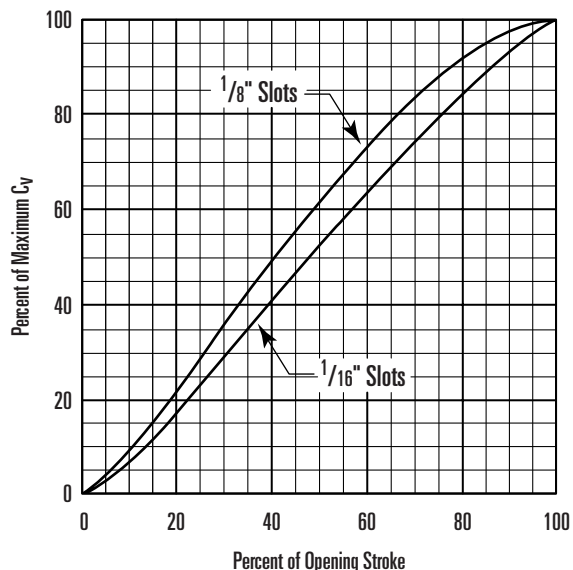
No. of Turns from 0 to Full Stroke: 15

Test Data per ISA S-75.02

### Maximum Capacity: Model 2S-TYV

Based on water @ 60°F in BBL's/Day

Slots	Model: 2S-TYV							
	4 1/16"		4 1/8"		6 1/8"		8 1/8"	
	FTC	FTO	FTC	FTO	FTC	FTO	FTC	FTO
Flow C <sub>v</sub>	5.9	6.2	9.8	11.1	13.6	15.4	16.3	19.0
ΔP, Psig								
10	630	670	1060	1200	1470	1660	1760	2050
25	1010	1060	1680	1900	2330	1640	2790	3250
50	1430	1500	2370	2690	3290	3730	3950	4600
100	2020	2120	3360	3800	4660	5280	5580	6510
200	2860	3000	4750	5380	6590	7460	7900	9210
300	3500	3680	5810	6590	8070	9140	9670	11,280
400	4040	4250	6720	7610	9320	10,560	11,170	13,020
500	4520	4750	7510	8500	10,420	11,800	12,490	14,560
600	4950	5200	8230	9320	11,420	12,930	13,680	15,950
700	5350	5620	8880	10,060	12,330	13,960	14,780	17,230
800	5720	6010	9500	10,780	13,180	14,930	15,800	18,420
900	6060	6370	10,080	11,410	13,980	15,840	16,760	19,540
1000	6390	6720	10,620	12,030	14,740	16,690	17,670	20,600

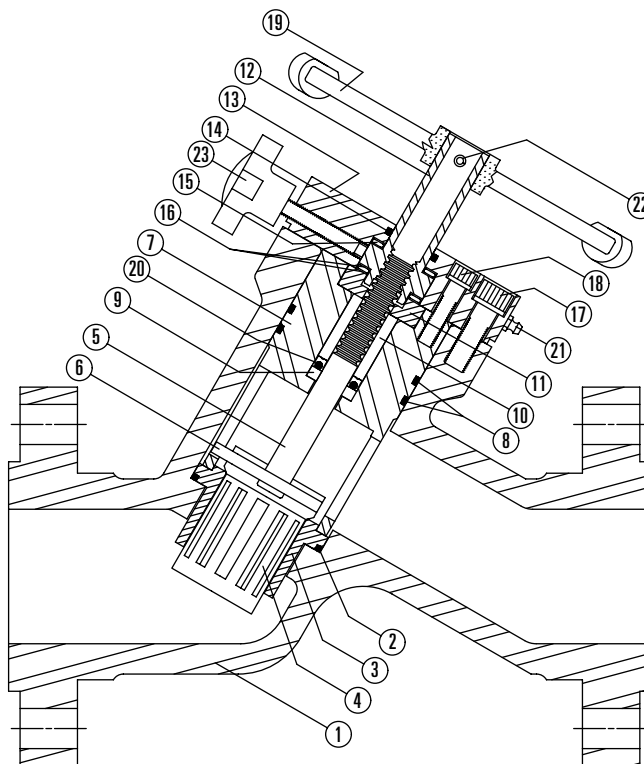


## 2021-3 Flow Control Throttling Valve (3" Manually Actuated)

### Parts List

Item	Description	Qty.	Part No.
1	BODY 3"-300RF, STEEL WCB	1	05013-0505
	BODY 3"-600RF, STEEL WCB	1	05012-7820
	BODY 3"-300RF, STAINLESS STEEL CF8M	1	05012-8069
	BODY 3"-600RF, STAINLESS STEEL CF8M	1	05013-0513
2*	O-RING, TEFLON®	1	05000-5396
3*	SEAT, 17-4PH COND. H-900	1	05012-7853
4*	PLUG (12) 1/4", 17-4PH COND. H-900	1	05012-7879
5	STEM, 17-4PH COND. H-1150	1	05012-9237
6	PIN, 17-4PH COND. H-900	1	05012-7895
7	CAGE, ASTM A-582 TY. 303	1	05012-7838
8*	O-RING, BUNA-N	2	05000-3292
9	SPACER, ALUM. BRONZE	1	05012-9245
10	SPACER, ALUM. BRONZE	1	05012-9252
11	WASHER, 17-4PH COND. H-900	1	05012-7903
12	DRIVER, 17-4PH COND. H-900	1	05012-8085
13	BEARING RETAINER, STEEL	1	05012-7846
	BEARING RETAINER, 303 S.S.	1	05012-8077
14*	O-RING, BUNA-N	1	05000-0470
15	THRUST BEARING, STAINLESS STEEL	2	06000-7245
16	THRUST WASHER, STAINLESS STEEL	4	06000-7252
17	SOCKET HD. SCREW, ASTM A-307 GR.B	8	05000-2021
18	SOCKET HD. SCREW, ASTM A-307 GR.B	4	05000-5404
19	HANDWHELL, ASTM A-536	1	05012-7937
20*	POLYPAK, MOLYTHANE	1	06000-7260
21	GREASE ZERK, STL. PLATED	1	06000-0221
22	ROLL PIN, STEEL	1	06000-3068
23	STEM LOCK, STEEL/ALUMINUM	1	06000-7719

\*Recommended Spare Parts



### Model and Part No.

Model No.	W.P.	Material	Part No.
3F-TYV-300RF(12) 1/4	720	WCB	03002-0565
3F-TSYV-300RF(12) 1/4	720	CF8M	03002-0326
3F-TYV-600RF(12) 1/4	1440	WCB	03002-0540
3F-TSYV-600RF(12) 1/4	1440	CF8M	03002-0599

### Flow Data

Plug Orifice	C <sub>v</sub>	
	FTC	FTO
*TWELVE (12) 1/4" SLOTS	80	95

\*Other C<sub>v</sub> available on request.

Seat Orifice: 2"  
Stroke = 1.5 in.  
No. of Turns from 0 to Full Stroke: 12  
Test Data per ISA S-75.02

### Maximum Capacity: Model 3F-TYV

Based on water @ 60°F in BBL's/Day

Model: 3F-TYV		
Slots Flow C <sub>v</sub> ΔP, Psig	12 1/4" To Open 95 GPM	12 1/4" To Open 95 BBL/Day
10	300	10,200
25	475	16,150
50	575	22,850
100	950	32,300
200	1900	3140
300	1645	56,000
400	1900	64,600
500	2124	72,000
600	2327	79,000
700	2513	85,400
800	2667	91,300
900	2850	96,900
1000	3000	102,000

