

Pacson heads for deep water



Scotland is famous for its rugged yet beautiful scenery. The same qualifications also apply to another of Scotland's assets, namely the severe service valves made by Pacson. These high integrity flow control solutions, which unite quality engineering with robust, long-life performance, are seen as the valves of choice for demanding subsea applications the world over. The Pacson name could soon be equally familiar to specifiers of topside, chemical and power generation valves too, as Valve World learnt during a trip to the company's headquarters in Carnoustie, Scotland.

Finding a convenient label for a valve manufacturer can be a difficult issue. Take Pacson for instance. This company enjoys an enviable reputation amongst clients for its made-to-order valves, which are often specifically engineered to suit unique and/or

demanding subsea applications. Yet Pacson's management insist that the company cannot really be termed a 'specialist' firm. Mr Keith Crawford, Executive Director, explains: "Most valve applications can be satisfied by off-the-shelf producers. We get in-

involved in the remaining ten per cent, whereby it is essential to interpret the customer's requirements. In many cases this means we then do provide unique valves, but generally and importantly these are often evolutions of existing, proven designs and technologies. For example, we may have to manufacture a gate valve with a flange at one end and a screwed connection at the other. Or perhaps a ball valve in which the entrance and exit ports are offset. Such items would be beyond the scope of many valvemakers, although in essence the engineering and manufacturing principles remain the same. So whilst I don't want to pretend that what we are doing is rocket science, I can say with confidence that Pacson really is a problem solver."

The range of valves provided by Pacson focuses on ball, gate, check and needle designs, in sizes from 3/8" to 24". These are used in challenging applications, such as at high pressures/temperatures, in dirty service, corrosive environments, etc. Many are often manufactured from exotic alloys. However, a distinguishing feature of all the valves produced is attention to detail regarding both engineering and manufacturing. Giving examples, Mr Martin Phillips, Sales Manager, touches on the standard bi-directional sealing in ball valves and the simple yet elegant position indicator in the gate valve. Turning to the needle valve he says that the common problem with most standard designs is that rotation between the needle and seat can cause galling. Mr

Phillips: "Some suppliers try to resolve this problem by using a crimped or floating stem tip with varying degrees of success. In practice, this head often sticks fast to the stem and hence does not permanently alleviate the galling problem. Pacson's patented solution is a two-piece stem design, whereby the upper and lower sections are joined by half collars and a thrust washer to allow independent rotation. So when the valve is operated, the needle can close without any galling for the life of the valve." To date, Pacson has sold some 6500 of its second generation needle valves for use in areas such as chemical injection lines, hydraulic services, pressure monitoring isolation and small bore take offs. Despite the arduous services and the potential for external damage (eg, from ROVs or divers), Pacson's needle valves are proving very robust and not a single valve has ever been returned from service for repair! Clients are also said to appreciate the fact that, unlike some other designs, the Pacson needle valve offers a true full-bore flow. Moreover, the valve can be specified for diver operation, ROV operation or fitted with one of Pacson's own linear actuators for remote operation.

Efficiency

As may be now be obvious, the greater majority of orders taken by Pacson require an individual approach. To cope with the demands of bespoke manufacturing and the trend for ever shorter lead times Pacson has invested heavily in both engineering and production departments, as a tour of their premises revealed. The engineering department, for example, makes extensive use of CAD software, and boasts staff with a wealth of experience from all sides of the offshore industry. Mr Phillips: "Again, we do not re-invent the wheel for every project. In many cases we can start with an existing design - Pacson has over 1000 basic designs on hand - and modify that to meet the customer's specifications. Finding commonalities in engineering and manufacturing speeds up the entire production cycle and helps us control costs, too."

Pacson's manufacturing and assembly workshops can rightly be described as busy. Very busy, in fact. Mr Crawford explains that many sections are running both day and night shifts on a 24 hour basis, as demand for high integrity valves continues to in-

crease. Beneath the hustle and bustle, however, the plant is run with clock-like efficiency. Mr Crawford: "We work along integrated manufacturing lines, which ensures fast throughput by concurrent design and manufacture of valve orders. Moreover, we can alter production after a job has gone 'live'. For example, to accommodate a particularly urgent customer order or order variation."

Pacson's facilities include equipment one would expect to find at a blue-chip manufacturer's, such as CNC machines and a clean room assembly unit. More of a surprise, perhaps, are work stations where seemingly innocuous parts such as nuts and bolts are made. Mr Crawford explains the rationale behind these stations. "Firstly, all the components in a Pacson valve have to meet strict quality requirements. Moreover, we often need parts in a hurry, sometimes from quite exotic materials. So having in-house stocks and the capability to manufacture all the parts we need is, we feel, the way to guarantee quality and provide optimum service. This is backed up by a network of proven, local sub-suppliers who have demonstrated that they can meet our exacting standards."

Test protocols

Pacson is indeed known as a valvemaking which can successfully work with all kinds of materials, such as duplexes, nickel-based alloys and titanium. Mr Crawford explains that, during the past decade, the company has developed an in-depth knowledge of the tooling and manufacturing requirements necessary to optimise performance in cutting these materials. Mr Crawford: "Many people fail to appreciate the careful handling exotic materials require if they are to perform as expected. Parameters such as work holding, the tool speed, tool width, angle of cut, etc, are very important. We continue to work closely with suppliers to develop best practice in our manufacturing units, and are therefore confident whether processing carbon steel or Hastelloy®." By way of illustration, Mr Crawford points to a gun-drill machine specially modified for boring deep bores in Inconel®. Another good example concerns a 1" gate valve, which was to be a scaled down version of Pacson's existing one-piece valve. Realising that the limited internal space might lead to a compromise



Pacson has a track record in successfully working with all kinds of materials, such as duplexes, nickel-based alloys and titanium. Shown are 4" Class 600# Double Block & Bleed Ball Valves for gas service, with duplex body and trim materials.

between internal finish and design, Pacson developed special tooling to produce this valve to the same high technical standards as its larger valves. Pacson's testing facilities are also definitely worth mentioning. In-house equipment includes gas leak testing baths, thermal and pressure cycling chambers (up to 40,000 psi!), hot oil tests, hyperbaric chambers, etc. This enables Pacson to perform fundamental research and development work as well as qualification tests and company-specific tests. Mr Crawford. "Part of Pacson's success is the empirical testing we conduct to prove each product's design and suitability for the intended application. One trend we have noted is that more operators

The range of valves provided by Pacson focuses on ball, gate, check and needle designs, in sizes from 3/8" to 24". The valve in the photo is a 9" API 5K Single Isolation Through Conduit Gate Valve. Features include metal sealing, full super duplex specification and a Pacson manufactured linear actuator.

are establishing their own test protocols, especially for subsea applications. We are therefore setting up a full time department to handle the extra requirements. We certainly won't shy away from testing, but look to foster an open relationship with clients which should benefit both sides."

Mr Crawford adds that very satisfactory results were recently obtained when a new double block and bleed metal-seated ball valve was tested for leak tightness. Apparently, all four seats proved bubble-tight, across a range from 30 to 10,000 psi. "Many valves are unable to cope with low pressures, so the result speaks volumes for our design and build quality. Especially as this is a large, 1.5 tonne valve, the first time we have made a double block and bleed valve at that size," he says

Life cycle costs

As a manufacturer, Pacson is striving to achieve the optimum balance between product quality and price. It is also very active in discussing these issues with its client base, according to Mr Phillips. "Our principal clients

include first tier OEMs, end users and engineering companies. Each type of buyer seems to have his own particular focus. For example, OEMs are looking for a long, trouble-free product life. That's essential on subsea equipment. On the other hand, contractors, who are more involved with standard process equipment, appear more focussed on CAPEX costs. End users consider both CAPEX and OPEX costs. This makes determining the right specifications for a job a real challenge. Our view is that, especially with valves in critical, hard to reach areas, the emphasis must be on integrity and total life cycle costs. In fact, there has been much brainstorming in recent years on the best way of incorporating total life costs into CAPEX projects. In essence, this boils down to getting the right specifications on the datasheet. We therefore try and work as far up front as possible, sharing our experiences with all parties and highlighting potential problems. We believe this open approach is the best way to get the best value for the customer. Moreover, as the fast tracking of projects is on the increase, end users and others are able to turn to Pacson as a knowledge database for valve applications."

Growing fast.

Through the nineties, Pacson became renowned for its severe service valves, typically small bore valves used in secondary subsea applications. However, the company believes that its quality ethos will also appeal to other market sectors. A few years ago, for example, Pacson started to develop valves in larger sizes. Mr Phillips. "Originally we only made large valves on an ad hoc basis for certain customers. However, we do see larger valves as a natural extension of our activities, and an excellent route for the company to move forward and grow. So we have engaged experienced staff and taken the time to develop new designs and manufacturing procedures – you certainly can't simply scale up existing designs. Our traditional customers are already showing a great interest in these valves for use in their primary processes."

In addition, the larger sized ball valves and through conduit gate valves in particular could also bring opportunities in areas such as coker plants, pipelines, refineries and petrochemical facilities, where severe service applications mean only the very best valves will



With in-house test equipment including gas leak testing baths, thermal and pressure cycling chambers (up to 40,000 psi!), hot oil tests, hyperbaric chambers, etc, Pacson can perform fundamental research and development work as well as qualification tests and company-specific tests. The unit shown here is a 5-1/8" 10K Double Block & Bleed Ball Valve. Designed for subsea service (hot tapping applications) and metal seated, the unit was PR2 tested and is bubble tight from 30 through to 10,000psi gas.

do. Pacson's capabilities with exotic materials could also be important to end users trying to cope with acid services. Mr Crawford: "The oil and gas sector will remain a core competence. I expect orders will grow thanks in part to our new Houston office, which can lock us in to projects engineered in the region, as well as the move to exploit oil from deeper waters. These are very harsh conditions where high integrity valves from a proven supplier like Pacson are a must. But Pacson is set to cross borders and I am confi-

dent our customised approach will appeal to users in many other markets too. During the past 15 months we have increased staff from 50 to 80 to keep up with demand and we expect to move to new premises shortly, doubling our floor space. Pulling these elements together we expect to at least double the size of our company over the next three years. But we will never lose our focus or forget what we do best; namely listening to clients and making valves which perform without fail in severe service applications." ■

FACTS & FIGURES

Name:	Pacson Valves
Ownership:	Private company; two executive and one non-executive directors hold greater majority of shares
Products:	High integrity valves for severe service applications.
Designs:	Ball, check, gate, and needle valves, in single isolation or double block and bleed formats.
Sizes:	3/8" to 24"
Materials:	Carbon steel, low alloy steel, stainless steels, duplexes, nickel alloys, titanium, etc.
Headquarters:	Carnoustie, Scotland
Employees:	80
Core markets:	Subsea and offshore (secondary applications)
Growth markets:	Subsea and offshore (primary applications), pipelines, refineries, petrochemicals plants