DUAL PLATE
CHECK VALVES
INNOVATION IN THE PIPELINE

GOODWIN
INTERNATIONAL LTD

www.checkvalves.co.uk
Goodwin International is the market leader in the design and manufacture of Dual Plate Check Valves for use in the world’s hydrocarbon, energy and process industries. With a track record of supply spanning over 30 years, Goodwin has developed an enviable reputation for quality and reliability of product at internationally competitive prices.

Based in the United Kingdom, Goodwin sells internationally exporting to over 50 countries. Through its network of agents and distributors, with some US$ 7,500,000 of inventory in 16 stocking locations worldwide, Goodwin offers outstanding support to its customers listed amongst whom are many of the world’s end users, including oil majors and national oil companies, and national and international engineering contractors.

**Goodwin Dual Plate Check Valves**

**6 Different Body Styles**
- Wafer (BR)
- Flanged (BFR)
- Solid Lug (BSR)
- Buttweld end (BWR)
- Buttweld end with access (BWA)
- Hub-ended (BHR)

**Sizes**
2” - 144” (50mm - 3600mm)

**Pressure Classes**
- ASME 150 - 2500
- API 2000 - 20000
- PN 10 - PN 400

**Materials**
- Ductile and Ni-Resist® Irons; Carbon Steels; Stainless Steels; Duplex and Super Duplex Stainless Steels; Aluminium Bronzes; High Nickel Alloys; Titanium.

**Features**
- Designed, manufactured, assembled and tested in accordance with Quality Assurance System accredited by BSI to BS EN ISO 9001.
- Certifiable in compliance with European Pressure Directive (PED) 97/23/EC and/or ATEX Directive 94/9/EC to meet customer requirements when specified.
- Designed and tested to API 594.
- All bodies and plates certified to BS EN 10204 3.1 as a minimum.
- Retainerless design as standard.
- No screwed body plugs - no leakpath to atmosphere - no fugitive emissions.
- Firetested design. Firetest approved and certified to API 6FA, API 6FD and BS EN ISO 10497.
## Major Project Successes

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Market Sector</th>
<th>Location</th>
<th>Customer</th>
<th>Engineering Contractor</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore Hydro-Desulphur Refinery</td>
<td>Refinery</td>
<td>Singapore</td>
<td>ExxonMobil Chemical Asia Pacific</td>
<td>JGC</td>
<td>2011</td>
</tr>
<tr>
<td>Algerian Oman Fertiliser</td>
<td>Fertilizer</td>
<td>Algeria</td>
<td>Algeria Oman Fertiliser Co.</td>
<td>MHI</td>
<td>2011</td>
</tr>
<tr>
<td>Yanbu Export Refinery</td>
<td>Refinery</td>
<td>Saudi Arabia</td>
<td>Saudi Aramco</td>
<td>SKEC</td>
<td>2011</td>
</tr>
<tr>
<td>Goliat FPSO</td>
<td>Oil</td>
<td>Norway</td>
<td>Eni Norge</td>
<td>HHI</td>
<td>2011</td>
</tr>
<tr>
<td>Bourage 3 Polyolefin Units</td>
<td>Gas</td>
<td>Petcham</td>
<td>Borouge</td>
<td>SEC</td>
<td>2011</td>
</tr>
<tr>
<td>Deen Dayal Wellhead Platform</td>
<td>Gas</td>
<td>India</td>
<td>Gujarat State Petroleum Corp</td>
<td>L &amp; T</td>
<td>2011</td>
</tr>
<tr>
<td>Jasmine</td>
<td>Gas</td>
<td>North Sea, UK</td>
<td>ConocoPhillips</td>
<td>Worley Parsons</td>
<td>2011</td>
</tr>
<tr>
<td>Barzan Onshore</td>
<td>Gas</td>
<td>Qatar</td>
<td>Rasgas</td>
<td>JGC</td>
<td>2012</td>
</tr>
<tr>
<td>BP Quad 204 Topsides and Hull</td>
<td>Oil</td>
<td>North Sea, UK</td>
<td>BP</td>
<td>HHI</td>
<td>2012</td>
</tr>
<tr>
<td>BP Quad 204 Turret</td>
<td>Oil</td>
<td>North Sea, UK</td>
<td>BP</td>
<td>SBM</td>
<td>2012</td>
</tr>
<tr>
<td>Majnoon Oil Field Development</td>
<td>Oil</td>
<td>Iraq</td>
<td>Shell Iraq Pet. Dev. BV</td>
<td>Petrofac</td>
<td>2012</td>
</tr>
<tr>
<td>Satoh Full Field Development</td>
<td>Oil</td>
<td>Abu Dhabi, UAE</td>
<td>ZADCO</td>
<td>Technip &amp; NPCC</td>
<td>2012</td>
</tr>
<tr>
<td>Thangshan LNG</td>
<td>LNG</td>
<td>China</td>
<td>CNPC</td>
<td>HQC</td>
<td>2012</td>
</tr>
<tr>
<td>Manroose BLP</td>
<td>Oil</td>
<td>North Sea, UK</td>
<td>Talisman Sinopec Energy (UK)</td>
<td>CB&amp;I</td>
<td>2012</td>
</tr>
<tr>
<td>Hebron GBS Topsides</td>
<td>Oil</td>
<td>Newfoundland</td>
<td>ExxonMobil</td>
<td>Worley Parsons</td>
<td>2012</td>
</tr>
<tr>
<td>Velemon</td>
<td>Gas</td>
<td>Norway</td>
<td>Statoil</td>
<td>SHI</td>
<td>2012</td>
</tr>
<tr>
<td>Queensland Curtis</td>
<td>LNG</td>
<td>Australia</td>
<td>BG / Origin</td>
<td>Bechtel</td>
<td>2012</td>
</tr>
<tr>
<td>Ichthys CPP Topsides &amp; Hull</td>
<td>Gas</td>
<td>Australia</td>
<td>Inpex</td>
<td>SHI</td>
<td>2012</td>
</tr>
<tr>
<td>Ichthys FPSO Topsides &amp; Hull</td>
<td>Gas</td>
<td>Australia</td>
<td>Inpex</td>
<td>DSME</td>
<td>2013</td>
</tr>
<tr>
<td>Prelude FLNG - Turret</td>
<td>LNG</td>
<td>Australia</td>
<td>Shell</td>
<td>Technip-Samsung</td>
<td>2013</td>
</tr>
<tr>
<td>Prelude FLNG Turret</td>
<td>LNG</td>
<td>Australia</td>
<td>Shell</td>
<td>SBM</td>
<td>2013</td>
</tr>
<tr>
<td>Hejra Dev. Platform</td>
<td>Oil</td>
<td>Denmark</td>
<td>Dong Energy</td>
<td>Technip</td>
<td>2013</td>
</tr>
<tr>
<td>Wheatstone LNG</td>
<td>LNG</td>
<td>Australia</td>
<td>Chevron</td>
<td>Bechtel</td>
<td>2013</td>
</tr>
<tr>
<td>Wasit Gas Dev. Programme</td>
<td>Gas</td>
<td>Saudi Arabia</td>
<td>Saudi Aramco</td>
<td>SKEC</td>
<td>2013</td>
</tr>
<tr>
<td>Petronas LNG Train 9</td>
<td>LNG</td>
<td>Malaysia</td>
<td>Petronas</td>
<td>JGC</td>
<td>2013</td>
</tr>
<tr>
<td>Upper Zakum 750K Project</td>
<td>Oil &amp; Gas</td>
<td>Abu Dhabi, UAE</td>
<td>ZADCO</td>
<td>NPCC/Technip</td>
<td>2013</td>
</tr>
<tr>
<td>Cygnus Alpha Platform</td>
<td>Gas</td>
<td>UK</td>
<td>GDF Gas De France</td>
<td>AMEC</td>
<td>2013</td>
</tr>
<tr>
<td>Atoha Nord TLP &amp; FPU</td>
<td>Oil</td>
<td>Congo</td>
<td>Total</td>
<td>HHI</td>
<td>2013</td>
</tr>
<tr>
<td>Shah Deniz Phase II</td>
<td>Gas</td>
<td>Azerbaijan</td>
<td>BP</td>
<td>KBR</td>
<td>2013</td>
</tr>
<tr>
<td>Martin Linge</td>
<td>Oil &amp; Gas</td>
<td>UK/Norway</td>
<td>Total</td>
<td>Technip</td>
<td>2013</td>
</tr>
<tr>
<td>Nyhamne Onshore Facilities</td>
<td>Gas</td>
<td>Norway</td>
<td>Shell</td>
<td>Kvaerner Stord AS</td>
<td>2013</td>
</tr>
<tr>
<td>West Qurna</td>
<td>Oil</td>
<td>Iraq</td>
<td>ExxonMobil</td>
<td>Fluor Daniel</td>
<td>2013</td>
</tr>
<tr>
<td>Jazan Refinery</td>
<td>Refinery</td>
<td>Saudi Arabia</td>
<td>Saudi Aramco</td>
<td>JGC</td>
<td>2014</td>
</tr>
<tr>
<td>Ivar Asen Field Development pdQ</td>
<td>Oil</td>
<td>Norway</td>
<td>Det Norske</td>
<td>SME/D</td>
<td>2014</td>
</tr>
<tr>
<td>Longford Gas Conditioning Plant</td>
<td>Gas</td>
<td>Australia</td>
<td>Esso</td>
<td>CB&amp;I</td>
<td>2014</td>
</tr>
<tr>
<td>Clashan Topsides modifications</td>
<td>Oil</td>
<td>UK</td>
<td>TAQA Bratani</td>
<td>AMEC</td>
<td>2014</td>
</tr>
<tr>
<td>Stampede</td>
<td>Oil</td>
<td>GoM, USA</td>
<td>Hess</td>
<td>Mustang</td>
<td>2014</td>
</tr>
<tr>
<td>Rizhao to Yiheng Oil Pipeline</td>
<td>Pipeline</td>
<td>China</td>
<td>Sinopec</td>
<td>East Pipeline Design Inst.</td>
<td>2014</td>
</tr>
<tr>
<td>Zakum Oil Lines Replacement (ZKOL)</td>
<td>Gas</td>
<td>Abu Dhabi, UAE</td>
<td>Adma Opco</td>
<td>NPCC</td>
<td>2014</td>
</tr>
<tr>
<td>Shaybah CPF</td>
<td>Gas</td>
<td>Saudi Arabia</td>
<td>Aramco</td>
<td>Samsung Engineering</td>
<td>2014</td>
</tr>
<tr>
<td>Umrn Wu'al Ammonia Plant</td>
<td>Chemical</td>
<td>Saudi Arabia</td>
<td>Ma'aden</td>
<td>Daelim</td>
<td>2014</td>
</tr>
<tr>
<td>CO2 Injection Plants</td>
<td>Oil</td>
<td>Abu Dhabi, UAE</td>
<td>ADCO</td>
<td>Alsa</td>
<td>2014</td>
</tr>
<tr>
<td>Incalhussa</td>
<td>Gas</td>
<td>Bolivia</td>
<td>Total</td>
<td>Tecno</td>
<td>2015</td>
</tr>
<tr>
<td>Tuz Gozu UGS</td>
<td>Gas</td>
<td>Turkey</td>
<td>Botas</td>
<td>China Tianchen Eng. Corp.</td>
<td>2015</td>
</tr>
<tr>
<td>Yamal LNG</td>
<td>LNG</td>
<td>Russia</td>
<td>Novatek / Total / CNPC</td>
<td>TMSI</td>
<td>2015</td>
</tr>
<tr>
<td>Egina FPSO Topsides and Hull</td>
<td>Oil</td>
<td>Nigeria</td>
<td>Total</td>
<td>SHI</td>
<td>2015</td>
</tr>
</tbody>
</table>
Installation Between End Connections

Type BR
Wafer

Type BFR
Flanged

Type BSR
Solid Lug

Type BHR
Hub Ended

Type BWR
Buttweld End

Type BWA
Buttweld End with access

BR, BFR & BSR face-to-face dimensions to API 594.
BH & BHR face-to-face dimensions to manufacturer’s standard.
BWR & BWA face-to-face dimensions to manufacturer’s standard.
Goodwin’s Check Valve manufacturing facilities in Stoke-on-Trent, England, comprises of a Steel and Super Nickel alloy foundry (Goodwin Steel Castings) and a well equipped CNC machine shop with full design, fabrication, inspection and test facilities (Goodwin International).

The ISO 9001 foundry specialises in producing high integrity, pressure vessel castings from a few kilos to 18,000 kg in weight. The materials cast by the foundry include ductile and Ni-Resist® irons, carbon and low alloy steels, stainless steels, duplex stainless steels and super nickel alloys such as Hastelloy® and Alloy 625. Goodwin’s ability to produce the special alloys is enhanced by its in-house 10 tonne AOD refining furnace.

The design, machine and assembly shops cover some 24,500m² and are equipped with 42 modern CNC machine tools that are the core of the production and are supplemented by many conventional machine tools.

The test facilities include six hydraulic hydrostatic test rigs, the largest of which has a 2500 tonne hydraulic ram, and two pneumatic test rigs. Cryogenic testing is also carried out on site where valves are cooled by liquid nitrogen at -196°C and leak tested with helium gas.

Valve design is carried out using 3D CAD and is verified on computers utilising finite element analysis and Flow Simulation programs. Both the foundry and the design, machining, assembly and test facilities are audited and accredited to BS EN ISO 9001.

Extensive in-house testing and laboratory facilities are available including:-

- Hydrostatic Pressure Testing (25000psig/1725barg)
- High Pressure Gas Testing (15000psig/1035barg)
- Low Temperature (-46°C) and Cryogenic Temperature (-196°C) Pressure Testing
- High Temperature Pressure Testing to 550°C
- Helium Leak Testing (Mass Spectrometer)
- Tensile / Bend / Impact / Hardness / Testing
- Corrosion Testing
- Metallography
- Magnetic Particle
- Dye Penetrant
- Ultrasonic Examination
- Radiography
- Chemical Analysis
- Alloy Verification / Positive Material Identification (PMI)
- Feritscope Verification
- CMM Measurement
- Laser Measurement
Engineering Contractors

AIEL
AIR LIQUIDE
AIR PRODUCTS
ALSA
AKER SOLUTIONS
ALLIANCE
AMEC
ATLANTICO SUL
BANTREL
BECHTEL
BLACK & VEATCH
BOC
CB & I LUMMUS
CCDC
CHYODA
CLOUGH
COLT ENGINEERING
CTC
DAEUM
DAEWOO
DEGREMONT
DECOSA
DOOSAN
EL
ENRPI
ENTREPOSE
FLOUOR
FOSTER WHEELER
GEC ALSTOM
GROOTINT
GS ENGINEERING
HANWHA
HITACH ZOSEN
HYUNDAI
I V OIL & GAS
ICA FLUOR
IDEX
IH GUSTO
JACOBS
JGC
JP KENNY
KAWASAKI
KBR
KEPPEL FELS
KTKINETICS
KVWERNER STORD
LARSON & TOUBRO
LINDE
LITWIN
LURGI
MACCHI
MCDERMOTT
MITSUI
MITSUBISHI
MAHE
MODEC
NIEEN STEEL
NPCC
PT TRIPATRA
PENANG SHIPBUILDING
PETROAC
PEYRONET
PT GUANAMUSA
PUNU LLOYD
QUIP
RANNHIL WORLEY
ROSENBERG
SAIPEM
SAXINETHGAE ENGINEERING
SAMUNG
SAMSUNG
SEC
SEMBAWANG ENGINEERING
SHAW
SIME DARBY
SIME SEMBAWANG
SK ENGINEERING
SMOE
SNC LAVALIN
SOFEC
SOFRESID
STANTEC
STOLT OFFSHORE
SUMITOMO
TARGET E & C
TECHINT
TECNICAS REUNIDAS
TECPETROL
THAI NIPPON STEEL
THYSSEN KRUPP Uhde
TOYO ENGINEERING
TI OCEAN
NUDE SHEDDEN
UNIVERSAL PEGASUS
VEOLIA
WEIR WESTGARTH
WILBROS
WOOD GROUP PSN
WOOD GROUP MUSTANG
WOLEY PARSONS

End Users

ADCO
ADNOC
ADWEA
AGIP
AIR LIQUIDE
ALSTOM
AMABADA HESS
ANDARAKO
APACHE
ARABIAN CHLOR VINYL
BAPETCO
BASF
BIG
BHP
BORBOUGE
BOTAS
BP
CHEVRON
CNOC
CNPC
CNRL
CON EDISON
CONOCOPHILLIPS
CTOC
DOELPHIN ENERGY
DONG ENERGY
DOH CHEMICAL
DUKE POWER
DUPONT
EASTMAN CHEMICALS
ECOPETROL
EGAT
EGPC
EMEPHI
ENagas
ENRIQUE
ENCANA
ENI
EXXON NETGEAS
EXXONMOBIL
FORMOSA
GAIL
GASCOCO
GASFLUX
GAZ DE FRANCE
GDF SUEZ
GE
GENIEF
GIMAO KINDEL
HSS CORP
HUSKY OIL
IMPERIAL OIL
INPEX
IOCL
IPCL
JUPC
KNPC
KOKC
KOGAS
LASMOS
MAARES
MAERSK
MARATHON
METHANEX
MEW (MAN)
MEW (KUWAIT)
MINERA ESCONDIDA
MURPHY OIL
NCPCO
NLNG
NNPC
NOVA CHEMICALS
OCCIDENTAL
OMV
ONGC
ORIGIN ENERGY
ORX
OSK
PDO
PDVSA
PELONI
PEMEX
PERTAMINA
PETROCHINA
PETRONAS
PETRONI
PETRUIN
POSCO
PPT
PITTEP
QAFAC
QAFCO
QAPCO
QILGQ (QATARGAS)
QPC
QVC
RASGAS
REUNANCE
REPSOL
SABIC
SAXINETHGAE ENERGY
SANTOS
SASOL
SAUDI ARAMCO
SAUDI METHANOL
SEC
SEGAS
SHELL
SINOPEC
SK CORP
SONATRACH
STATOCO
SUNCOR
SYNCRUDE

ddE tle BSS tll EAN p Or OF SdE E EAN dE

Industries Served

On & Offshore Oil & Gas Production
Refinery
Petrolchemical
Chemical
Fertilizer
Gas Plant
GTL
LNG
Onshore LNG Plants

Typical Applications

Pump discharge
Compressor suction
Heat Exchangers
Reactors
Separators
Vessels
High / low pressure
High / low temperature
Cryogenic
Erosive
Corrosive
Flammable
Toxic

Chemicals
Petrochemicals
Hydrocarbons
Gases
Liquids
Steam
Seawater

Newstead Industrial Estate, Trentham, Stoke-on-Trent, ST4 8HU, England
Tel +44 (0)1782 220000  Fax +44 (0)1782 208060  Email checkvalves@goodwingroup.com

www.checkvalves.co.uk

GIV-049 DPCV - 5000 15