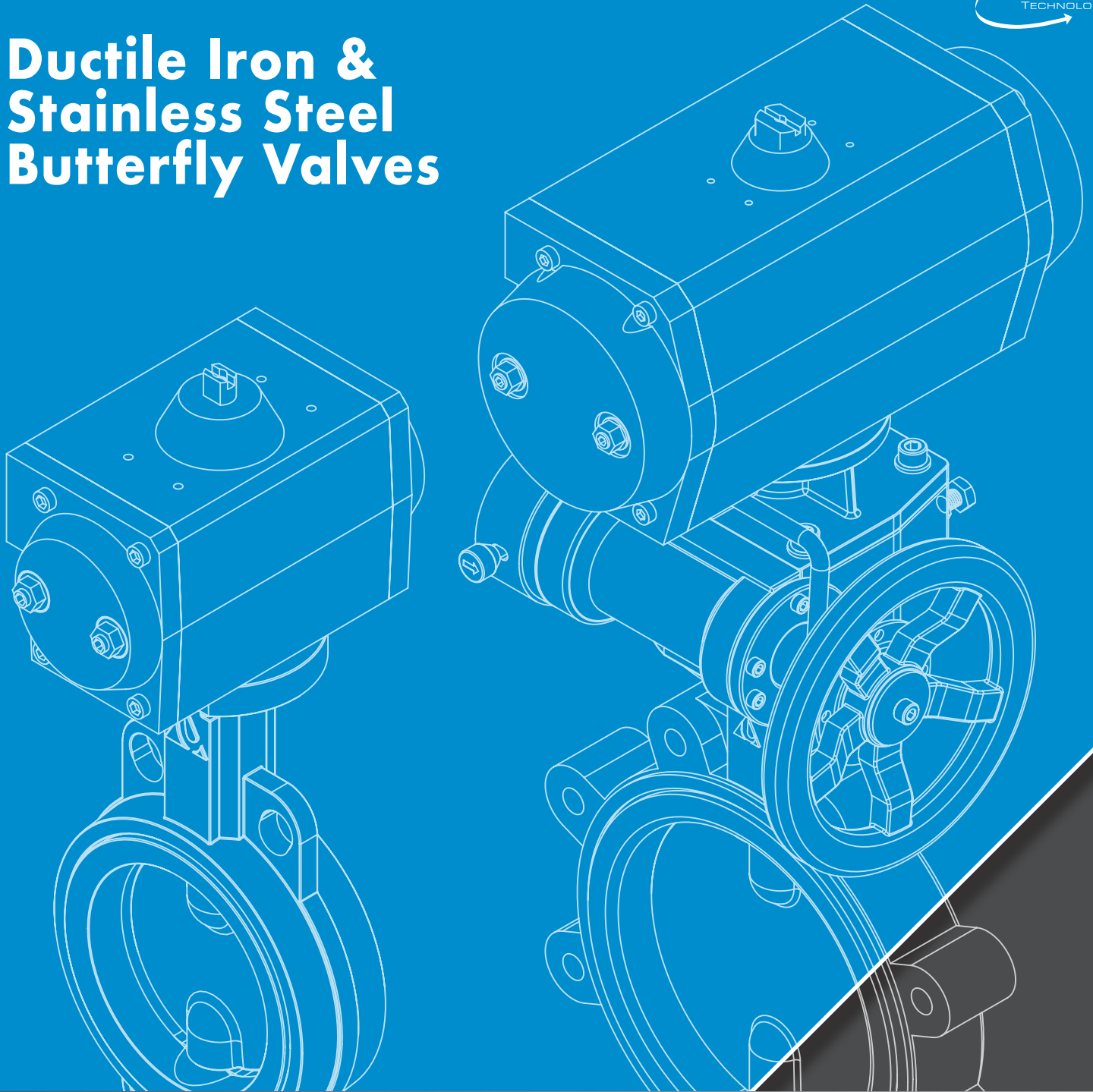




*The Best Way To Automate Your Process*



# Ductile Iron & Stainless Steel Butterfly Valves

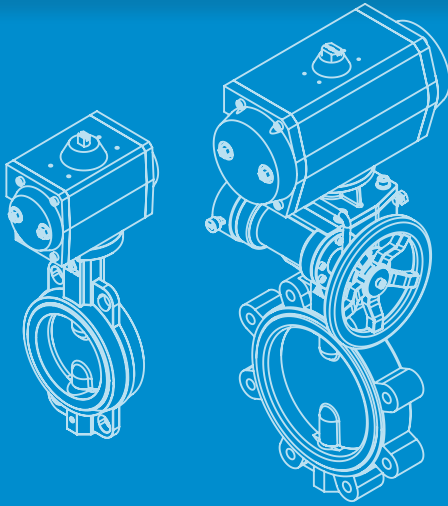


## Resilient Butterfly Technical Brochure

*Max-Air Technology Inc. | Rotary Actuators & Valve Automation Solutions*

# Resilient Seated Butterfly Valves

Industry Leading, Resilient Butterfly Valves w/ Cartridge Seat & Dead-End Service Design.



The Delta T 05X and 65X Resilient Seated Butterfly Valves follow the Max-Air Technology tradition of utilizing easy integration, flexible customization, and reliable operation. Features include standard ISO 5211 bolt circle pattern for mounting, ISO square stems, and 3-year limited warranty.

## 050/051 Series Part # Builder

A	-	B	-	C	-	D	-	E
060	-	051	-	579	-	HND	-	N/A

### Example Part # 060-051-579-HND

**EXAMPLE DESCRIPTION:** 6" 051-579 LUG PATTERN BUTTERFLY VALVE, IRON BODY, CF8M STAINLESS STEEL DISC, EPDM SEAT, 410/416 STAINLESS STEEL STEM, PTFE BUSHINGS, HANDLE OPERATED

A - SIZE			B - SERIES	C - TRIM
015 - 1.5"	100 - 10"	280 - 28"	050 - Ductile Iron, 125/150 ANSI Wafer Pattern	See Page 3 For List of Trims.
020 - 2"	120 - 12"	300 - 30"		
025 - 2.5"	140 - 14"	320 - 32"		(Additional Trims Available Upon Request)
030 - 3"	160 - 16"	360 - 36"	051 - Ductile Iron, 125/150 ANSI Lug Pattern	
040 - 4"	180 - 18"	400 - 40"		
050 - 5"	200 - 20"	420 - 42"		
060 - 6"	240 - 24"	480 - 48"		
080 - 8"	260 - 26"			

D - OPERATOR   1-1/2" - 12" Sizes	
CODE	DESCRIPTION
BST	BARE STEM
HND	LEVER HANDLE
ILP	LEVER HANDLE W/ ILP PLATE & ARM
GOP	GEAR OPERATOR
Cxx	CHAINWHEEL OPERATOR, "xx" LENGTH (Length Measured in Feet)

D - OPERATOR   14" - 48" SIZES	
CODE	DESCRIPTION
BST	BARE STEM
GOP	GEAR OPERATOR
Cxx	CHAINWHEEL OPERATOR, "xx" LENGTH (Length Measured in Feet)

E - SPECIAL	
CODE	DESCRIPTION
	(NONE)
O2	OXYGEN FREE CLEANING
SF	SILICONE FREE CLEANING
CCxxxx	CUSTOM RAL ACRYLIC PAINT COLOR
E	PASSIVATED DISC
P	POLISHED DISC
UC	UNDERCUT DISC

\*Note: 1) Not all combinations available, and special solutions not shown are possible. Please call factory for details.  
2) Max-Air Technology reserves the right to change or modify products without prior notice & without incurring any obligation to make such changes on products previously or subsequently sold.

# 050/051/650/651 Series Technical Brochure

Max-Air Technology Inc. | Rotary Actuators & Valve Automation Solutions



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C - TRIM   1-1/2" - 12" Sizes								
DISC CUT	STEM	CODE	DISC MTL	SEAT	RATING	TEMP RANGE	NSF	
Best Availability	Full	416 SS	261	DI-NP	NR	200 PSI	-55°F to +210°F	NSF372
			262	DI-NP	EPDM	200 PSI	-40°F to +275°F	NSF372
			263	DI-NP	BUNA	200 PSI	+10°F to +180°F	NSF372
			264	DI-NP	VITON	200 PSI	+0°F to +392°F	NSF372
			463	PTFE/SS	PTFE/E	150 PSI	-4°F to +250°F	NSF61
			482	CF8M	PTFE/E	150 PSI	-4°F to +250°F	NSF61
			579	CF8M	EPDM	200 PSI	-40°F to +275°F	NSF61
			582	CF8M	BUNA	200 PSI	+10°F to +180°F	NSF61
			590	CF8M	HT-EPDM	200 PSI	-4°F to +302°F	NSF61
			780	AL-BZ	EPDM	200 PSI	-40°F to +275°F	NSF61
			783	AL-BZ	BUNA	200 PSI	+10°F to +180°F	NSF61
			897	NY11	EPDM	200 PSI	-40°F to +275°F	NSF61
			898	NY11	BUNA	200 PSI	+10°F to +180°F	NSF61
			962	CF8M	VITON	200 PSI	+0°F to +392°F	NSF372
			Full	316 SS	483	CF8M	PTFE/E	50 PSI
483P	POL CF8M	PTFE/E			50 PSI	-4°F to +250°F	NSF61	
580	CF8M	EDPM			150 PSI	-40°F to +275°F	NSF61	
583	CF8M	BUNA			150 PSI	+10°F to +180°F	NSF61	
591	CF8M	HT-EPDM			150 PSI	-4°F to +302°F	NSF61	
Undercut	416 SS	482UC	CF8M	PTFE/E	50 PSI	-4°F to +250°F	NSF61	
		579UC	CF8M	EPDM	50 PSI	-40°F to +275°F	NSF61	
		582UC	CF8M	BUNA	50 PSI	+10°F to +180°F	NSF61	
		780UC	AL-BZ	EPDM	50 PSI	-40°F to +275°F	NSF61	
		783UC	AL-BZ	BUNA	50 PSI	+10°F to +180°F	NSF61	
		962UC	CF8M	VITON	50 PSI	+0°F to +392°F	NSF372	

C - TRIM   14" - 48" Sizes							
DISC CUT	STEM	CODE	DISC MTL	SEAT	RATING	TEMP RANGE	NSF
Full	17-4PH	262	DI-NP	EPDM	150 PSI	-40°F to +275°F	NSF372
		263	DI-NP	BUNA	150 PSI	+10°F to +180°F	NSF372
		579	CF8M	EPDM	150 PSI	-40°F to +275°F	NSF61
		582	CF8M	BUNA	150 PSI	+10°F to +180°F	NSF61
		780	AL-BZ	EPDM	150 PSI	-40°F to +275°F	NSF61
		783	AL-BZ	BUNA	150 PSI	+10°F to +180°F	NSF61
		962	CF8M	VITON	150 PSI	+0°F to +392°F	NSF372
Undercut	17-4PH	482UC	CF8M	PTFE/E	50 PSI	-4°F to +250°F	NSF61
		579UC	CF8M	EPDM	50 PSI	-40°F to +275°F	NSF61
		582UC	CF8M	BUNA	50 PSI	+10°F to +180°F	NSF61
		780UC	AL-BZ	EPDM	50 PSI	-40°F to +275°F	NSF61
		783UC	AL-BZ	BUNA	50 PSI	+10°F to +180°F	NSF61
		962UC	CF8M	VITON	50 PSI	+0°F to +392°F	NSF372

# Resilient Seated Butterfly Valves

Industry Leading, Resilient Butterfly Valves w/ Cartridge Seat & Dead-End Service Design.

## 650/651 Series Part # Builder

A	-	B	-	C	-	D	-	E
120	-	650	-	492	-	GOP	-	N/A

### Example Part # 120-650-492-GOP

**EXAMPLE DESCRIPTION:** 12" DELTA T 650-492 SERIES WAFER BFV, STAINLESS STEEL BODY, VITON (FKM) SEAT, POLISHED CF8M STAINLESS STEEL DISC, 431 SS STEM, PTFE BUSHINGS, W/ HANDWHEEL GEAR OPERATOR

A - SIZE		B - SERIES
020 - 2"	100 - 10"	650 - Stainless Steel, 125/150 ANSI Wafer Pattern
025 - 2"	120 - 12"	
030 - 3"	140 - 14"	
040 - 4"	160 - 16"	651 - Stainless Steel, 125/150 ANSI Lug Pattern
050 - 5"	180 - 18"	
060 - 6"	200 - 20"	
080 - 8"	240 - 24"	

Best Availability

C - TRIM   2" - 12" Sizes							
DISC CUT	STEM	CODE	DISC MTL	SEAT	RATING	TEMP RANGE	NSF
Full	431	463	PTFE/SS	PTFE/E	150 PSI	-4°F to +250°F	NSF61
		465	POL CF8M	BUNA	200 PSI	+10°F to +180°F	NSF61
		479	POL CF8M	EPDM	200 PSI	-40°F to +275°F	NSF61
		482P	POL CF8M	PTFE/E	150 PSI	-4°F to +250°F	NSF61
		492	POL CF8M	VITON	200 PSI	+0°F to +392°F	NSF372
Full	316	462	PTFE/SS	PTFE/E	150 PSI	-4°F to +250°F	NSF61
		466	POL CF8M	BUNA	200 PSI	+10°F to +180°F	NSF61
		480	POL CF8M	EPDM	150 PSI	-40°F to +275°F	NSF61
		483	CF8M	PTFE/E	150 PSI	-4°F to +250°F	NSF61
		483P	POL CF8M	PTFE/E	150 PSI	-4°F to +250°F	NSF61
		493	POL CF8M	VITON	200 PSI	+0°F to +392°F	NSF372

D - OPERATOR   1-1/2" - 12" Sizes	
CODE	DESCRIPTION
BST	BARE STEM
HND	LEVER HANDLE
ILP	LEVER HANDLE W/ ILP PLATE & ARM
GOP	GEAR OPERATOR
Cxx	CHAINWHEEL OPERATOR, "xx" LENGTH (Length Measured in Feet)

D - OPERATOR   14" - 24" SIZES	
CODE	DESCRIPTION
BST	BARE STEM
GOP	GEAR OPERATOR
Cxx	CHAINWHEEL OPERATOR, "xx" LENGTH (Length Measured in Feet)

C - TRIM   14" - 24" Sizes							
DISC CUT	STEM	CODE	DISC MTL	SEAT	RATING	TEMP RANGE	NSF
Full	17-4PH	463	PTFE/SS	PTFE/E	100 PSI	-4°F to +250°F	NSF61
		465	POL CF8M	BUNA	150 PSI	+10°F to +180°F	NSF61
		479	POL CF8M	EPDM	150 PSI	-40°F to +275°F	NSF61
		482P	POL CF8M	PTFE/E	150 PSI	-4°F to +250°F	NSF61
		492	POL CF8M	VITON	150 PSI	+0°F to +392°F	NSF372
Undercut	17-4PH	479UC	POL CF8M	EPDM	50 PSI	-40°F to +275°F	NSF61
		482PUC	CF8M	PTFE/E	50 PSI	-4°F to +250°F	NSF61

E - SPECIAL	
CODE	DESCRIPTION
	(NONE)
O2	OXYGEN FREE CLEANING
SF	SILICONE FREE CLEANING
E	PASSIVATED DISC
P	POLISHED DISC
UC	UNDERCUT DISC

\*Note:

- 1) Not all combinations available, and special solutions not shown are possible. Please call factory for details.
- 2) Max-Air Technology reserves the right to change or modify products without prior notice & without incurring any obligation to make such changes on products previously or subsequently sold.



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## 3-YEAR LIMITED WARRANTY

*Max-Air Technology Inc. | The Best Way to Automate Your Process*

Max-Air Technology provides the following warranty regarding its products. THE WARRANTY STATED HEREIN IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, OR STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Max-Air Technology warrants its products shall be delivered free from defects in materials and workmanship when these products are used for the purpose for which they were designed and manufactured. Max-Air Technology does not warrant its products against chemical or stress corrosion or against any other failure other than from defects in materials or workmanship. The applicable warranty period is dependent on the clearly identified brand labeling.

**The warranty period for Max-Air, Max-Electric, Delta T, and Sesto Valves brand labeled products is for thirty-six (36) months from the delivery date to the Purchaser.**

Any claims regarding this warranty must be in writing and received by Max-Air Technology before the last effective date of the warranty period, failing which this warranty shall expire. Upon Max-Air Technology's receipt of a warranty claim, Max-Air Technology reserves the right to inspect the product(s) in question at either the field location or at Max-Air Technology manufacturing plant. If, after inspection of the product(s) in question, Max-Air Technology determines that the Purchaser's claim is covered by this warranty, Max-Air Technology's sole liability and the Purchaser's sole remedy under this warranty is limited to the refunding of the purchase price or repair or replacement thereof at Max-Air Technology's option. Warranty repair, replacement or re-performance by Seller shall not extend or renew the applicable warranty period. Max-Air Technology will not be liable for any repairs, labor, material or other expenses that are not specifically authorized in writing by Max-Air Technology, and in no event shall Max-Air Technology be liable for any direct, indirect or consequential damages arising out of any defect from any cause whatsoever. If any Max-Air Technology product is modified or altered at any location other than Max-Air Technology – Wentzville (Missouri) or Max-Air Technology – Agrate Brianza (MB) ITALY without the express written authorization of Max-Air Technology, it is expressly not covered by this warranty. The warranties and remedies are conditioned upon (a) proper storage, installation, use, operation, and maintenance of products, (b) Purchaser keeping accurate and complete records of operation and maintenance during the warranty period and providing Max-Air Technology access to those records, and (c) modification or repair of products only as authorized by Max-Air Technology in writing. Failure to meet any such conditions renders the warranty null and void. Max-Air Technology is not responsible for normal wear and tear. The warranty for such products shall be subject only to the warranty relief, if any, provided by the suppliers and/or manufacturers of such products.



# Features & Benefits

Industry Leading, Resilient Butterfly Valves w/ Cartridge Seat & Dead-End Service Design.

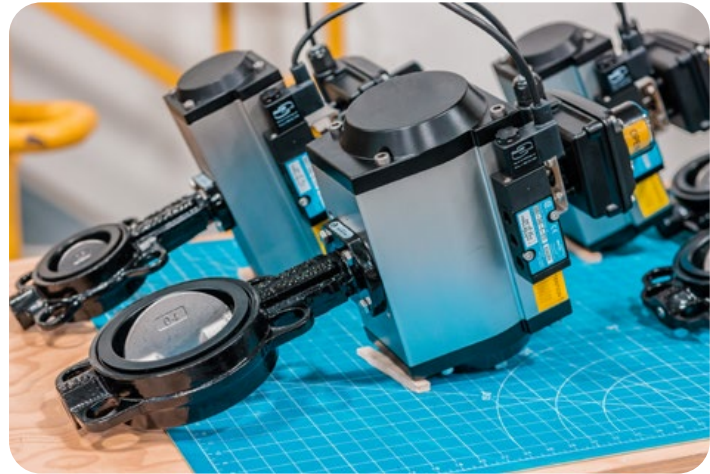
## Cartridge Seat Resilient Butterflies

In 2009, Max-Air Technology entered the valve market with its first valve product, the Delta T Resilient Series Butterfly Valve. With years of industry experience in valve automation, Max-Air sought to address the market's need for thoughtfully engineered valves. These Delta T Resilient Seated Butterfly Valves lead the way with a proven cartridge seat design and standard ISO configurations. The full breadth includes a comprehensive disc, seat, and size offering for any application.

The Delta T 05X and 65X Resilient Seated Butterfly Valves follow the Max-Air Technology tradition of utilizing easy integration, flexible customization, and reliable operation. Features include standard ISO 5211 bolt circle patterns for mounting, ISO square stems, and a 3-year limited warranty.

### Features:

- Ductile Iron Body sizes 1.5" - 48"
- Stainless Steel Body sizes 2" - 24"
- Max Pressure Rating 200 PSI for 1.5"-12"
- Max Pressure Rating 150 PSI for 14"-48"
- Dead-End Pressure Rating 200 PSI Up to 12" Lug
- Double Dead-End Service Available
- Install between Standard ANSI class 125/150 flanges
- 050 Wafer also compatible with PN10/PN16 flanges
- ISO 5211 square drive shaft for easy automation
- Conforms to MSS-SP-67, MSS-SP-25, API-609
- Designed for blowout-proof service
- High-Cv slim disc & 2-piece stem design 1.5"-12"
- Field repairable
- Vacuum service capable 1.5"-12" to below 10 microns
- Malleable Iron Handles available
- Cast Iron Gear Operators available
- Flange Bolt Kits available

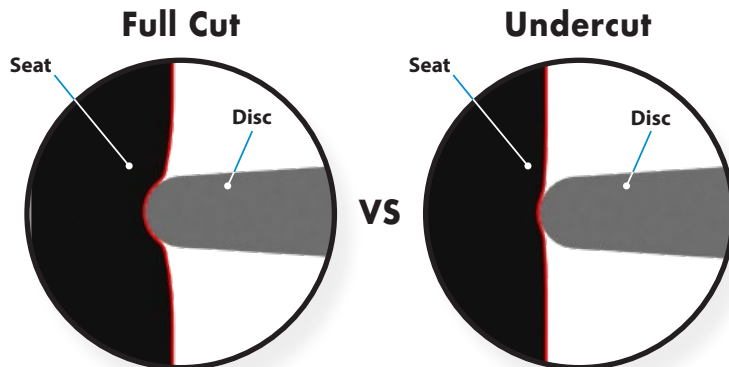


### Specifications:

Ambient Temp.	-40°F to 300°F
Body Material	Epoxy Coated Ductile Iron or CF8M
Stem Material	Stainless Steel
Stem	Standard ISO
Mounting	Standard ISO 5211
Seat	Field Repairable Cartridge Seat
Disc	High- Cv Slim Disc Design
Max Pressure Rating	200 PSI
Additional Options	Handles, Infinite Locking Plates, Manual Gear Operators, Chainwheels, Stem Extensions, Operator Nuts, Flange Bolt Kits

### Full vs Undercut Disc Options

What is the advantage of the Slim Disc design?



#### Why Full Cut?

Full cut discs provide bubble tight shut off at 150/200 PSI for a wide variety of applications.

#### Why Undercut?

Undercut discs require less torque to operate but are only rated to 50 PSI bubble tight shut off. Common applications are solids dispensing or conveying, or any low pressure process.

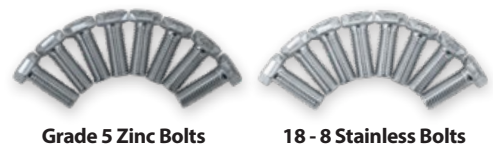
### High CV Slim Disc Design

What is the advantage of the Slim Disc design?



### Flange Bolt Kits Available

Bolt Kits available for sizes 2"-12", for larger sizes call.



# 050/051/650/651 Series Technical Brochure

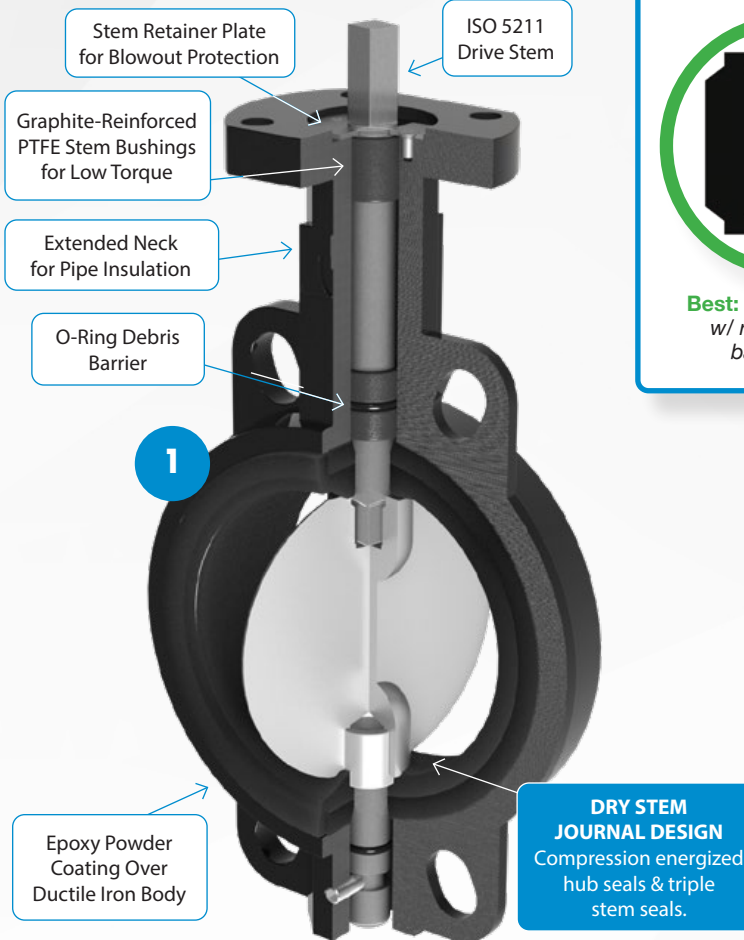
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## 050/051 Series

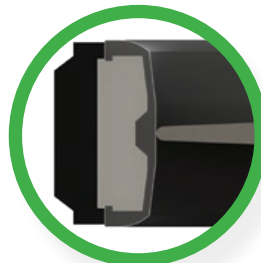
Ductile Iron Resilient Seated Butterfly Valves



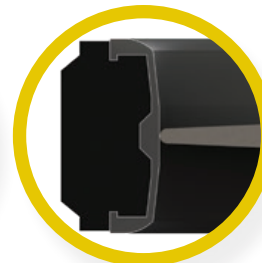
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## Superior Cartridge Seat Design

Why a Delta T Cartridge Seat is the preferred choice (see page 9 for full details):



**Best: Cartridge Seat**  
w/ rigid phenolic backing ring



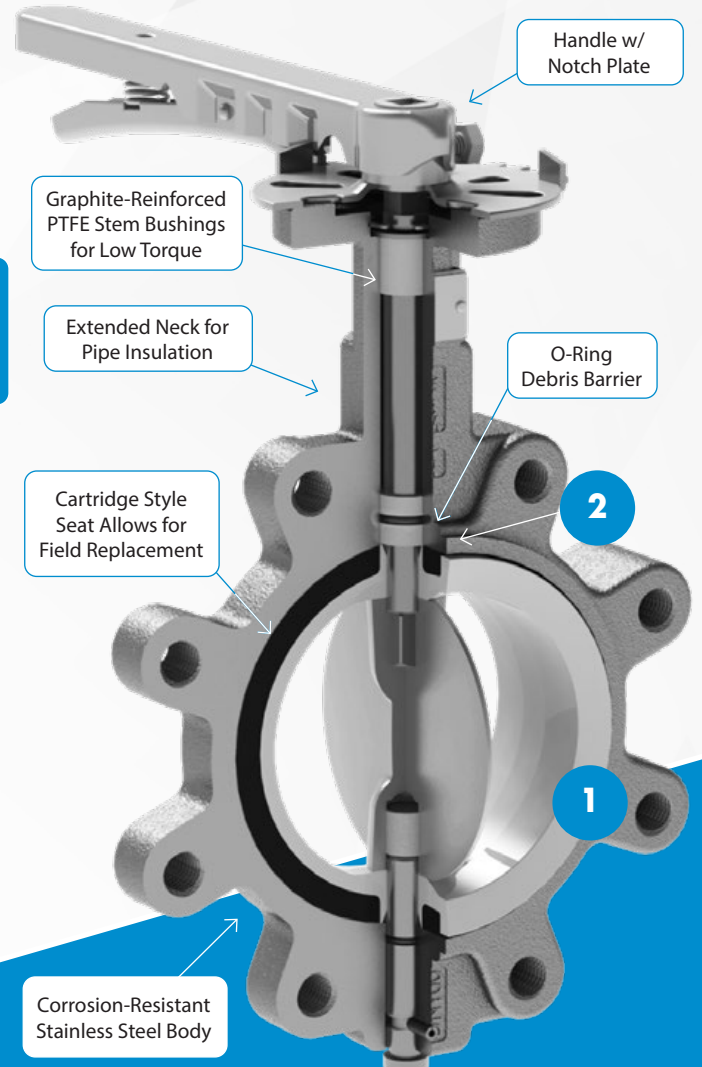
**OK: Molded Seat**  
permanently bonded to valve body



**Poor: Booted Seat**  
bulging around disc contact points

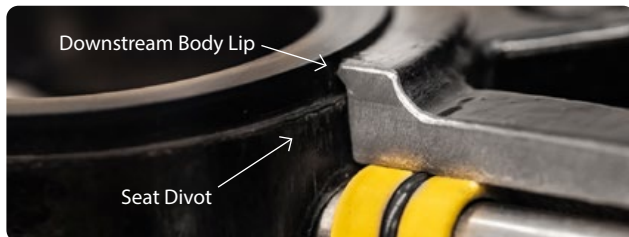
## 650/651 Series

Stainless Steel Resilient Seated Butterfly Valves



2

## Full Contact Dead-End Service Design



**Delta T Lug Style Resilient Butterfly Valves**, as a standard up to 12", come ready for Dead-End Service. Our **Full-Contact Dead-End Service Design** includes a lip on the downstream side that matches the **Seat Divot**. Under pressure, the seat is retained by the **Downstream Body Lip**, creating an anti-blowout solution with full contact, evenly distributed support around the circumference of the valve. In contrast, set screw based dead-end service designs make limited contact with the seat, holding back pressure on a few focused points.

Email: [sales@maxairtech.com](mailto:sales@maxairtech.com)  
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# Disc & Seat Options

Recommended Applications, Temperatures, and Not Recommended For Guidance



## DI-NP

### Nickel Plated Ductile Iron

Ductile iron disc for strength, coated with Nickel Plating for corrosion resistance and increased abrasion resistance.

#### Recommended Applications:

Air, Kerosene, Oils, Ketones, Hydrocarbons, Solvents, Detergents, Salts, Concentrated Organic Acids

#### Not Recommended For:

Inorganic Acids, Diluted Organic Acids



## CF8M

### CF8M Stainless Steel

Stainless steel disc is inherently strong for industrial use and corrosion resistant for a wide range of chemical and environmental applications.

#### Recommended Applications:

Acetic Acids, Air, Automotive Oils & Fuels, Beer, Freon, Gasoline, Ketones, Oils, Oxygen, Steam, Sea Water, Potable Water

#### Not Recommended For:

Acids



## AL-BZ

### Aluminum Bronze

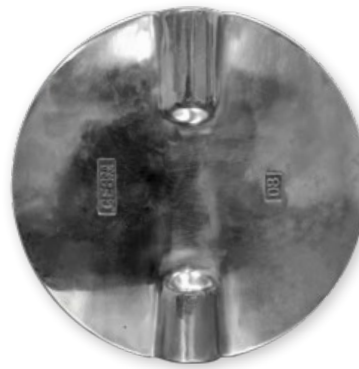
Strength similar to carbon steel, but with an aluminum oxide layer on the surface for excellent corrosion resistance.

#### Recommended Applications:

Sea Water, Brine, Detergents, Gasoline, Alcohols, Esters, Ketones, Potable Water

#### Not Recommended For:

Acids



## Polished CF8M

### Polished CF8M Stainless Steel

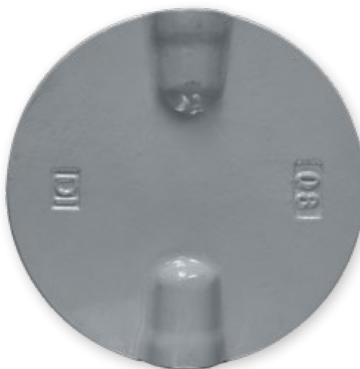
All the benefits of stainless steel strength and corrosion resistance, plus a highly polished surface for sanitary applications.

#### Recommended Applications:

Sanitary Applications, Potable Water

#### Not Recommended For:

Acids



## NY11

### Nylon 11 Coated Ductile Iron

Ductile iron disc for strength, coated with Nylon 11 for corrosion resistance and excellent abrasion resistance.

#### Recommended Applications:

Inorganic Salts, Alkalis, Most Solvents, Most Organic Acids, Hydrocarbons, Oils, Kerosene, Ketones, Esters, Detergents, Sea Water, Abrasives

#### Not Recommended For:

Inorganic Acids, Phenols, Chlorinated Solvents



## PTFE

### PTFE Coated

### CF8M Stainless Steel

#### Recommended Applications:

Acids, Alcohols, Solvents, Oils, Potable Water

#### Not Recommended For:

Fluorine



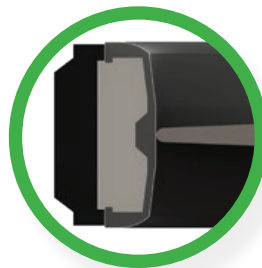


## Superior Cartridge Seat Design

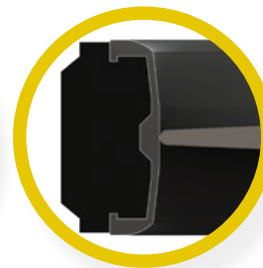
Delta T resilient-seated butterfly valves come standard with cartridge seats because they supply reliable torque, increased wear resistance, robustness and versatility. Cartridge seats offer advantages unmatched by other seat types. The chart to the below compares features of the three different seat styles

Butterfly valves with cartridge style seats can mount in a variety of flange configurations because the seat resists deformation and is mostly independent of unique mounting conditions. In highly abrasive applications where valves need to be replaced on a regular basis, the cartridge seat could simply be replaced rather than the entire valve. When the valve body has an integrated retaining lip, cartridge seated valves are capable of dead-end service. Furthermore, unlike booted or dovetail seats, cartridge seats can more suitably operate in a system that requires vacuum service. The cartridge seat unlocks the full potential of resilient-seated butterfly valves and provides competitive solutions for the fluid flow industry. Whatever the application, Delta T resilient-seated butterfly valves are equipped with cartridge seats to provide consistent torque, improved valve lifespan, and maximum flexibility.

Feature	Cartridge Seat	Molded Seat	Booted Seat
Replaceable	YES	NO	YES
Consistent Torque	YES	NO	NO
Ideal for Vacuum Service	YES	YES	NO
Dead-End Service Capable	YES	YES	NO
Deformation Resistant	YES	YES	NO
Flange Type Independent	YES	YES	NO



**Best: Cartridge Seat**  
w/ rigid phenolic backing ring



**OK: Molded Seat**  
permanently bonded to valve body



**Poor: Booted Seat**  
bulging around disc contact points



### EPDM

EPDM (Phenolic)

**Recommend Temperature:**  
-40°F to 275°F (-40°C to 135°C)

**Recommend Applications:**  
H<sub>2</sub>O, Air, Brine, Abrasives, Phosphates, Esters Ketones, Alkali, Food Compounds, Liquids and Solids, Dilute Inorganic Acids, Caustic Soda

**Not Recommended For:**  
Hydrocarbons, Oils, Fats, Dry Air



### VITON

Viton (FKM) (Aluminum)

**Recommend Temperature:**  
0°F to 392°F (-18°C to 200°C)

**Recommend Applications:**  
Air, Kerosene, Oils, Ketones, Hydrocarbons, Solvents, Detergents, Salts, Concentrated Organic Acids

**Not Recommended For:**  
Inorganic Acids, Diluted Organic Acids, Steam



### BUNA

Buna-N (NBR) (Phenolic)

**Recommend Temperature:**  
10°F to 180°F (-12°C to 82°C)

**Recommend Applications:**  
Hydrocarbons with less than 40% of aromatics, Natural Gas, Air, H<sub>2</sub>O, Sea Water, Brine, Alcohols, Glycols

**Not Recommended For:**  
Solvents, Benzene, Xylene



### HT-EPDM

High Temp EPDM (Phenolic)

**Recommend Temperature:**  
-4°F to 302°F (-20°C to 150°C)

**Recommend Applications:**  
Standard EPDM + Low Pressure Saturated Steam

**Not Recommended For:**  
Hydrocarbons, Oils, Fats, Dry Air



### PTFE/E

PTFE over EPDM (Phenolic)

**Recommend Temperature:**  
-4°F to 275°F (-20°C to 135°C)

**Recommend Applications:**  
Hydrocarbons with high concentration of aromatics, Mineral and Halogenated Acids, Phosphoric Acid, Aliphatic and Aromatic Ethers

**Not Recommended For:**  
Steam, Ketones, Amines, Esters, Alkali

Note: Other Seat Options Available. Consult Factory.

# Finish & Operation Options

Automation, Manual Operators, Tee/Wye Configurations, & Treatments

## Valve & Disc Treatment/Finish Options

Passivation, Oxygen Cleaning, Silicone Free, & Custom Epoxy Paint Color



### Passivation

#### Why passivation treatment?

Passivation is a process by which the inherent corrosion resistance of stainless steel is maximized through a two step process of cleaning and subsequent immersion in an acid bath thereby creating a uniform oxidation layer that optimizes the corrosion resistance.

#### What's treated?

Disc only



### Oxygen Clean

#### Why oxygen clean treatment?

Oxygen cleaning is conducted on valves to prevent the potentially violent oxidation (fire or explosion) of contaminants (most often hydrocarbons) on the surfaces exposed to oxygen within a process. The valves are subsequently sealed within polyethylene bags to prevent recontamination prior to installation.

#### What's treated?

Total Valve



### Silicone Free

#### Why silicone free treatment?

Silicone Free cleaning is conducted on valves in order to prevent silicone contamination within processes (such as automotive painting) that are sensitive to silicone. The valves are subsequently sealed within polyethylene bags to prevent recontamination prior to installation.

#### What's treated?

Total Valve



### Custom Epoxy Color

#### Why custom paint?

There are some times when end users require specific colors to match their plant. When this becomes an issue, we have the option of provide custom epoxy valve painting to an RAL code for an exact color match.

#### What's treated?

Valve Body

Note: Custom Color on Ductile Iron Valves Only

## Infinite Locking Plate

Open Any Position 0° to 90° or Lockout in Open or Closed

### Ductile Iron ILP, Arm, & Handle

05X	ILP Plate	ILP Arm	Handle
1.5"-3"	02A	07S	HND-M01
4"	02A	03S	HND-M02
5-6"	02A	04S	HND-M03
8"	03A	05S	HND-M04
10"-12"	03A	06S	HND-M05

Note: For 8" and larger it is recommended a gear operator be used for manual operation.

### Stainless Handles ILP, Arm, & Handle

65X	ILP Plate	ILP Arm	Handle
2-2.5"	02A	07S	HND-S01
3"-4"	02A	03S	HND-S02
5-6"	02A	04S	HND-S03
8"	03A	05S	HND-S04
10"-12"	03A	06S	HND-S05

Note: For 8" and larger it is recommended a gear operator be used for manual operation.

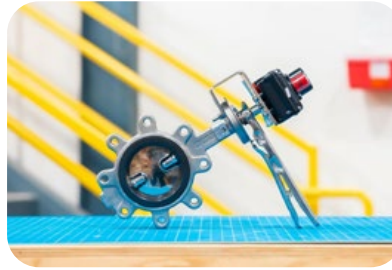




## Manual Operators

Options for Manual Operation of Butterfly Valves:

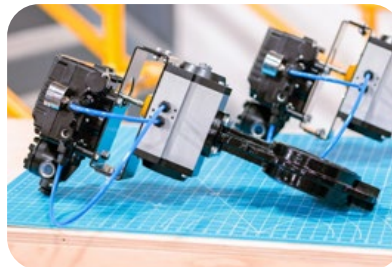
- Handle Operator
- Handle Operator: Infinite Locking Plate w/ Lockout
- Handle Operator w/ Limit Switch
- Gear Operator
- Gear Operator w/ Chainwheel
- Gear Operator w/ Lockout
- Gear Operator w/ Limit Switch



## Pneumatic Automation

Options for Pneumatic Automation of Butterfly Valves:

- Rack & Pinion Actuators
- Scotch Yoke Actuators
- Limit Switch & Positioners
- Declutchable Override
- Tee Assembly
- Hazardous Locations



## Electric Automation

Options for Electric Automation of Butterfly Valves:

- Electric Actuators w/ Manual Override
- Electric Actuators w/ Failsafe
- Battery Backup Units
- Tee Assembly
- Hazardous Locations



## Multipoint Options

Options for Multipoint Automation of Butterfly Valves:

- Ductile Iron Tee Assembly w/ Linkage
- Stainless Tee Assembly w/ Linkage
- Ductile Iron Wye Assembly w/ Linkage
- Stainless Wye Assembly w/ Linkage



## Stem Extensions

Options for Stem Extension of Butterfly Valves:

- Carbon Stem Extensions
- Stainless Stem Extensions
- Custom Lengths Available



# Pressure Temperature & Cv Values

Material Configuration Based Pressure Rating Tables & Cv Values

## 050/051 Pressure Rating

Size Range	1-1/2" - 12"						14" - 48"			
Disc	Full Cut				Undercut		Full Cut		Undercut	
Seat	EPDM, BUNA, VITON		PTFE/E		EPDM, BUNA, VITON	PTFE/E	EPDM, BUNA, VITON	PTFE/E	EPDM, BUNA, VITON	PTFE/E
Stem	416 SS	316 SS	416 SS	316 SS	416 SS, 316 SS	416 SS, 316 SS	17-4PH	17-4PH	17-4PH	17-4PH
Max Rated Body Pressure	200 PSI	200 PSI	150 PSI	150 PSI	200 PSI	150 PSI	150 PSI	100 PSI	150 PSI	100 PSI
Bidirectional Service	200 PSI	150 PSI	150 PSI	50 PSI	50 PSI	50 PSI	150 PSI	100 PSI	50 PSI	50 PSI
Unidirectional Dead-End Service	200 PSI	150 PSI	150 PSI	50 PSI	50 PSI	50 PSI				

## 650/651 Pressure Rating

Size Range	2" - 12"						14" - 24"			
Disc	Full Cut				Undercut		Full Cut		Undercut	
Seat	EPDM, BUNA, VITON		PTFE/E		EPDM, BUNA, VITON	PTFE/E	EPDM, BUNA, VITON	PTFE/E	EPDM, BUNA, VITON	PTFE/E
Stem	431 SS	316 SS	431 SS	316 SS	431 SS, 316 SS	431 SS, 316 SS	17-4PH	17-4PH	17-4PH	17-4PH
Max Rated Body Pressure	200 PSI	200 PSI	150 PSI	150 PSI	200 PSI	150 PSI	150 PSI	100 PSI	150 PSI	100 PSI
Bidirectional Service	200 PSI	150 PSI	150 PSI	50 PSI	50 PSI	50 PSI	150 PSI	100 PSI	50 PSI	50 PSI
Unidirectional Dead-End Service	200 PSI	150 PSI	150 PSI	50 PSI	50 PSI	50 PSI				





## Cv Values

SIZE	Opening Angle								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
1.5"	0.1	1.8	7	16	32	41	59	76	99
2"	0.1	2	11	22	42	58	86	120	132
2.5"	0.2	4	20	37	65	98	142	202	256
3"	0.3	8	21	38	86	125	198	392	505
4"	0.4	14	35	77	140	232	401	702	936
5"	0.9	29	62	132	232	392	625	922	1109
6"	2.1	42	96	203	372	611	1105	2009	2531
8"	3.2	65	191	401	726	121	1901	3555	4812
10"	3.9	151	321	695	1232	2065	3740	6183	7498
12"	5	234	495	1065	1909	2178	5905	8805	9928
14"	5.8	338	712	1554	2771	4560	7220	10854	12915
16"	8	460	980	2133	3780	6289	9909	14961	16626
18"	10	613	1301	2833	5029	8325	12178	19743	23705
20"	12	790	1678	3623	6468	10698	16928	25396	27915
24"	21	860	2521	5567	9807	16550	26128	39206	43212
26"	26	1455	3111	6365	1123	18964	28733	37811	50034
28"	30	1633	3522	7630	12599	20036	30482	46899	58696
30"	35	2005	4430	8033	13003	20199	30995	47362	62331
32"	45	2387	4791	8736	13786	20613	31395	48117	68250
36"	60	3021	6063	11055	17449	26086	39731	60895	86375
40"	84	4183	8395	15307	24159	36166	55084	84425	119750
42"	95	4266	9200	16020	25879	39521	62835	92236	125673
48"	102	4651	10365	17010	27242	43853	70431	108968	132888

# Torque Data

Torques and Service Factor Ratings

## Torque (in-lbs)

in-lbs Size	Standard Seat				Undercut	PTFE Seat		
	50ΔP	100ΔP	150ΔP	200ΔP	50ΔP	50ΔP	100ΔP	150ΔP
1.5"	89	97	106	115	n/a	133	133	136
2"	105	111	117	124	n/a	144	148	150
2.5"	133	143	159	184	n/a	161	165	168
3"	191	203	218	247	n/a	299	304	310
4"	283	316	343	373	200	392	409	425
5"	428	479	540	631	330	771	793	814
6"	636	720	799	909	440	1074	1113	1151
8"	1239	1273	1411	1506	820	2106	2177	2257
10"	2568	2710	2832	3106	1151	3152	3301	3453
12"	3154	3308	3671	4306	2400	4186	4444	4692
14"	3859	4139	4338	n/a	2969	7980	9281	10955
16"	5414	6028	7467	n/a	4164	9932	12574	15044
18"	6834	8122	10092	n/a	5256	13304	16545	20156
20"	9822	10529	13369	n/a	7555	16677	21762	26888
24"	15911	17008	21044	n/a	12240	26065	33447	42038
26"	15524	17861	22118	n/a	n/a	n/a	n/a	n/a
28"	18649	21463	26977	n/a	n/a	n/a	n/a	n/a
30"	22552	25933	32792	n/a	n/a	n/a	n/a	n/a
32"	27322	31420	38598	n/a	n/a	n/a	n/a	n/a
36"	37731	43413	55583	n/a	n/a	n/a	n/a	n/a
40"	57247	65850	84135	n/a	n/a	n/a	n/a	n/a
42"	64079	73727	88472	n/a	n/a	n/a	n/a	n/a
48"	104952	120724	134956	n/a	n/a	n/a	n/a	n/a

Service Factor Rating				
Level	Condition	Media	Safety Factor	Multiplier
1	Ideal	Lubricating Oil	20%	1.2
2	Normal	Water	30%	1.3
3	Severe	Dry Air, Solvents	50%	1.5
4	Extreme	Abrasives	100%	2.0



## Torque (Nm)

Nm	Standard Seat				Undercut	PTFE Seat		
	50ΔP	100ΔP	150ΔP	200ΔP		50ΔP	100ΔP	150ΔP
1.5"	10.0	11.0	12.0	13.0	n/a	15.0	15.0	15.4
2"	11.9	12.5	13.2	14.0	n/a	16.3	16.7	17.0
2.5"	15.0	16.2	18.0	20.8	n/a	18.2	18.6	19.0
3"	21.6	22.9	24.6	27.9	n/a	33.8	34.4	35.0
4"	32.0	35.7	38.8	42.1	22.6	44.3	46.2	48.0
5"	48.4	54.1	61.0	71.3	37.3	87.1	89.6	92.0
6"	71.9	81.4	90.3	102.7	49.7	121.4	125.8	130.1
8"	140.0	143.8	159.4	170.1	92.7	238.0	246.0	255.0
10"	290.1	306.2	320.0	350.9	130.0	356.1	373.0	390.1
12"	356.3	373.7	414.8	486.5	271.2	473.0	502.1	530.1
14"	436.0	467.6	490.1	n/a	335.4	901.6	1048.6	1237.7
16"	611.7	681.1	843.7	n/a	470.5	1122.2	1420.7	1699.7
18"	772.1	917.7	1140.2	n/a	593.9	1503.2	1869.3	2277.3
20"	1109.7	1189.6	1510.5	n/a	853.6	1884.3	2458.8	3037.9
24"	1797.7	1921.6	2377.6	n/a	1382.9	2944.9	3779.0	4749.6
26"	1754.0	2018.0	2499.0	n/a	n/a	n/a	n/a	n/a
28"	2107.0	2425.0	3048.0	n/a	n/a	n/a	n/a	n/a
30"	2548.0	2930.0	3705.0	n/a	n/a	n/a	n/a	n/a
32"	3087.0	3550.0	4361.0	n/a	n/a	n/a	n/a	n/a
36"	4263.0	4905.0	6280.0	n/a	n/a	n/a	n/a	n/a
40"	6468.0	7440.0	9506.0	n/a	n/a	n/a	n/a	n/a
42"	7240.0	8330.0	9996.0	n/a	n/a	n/a	n/a	n/a
48"	11858.0	13640.0	15248.0	n/a	n/a	n/a	n/a	n/a

### Service Factor Rating

Level	Condition	Media	Safety Factor	Multiplier
1	Ideal	Lubricating Oil	20%	1.2
2	Normal	Water	30%	1.3
3	Severe	Dry Air, Solvents	50%	1.5
4	Extreme	Abrasives	100%	2.0

# Weight Data

Weight of Ductile Iron & Stainless: Bare Stem, w/ Handle, & w/ Gear

## Ductile Iron

Size	Wafer		Lug	
	lbs	kg	lbs	kg
1.5"	3.5	1.6	4.0	1.8
2"	4.4	2.0	5.4	2.5
2.5"	5.1	2.3	6.6	3.0
3"	5.8	2.7	7.3	3.3
4"	9.4	4.3	13.2	6.0
5"	12.6	5.7	16.3	7.4
6"	15.6	7.1	20.5	9.3
8"	25.9	11.8	33.3	15.1
10"	40.8	18.5	57.8	26.2
12"	61.8	28.1	81.3	36.9
14"	72.5	32.9	104.9	47.6
16"	114.6	52.0	163.1	74.0
18"	206.6	93.7	218.3	99.0
20"	231.5	105.0	275.6	125.0
24"	359.4	163.0	383.6	174.0
26"	374.8	170.0	416.7	189.0
28"	597.5	271.0	703.3	319.0
30"	725.3	329.0	835.6	379.0
32"	765.0	347.0	1056.0	479.0
36"	1373.5	623.0	1457.3	661.0
40"	1607.2	729.0	1589.5	721.0
42"	1735.0	787.0	1862.9	845.0
48"	1896.0	860.0	2292.8	1040.0

## Stainless Steel

Size	Wafer		Lug	
	lbs	kg	lbs	kg
2"	4.0	1.8	5.3	2.4
2.5"	4.8	2.2	6.0	2.7
3"	5.6	2.6	6.5	3.0
4"	9.4	4.3	12.5	5.7
5"	12.5	5.7	14.7	6.7
6"	16.3	7.4	20.0	9.1
8"	26.6	12.1	31.7	14.4
10"	41.7	18.9	54.7	24.8
12"	66.6	30.2	75.6	34.3
14"	86.9	39.4	93.7	42.5
16"	121.4	55.1	149.0	67.6
18"	154.2	69.9	202.8	92.0
20"	208.5	94.6	248.0	112.5
24"	387.9	176.0	413.4	187.5

## Ductile Iron w/ Handle

Size	Handle			Wafer w/ Handle		Lug w/ Handle	
	P/N	lbs	kg	lbs	kg	lbs	kg
1.5"	HND-M01	1.1	2.4	4.6	4.0	5.1	4.2
2"	HND-M01	1.1	2.4	5.5	4.4	6.5	4.9
2.5"	HND-M01	1.1	2.4	6.2	4.7	7.7	5.4
3"	HND-M01	1.1	2.4	6.9	5.1	8.4	5.7
4"	HND-M02	1.2	2.6	10.6	6.9	14.4	8.6
5"	HND-M03	1.3	2.9	13.9	8.6	17.6	10.3
6"	HND-M03	1.3	2.9	16.9	9.9	21.8	12.1
8"	HND-M04	2.6	5.7	28.5	17.5	35.9	20.8
10"	HND-M05	2.6	5.7	43.4	24.2	60.4	31.9
12"	HND-M05	2.6	5.7	64.4	33.8	83.9	42.6

Note: For 8" and larger it is recommended a gear operator be used for manual operation.

## Stainless w/ Handle

Size	Handle			Wafer w/ Handle		Lug w/ Handle	
	P/N	lbs	kg	lbs	kg	lbs	kg
2"	HND-S01	1.0	2.2	5.0	4.0	6.3	4.6
2.5"	HND-S01	1.0	2.2	5.8	4.4	7.0	4.9
3"	HND-S02	1.0	2.2	6.6	4.8	7.5	5.2
4"	HND-S02	1.0	2.2	10.4	6.5	13.5	7.9
5"	HND-S03	1.0	2.2	13.5	7.9	15.7	8.9
6"	HND-S03	1.0	2.2	17.3	9.6	21.0	11.3
8"	HND-S04	2.5	5.5	29.1	17.6	34.2	19.9
10"	HND-S05	2.5	5.5	44.2	24.4	57.2	30.3
12"	HND-S05	2.5	5.5	69.1	35.7	78.1	39.8

Note: For 8" and larger it is recommended a gear operator be used for manual operation.



# 050/051/650/651 Series Technical Brochure

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## Ductile Iron w/ Gear

Size	Gear		Wafer w/ Gear		Lug w/ Gear		
	P/N	lb	kg	lbs	kg	lbs	kg
1.5"	GO-01-ISO	3.0	6.6	6.5	8.2	7.0	8.4
2"	GO-01-ISO	3.0	6.6	7.4	8.6	8.4	9.1
2.5"	GO-01-ISO	3.0	6.6	8.1	8.9	9.6	9.6
3"	GO-01-ISO	3.0	6.6	8.8	9.3	10.3	9.9
4"	GO-01-ISO	3.0	6.6	12.4	10.9	16.2	12.6
5"	GO-02-ISO	6.0	13.2	18.6	18.9	22.3	20.6
6"	GO-02-ISO	6.0	13.2	21.6	20.3	26.5	22.5
8"	GO-03-ISO	12.0	26.5	37.9	38.2	45.3	41.6
10"	GO-03-ISO	12.0	26.5	52.8	45.0	69.8	52.7
12"	GO-04A-ISO	22.0	48.5	83.8	76.6	103.3	85.4
14"	GO-04A-ISO	22.0	48.5	94.5	81.4	126.9	96.1
16"	GO-05B-ISO	41.0	90.4	155.6	142.4	204.1	164.4
18"	GO-05B-ISO	41.0	90.4	247.6	184.1	259.3	189.4
20"	GO-06B-ISO	78.0	172.0	309.5	277.0	353.6	297.0
24"	GO-07-ISO	101.0	222.7	460.4	385.7	484.6	396.7
26"	GO-08A-ISO	171.0	377.0	545.8	547.0	587.7	566.0
28"	GO-08B-ISO	171.0	377.0	768.5	648.0	874.3	696.0
30"	GO-08B-ISO	171.0	377.0	896.3	706.0	1006.6	756.0
32"	GO-08B-ISO	171.0	377.0	936.0	724.0	1227.0	856.0
36"	GO-09A-ISO	238.0	524.7	1611.5	1147.7	1695.3	1185.7
40"	GO-09B-ISO	238.0	524.7	1845.2	1253.7	1827.5	1245.7
42"	GO-09C-ISO	238.0	524.7	1973.0	1311.7	2100.9	1369.7
48"	GO-10-ISO	408.0	899.5	2304.0	1759.5	2700.8	1939.5

## Stainless w/ Gear

Size	Gear		Wafer w/ Gear		Lug w/ Gear		
	P/N	lb	kg	lbs	kg	lbs	kg
2"	GO-01-ISO	3.0	6.6	7.0	8.4	8.3	9.0
2.5"	GO-01-ISO	3.0	6.6	7.8	8.8	9.0	9.3
3"	GO-01-ISO	3.0	6.6	8.6	9.2	9.5	9.6
4"	GO-01-ISO	3.0	6.6	12.4	10.9	15.5	12.3
5"	GO-02-ISO	6.0	13.2	18.5	18.9	20.7	19.9
6"	GO-02-ISO	6.0	13.2	22.3	20.6	26.0	22.3
8"	GO-03-ISO	12.0	26.5	38.6	38.5	43.7	40.9
10"	GO-03-ISO	12.0	26.5	53.7	45.4	66.7	51.3
12"	GO-04A-ISO	22.0	48.5	88.6	78.7	97.6	82.8
14"	GO-04A-ISO	22.0	48.5	108.9	87.9	115.7	91.0
16"	GO-05B-ISO	41.0	90.4	162.4	145.5	190.0	158.0
18"	GO-05B-ISO	41.0	90.4	195.2	160.3	243.8	182.4
20"	GO-06B-ISO	78.0	172.0	286.5	266.6	326.0	284.5
24"	GO-07-ISO	101.0	222.7	488.9	398.6	514.4	410.2

# 050/051 Butterfly Valves (1.5" - 24")

Exploded View, Materials of Construction, & Dimensional Data



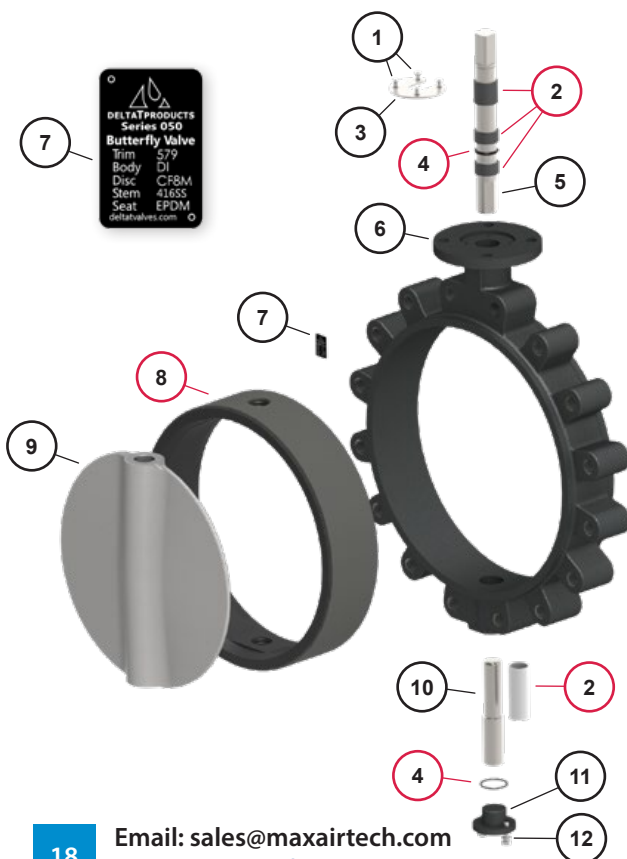
## 1.5" - 12" Lug & Wafer

### Exploded View & Bill of Materials

#	DESCRIPTION	MATERIALS
1	Stem Retainer Screws	Carbon Steel, Plated
2	Stem Retainer	Carbon Steel, Plated
4	Upper Stem	ASTM A582 416SS, 316SS
6	Body	ASTM A536 Ductile Iron
7	Tag	Aluminum
9	Disc	See Page 8 for Options
10	Stem Retainer Set Screw	Carbon Steel, Plated
11	Lower Stem	ASTM A582 416SS, 316SS

#	DESCRIPTION	MATERIALS
3	Bushing	PTFE
5	Stem O-Ring	Buna (NBR)
8	Seat	See Page 9 for Options

Red = Items sold in the Standard Repair Kit



## 14" - 24" Lug & Wafer

### Exploded View & Bill of Materials

#	DESCRIPTION	MATERIALS
1	Stem Retainer Screws	Carbon Steel, Plated
3	Stem Retainer	Carbon Steel, Plated
5	Upper Stem	17-4PH
6	Body	ASTM A536 Ductile Iron
7	Tag	Aluminum
9	Disc	See Page 8 for Options
10	Lower Stem	17-4PH
11	Lower Stem Retainer	Carbon Steel, Plated
12	Lower Stem Retainer Bolts	Carbon Steel, Plated

#	DESCRIPTION	MATERIALS
2	Bushing	PTFE
4	Stem O-Ring	Buna (NBR)
8	Seat	See Page 9 for Options

Red = Items sold in the Standard Repair Kit

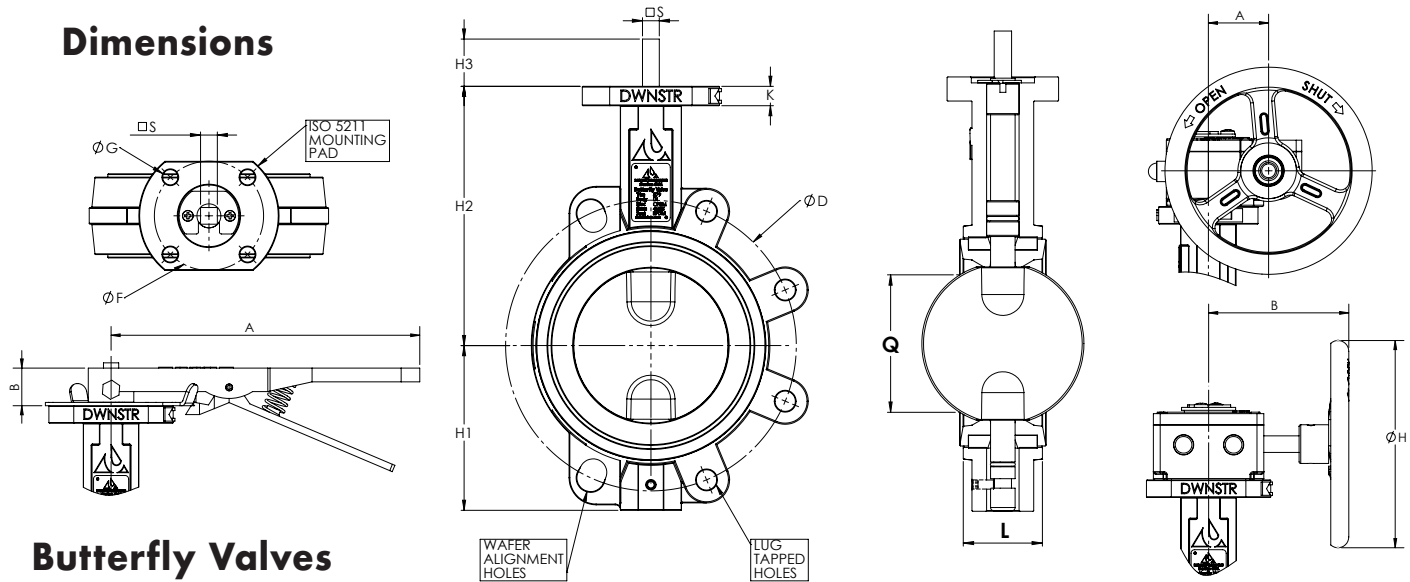
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## Dimensions



## Butterfly Valves

Size	L	Q	ØD	Wafer Holes	Lug Taps	H1	H2	H3	□S	ØF	ISO	ØG	K	Wafer Weight	Lug Weight
in	in	in	in	in	SAE Thread	in	in	in	in	in		in	in	lb	lb
1½"	1.30	0.83	3.88	0.63	-	2.32	4.92	1.18	0.354	1.969	F05	0.30	0.39	3.5	4.0
2"	1.69	1.14	4.74	0.75	4 x 5/8"-11 UNC	2.60	5.12	1.18	0.354	1.969	F05	0.30	0.43	4.4	5.4
2½"	1.81	1.77	5.50	0.75	4 x 5/8"-11 UNC	3.23	5.55	1.18	0.354	1.969	F05	0.30	0.43	5.1	6.6
3"	1.81	2.44	6.00	0.75	4 x 5/8"-11 UNC	3.54	5.83	1.18	0.354	1.969	F05	0.30	0.43	5.8	7.3
4"	2.05	3.50	7.50	0.75	8 x 5/8"-11 UNC	4.25	6.69	1.18	0.433	2.756	F07	0.41	0.47	9.4	13.2
5"	2.20	4.57	8.50	0.87	8 x 3/4"-10 UNC	4.84	7.36	1.18	0.551	2.756	F07	0.41	0.51	12.6	16.3
6"	2.20	5.71	9.51	0.87	8 x 3/4"-10 UNC	5.43	7.95	1.18	0.551	2.756	F07	0.41	0.51	15.6	20.5
8"	2.36	7.76	11.75	0.87	8 x 3/4"-10 UNC	6.69	9.37	1.57	0.669	4.016	F10	0.48	0.59	25.9	33.3
10"	2.68	9.76	14.25	0.98	12 x 7/8"-9 UNC	7.87	10.71	1.57	0.866	4.016	F10	0.48	0.59	40.8	57.8
12"	3.07	11.73	17.01	0.98	12 x 7/8"-9 UNC	9.29	12.01	1.57	0.866	4.016	F10	0.48	0.59	61.8	81.3
14"	3.07	12.44	18.74	1.14	12 x 1"-8 UNC	10.31	12.99	1.57	0.866	4.016	F10	0.48	0.59	72.5	104.9
16"	4.02	14.76	21.24	1.14	16 x 1"-8 UNC	11.81	14.17	2.01	1.063	5.512	F14	0.72	0.63	114.6	163.1
18"	4.49	16.81	22.76	1.26	16 x 1-1/8"-7 UNC	12.80	15.55	2.01	1.063	5.512	F14	0.72	0.63	206.6	218.3
20"	5.00	18.62	25.00	1.26	20 x 1-1/8"-7 UNC	14.17	17.32	2.52	1.063	6.496	F16	0.87	0.67	231.5	275.6
24"	6.06	22.52	29.51	1.38	20 x 1-1/4"-7 UNC	16.54	19.69	2.76	1.417	6.496	F16	0.87	0.71	359.4	383.6

## Gear Operators

BFV Size	Gear Operator	A	B	H	Valve w/ Gear Weight	
					Wafer	Lug
in	Part #	in	in	in	lbs	lbs
1½"	GO-01-ISO	1.69	3.9	6	6.5	7.0
2"	GO-01-ISO	1.69	3.9	6	7.4	8.4
2½"	GO-01-ISO	1.69	3.9	6	8.1	9.6
3"	GO-01-ISO	1.69	3.9	6	8.8	10.3
4"	GO-01-ISO	1.69	3.9	6	12.4	16.2
5"	GO-02-ISO	2.49	5.8	6	18.6	22.3
6"	GO-02-ISO	2.49	5.8	6	21.6	26.5
8"	GO-03-ISO	2.38	8.4	10	37.9	45.3
10"	GO-03-ISO	2.38	8.4	10	52.8	69.8
12"	GO-04A-ISO	2.63	8.3	12	83.8	103.3
14"	GO-04A-ISO	2.63	8.3	12	94.5	126.9
16"	GO-05B-ISO	3.49	11.1	16	155.6	204.1
18"	GO-05B-ISO	3.49	11.1	16	247.6	259.3
20"	GO-06B-ISO	4.98	13.5	16	309.5	353.6
24"	GO-07-ISO	6.05	14.4	16	460.4	484.6

## Handles

BFV Size	Handle	A	B	Valve w/ Handle Weight	
				Wafer	Lug
in	Part #	in	in	lbs	lbs
1½"	HND-M01	8.9	1.3	4.6	5.1
2"	HND-M01	8.9	1.3	5.5	6.5
2½"	HND-M01	8.9	1.3	6.2	7.7
3"	HND-M01	10.2	1.42	6.9	8.4
4"	HND-M02	10.2	1.42	10.6	14.4
5"	HND-M03	10.2	1.42	13.9	17.6
6"	HND-M03	14	1.69	16.9	21.8
8"	HND-M04	14	1.69	28.5	35.9
10"	HND-M05	14	1.69	43.4	60.4
12"	HND-M05	14	1.69	64.4	83.9

Note: For 8" and larger it is recommended a gear operator be used for manual operation.

# 050/051 Butterfly Valves (26" - 48")

Exploded View, Materials of Construction, & Dimensional Data

## 26" - 48" Lug & Wafer Exploded View & Bill of Materials



#	DESCRIPTION	MATERIALS
1	Stem Retainer Screws	Carbon Steel, Plated
2	Stem Retainer	Carbon Steel, Plated
5	Upper Stem	17-4PH
6	Body	ASTM A536 Ductile Iron
7	Tag	Aluminum
9	Disc	See Page 8 for Options
10	Lower Stem	17-4PH
11	Lower Stem Retainer	Carbon Steel, Plated
12	Lower Stem Retainer Bolts	Carbon Steel, Plated

#	DESCRIPTION	MATERIALS
3	Bushing	Brass
4	Stem O-Ring	Buna (NBR)
8	Seat	See Page 9 for Options

**Red = Items sold in the Standard Repair Kit**

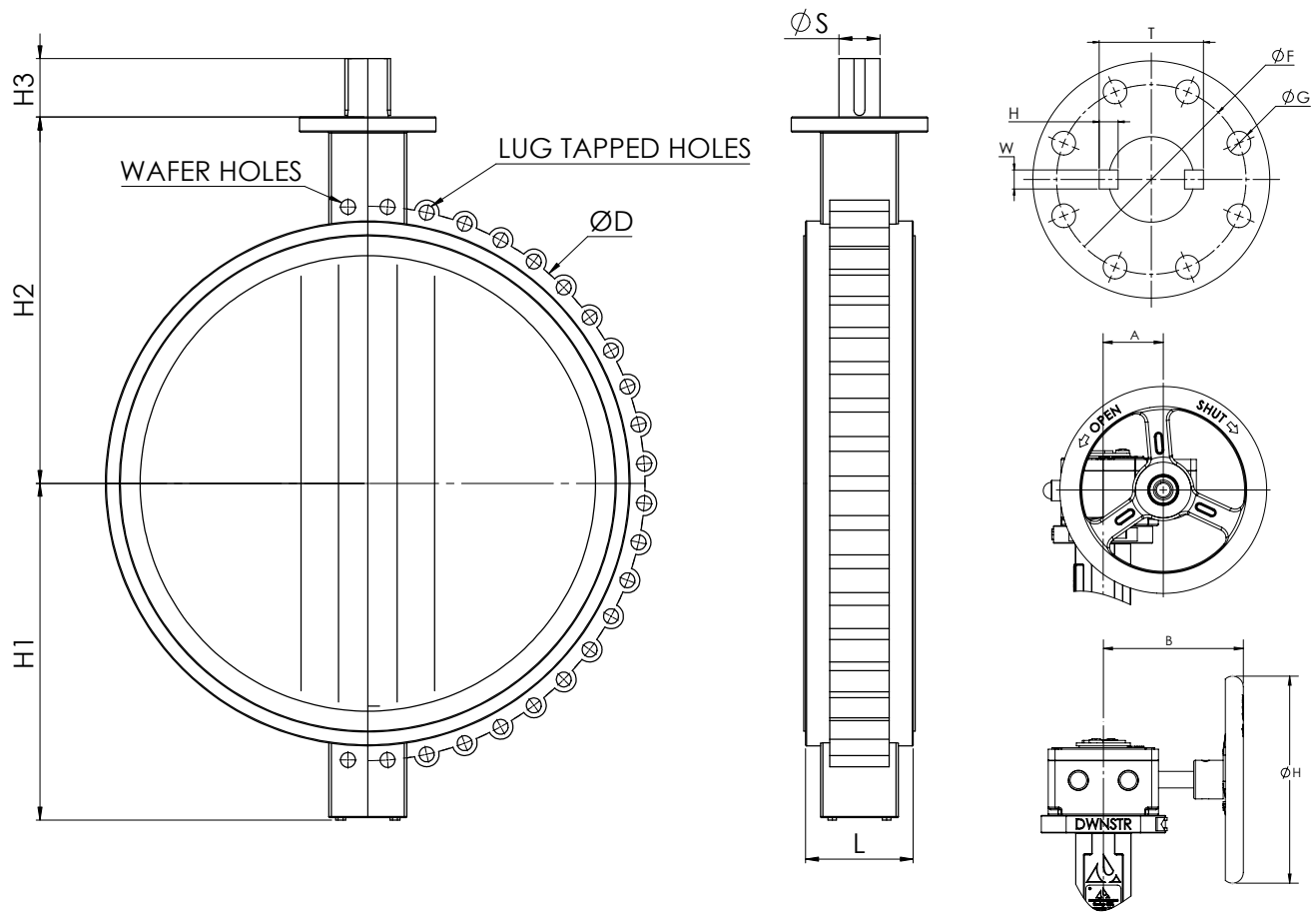


# 050/051/650/651 Series Technical Brochure

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## Butterfly Valves

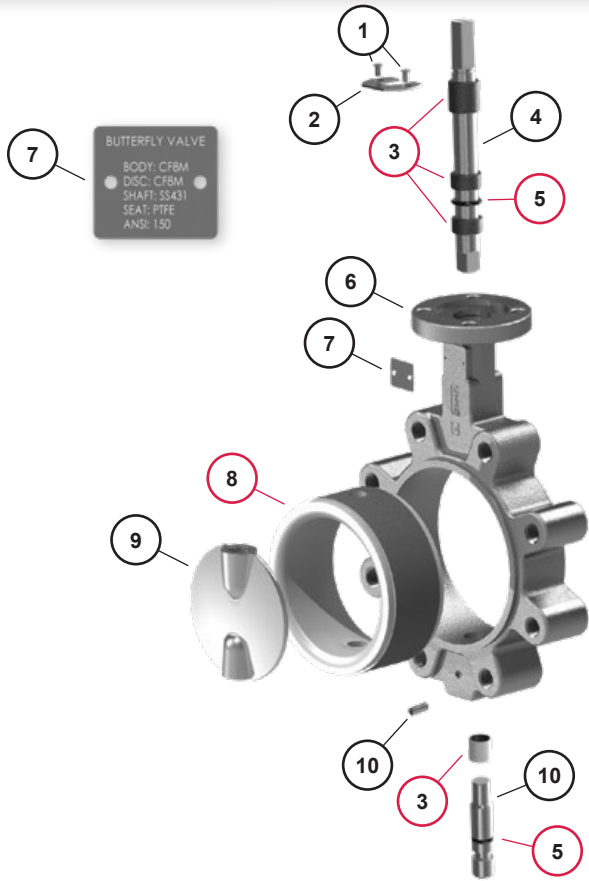
Size	L	ØD	Wafer Holes	Lug Taps	H1	H2	H3	ØS	W	H	T	ØF	ISO	ØG	K	Wafer Weight	Lug Weight
in	in	in	in	SAE Thread	in	in	in	in	in	in	in	in		in	in	lb	lb
26"	6.50	31.75	1.38	24 x 1-1/4"-7 UNC	17.72	20.47	2.95	2.126	0.630	0.394	2.445	10.00	F25	0.71	-	374.8	416.7
28"	6.50	34.00	1.38	28 x 1-1/4"-7 UNC	20.47	24.57	2.95	2.494	0.709	0.433	2.807	10.00	F25	0.71	-	597.5	703.3
30"	6.57	36.00	1.38	28 x 1-1/4"-7 UNC	22.05	25.59	2.95	2.494	0.709	0.433	2.807	10.00	F25	0.71	-	725.3	835.6
32"	7.48	38.50	1.61	28 x 1-1/2"-6 UNC	23.39	26.46	3.35	2.494	0.709	0.433	2.807	10.00	F25	0.71	-	765.0	1056.0
36"	7.99	42.75	1.61	32 x 1-1/2"-6 UNC	25.39	28.94	3.35	2.953	0.787	0.472	3.307	10.00	F25	0.71	-	1373.5	1457.3
40"	8.50	47.25	1.61	36 x 1-1/2"-6 UNC	28.35	31.50	5.51	3.346	0.866	0.551	3.740	10.00	F25	0.71	-	1607.2	1589.5
42"	9.88	49.50	1.61	36 x 1-1/2"-6 UNC	30.59	33.78	5.91	3.740	0.984	0.551	4.134	10.00	F25	0.71	-	1735.0	1862.9
48"	10.87	56.00	1.61	44 x 1-1/2"-6 UNC	34.02	37.05	5.91	4.134	1.102	0.630	4.606	11.732	F30	0.87	-	1896.0	2292.8

## Gear Operators

BFV Size	Gear Operator	A	B	H	Valve w/ Gear Weight	
					Wafer	Lug
in	in	in	in	in	lbs	lbs
26"	GO-08A-ISO	5.4	15.1	20	545.8	587.7
28"	GO-08B-ISO	5.4	15.1	20	768.5	874.3
30"	GO-08B-ISO	5.4	15.1	20	896.3	1006.6
32"	GO-08B-ISO	5.4	15.1	20	936.0	1227.0
36"	GO-09A-ISO	7.1	14.0	20	1611.5	1695.3
40"	GO-09B-ISO	7.1	14.0	20	1845.2	1827.5
42"	GO-09C-ISO	7.1	14.0	20	1973.0	2100.9
48"	GO-10-ISO	9.3	19.7	24	2304.0	2700.8

# 650/651 Butterfly Valves (2" - 24")

Exploded View, Materials of Construction, & Dimensional Data



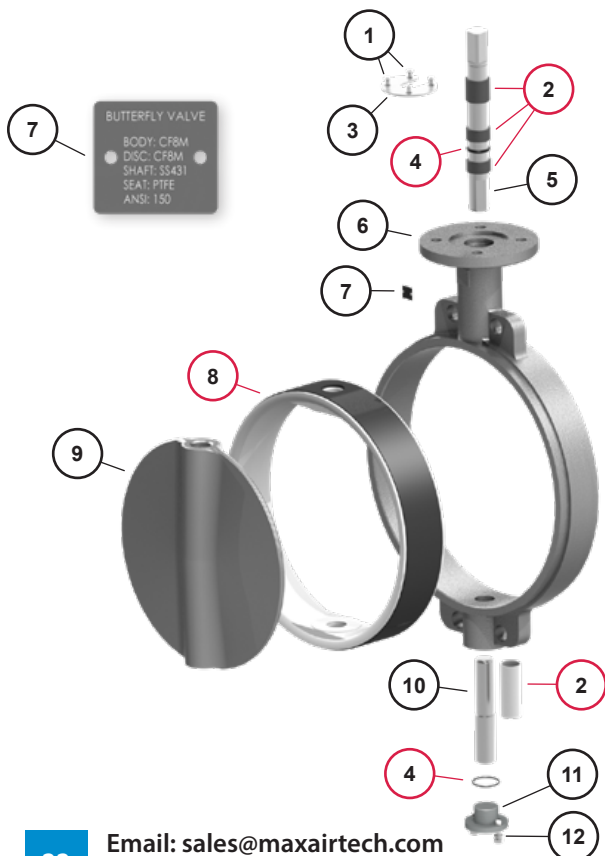
## 2" - 12" Lug & Wafer

### Exploded View & Bill of Materials

#	DESCRIPTION	MATERIALS
1	Stem Retainer Screws	304SS
2	Stem Retainer	304SS
4	Upper Stem	ASTM A276 431SS, 316SS
6	Body	ASTM A351 Grade CF8M
7	Tag	Stainless Steel
9	Disc	See Page 8 for Options
10	Stem Retainer Set Screw	304SS
11	Lower Stem	ASTM A276 431SS, 316SS

#	DESCRIPTION	MATERIALS
3	Bushing	PTFE
5	Stem O-Ring	Buna (NBR)
8	Seat	See Page 9 for Options

Red = Items sold in the Standard Repair Kit



## 14" - 24" Lug & Wafer

### Exploded View & Bill of Materials

#	DESCRIPTION	MATERIALS
1	Stem Retainer Screws	304SS
3	Stem Retainer	304SS
5	Upper Stem	17-4PH
6	Body	ASTM A351 Grade CF8M
7	Tag	Stainless Steel
9	Disc	See Page 8 for Options
10	Lower Stem	17-4PH
11	Lower Stem Retainer	304SS
12	Lower Stem Retainer Bolts	304SS

#	DESCRIPTION	MATERIALS
2	Bushing	PTFE
4	Stem O-Ring	Buna (NBR)
8	Seat	See Page 9 for Options

Red = Items sold in the Standard Repair Kit

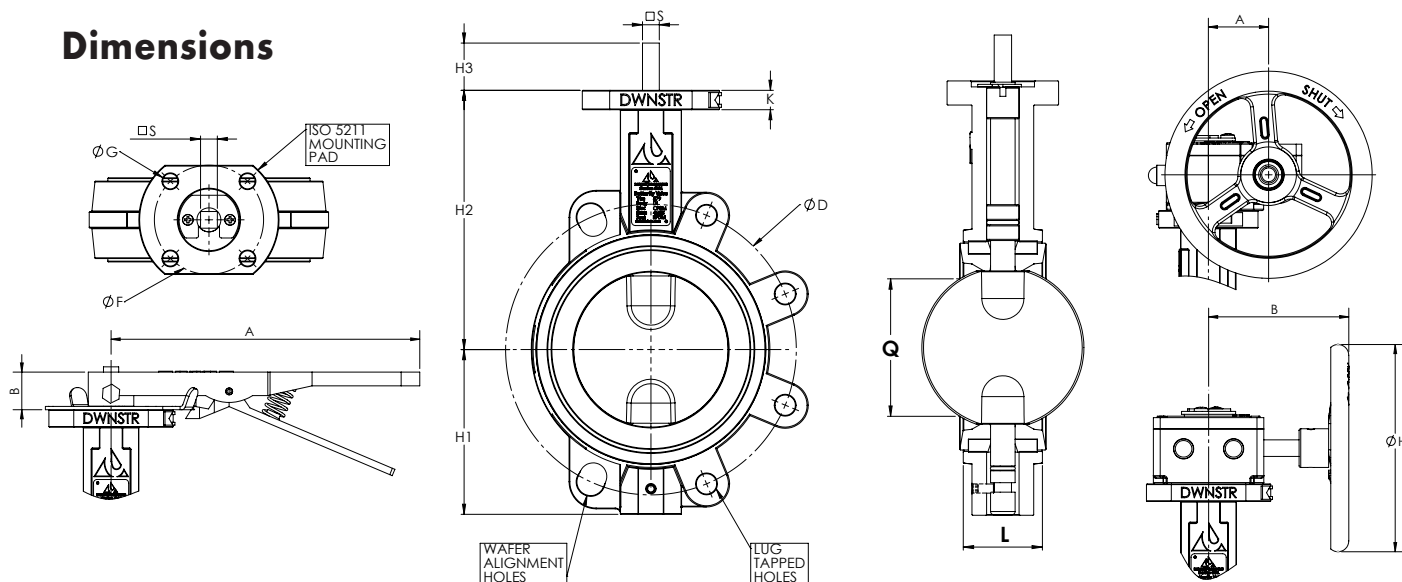
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## Dimensions



## Butterfly Valves

Size	L	Q	ØD	Wafer Holes	Lug Taps	H1	H2	H3	□S	ØF	ISO	ØG	K	Wafer Weight	Lug Weight
in	in	in	in	in	SAE Thread	in	in	in	in	in		in	in	lb	lb
2"	1.69	1.14	4.75	4 x 0.75	4 x 5/8"-11 UNC	2.60	5.12	1.18	0.354	1.969	F05	0.30	0.43	4.0	5.3
2½"	1.81	1.77	5.50	4 x 0.75	4 x 5/8"-11 UNC	3.23	5.55	1.18	0.354	1.969	F05	0.30	0.43	4.8	6.0
3"	1.81	2.44	6.00	4 x 0.75	4 x 5/8"-11 UNC	3.54	5.83	1.18	0.433	1.969	F05	0.30	0.43	5.6	6.5
4"	2.05	3.50	7.50	4 x 0.75	8 x 5/8"-11 UNC	4.25	6.69	1.18	0.433	2.756	F07	0.41	0.47	9.4	12.5
5"	2.20	4.57	8.50	4 x 0.87	8 x 3/4"-10 UNC	4.84	7.36	1.18	0.551	2.756	F07	0.41	0.51	12.5	14.7
6"	2.20	5.71	9.50	4 x 0.87	8 x 3/4"-10 UNC	5.43	7.95	1.18	0.551	2.756	F07	0.41	0.51	16.3	20.0
8"	2.36	7.76	11.75	4 x 0.87	8 x 3/4"-10 UNC	6.69	9.37	1.57	0.669	4.016	F10	0.48	0.59	26.6	31.7
10"	2.68	9.76	14.25	4 x 0.98	12 x 7/8"-9 UNC	7.87	10.71	1.57	0.866	4.016	F10	0.48	0.59	41.7	54.7
12"	3.07	11.73	17.00	4 x 0.98	12 x 7/8"-9 UNC	9.29	12.01	1.57	0.866	4.016	F10	0.48	0.59	66.6	75.6
14"	3.07	12.44	18.75	4 x 1.14	12 x 1"-8 UNC	10.31	12.99	1.57	0.866	4.016	F10	0.48	0.59	86.9	93.7
16"	4.02	14.76	21.25	4 x 1.14	16 x 1"-8 UNC	11.81	14.17	2.01	1.063	5.512	F14	0.72	0.63	121.4	149.0
18"	4.49	16.81	22.75	4 x 1.26	16 x 1-1/8"-7 UNC	12.80	15.55	2.01	1.063	5.512	F14	0.72	0.63	154.2	202.8
20"	5.00	18.62	25.00	4 x 1.26	20 x 1-1/8"-7 UNC	14.17	17.32	2.52	1.063	6.496	F16	0.87	0.67	208.5	248.0
24"	6.06	22.52	29.50	4 x 1.38	20 x 1-1/4"-7 UNC	16.54	19.69	2.76	1.417	6.496	F16	0.87	0.71	387.9	413.4

## Gear Operators

BFV Size	Gear Operator	A	B	H	Valve w/ Gear Weight	
					Wafer	Lug
in	in	in	in	in	lbs	lbs
2"	GO-01-ISO	1.69	3.9	6	7.0	8.3
2½"	GO-01-ISO	1.69	3.9	6	7.8	9.0
3"	GO-01-ISO	1.69	3.9	6	8.6	9.5
4"	GO-01-ISO	1.69	3.9	6	12.4	15.5
5"	GO-02-ISO	2.49	5.8	6	18.5	20.7
6"	GO-02-ISO	2.49	5.8	6	22.3	26.0
8"	GO-03-ISO	2.38	8.4	10	38.6	43.7
10"	GO-03-ISO	2.38	8.4	10	53.7	66.7
12"	GO-04A-ISO	2.63	8.3	12	88.6	97.6
14"	GO-04A-ISO	2.63	8.3	12	108.9	115.7
16"	GO-05B-ISO	3.49	11.1	16	162.4	190.0
18"	GO-05B-ISO	3.49	11.1	16	195.2	243.8
20"	GO-06B-ISO	4.98	13.5	16	286.5	326.0
24"	GO-07-ISO	6.05	14.4	16	488.9	514.4

## Handles

BFV Size	Handle	A	B	Valve w/ Handle Weight	
				Wafer	Lug
in	Part #	in	in	lbs	lbs
2"	HND-S01	8.9	1.3	5.0	6.3
2½"	HND-S01	8.9	1.3	5.8	7.0
3"	HND-S02	10.2	1.42	6.6	7.5
4"	HND-S02	10.2	1.42	10.4	13.5
5"	HND-S03	10.2	1.42	13.5	15.7
6"	HND-S03	14	1.69	17.3	21.0
8"	HND-S04	14	1.69	29.1	34.2
10"	HND-S05	14	1.69	44.2	57.2
12"	HND-S06	14	1.69	69.1	78.1

Note: For 8" and larger it is recommended a gear operator be used for manual operation.

# Certifications & Approvals

CE, NSF/ANSI 61, NSF/ANSI 372, ABS, USCG / Coast Guard, ISO 5211, CRN (Canadian)



## CE Marking

is a mandatory conformity marking for certain products sold within the European Economic Area (EEA) since 1985. The CE marking is also found on products sold outside the EEA that are manufactured in, or designed to be sold in, the EEA. This makes the CE marking recognizable worldwide even to people who are not familiar with the European Economic Area. It is in that sense similar to the FCC Declaration of Conformity used on certain electronic devices sold in the United States.

The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EC directives.



NSF/ANSI 61

## NSF/ANSI Standard 61

NSF/ANSI 61 sets health effects criteria for many water system components including:

- Protective barrier materials (cements, paints, coatings)
- Joining and sealing materials (gaskets, adhesives, lubricants)
- Mechanical devices (water meters, valves, filters)
- Pipes and related products (pipe, hose, fittings)
- Plumbing devices (faucets, drinking fountains)
- Process media (filter media, ion exchange resins)
- Non-metallic potable water materials

As it relates to valves specifically, it assures that the materials in contact with the flow stream do not introduce toxins into the water in amounts that exceed allowable exposure limits. Some trims excluded. See pg. 2-4



NSF/ANSI 372

## NSF/ANSI 372

is essentially equivalent to Annex G of NSF/ANSI Standard 61 and assures that the materials used in the water contact components of a water system component do not exceed 0.25% lead content. Some trims excluded. See pg. 2-4



## ISO 5211:

This standard defines a standardized interface system between industrial valves and the part turn actuators used operate them. It details the dimensional requirements for both the mounting flanges on both devices as well as the driving and driven components. This standardization simplifies the design of or eliminates the need for interface components between part turn valves and actuators.



## ABS, the American Bureau of Shipping

offers several different reviews which reduce the amount of analysis required for the use of a product in a specific application related to ABS class vessels. An ABS Product Design Assessment (PDA) is the assessment of a product for use on a variety of ABS-classed ships following a technical evaluation. The PDA reduces the turnaround time for approval on a specific ship. When a specific ship is chosen, ABS technical staff verifies that the product is suitable for use after a review of the PDA. On an even higher level of approval, achieving ABS Type Approval for a product grants that the product can be selected by ship designers, builders and owners to be placed aboard an ABS-classed vessel.



## USCG / Coast Guard:

Valves designed for use in ship engineering systems must comply with USCG requirements according to industry standards specified in Title 46, Code of Federal Regulations, Part 56 (46 CFR Part 56). Some applications such as pressure-vacuum relief valves for tank vessels or liquefied compressed gas safety relief valves do require additional USCG Type Approval, and must conform to requirements outlined in 46 CFR Part 162, sections 162.017 and 162.018. For equipment or materials to receive USCG Type Approval, they must be demonstrated to comply with the relevant requirements in the regulations, successfully complete the specified tests, and be enrolled in a quality control or follow up program as required.



## CRN - The Canadian Registration Number

is a number issued by each province or territory of Canada to the design of a boiler, pressure vessel or fitting. The CRN identifies the design has been accepted and registered for use in that province or territory.



## Commercial Hot

In today's valve market, there are a host of regulations for valves that come in contact with drinking water. These regulations are designed to protect human health and prevent water pollution by setting strict limits on harmful contaminants that may leach from the product into the water. Whenever a valve is used in a drinking water system, it must meet local compliance requirements; and often valve specifiers will require compliance for non-drinking water applications if there is even a remote possibility of drinking water contact.

One of the most well-known drinking water standards is NSF/ANSI Standard 61, Drinking Water System Components – Health Effects. This standard is widely recognized and specified because compliance with NSF/ANSI 61 assures compliance with essentially all other regulations, including US state and federal regulations such as Section 1417 of the US Safe Drinking Water Act.

NSF/ANSI 61 is a performance-based standard that requires evaluation of actual contaminant levels from a sample product under laboratory conditions, which is then normalized to represent service conditions. This differs from US FDA requirements which preventatively prescribe material content to avoid contaminants. NSF/ANSI 61 evaluations must be performed by an accredited NRTL (Nationally Recognized Testing Laboratory) that is certified to perform the testing.

NSF/ANSI 61 testing can be summarized as follows:

1. Manufacturers disclose the material composition of contact materials, and the lab identifies associated known contaminants to include in the test.
2. Samples of all water contact materials are collected from the manufacturer and are prepared for testing by thorough cleaning. Samples are then immersed in various test solutions for defined time periods to allow any identified constituents to leach into the test water. The test solutions consist of purified water controlled at specific PH levels and temperatures.
3. The solutions are evaluated for contaminant levels and results are normalized to represent actual in-service conditions. Contamination levels are compared to maximum acceptance limit for a pass/fail grade.

One very important factor in the testing, which is often overlooked, is the specified evaluation temperature. NSF/ANSI 61 allows for the components to be evaluated at 3 different water contact temperatures:

- Cold Water – 23°C (73°F) ----> listed as "CLD 23"
- Domestic Hot – 60°C (140°F) ----> listed as "D. Hot"
- Commercial Hot – 82° (180°F) ----> listed as "C. Hot"

Because hot water dissolves constituents more quickly than cold water, hotter temperatures produce higher levels of contaminants leaching into the test water. Therefore, a valve that has passed testing at the most difficult "Commercial Hot" level provides the highest level of protection against drinking water contamination.

Delta T is proud to offer NSF/ANSI 61 certified resilient seated valves that are certified for Commercial Hot service, ensuring the highest level of protection against contamination in cold or hot water systems. Many buyers and specifiers are unaware of these subtle differences within the NSF/ANSI 61 specification, and we recommend using the full "NSF/ANSI 61 Commercial Hot" description to increase awareness and promote our commitment to high quality valves.

\*Note: NSF reference for water contact temperatures see below <https://info.nsf.org/Certified/PwsComponents/watercontacttemp.html>

## Sanitary Applications

Max-Air Technology's Delta T brand resilient seated butterfly valves are produced with user safety in mind. All the valves are produced in a manner to provide safe operation from a physical perspective but are also evaluated for chemical compounds that might be introduced into the flow stream in drinking water applications.

Specifically, our 050, 051, 650, and 651 series valves have all been evaluated according to the following Standards:

- NSF/ANSI Standard 372 – Drinking Water System Components – Lead Content
- NSF/ANSI Standard 61 – Drinking Water System Components – Health Effects

Our valves have successfully completed these evaluations, even at the more challenging level of testing called "Commercial Hot". The details of that evaluation can be found here: [https://www.deltatvalves.com/wp-content/uploads/2020/08/DeltaT\\_WhitePaper\\_NSF-ANSI61-CommercialHot.pdf](https://www.deltatvalves.com/wp-content/uploads/2020/08/DeltaT_WhitePaper_NSF-ANSI61-CommercialHot.pdf)

Continued compliance to these requirements is reinforced by means of an annual 3rd party audit which dictates inspection of the production facility and evaluates the factory's production processes to assure continued compliance with this high level of performance.

Only a few materials which are intended exclusively for industrial application were not evaluated to this high level of scrutiny.

## Food Grade Applications

For applications where FDA compliant materials must be utilized for food contact applications, we offer our 482P trims. This trim combination has virgin PTFE lined seats and polished stainless steel discs as the ONLY food contact materials. These are materials that are on the FDA's white list of allowed food contact materials. Additionally, only food grade lubricants are allowed during the production of these products resulting in a product where all food contact materials are compliant with the requirements for direct or incidental food contact.

Further, our 650 and 651 series valves feature a full stainless steel body

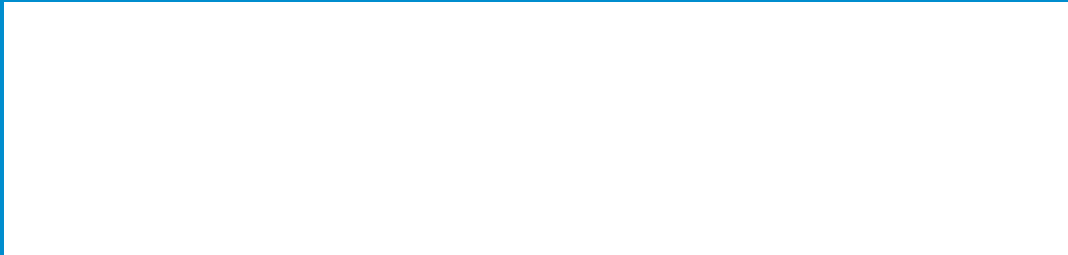


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