

Going to Extremes



**CRYSEAL TRIPLE OFFSET  
CRYOGENIC VALVE**

---

**IOMOTRITEC**  
THE ULTIMATE PROCESS VALVE

# At the leading edge

The need for positive, verifiable, maintainable shut-off in critical applications has led to the wide-spread use of triple offset butterfly valves in cryogenic applications. Traditionally these valves have been ball or plug valves, both of which penalise the user in terms of weight, operating torque, initial material cost and of course maintainability that translates into cost of ownership. The Tomoe Tritec 'Cryseal' range incorporates a triple offset high performance butterfly valve designed specifically to meet the requirements of international Cryogenic Valve standards, including BS6364(1984) and Shell SPE 77/306.

The Cryseal range has been extensively used on applications including low temperature gas and liquid service (Liquid Nitrogen, Oxygen & Hydrogen), LNG Tankers on process duties, Onshore LNG Production Plants and Onshore Gas Distribution Terminals.

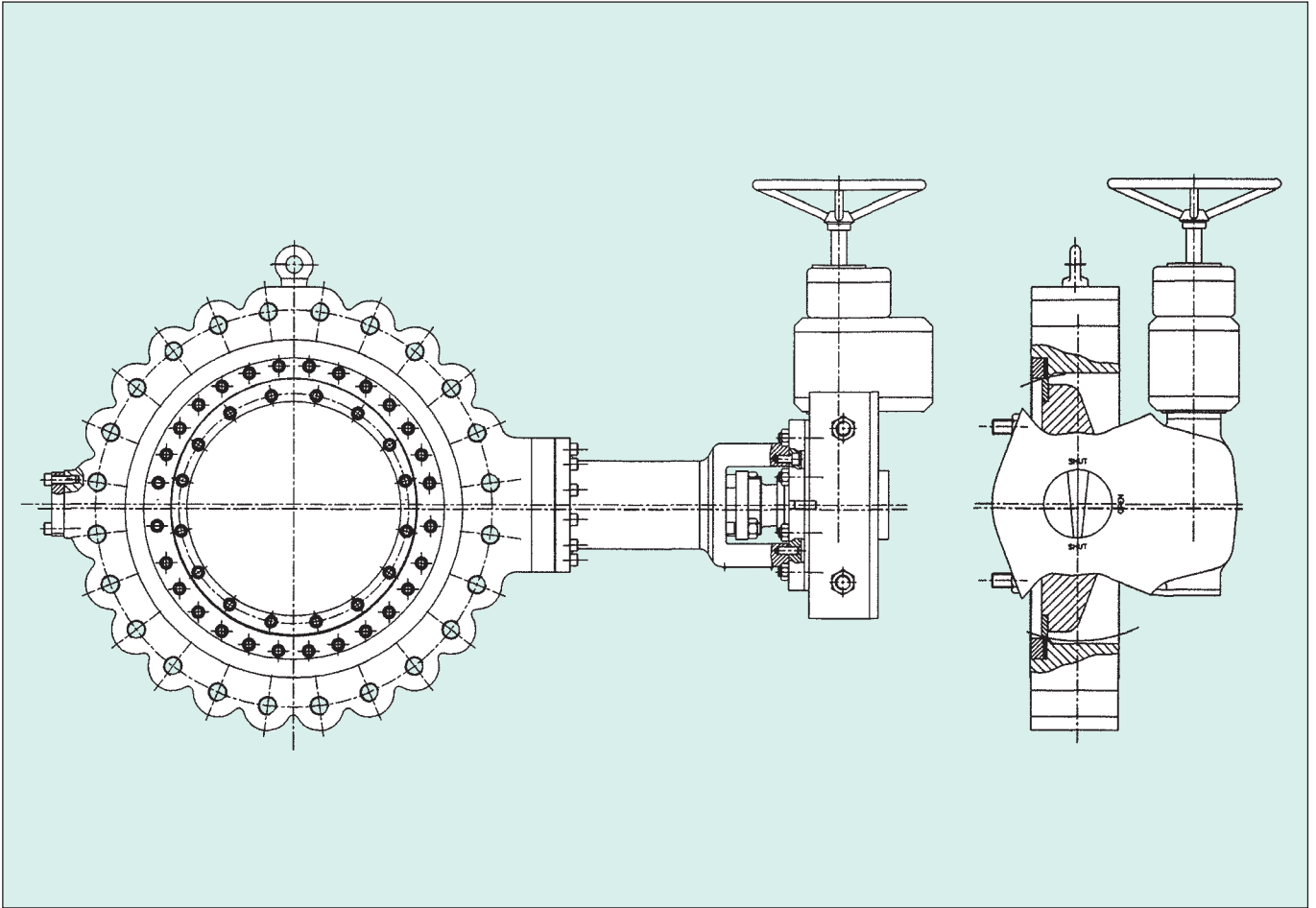


## Benefits

- Full pressure rating up to Class 2500
- Operating Temperature range to  $-196^{\circ}\text{C}$
- Firesafe to BS6755 part2, API 6FA, API 607 4th edition
- Field replaceable Body Seat and Disc Seal
- 1 piece shaft, no linkage or potential point of failure
- Anti blow-out mechanism at both top and bottom of shaft
- Extension bonnet dowelled both to valve and operator to eliminate potential loss of torque

## Options

- Helium Gland Emission testing available to EPA21, ISA-SP-93, ANSI/FCI 91-1
- Available de-greased and specially cleaned to customer standards for clean gas service.
- Standard extension bonnet length to BS6364 with other extension bonnet lengths to customer order.
- Any face to face, no pipe modifications required.
- Buttweld with or without top entry port.



### Cryogenic Valve Bill of Materials

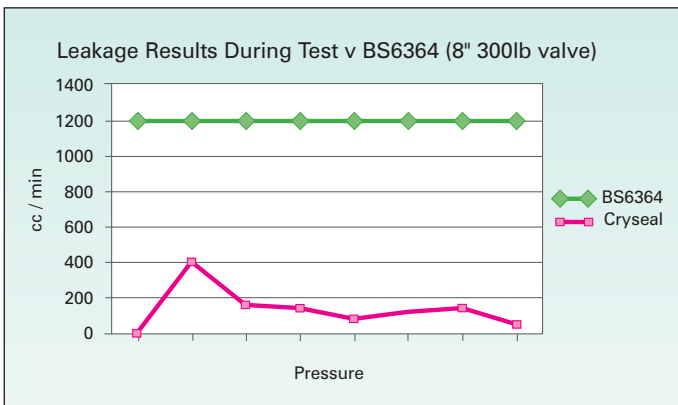
Component	For applications to $-46^{\circ}\text{C}$	For applications to $-196^{\circ}\text{C}$
Body	A352LCC	A351 CF8M
Disc	A352LCC	A351 CF8M
Body Seat	316SS/Graphite Laminate	Inconel 625/Graphite Laminate
Body Seat Retainer	316 Stainless Steel	316 Stainless Steel
Disc Seal	316 Stainless Steel	316 Stainless Steel
Shaft	17-4PH	Inconel 718
Shaft Pins	17-4PH	Inconel 718
Bearings	CR/316SS	CR/316SS
Thrust Ring	CR/316SS	CR/316SS
Thrust Pad	17-4PH	Inconel 718
End Cover	316 Stainless Steel	316 Stainless Steel
Gland Plate	316 Stainless Steel	316 Stainless Steel
Gaskets	Graphite (Supagraf)	Graphite (Supagraf)
Mounting Plate	Steel	Steel
Fixings	17-4PH	Inconel 718
Gland packing	Graphite (Supagraf)	Graphite (Supagraf)

# Cryogenic Testing

The Cryseal range of valves can be cryogenically tested in accordance with BS6364 and Shell SPE 77/306. These standards specify the requirements for the design, manufacture and testing of valves for cryogenic service.

During testing, the valve is immersed in liquid nitrogen and cooled to a temperature of  $-196^{\circ}\text{C}$ . Dry oil-free air or inert gas (usually helium) is passed through the valve and the seat is pressure tested in increments up to the maximum permissible working pressure. The valve gland and body/bonnet joint are also tested for leakage.

In tests, the Cryseal valve design has been shown to produce leakage rates significantly below those allowable to achieve the standard (see Graph).



*Cryseal valve undergoing low temperature liquid nitrogen test (photos courtesy Valve Testing Centre, Leeds University)*

**TOMOETRITEC**  
THE ULTIMATE PROCESS VALVE

Cryogenic Test Report  
to the Requirements of BS6364 Appendix A

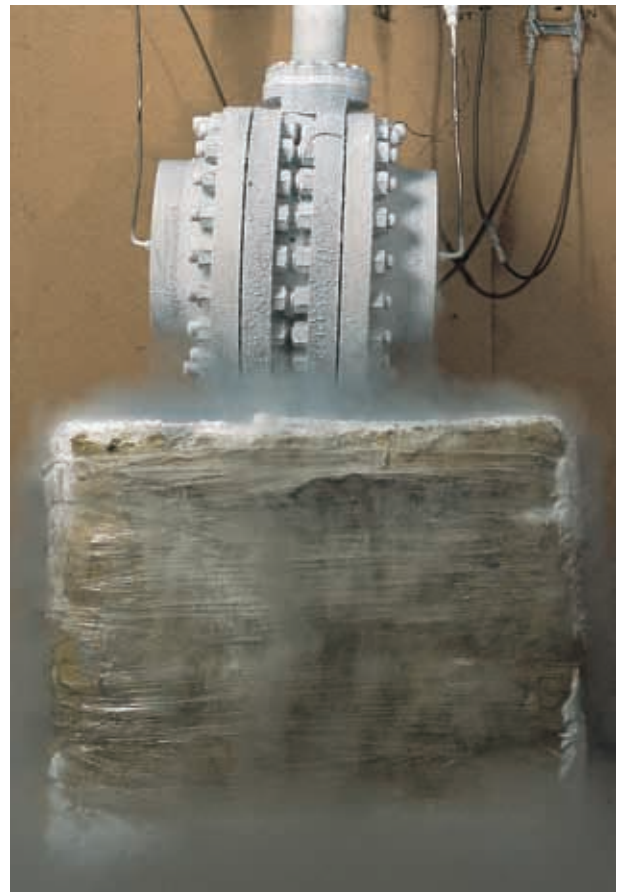
Valve: Champion Type 600 4200	Report No: 67-120
Size: 8 inch Pressure Class: 300lb Operation: Open Stop	Tested at: 20.08.10
Material: Body: CF8M Stem: CF8M Gland: 304L Seat: 304L	Tested at: Southampton Valve Test of origin
Manufacturer: TOMOETRITEC (UK) Ltd. 165218 + 1710	Tested by: Mr. Dave Gwynne

Test Equipment: See attached sheet 1  
Test procedure: See notes  
Test Result: See 1 of 2 (Note: tested in the preferred flow direction - using helium gas)

Assn	Temp	Test Method	Test Duration	Test Results	BS 6364 Requirements	Results
1	20°C	Seat	100sec	Microleak	< 1000cc/min	No leakage
2	-196°C	Seat	100sec	Microleak	< 1000cc/min	400 cc/min
3	-196°C	Torque	60sec	---	---	Cycle 20 times Minimum operating torque 1.5 - 1.8 Nm
4	-196°C	Body	100sec	Microleak	< 1000cc/min	1000 cc/min
5	-196°C	Gland	100sec	Microleak	Check for leaks	Zero
6	20°C	Body	27 sec	Microleak	< 1000cc/min	Microleak
7	20°C	Torque	60sec	---	Normal Closing Torque	6 Nm
8	20°C	Seat	---	---	---	No leakage at test temperature

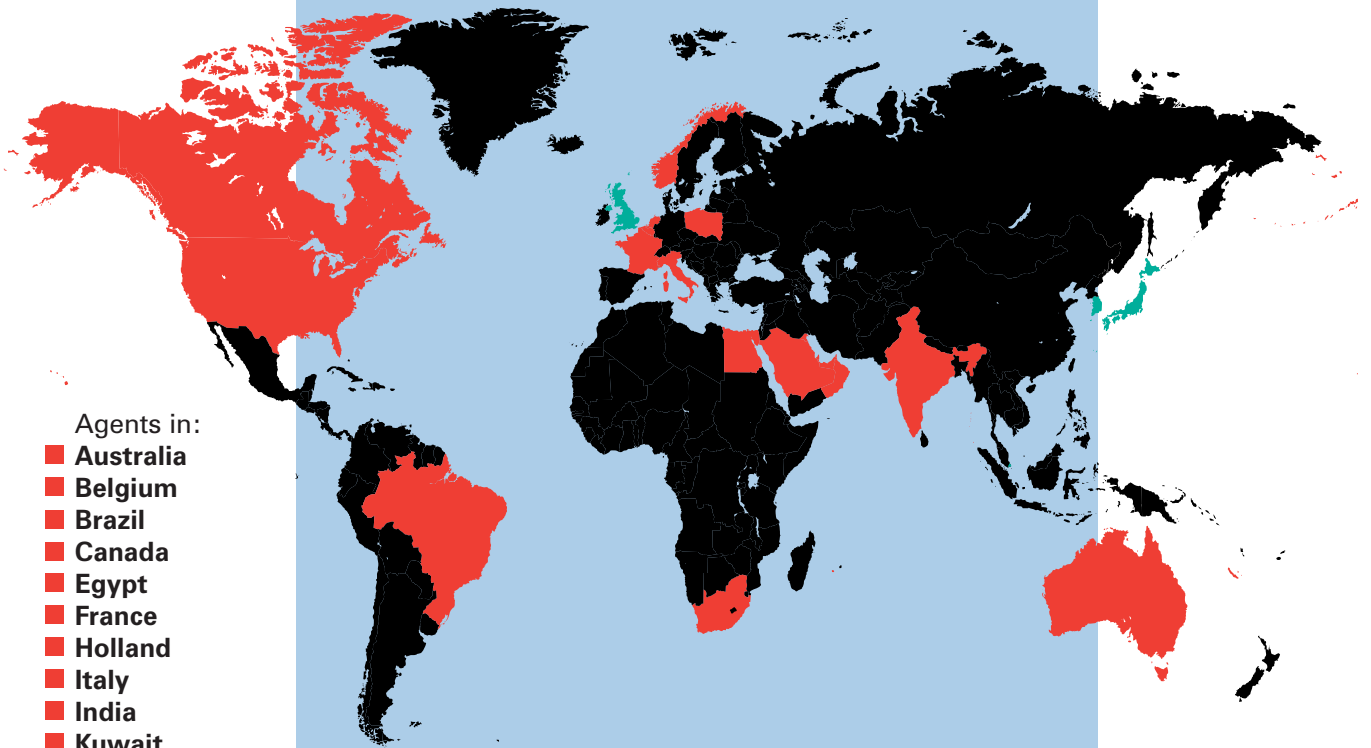
Notes: See attached sheet 1 & 2  
165218 + 1710  
165218 + 1710  
165218 + 1710

Signature: D. Gwynne  
D. Gwynne - Research Assistant



# Cryseal Reference List

Location	Application	Scope of Supply	Case History
Korea	Propane	3 x 14" wafer Stainless Steel Class 300	LPG receiving terminal, process duty.
Japan	Process Air	1 x 16" wafer Stainless Steel Class 300	Defence Agency test rig.
Japan	Process Air	1 x 20" wafer Stainless Steel Class 150	Defence Agency test rig.
Scotland	Hydrocarbon Gas	2 x 12" Double Flanged Stainless Steel Class 150	Sour gas storage facility. North Sea receiving plant.
Scotland	Hydrocarbon Gas	2 x 12" Double Flanged Stainless Steel Class 150	Sour gas storage facility. North Sea receiving plant.
UK	Liquid LFT	1 x 20" wafer Stainless Steel Class 300	Chemical plant isolation.
UK	Liquid LFT	1 x 3" wafer Stainless Steel Class 300	Chemical plant isolation.
UK	Liquid LFT	1 x 4" wafer Stainless Steel Class 300	Chemical plant isolation.
UK	Solid LFT	1 x 12" wafer Hastelloy / Incon Class 150	Chemical plant hopper isolation.
UK	Process Fluid	6 x 3" wafer Stainless Steel Class 300	Chemical plant low temperature gas isolation.



Agents in:

- Australia
- Belgium
- Brazil
- Canada
- Egypt
- France
- Holland
- Italy
- India
- Kuwait
- Norway
- Oman
- Poland
- Qatar
- Saudi Arabia
- South Africa
- U.A.E.
- U.S.A.

Contact the sales office for agents in your area

For enquiries, please contact:

### Tomoe Tritec Ltd.

Clearwater Road, Queensway Meadows Ind. Est.,  
Newport, South Wales NP19 4ST United Kingdom  
Tel: Main Reception +44 (0) 1633 274707  
Fax: Main Reception +44 (0) 1633 292600  
Tel: Sales Office +44 (0) 1633 292601  
Fax: Sales Office +44 (0) 1633 292605  
E-mail: Sales@TomoeTritec.co.uk  
www.tritecvalve.com • www.tomoetritec.com

#### International Sales Offices at:

(headquarters)

##### ■ Tomoe Valve Co. Ltd.

11th Floor Mitsui Bldg  
1-11-7 Utsubo Hommachi  
Nishi-Ku  
Osaka 550-0004  
Japan  
Telephone: +81 6 448 4320  
Telefax: +81 6 448 4330

##### ■ Tomoe Valve Ltd.

Estuary Road  
Queensway Meadows Ind. Est.  
Newport  
Gwent NP19 4SP  
United Kingdom  
Telephone: +44 (0) 1633 636800  
Telefax: +44 (0) 1633 636801

##### ■ Tomoe Valve S.E.A. PTE Ltd.

28 Third Lok, Yang Road  
Singapore 628 016  
Telephone: +65 899 5060  
Telefax: +65 899 5061



**TOMOETRITEC**  
THE ULTIMATE PROCESS VALVE