

"Hypergienic" Rotary Valves meet high pharmaceutical standards

(www.hypergienic.co.uk)

Rota Val Ltd. has further developed its leading 'Hypergienic' range of rotary valves dedicated for use in exacting pharmaceutical applications. This latest development further enhances the ability of the range of valves to meet increasing demands, particularly on issues such as Occupational Exposure Levels (OELs), explosion and flame containment, and safe handling without compromising design performance.

Originally developed through a three-way process between a major pharmaceutical company, Rota Val and a leading supplier of processing equipment to the industry, the 'Hypergienic' range broke completely new ground in providing a rotary valve to perform successfully inside an isolator (glove) box whilst offering full clean-in-place facilities with minimal operator effort. The new valves incorporated a range of special features to ensure that no crevices could trap product while providing drainage, fluid injection and air blast systems to cope effectively with wash procedures. Leakage monitoring points permit integration with the users own safety systems. Unique design provided simple and fast strip down accompanied by long service life even under the demanding conditions of frequent cleaning and arduous duty cycles. Critical to this, in some cases, is that surface finishes are not compromised through inadvertent component contact during assembly and disassembly.

Since then, Rota Val has continued to research and develop the range. The advent of EC Directive 94/9/EC (ATEX), has focussed attention on a different aspect of the role of a rotary valve. Whilst these valves still have a vital function in providing accurate control of powder flow through a pneumatic conveying system, the emphasis has moved on to ensuring totally safe conditions within the working environment.

A key concern in the manufacture of potentially harmful pure chemicals is the Occupational Exposure Level (OEL) to which employees are subjected. In designing rotary valves for use within isolation boxes, Rota Val had to consider the need to consistently maintain OELs of between 0.01gms/m³ and 0.001gms/m³ under normal production conditions over a very long time.

This involved the design of valves with extremely close operating tolerances and seals to virtually eliminate product loss. Further reductions in leakage are made possible by the introduction of an inert gas at positive pressure into the seals. These features have proven value in reducing the waste of expensive pure chemicals, lower disposal costs, and better containment with a subsequent improvement in working conditions. Ease of manual strip-down without special tools and effortless cleaning can also result in reduced system downtime and a consequent improvement in productivity with lower maintenance costs.

Rotary valves which achieve the relevant European standards are now used increasingly to act as an autonomous safety device in the event of an explosion. Rota Val submitted representative samples of its wide range via Notified Body Baseefa Ltd. to the Health and Safety Laboratory at Buxton for rigorous testing for explosion and flame containment for St2 Dusts, and has been fully approved. This means that the valves will withstand a 10barg explosion pressure (actually tested in excess of this level, to more than 11 barg) and have undergone 20 successive full explosion tests using Zinc Stearate with an explosive rating of Kst293. In addition to type approval with full documentation, every 'Hypergienic' valve is individually tested hydrostatically to 13 barg before leaving the factory as part of the product verification process.

Working conditions are not entirely about meeting international OEL standards, however. By reducing the manual handling and physical effort required to clean a valve, together with eliminating the need for the operator to wear respiratory protective equipment at all times, Rota Val actively contributed to an improvement in Safety, Health and Environment standards. Employees have expressed high levels of satisfaction with the 'Hypergienic' valves wherever these have been introduced. As one production manager said, "If operators are happy with the equipment, they enjoy using it, clean it regularly and maintain or exceed the very high standards we as a company have set. Removing the need for heavy lifting also means operators are subjected to much less strain, which has a knock-on effect in reducing the number of working days lost through injury."

Rota Val Ltd. has a long history of innovative development. Formed in 1970, the company is dedicated to the design, manufacture and servicing of rotary valves, blowing seals, diverter valves and associated equipment. By specialising in this technology, Rota Val has amassed a vast wealth of experience in the behaviour of different materials within pneumatic and vacuum conveying systems. From sticky, glassy particulates to abrasive granules or very fine powders, the range of materials handled can present a challenge to the valve designer. Pharmaceutical applications rarely require large throughput volumes, but the value of the product may be very high and its effect on employees potentially harmful if losses to atmosphere occur.

Acutely aware of these constraints, the company has further developed the original 'Hypergienic' valve designs to enhance performance in these areas. A crevice-free design is assured by machining the valve body from solid stainless steel, which also has the advantage over cast bodies in that small inclusions, pinhole porosity and other defects often found in castings are completely eliminated. The optional use of pharmaceutical joint seals further aids the internal crevice-free design.

Minute attention to detail has produced a range of valves which can be washed down under pressure at 75°C above ambient without affecting performance. Rota Val maintains test facilities for high-temperature wash down which permit testing of all valve types for this essential feature. Despite the close rotor to body tolerances essential for explosion containment, unique design means that the rotor will not make contact and damage the body during strip-down and reassembly. This feature ensures that valves safely operate over many CIP cycles and still achieve the desired performance characteristics.

Whether supplied for normal environment or isolator box installation, all valves are constructed to make strip-down fast and simple. Versions with large handles and quick-release toggles can be supplied for applications requiring frequent cleaning, making the process more efficient and reducing downtime. Connections to the conveying system and other process equipment include flanged, quick-clean and types individually specified by the customer. Where required, the motor can be totally encased. FDA-approved seals complete an outstanding design which comes with full validation documentation. Versions intended for isolator box mounting are equipped with additional seals and remote geared motor with a removable drive shaft. All models come with full safety interlocks according to customer needs.

Through rigorous testing on prototypes, continuous development and extensive experience in handling products with a very wide range of characteristics, Rota Val have honed the 'Hypergienic' rotary valves to successfully manage the flow of even highly cohesive materials. For instance, valves may be specified with large inlets to discharge in a precisely controlled manner at low throughputs, ensuring smooth, progressive conveying through the system. Position indicators provide operators with the essential information to confirm rotor pockets are empty before the valve is opened for cleaning, while true blow-through facilities also ensure full pocket evacuation of product. Dummy end covers incorporating a spray ball may be supplied for certain CIP applications.

Rota Val's long experience is revealed by the depth and quality of service provided. Whilst there is a wide range of standard 'Hypergienic' valves already available with inlet sizes from 100mm to 300mm, the company is always pleased to consider the design and manufacture of valves with special features to meet new application requirements. Standard or custom-designed, every valve produced has a detailed technical specification record, meaning spares and replacement consumable parts are always available to guarantee long service life.

Managing Director Ian Blackmore commented "A clean, well-designed plant is actually looked after better by staff. There is a significant effect on productivity, and operators feel valued in that their views have been considered closely at the valve design stage. The new 'Hypergienic' valves allow users to improve containment capability, make the working environment easier and safer, and save time in handling and cleaning. The rotary valves perform a vital function in

the smooth control of product conveying, and are an essential part of modern autonomous safety systems. Our ATEX and QA approvals are the customer's assurance of exceptional performance, and our reputation an assurance of competence and high quality service."

ATEX 94/9/EC Certified by Baseefa for Explosion/Flame Containment for Class ST2 Dusts