

In 2016 Goodwin International launched a range of axial isolation and control valves. Designed and engineered from the ground up, these valves have received critical acclaim for their many innovative features. Valve World reports from Goodwin's facility in Stoke-on-Trent, England.

By Lucien Joppen



The team behind the control valve technology of Goodwin.

## Goodwin International promotes axial valve technology

Many readers of this journal will of course already be quite familiar with the name of Goodwin thanks to the company's well-established range of dual plate and non-slam nozzle check valves. However, Goodwin make much more than check valves so it is certainly worth pointing out Goodwin's heritage and scope. In fact, the company can trace its roots back to 1883 when a certain Mr. Ralph Goodwin and his sons established a foundry. The business expanded, branching out into engineering as well as equipment manufacture. Fast-forward to the present day and Goodwin is still a family company at heart that is held in high standing by customers for delivering quality products and equipment built to last. Set against this background, the decision to move into the niche market of axial isolation & control

valves is perfectly logical, states Paul Root, Director at Goodwin International. "From the shop floor to the design team, people who work at Goodwin have engineering in their blood and relish new challenges. So when we first considered developing our new range of valves the key question we asked ourselves was this: 'can we re-design the axial isolation and control valves from scratch, creating valves which are simpler to manufacture, technically superior to existing products and which will provide a long, trouble-free service to customers?' The answer was an emphatic 'yes'."

### Growth potential

The growth potential for Goodwin's axial isolation and control valves is therefore 'very exciting', comments Mr. Root. "Obviously the lion's share of the isolation valve and control valve markets are

dominated by ball valves and globe valves respectively. This market segment is less attractive to us as it is highly commoditized with an emphasis on standardization and price competition. However, as more and more end users are realizing that there can be performance drawbacks to using ball and globe valves. For example, in terms of noise generation, reliability, precision, maintenance and life-span. With our new range of axial isolation and control valves we have addressed these issues. In consequence we see plenty of opportunity for growth in both volume and value terms in this particular market segment." Interestingly, Mr. Root adds that axial flow valve technology has in fact been around for quite a while. It seems the first axial flow valves were developed several decades ago for use in low pressure hydro electric power applications. Mr. Root: "Several companies continue to make axial flow style valves, however, Goodwin is one of just two or three reputable companies making axial isolation and control valves that are suited for highly demanding applications. In fact, many customers tell us they are delighted that Goodwin has entered this market not just because of the quality of our product but also as the number of suppliers was previously perceived as too limited in scope."



The assembly of the control valve. Goodwin has been able to draw on a highly skilled workforce, many of whom were trained in-house.

### Innovative design features

At this stage Valve World decide to ask Mr. Root if he could go into more detail about some of the unique design features of Goodwin's axial isolation and control valves. "First of all let's discuss the body design," replies Mr. Root. "We have deviated from the norm in axial isolation and control valves by developing a three-piece body design for the small to medium sized valves in our range. The reason is simple: one piece body designs for this style of valve are manufactured from a casting, which makes it impossible to use non-invasive quality testing as access is so limited. As most valve bodies will require some modification after casting, a three-piece body makes perfect sense. This also applies to inspection and maintenance at the end user level."

Thanks to advances in sealing technology Goodwin's design easily meets the most stringent of demands for fugitive emissions, Mr. Root states. "Furthermore, the three-piece design prevents distortion of the body at high pressures which are typically seen on smaller diameter valves. This allows for much tighter internal clearances on the moving parts inside the valve than could otherwise be achieved."



### Less friction, less wear

Another design feature which is unique to the Goodwin range of axial isolation and control valves is the patented rack-pinion-rack gear train. The company deliberately steered away from the standard linear mechanism which is prone to high friction, says Mr. Root. "In general, the linear mechanism with the 45 degree sliding rack suffers from greater wear and tear due to higher frictional forces, this results in the need for greater maintenance during its life span. The higher frictional forces also mean that greater actuation forces are needed. With our rack-pinion-rack-mechanism we have considerably lowered the frictional forces. This means we are confident we have developed a valve with a design life of 30 years minimum under standard conditions whereas the industry generally expects 25 years. Such improvements are especially important in the oil and gas sector where we see that end users have extended the recovery periods from wells, therefore requiring longer life-spans from their existing assets." And last but by no means least, the design team at Goodwin paid particular attention to the internal body shape. Says Mr. Root: "Our goal was to create a more stable and more laminar flow within the valve for better performance and more precise controllability. Also, we have been able to direct the flow through the valve so that parts which are known to be more vulnerable are well protected, such as the trim and critical sealing areas."



A sneak peek at Goodwin's manufacturing capabilities.

### Input from end users

During the development phase Goodwin actively encouraged input from end users at all stages. This has helped ensure that the final valves are in line with market demands, notes Mr. Root. "Some of our unique selling points, for example, include the valve's high capacity, reliability, accuracy and also its low noise." Noise can be a particular concern in gas transmission pipelines, it seems. "If you build a compression station close to a suburban area then you will very soon have angry residents if your installed control valves emit a high-pitched whistling sound. So noise reduction is key. The typical industry standard is 85 Decibel or less, and we often see applications whereby end users demand a maximum of 75 Db. Our axial range would be the perfect solution for such applications." Noise reduction, however, is only one part of the equation. Other end users set high store on capacity. "Our axial control valves are very efficient, which enables us to downsize. So if a particular application would require say a 10" globe valve, we can substitute that valve with an 8" or even a 6" axial control valve whilst maintaining comparable or better flow rates and very low noise generation," states Mr. Root. He also adds that Goodwin's axial isolation and control valves are the ideal choice when reliability, speed and/or precision are required. "If you need a control valve for modulation, or an isolation valve for emergency shut down then our axial style valve should be top of your list.

It can be operated against full differential pressure and has a closure time of less than two seconds even on very large valves."

### Total Cost of Ownership is key

Mr. Root is therefore very confident when stating that Goodwin's axial valve range is a technically superior alternative to globe valves in many applications. However, he is equally adamant that the axial control valve is the better choice from the financial perspective, too. "Quality doesn't come cheap and the price ticket for a Goodwin axial style valve is naturally higher than that of a globe or ball valve. But you have to think of this in terms of total cost of ownership. As I have mentioned before, we may be able to offer a smaller size axial control valve than expected, saving the customer money. The customer will probably require a lower power smaller actuator as well, which constitutes an additional saving in terms of installation envelope and cost. Add in the fact that inspection and maintenance costs are lower whilst the typical life span of our axial valve range exceeds the industry average by 20 per cent and you can easily see that Goodwin axial isolation and control valves becomes the valve of choice, both technically and financially."

Whilst speaking of maintenance, Mr. Root notes that Goodwin will quite naturally respect existing customer practices. "Some clients ask us to come along to perform on-site maintenance and inspection. Others prefer to use



The close proximity to Goodwin's own foundry helps to significantly reduce manufacturing lead times for axial control and isolation valves.

their own maintenance teams. In that case we will fully support their technicians. For example, by providing initial training to ensure that they understand the inner workings of the valves. That contributes to more effective and efficient maintenance and a longer trouble free life span, which is of course good news for both manufacturer and operator."

### Human capital key

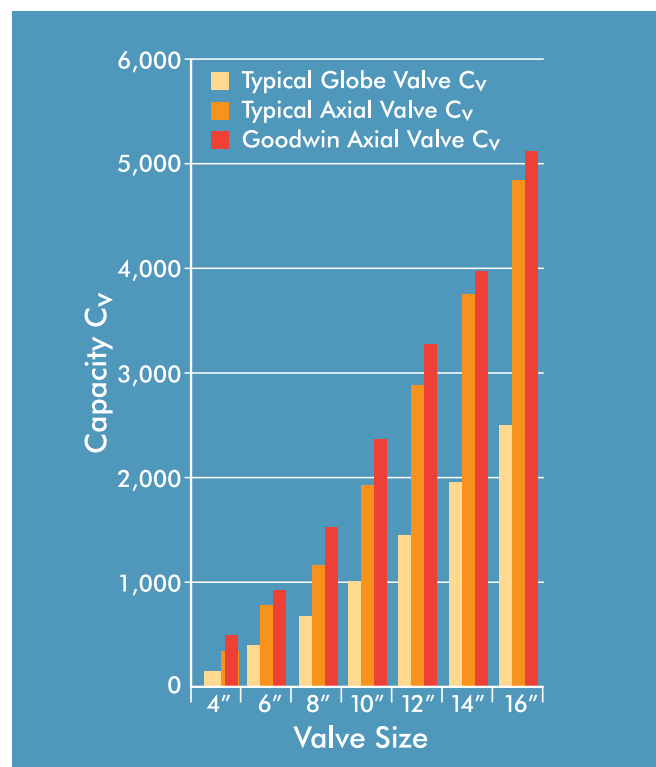
At this stage Mr. Root invites Valve World to take a quick tour of Goodwin's manufacturing facility. In fact, the walk-through takes longer than anticipated, not only because there are so many interesting areas to see but also because staff are really enthusiastic and keen to discuss the whys and wherefores of what they are doing. The first thing that is immediately evident, however, is the breadth and depth of Goodwin International's production capabilities. "This company makes a wide variety of finished equipment as well as components for other manufacturers. The common denominator is top quality engineering. We don't do mass production. Our strength is in providing equipment that will last and last, or items that simply cannot be produced elsewhere." This effectively meant that, when looking to set up an axial style valve manufacturing facility, Goodwin was immediately able to use any number of top-of-the-line CNC machines without having to make expensive, up-front investments.

### Highly skilled workforce

The company is also able to draw on a highly skilled workforce, many of whom were trained in-house. "Our human capital is what makes us really stand out. In fact, a few years ago we created our own

apprenticeship scheme to better fulfil our growing need for qualified, motivated staff. So today we take on some twenty to thirty apprentices each year who in addition to theoretical training also benefit from working alongside highly seasoned staff." The walk-through also amply demonstrates Goodwin's commitment to testing, as there are quite a number of test facilities dotted around. These include a hydro loop for valve type testing and accelerated life testing. Other facilities on-site include high pressure gas and hydro test equipment allowing pressure testing up to 22,000psi, cryogenic testing and high-temperature testing. However, perhaps the most remarkable test unit is to be found

in an outside area, having been purpose-built for the axial control valve range. Mr. Root says "What we can do here is to thoroughly investigate the overall performance of the axial control valve. We can test subtle design changes, such as altering the shape and size of the trims, to see for example if we can further reduce the produced noise or increase capacity. In short, this test unit is really helping us to fill in the knowledge gap that exists throughout the industry as a whole when it comes to axial control valves, in addition to further refining our own existing product range. As you can see, when Goodwin sets out to make an engineered product like the axial control and isolation valve we take it seriously and do a thorough job. Customers therefore know they can rely on us, as Goodwin is here for the long term!" The foundry and Goodwin International, Goodwin's pumps and valves business, work closely together. Goodwin International utilizes castings from its sister company. 'We endeavor to insource wherever possible', Mr. Root says. 'This allows us to be flexible and responsive to customer demand. Lead times of nine to twelve months are commonplace in our industry. Because of our control over the entire supply chain we are able to cut lead times roughly in half, which is clearly of interest to the customers we serve. The close relationship between Goodwin and its supply base means that a joined up approach to new product development is the norm, resulting in higher levels of both quality and manufacturability.'



Valve capacity comparison (typical ASME 600lb).

### Current scope of axial isolation and control valve manufacture

- 2"-48" valve size range
- ASME 150-2500lb, API 3000 - 15,000 pressure class range
- fire tested design to API 6FA - ISO 10497 verified by Lloyds register



- Material possibilities include: carbon, low temperature carbon, low-high alloy, stainless, duplex and super duplex steels, super nickel alloy, aluminium bronze and titanium.
- hydro tested to API 598, FCI 70-2, ASME B16.37 (tight shut off to FCI 70-2 Class VI)
- control valve sizing in compliance with IEC 60534
- face to face dimensions in accordance with ASME B16.10, interchangeable with ball and globe valves. (application specific F-F available upon request)
- control valve single and multi stage trims designed for compressible and incompressible fluids, anti-cavitation, noise attenuation and high pressure drop.
- linear, equal percentage and fast opening control valve cage trim characteristics available.