

# *Butterfly Control Valves*



**L&T Valves**

L&T Valves, a wholly owned subsidiary of Larsen & Toubro, manufactures a wide range of globe and butterfly control valves for hydrocarbon and power industries.

The Butterfly Control Valves, suitable for both control and on-off services, are available in ASME classes 150 and 300, in sizes up to 24" (600 mm). The valves are built on the proven Triple-offset Butterfly Valves and offered in a variety of body styles and materials, with a range of actuation options and accessories to suit customer requirements.

In Triple-Offset Butterfly Valves, bidirectional bubble-tight sealing is obtained using a laminar disc-seal that generates a compressive force around the body seat. The sealing is independent of line pressure and hence bubble-tight even at low differential pressures.

### Compliance Standards

Parameter		Standard	
Design		ASME B16.34, API 609 (Category B)	
Pressure - Temperature Rating		ASME B16.34	
Leakage Class		ANSI/ FCI 70-2	
Ends	Flanged	Face-to-face	API 609
		End Flange Dimensions	ASME B16.5/ ASME B16.47
	Wafer	Face-to-face	API 609
		End Flange Dimensions	ASME B16.5
		C <sub>v</sub> Testing	ISA-75.02
Testing		Hydrotesting	API 598
		Fire Test	API 607
Systematic Integrity (SIL)		IEC 61508	



### Materials of Construction

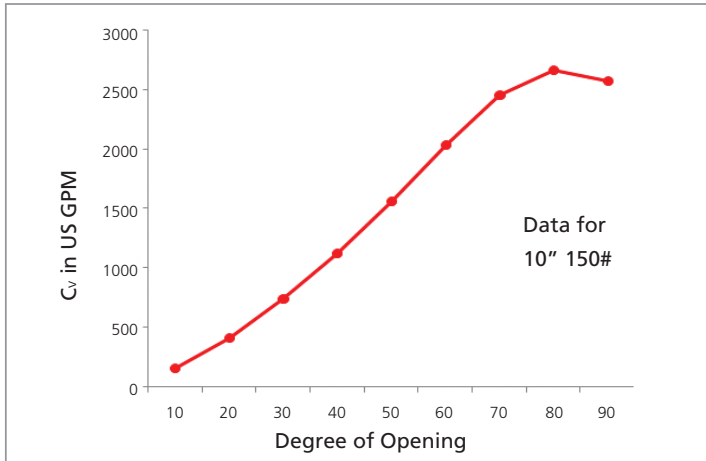
Body	Laminar Seal	Shaft
A 216 Gr. WCB/ WCC	UNS S31803 + Graphite/ UNS S20910 + Graphite	A 479 Type SS 410/ A 564 Type 630
A 352 Gr. LCB/ LCC		A 479 Type XM-19/ A 564 Type 630
A 217 Gr. WC6/ WC9	SS 410 + Graphite/ UNS S20910 + Graphite	A 479 Type SS 410
A 217 Gr. C5		A 479 Type SS 410/ A 479 Type XM-19
A 351 Gr. CF3/ CF8	UNS S31803 + Graphite/ UNS S20910 + Graphite	UNS N07718/ A 479 Type XM-19
A 351 Gr. CF3M/ CF8M		UNS N07718/ A 479 Type XM-19

**Applications**

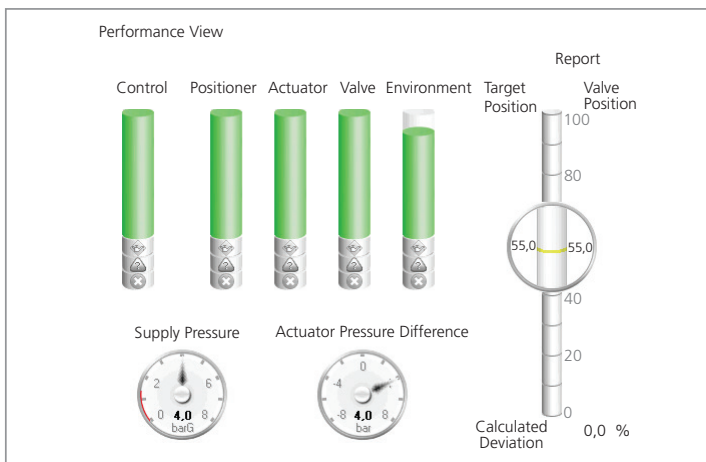
Butterfly control valves are preferred for high flow rate applications.

**Features**

- Flow Characteristic close to linear



- Bidirectional bubble-tight sealing
- Triple-offset geometry - low wear-and-tear, low torque
- Metal-to-metal seats
- Longer service life
- Anti-blowout shaft
- Suitable for temperatures up to 538°C (1000°F)
- Meets ISO 15848-1 Class A Fugitive Emission & NACE: MR0175 requirements
- Can be offered with Valve Diagnostic Software to monitor and enhance valve/ process performance



**Actuator Options**

- Pneumatic
- Hydraulic
- Electrical

### Coefficients Table - Class 150

Valve Size NPS	Coefficients	Class 150								
		Valve Rotation, Degrees								
		10	20	30	40	50	60	70	80	90
4	C <sub>v</sub>	16	41	72	110	152	198	239	259	250
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
6	C <sub>v</sub>	46	119	211	320	444	578	698	756	730
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
8	C <sub>v</sub>	91	234	416	632	875	1141	1377	1492	1440
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
10	C <sub>v</sub>	162	417	743	1128	1562	2036	2457	2663	2570
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
12	C <sub>v</sub>	239	616	1095	1663	2304	3003	3624	3927	3790
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
14	C <sub>v</sub>	321	825	1468	2230	3088	4025	4857	5264	5080
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
16	C <sub>v</sub>	520	1336	2377	3610	4999	6517	7864	8523	8225
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
18	C <sub>v</sub>	665	1708	3040	4617	6394	8335	10058	10902	10520
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
20	C <sub>v</sub>	862	2215	3942	5986	8290	10807	13041	14135	13640
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
24	C <sub>v</sub>	1257	3231	5749	8732	12092	15763	19021	20617	19895
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>r</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23

## Coefficients Table - Class 300

Valve Size NPS	Coefficients	Class 300								
		Valve Rotation, Degrees								
		10	20	30	40	50	60	70	80	90
4	C <sub>v</sub>	16	41	72	110	152	198	239	259	250
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
6	C <sub>v</sub>	38	97	172	261	362	471	569	617	595
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
8	C <sub>v</sub>	69	178	316	481	666	868	1047	1135	1095
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
10	C <sub>v</sub>	140	361	642	975	1351	1760	2124	2303	2222
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
12	C <sub>v</sub>	215	553	983	1494	2068	2696	3254	3526	3403
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
14	C <sub>v</sub>	297	763	1358	2063	2857	3724	4494	4870	4700
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
16	C <sub>v</sub>	381	981	1745	2650	3670	4784	5773	6257	6038
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
18	C <sub>v</sub>	523	1344	2392	3633	5031	6559	7914	8578	8278
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
20	C <sub>v</sub>	680	1748	3110	4723	6541	8527	10289	11152	10762
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23
24	C <sub>v</sub>	996	2561	4557	6921	9585	12495	15077	16342	15770
	F <sub>d</sub>	0.09	0.17	0.26	0.34	0.42	0.49	0.57	0.64	0.7
	F <sub>L</sub>	0.9	0.89	0.88	0.85	0.8	0.73	0.67	0.65	0.65
	X <sub>T</sub>	0.5	0.53	0.55	0.55	0.51	0.45	0.39	0.3	0.23

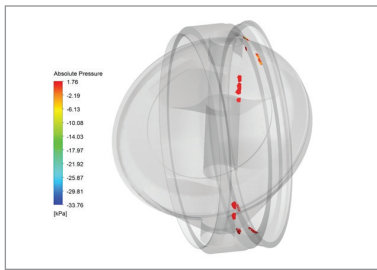
## L&T Valves

L&T Valves has three modern manufacturing units, in Manapakkam (Chennai), Coimbatore and Kancheepuram. State-of-the-art manufacture which leverages the best in technology and skill is an L&T Valves hallmark. All critical manufacturing operations are carried out on 5-axis machining centres, 5-axis welding machines, CNC machines and special purpose machines. International safety, health and environment standards govern every phase of the manufacturing process.

The valves are designed using state-of-the-art 3D design, simulation and analysis software. Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) are used to fine-tune product performance. Rigorous prototype tests - both in-house and at advanced flowcontrol research establishments - ensure that the customised solutions meet customer expectations.

L&T Valves Limited is synonymous with world-class manufacturing and quality assurance systems. Our plants have the agility and flexibility to deliver a wide variety of valves against time constraints and dynamic customer demands. International safety, health and environment standards govern every phase of the manufacturing process.

L&T Valves has a marketing network that spans the globe reinforced by strategic alliance with key international distributors. In India, it has a presence in every industrial centre through a network of offices, distributors, automation centres and service franchisees.



Larsen & Toubro is a USD 14.3 billion technology, engineering, construction, manufacturing and financial services conglomerate, with global operations. Its products and systems are marketed in over 30 countries worldwide. L&T is one of the largest and most respected companies in India's private sector. A strong, customer-focused approach and the constant quest for top-class quality have enabled L&T to attain and sustain leadership in its major lines of business over seven decades.



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Publication Number: VF009-R2/0714

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