

Controlling and regulating solid material flows

Discharge and dosing with modified butterfly valve;

EBRO ARMATUREN FSM, ViDos and Inflas

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Regardless of whether production facilities already exist or are to be newly built, the demands on their performance requirements are increasing. This requires specially adapted valves to control and regulate solid flows. The focus of the new tasks is on service life, system monitoring and service friendliness. Manufacturers are increasingly developing into system partners and offering cross-divisional services.

Competence is expensive. Well-founded knowledge of raw materials, their procurement and logistics, procedural needs, storage and packaging of finished products, has usually been built up over many years within the manufacturing companies. Plant manufacturers often invest a lot of money in complex test centres in order to produce, or reliably handle, the powders or granulates newly developed by their customers.



Figure 1: INFLAS® fitting with wear-reducing inflation technology

The constant increase in the efficiency of newly planned, or already existing older plants, is based on systematic analyses of the weak points and consistent evaluation of the process parameters.

To this day, plant engineers generally attach great importance to the classification and archiving of the knowledge, gained in more or less perfected expert systems, in order to be able to pass on the knowledge gained over generations of project engineers.

The plant operators usually had their own engineering departments, which often provided advice and practical support to the producing parts of the plant across all areas. In some places, however, resourceful business economists came up with the idea of forcing the company's own consultants into self-employment, for cost reasons, or even abolishing them altogether. What initially turned out to be a proven cost reducer is now proving to be a



Figure 2: ViDos® dosing valve for coarse/fine flow dosing of solids

boomerang in many cases. Elementary specialist knowledge and in-house know-how have been lost and now have to be developed or bought in at high cost. In addition, the enormous time and cost pressure in the development of new products - and the associated new manufacturing processes - often

significantly limits the redevelopment of well-founded in-house expertise. The ability to keep an eye on the supplier market for plant components, sensors, building, infrastructure elements and security technology has been almost completely lost in many operations. Globalization also contributes to the loss of

overview, as the international range of products and services is often very market-specific and is not easily transferable due to different standards and guidelines. Plant constructors are therefore often confronted by customers with requirements that go far beyond process engineering tasks. Forwarders, who used to transport goods from A to B, are forced to carry out complex procurement and logistics tasks that go much further than the traditional operational responsibilities. Reliable partnerships with a basis of trust designed for long-term cooperation are increasingly at the heart of a well-functioning supply chain.

There is a new role also for valve manufacturers

The shift of process responsibility has long since also reached the manufacturers of individual components such as valves,

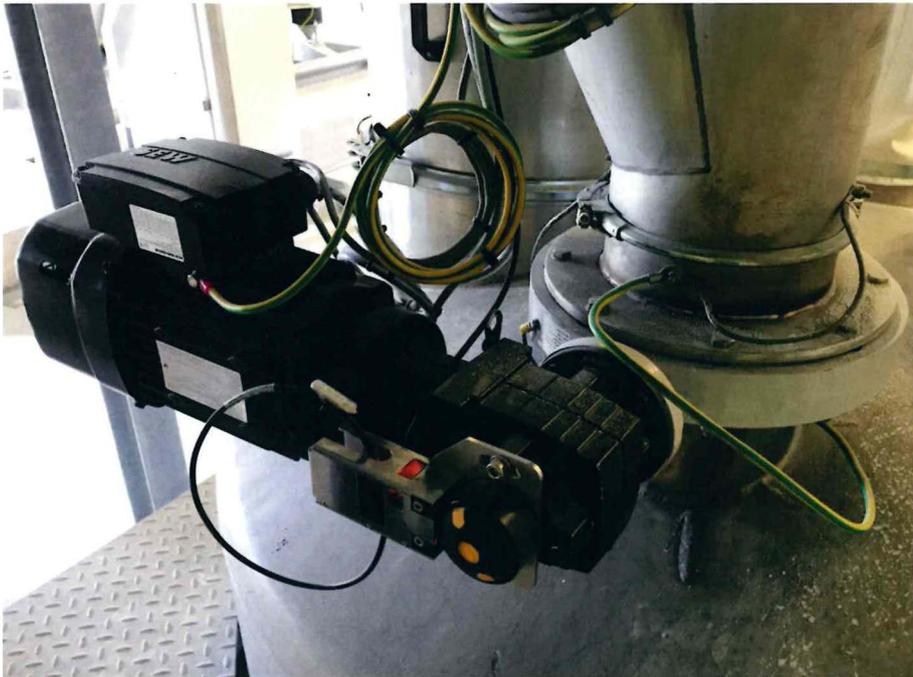


Figure 3: Impeller Valve FS-M with infinitely variable speed control

conveyor units, dosing technology or transport and storage technology.

EBRO in Hagen has increasingly faced up to the increased expectations of the thousand-fold proven technology of shutting off solid flows. Here, too, the areas of responsibility are constantly growing. In the past, valves were mainly used as a tight-closing element to seal off silos, containers, weighing equipment or conveyor sections, but their ability to throttle product flows and thus influence the volume flow was recognized at a very early stage. As early as the 1980s, this led EBRO to develop its own pneumatic and later also electric actuators for valves, which are also capable of approaching, holding and, if necessary, quickly changing precisely determinable valve positions.

Today, the necessary control and regulation technology is usually developed and manufactured in-house. Position feedback systems and integration of valve technology into higher-level complex control systems are as much a part of everyday life as advanced dosing technology based on cost-effective standard valves. European standards such as the Pressure Equipment, Machinery and Explosion Protection Directives are just as much the focus of development as the requirements of e.g. KOSHA, NEMA and many others.

Furthermore, in close cooperation with plant manufacturers and operators, specific services are offered that optimize maintenance and repair costs and in some cases significantly increase energy efficiency. Especially in the field of

handling bulk materials with their diverse application-specific features, EBRO is facing up to the increased requirements and has invested considerably in both the development and testing of the valves.

Wear minimization and service life improvement

The two topics usually go hand in hand. Abrasive bulk materials such as glass-doped plastic granulates quickly overtax existing plant components with regard to their service life. In this case, the friction wear which inevitably occurs when the valve disc engages in the sealing sleeve must be significantly reduced without negatively affecting the tightness of the valve. For this purpose, air or inert gas is conducted behind the sealing sleeve of the INFLAS® valves to seal the pipe cross-section, which then clings firmly to the already closed valve disc.

Especially in combination with new sealing materials and hard steel discs, a long-lasting shut-off device is available. Due to the consistent use of standard components and standardized installation dimensions, retrofitting in existing production plants makes sense. On request, the inflation and venting cycle can also be taken over via the customer's existing system control. For adhesive or encrusted materials, an integrated vacuum system is available that pulls the sealing sleeve off the edge of the disc before opening. This process has also proven to be very gentle on the product, since granulates, for example, are

hardly crushed during the sealing process.

No deflection of product flows during dosing

Due to the tendency towards bridging, dosing of solids is sometimes extremely laborious. In particular, if abrasive, difficult flowing or electrostatically charged substances are to be measured, blockages can occur which inhibit production. The ViDos® valves combine the best possible repeat accuracy of the dosing results with an optimized cost structure in the entire environment. Based on standard valves with their high production quantities and the associated worldwide secured spare parts supply, the position of the valve disc can be freely controlled in the 0° to 90° of as an additional function. This leads to an effective throttling of the product flow from the coarse flow to the fine dosing. Triggered by the control of the scale, a very precise control of the registered product is made possible. The valve disc vibrates horizontally with a high frequency but small amplitude and takes the support of the potential product bridge away. The product flow continues freely and can even be restarted during post-dosing.

Depending on the product to be dosed and the diameter of the fitting, repeat accuracies of less than 20 grams are possible. In addition, there is no need for transverse dosing screws,

the product flow falls vertically and is not deflected. ViDos® with containment and CIP capability can be used especially in the food and pharmaceutical industries. In addition to their space-saving installation dimensions and naturally favourable TCO*, they can also be serviced by the in-house maintenance team. The ViDos® is available with elastomer seals as well as PTFE seals.

Uniform and controlled discharge

Impeller valves are used for the uniform discharge of powders and granulates, if no pressure differences need to be bridged, (e.g. uniform product feed on screening machines, in separators and mixers, or prevention of segregation when discharging from storage containers).

Based on the design principle of the butterfly valve, the impeller valve has a 6-wing, spherical conveying wheel. Driven by frequency-controlled geared motors, the product can be dosed cleanly by rotation. Product shot through and overflowing of downstream plant components is effectively prevented. The impeller is blocked in the stop position when the desired discharge quantity is reached, so that a dust-tight seal can be achieved. Motors are available in various standards, e.g. CSA and others.

ATEX certified motors are also available

Almost the entire product portfolio of EBRO valves is tested by type and is marked



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accordingly in the case of planned use in ATEX zones (inside and/or outside). The documents provided identify the valve accordingly. Since the valves can also be offered in a pressure shock-resistant design, they also act as a flame- and ignition-proof element within the system.

Advanced Tasks

Whenever possible, the developments are based on standard valves

that have been tried and tested over long periods and whose extension by a function that goes beyond shut-off can fulfil new tasks. In addition to the functionality gained, the focus is on optimizing performance and costs. Optimizing maintenance intervals, improving service life and realizing dosing and discharge tasks with modified series products require investments in R&D, manufacturing technology and testing.

Competence that contributes to helping even difficult bulk materials to make the most of their leaps and bounds.

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Andreas Kühn is Key Account Manager Bulk Materials Technology at EBRO ARMATUREN Gebr. Bröer and has been working for more than 30 years with Mecatromation, the combination of mechanical and electrical components of existing automated systems, and is responsible at EBRO for the application of bulk materials valves. EBRO ARMATUREN Gebr. Bröer GmbH, headquartered in Hagen, Germany, is one of the world's leading manufacturers of industrial valves, actuators and automation technology as well as an internationally recognized partner for mechanical and plant engineering. EBRO develops and produces the actuators that best match the valves itself. Individually developed valve solutions can be realised on request. Behind the Bröer Group are more than 900 employees at 29 different locations worldwide. In the 2017 financial year, sales of EUR 141 million were generated.