

**ZWICK**



## **Zwick Series Tri-Con**

### **Zero-Leakage Metal-Seated Valves**

#### Features

- Unique triple-offset, conical seating**
- Metal-to-metal seating**
- Unique, self-centering disc design**
- Emission-control technology**
- Superior bearing/bushing design**
- Laminated seal ring**

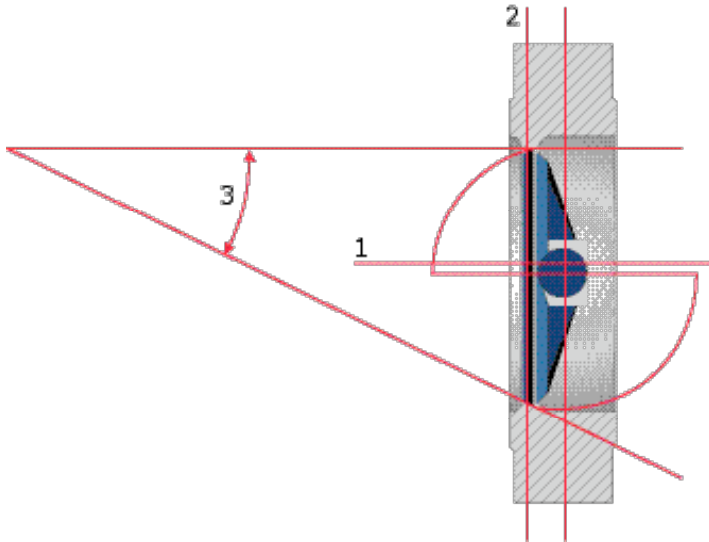
#### Benefits

- Zero leakage in demanding services**
- Inherently firesafe**
- Low torque required**
- Elimination of jamming due to thermal expansion**
- Bi-directional shutoff capabilities**

# ZWICK TRI-CON FEATURES

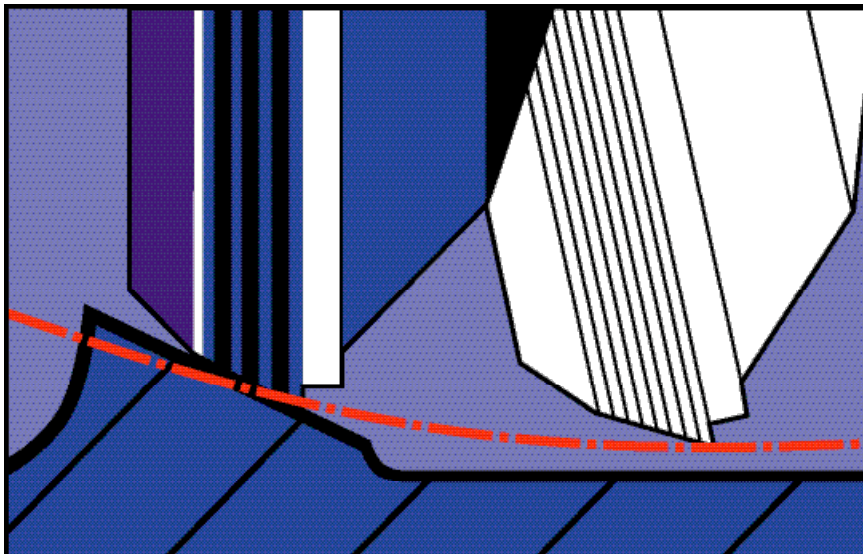
## Triple-Offset Conical Seating

Most high-performance butterfly valves are manufactured with a double-offset shaft design. Tri-Con valves incorporate a unique third offset with a 25-degree incline, eliminating the friction between the laminate seal ring and the body seat. The resulting camming action allows the stainless and graphite laminated seal ring, with a corresponding 25-degree inclined surface, to seat into an inclined 25-degree body seat. The result: true cone-in-cone seating and zero-leakage performance.



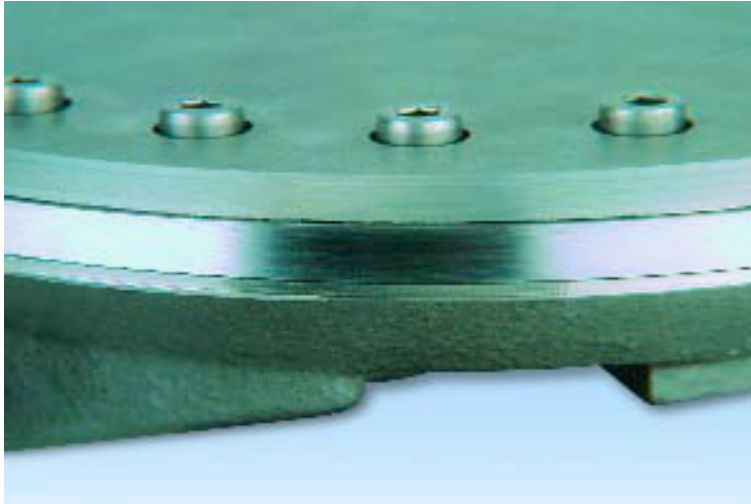
## Statically Held Laminated Seal Ring/Flat Gasket

Tri-Con valves offer the widest laminated seal ring in the market today, made possible by true cone-in-cone seating design. This wide lamination of stainless steel and graphite provides a forgiving sealing surface when it is seated against line scale or particulates. Multiple laminations naturally translate into multiple sealing surfaces to achieve zero leakage.



## All-Metal Lamination Seal Ring

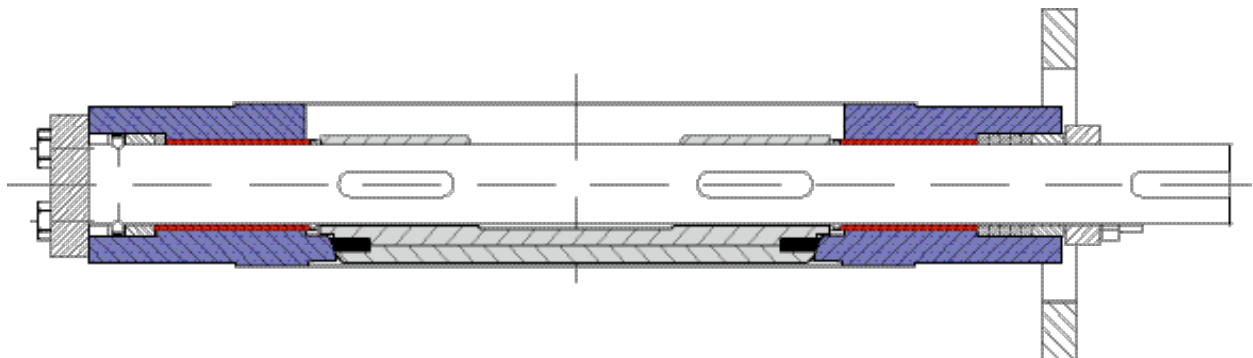
Tri-Con valves offer an all-metal laminated seal ring for higher-temperature or aggressive applications. While some competitive laminated seal ring designs have failed due to aggressive line media's attacking the graphite and binders, the layered lamination of all-metal can achieve zero leakage.



## Self-Centering Disc Design – No Pinning of Shaft to Disc

Zwick's Tri-Con valve employs a floating disc that is keyed to the shaft, not pinned. Other triple-offset valve manufacturers permanently pin or affix their discs to the shaft. To accommodate for differential thermal expansion of the shaft and disc, other manufacturers must rely on a seal ring that compresses radially. This makes their designs subject to jamming due to thermal expansion.

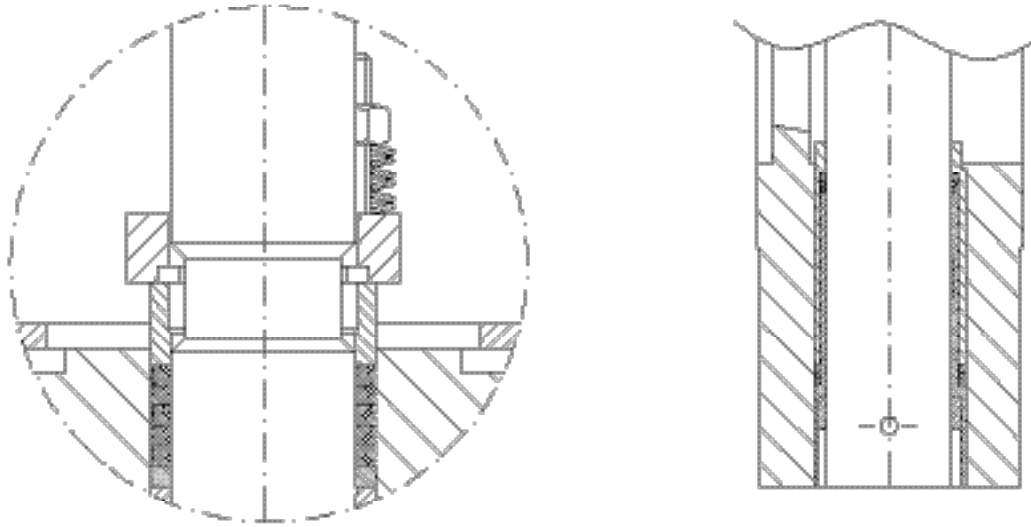
The Zwick self-centering disc design not only assures equal transmission of the torque but will also allow for more than 1,000 times the thermal differential between the shaft and disc. This allows the disc to torque into its ideal position with each closing. The Zwick design also offers substantially lower torque than most of the other metal-seated valves.



# ZWICK TRI-CON FEATURES

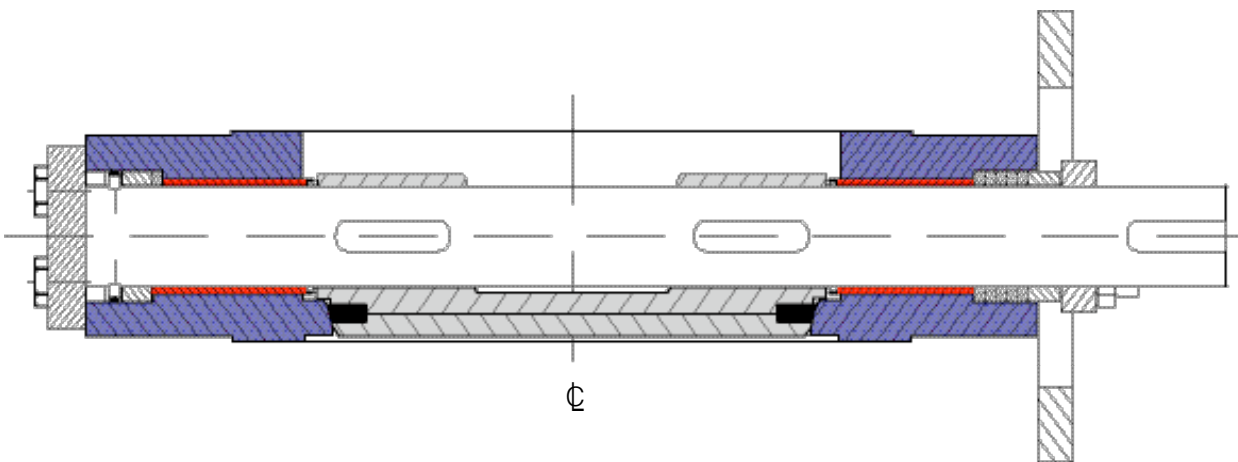
## Emission Control

Tri-Con's standard five-ring graphite packing meets all the requirements of TA Luft for fugitive emissions from the shaft and packing arrangements. The inherent quarter-turn action coupled with the superior trunnion mounting of the bearings and shaft arrangement assures that shaft deflection is eliminated.



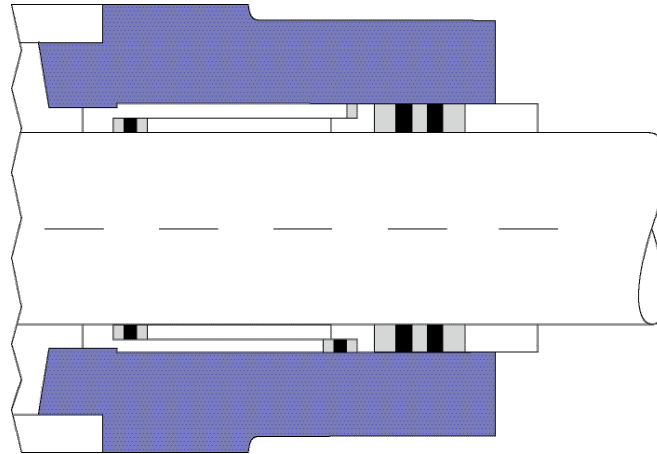
## Superior Bearing/Bushing Design

Tri-Con valve bushings are located close to the centerline of the disc, helping to eliminate the shaft bending associated with torque-seated valves. While other manufacturers locate their bushings within the body, Tri-Con valve bushings protrude into the waterway of the valve in order to offer the most effective design. The standard bushing design also offers a graphite bushing protector ring to help combat the migration of particulates into the bushings.



## Unique, Patented Sealed Bearing Design

For some applications, the standard bushing protection ring is not effective in preventing fouling of the bushings associated with the line media. Zwick's zero-leakage bushing design assures that no line media will migrate into the bushing cavity. While competitive designs have failed due to fouling or galling of the bushing and shaft, the Zwick design has been proven in the severest of applications. Zwick's patented sealed bearings also offer zero- to low-ppm performance out of the stem packing.



## TECHNICAL QUALIFICATIONS

Quality Assurance	ISO 9001
Testing	API 598 Zero Leakage API 6D Zero Leakage
Flange Drilling	ANSI B16.5 (Sizes 3"-24") ANSI 16.47 Series A & B
Fire Test	API 607 4th Edition
Design	ANSI 16.34
TA Luft	Emission Control
PED CE Mark Qualified	

## CERTIFICATIONS

BAM-Approval for Oxygen  
 TA-Luft gem. / acc. To VDI 2440  
 DIN EN ISO 9001:1994  
 Fire Safe gem. / acc. To API 607  
 Fire Safe gem. / acc. To British  
 Standard B.S. 6755  
 CE-Certificate gem. / acc. To 97/23/EG





BALL VALVES

GATE VALVES

ZWICK VALVES

# ZWICK TRI-CON VS. OTHERS

## Comparative Features to Gate and Ball Valves

### Zero Leakage

Bi-directional testing (API 598, API 6D) confirms the power of Tri-Con valves to prevent leakage.

### Resilient Metal Seat

Even in the most severe applications, metal seating provides long-term zero leakage.

### Quarter-Turn Operation

Stress on pipe is reduced while automation is simplified. Compared with other designs, fugitive emissions are substantially reduced.

### All-Metal Construction

Rely on all-metal construction for greater resistance to higher temperatures.

### Inherently Firesafe

Zero leakage and all-metal construction make Tri-Con valves inherently firesafe.

### Patented Seal Bearing

Tri-Con offers zero- to low-ppm performance out of the stem packing.

### Zero-PPM Performance

A superior bearing and bushing design combats the migration of particulates.

### Bi-Directional

Tri-Con valves are bi-directional and provide zero-leakage shutoff.

### Nonrubbing Design

Thanks to triple-offset conical seating, rubbing and wear are eliminated for the entire quarter turn.

### Double-Flange Body

The compact design makes installation and maintenance easier.

### Available ANSI B16.10 Face-to-Face

Allows direct replacement of most gate, ball and globe valves.

### Available API 609, Face-to-Face

The Zwick Tri-Con design allows operators to easily upgrade from high-performance butterfly valves.

### Lightweight

Reduce piping stress and maintenance while also lowering construction costs.

### ANSI 150, 300, 600, 900

Zwick Tri-Con valves are available in familiar gate and ball valve pressure standards.

### 3" to 60" Sizes

Zwick has the right sized valve for nearly all applications.

### Cryogenic to -400°F

Get the low-temperature performance you need.

### High Temperature to 1500°F

Get better shutoff performance than with soft-seated valves.

### Ease of Automation

Quarter-turn valves require less time and cost to automate.

### Fast Operation

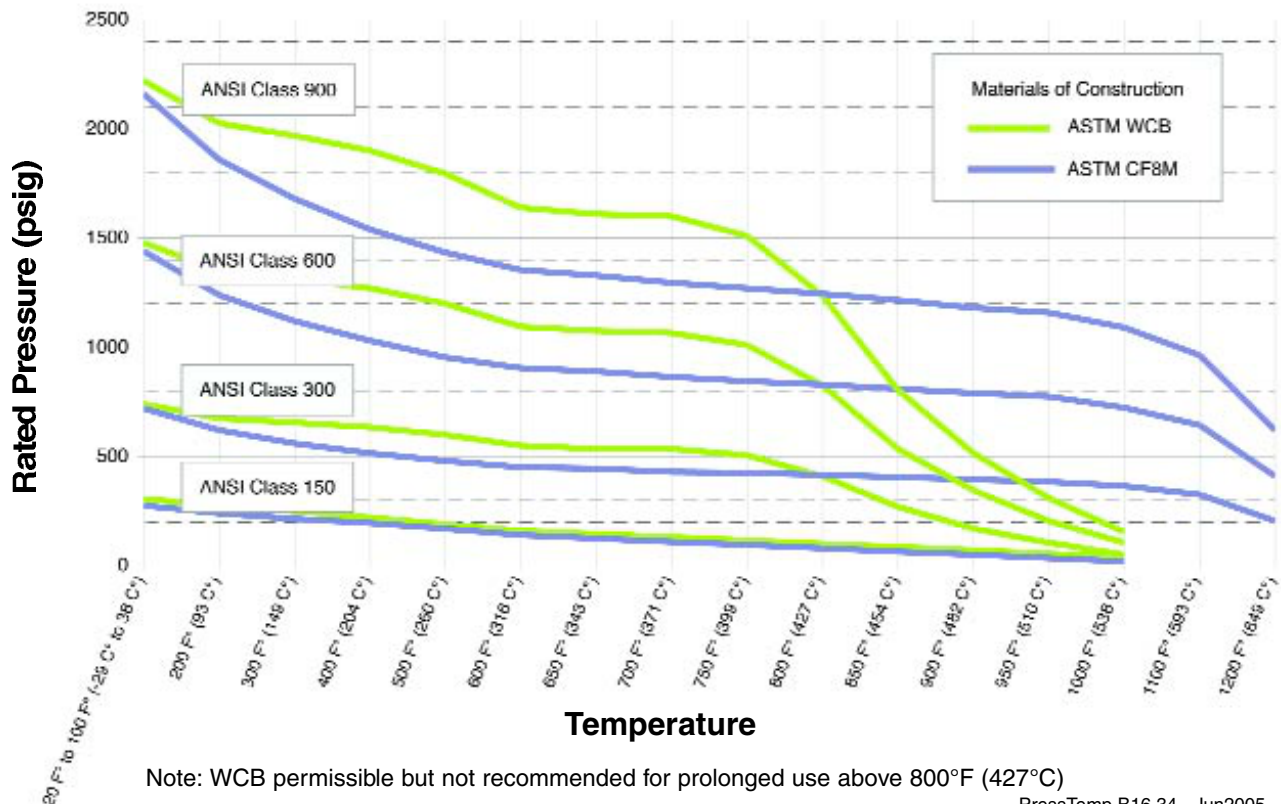
Get closing times as fast as .15 seconds.

# LEAKAGE COMPARISON

VALVE SIZE		ZWICK TRI-CON API 598 RESILIENT		GATE VALVE API 598 METAL		H.P. BUTTERFLY VALVE ANSI CLASS VI		ZWICK TRI-CON API 6D	
INCH	DN	Liquid	Air	Liquid	Air	Liquid	Air	Liquid	Air
3"	80	0	0	12	72	N/A	3	0	0
4"	100	0	0	12	72	N/A	11	0	0
6"	150	0	0	12	72	N/A	27	0	0
8"	200	0	0	20	120	N/A	45	0	0
10"	250	0	0	20	120	N/A	70	0	0
12"	300	0	0	20	120	N/A	100	0	0
14"	350	0	0	28	168	N/A	136	0	0
16"	400	0	0	28	168	N/A	178	0	0
18"	450	0	0	28	168	N/A	225	0	0
20"	500	0	0	28	168	N/A	278	0	0
24"	600	0	0	28	168	N/A	400	0	0
30"	750	0	0	28	168	N/A	620	0	0
36"	900	0	0	28	168	N/A	900	0	0
40"	1000	0	0	28	168	N/A	1111	0	0

Notes: Allowable gate valve leakage per API 598 6th Ed. 1990  
 Leakage comparisons are measured in drops/minute for liquid and in bubbles/minute for air.  
 1 drop = 0.0625 cm  
 1 bubble = 0.15 cm<sup>3</sup>

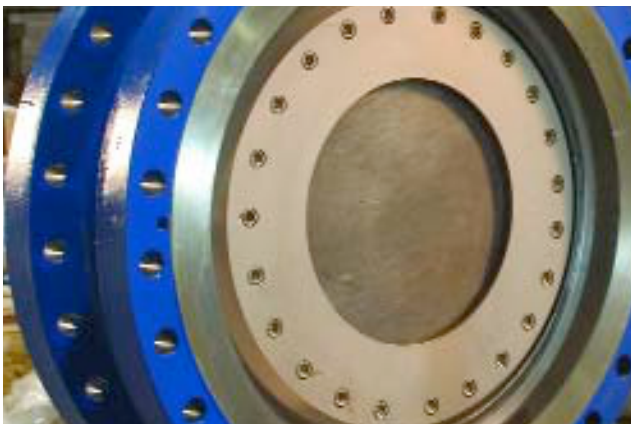
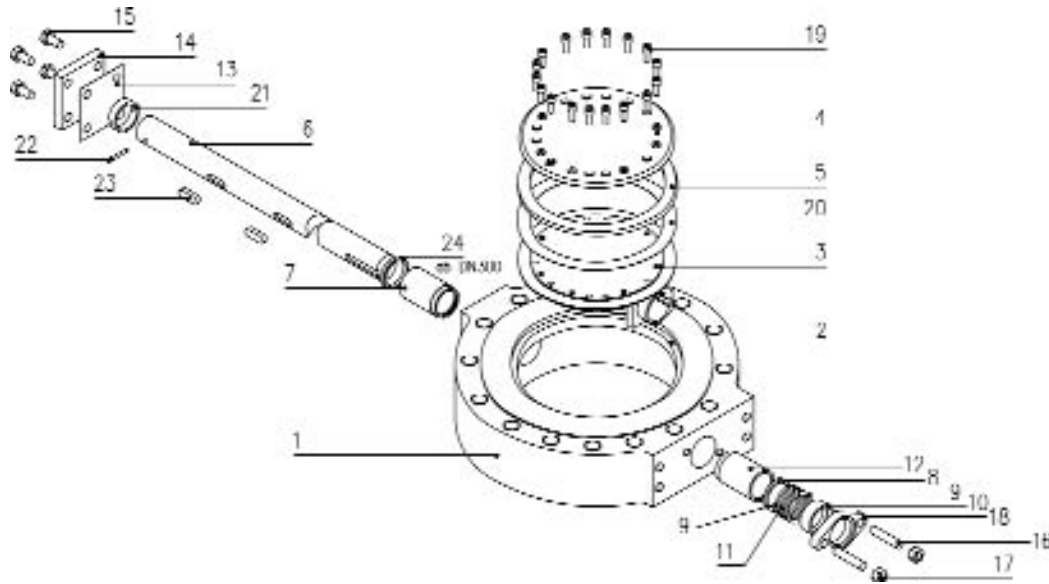
## PRESSURE/TEMPERATURE RATINGS PER ASME/ANSI B16.34 ZWICK TRI-CON MODELS A1, B1, I1, W1



Note: WCB permissible but not recommended for prolonged use above 800°F (427°C)

PressTemp B16.34 - Jun2005

# STANDARD MATERIAL/ANSI DESIGN





# STANDARD MATERIAL/ANSI DESIGN

## Standard Bill of Materials

POS.	PART	CARBON STEEL DESIGN	STAINLESS STEEL DESIGN
1	Body	ASTM A216 WCB / A516 Gr.60	ASTM A351 CF8M / A276 Gr.316 Ti
2	Body Seat	ASTM A276 Gr.316 Ti	ASTM A351 CF8M / A276 Gr.316 Ti
	(Optional)	Stellite	Stellite
3	Disc	ASTM A216 WCB / A516 Gr.60	ASTM A351 CF8M / A276 Gr.316 Ti
4	Clamp Ring	ASTM A216 WCB / A516 Gr.60	ASTM A351 CF8M / A276 Gr.316 Ti
5	Laminated Seal	ASTM A276 Gr.316 Ti / Graphite	ASTM A276 Gr.316 Ti / Graphite
	(Optional)	Solid Lamination	Solid Lamination
6	Shaft	ASTM A276 Type 431	ASTM A276 Type 431
7	Lower Bearing Bush	ASTM A582 Type 303 hardchromed	ASTM A276 Gr.316 Ti hardchromed
	(Optional)	Zero leakage bearing	Zero leakage bearing
8	Lantern Ring	ASTM A582 Type 303 hardchromed	ASTM A276 Gr.316 Ti hardchromed
9	Gland Packing	Carbon Fibre	Carbon Fibre
10	Gland Follower	ASTM A582 Type 303 hardchromed	ASTM A276 Gr.316 Ti hardchromed
11	Gland Packing	Graphite	Graphite
12	Upper Bearing Bush	ASTM A582 Type 303 hardchromed	ASTM A276 Gr.316 Ti hardchromed
	(Optional)	Zero leakage bearing	Zero leakage bearing
13	Cover Seal	Graphite	Graphite
14	Cover	ASTM A216 WCB / A516 Gr.60	ASTM A351 CF8M / A276 Gr.316 Ti
15	Cover Screw	ASTM A193 Gr.B8	ASTM A193 Gr.B8
16	Gland Adjust. Stud	ASTM A193 Gr.B8	ASTM A193 Gr.B8
17	Gland Adjust. Nut	ASTM A194 Gr.8	ASTM A194 Gr.8
18	Gland Plate	ASTM A216 WCB / A516 Gr.60 / CF8M	ASTM A351 CF8M
19	Clamp Ring Screw	ASTM A193 Gr.B8	ASTM A193 Gr.B8
20	Gasket	Graphite	Graphite
21	Shaft Retainer	ASTM A582 Type 303 hardchromed	ASTM A276 Gr.316 Ti hardchromed
22	Cross Pin	ASTM A582 Type 303 hardchromed	ASTM A276 Gr.316 Ti hardchromed
23	Disc Drive Key	ASTM A276 Gr. 316Ti	ASTM A276 Gr. 316Ti
24	Thrust Ring	ASTM A582 Type 303	ASTM A276 Gr.316 Ti



# TYPICAL SPECIFICATIONS

## General

The valve shall be a 90-degree clockwise-to-close, nonrubbing, metal-to-metal-seated, zero-leakage bi-directional design. The valve shall be designed to require torque seating in order to achieve zero leakage.

The valve shall be designed in accordance with ANSI B16.34, B31.1 and B31.3 standards. The body, disc and shaft must be designed within the allowable stress levels defined by ASME Sections III and VII for the material used. The pressure rating of the valve and the end connections shall be per ANSI B16.5.

The face-to-face dimensions shall conform to either:

ISO 5752 Standard Double Flanged

ANSI B16.10 Double Flanged

API 609/MSS SP-68

The valve design shall be of all-metal construction, inherently firesafe and fire tested by a recognized independent agency.

The valve shall be (Select appropriate model):

Series I (ISO 5752 Double Flanged)

Series B (ANSI B16.10 Double Flanged)

Series A (API 609/MSS SP-68)

Series S Butt weld

## Valve Body and Seat

Flanged valve bodies shall be one-piece cast or fabricated. The valve seat shall be integral with the valve body. A carbon-steel-bodied valve shall have a stainless steel welded overlay for the body seat. Plated carbon steel seating surfaces are not allowed. The valve seat, whether integral or welded overlay, shall be machined together with the valve. The valve seat shall be of a slanted conical shape with a 25-degree inclined angle for nonrubbing, frictionless, nonjamming, zero-leakage, bi-directional shut-off capabilities.

## Valve Disc and Seat Ring

The valve disc shall be of the same material as specified for the valve body. The disc shall be driven by the means of machined fitted keys. NO PINNING of the disc to the shaft is allowed. Shaft bushings shall be located as close to the centerline of the valve as possible to absolutely eliminate all possible shaft deflection or bending. Disc designs that use a single hub are not allowed. Valves designed with the end of the bushings located up into the valve body are not allowed.

The seal ring shall consist of stainless steel lamination with a METALIC REINFORCEMENT to avoid washing out of the graphoil. The seal ring shall be machined in a parallel method to the laminates, and the outside diameter shall be machined to a conical 25-degree inclined plane. (Seal ring conical cone shall match the conical cone of the body seat.) NO ELLIPICAL SEAL RING SHALL BE ALLOWED. The seal ring shall be sealed to the disc and clamp ring by means of a flat graphoil gasket. NO SPIRAL-WOUND GASKETS ARE ALLOWED.

## Valve Shaft

The valve shaft shall be stainless steel. The shaft shall be a through shaft of one-piece construction. TWO-PIECE SHAFTS ARE NOT ALLOWED. No pinning of the shaft to the disc shall be allowed. Torque is delivered to the disc by means of machined keys. NO ADJUSTABLE THRUST BEARINGS ARE ALLOWED.

The valve shaft shall be designed with an external method to prevent the shaft from blowout in the unlikely event that the internal connections between the shaft and disc are broken. This design must be in compliance with API 609 requirements.

## Packing

An adjustable packing gland shall be supplied. The packing shall consist of two braided graphite antiextrusion rings top and bottom and a minimum of two die-formed graphite rings in the middle.

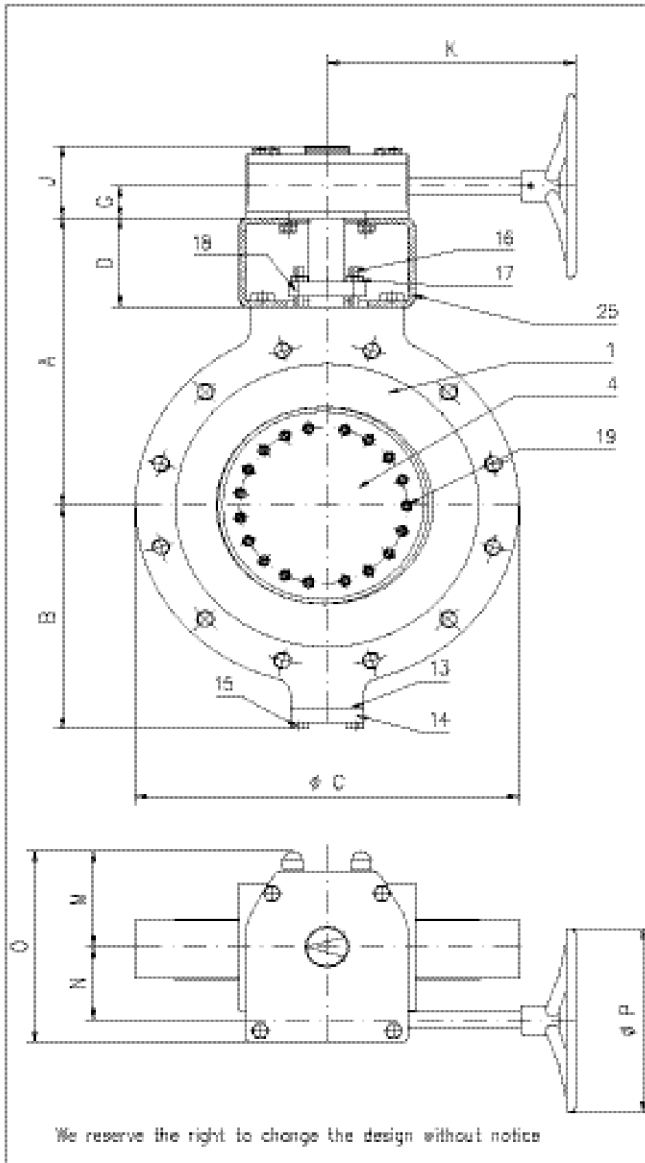
## Bearings

As a minimum, bearings shall be stainless steel with one ring of graphoil to act as a barrier for debris. For full bearing protection and zero emissions, a three-piece bearing set shall be supplied with three rings of graphoil rings on the interior and exterior of the three-piece bearing set. The three-piece bearing set shall be loaded by the load of the packing gland with a design to prevent any extrusion of the rings.

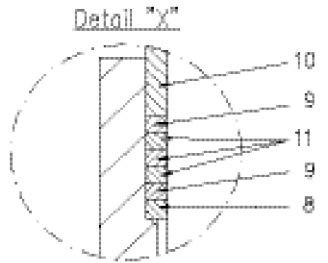
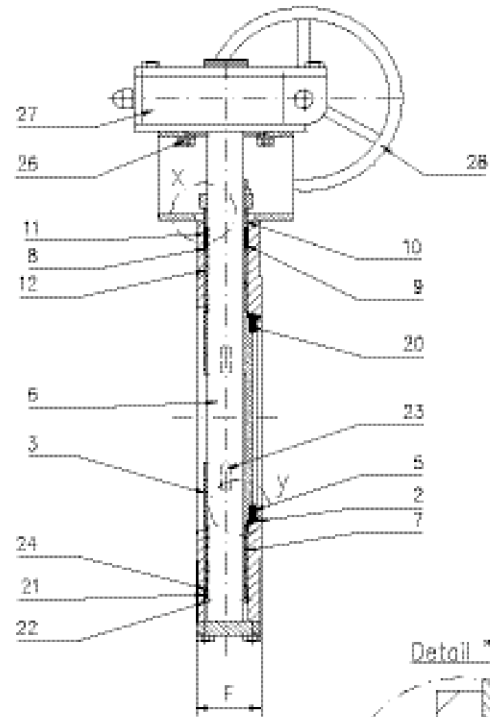
# SIZES AND BODY STYLES

3"-60" in ANSI 150-900 lb.  
Double flanged (ISO 5752)  
Lug (API 609)  
Gate valve (API B16.10)  
Buttweld





We reserve the right to change the design without notice



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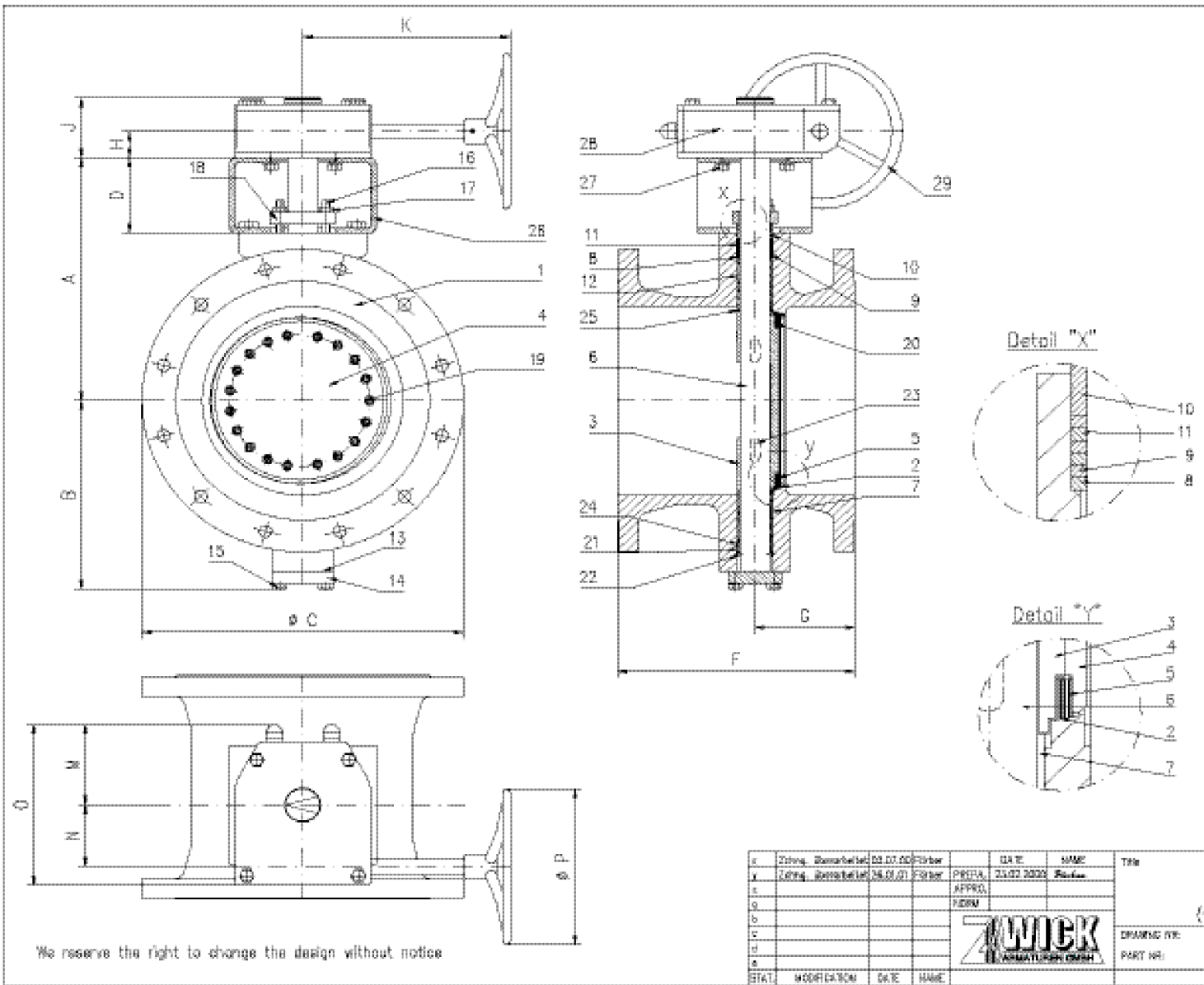
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# MODEL A1/ SERIES TRI-CON (With Gear Operator)

Lugged Body per API-609  
Units of Measure in Inches

		3"	4"	6"	8"	10"	12"	14"	16"	18"
ANSI 150	A	7.87	8.45	9.84	12.91	14.49	15.24	17.60	19.61	21.87
	B	5.35	5.94	7.32	8.39	9.69	11.97	13.07	15.47	17.47
	C	7.48	9.02	11.61	13.50	15.94	18.98	20.87	23.50	26.50
	D	3.15	3.15	3.15	4.72	4.72	4.72	5.91	5.91	5.91
	F	1.89	2.13	2.24	2.52	2.80	3.19	3.62	4.02	4.41
	G	1.06	1.06	1.59	1.59	1.65	1.65	1.89	2.17	2.17
	J	2.95	2.95	3.43	3.43	3.54	3.54	3.90	4.92	4.92
	K	8.58	8.58	10.04	10.04	10.94	11.45	12.83	15.24	15.24
	M	2.60	2.60	3.27	3.27	3.98	3.98	4.33	5.61	5.61
	N	1.77	1.77	2.80	2.80	3.39	3.39	4.11	5.12	5.12
	O	5.47	5.47	7.40	7.40	8.94	8.94	10.16	12.70	12.70
P	7.87	7.87	11.81	11.81	11.81	15.75	15.75	19.69	19.69	
ANSI 300	A	7.87	8.45	9.84	12.91	14.49	15.24	17.60	19.61	21.87
	B	5.35	5.94	7.32	8.39	9.69	11.81	13.07	15.47	17.47
	C	8.27	10.00	12.52	14.95	17.52	20.47	23.03	25.51	27.99
	D	3.15	3.15	3.15	4.72	4.72	4.72	5.91	5.91	5.91
	F	1.89	2.13	2.32	2.87	3.27	3.62	4.61	5.24	5.24
	G	1.06	1.06	1.65	1.65	1.89	2.17	2.17	2.32	2.32
	J	2.95	2.95	3.54	3.54	3.90	4.92	6.11	6.25	6.25
	K	8.58	8.58	10.94	11.45	12.83	14.45	17.40	18.70	18.70
	M	2.60	2.60	3.98	3.98	4.33	5.61	5.61	6.69	6.69
	N	1.77	1.77	3.39	3.39	4.11	5.12	8.31	10.35	10.35
	O	5.47	5.47	8.94	8.94	10.16	12.70	15.85	18.98	18.98
P	7.87	7.87	11.81	15.75	15.75	15.75	19.69	15.75	15.75	
ANSI 600	A	7.87	9.25	10.35	13.58	17.05	17.72	18.03	21.65	22.82
	B	5.43	6.54	8.03	9.57	11.73	12.24	13.50	15.71	17.47
	C	8.27	10.75	14.02	16.50	20.00	22.01	23.78	27.01	28.50
	D	3.15	3.15	3.15	4.72	5.91	5.91	5.91	5.91	5.91
	F	2.13	2.52	3.07	4.02	4.61	5.51	6.10	7.01	7.01
	G	1.59	1.59	1.89	2.17	2.17	2.32	2.32	3.33	3.33
	J	3.43	3.43	3.98	4.37	4.37	4.75	4.75	6.65	6.65
	K	9.41	11.30	14.96	18.70	19.09	20.79	23.95	25.16	25.16
	M	3.27	3.27	4.33	5.61	5.61	6.69	6.69	9.25	9.25
	N	2.80	2.80	4.11	8.31	8.31	10.35	14.05	16.97	16.97
	O	7.40	7.40	10.16	15.85	15.85	18.98	22.99	28.54	28.54
P	7.87	11.81	23.62	15.75	23.62	15.75	15.75	15.75	15.75	

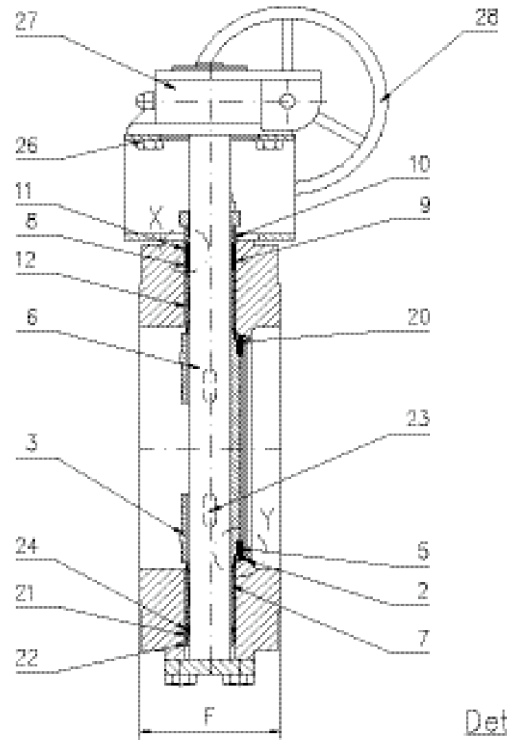
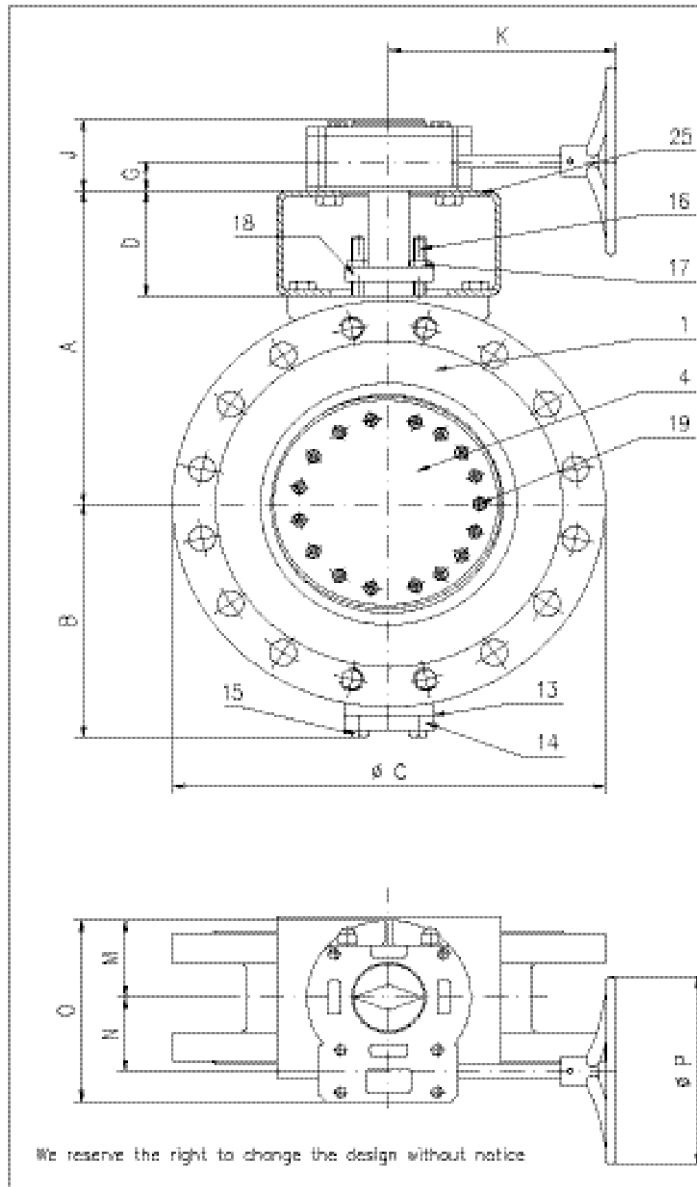


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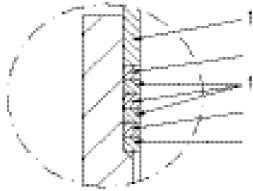
# MODEL B1/ SERIES TRI-CON (With Gear Operator)

Double Flanged Gate Valve  
Units of Measure in Inches

		3"	4"	6"	8"	10"	12"	14"	16"	18"
ANSI 150	A	7.87	8.46	9.84	12.91	14.49	15.24	17.60	19.61	21.87
	B	5.35	5.94	7.32	8.39	9.69	11.97	13.07	15.42	17.17
	C	7.48	9.02	11.61	13.50	15.94	18.98	20.87	23.90	26.87
	D	3.15	3.15	3.15	4.72	4.72	4.72	5.91	5.91	5.91
	F	7.99	9.02	10.51	11.50	12.99	14.02	15.00	15.98	15.98
	G	3.54	3.94	4.02	4.13	5.71	5.91	5.79	6.10	6.10
	H	1.06	1.06	1.59	1.59	1.65	1.65	1.89	2.17	2.17
	J	2.96	2.96	3.43	3.43	3.54	3.54	3.90	4.92	4.92
	K	8.58	8.58	10.04	10.04	10.94	11.46	12.83	15.24	15.24
	M	2.60	2.60	3.27	3.27	3.98	3.98	4.33	5.61	5.61
	N	1.77	1.77	2.80	2.80	3.39	3.39	4.11	5.12	5.12
	O	5.47	5.47	7.40	7.40	8.94	8.94	10.16	12.70	12.70
P	7.87	7.87	11.81	11.81	11.81	15.75	15.75	19.69	19.69	
ANSI 300	A	7.87	8.46	9.84	12.91	14.49	15.24	17.60	19.61	21.87
	B	5.35	5.94	7.32	8.39	9.69	11.81	13.07	15.47	17.17
	C	8.27	10.00	12.52	14.96	17.52	20.47	23.03	25.51	27.87
	D	3.15	3.15	3.15	4.72	4.72	4.72	5.91	5.91	5.91
	F	11.14	12.01	15.87	16.50	17.99	19.76	30.00	32.99	33.99
	G	3.54	3.94	4.02	4.13	5.71	5.91	5.79	6.10	6.10
	H	1.06	1.06	1.65	1.65	1.89	2.17	2.17	2.32	2.32
	J	2.96	2.96	3.54	3.54	3.90	4.92	6.11	6.26	6.26
	K	8.58	8.58	10.94	11.46	12.83	14.46	17.40	18.70	18.70
	M	2.60	2.60	3.98	3.98	4.33	5.61	5.61	6.69	6.69
	N	1.77	1.77	3.39	3.39	4.11	5.12	8.31	10.35	10.35
	O	5.47	5.47	8.94	8.94	10.16	12.70	15.85	18.98	18.98
P	7.87	7.87	11.81	15.75	15.75	15.75	19.69	15.75	15.75	
ANSI 600	A	7.87	9.25	10.35	13.58	17.05	17.72	18.03	21.65	23.87
	B	5.43	6.54	8.03	9.57	11.73	12.24	13.50	15.71	17.17
	C	8.27	10.75	14.02	16.50	20.00	22.01	23.78	27.01	29.87
	F	14.02	17.01	22.01	25.98	30.98	32.99	35.00	39.02	41.99
	G	7.05	8.74	4.13	5.71	10.62	17.00	-	19.51	-
	H	1.59	1.59	1.89	2.17	2.17	2.32	2.32	3.33	-
	J	3.48	3.48	3.98	4.37	4.37	4.76	4.76	6.65	-
	K	9.41	11.30	14.96	18.70	19.09	20.79	23.86	25.16	-
	M	3.27	3.27	4.33	5.61	5.61	6.69	6.69	9.25	-
	N	2.80	2.80	4.11	8.31	8.31	10.35	14.06	16.97	-
	O	7.40	7.40	10.16	15.85	15.85	18.98	22.99	28.54	-
	P	7.87	11.81	23.62	15.75	23.62	15.75	15.75	15.75	-



Detail "X"



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DRAWING NO:  
PART NO:



**MODEL I1/ SERIES TRI-CON  
(With Gear Operator)**

ISO 5752 Double Flanged  
Units of Measure in Inches

		3"	4"	6"	8"	10"	12"	14"	16"	18"
<b>ANSI 150</b>	A	7.87	8.46	9.84	12.91	14.49	15.24	17.60	19.61	21.19
	B	5.35	5.94	7.32	8.39	9.69	11.97	13.07	15.47	17.97
	C	7.48	9.02	11.61	13.50	15.94	18.98	20.87	23.90	25.90
	D	3.15	3.15	3.15	4.72	4.72	4.72	5.91	5.91	5.91
	F	4.49	5.00	5.51	5.98	6.50	7.01	7.48	8.50	8.77
	G	1.06	1.06	1.59	1.59	1.65	1.65	1.89	2.17	2.17
	J	2.36	2.36	3.43	3.43	3.54	3.54	3.90	4.92	4.92
	K	8.58	8.58	10.04	10.04	10.94	11.46	12.83	15.24	15.24
	M	2.60	2.60	3.27	3.27	3.98	3.98	4.33	5.61	5.61
	N	1.77	1.77	2.80	2.80	3.39	3.39	4.11	5.12	5.12
	O	5.47	5.47	7.40	7.40	8.94	8.94	10.16	12.70	12.70
P	7.87	7.87	11.81	11.81	11.81	15.75	15.75	19.69	19.69	
<b>ANSI 300</b>	A	7.87	8.46	9.84	12.91	14.49	15.24	17.60	19.61	21.19
	B	5.35	5.94	7.32	8.39	9.69	11.81	13.07	15.47	17.97
	C	8.27	10.00	12.52	14.86	17.52	20.47	23.03	25.51	27.97
	D	3.15	3.15	3.15	4.72	4.72	4.72	5.91	5.91	5.91
	F	4.49	5.00	5.51	5.98	6.50	7.01	7.48	8.50	8.77
	G	1.06	1.06	1.65	1.65	1.89	2.17	2.17	2.32	2.32
	J	2.36	2.36	3.54	3.54	3.90	4.92	6.11	6.25	6.25
	K	8.58	8.58	10.94	11.46	12.83	14.45	17.40	18.70	18.70
	M	2.60	2.60	3.98	3.98	4.33	5.61	5.61	6.69	6.69
	N	1.77	1.77	3.39	3.39	4.11	5.12	8.31	10.35	10.35
	O	5.47	5.47	8.94	8.94	10.16	12.70	15.85	18.98	18.98
P	7.87	7.87	11.81	15.75	15.75	15.75	19.69	15.75	15.75	
<b>ANSI 600</b>	A	7.87	9.25	10.35	13.58	17.05	17.72	18.03	21.65	22.97
	B	5.43	6.54	8.03	9.57	11.73	12.24	13.50	15.71	17.97
	C	8.27	10.75	14.02	16.50	20.00	22.01	23.78	27.01	29.97
	D	3.15	3.15	3.15	4.72	5.91	5.91	5.91	5.91	5.91
	F	7.09	7.48	8.27	9.06	9.84	10.63	11.42	12.20	12.97
	G	1.59	1.59	1.89	2.17	2.17	2.32	2.32	3.33	-
	J	3.48	3.48	3.98	4.37	4.37	4.75	4.75	6.65	-
	K	9.41	11.30	14.96	18.70	19.09	22.91	23.85	25.15	-
	M	3.27	3.27	4.33	5.61	5.61	6.69	6.69	9.25	-
	N	2.80	2.80	4.11	8.31	8.31	10.35	14.06	16.97	-
	O	7.40	7.40	10.16	15.85	15.85	18.98	22.99	28.54	-
P	7.87	11.81	23.62	15.75	23.62	15.75	15.75	15.75	-	

## BOLTING DIMENSIONS

### MODEL A1 (LUGTYPE API 609 T.2)

DN SIZE	ANSI	Face to Face	Thread (per side)	Thread in shaft area (per side)
80 / 3"	150	48	4 x 5/8" – 11 UNC / 19mm / deep	–
	300	48	6 x 3/4" – 10 UNC / 19mm / deep	2 x 3/4" – 10 UNC / 9mm / deep
	600	54	6 x 3/4" – 10 UNC / 20mm / deep	2 x 3/4" – 10 UNC / 9mm / deep
100 / 4"	150	54	8 x 5/8" – 11 UNC / 20mm / deep	–
	300	54	8 x 3/4" – 10 UNC / 22mm / deep	–
	600	64	8 x 7/8" – 9 UNC / 21mm / deep	–
150 / 6"	150	57	8 x 3/4" – 10 UNC / 22mm / deep	–
	300	59	10 x 3/4" – 10 UNC / 22mm / deep	2 x 3/4" – 10 UNC / 9mm / deep
	600	78	10 x 1" – 8 UNC / 25mm / deep	2 x 1" – 8 UNC / 10mm / deep
200 / 8"	150	64	8 x 3/4" – 10 UNC / 25mm / deep	–
	300	73	12 x 7/8" – 9 UNC / 27mm / deep	–
	600	102	10 x 1 1/8" – 8 UNC / 35mm / deep	2 x 1 1/8" – 8 UNC / 22mm / deep
250 / 10"	150	71	12 x 7/8" – 9 UNC / 30mm / deep	–
	300	83	12 x 1" – 8 UNC / 30mm / deep	4 x 1" – 8 UNC / 19mm / deep
	600	117	12 x 1 1/4" – 8 UNC / 47mm / deep	4 x 1 1/4" – 8 UNC / 19mm / deep
300 / 12"	150	81	12 x 7/8" – 9 UNC / 34mm / deep	–
	300	92	12 x 1 1/8" – 8 UNC / 35mm / deep	4 x 1 1/8" – 8 UNC / 33mm / deep
	600	140	16 x 1 1/4" – 8 UNC / 48mm / deep	4 x 1 1/4" – 8 UNC / 19mm / deep
350 / 14"	150	92	12 x 1" – 8 UNC / 40mm / deep	–
	300	117	16 x 1 1/8" – 8 UNC / 50mm / deep	4 x 1 1/8" – 8 UNC / 23mm / deep
	600	155	16 x 1 3/8" – 8 UNC / 60mm / deep	4 x 1 1/8" – 8 UNC / 24mm / deep
400 / 16"	150	102	12 x 1" – 8 UNC / 40mm / deep	4 x 1" – 8 UNC / 28mm / deep
	300	133	16 x 1 1/4" – 8 UNC / 55mm / deep	4 x 1 1/4" – 8 UNC / 27mm / deep
	600	178	16 x 1 1/2" – 8 UNC / 57mm / deep	4 x 1 1/2" – 8 UNC / 16mm / deep
450 / 18"	150	114	12 x 1 1/8" – 8 UNC / 43mm / deep	4 x 1 1/8" – 8 UNC / 24mm / deep
	300	149	20 x 1 1/4" – 8 UNC / 55mm / deep	4 x 1 1/4" – 8 UNC / 26mm / deep
	600	200	16 x 1 5/8" – 8 UNC / 65mm / deep	4 x 1 5/8" – 8 UNC / 29mm / deep
500 / 20"	150	127	16 x 1 1/8" – 8 UNC / 43mm / deep	4 x 1 1/8" – 8 UNC / 18mm / deep
	300	159	20 x 1 1/4" – 8 UNC / 48mm / deep	4 x 1 1/4" – 8 UNC / 30mm / deep
	600	215	20 x 1 5/8" – 8 UNC / 65mm / deep	4 x 1 5/8" – 8 UNC / 18mm / deep
600 / 24"	150	154	16 x 1 1/4" – 8 UNC / 55mm / deep	4 x 1 1/4" – 8 UNC / 18mm / deep
	300	181	20 x 1 1/2" – 8 UNC / 57mm / deep	4 x 1 1/2" – 8 UNC / 34mm / deep

### MODEL I1 (DOUBLE FLANGE)

DN SIZE	ANSI	Face to Face	Thread
80 / 3"	150	114	–
	300	114	4 x 3/4" – 10 UNC / 9mm / deep
	600	180	4 x 3/4" – 10 UNC / 9mm / deep
100 / 4"	150	127	4 x 5/8" – 11 UNC / 19mm / deep
	300	127	4 x 3/4" – 10 UNC / 19mm / deep
	600	190	4 x 7/8" – 9 UNC / 21mm / deep
150 / 6"	150	140	4 x 3/4" – 10 UNC / 19mm / deep
	300	140	4 x 3/4" – 10 UNC / 20mm / deep
	600	210	4 x 1" – 8 UNC / 25mm / deep
200 / 8"	150	152	4 x 3/4" – 10 UNC / 25mm / deep
	300	152	4 x 7/8" – 9 UNC / 21mm / deep
	600	230	4 x 1 1/8" – 8 UNC / 35mm / deep
250 / 10"	150	165	4 x 7/8" – 9 UNC / 30mm / deep
	300	165	4 x 1" – 8 UNC / 30mm / deep
	600	250	4 x 1 1/4" – 8 UNC / 47mm / deep
300 / 12"	150	178	4 x 7/8" – 9 UNC / 34mm / deep
	300	178	4 x 1 1/8" – 8 UNC / 35mm / deep
	600	270	4 x 1 1/4" – 8 UNC / 48mm / deep
350 / 14"	150	190	4 x 1" – 8 UNC / 40mm / deep
	300	190	4 x 1 1/8" – 8 UNC / 50mm / deep
	600	290	4 x 1 3/8" – 8 UNC / 60mm / deep
400 / 16"	150	216	4 x 1" – 8 UNC / 40mm / deep
	300	216	4 x 1 1/4" – 8 UNC / 55mm / deep
	600	310	4 x 1 1/2" – 8 UNC / 57mm / deep
450 / 18"	150	222	4 x 1 1/8" – 8 UNC / 43mm / deep
	300	222	4 x 1 1/4" – 8 UNC / 55mm / deep
	600	330	4 x 1 5/8" – 8 UNC / 65mm / deep
500 / 20"	150	229	4 x 1 1/8" – 8 UNC / 43mm / deep
	300	229	4 x 1 1/4" – 8 UNC / 48mm / deep
	600	350	4 x 1 5/8" – 8 UNC / 65mm / deep
600 / 24"	150	257	4 x 1 1/4" – 8 UNC / 55mm / deep
	300	257	4 x 1 1/2" – 8 UNC / 57mm / deep
	600	390	4 x 1 7/8" – 9 UNC / 60mm / deep
700 / 28"	150	292	4 x 1 1/4" – 8 UNC / 55mm / deep
	300	292	4 x 1 5/8" – 8 UNC / 65mm / deep
	600	470	4 x 2" – 8 UNC / 76mm / deep
750 / 30"	150	318	4 x 1 1/4" – 8 UNC / 55mm / deep
	300	318	4 x 1 3/4" – 10 UNC / 63mm / deep
	600	470	4 x 2" – 8 UNC / 76mm / deep
800 / 32"	150	470	4 x 1 1/2" – 8 UNC / 63mm / deep
	300	328	4 x 1 7/8" – 9 UNC / 60mm / deep
	600	328	4 x 1 1/2" – 8 UNC / 63mm / deep
1000 / 40"	150	330	4 x 1 1/2" – 8 UNC / 63mm / deep

## HOW TO ORDER MODEL NUMBERS/ANSI

Designation	Size	Pressure	Body & Disc Material	Shaft Material	Packing	Lamination Material	Execution
A1= API 609 Lug Type	0080 = 3"	X = ANSI 150	X = A 352 LCB	A = A 479 T 431	1 = Graphite	1 = Stainless Steel / Graphite	A = Standard
B1= B16.10 Gate Valve Double Flange	0100 = 4"	Y = ANSI 300	Y = A 351 CF8M	B = A 276 Gr. 316Ti	2 = PTFE	2 = Stainless Steel All-Metal Lamination	B = Inconel Seal
I1= ISO 5752 Double Flange	0150 = 6"	Z = ANSI 600	Z = A 216 WCB	C = AISI T 660	3 = Kalrez	3 = Stainless Steel / PTFE	C = Ring Type sec. To ASME
S1= Buttweld	0200 = 8"	W = ANSI 900	D = A 276 Gr. 316Ti	D = Duplex	4 = Spedel	4 = Hastelloy / Graphite	D= High Cycle Bearing
W1= Wafer	0250 = 10"		E = A 276 T 304	E = A 276 T 304		5 = Spedel	E= Sealed Box Design
	0300 = 12"		F = A 276 T 303	F = A 276 T 303		6 = Duplex / Graphite	F= Stellite Seal
	0350 = 14"		G = A 217 WCB	G = Alloy 904L		7 = Inconel / Graphite	H= Combination
	0400 = 16"		H = Hastelloy C	H = Hastelloy C		8 = Hastelloy	I= Hastelloy seal
	0450 = 18"		I = Inconel	I = Inconel		9 = Duplex	J= Inconel seal
	0500 = 20"		J = Duplex	J = A 276 T 316		0 = Inconel	N= Duplex seal
	0600 = 24"		K = A 276 T 316L	K = A 479 T 321			V= Extension
	0750 = 30"		L = A 182 F12	S = Special			S= Special
	0900 = 36"		M = A 351 CF8				
	1200 = 48"		N = A 351 CF8C				
			S = Special				

Contents sub



## APPLICATIONS

Zwick Tri-Con valves are used in demanding industries. From applications with oxygen up to exhausted gases, cryogenic and superheated steam and also in widely used chemical processes, Tri-Con valves are proven throughout a wide range of industries.

### Refining

- Desulphurization Systems and Tail Gas Treaters
- Steam
- Oil & Refined Product Storage
- Hot Cracking Gases
- Flare Gas
- Light Ends Isolation

### Petrochemical Plants

- Propylene Plant Equipment Isolation
- Oxygen & Hydrogen Services
- Ethylene Cracking Plants
- PSA & Molecular Sieves Switching Valves
- Flare Isolation
- CO<sub>2</sub>
- Butadiene & Styrene Plants

### Offshore

- Fixed Equipment Isolation
- Fire Water Systems
- CO<sub>2</sub> Switching Valves
- Crude Oil Isolation

### Power

- Steam Isolation
- Condenser Cooking
- Pump Isolation
- Fuel Gas Isolation

### Pulp & Paper

- Lime & Slurries
- Steam Isolation, Boiler Feed Water
- Green, Red & Black Liquors
- Oxygen Isolation

### Commercial Buildings & Energy Centers

- Hot Water Isolation
- Steam Isolation
- Fuel Gas Isolation

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