

PROCESSING OF 2-COMPONENT ADHESIVES AND SEALANTS

Protects material and process reliability

Industrial production processes become more and more demanding. The challenge is to combine growing production speed with flexibility and reasonable costing. In order to process 2-component adhesives and sealants under these aspects of material compatibility, it requires the use of intelligent dosing systems.

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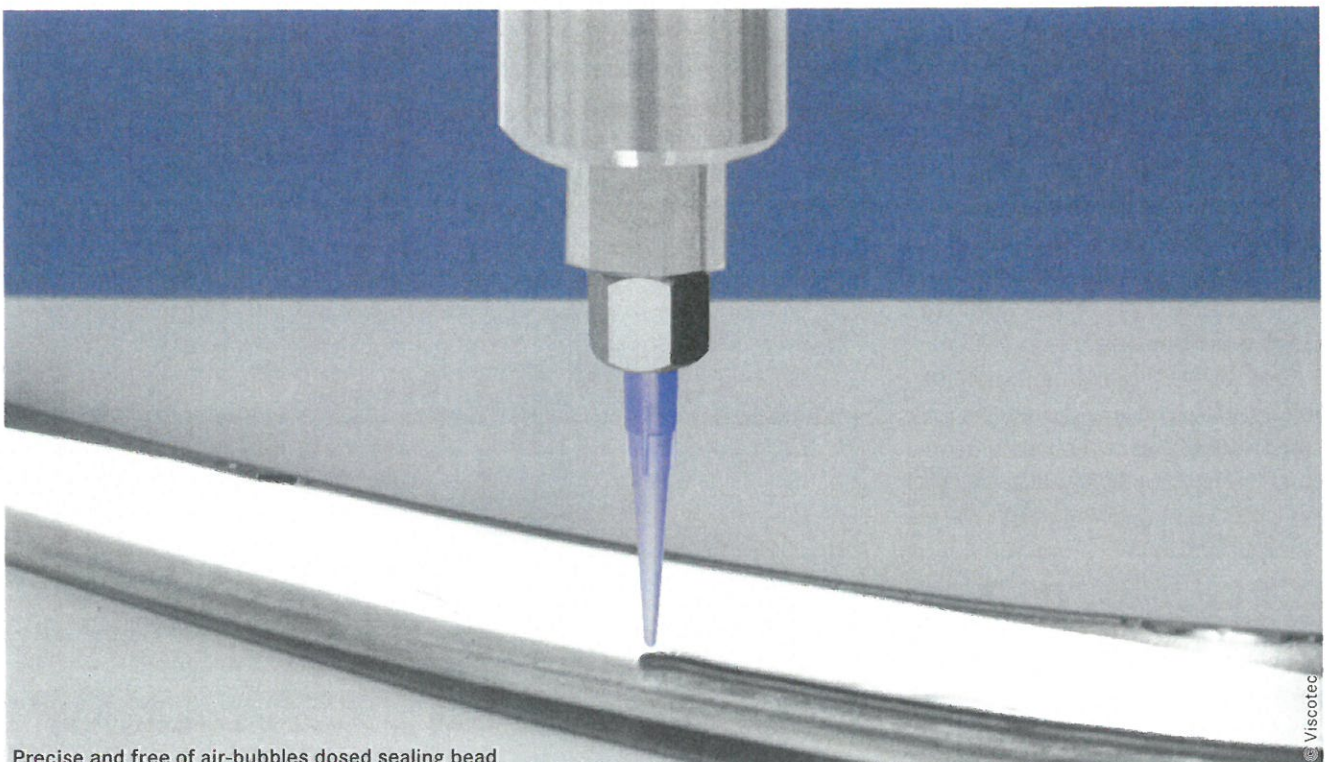
More or less flowable materials, modified and adopted in their adhesive and sealing properties depending on the specific application meet increasingly important functions in the production of components in many industries. In the automotive,

electronics and aviation industry, for example, more often 2-component material mixtures are being used. There are various demands on the process. The possibility must be given to prepare and dose a broad variety of materials – simple substances up to highly filled and abrasive media and so-called microballoons (smallest hollow glass spheres). In any

case, the focus is on the most economical option with the best quality result.

The specific dosing task

Dosing applications first of all depend on a defined shape of the component. In addition, certain observed contours and speeds must be modified. Critical ranges are curves driven at a slower speed



Precise and free of air-bubbles dosed sealing bead

to avoid accumulations of material and at the overlap of two stick ends as well. In the same way dripping or stringing of the pressurized medium at the end of each dosing task should be avoided.

Precise endless piston principle

Best preconditions for emptying from the bucket, preparation and dosing of materials offers the endless piston principle. The special dosing geometry guarantees a pulsation-free material flow. The interaction between the rotor and stator arise completed chambers with identical volume that does not change during the dosing process. Therefore it's possible to dose highly filled materials with low shear and low abrasion, without damaging the fillers

The adjusted dosing amounts are dosed precisely and with a very high repeatability. The medium is transferred from the suction to the pressure side of the pump. A dosing geometry without undercuts and a cavity-free construction design ensures a constant flow according to the first-in-first-out principle. Due to their small size, the dispenser can be directly placed on the application position. The systems can operate at low pressures and stop by the continuous flow system pressure fluctuations. The dosing volume per round is defined by the chamber volume. A change in the rotation speed of the rotor causes an immediate change of dosing.

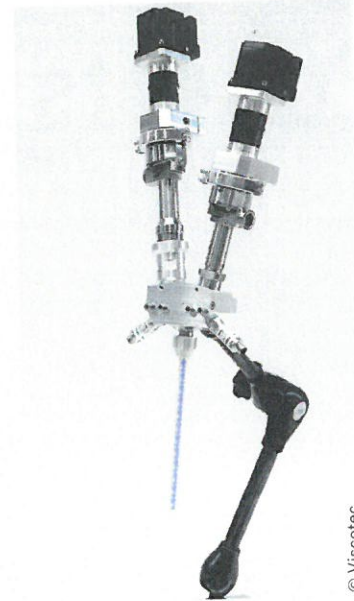
Gentle processing

By selecting the proper pump size and geometry, it is possible to operate the rotor speed within an optimal range, and so the abrasion and shear forces in the metering system be kept to a minimum. Due to the selected material combination (rotor firm – stator soft) the fillers within the medium will not be broken or damaged by the “rollover”. Stator materials with different elastomer grades provide the necessary chemical resistance against ingredients from adhesives, solvents and sealants.

Dynamic application of material

The endless piston technology works strictly volumetrically and independently of viscosity. The dispensers have got a linear characteristic dosing line. That means, the dosed quantity is directly proportional to the selected rotational speed. This fact guarantees a speed proportional dosing amount, which can simply be adapted to the robot speed. The setting of the dosing amount is dynamically adjustable in an analogue voltage range from 0 to 10V. Precise bead applications can be dosed precisely with a high repeatability in tracked position and track cross-section at speeds of axis or robot system. When starting and stopping the bead dosing, the dosing rate can be increased or reduced uniformly over ramps, so at the final point of the dosing the connection between start and end of the bead is implemented with a constant diameter without too much material (bead factor <1%).

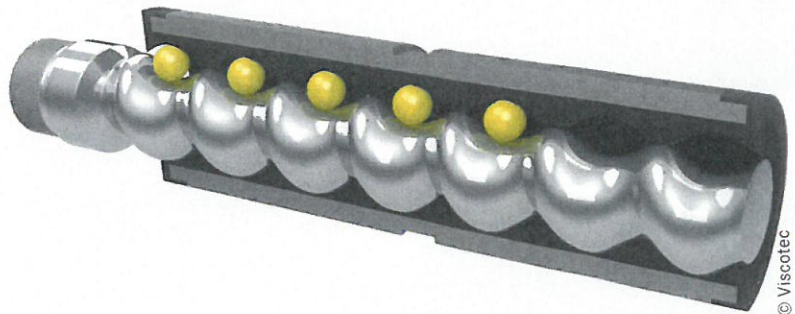
To rarefy the dosing process in the microscopic scale, even the acceleration or deceleration ramps can be modified. Also used individually, the dispenser has an integrated programmable controller, easy to parameterize. For example a programmable metering quantity in the dosing-amount-mode can be specified which will be started by a trigger signal and dosed with a reliable and ex-



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The direct connection of the endless-piston metering dispensers to the mixing head with short channel lengths ensures maximum process accuracy and gentle product dosing.

act volume. Theoretically endless beads can be varied in diameter by speed control or by changed speeds kept constant. Further a self-controlled suck-back can be programmed to slack the medium in the dosing needle after the dosing procedure. This prevents dripping of low-vis-



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Between rotor and stator the pump system forms a sealing line. There are no additional valves needed to prevent dripping or stringing of the dosing material.



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With the endless piston technology consistently high accuracies can be guaranteed throughout the application process.

cosity media and minimizes stringing of high viscosity materials. Therefore a cut-off string can be served significantly controlled.

Speed and precision

While dispensing it is necessary to ensure that the layer of the applied adhesive – particular at bead dosing – can be observed precisely and repeatable. This is firstly required to guarantee, for instance, the precise position of an adhesive line. However, the active surfaces of the light sources to initiate the curing process are partly limited in the area sizes, so that the position of an adhesive application is precisely defined, in order to achieve an accurate position curing.

In a dynamic job as the bead application on moving axes the repeatable as-

sembly of the dosed adhesive is mainly determined by the precision of switch-on and switch-off of the used system and the possibility of a programmable withdrawal option.

Specified reaction and curing times require also high accuracy limits at the dosing amounts and uniform bead geometries. The endless piston technology guarantees high repeatable dosing amounts and also offers the qualification for accelerated work processes and optimized cycle times for individual adjustments.

End-to-end Process Monitoring

To watch over all a modern control technology based on an operator terminal with touch-screen handling is established for the system configuration, process parameter settings, system calibration and the handling of the entire service menus. All views are clear and intuitive to use within a newly developed user interface; as well as the on-line display of the current process parameters.

Economically due to the modular structure

In order to ensure a significantly improved system operation, maintenance and replacement parts at module level, now a modular structure for the configuration of 2-component dosing system was introduced within the endless piston technology. In particular the focus was on reducing maintenance time and reducing of the of spare part-costs, storing of spare parts as well as the flexible usage of different types of mixers.

Both cleaning and maintenance work can be realized in segments from now on. It is no longer necessary to disassemble and re-assemble the whole 2-component dosing system. As well the range for parts exchange and the necessary spare parts stock has been optimized. Cost savings also result from the design of the wear-resistant 2-com-

ponent module that recently can be manufactured in stainless steel.

Material processing

An important requirement for minimum tolerances is to provide a homogeneous dosing material. A consistent and reliable supply of media ensures a material processing system. It allows the system filling and simultaneous material supply under vacuum conditions. The way of the medium in the pulsation-free flow rate with precisely defined volume follows also the endless piston principle. The process functions product buffer, material processing with the option of recirculation and inline product degassing provide optimal conditions for a continuous production process. Air bubbles in the applied adhesive bead can be prevented reliably by the degassing process.

Conclusion

Wherever materials need to be applied accurate and reliable, the use of continuous piston pumps, whose function is based on the volumetric dosing principle, is recommended. The dosing precision over a wide range of low to high viscous fluid types and even with high filler contents are achieved repeatable. The capability characteristics are preserved both in 1-component materials as well as in the processing of 2-component media in more different viscosities and simultaneously use of strongly various mixing ratios. ■

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