



Press Release

Sourcing market for dosing technology

Fine tuning the application parameters prior to sourcing phase ensures the accuracy and quality of the dosing process in the dosing of abrasive media

The basis of each dosing process revolves around the medium and the method of application. After successful selection of a medium, it is necessary that the medium is dosed, applied or filled with high precision and high repeatability to ensure process reliability. For such applications, various factors must be considered when selecting the dosing technology – especially when it comes to the handling of abrasive media.

Dosing systems can be grouped into two different functional units: dosing valves and dosing pumps. Dosing valves may include means of pressure-time, volumetric and gravimetric dosing, whereas the dosing pumps can be found in rotating and oscillating systems. In an oscillating pump, the medium is transported by changing the chamber volume – increasing it and decreasing it. Typical examples include piston or diaphragm pumps. Dosing components in rotating systems displace a more consistent volume. ViscoTec Pumpen- u. Dosiertechnik GmbH makes use of the endless piston principle of the eccentric screw pump in all its dosing applications. This type of rotary positive displacement pump feeds the medium in a self-contained cavity. The combination of a rotor made of hardened stainless steel and a soft elastomer stator can, for instance, gently dose and promote highly filled media. The sealing line between the rotor and the elastomeric stator produces minimal shear on the medium and at the same time ensures a seal effect without valve. In this way abrasive media with particles of high grain hardness can be dosed without increased wear, volumetrically accurate on any one part. However, there are a number of criteria that must be observed even when selecting the correct pump type from ViscoTec. What now follows are the answers to key questions about the dosing of abrasive media.

(Picture 1: Abrasive media)

Which essential questions must be asked – from making a selection of the material up to the new acquisition of the dosing technology, especially in the application of abrasive media:

1. What criteria must be set prior to the sourcing of dosing technology?

Before a dosing technology is selected, it is necessary to contact the manufacturer of the medium to be applied. The medium can either specify a defined process or the process might have been

previously defined by the end user. In any case, information, such as viscosity, density and filler content are just as relevant as pot life, the type of cross-link and the mixing ratio for 2-component applications. In this context, the rheological behaviour of the medium plays an essential role and is subject to various factors, such as type, amount and duration of a load, as well as the processing temperature. Particularly non-Newtonian fluids require high application and processing know-how, as their viscosity can vary during the dosing process. After the selection of the medium, the size of container to be delivered is to be considered, particularly if a material is to be removed directly from the delivery barrel.

2. *What basic components should be included in the dosing process?*

As a system provider, ViscoTec refrains from selling individual components, but puts significant emphasis on a coordinated, functional process that is technically specified in close consultation with the customer. As a result, the components of the dosing process can be specified in the next step: these can be structured depending on the application in terms of supply of material, material preparation and dosage. The supply of material can be from any kind of container, such as cartridges, cans, buckets or barrels and ensures a reliable removal without air being trapped in the medium. Material preparation is necessary if the media already contains air pockets, if it has a tendency to set the filler content or if it must only be fed continuously. Depending on these requirements, material processing plants buffer, circulate, homogenize or degas the fluid. The heart of the process is the dosing, which is also the focus of this sourcing guide. Dosing can include any one medium, but can also consist of a mix of two components which are dosed well before the actual application. In particular, an indication of the required cycle times, the required dosing quantity, the application type and the ambient temperature are of importance for the application. Also the required dosing and repeatability of the application is to be determined.

(Picture 2: Sectional model RD-EC-Dispenser)

3. *What information is required concerning the set up of the dosing technology?*

Along with the existing knowledge of the material, the container type and the parameters of the application are agreed in an individual consultation with a member of ViscoTec's sales staff and the details of any open questions are discussed. These include, for example, the required hoses, adapters and connectors of the dosing components. Here it is as well to observe restrictions of space in the end process, such as the mechanical mounting of the components. Signal access of the controls and electrical connections represents another important aspect in this detail-collecting stage. A semi-automated 'stand alone' solution with ViscoTec controls is equally achievable as a fully-automated system controlled via PLC—whether via Profibus, PROFINET or digital I/O. For particularly demanding



dosing tasks, testing in our in-house laboratory can be carried out in consultation with the customer. These tests provide an important insight into the process and help to erase any last doubts that the customer may have. In conclusion, based on this information a customized solution will be prepared and an individual offer submitted.

(Picture 3: Solid containing medium in the Endless-Piston-Prinziple)

4. *What are the technical challenges to be aware of when dosing abrasive media?*

When it comes to the processing of abrasive media, there are a number of details to consider: ViscoTec offers a broad selection of different elastomers that can be used depending on the medium and its mechanical aggressiveness. A multi-tiered qualification process will therefore be used to specify the correct elastomer for the stator thus to significantly increase its service life despite mechanical load. In addition, it is also important to take into account, and minimize, the friction of the particles in the medium onto the dosing components. The wear of both the rotor and the stator can be reduced by adjusting a comparatively low flow. High flow velocities such as abrupt reversals or narrow openings in the dosing pump geometry should also be avoided. These measures can counteract a so-called cavitation in the dosing pump. Short inlets with large diameters equally prevent the build up of high pressures and thereby reduce the friction on the inside of the pipe. To prevent a blockage of particles in the dispensing needle, a conical dispensing needle with a diameter of at least the size of the largest grain cross-section, should be chosen.

5. *Where have ViscoTec dosing pumps been already used successfully with abrasive media?*

ViscoTec dosing pumps have been successfully used for 20 years in abrasive applications, such as in the automotive, electronics and semiconductor industries. A specific implementation in the automotive industry is, for example, the application of an abrasive heat-conductive paste on a magnetic coil. After proper adjustment of all relevant dosing parameters, such as the mixing ratio and the pot life, the paste is mixed with the help of a 2-component dispenser and a static mixer. Subsequently, the homogeneously mixed medium, consisting of a base and of an activator, is applied on the part in a defined quantity and with a dosing accuracy of over 99 %. The dosed product then hardens on the part and after a short period of time the part is ready for the next stage in the production process. There are other abrasive applications from various industries that have already been handled by ViscoTec, such as the application of solder paste, fluxing agent, abrasive adhesives and gap fillers in various configurations.

Checklist for the new acquisition of the dosing technology

- ✓ Which medium is to be dosed? What particular characteristics does this fluid have?
- ✓ In which containers is the medium to be delivered?
- ✓ Is the medium to be applied ready to be processed and/or dosed or does it require preparation?
- ✓ Is all the data for the dosing process available?
- ✓ Do preliminary tests in the laboratory need to be carried out due to high technical requirements?
- ✓ Have all mechanical details been clarified? (Hose lengths, connectors, adapters, mountings)
- ✓ Have all electrical details been clarified? (Signal exchange, electrical connections, interfaces)
- ✓ Has sufficient attention been given to all criteria for the dosing of abrasive media?

(Picture 4: Different Dispenser of ViscoTec GmbH)

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Picture 1: Abrasive media



Picture 2: Sectional model RD-EC-Dispenser



Picture 3: Solid containing medium in the Endless-Piston-Prinziple



Picture 4: Different Dispenser of ViscoTec GmbH

ViscoTec – Perfectly dosed!

ViscoTec Pumpen- u. Dosiertechnik GmbH primarily deals with systems required for conveying, dosing, applying, filling and emptying medium to high-viscosity fluids. The technological leader headquarter is in Töging a. Inn (Bavaria). Furthermore ViscoTec has subsidiaries in the USA, in China and in Singapore and employs almost 120 people worldwide. Numerous sales partners all over the world complete the international distribution network. Next to technically sophisticated solutions to even the most complicated application, ViscoTec is the single point of contact to deliver all components for a complete system: from emptying to preparing and to dosing. This guarantees successful interaction of all components. All fluids showing a viscosity of up to 7.000.000 mPas can be conveyed and dosed almost pulsation-free and with extremely low shear. ViscoTec offers comprehensive consulting for every application and, if required, extensive tests will be carried out in close cooperation with the customer. The dosing pumps and systems are perfectly adapted to their respective application whether it is the food sector, the automotive industry, the aerospace field, the medical technology, the pharmaceutical industry and many other branches.

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