

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

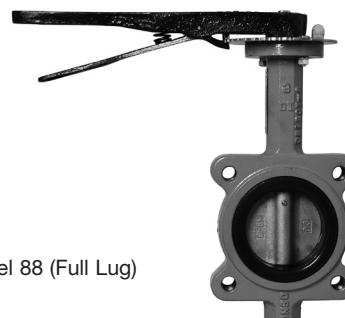
The Valves are MSS-SP-67 Type I – Valves for tight shut-off (tested per section 10.2.1). As specified in MSS-SP-67, we conduct 100% shell testing at 1.5 times rated pressure and seat leakage testing at 1.1 times rated pressure.

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

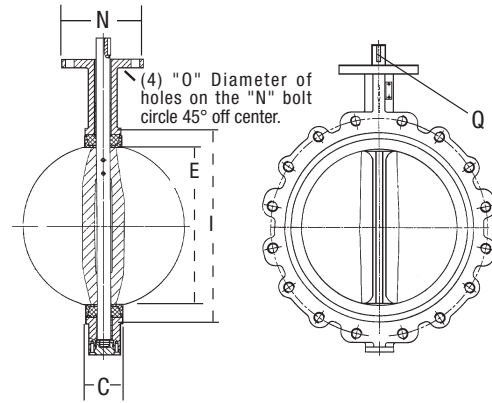
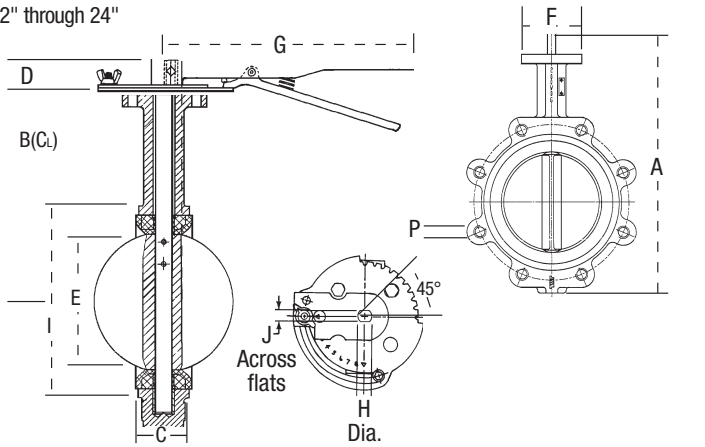
The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation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

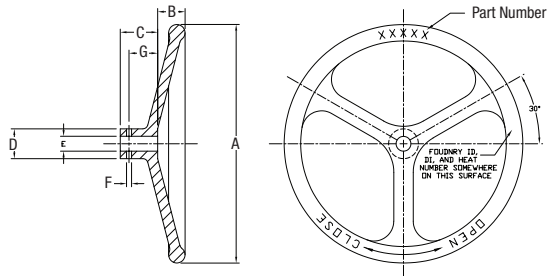


| SIZE | DIMENSIONS | | | | | | | | | | | | | | | | | | | |
|------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|
| | A | | B | | C | | D | | E | | F | | G | | H | | B | | J | |
| | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> |
| 2" | 10¼ | 273 | 6⅞ | 161 | 1⅞ | 42 | 1¼ | 32 | 2⅞ | 54 | 3⅞ | 77 | 10½ | 267 | ½ | 13 | 3⅞ | 95 | ⅝ | 9 |
| 2½" | 11⅞ | 295 | 6⅞ | 175 | 1¾ | 45 | 1¼ | 32 | 2½ | 64 | 3⅞ | 77 | 10½ | 267 | ½ | 13 | 4¼ | 108 | ⅝ | 9 |
| 3" | 12⅞ | 308 | 7⅞ | 181 | 1¾ | 45 | 1¼ | 32 | 3⅞ | 79 | 3⅞ | 77 | 10½ | 267 | ½ | 13 | 4¾ | 120 | ⅝ | 9 |
| 4" | 13⅞ | 346 | 7¼ | 200 | 2 | 52 | 1¼ | 32 | 4¼ | 105 | 3⅞ | 92 | 10½ | 267 | ⅝ | 16 | 6⅞ | 154 | ⅞ | 11 |
| 5" | 14⅞ | 372 | 8⅞ | 213 | 2⅞ | 56 | 1¼ | 32 | 4⅞ | 124 | 3⅞ | 92 | 10½ | 267 | ¾ | 19 | 7⅞ | 181 | ½ | 13 |
| 6" | 15⅞ | 397 | 8⅞ | 226 | 2⅞ | 56 | 1¼ | 32 | 6⅞ | 156 | 3⅞ | 92 | 10½ | 267 | ¾ | 19 | 8⅞ | 208 | ½ | 13 |
| 8" | 18⅞ | 479 | 10¼ | 260 | 2⅞ | 60 | 1¾ | 45 | 8 | 202 | 5 | 125 | 14 | 356 | ⅞ | 22 | 10¼ | 260 | ⅝ | 16 |
| 10" | 21¼ | 540 | 11½ | 292 | 2⅞ | 66 | 1¾ | 45 | 9⅞ | 251 | 5 | 125 | 14 | 356 | 1⅞ | 29 | 12⅞ | 320 | ⅞ | 21 |
| 12" | 24⅞ | 626 | 13¼ | 337 | 3 | 76 | 1¾ | 45 | 11⅞ | 301 | 6 | 150 | 14 | 356 | 1¼ | 32 | 14¼ | 375 | — | — |
| 14" | 26¼ | 679 | 14½ | 368 | 3 | 76 | 1¾ | 45 | 13⅞ | 333 | 6 | 150 | — | — | 1¼ | 32 | 15⅞ | 405 | — | — |
| 16" | 30 | 762 | 15¼ | 400 | 3⅞ | 87 | 2 | 50 | 15⅞ | 391 | 6⅞ | 175 | — | — | 1⅞ | 33 | 18½ | 470 | — | — |
| 18" | 31½ | 800 | 16⅞ | 422 | 4⅞ | 105 | 2 | 50 | 17¼ | 442 | 6⅞ | 175 | — | — | 1½ | 38 | 20⅞ | 525 | — | — |
| 20" | 35⅞ | 897 | 18⅞ | 480 | 5⅞ | 130 | 2⅞ | 53 | 19⅞ | 493 | 8¼ | 210 | — | — | 1⅞ | 41 | 22¼ | 565 | — | — |
| 24" | 42⅞ | 1088 | 22⅞ | 562 | 6 | 152 | 2¼ | 58 | 23⅞ | 594 | 8¼ | 210 | — | — | 2 | 50 | 27⅞ | 693 | — | — |

| SIZE | TOP PLATE DRILLING | | | | TAPPED LUG DATA | | | | KEY WAY | | WEIGHT (LBS.)† | |
|------|--------------------|-----|-----|----|-----------------|-----|-----|----------------|---------|---------|----------------|-----|
| | N | | O | | Bolt Circle | | No | Bolt | Q | | | |
| | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | lbs. | kg |
| 2" | 2 | 50 | ¼ | 7 | 4¾ | 121 | 4 | ⅝"-11UNC x 1⅝" | — | — | 8 | 6 |
| 2½" | 2 | 50 | ¼ | 7 | 5½ | 140 | 4 | ⅝"-11UNC x 1¾" | — | — | 10 | 7 |
| 3" | 2 | 50 | ¼ | 7 | 6 | 150 | 4 | ⅝"-11UNC x 1¾" | — | — | 10 | 7 |
| 4" | 2¾ | 70 | ⅜ | 10 | 7½ | 191 | 8 | ⅝"-11UNC x 2" | — | — | 17 | 12 |
| 5" | 2¾ | 70 | ⅜ | 10 | 8½ | 216 | 8 | ¾"-10UNC x 2⅞" | — | — | 25 | 16 |
| 6" | 2¾ | 70 | ⅜ | 10 | 9½ | 241 | 8 | ¾"-10UNC x 2⅞" | — | — | 27 | 20 |
| 8" | 4 | 102 | ½ | 13 | 11¾ | 298 | 8 | ¾"-10UNC x 2⅞" | — | — | 40 | 29 |
| 10" | 4 | 102 | ½ | 13 | 14¼ | 362 | 12 | ⅞"-9UNC x 2⅞" | — | — | 63 | 48 |
| 12" | 5 | 125 | ½ | 13 | 17 | 432 | 12 | ⅞"-9UNC x 3" | ¼ x 1¼ | 6 x 32 | 107 | 78 |
| 14" | 5 | 125 | ½ | 13 | 18¼ | 476 | 12 | 1"-8UNC x 3" | ¼ x 1¼ | 6 x 32 | 156 | 99 |
| 16" | 5½ | 140 | ⅝ | 18 | 21¼ | 540 | 16 | 1"-8UNC x 3⅝" | ⅝ x 1⅝ | 8 x 46 | 203 | 140 |
| 18" | 5½ | 140 | ⅝ | 18 | 22¾ | 578 | 16 | 1⅝"-7UNC x 4⅝" | ⅝ x 1⅝ | 10 x 40 | 269 | 188 |
| 20" | 6½ | 165 | ⅞ | 22 | 25 | 635 | 20 | 1⅝"-7UNC x 5⅝" | ⅝ x 1⅝ | 10 x 40 | 392 | 248 |
| 24" | 6½ | 165 | ⅞ | 22 | 29½ | 750 | 20 | 1¼"-7UNC x 6" | ½ x 2½ | 13 x 60 | 593 | 450 |

| SEATING TORQUE | |
|-------------------------|------------------------------|
| Buna-N, EPDM (in./lbs.) | |
| Size | Normal Conditions WET/DRY |
| 2" | 134/214 |
| 2½" | 190/289 |
| 3" | 250/387 |
| 4" | 390/644 |
| 5" | 600/959 |
| 6" | 907/1,542 |
| 8" | 1,697/2,919 |
| 10" | 2,500/4,857 |
| 12" | 3,300/7,071 |
| 14" | 3,500/7,305 |
| 16" | 5,500/10,027 |
| 18" | 8,200/13,437 |
| 20" | 10,000/17,925 |
| 24" | 18,680/28,020 |

| (FULL OPEN) | |
|-------------|-----------|
| Size | CV Rating |
| 2" | 135 |
| 2½" | 220 |
| 3" | 302 |
| 4" | 600 |
| 5" | 1,022 |
| 6" | 1,579 |
| 8" | 3,136 |
| 10" | 5,340 |
| 12" | 8,250 |
| 14" | 11,917 |
| 16" | 16,388 |
| 18" | 21,705 |
| 20" | 27,908 |
| 24" | 43,116 |



Key:

F = Mounting Flange Diameter

N = Mounting Bolt Circle Diameter

0 = 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 |
|--------|------|------|-------|------------------|---------------|------|--------|-----------|
| Ø6.00 | 1.25 | 1.88 | Ø1.50 | Ø.64 - Ø.66 1.44 | Ø.183 - Ø.193 | 1.44 | 4 lbs | 2" - 6" |
| Ø12.00 | 1.38 | 1.88 | Ø1.50 | Ø.75 - Ø.77 | Ø.245 - Ø.255 | 1.44 | 7 lbs | 8" - 12" |
| Ø18.00 | 1.62 | 1.88 | Ø2.19 | Ø.75 - Ø.77 | Ø.245 - Ø.255 | 1.44 | 12 lbs | 14" - 16" |
| Ø18.00 | 1.62 | 1.88 | Ø2.19 | Ø1.00 - Ø1.02 | Ø.245 - Ø.255 | 1.44 | 18 lbs | 18" - 20" |
| Ø24.00 | 1.62 | 2.38 | Ø2.00 | Ø1.00 - Ø1.02 | Ø.245 - Ø.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 - IHH - 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



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