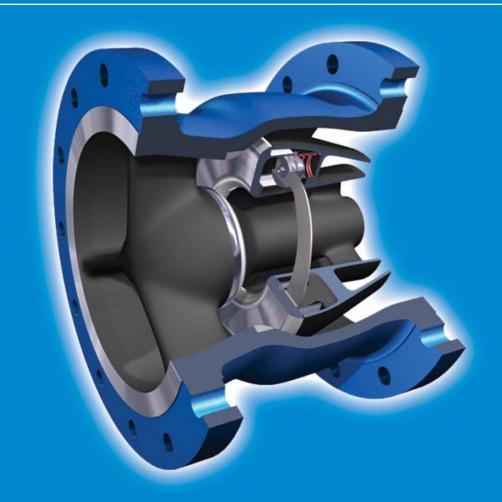
Goodwin



Goodwin - NoReVa Nozzle Check Valves Goodwin Goodwin Goodwin Goodwin Goodwin Goodwin

Goodwin Goodwin Goodwin Goodwin Goodwin Goodwin Goodwin **Goodwin** Goodwin Goodwin Goodwin Goodwin Goodwin **Goodwin** Goodwin Goodwin **Goodwin** Goodwin Goodwin Goodwin

Goodwin

Goodwin

Goodwin

Goodwin

Goodwin Goodwin Goodwin Goodwin Goodwin Goodwin

Goodwin - The International Company

N-ZK









Goodwin Goodwin Goodwin Goodwin Goodwin International, the established market leader in the manufacture, design and supply of Dual Plate Check Valves for use in the world's hydrocarbon, energy and process industries, now includes within its range of check valve solutions the Goodwin-Noreva Nozzle Check Valve.

With the acquisition by Goodwin PLC of Noreva GmbH, the addition of axially operated non-slam valves into the Goodwin portfolio, sitting along side the Goodwin range of Dual Plate Check Valves, enhances Goodwin International's position to provide cost effective technical solutions for those critical / severe pump and compressor applications where reliability and high performance is an absolute necessity. By integration with Noreva, an internationally recognised company in its own right, the Goodwin-Noreva Nozzle Check Valve is founded on some 70 years of proven and established design, technology and experience.

Based in the United Kingdom, Goodwin sells internationally exporting to over 50 countries. Goodwin offers outstanding support to its customers listed amongst whom are many of the world's end users, oil majors and international engineering contractors.

The Goodwin-Noreva range of Nozzle Check Valves:

4 Valve types: N-ZK; N-ZSK; N-B; N-BK

6 different body styles: Wafer (N-ZSK, N-BK)

Flanged (N-ZK, N-B, N-BK) Solid Lug (N-ZSK, N-BK) Hub-ended (N-ZK, N-B)

Buttweld end (N-ZK, N-B, N-BK)

Threaded end (N-ZK)

1" - 88" (DN 25 - DN 2200) Sizes:

Pressure Classes: ANSI 150 - 2500lb, API 2000 - 15000,

PN 10 - PN 400. JIS 10K & 20K.

Materials: Cast and Ductile Irons; Carbon Steels; 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 9001:2000.

Certifiable in compliance with European Pressure Directive (PED) 97/23/EC to meet customer requirements when

either or both specifed.

All bodies certified to BS EN 10204 3.1 as a minimum

No leakpath to atmosphere - no fugitive emissions

Firesafe design

Nozzle Check Valve Specifications



N-ZK

Size range: 1" - 10" (DN 25 - DN 250)

Pressure Class: ANSI 150# - ANSI 2500#, API 2000 - API 10000

Non-slam closure
 Low weight
 Very low pressure loss
 Short face-to-face length
 Maintenance free

The N-ZK is the standard valve for sizes 1" to 10" in pressure classes ANSI 150# to ANSI 2500# $\,$

With its optimum designed aerodynamic flowpath through the valve the N-ZK produces very low pressure losses.

The N-ZK is suitable for all fluids and all installation positions.

N-ZSK

N-B



N-ZSK

Size range: 1" - 10" (DN 25 - DN 250)

Pressure Class: ANSI 150# - ANSI 2500#, API 2000 - API 10000

- Non-slam closure
 Low pressure loss
 Very short face-to-face length
- Very low weight
 Metal sealing
 Maintenance free

With a shorter face-to-face than the N-ZK and where pressure loss across the valve is not a significant consideration, the N-ZSK is installed where space is at a premium.

The N-ZSK is suitable for all fluids and all installation positions.

N-B

Size range: 12" - 88" (DN 300 - DN 2200)

Pressure Class: ANSI 150# - ANSI 2500#, API 2000 - API 10000

- Non-slam closure
 Very low pressure loss
 Friction-free valve disc guiding
- Metal sealing
 Maintenance free

The N-B is the standard valve for 12" and larger in pressure classed ANSI 150# to ANSI 2500#.

Utilising a valve disc ring guided by springs and friction-free radial guides, the N-B is unique amongst nozzle check valves. With the ring shaped flow ports and low critical velocity required to fully open the valve, the N-B provides the following distinct advantages:

- 1. Very low pressure losses due to the two ring-shaped annular flow paths
- 2. Rapid non-slam closure of the disc
- 3. Excellent dynamic behaviour due to low moving masses and friction-free guiding of the disc.

N-BK



N-BK

Size range: 12" - 88" (DN 300 - DN 2200)

Pressure Class: ANSI 150# - ANSI 2500#, API 2000 - API 10000

- riessure Ciass. Andi 150# Andi 2500#, Ari 2000 Ari 1
- Non-slam closure Low pressure loss Friction-free valve disc guiding
- Metal sealing Low weight Short face-to-face length
- Maintenance free

The N-BK combines the worldwide proven ring shaped valve disc / radial guide concept of the N-B whilst providing shorter face-to-face and reduced weight. The N-BK is a lower cost solution where marginally higher pressure drops can be accepted.

The N-BK is suitable for all kind of liquid and gaseous fluids and all installation positions.

End Connections



Flanges: Available with the following valve types: N-ZK, N-B, N-BK



Welding Ends:Available with the following valve types: N-ZK, N-B, N-BK



Wafer Type:Available with the following valve types: N-ZSK, N-BK



Fully Lugged Wafer Type:Available with the following valve types: N-ZSK, N-BK



Hub Ends:Available with the following valve types: N-ZK, N-B



Threaded Ends: Available with the following valve types: N-ZK

Goodwin Goodwin Goodwin Goodwin

Good Goodwin Goodwin **Goodwin Goodwin Goodwin** Goodwin **Goodwin Goodwin** Goodwin **Goodwin** Goodwin Goodwin **Goodwin** Goodwin Goodwin

Goodwin

Goodwin Facilities and Resources

Goodwin's Check Valve manufacturing facilities in Stoke-on-Trent, England, comprise 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 12,000 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 our in-house 10 tonne AOD refining furnace.



The design, machine and assembly shops cover some $9,400~\text{m}^2$ and are equipped with 31 modern CNC machine tools that are the core of the production and are supplemented by many conventional machine tools.

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

Valve design is carried out using CAD and is verified on computers utilising finite element analysis - ANSYS. Both the foundry and the design, machining, assembly and test facilities are audited by the British Standards Institute and approved to ISO 9001. (Certificate FM00343 and FM00336).

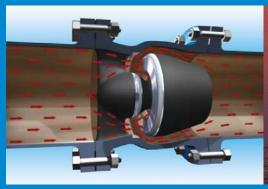
Extensive in-house testing and laboratory facilities are available including:-

- Hydrostatic Pressure Testing
- High Pressure Gas Testing (6000psig/414barg)
- Flow Testing
- Low Temperature (-46°C) and Cryogenic Temperature (-196°C) Pressure Testing
- Helium Leak Testing (Mass Spectrometer)
- Tensile / Bend / Impact / Hardness Testing
- Corrosion Testing
- Metallography
- Magnetic Particle
- Dve Penetrant
- Ultrasonic Examination
- Radiography
- Chemical Analysis
- Alloy Verification / Positive Material Identification (PMI)
- Ferritoscope Verification
- High Temperature Pressure Testing to 550°C

Goodwin Goodwin Goodwin Goodwin Goodwin



Goodwin **Goodwin** Goodwin Goodwin Goodwin Goodwin













Goodwin House, Leek Road, Stoke-on-Trent, England ST1 3NR Tel +44 (0)1782 220000 or +44 (0)700 GOODWIN Fax +44 (0)1782 208060 Web Sites: www.checkvalves.co.uk E Mail: checkvalves@goodwingroup.com

Goodwin Goodwin **Goodwin** Goodwin Goodwin **Goodwin** Goodwin Goodwin **Goodwin** Goodwin Goodwin **Goodwin** Goodwin Goodwin Goodwin **Goodwin** Goodwin **Goodwin** Goodwin Goodwin Goodwin **Goodwin** Goodwin **Goodwin** Goodwin Goodwin Goodwin Goodwin Goodwin Goodwin GCV GNP-5M07 Goodwin

Goodwin