Grinnell®

GRINNELL Model B303 Grooved End Butterfly Valves with Gear Operators or Lever-Lock Operators

General Description

The GRINNELL Model B303 Butterfly Valves provide for efficient control in piping systems of on/off or throttling/balancing service, fluid flow, and bubble-tight shut-off. The valves are furnished with grooved ends for use with grooved couplings and can be easily adapted to flanged components utilizing GRINNELL Figure 71 and Figure 71H Class 150 Flange Adapters.

The Model B303 Butterfly Valve with Grade "E" EPDM Disc Seal is temperature rated from -30°F (-34°C) to +230°F (+110°C).

The 2 in. through 12 in. (DN50 through DN300) Model B303 Butterfly Valve with Gear Operator is a self-locking, traveling nut gear operator (2 in. through 8 in.) and segmented gearbox (10 in. through 12 in.) type. It is equipped with adjustable stop screws to lock the valve at the full open and shut positions.

The 2 in. through 8 in. (DN50 through DN200) Model B303 Butterfly Valve (Ref. Figure 2) with Lever-Lock Operator has a throttling plate that provides throttling notches every 10° for manual control in balancing up to 90° or to shut off service. The Lever may be pad-locked in any one of the positions, including opened or closed, by virtue of a locking hole located in the handle and lever. The lever operation accommodates at least 2 inches of clearance for insulation (Ref. Figure 2 dimensions).

Flow may be from either direction and the valve may be positioned in any orientation. The body and disc construction provides for increased strength and durability. The disc seal and body coatings are compatible with a variety of chemicals and temperature ranges. Contact your GRINNELL Representative for specific recommendations on seal and coating selections.

IMPORTANT

Refer to Technical Data Sheet G1100 for warnings pertaining to regulatory and health information.

NOTICE

The GRINNELL Model B303 Butterfly Valves described herein must be installed and maintained in compliance with this document, in addition to the standards of any authorities having jurisdiction. Failure to do so may result in serious personal injury, impair the performance of these devices, or void the warranty.

Never remove any tubing component nor correct or modify any tubing deficiencies without first de-pressurizing and draining the system. Failure to do so may result in serious personal injury, property damage, and/or impaired device performance.

The designer is responsible for selecting products suitable for the intended service and to ensure that pressure ratings and performance data are not exceeded. Verify encapsulated disc material for compatibility with the specific application. Always read and understand the installation instructions.

The owner is responsible for maintaining their mechanical system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

10 YEAR LIMITED WARRANTY

For warranty terms and conditions, visit www.grinnell.com

Nominal Pipe Size		Nominal Dimensions Inches *mm*								Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	
2 *DN50*	2.375 *60,3*	8.43 *214,0*	2.85 *72,5*	4.28 *108,6*	2.76 *70.0*	3.80 *96,4*	0	4.9 *124,5*	4.92 *125,0*	15.9 *7,2*
2-1/2 *DN65*	2.875 *73,0*	9.34 *237,3*	3.35 *85,0*	4.28 *108,6*	3.03 *77,0*	3.80 *96,4*	0	5.50 *139,8*	4.92 *125,0*	19.2 *8,7*
76,1 mm *DN65*	3.000 *76,1*	9.34 *237,3*	3.35 *85,0*	4.28 *108,6*	3.03 *77,0*	3.80 *96,4*	0	5.50 *139,8*	4.92 *125,0*	19.2 *8,7*
3 *DN80*	3.500 *88,9*	9.60 *243,8*	3.58 *91,0*	4.28 *108,6*	3.78 *96.0*	3.80 *96,4*	0	5.76 *146,3*	4.92 *125,0*	21.0 *9,5*
4 *DN100*	4.500 *114,3*	10.59 *269,0*	4.29 *109,0*	4.28 *108,6*	4.88 *124.0*	4.54 *115,4*	0	6.75 *171,5*	4.92 *125,0*	24.3 *11,0*
139,7 mm *DN125*	5.500 *139,7*	11.42 *290,0*	4.16 *131,0*	5.79 *147,0*	*5.75* *146,0*	5.21 *132,4*	0	7,93 *201,5*	5.91 *150,0*	32.0 *14,5*
5 *DN125*	5.563 *141,3*	11.42 *290,0*	4.16 *131,0*	5.79 *147,0*	5.75 *146.0*	5.21 *132,4*	0	7,93 *201,5*	5.91 *150,0*	32.0 *14,5*
165,1 mm *DN150*	6.500 *165,1*	11.93 *303,0*	5.71 *145,0*	5.79 *147,0*	6.89 *175,0*	5.21 *132,4*	0.27 *6,8*	8,44 *214,5*	5.91 *150,0*	35.7 *16,2*
6 *DN150*	6.625 *168,3*	11.93 *303,0*	*5.71* *145,0*	5.79 *147,0*	6.89 *175.0*	5.21 *132,4*	0.27 *6,8*	8,44 *214,5*	5.91 *150,0*	35.7 *16,2*
8 *DN200*	8.625 *219,1*	12.91 *328,0*	*6.69* *170,0*	8.19 *208,0*	8.82 *224.0*	5.80 *147,4*	0.94 *24,0*	9.29 *236,0*	8.86 *225,0*	49.6 *22,5*
10 *DN250*	10.750 *273,5*	14.72 *374,0*	*7.68* *195,0*	8.19 *208,0*	10.83 *275,0*	6.26 *159,0*	1.65 *41,8*	11.10 *282,0*	8.86 *225,0*	72.8 *33,0*
12 *DN300*	12.750 *323,9*	15.83 *402,0*	*9.51* *241,5*	8.19 *208,0*	13.15 *339,0*	6.50 *165,0*	2.70 *68,5*	12.20 *310,0*	8.86 *225,0*	89.3 *40.4*

No.	Description	Material	Qty
1	Upper Stem	Stainless Steel	1
2	Bearing	Polyacetal	4
3	O-ring	EPDM, Nitrile, or Fluoroelastomer	4
4	Body	Ductile Iron RILSAN Coated	1
5	Disc	Ductile Iron Encapsulation per Table A	1
6	Lower Stem	Stainless Steel	1

No.	Description	Material	Qty
7	Dust Plug	EPDM, Nitrile, or Fluoroelastomer	1
8	Nameplate	Aluminium	1
9	Gear Operator	Ductile Iron, Steel	1
10	Handwheel	Ductile Iron	1
11	Spring Pin	Steel	1
12	Hex. Bolt	Zinc-Plated Steel	2

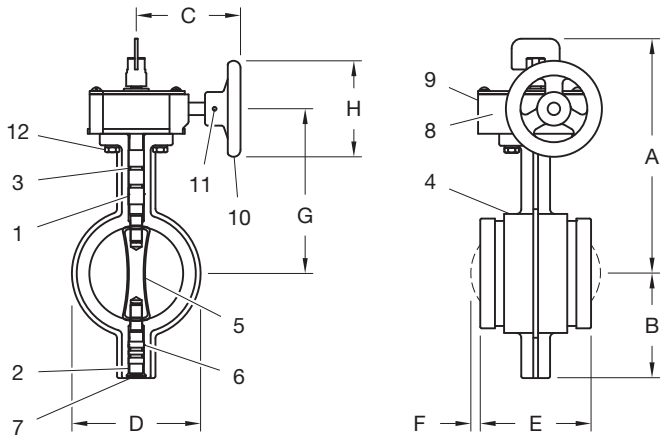


FIGURE 1
MODEL B303 GROOVED END BUTTERFLY VALVE
WITH GEAR OPERATOR

Nominal Pipe Size		Nominal Dimensions Inches *mm*							Approx. Weight Lbs. *kg*
ANSI Inches *DN*	**O.D. Inches *mm***	**A**	**B**	**C**	**D**	**E**	**F**	**G**	
2 *DN50*	2.375 *60,3*	5.16 *131,0*	2.85 *72,5*	11.18 *284,0*	2.76 *70.0*	3.80 *96,4*	0	2.00 *50,8*	4.0 *1,8*
2-1/2 *DN65*	2.875 *73,0*	5.76 *146,0*	3.35 *85,0*	11.18 *284,0*	3.03 *77.0*	3.80 *96,4*	0	2.34 *59,4*	8.4 *3,8*
76,1 mm *DN65*	3.000 *76,1*	5.76 *146,0*	3.35 *85,0*	11.18 *284,0*	3.03 *77.0*	3.80 *96,4*	0	2.28 *57,9*	8.4 *3,8*
3 *DN80*	3.500 *88,9*	6.02 *153,0*	3.58 *91,0*	11.18 *284,0*	3.78 *96.0*	3.80 *96,4*	0	2.29 *58,2*	9.5 *4,3*
4 *DN100*	4.500 *114,3*	7.01 *178,0*	4.29 *109,0*	11.18 *284,0*	4.88 *124.0*	4.54 *115,4*	0	2.78 *70,6*	13.2 *6,0*
139,7 mm *DN125*	5.500 *139,7*	7.83 *199,0*	4.16 *131,0*	11.18 *284,0*	5.75 *146.0*	5.21 *132,4*	0	2.34 *59,4*	19.4 *8,8*
5 *DN125*	5.563 *141,3*	7.83 *199,0*	4.16 *131,0*	11.18 *284,0*	5.75 *146.0*	5.21 *132,4*	0	2.31 *58,7*	19.4 *8,8*
165,1 mm *DN150*	6.500 *165,1*	8.35 *212,0*	5.71 *145,0*	11.18 *284,0*	6.89 *175.0*	5.21 *132,4*	0.27 *6,8*	*2.35* *59,7*	23.4 *10,6*
6 *DN150*	6.625 *168,3*	8.35 *212,0*	5.71 *145,0*	11.18 *284,0*	6.89 *175.0*	5.21 *132,4*	0.27 *6,8*	2.29 *58,2*	23.4 *10,6*
8 *DN200*	8.625 *219,1*	9.33 *237,0*	6.69 *170,0*	11.18 *284,0*	8.82 *224.0*	5.80 *147,4*	0.94 *24,0*	2.27 *57,7*	34.4 *15,6*

No.	Description	Material	Qty
1	Upper Stem	Stainless Steel	1
2	Bearing	Polyacetal	4
3	O-Ring	EPDM, Nitrile, or Fluoroelastomer	4
4	Body	Ductile Iron RILSAN Coated	1
5	Disc	Ductile Iron Encapsulation per Table A	1
6	Lower Stem	Stainless Steel	1
7	Dust Plug	EPDM, Nitrile, or Fluoroelastomer	1

No.	Description	Material	Qty
8	Nameplate	Aluminium	1
9	Handle	Ductile Iron	1
10	Lever	Zinc-Plated Steel	1
11	Throttle Plate	Zinc-Plated Steel	1
12	Hex. Bolt	Zinc-Plated Steel	2
13	Hex. Nut	Zinc-Plated Steel	2

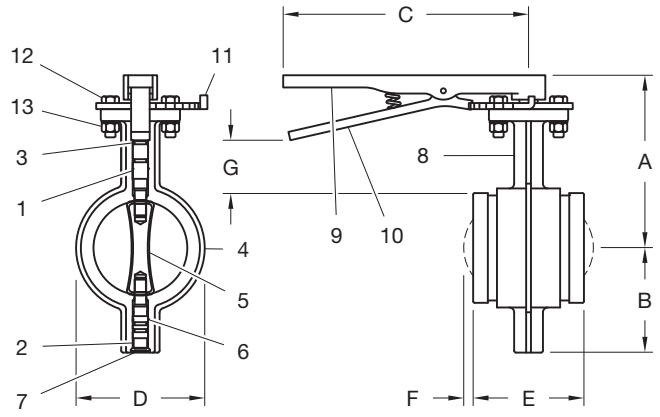


FIGURE 2
MODEL B303 BUTTERFLY VALVE
WITH LEVER-LOCK OPERATORS

Technical Data

Approvals
The Model B303 Butterfly Valves conform to MSS SP-67

Sizes
Gear Operator:
2 in. to 12 in. (DN50 to DN300)

Lever Operator:
2 in. to 8 in. (DN50 to DN200)

Maximum Working Pressure
2 in. to 8 in. (DN50 to DN200): 300 psi (20,7 bar)
10 in. to 12 in. (DN250 to DN300): 175 psi (12 bar)

Operating Temperature Range
See Table A

Encapsulated Disc Material
See Table A

Materials of Construction
Body:
Ductile Iron conforming to ASTM A 536, Grade 65-45-12

Body Coating:
RILSAN (PA11), Black

Disc:
Ductile Iron conforming to ASTM A 395, Grade 60-40-18

Upper and Lower Stem:
Type 410 Stainless Steel conforming to ASTM A479

Gear Operator:
2 in. to 8 in. – bronze traveling nut gearbox in ductile iron housing.
10 in. to 12 in. – segmented gearbox in ductile iron housing.

Lever-Lock Operator:
Handle . . . . . Polymer-Coated Iron
Lever-Lock . . . . . Zinc-Plated Steel
Throttling Plate . . . . . Zinc-Plated Steel

Valve Operating Torque
Torque is the rotary effort required to operate a valve. This turning force in a butterfly valve is determined by three factors:

- Friction of the disc to seat for sealing
- Bearing friction
- Dynamic torque

Breakaway Torque is the total of the torques resulting from bearing friction and seat/disc interference friction at a given pressure differential. This value is normally the highest required torque to operate a valve and is used in sizing actuators. The torque values provided in Table B are valid for water and lubricating fluids at ambient temperature. For dry and non-lubricating fluids, contact a GRINNELL Technical Service representative.

Encapsulated Disc Material		
Grade "E" EPDM(1)	**Grade "T" Nitrile(2)**	**Grade "O" Fluoroelastomer(3)**
-30°F to 230°F -34°C to 110°C	-20°F to 180°F -29°C to 82°C	-20°F to 200°F -29°C to 93°C

Notes:
1. Recommended for hot water, dilute acids, alkalis, oil free air, and many chemical services not involving petroleum products. Not recommended for hydrocarbons or steam service.
2. Recommended for petroleum products, vegetable oils, mineral oils, and air with oils. High-end oil vapor temperature decreases to 150°F (66°C). Not recommended for hot water or hot dry air systems.
3. Recommended for oxidizing acids, petroleum products, hydraulic fluids, lubricants, halogenated hydrocarbons. Not recommended for hot water.

TABLE A
MODEL B303 BUTTERFLY VALVE
OPERATING TEMPERATURE RANGE

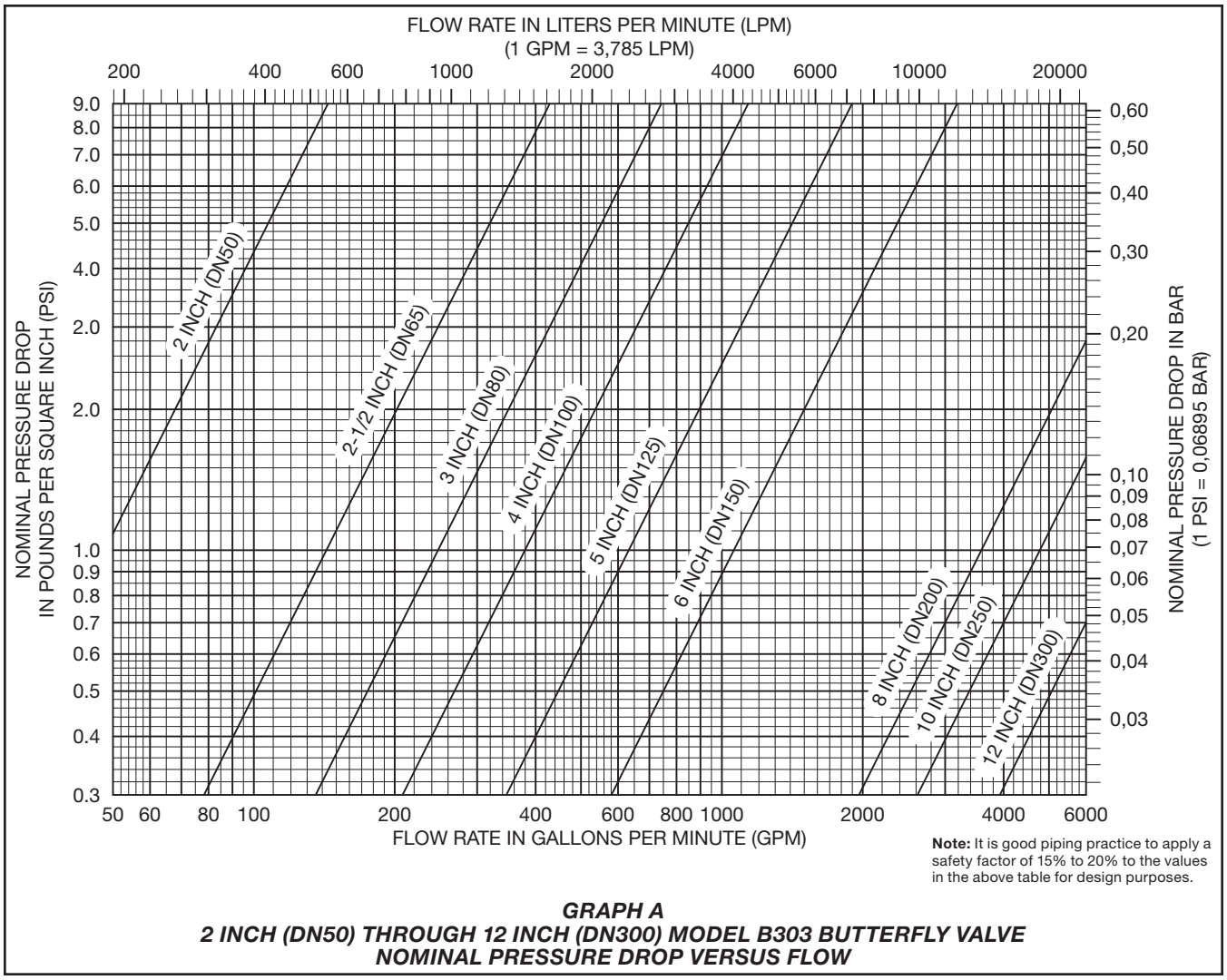
Sizes ANSI ***DN***	**O. D. Inches** ***mm***	**Torque Inch Lbs.** ***Nm***		
		100 psi ***6,9 bar***	**200 psi** ***13,8 bar***	**300 psi** ***20,7 bar***
2 *(DN50)*	2.375 *(60,3)*	138 *15,6*	153 *17,3*	170 *19,2*
2-1/2 *(DN65)*	2.875 *(73,0)*	199 *22,5*	221 *25,0*	246 *27,8*
76,1 (DN65)	*3.000* *(76,1)*	199 *22,5*	221 *25,0*	246 *27,8*
3 *(DN80)*	*3.500* *(88,9)*	257 *29,0*	286 *32,3*	318 35,9
4 *(DN100)*	*4.500* *(114,3)*	463 *52,3*	515 *58,2*	317 *35,8*
139,7 (DN125)	*5.500* *(139,7)*	402 *45,4*	497 *56,2*	573 *64,7*
5 *(DN125)*	*5.563* *(141,3)*	402 *45,4*	497 *56,2*	585 *66,1*
165,1 (DN150)	*6.500* *(165,1)*	523 *59,1*	599 *67,7*	585 *66,1*
6 *(DN150)*	*6.625* *(168,3)*	523 *59,1*	599 *67,7*	629 *71,1*
8 *(DN200)*	*8.625* *(219,1)*	1457 *164,6*	1808 *204,3*	2028 *229,1*
10 *(DN250)*	*10.750* *(273,05)*	1481 *167,3*	2306[1] *260,5*	—
12 *(DN300)*	*12.750* *(323,9)*	3318 *374,9*	4152[1] *469,1*	—

Notes:
1. Torque values for 10 in. (DN250) and 12 in. (DN300) valves recorded at 175 psi (12,1 bar) instead of 200 psi (13,8 bar).

TABLE B
MODEL B303 BUTTERFLY VALVE
OPERATING TORQUE

Butterfly valves, sizes 8 Inch and larger, when used on liquids, show a marked increase in dynamic torque that tends to close the valve. For this reason, gear operated or actuated valves are available.

The torque values provided in Table B apply to Grade "E" EPDM. When calculating torques for Nitrile or Fluoroelastomer, multiply listed torque by 1.25.



Note: It is good piping practice to apply a safety factor of 15% to 20% to the values in the above table for design purposes.

GRAPH A
2 INCH (DN50) THROUGH 12 INCH (DN300) MODEL B303 BUTTERFLY VALVE
NOMINAL PRESSURE DROP VERSUS FLOW

Installation

NOTICE

All replacement parts must be obtained from the manufacturer to assure proper operation of the valve.

In piping systems, butterfly valves should be located where operation, inspection, and maintenance are readily accessible.

When a valve closes hard, it may be due to debris lodged in the sealing area. This may be corrected by backing-off the handle or handwheel and closing it again, several times if necessary. Never force the valve to seat by applying a wrench to the handwheel or extension to the lever, as it may distort the valve components or score the sealing surfaces.

To prevent rotation of the valve, the Model B303 Butterfly Valve is recommended to be installed with rigid type couplings such as the GRINNELL Figure 772 Coupling. If flexible couplings are used, additional support may be needed to prevent rotation.

Ordering Procedure

Grinnell Mechanical Products, valves, accessories and other products are available globally through a network of distribution centers.

Model B303 Butterfly Valve
Specify the following:

- Model B303
- Size
- Quantity
- Type of Operator:

  Gear (2 in. to 12 in.)
  Lever (2 in. to 8 in.)
- Type of Disc Seal:

  Grade “E” EPDM
  Grade “T” Nitrile
  Grade “O” Fluoroelastomer