

# SPECIAL SCREWS FOR VALVE TESTING BENCHES

IN PETROCHEMICAL PLANTS, POWER PLANTS and other industrial installations, control valves precisely regulate the movement of gases and liquids.

**SCREWS THAT ARE MANUFACTURED BY WHIRLING (MANUFACTURING PROCESS) PROVE TO BE THE RIGHT CHOICE FOR PETROCHEMICAL PLANTS, POWER PLANTS AND OTHER INDUSTRIAL INSTALLATIONS.**

LEAKING VALVES ARE ONE OF THE single greatest impediments to the efficiency of industrial processes. These valves can be big pieces of equipment, with dimensions measured in metres but manufactured to micro tolerances

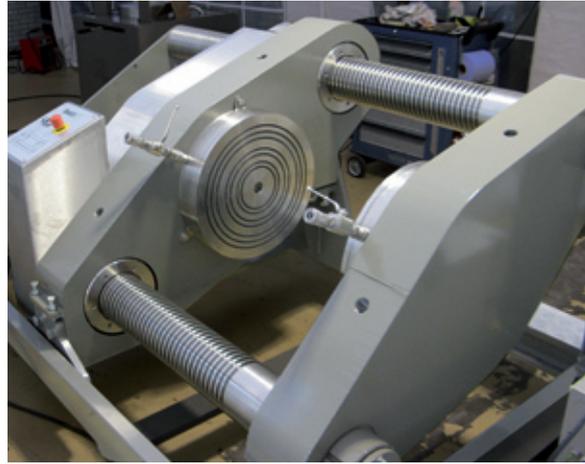
to ensure their air-tightness. It is important that they are rigorously tested before they can be trusted for use.

“The monitoring of the condition of valves on both onshore and offshore oil and gas installations is essential. The failure of a valve to operate on demand, or fail to provide a shut off to flow can have a major impact on personnel, the environment and capital assets,” warns David M. Anderson, sales and marketing director of Score Diagnostic Limited, a leading company in the field of valve diagnostics technologies and equipment.

Quality testing for these valves involves placing them on a test bench, where they are clamped securely in place

by a vice mechanism which opens and closes by travelling along a large threaded spindle. Just as the valves are subject to the strictest quality control, so the test benches themselves must also meet the very highest performance standards.

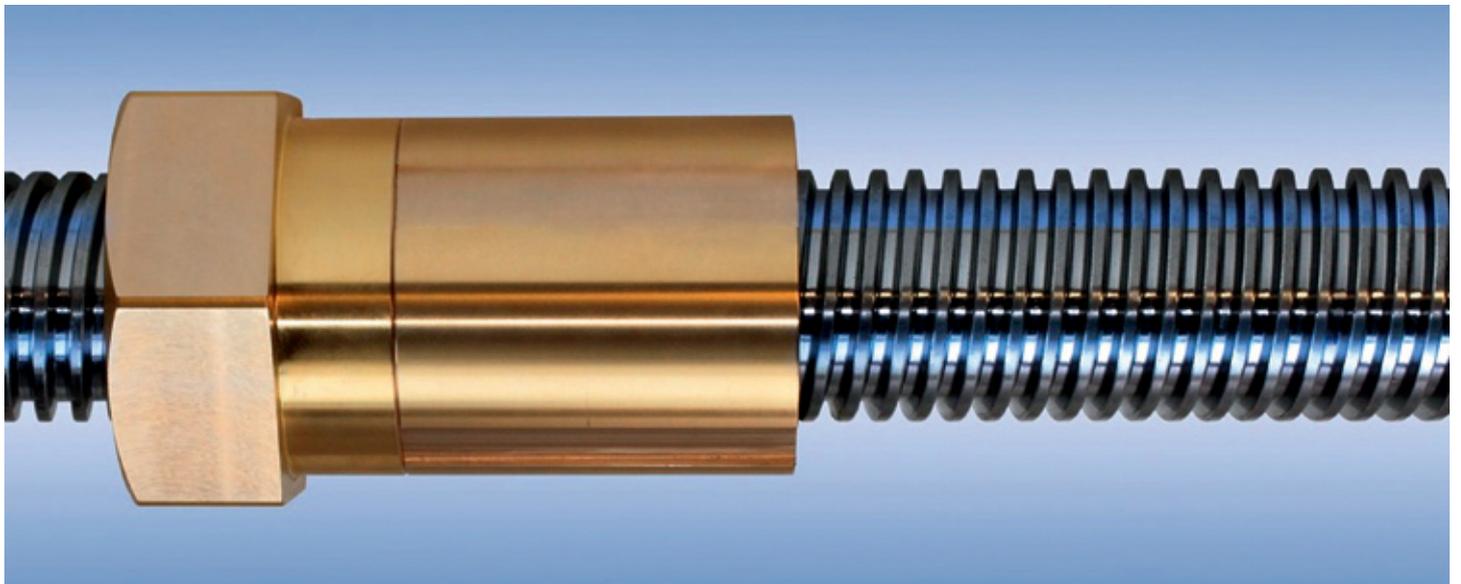
The design and production of screw spindles for valve test benches is a specialism of German engineering company Bornemann Gewindetechnik GmbH & Co KG, based in Delligsen. Bornemann has a long-standing reputation for precision manufacturing of threaded components it custom-engineers for all kinds of specialist industrial winding applications.



friction; then the accumulation of kinetic force overcomes the static friction and the cold weld is suddenly broken. At best there is a juddering that can damage both the testing machinery and the valve being held upon it. At worst both machinery and valve are totally destroyed.

Even when lubricant is applied liberally and regularly, the interaction of nut and screw can soon squeeze it out resulting in dry metal and ‘stick-slip’.

When it comes to specialised threaded spindles for heavy-duty industrial applications, stick-slip is the number one enemy that must be eliminated.



Manufacturers of valve test benches have one very particular requirement above all others, as Stefan Pos, mechanical engineer at Ventil Test Equipment BV, explains: “The key requirement for the spindle set in a valve test bench is that as it rotates the load must move smoothly across its length,” he says. “As it is fixed, the thread has to withstand very heavy forces. When metal rubs against metal in this way, lubrication is essential.”

Without appropriate lubrication, the metal surfaces that move against each other are subject to friction, which can often result in the so-called ‘stick-slip effect’. First, smooth movement is inhibited by

Bornemann’s expertise lies in designing and producing spindles that require less frequent lubrication – as well as less lubricant – to conquer stick-slip.

Bornemann’s solution lies in its fabrication process that results in lubrication pockets machined into the flanks of the screws. This is achieved through by a whirling process that creates the thread in the spindle using a machine tool that rotates at variable speed.



By using an asymmetric whirling process where the cutting is interrupted, Bornemann produces a surface that while apparently



perfect to the naked eye, is very slightly rippled. The surface of the flanks is embedded with micro pockets which retain lubricant that would otherwise be squeezed out as the nut passes across it.

Bornemann's whirled thread spindles have proved themselves able to withstand wear and tear even in heavy lifting applications. Even under persistent heavy pressure, there is no deformation or erosion of these lubrication pockets.

The result for valve test benches is longer maintenance intervals, with less lubricant applied less often. At the same time, the risk of damaging stick-slipping is also minimised.

According to sales director Moritz von Soden, Bornemann has two key advantages. The first is that the company has 25 years' of experience in the design and production of threaded spindles. The second is that it makes the cutting tools itself so that it can ensure that the pockets have the ideal form to retain the lubrication.

In fact, everything Bornemann does is precisely tailored to the application and to customer need. It can manufacture screws up to 10 metres long and up to 400 mm in diameter. It has the capability to manufacture screws out of whatever material its customers specify, in precise accordance with the customers specifications and technical drawings. ■



Lubrication pockets on the screws avoid the Stick-Slip Effect



Picture of the thread surface of a 12t lifting jack after the initial "running-in". It is clearly visible that there is no mechanical flattening in the valleys of the micro pockets where the lubricant is being stored. These excellent lubrication characteristics are typical for screws which are manufactured by the whirling process and this surface is the secret of how to avoid the dreaded Stick-Slip effect.

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