

TTR Group Inc.

The Engineered Valve
& Speciality Products Company



TTR LPHV Engineered Butterfly Valve



**Standard and Custom Designs
for severe applications 3" (75mm) - 132" (3300mm)**



www.ttrgroupinc.com

Valve & Application Solutions for the Municipal, Industrial, Mining and Power Industries



Applications	Pressure	Temperature	Model	Seat Suggestions
Severe high temperature	15-25 PSIG	-40° - 2500°F	TRDV-ST	Metal in body Ceramic fiber seats
Severe abrasive	0-15 PSIG	-40° - 2000°F	TRDV-SA	Metal in body
High pressure	0-15 PSIG	-40° - 350°F	TRDV-SHP	Metal in body Seat on disc (resilient)
Ambient medium duty	0-15 PSIG	-40° - 250°F	TRDV-M	Metal in body Seat in body (resilient) Seat on disc (resilient)
Ambient light duty	0-15 PSIG	-40° - 100°F	TRDV-L	No seat Metal in body Seat in body (resilient) Seat on disc (resilient)

* Other pressure ratings available. Please consult factory.

Typical Designs

Size range:	3" (75mm) to 132" (3300mm) ASME Section VIII
Pressure range: (bi-directional)	15 PSIG ΔP (103kPa) in the fully closed position 150 PSIG ΔP (1034kPa) optional in the fully closed position. Full vacuum.
Temperature rating:	-40°F (-40°C) to 2500°F (1300°C)
Leakage rates:	FCI ANSI CLASS I - VI Optional - Zero Leakage
Inspection:	ANSI FCI 70-2-1991
Style:	Wafer or Flanged (all models)



Design Parameters & Options

1. Bodies and Discs	Rubber lining / Special coatings
2. End Connections	Wafer and Flanged
3. Shaft Design	Through shaft and split shaft for reduced ΔP across fully open disc
4. Packing	Single or dual packing. Adjustable optional Parker Poly-Pak
5. Roller Bearings	Single or dual UHMPH or roller bearing (field replaceable)
6. Thrust Bearings	Single or dual thrust bearings and shoulder collars
7. Disc Designs	Standard or flow through disc designs for maximum SCFM flow rates and low Delta P
8. Seats (Field replaceable)	Metal, ceramic, resilient EPDM, Buna, Viton
9. Sealing	FCI ANSI Leakage classifications

Features and Benefits

Bodies	Designed to ISO 5752 (MSSSP67) API or AWWA C-504 standards for face to face dimensions.
Ribbed Flanged Bodies	Prevents flange distortion on thru bolting.
Reinforced Discs	Discs are reinforced with structure ribs and arched on large diameters for high capacity and velocity at all angles.
Shaft Thrust Collars	Prevents disc movement when mounted in any pipe orientation. Non metallic for low or friction.
Coatings	Two-part Epoxy. Nylon or rubber coatings are available as an option.
Seats	All ceramic and resilient seats are field replaceable.
Disc and Shaft Connection	Shafts are tangential, pinned for high Delta ΔP applications and ISO square drive connections at the disc for ease of repair.
Roller Bearings	For maximum shaft support and low rotational friction. Field replaceable.
Shaft Journals	Designed for the elimination of journal corrosion on aggressive media and high temperature applications.
Shafts	Large diameter for torsional deflection and disc loading. Keyed or square actuator drive.
Actuator Mounting	ISO 5211 or designed to direct mount all actuators.



Valve Size													Top Plate Drilling		
Inches	mm	A	B	C	D	E	F	G	H	J	K*	L	BC	No.Holes	Hole Dia.
3	80	1.75	7.50	0.25	0.22	4.00	6.25	0.50	0.39	1.12	2.50	3.00	2.76	4	0.38
4	100	2.00	9.00	0.25	0.23	4.00	7.00	0.50	0.39	1.12	3.56	4.00	2.76	4	0.38
5	125	2.12	10.00	0.25	0.25	4.00	7.50	0.50	0.39	1.12	4.62	5.00	2.76	4	0.38
6	150	2.12	11.00	0.25	0.25	4.00	8.00	0.50	0.39	1.12	5.44	6.00	2.76	4	0.38
8	200	2.50	13.50	0.25	0.25	4.00	9.50	0.75	0.51	1.12	7.44	8.00	2.76	4	0.38
10	250	2.50	16.00	0.25	0.25	6.00	10.75	0.75	0.51	1.12	9.50	10.00	2.76	4	0.38
12	300	3.00	19.00	0.25	0.25	6.00	12.25	0.75	0.51	1.12	11.44	12.00	4.92	4	0.56
14	350	3.00	21.00	0.25	0.25	6.00	13.38	1.00	0.51	1.25	13.00	14.00	4.92	4	0.56
16	400	4.00	23.50	0.38	0.25	6.00	14.25	1.00	0.51	1.25	15.50	16.00	4.92	4	0.56
18	450	4.25	25.00	0.38	0.25	6.00	15.00	1.00	0.51	1.25	17.50	18.00	4.92	4	0.56
20	500	4.88	27.50	0.38	0.25	6.00	16.25	1.00	0.51	1.25	19.44	20.00	4.92	4	0.56
24	600	5.94	32.00	0.50	0.38	6.00	20.12	1.00	.375 x .375	1.25	23.38	24.00	4.92	4	0.56
30	750	6.56	38.75	0.50	0.38	6.56	22.88	1.50	.375 x .375	2.00	29.25	30.00	4.92	4	0.56
36	900	7.88	46.00	0.62	0.50	7.88	26.50	1.50	.500 x .500	2.50	35.06	36.00	4.92	4	0.56
42	1000	9.88	53.00	0.62	0.50	9.88	30.25	1.50	.500 x .500	2.50	40.75	42.00	6.00	4	0.75
48	1200	10.88	59.50	0.75	0.62	10.88	35.75	2.00	.500 x .500	2.50	46.75	48.00	8.00	8	0.75
54	1400	12.00	66.25	0.75	0.62	12.00	40.25	3.00	.625 x .625	3.00	52.75	54.00	8.00	8	1.00
60	1600	12.00	73.00	1.00	0.75	12.00	44.50	3.50	.625 x .625	3.00	58.75	60.00	8.00	8	1.00
72	1830	12.00	86.50	1.00	0.75	12.00	50.50	3.75	.750 x .750	3.50	69.75	72.00	8.00	8	1.00

Note: Valve actuator mounting pads are designed for direct mount

(H) Round or square bodies

(C) Based on design parameters

(J) Designed for full actuator bore engagement

Standard Design	Optional Seats
<p>All valves are designed with dual thrust bearings for any piping installation orientation.</p>	<p style="text-align: right;">Zero Leakage</p> <hr/> <p style="text-align: right;">Class I</p> <p>Standard Seat</p> <hr/> <p style="text-align: right;">H.T. Class III</p> <p>High Temperature Minimum Leakage Seat</p>



Typical CV Values

Valve Size		Disc Position (degrees)							
Inches	mm	90°	80°	70°	60°	50°	40°	30°	20°
3	80	461	364	267	154	96	61	35	15
4	100	841	701	496	274	171	109	62	27
5	125	1376	1146	775	428	268	170	98	43
6	150	1850	1542	1025	567	354	225	129	56
8	200	3316	2842	1862	1081	680	421	241	102
10	250	5430	4525	2948	1710	1076	667	382	162
12	300	8077	6731	4393	2563	1594	1005	555	235
14	350	10538	8874	5939	3384	2149	1320	756	299
16	400	13966	11761	7867	4483	2847	1749	1001	397
18	450	17214	14496	10065	5736	3643	2237	1281	507
20	500	22339	18812	12535	7144	4536	2786	1595	632
24	600	32693	27718	17981	10421	6618	4064	2327	922
30	750	52905	44855	28458	16494	10474	6432	3684	1459
36	900	77785	65949	41331	23954	15211	9342	5350	2119
42	1000	102861	84574	54680	32803	20830	12793	7326	2901
48	1200	132794	108786	70485	43039	27331	16785	9612	4037
54	1400	168742	138235	89523	54664	34713	21319	12208	5127
60	1600	204477	172379	110833	67677	42976	26394	15114	6348
72	1830	265820	224093	144083	87980	55869	34312	19648	8252

CV's will increase or decrease based on design and media. Disc configurations may alter ΔP at all angles or in the fully open position.

Material / Temperature Ratings

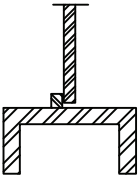
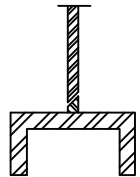
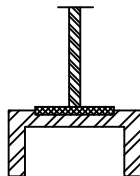
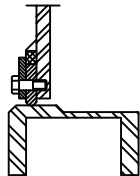
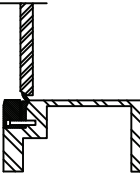
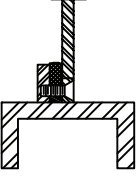
Materials	Continuous Service	
	°F	°C
A-36 Carbon Steel	580	304
310 Stainless Steel	2050	1121
448 Stainless Steel	2000	1095
330 Stainless Steel	1900	1035
310S\310H	1900	1035
309S\309H	1800	980
316\316L Low Carbon Stainless Steel	1600	870
321\321H	1600	870
304\304L\304H	1600	870
430 Stainless Steel	1500	815
410 Stainless Steel	1300	705

Valve Weights

Size	Inches	3	4	5	6	8	10	12	14	16	18	20	24	30	36	42	48	54	60	72
	mm.	75	100	125	150	200	250	300	350	400	450	500	600	750	900	1050	1200	1400	1500	1800
lbs.		5	8	10	14	20	29	40	70	115	120	151	310	380	610	850	1400	1800	2600	3700
kg.		2.2	3	4	6	9	13	18	32	52	54	68.7	141	173	277	386	636	818	1182	1682

Note: Weights are approximate and will vary based on design selection, materials and shaft diameter requirements that will vary depending on engineering requirements.



Style	Design	Models	Leakage Class ANSI FC1	Drawing Reference
	<ul style="list-style-type: none"> • Metal seated on body • Through shaft • Center Seated <p>Standard Applications</p>	R1	Class I	R1-8121001
	<ul style="list-style-type: none"> • Metal seated on body • Machined edge • Off-set eccentric <p>High Temperature -40°F - 2500°F</p>	R2	Class I-III	R2-8121002
	<ul style="list-style-type: none"> • Resilient seat on body • Resilient seated in the body recessed and supported on 3 sides. • EPDM, Buna, Viton <p>Minimum and Zero Leakage -40°F - 350°F</p>	R3	Class III-VI Optional Zero Leakage	R3-8121003
	<ul style="list-style-type: none"> • Double off-set eccentric disc design, low torque • Seat on disc design • Positive sealing • Replaceable and adjustable • EPDM, Buna, Viton <p>Minimum and Zero Leakage -40°F - 350°F</p>	R4	Class I-VI Optional Zero Leakage	R4-8121004
	<ul style="list-style-type: none"> • Double off-set eccentric design • Teflon and RTFE seats • Field replaceable • Seat in body moulded one piece design <p>Minimum and Zero Leakage Temperature limited to Teflon & RTFE Corrosion / High Volume</p>	R5	Class I-VI Optional Zero Leakage	R5-8121005
	<ul style="list-style-type: none"> • Through shaft design / off-set designs • Resilient and ceramic style seats • EPDM, Buna, Viton, Ceramic • Field adjustable and replaceable • Seat in body design, no seating torque <p>Minimum Leakage -40°F - 2500°F Severe</p>	R6	Class I-VI	R6-8121006
SPECIAL	<ul style="list-style-type: none"> • Through shaft design • Resilient seat in body, cartridge design • Field replaceable seat • EPDM, Buna, Viton, Teflon • Seat isolates media from the valve body • Primary and secondary sealing <p>Zero Leakage Design -40°F - 350°F</p>	R7	Per design application and specifications	R7-8121007



TRDV Design Selection (High Cycle / High Volume / Corrosion / Abrasion / Temperature)		
Description	Design Details	
Economy Series Carbon or Stainless Steel Light Duty On-Off - Modulating Select R1	<ul style="list-style-type: none"> • Flanged or Wafer • Metal Seat • Single Bearing • Through Shaft • Single Packing 	Class I Leakage Delta P - 15 PSIG Clean Dry Media Standard Dimensions
High Temperature - Metal Carbon or Stainless Steel Severe High Temperature High Volume Select R2	<ul style="list-style-type: none"> • Flanged • Metal Seat • Seat in body fixed • Machined disc • Dual packing and bearings • Split shaft, ceramic puck 	Class III - V Leakage High Temperature
Economy - Resilient Seated Carbon or Stainless Steel On-Off Medium Service Modulating Isolation Select R3	<ul style="list-style-type: none"> • Flanged or Wafer • Resilient recessed seat • Dual packing and bearings • Through shaft • Seat is not field replaceable • Factory replaceable seat • No seat adjustment is necessary 	Class I - VI Zero Leakage Elastomer Seats
Low Torque High Volume Modulating High Cycle Dirty Media Application - Heavy Service Select R4	<ul style="list-style-type: none"> • Flanged • Field replaceable resilient seat on disc • Double offset eccentric design • Seat is field adjustable • Self wiping/cleaning seat • Dual packing and bearings 	Class I - VI Elastomer Seats
Low Torque Modulating High Cycle Corrosive Applications Heavy - Severe Select R5	<ul style="list-style-type: none"> • Flanged • Low torque small cross sectional seating surface • Low coefficient of friction seat • Field replaceable seat • No adjustment required on seat • Dual packing and bearings 	Class I - VI Elastomer Seats
Low Torque High Temperature Modulating High Cycle Severe Service, Abrasion, High Volume Select R6	<ul style="list-style-type: none"> • Flanged • Through shafts • Dual packing and bearings • Field adjustable replacement ceramic seats • Low torque high cycle • No wear 	Class I - V Ceramic Seats
Low Torque High Cycle - Minimum Leakage On-Off / Modulating Abrasion, Corrosion, Medium Duty Select R7	<ul style="list-style-type: none"> • Through shafts • Seat isolates media from the valve body • Dual external bearings • Dual external packing 	Class I - VI Seat in Body

* Special high cycle zero leakage valves are available in various body materials with standard industry seating configurations.



Suggested Specifications

Bodies: All bodies shall be fabricated steel flanged construction to suit the pressure, temperature and media application, machine-faced to 125 RMS ANSI B16.5. All bodies and discs shall be sufficiently ribbed to prevent body deflection. Body journals shall be designed to incorporate sufficient clearance and shall not incorporate internal shaft bearings or bushings (when noted). Upper and lower body journals shall be drilled, tapped and plugged to accommodate purge lines when required. All bodies shall be stress relieved after fabrication. All welds to be full penetration. All valves shall be rated for 15 PSIG in the fully closed position or as required.

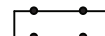
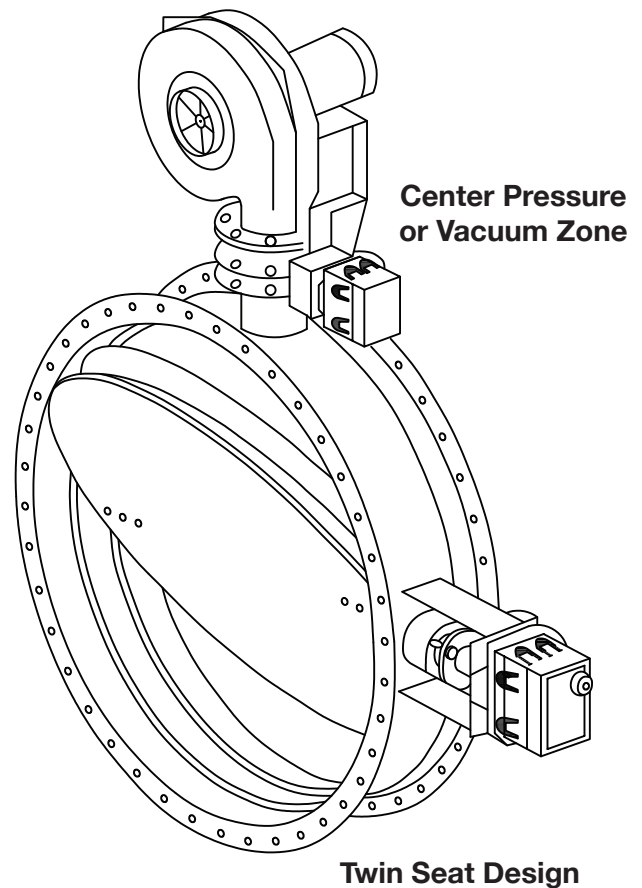
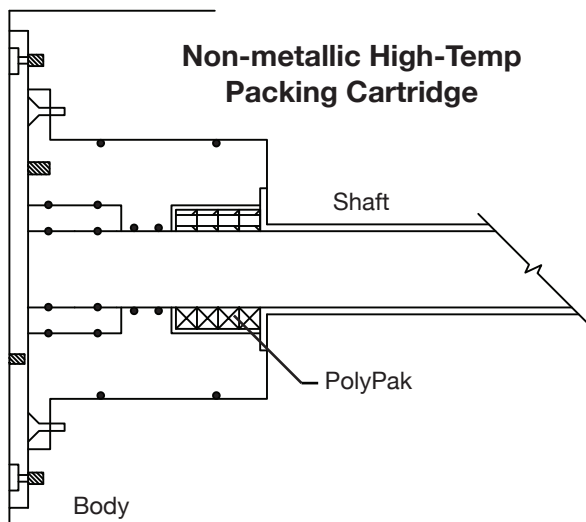
Discs: Discs shall be fabricated steel, split-shaft or through shaft removable construction and ribbed for maximum flow and minimal deflection. All discs shall be connected by means of solid taper pins securely fastened with retaining nuts or back welds. All discs shall be stress relieved after fabrication. Disc will accommodate through shaft construction on high velocity applications.

Seats: All seats shall be located on the body and mechanically retained with removable retaining rings. The seat will be stepped to maximize the sealing surface and incorporate specified material. The seat material will be designed to withstand continuous service conditions and shall be field replaceable.

Shafts: All shafts shall be split or thru-design. Minimum 316 stainless steel or to meet the application and machined to accommodate direct mount actuation. Shaft diameters shall be to AWWA C-504 CI-75B when specified by size. All shafts shall incorporate bi-directional thrust bearing and location locking collars. All shafts shall be supported by dual external roller bearings as required. All valves shall incorporate dual thrust bearings for 360° pipe orientation in vertical or horizontal pipe.

Packing: Valves shall incorporate cartridge style live loaded self-adjusting packing that is field replaceable without removal or disassembly of the valve from the piping for the application. Packing shall consist of minimum 3 rings of 0.25" Grafoil in each journal. Dual packing will be used as required with external bearings. The cartridge shall be field replaceable without removal of the valve from the pipe. Poly-Pak retention shall be retained by a shoulder as part of the cartridge.

External Roller Bearings: All valve bodies shall incorporate upper and lower roller bearings to support the shaft and disc assembly. All bearings shall be permanently lubricated and field replaceable without the removal of the valve from the piping. Bearings shall be suitable for indoor and outdoor environments up to -40°C to 2500°F or as required. All actuators shall direct mount to the valve shaft and mounting plate to ISO 5211 standards. All valves shall be capable of mounting in any orientation in the pipe including the inverted position. Pneumatic actuators shall be capable of mounting fail open or fail close in the field without changing actuator orientation when required.

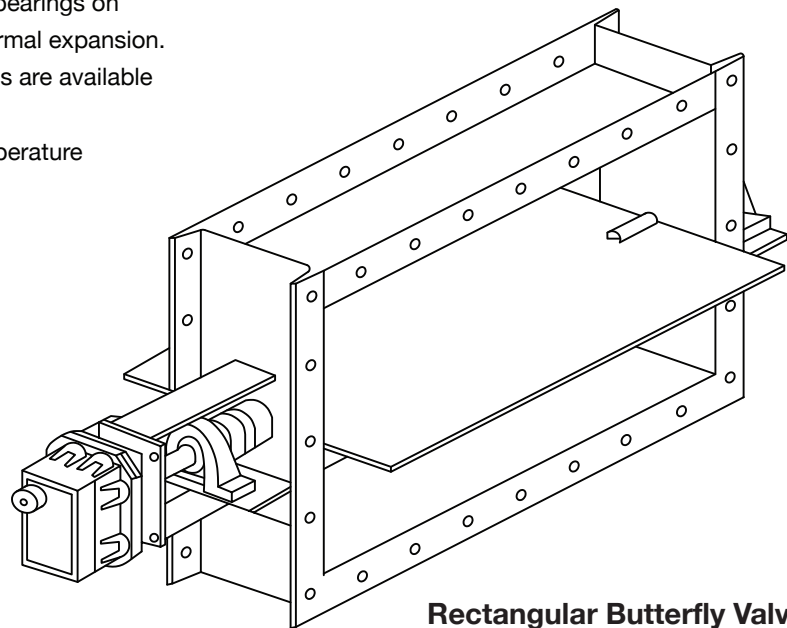


TRDV Ordering Chart

Model Example: TRDV-STR-75-A-1-1-3-R1-1-1-1-E

Model	Type	Size	Materials	Internal Coating	External Coating	Seat Material	Seat Style	Bearing	Packing	Shaft	Actuator
TRDV	STR	75	A	1	1	3	R1	1	1	1	E
TRDV	STF-Wafer STR-Rectangular STS-Square STL-Louvered	75mm 100mm 125mm 150mm 200mm 250mm 300mm 350mm 400mm 450mm 500mm 600mm 750mm 900mm 1000mm 1200mm 1400mm 1600mm 1850mm	A- Carbon Steel Body, Carbon Steel Disc, 304SS Shaft B- Carbon Steel Body, Carbon Steel Disc, 316SS Shaft C- 304SS Body, 304SS Disc, 304SS Shaft D- 316SS Body, 316SS Disc, 316SS Shaft E- Special Body, Disc & Shaft, Hastalloy C-321 Titanium F - Aluminum Body, Aluminum Disc, 316SS Shaft	1 Primer 2 Epoxy 3 Nylon 4 Rubber	1 Primer 2 Epoxy 3 Nylon 4 Rubber	1 No Seat 2 Metal 3 EPDM 4 Buna 5 Viton 6 Ceramic 7 Teflon 8 RTFE 9 Fiberglass 10 Full Rubber	R1 R2 R3 R4 R5 R6 R7	1 Single Internal 2 Block UHMUP 3 Roller Dual 4 Sealed Dual Roller	1 Single Teflon 2 Dual Teflon 3 Single Grafoil 4 Dual Grafoil 5 Single PolyPak 6 Dual PolyPak 7 Dual Teflon & PolyPak	1 Split 2 Dual 3 Thru	E- Electric P- Pneumatic L- Lever G- Gear PS- Plain Stem H- Hydraulic

- All valves are designed for any piping configurations and valve orientations using standard dual thrust bearings on the valve shaft. Special designs allow for thermal expansion.
- Face to face dimensions and end connections are available as customer requirements.
- Seat material and metallurgy determine temperature ratings of the valves.



Rectangular Butterfly Valve
Metal • Resilient • Ceramic • Seated



TRDV Valve & Actuator Details and Requirements

Customer:			Date:		
Address:			Contact:		
Phone:	Fax:	Email:		Site Location:	
Issue Drawings: Yes <input type="checkbox"/> No <input type="checkbox"/>					
No Drawing Required: Yes <input type="checkbox"/> No <input type="checkbox"/>			Use TTR Standard Dimensions: Yes <input type="checkbox"/> No <input type="checkbox"/>		

Valve Design			
Size	Quantity	Body Type Wafer / Flanged	Pipe ID. At Flange
Valve ID.	Valve Flanged OD.	Valve Bolt Circle Diameter	Number of Flange Holes
Flange Hole Diameter	Extended Neck	Face to Face	Model

Valve Material (Refer to MTL Guide)				
Flanges		Body Disc	Shaft Dual Through	Dual Shaft Packing
Seat Type	Seat MTL	Internal Bearing	External Bearing	Single Shaft Packing

Automation							
Actuator Specification	Manufacture		Double Acting		Fail Open	Fail Close	
	Minimum Supply Pressure		Lever		Gear	Electric Voltage	
	Nema Rating		On-Off		Special Coating	Hardware	
	Fitting Material		Modulating		Manual Override	Duty	
Solenoid Specification	3-Way	4-Way	Nema Rating		Voltage	Manual Override	Speed Controls
Limit Switch Specification	Type		Nema Rating		Voltage	Indicator	
Positioner Specification	Type		Signal In	Signal Out		Gauges	
	Indicator		Reverse	Direct	Piping Material	Switches	External Feedback
Coating Specification	Valve External		Disc		Valve Internal		
	Actuator						
Tagging Details				Tag Numbers			

Actuator Mounting Details					
Top Valve Flange OD.	Bolt Circle Diameter		Flange Diameter	Number of Flange Holes	
Shaft Height	Shaft OD.		Keyway	Parallel Flat	Square Drive
Match Shaft to Actuator Type/Size	Model Number		In Line with Pipe	Adjacent to Pipe	

Media				
Max. Allowable Leakage (based on FCI ANSI B16, 104)	Class I, II, III		Zero Leakage	Requirement
	Class IV, V, VI			
Media	Operating Pressure		Operating Temperature	
Operating Velocity	Maximum Velocity		Maximum Pressure	Maximum Temperature



Notes

Blank area for notes, consisting of ten horizontal grey bars.

COMMITMENT TO OUR CUSTOMERS & INDUSTRY

TTR has combined quality products manufactured in North America selecting originators of these products as early as 1879 that exist today as leaders and role models in the Markets and Industry today. TTR has combined these products as a package with our speciality Engineered Products Division to meet the requirements of many applications within the same project culminating the advantages of established proven quality engineered products with over 70 years of combined field service and site commissioning experience.

Products & Services – AWWA Compliant and NSF



Products

Valve and Full Electric / Pneumatic / Hydraulic and Electro Hydraulic Automation \ Packages for In-Plant and Submerged Service

Engineered Speciality Products

- Energy Dissipating Valves and Systems / AWWA Knife Gate Valves
- Counterweighted Turbine Isolation
- Torque Tubes / Shaft Extensions / Rod Extensions

AWWA Valves

Butterfly /Resilient Seated Wedge Gate /Knife Gate / Air and Sewage Relief Globe, Silent, Tilting Check Self Piloted Control / Slide / Plug / Ball

Services - 35 Years Experience

Speciality Engineered Products / Design and Manufacturing Capabilities / FEA and CFD modelling Support / Unbiased Specification Assistance / Field Service Analysis and Support / Site Commissioning / 3rd Party Inspection / Confined Space Certified

Continuing Education Courses

OWWCO - Director Approved Training Course

TTR Training Course Name - AWWA C504 Butterfly Valves & Actuators

Follow <http://www.owwco.ca> Course ID 8733. Page 228

CONTACT

TTR Group Inc.

2011 Markle Drive • Oakville • Ontario • L6H3N6

905.302.4488 • Fax 905.849.6893 • sales@ttrgroupinc.com • www.ttrgroupinc.com

Established 2009

ASSOCIATIONS

