

# CERTIFICATION & TESTING

A Quality Management System accredited by BSI in accordance with BS EN ISO 9001:2000 is maintained

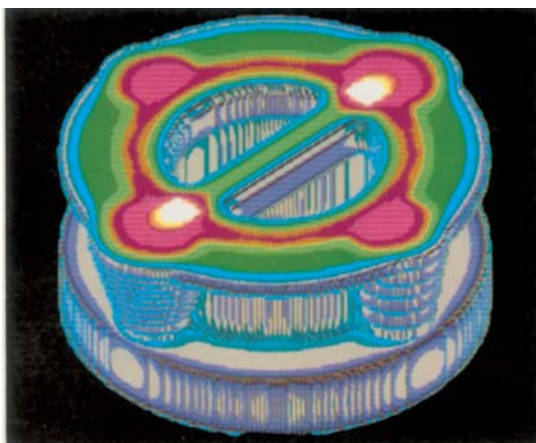
### The Standard GOODWIN Check Valve features:-

- Designed, manufactured, assembled and tested in accordance with Quality Assurance System accredited by BSI to BS EN ISO 9001:2000
- Designed and tested to API 594.
- All bodies, plates and trim material are certified to BS EN 10204 3.1 as a minimum.
- All new castings are sample approved by dimensional checks (wall thickness etc.) and radiography, 100% coverage to ASTM E446/E186, Level 2 minimum, or ultrasonic testing to ASTM A609, Level "A".
- Surface finish to MSS SP 55 on cast bodies and plates.
- Traceability per melt (not batch of ingot) is maintained throughout all manufacturing processes for bodies, plates and trim.
- All valves are hydrostatically tested (Shell and Seat) to API 598 with unique traceability to certification.
- Firetest approved and certified to BS 6755 Pt2, API 6FA & API 6FD for pressure classes ANSI 150lb to ANSI 900lb
- Additional testing to be specified on the inquiry and Purchase Order.

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

- Pressure Testing
- Flow Testing
- Low Temperature (-46°C) and cryogenic temperature (-196°C) Pressure Testing
- High Temperature Pressure Testing to 550°C
- High Pressure Gas Testing
- 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)
- Ferriscope Verification
- Finite Element Analysis

Other examination Methods or Acceptance criteria to comply with the customer's own specification may be substituted if agreed with the Company at the time of quotation.



### COMPUTER MODELLING

Goodwin Steel Castings model all cast Valve Bodies on their finite element analysis computer. This computer modelling system develops casting feeding and gating designs that will ensure "right first time" production of high integrity castings, when metal is actually poured. The finite element analysis solidification program includes both thermal analysis and X-ray simulation. It is, therefore, possible to predict where defects will occur in a given casting and engineer them out by adjustment of the riser and gating system on the casting. This optimisation process is a feature of Goodwin Steel Castings' Quality Assurance system, accredited by BSI to BS EN ISO 9001:2000. Goodwin Steel Castings was the first steel foundry in Europe to develop and be accredited by BSI (British Standards Institute) for a design system, which gives rise to delivered on time, higher integrity castings, at more competitive prices.



### RADIOGRAPHY

Radiography is conducted inhouse using 8 MeV Linear Accelerator X-Ray machine with developing and viewing facilities

Method: ASME V Art 2 or ASME B16.34 Appendix 1

Options: 100% of All castings  
100% of 10% of castings  
Critical Areas\* of All castings  
Critical Areas\* of 10% of castings

Acceptance: ASME VIII Div 1 Appendix 7 or ASME B16.34 Appendix 1

\*Critical Areas as defined by ASME B16.34

The Company's operators / interpreters for all forms of Non-Destructive Testing are qualified to SNT Level2



## MAGNETIC PARTICLE/ DYE PENETRANT

Method: MPI to ASME V Art 7 or ASME B16.34 Appendix II  
DPI to ASME V Art 6 or ASME B16.34 Appendix III

Options: 1) 100% of All castings/forgings  
2) 100% of 10% of castings/forgings  
3) 100% of all machined surfaces

Acceptance: MPI to ASME VIII Div 1 Appendix 7  
or ASME B16.34 Appendix II  
DPI to ASME VIII Div 1 Appendix 7  
or ASME B16.34 Appendix III



## ULTRASONIC EXAMINATION

Method: ASME V Art 5 or ASME B16.34 Appendix IV

Options: 1) 100% of All castings/forgings  
2) 100% of 10% of castings/forgings  
3) Critical Areas\* of All castings/forgings  
4) Critical Areas\* of 10% castings/forgings

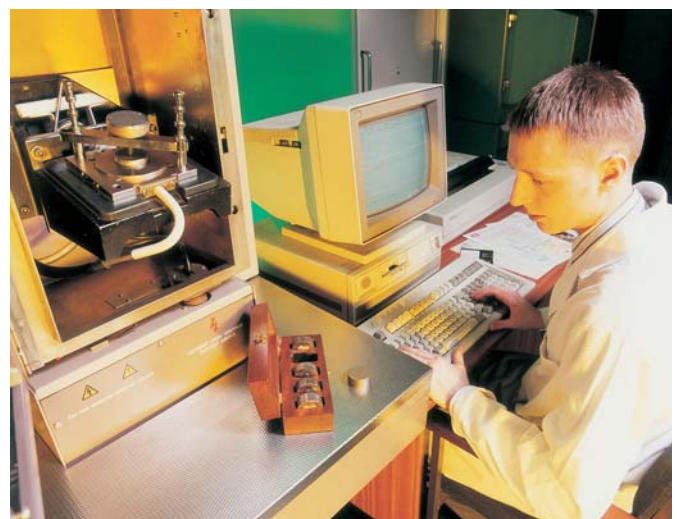
Acceptance: ASME SA 388 or ASME B16.34 Appendix IV

\*Critical Areas as defined by ASME B16.34



## CORROSION TESTING & METALLOGRAPHY

- Intercrystalline corrosion
- Strauss and Huey tests
- Crevice corrosion
- Pitting Corrosion
- Typical Standards - ASTM G48, A262, G31, G36
- Ferrite counting
- Phase checks
- Graph size/inclusion counts
- Macro and Micro photography
- Typical Standards - ASTM E562, E112, E45



## CHEMICAL ANALYSIS

- 24 channel, direct reading spectrograph. Includes determination of the volatile elements such as carbon, sulphur and nitrogen.
- Portable PMI (Positive Material Identification)
- Carbon/Low alloy steels
- Stainless/Duplex/6Mo steels
- Nickel alloys
- Cobalt alloys