

## 2020 Flow Control Choke Valve

### Application

This versatile and proven valve is ideal for use in well head control, in gas gathering systems to regulate flow, for CO<sub>2</sub> and water or steam injection systems as well as pressure separators. Suitable for water, gas and other liquid service.

### Features

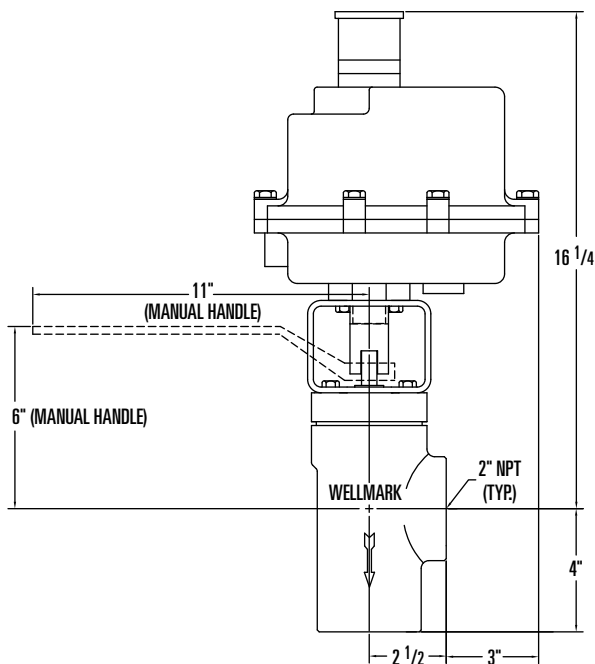
- Choice of Manual, Electric, or Pneumatic Actuation
- Choice of Angle or "Y" Body Style in Carbon or Stainless Steel
- Choice of Tungsten Carbide or Ceramic Disc Material
- Multiple Orifice Sizes for Greater Control
- Low Torque At High Differential Pressure

### Specifications

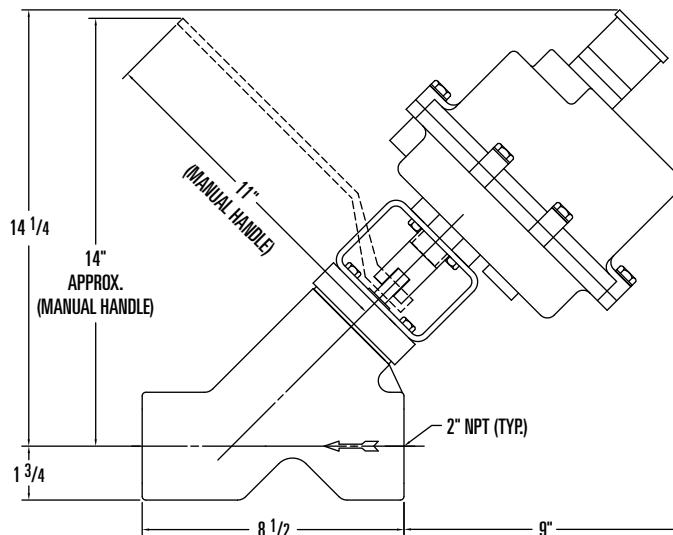
Working Pressure ..... To 3600 psi  
 Body Material ..... WCB Carbon Steel or CF8M Stainless Steel  
 Disc Material ..... Tungsten Carbide or Ceramic



### Dimensional Data



2" ANGLE VALVE



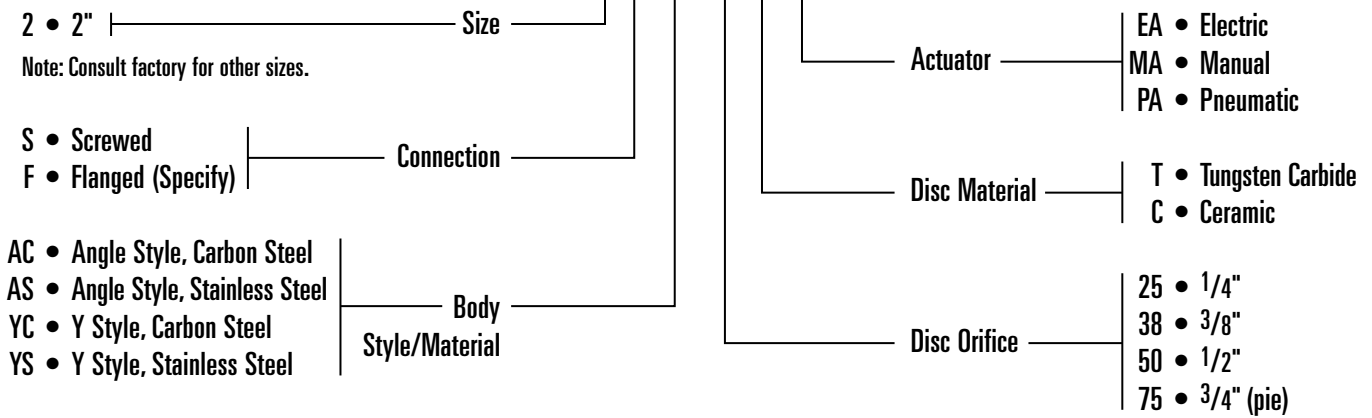
2" "Y" VALVE

## 2020 Flow Control Choke Valve

### Determining the Model Number

Example given: A 2" Model 2020 Choke Valve with Screwed Ends in the Angle Style Body Configuration Constructed of Carbon Steel, Utilizing a 3/4" Disk Orifice and Tungsten Carbide Disc Material with Electric Actuation.

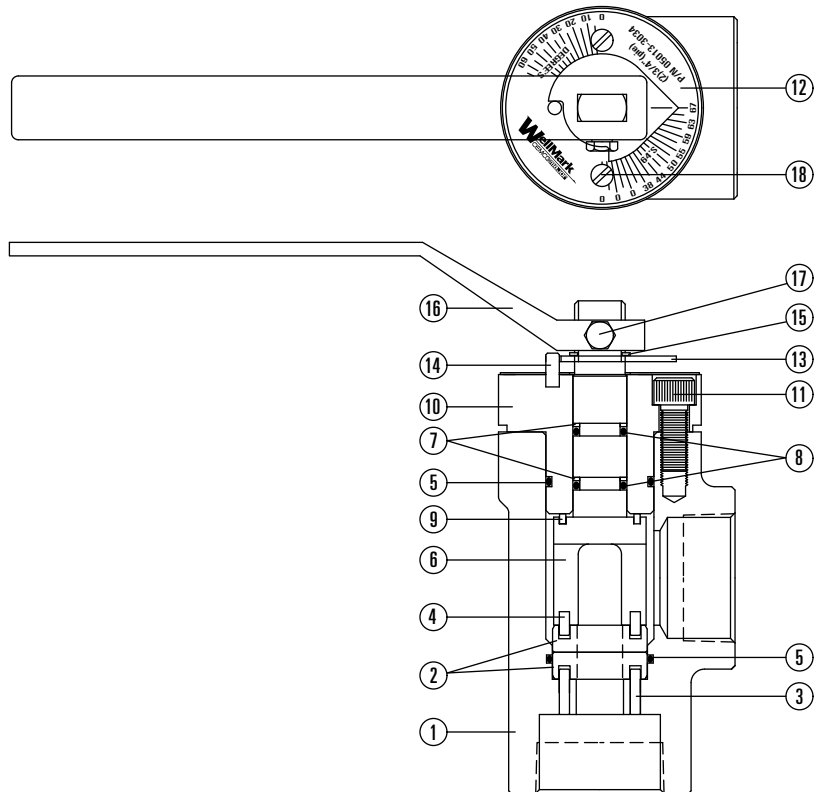
#### MODEL 2 S AC-75 T EA



### Parts List Series 2020 w/Manual Handle

Item	Description	Qty.	Part No.
1	BODY, 2" ANGLE, STEEL WCB	1	05013-2879
	BODY, 2" "Y", STEEL WCB	1	05013-3000
2*	DISC, 1/4" DIA., TUNGSTEN CARBIDE	2	06000-8741
	DISC, 3/8" DIA., TUNGSTEN CARBIDE	2	06000-8775
	DISC, 1/2" DIA., TUNGSTEN CARBIDE	2	06000-8809
	DISC, 3/4" PIE, TUNGSTEN CARBIDE	2	06000-8534
	DISC, 1/4" DIA., CERAMIC	2	06000-8759
	DISC, 3/8" DIA., CERAMIC	2	06000-8783
	DISC, 1/2" DIA., CERAMIC	2	06000-8817
	DISC, 3/4" PIE, CERAMIC	2	06000-8725
3	PIN, 17-4PH, ANGLE BODY ONLY	2	05013-2961
4	PIN, 17-4PH	2**	05013-2953
5*	O-RING, BUNA-N	2	05000-2914
6	STEM, STEEL PLATED	1	05013-2887
7*	BACK UP RING, TEFLON®	2	05000-5844
8*	O-RING, BUNA-N	2	05000-0447
9	BEARING, BRONZE	1	05013-2929
10	BONNET, STEEL	1	05013-2895
11	SOCKET HEAD SCREW, 18-8 S.S.	4	05000-2021
12	INDICATOR, 1/4", ALUMINUM	1	05013-3105
	INDICATOR, 3/8", ALUMINUM	1	05013-3155
	INDICATOR, 1/2", ALUMINUM	1	05013-3163
	INDICATOR, 3/4" PIE, ALUMINUM	1	05013-3034
13	STOP PLATE, STAINLESS STEEL	1	05013-3042
14	PIN, STAINLESS STEEL	1	06000-8700
15	RETAINER RING, STEEL	1	936200000
16	HANDLE, DUCTILE IRON	1	929200000
17	HANDLE SCREW, STEEL PLATE	1	915000000
18	INDICATOR SCREW, STEEL	2	05000-5878

\*Recommended Spare Part  
 \*\*4 Req'd on 2" "Y" Valve



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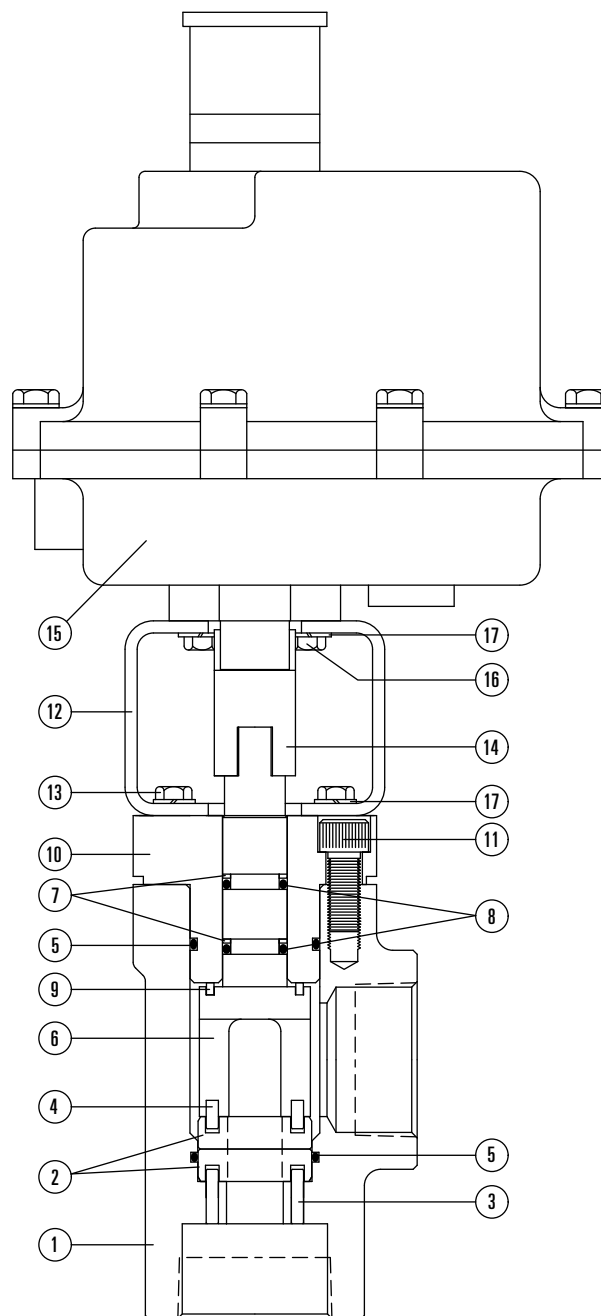
## Parts List Series 2020 w/Electric Actuator

Item	Description	Qty.	Part No.
1	BODY, 2" ANGLE, STEEL WCB	1	05013-2879
	BODY, 2" "Y", STEEL WCB	1	05013-3000
2*	DISC, 1/4" DIA., TUNGSTEN CARBIDE	2	06000-8741
	DISC, 3/8" DIA., TUNGSTEN CARBIDE	2	06000-8775
	DISC, 1/2" DIA., TUNGSTEN CARBIDE	2	06000-8809
	DISC, 3/4" PIE, TUNGSTEN CARBIDE	2	06000-8534
	DISC, 1/4" DIA., CERAMIC	2	06000-8759
	DISC, 3/8" DIA., CERAMIC	2	06000-8783
	DISC, 1/2" DIA., CERAMIC	2	06000-8817
	DISC, 3/4" PIE, CERAMIC	2	06000-8725
3	PIN, 17-4PH, ANGLE BODY ONLY	2	05013-2961
4	PIN, 17-4PH	2**	05013-2953
5*	O-RING, BUNA-N	2	05000-2914
6	STEM, STEEL PLATED	1	05013-2887
7*	BACK UP RING, TEFLON®	2	05000-5844
8*	O-RING, BUNA-N	2	05000-0447
9	BEARING, BRONZE	1	05013-2929
10	BONNET, STEEL	1	05013-2895
11	SOCKET HEAD SCREW, 18-8 S.S.	4	05000-2021
12	BRACKET, STEEL	1	05013-2945
13	SCREW, STEEL PLATED	4	05000-5198
14	DRIVER, STEEL PLATED	1	05013-2937
15	ELECTRIC ACTUATOR***	1	06000-8526
16	SCREW, STEEL PLATED	4	05000-5852
17	LOCK WASHER, STEEL PLATED	8	05000-5860

\*Recommended Spare Part

\*\*4 Req'd on 2" "Y" Valve

\*\*\*Consult Factory for Actuation Details



## 2020 Flow Control Choke Valve

### Flow Data

C <sub>v</sub> Factor Chart				
VALVE ORIFICE	1/4"	3/8"	1/2"	3/4" (pie)
C <sub>v</sub> FACTOR	2.98	6.84	11.83	31.3

Using the C<sub>v</sub> factors above for any valve, its approximate flow capacity can be determined by the formulas at right.

If required flow capacity is known and valve selection is desired, solve for C<sub>v</sub> with the formulas below and select appropriate valve from C<sub>v</sub> Factor Chart above.

For Liquids:

$$C_v = \frac{Q}{34.3 \sqrt{\frac{\Delta P}{G}}}$$

For Gas:

$$C_v = \frac{Q}{.0234 \sqrt{\frac{\Delta P (P_1 + P_2)}{GT}}}$$

For Liquids:

$$Q = 34.3 C_v \sqrt{\frac{\Delta P}{G}}$$

Q = Flow (Barrels/Day)

C<sub>v</sub> = Flow factor

ΔP = Pressure drop across valve

G = Specific gravity (water=1.0)

For Gas:

$$Q = .0234 C_v \sqrt{\frac{\Delta P (P_1 + P_2)}{GT}}$$

Q = Flow (MMSCFD)

C<sub>v</sub> = Flow factor

P<sub>1</sub> = Inlet pressure (psia)

P<sub>2</sub> = Outlet pressure (psia)

ΔP = Pressure drop (P<sub>1</sub>-P<sub>2</sub>).

When P<sub>2</sub> is less than 1/2 P<sub>1</sub>, use 1/2 P<sub>1</sub>, for P<sub>2</sub> in formula.

G = Specific gravity (air= 1.0)

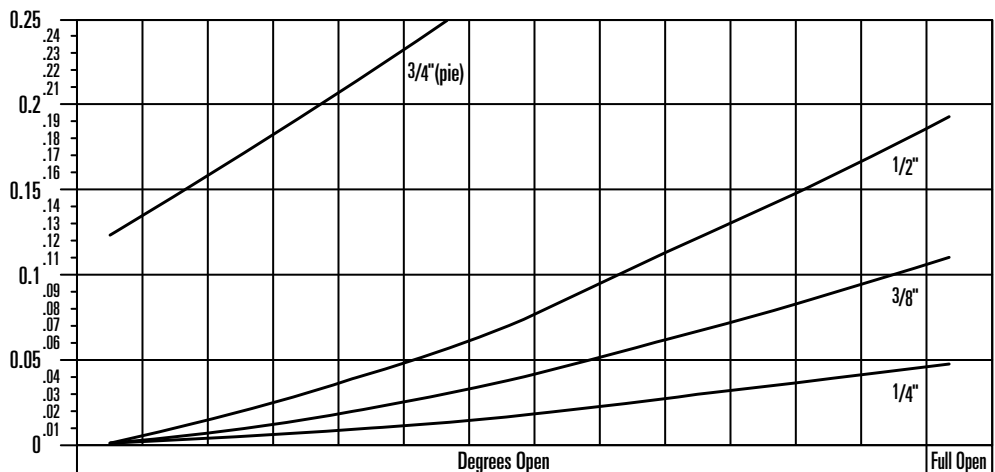
T = Flowing temperature absolute (°F + 460)

### Conversion Chart To Determine Open Area of Disc Orifice to 64th's

Degrees Open	Orifice Size							
	1/4"		3/8"		1/2"		3/4" (pie)	
	64th's	Area Open (Sq. in.)	64th's	Area Open (Sq. in.)	64th's	Area Open (Sq. in.)	64th's	Area Open (Sq. in.)
0-20°	0	0	0	0	0	0	0	0
25°	2.04	.0004	3.23	.001	5.59	.003	34.93	.117
30°	4.57	.002	6.46	.004	9.69	.009	38.35	.141
35°	6.54	.0041	9.63	.0089	13.7	.018	41.55	.1655
40°	8.42	.0068	12.42	.0148	17.39	.029	44.52	.19
45°	10.16	.0099	15.08	.0218	20.68	.041	47.3	.2145
50°	11.82	.0134	17.57	.0296	23.95	.055	49.93	.239
55°	13.39	.0172	19.94	.0381	27.02	.07	52.43	.2635
60°	14.87	.0212	21.21	.0473	29.95	.086	54.81	.288
65°	16.3	.0255	24.38	.057	32.78	.103	57.05	.312
70°	17.69	.03	26.48	.0672	35.53	.121	59.19	.336
75°	18.99	.0346	28.47	.0777	38.08	.139	61.32	.3605
80°	20.27	.0394	30.37	.0884	40.59	.158	63.37	.385
85°	21.47	.0442	32.19	.0994	42.97	.177	65.35	.4095
90°	22.6	.049	33.87	.11	45.21	.196	67.28	.434

Conversion formula for converting known open orifice area to 64th's:

$$64th's = 128 \sqrt{\frac{2 \times \text{Area Open}}{3.1416}}$$



### Orifice Open Area Data

Open area of one hole in sq. in.

Area Open	Orifice	Degrees Open														Full Open
		25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	
Area Open	1/4"	0.0004	0.002	0.0041	0.0068	0.0099	0.0134	0.0172	0.0212	0.0255	0.03	0.0346	0.0394	0.0442	0.049	
	3/8"	0.001	0.004	0.0089	0.0148	0.0218	0.0296	0.0381	0.0473	0.057	0.0672	0.0777	0.0884	0.0994	0.11	
	1/2"	0.003	0.009	0.018	0.029	0.041	0.055	0.07	0.086	0.103	0.121	0.139	0.158	0.177	0.196	
	3/4" (pie)	0.117	0.141	0.1655	0.19	0.2145	0.239	0.2635	0.288	0.312	0.336	0.3605	0.385	0.4095	0.434	