

## Engineering Specification

Job Name \_\_\_\_\_

Contractor \_\_\_\_\_

Job Location \_\_\_\_\_

Approval \_\_\_\_\_

Engineer \_\_\_\_\_

Contractor's P.O. No. \_\_\_\_\_

Approval \_\_\_\_\_

Representative \_\_\_\_\_

# Model: 88

## Ductile Iron Full Lug Butterfly Valves

**Sizes: 2" – 24"**

### Typical Service

These soft-seated butterfly valves are designed for a variety of general applications in the control of water, air, oil, gases, and corrosive media. Examples of applications where these valves can be used are irrigation, cooling water, and fire protection systems. They are equally effective for on-off, throttling, or isolation service requirements. Lug style valves are designed for dead-end service to the full pressure rating of the valve. Model 88 butterfly valve is especially well suited for higher velocity service and vacuum service. All valves are 100% factory tested to guarantee bi-direction, drop tight shutoff at fully rated pressure.

### Features

- Phenolic backed (2" – 14"), aluminum backed (16" – 24"),
- Non-collapsible, resilient elastomer seat. Available in EPDM or Viton.
- ISO 5211 mount is standard. Double D shaft is standard 2" – 10" while keyway design is supplied 12" – 24"
- Stem is a one-piece design for maximum strength and is retained in valve body for blowout proof operation. 316SS is standard for 316SS discs (2" – 12") and 431SS is standard for 316SS discs (14" – 24")
- Stem bushings provide shaft support for proper stem alignment and minimize stem deflection. Duralon bushings are standard material in 2" – 12" sizes. Bronze bushings are standard in 14" – 24" sizes.
- Stem seals prevent external contamination of stem area and provide backup for the primary shaft seal formed by the disc/seat interface.
- ASTM-A-536 ductile iron body available in full lug (Model 88) designed for use between ANSI 125 and 150 flanges. Face-to-face dimension comply with API 609 and MSS-SP-67.
- Available in standard 10-position locking handle. Also gear operators are available 2" – 24". Contact the factory for electric actuation.

### Approvals

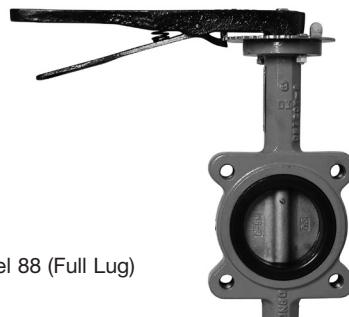
The Valves are MSS-SP-67 Type I – Valves for tight shut-off (tested per section 10.2.1). As specified in MSS-SP-67, we conduct 100% shell testing at 1.5 times rated pressure and seat leakage testing at 1.1 times rated pressure.

### Performance Guidelines

Guidelines for throttling service:

Liquids – Line velocity should not exceed 20ft./sec.

Gases – Line velocity should not exceed 15,000 ft./min.



Model 88 (Full Lug)



### Pressure/Temperature - Non-Shock

Model	Size	Material	Rating
88	2"-12"	Ductile Iron	200psi
88	14"-24"	Ductile Iron	150psi

Max. temp. can be limited by seat material.  
Consult Factory.  
Not Recommended for Steam Service.

### Materials

MODEL 88	
Body	Ductile Iron
Stem	316SS (2"-12"), 431SS (14"-24")
Disc	316SS
Seat	EPDM - 5°F to 250°F (-15°C to +121°C) VITON - 20°F to +400°F (-28° to 204°C)

### Actuator Options

Electric Actuator  
Service: On-Off & Modulating  
Torque Range (in-lb): 347 to 20,000  
Enclosure: Weatherproof (IP67, Type 4, 4X) or (ATEX/IECEx Ex d IIB T4)  
Power Supply 110/220V AC 1PH, 50/60Hz, ± 10%, 24V AC/DC  
Motor: Class F Reversible Motor  
Limit Switches: (2) Operational & (2) Auxiliary, Open / Close, 6A 125/250VAC  
Mounting: ISO 5211

### NOTICE

Do not use EPDM when hydrocarbons are present

### NOTICE

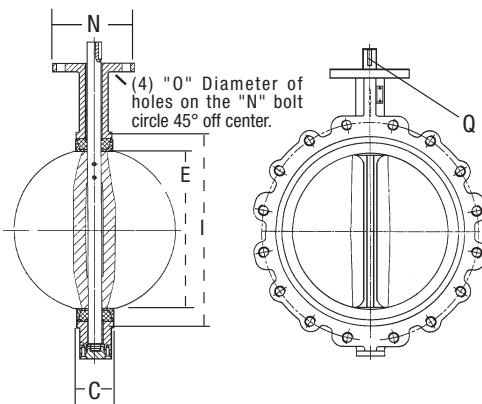
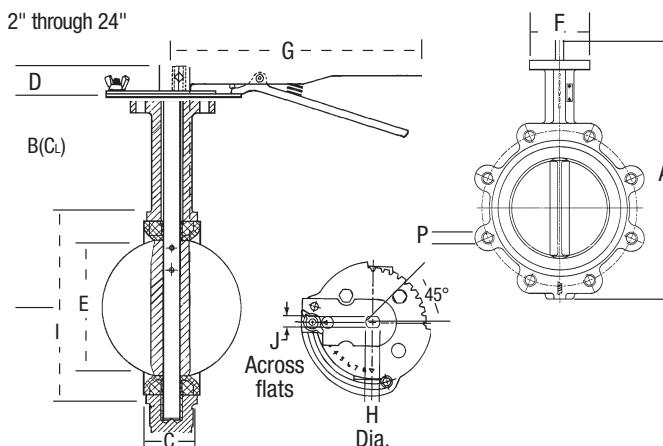
The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Mueller Steam Specialty product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Mueller Steam Specialty Technical Service. Mueller Steam Specialty reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Mueller Steam Specialty products previously or subsequently sold.

**Mueller Steam Specialty™**

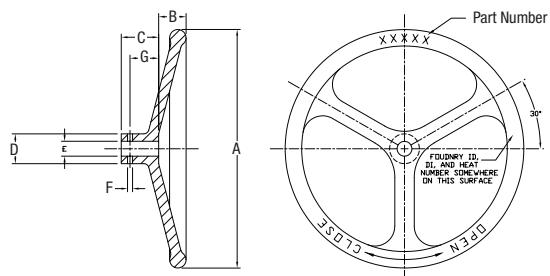
**A WATTS Brand**

## Dimensions and Weights \*Top Works Detail Per ISO 5211



SIZE	DIMENSIONS											
	A in. mm	B in. mm	C in. mm	D in. mm	E in. mm	F in. mm	G in. mm	H in. mm	B in. mm	J in. mm		
2"	10 $\frac{1}{4}$ 273	6 $\frac{1}{8}$ 161	1 $\frac{1}{8}$ 42	1 $\frac{1}{4}$ 32	2 $\frac{1}{8}$ 54	3 $\frac{1}{16}$ 77	10 $\frac{1}{2}$ 267	$\frac{1}{2}$ 13	3 $\frac{3}{4}$ 95	$\frac{3}{8}$ 9		
2 $\frac{1}{2}$ "	11 $\frac{1}{8}$ 295	6 $\frac{1}{8}$ 175	1 $\frac{1}{4}$ 45	1 $\frac{1}{4}$ 32	2 $\frac{1}{2}$ 64	3 $\frac{1}{16}$ 77	10 $\frac{1}{2}$ 267	$\frac{1}{2}$ 13	4 $\frac{1}{4}$ 108	$\frac{3}{8}$ 9		
3"	12 $\frac{1}{8}$ 308	7 $\frac{1}{8}$ 181	1 $\frac{1}{4}$ 45	1 $\frac{1}{4}$ 32	3 $\frac{1}{8}$ 79	3 $\frac{1}{16}$ 77	10 $\frac{1}{2}$ 267	$\frac{1}{2}$ 13	4 $\frac{1}{4}$ 120	$\frac{3}{8}$ 9		
4"	13 $\frac{1}{8}$ 346	7 $\frac{1}{8}$ 200	2 52	1 $\frac{1}{4}$ 32	4 $\frac{1}{8}$ 105	3 $\frac{5}{8}$ 92	10 $\frac{1}{2}$ 267	$\frac{1}{2}$ 16	6 $\frac{1}{16}$ 154	7 $\frac{1}{16}$ 11		
5"	14 $\frac{1}{8}$ 372	8 $\frac{1}{8}$ 213	2 $\frac{1}{16}$ 56	1 $\frac{1}{4}$ 32	4 $\frac{1}{8}$ 124	3 $\frac{5}{8}$ 92	10 $\frac{1}{2}$ 267	$\frac{3}{4}$ 19	7 $\frac{1}{8}$ 181	$\frac{1}{2}$ 13		
6"	15 $\frac{1}{8}$ 397	8 $\frac{1}{8}$ 226	2 $\frac{1}{16}$ 56	1 $\frac{1}{4}$ 32	6 $\frac{1}{8}$ 156	3 $\frac{5}{8}$ 92	10 $\frac{1}{2}$ 267	$\frac{3}{4}$ 19	8 $\frac{3}{16}$ 208	$\frac{1}{2}$ 13		
8"	18 $\frac{1}{8}$ 479	10 $\frac{1}{4}$ 260	2 $\frac{1}{8}$ 60	1 $\frac{1}{4}$ 45	8	202	5	125	14	356	$\frac{7}{8}$ 22	
10"	21 $\frac{1}{4}$ 540	11 $\frac{1}{2}$ 292	2 $\frac{1}{8}$ 66	1 $\frac{1}{4}$ 45	9 $\frac{1}{8}$ 251	5	125	14	356	1 $\frac{1}{8}$ 29	12 $\frac{1}{8}$ 320	
12"	24 $\frac{1}{8}$ 626	13 $\frac{1}{4}$ 337	3 76	1 $\frac{1}{4}$ 45	11 $\frac{1}{8}$ 301	6	150	14	356	1 $\frac{1}{4}$ 32	14 $\frac{1}{4}$ 375	
14"	26 $\frac{1}{8}$ 679	14 $\frac{1}{2}$ 368	3 76	1 $\frac{1}{4}$ 45	13 $\frac{1}{8}$ 333	6	150	—	—	1 $\frac{1}{4}$ 32	15 $\frac{1}{16}$ 405	
16"	30 762	15 $\frac{1}{4}$ 400	3 $\frac{1}{8}$ 87	2 50	15 $\frac{1}{8}$ 391	6 $\frac{1}{8}$ 175	—	—	1 $\frac{1}{16}$ 33	18 $\frac{1}{2}$ 470	—	
18"	31 $\frac{1}{2}$ 800	16 $\frac{1}{8}$ 422	4 $\frac{1}{8}$ 105	2 50	17 $\frac{1}{8}$ 442	6 $\frac{1}{8}$ 175	—	—	1 $\frac{1}{2}$ 38	20 $\frac{1}{16}$ 525	—	
20"	35 $\frac{1}{16}$ 897	18 $\frac{1}{8}$ 480	5 $\frac{1}{8}$ 130	2 $\frac{1}{8}$ 53	19 $\frac{1}{8}$ 493	8 $\frac{1}{4}$ 210	—	—	1 $\frac{1}{8}$ 41	22 $\frac{1}{4}$ 565	—	
24"	42 $\frac{1}{8}$ 1088	22 $\frac{1}{8}$ 562	6 152	2 $\frac{1}{4}$ 58	23 $\frac{3}{8}$ 594	8 $\frac{1}{4}$ 210	—	—	2 50	27 $\frac{1}{16}$ 693	—	

SIZE	TOP PLATE DRILLING				TAPPED LUG DATA			KEY WAY		WEIGHT (LBS.)†		SEATING TORQUE		(FULL OPEN)	
	N in. mm	O in. mm	Bolt Circle in. mm	No in.	Bolt mm	Q in. mm	mm	lbs.	kg	Buna-N, EPDM (in./lbs.)	Size	Normal Conditions	WET/DRY	Size	CV Rating
2"	2 50	1/4 7	4 $\frac{1}{4}$ 121	4	5/16"-11UNC x 1 $\frac{1}{8}$ "	—	—	8	6	135	2"	135		2 $\frac{1}{2}$ "	220
2 $\frac{1}{2}$ "	2 50	1/4 7	5 $\frac{1}{2}$ 140	4	5/16"-11UNC x 1 $\frac{1}{4}$ "	—	—	10	7	134/214	3"	302		3"	600
3"	2 50	1/4 7	6 150	4	5/16"-11UNC x 1 $\frac{1}{8}$ "	—	—	10	7	190/289	4"	1,022		4"	1,022
4"	2 $\frac{1}{4}$ 70	3/8 10	7 $\frac{1}{2}$ 191	8	5/16"-11UNC x 2"	—	—	17	12	250/387	5"	390/644		5"	1,579
5"	2 $\frac{1}{4}$ 70	3/8 10	8 $\frac{1}{2}$ 216	8	3/4"-10UNC x 2 $\frac{3}{16}$ "	—	—	25	16	600/959	6"	907/1,542		6"	3,136
6"	2 $\frac{1}{4}$ 70	3/8 10	9 $\frac{1}{2}$ 241	8	3/4"-10UNC x 2 $\frac{1}{16}$ "	—	—	27	20	1,697/2,919	8"	2,500/4,857		8"	5,340
8"	4 102	1/2 13	11 $\frac{1}{4}$ 298	8	3/4"-10UNC x 2 $\frac{3}{8}$ "	—	—	40	29	2,500/4,857	10"	3,300/7,071		10"	8,250
10"	4 102	1/2 13	14 $\frac{1}{4}$ 362	12	7/16"-9UNC x 2 $\frac{5}{16}$ "	—	—	63	48	3,300/7,071	12"	3,500/7,305		12"	11,917
12"	5 125	1/2 13	17 432	12	7/16"-9UNC x 3"	1/4 x 1 $\frac{1}{4}$	6 x 32	107	78	3,500/7,305	14"	5,500/10,027		14"	16,388
14"	5 125	1/2 13	18 $\frac{1}{4}$ 476	12	1"-8UNC x 3"	1/4 x 1 $\frac{1}{4}$	6 x 32	156	99	5,500/10,027	16"	8,200/13,437		16"	21,705
16"	5 $\frac{1}{2}$ 140	1 $\frac{1}{16}$ 18	21 $\frac{1}{4}$ 540	16	1"-8UNC x 3 $\frac{1}{16}$ "	5/16 x 1 $\frac{1}{16}$	8 x 46	203	140	8,200/13,437	18"	10,000/17,925		18"	27,908
18"	5 $\frac{1}{2}$ 140	1 $\frac{1}{16}$ 18	22 $\frac{1}{4}$ 578	16	1 $\frac{1}{8}$ "-7UNC x 4 $\frac{1}{8}$ "	5/16 x 1 $\frac{1}{16}$	10 x 40	269	188	10,000/17,925	20"	18,680/28,020		20"	43,116
20"	6 $\frac{1}{2}$ 165	7/8 22	25 635	20	1 $\frac{1}{8}$ "-7UNC x 5 $\frac{1}{8}$ "	5/16 x 1 $\frac{1}{16}$	10 x 40	392	248		24"				
24"	6 $\frac{1}{2}$ 165	7/8 22	29 $\frac{1}{2}$ 750	20	1 $\frac{1}{4}$ "-7UNC x 6"	1/2 x 2 $\frac{1}{2}$	13 x 60	593	450						



**Key:**  
F = Mounting Flange Diameter  
N = Mounting Bolt Circle Diameter  
O = Diameter of Holes  
D = Length of Stem Sticking Out From the Top of the Flange Surface  
J = Across Flats, Stem Dimension for Sizes 2" to 10"  
H = Shaft Diameter for Sizes 2" to 10"  
Q = Stem Key Dimension for Sizes 12" to 24"

A	B	C	D	E	F	G	WEIGHT	BFV SIZE
06.00	1.25	1.88	01.50	0.64 - 0.66 1.44	0.183 - 0.193	1.44	4 lbs	2" - 6"
012.00	1.38	1.88	01.50	0.75 - 0.77	0.245 - 0.255	1.44	7 lbs	8" - 12"
018.00	1.62	1.88	02.19	0.75 - 0.77	0.245 - 0.255	1.44	12 lbs	14" - 16"
018.00	1.62	1.88	02.19	01.00 - 01.02	0.245 - 0.255	1.44	18 lbs	18" - 20"
024.00	1.62	2.38	02.00	01.00 - 01.02	0.245 - 0.255	1.44	26 lbs	24" - 36"

## Recommended Bolt Torque Values

Size	Thread Size	Number Required	Bolt Length (in)	Torque min. (Ft-lbs)	Torque max. (Ft-lbs)
2"	5/8"-11UNC	4	1 1/4"	20	60
2 1/2"	5/8"-11UNC	4	1 1/2"	20	60
3"	5/8"-11UNC	4	1 1/2"	20	60
4"	5/8"-11UNC	8	1 3/4"	20	60
5"	3/4"-10UNC	8	1 3/4"	30	100
6"	3/4"-10UNC	8	2"	30	100
8"	3/4"-10UNC	8	2 1/4"	30	100
10"	7/8"-9UNC	12	2 1/4"	50	200
12"	7/8"-UNC	12	2 1/2"	50	200
14"	1"-8UNC	12	2 3/4"	70	300
16"	1"-8UNC	16	2 3/4"	70	300
18"	1 1/8"-7UNC	16	3 1/2"	100	400
20"	1 1/8"-7UNC	20	3 1/2"	100	400
24"	1 1/4"-7UNC	20	3 3/4"	150	500

## How to order Mueller Steam Specialty Model 88 Butterfly Valves

### Example: 04.0-88IHH61

This is a 4 lugged body valve with a ductile iron body, 316 SS stem, 316 SS Disc, EPDM Seat and a ten position handle

**4.0 - 88 - I H H - 6 - 1**

**SIZE:** \_\_\_\_\_

**MODEL:** \_\_\_\_\_

**88** - Full Lug (Replaces previous Model 66M)

**BODY:** \_\_\_\_\_

**I** - Ductile Iron

**STEM:** \_\_\_\_\_

**H** - 316SS (Standard 2" – 12")

**P** - 431SS (Standard 14" – 24")

**DISC:** \_\_\_\_\_

**H** - 316SS

**SEAT:** \_\_\_\_\_

**4** - Viton

**6** - EPDM

**OPERATOR:** \_\_\_\_\_

**1** - 10-Position Lever handle (Lockable in both open and closed positions)

**5** - Gear Operator (Recommended for 10 and above)

**E** - Electric Actuator



**A WATTS Brand**