

IN THE MIX

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RANGE OF METERING SYSTEMS UPDATED

2016 saw the launch of the revised range of metering systems tailored for the moulding of silicone rubber for a variety of applications. The year saw a large increase of system sales into the Asian manufacturing sector when the mobile device sector increased the use of seals on the system chassis to make the units

more tolerable to immersion in water.

To meet these small volumes, many impression moulding processes the team in Guangzhou adapted the SilcoStar e-flow and 924 systems to work as a constant pressure feed.

The utilisation of servo drives on both the E-flow and 924 enables the system to maintain pressure and use almost no energy. The system is constantly monitoring mixer pressure and as soon as a drop is detected, the system reacts and delivers on ratio silicone to the moulding machine.

The SilcoStar 924 system was shown at the recent K show at Dusseldorf. This system uses the traditional hydraulic drive system to power the metering pumps with the robust linked drive ensuring the materials are always on ratio. The unit has the drum level monitoring system and variable volumetric chambers to ensure the materials can be dispensed fully from the supplied containers.

These new adaptations of the range supplements the range of systems already in production and being used throughout the world.





E-Flow at K

904 at K

The work horse of the range, the 922 is still being produced for standard applications of LSR from 205 litre drums. This cost effective unit offers exceptional value with many examples still in production after 15 years service. The 2017 version of the machine shares the same chassis and frame as all the 205 litre systems.

The rest of the SilcoStar range is still delivering working solutions for the mass production of silicone components. These include the Process Flow Mix Servo Electric being used from a centralised material supply and local metering units enabling healthcare manufacturing systems to position the material handling and supply some 15 metres away from the moulding machine.

COATING A GLASS FIBRE MAT WITH HEAT ACTIVATED FOAM PU

OVERVIEW:

The customer required a method to spray a heat activated 2-part polyurethane foam directly onto glass fibre mats for the purpose of creating structural panels in the automotive industry. It was essential that the spray pattern was consistent and replicable with an estimated volume of ~2000ml per part.

SOLUTION PROPOSED:

The system proposed was based on our PGM 320 range of machines with the following options:

2KM control system: Microprocessor based control system with embedded 12" touch screen PLC for operator interface. Software locks for entering and storing information. Graphical display based on 1024 x 768 dpi screen.

Flow meter monitoring: Gear type flow meters to monitor application ratio and generate an alarm if deviation from set point detected.

45 litre pressurised vessels: to ensure the gear pumps are loaded with material correctly and to prevent cavitation.

Electrically controlled agitation:

Electric, low speed agitation to the 'A' side, to ensure the powder colour remains homogeneous and maintains the fill profile.

Vessel heating: Electronically controlled heating was applied to the material vessels to ensure the viscosity of material was not affected by ambient temperatures.

Bulk feed transfer system: Automatic bulk feed transfer system, controlled by level sensing probes within the material vessels.

2KM spray adapter: Air operated atomising adapter for the purpose of spraying low viscosity materials.

RESULTS:

After successful trials of the material with the PGM 101 system the customer expressed an interest in further control and user interactivity beyond the scope of a PGM 101. A PGM 320 system was proposed, The Process Gear Mix 320 carries the 2KM designed microprocessor based control system, which has the ability to control the whole process as well as monitor and adjust the ratio of the materials being applied.

The metering of the materials is done with the precision metering pumps fitted with pressure transducers.



ACCURACY IN DISPENSING

In dispensing adhesives and solder paste for medical device and electronics assembly, all types of dispensers have traditionally relied on pneumatics to "push" the material out of the barrel reservoir. Unfortunately, problems inherent with this type of dispensing, such as inconsistent dots due to variations in air pressure, changes in viscosity due to build-up, and, in the case of solder paste, separation of the paste and flux due to pneumatic exertions.



2KM offers an air free dispensing system that eliminates the variations of air pressure dispensing. The system combines the precision of linear drive technology, the intelligence of microprocessor control, and the costeffectiveness and flexibility of plastic barrel reservoirs. With this system, exact amounts of adhesive can be dispensed without variations in applied pressure, without problems with moisture and changing viscosity, without degradation and in repeatability as the amount of material is reduced within the syringe during dispensing.

PNEUMATIC DISPENSING

Commonly known in the industry as "time/pressure" dispensers, pneumatic

dispensers are the dominant means employed by hand-held, bench-top and automated systems in delivering small quantities of adhesives and solder paste for electronics assembly. Time/pressure dispensers are simple in design, they consist primarily of a plunger, or piston, and a syringe. Pulsed air from a compressor is applied in such a way that it "slaps" the top of the plunger in a rhythmic pattern, moving the plunger forward in the syringe. As a consequence, the pulses of the air supply create a degree of turbulence in the fluid as material is pushed out through the needle tip at the end of the syringe. The volume dispensed depends on the viscosity of the material, air pressure, and amount of time the pressure is applied. Therefore. while time/pressure dispensers are relatively inexpensive, this one advantage is overshadowed by a number of distinct disadvantages.

AIRFREE DISPENSING

The AirFree[™] dispenser differs dramatically from time/pressure dispensers because it operates without air supply. A crosssection illustration of the AirFree[™]



dispenser, Small dot volume (SDAV), medium dot volume (MDAV) and large dot volume (LDAV) models are available.

The LDAV provides dot volumes as small as 0.001cc at 3 Sigma for a 3cc syringe, the MDAV provides dot volume as small as .0005cc at 3 Sigma, and the SDAV achieves dot volumes as small as 0.00025cc also, at 3 Sigma for a 3cc syringe. The dispenser employs a linear actuator and a mechanical lead screw which lowers a piston on command from a microprocessor control unit to push the material through the syringe and out the tip. An interference fit between the plunger and syringe ensures against leakage of material and loss of pressure.

Key to the smooth operation and precision movement of the dispenser is how the screw travels along its axis, which is what makes this dispenser different from all other dispensers on the market. The linear actuator moves the plunger in the syringe by rotating a nut between electrically-charged poles.

The lead screw threads through the nut; the dispensing housing captures the top of the screw and prevents the screw from rotating. When actuated, the nut steps from one magnetic pole to the other, causing the screw and plunger to move outward. With AirFree[™] dispensing, control is achieved with the linear drive system and not by the size of the needle. Since the proper needle size can now be used for the material and the application, the adhesive is in a relaxed state and dispenses smoothly. Materials with fillers remain homogeneous. Tunnelling does not occur, and without air, no infusion of moisture or other contaminants is possible. Also because of the mechanical action of the lead screw, precise dispensing is achieved, even with changing viscosity.

The lead screw and plunger represent improvement over an auger mechanisms as well as pneumatic systems. With metering valves, the adhesive is compressed between the auger thread and the housing as it moves through the pump. As a result, changes are possible in the properties of the material. On the other hand, because the mechanical screw in the dispenser attaches to the piston and never touches the material, dispensing occurs without crushing the adhesive.

SOFTWARE

The dispensing "gun" with the mechanical lead screw is one component of the dispenser system. Companion to the dispenser is an intelligent microprocessor that provides precise control over volume output, based on the prescribed dispense rate

and the known inside diameter of the syringe being used. The control unit automatically calculates the distance the plunger must travel forward and backward for the correct shot size. The operator only needs to calibrate the system at the beginning of the process.

Once calibrated, the dispenser delivers the shot volumetrically, which means that even if the viscosity changes, the shot size is repeatable, dot after dot. The intelligent microprocessor will even track the amount of adhesive in the syringe, so that an incomplete shot at the end will not be fired.

To prevent dripping of material from the tip after a deposit, the dispenser is programmed to automatically draw the plunger back, causing the material to recede slightly within the tip. The microprocessor calculates the distance travelled forward and back so that on the next dispense cycle, the correct volume is dispensed.

When potting or beading with a compressible fluid, a delay can be built in at the end of the forward motion of the plunger, before the drawback, to ensure complete dispensing.

PERFORMANCE COMPARISONS BETWEEN PNEUMATIC AND THE DISPENSERS

Circalok 6755 is an olefin-based grease used in electronics manufacturing. The following chart demonstrates the superior process control of the dispenser over a digitally timed air pulse dispenser. The test sample is the second 85 dispenses or better known as the midsection of the barrel reservoir. Overall the dispenser maintained a repeatability standard deviation of .0057 versus a standard deviation of .0389 for the air pulse dispenser.



CONCLUSION

Pneumatic time/pressure dispensing has been around for a long time for handheld, bench top, and automated requirements; and users have been forced to live with system idiosyncrasies, waste, and lack of reliability. With the continuing trend toward smaller components and pitches, systems are fast becoming impractical because of their inability to deliver the required precision with consistency. AirFree[™] dispensing, a technology new to the market, overcomes the limitations of pneumatic dispensing systems to provide highly accurate and repeatable deposits without the material dripping at the end of the dispense cycle. The combination of the proprietary dispensing mechanism, microprocessor control unit, and inexpensive plastic syringes results in an economical system and - as supported with actual test data - a level of performance unobtainable with pneumatic-based dispensers.

2KM UK SECURE A PERMANENT BASE



After 5 years of leasing their building, 2KM UK have purchased the property at 1 Buntsford Park Road, Bromsgrove. The decision was made after their banking partner, Nat West Commercial, advised them of excellent interest rates and the availability of funding.

After consulting with local commercial property specialist John Dillon, agreements were made with the landlord and the sale was concluded.

2KM used their solicitors Higgs & sons to restructure the company allowing employees to become part of the management team and a more streamlined line of contact with 2KM (UK) subsidiary in Spain. The new structure sees directors Rob McLaren and Andrew Halton purchasing 49% of the company from 2KM (GmbH) Germany. This property has and will continue to play host to 18 employees of 2KM UK Ltd. The larger base in Bromsgrove allows employees to cover all aspects of 2KM work under one roof, from marketing, the manufacture and service of machines in the Offshore, composite, film and rapid prototyping industries.

Rob McLaren, managing director of 2KM (UK) Ltd, says:

"2KM has been operating in the UK since 1986 through distributors and then formed the UK side of the business in 1998, centred in Bromsgrove. It has had steady growth to the current turnover of around £3,000,000 per annum. Two years ago the company started to manufacture machines in the UK and thought it was an ideal time to establish a permanent base in the Midlands."





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