



# Exact!

Hilger u. Kern / Dopag Group

Application stories

Issue No. 11

## The future of proportionally controlled metering technology has begun!



**modis**  
Modular Dynamic Dispense System

modis is a highly dynamic state-of-the-art metering and dispensing system newly developed by the Hilger u. Kern / Dopag Group for applying adhesives in the automotive and automotive supply industries.

modis offers a completely new vision of a more effective and economical production process to the automotive industry user. Designed to fit neatly onto the end of a robot arm, this lightweight and compact system proportionally controls the metered flow rate of the adhesive in real time making for instantaneous adjustments demanded by the robot path and speed.

Applications that require a non-circular section bead such as windscreen bonding, are accommodated by the provision of a rotating nozzle in order to precisely orientate triangular or other styles of beads.

The efficiency factor  $\eta = 1$  is mainly achieved through special construction and control solutions which eliminate gear pump slippage. But there are much more advantages such as:

- Highly dynamic, speed proportional control of flow rate
- Dead volume-free construction
- Modular configuration and optimised construction for minimised service and maintenance
- Application oriented equipment such as rotating nozzles for additional degree of freedom
- Optimised weight



## Membrane dispensing valve is a huge hit

Feedback comments from customers across the world are growing in praise of the DOPAG membrane dispensing valve, launched by the Hilger u. Kern / Dopag Group just over twelve months ago.

Typical of reactions from users is one received by Steve Chandler, Spares Co-ordinator for DOPAG (UK) Ltd., who recalls a recent conversation with a user who reported that his valve had fired more than 15 million shots in only 2 months use without even any sign of leakage.

Designed to eliminate breakdowns common in standard dispensing valves caused by fluids leaking either to atmosphere or into the pneumatically powered section of the dispensing valve, the membrane dispensing valve makes use of an impenetrable membrane seal and has proved in a production environment that "It does exactly what it says on the tin."



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## Making blades

Gluing together and finishing wind turbine blades calls for innovative metering, mixing and dispensing systems



In the previous issue of Exact!, we looked at the vacuum supported resin infusion process used to introduce two component resin into fibre matting during the production of rotor blades. Following the demoulding of the two halves, they must be bonded together and finally finished with a smooth outer coat.

As with the vacuum supported infusion system, one of the most important aspects during the bonding of the two halves is to ensure total accuracy of the mixing ratio. This is a vital point since the life cycle of a wind energy system is directly connected to the mechanical attributes of the rotor blades.



DOPAG ELDO-MIX Glue Resin System

After all, approximately 600 kg of adhesive is applied to the mating surfaces during the bonding process. This procedure must be finished within a defined period, as curing of the mixture must not start before the assembly process is complete.

The ELDO-MIX Glue Resin System, from the Hilger u. Kern / Dopag Group has been especially developed for this purpose and is available as a static or mobile version. The mobile version can be moved parallel to the blade during the application process.

The adhesive is a pasty, thixotropic two component resin with a viscosity of up to several hundred thousand mPa s. The material is sometimes required to have gap filling properties and one or even both components are filled with glass fibres to ensure the stability of the finished product.

To reach a satisfactory output rate of 12 l/min (maximum output rate of the ELDO-MIX system is 20 l/min) with these material characteristics, the filling/refilling of the metering pumps must be guaranteed. For this reason, follower plate mounted eccentric spiral pumps are used to feed directly from 200 l drums.

Gel coating is used to protect the rotor blades from environmental conditions and is

either applied into the moulds prior to the vacuum supported infusion process or as the final process, following bonding.

The ELDO-MIX Gel Coat System can typically reach output rates of between 2 and 5 l/min. The "A" component, which has a viscosity of approximately 35.000 mPa s, is fed through gear pumps, whilst the "B" component, which has a much lower viscosity of around 3.000 mPa s, uses magnetically coupled axial piston pumps.

The advantage of these types of pumps is that through their design and construction leakage is not an issue, even with speed frequency or back pressure changes. In addition they are hermetically sealed, which is important particularly for the "B" component as the hardener is hygroscopic and can form potentially damaging crystals.

The mixing ratio can be adjusted to suit the application; in this case it is mostly within the range of 100:30 to 100:50, whether working with polyurethanes or epoxy resins. Material is normally supplied by material pressure vessels mounted onto the chassis. During break times, the system is connected to a refilling station where the vessels are automatically refilled directly from 200 l drums.

The Hilger u. Kern / Dopag Group has already installed more than 30 such systems and each complete production line normally consists of three or four Resin Infusion Systems, two Glue Resin Systems and a single Gel Coat System.



DOPAG ELDO-MIX Gel Coat System



# Giving waste the brush off



## Installing a DOPAG VARIO-MIX reduces waste and boosts productivity for a South African paintbrush manufacturer



RPS Marketing Manager Vanessa Bowes with Hamilton Brush's Plant Manager M. P. Malherbe



When the time came to upgrade their brush potting facility, Hamilton Brush of Cape Town, South Africa, needed to be certain that any new equipment would not only increase productivity in line with demand but would considerably reduce the resin wastage that they currently experienced.

Operations Director Ian Knight was keen to point out that "Having a state of the art system that is supported locally is a huge positive factor for us." So after having considered a number of alternatives and following advice from local Hilger u. Kern / Dopag Group distributors RPS, they decided to invest in a DOPAG VARIO-MIX system.

The brush potting process involves metering, mixing and dispensing measured shots of two component epoxy resin at a mixing ratio of 100:20, into the brush ferrules after the bristles have been inserted, so as to firmly fix the bristles in place.

The existing system had been in use for a number of years and was showing signs of considerable wear, so much so that the accuracy and consistency of both the mixing and the shot size were open to question.

Additionally, mixing of the two components was achieved by means of a dynamic mixer, which required frequent and wasteful flushing of the mixed material in order to avoid curing

within the mixer leading to unwanted blockages, which meant that a great deal of care was required to ensure that the pot life of the mixed resin was not exceeded.

Crucially, since the introduction of the DOPAG VARIO-MIX system, Hamilton Brush has seen their productivity levels improve by an order of magnitude and they are now capable of producing significantly more brushes per day, from 12 mm right up to 100 mm in width.

Perhaps even more important, has been the introduction of the DOPAG twin dispensing valve fitted with disposable plastic static mixers, which has completely eliminated the possibility of blockages caused by mixed material within the dynamic mixer exceeding it's pot life, with the resultant down time and material wastage.

Most important of all though, has been the increase in confidence that has resulted from the consistent accuracy of the shot size.

Commented Ian Knight: "Our investment in a DOPAG resin dispensing system has resulted in the achievement of our productivity goals, which has given us a far higher level of confidence in the quality of the products that we produce."

**"Our investment in the DOPAG dispensing system has resulted in the achievement of our productivity goals."**

*Ian Knight, Operations Director, Hamilton Brush*



Dispensing the mixed epoxy resin into the paint brush ferrules via a disposable plastic static mixer



# Fixing the kitchen sink



## Improving quality and saving costs for a major European kitchen worktop manufacturer

Located in the town of Bjerringbro in Denmark, Implast is a subsidiary of the HTH business unit of Swedish group Nobia AB, one of Europe's largest manufacturers of fitted kitchens and bathrooms, who boast such household names as Magnet, Invita, Optifit and Poggenpohl amongst their brands.

Implast, who were founded in 1967, are themselves Scandinavia's largest manufacturer of laminated worktops for both kitchens and bathrooms, a considerable proportion of which are required for Nobia's Nordic operations.

In 2005, Implast produced over a quarter of a million worktops and as Nobia's Nordic operations have grown, so Implast's output of worktops has also grown.

Implast's production capacity is now projected to increase by 30% following a factory expansion programme, planned to meet the rising demand. The capacity will also increase through more effective production processes, a review of which will be completed 2007 with the goal of increasing capacity by a total of 65%.

A small part of this programme focuses on the permanent fixing of kitchen sinks onto worktops by means of an adhesive.

Implast have been using a two component epoxy resin adhesive manufactured by 3M

for this operation for some time, with very satisfactory results. Its properties are perfect for their purpose, having outstanding stability under static loads coupled to high strength and excellent ageing characteristics.

However, the adhesive has previously been proportioned and mixed by hand, a process that can lead to the possibility of producing discrepancies in the mix ratio, which would alter the properties of the adhesive.

Additionally, the adhesive has a working life of less than ten minutes once the two components have been mixed, which can result in wasted material should more material be mixed than is needed for immediate use.

For these reasons, Implast chose to invest in a system that would accurately proportion the two adhesive components automatically, whilst at the same time dispense mixed adhesive only on-demand, thus eliminating the possibility of off-ratio adhesive whilst simultaneously reducing adhesive costs by mixing only the amount of adhesive that was required for each application.

The DOPAG ECONO-MIX C, recommended to Implast by DOPAG SCAN, has since proved to be the ideal solution for this application, proving to be quick, accurate, less wasteful and easy to use.

The DOPAG ECONO-MIX C is a compact double acting piston pump system driven by a reciprocating air motor, that has the ability to process two component medium viscosity materials, such as adhesives, polyurethanes, silicones and epoxy resins that have a required mix ratio of between 100:100 and 100:16. The mix ratio is infinitely variable between these two limits.

In this particular case, the epoxy resin is required to be proportioned and mixed at a ratio of 100:50 by volume.

Since the base component of the epoxy resin is of a higher viscosity than normal, such that it will not flow easily, it is fed to the inlet of the ECONO-MIX system by means of a DOPAG P30 drum pump, rather than utilising the standard pressure feed container.

However, the catalyst component, being of a lighter, flowable viscosity is fed directly from an on-board pressure feed container.



The base and catalyst components are proportioned by the ECONO-MIX metering pumps and fed under high pressure via flexible hoses, to the hand held twin snuffer dispensing valve.

Both components are kept completely separate until they enter the mixing block portion of the dispensing valve, which is fitted with a disposable plastic static mixing tube, where they are homogeneously mixed before being laid in bead form by the operator onto the worktop.

Should production cease for a period of time longer than the pot life of the resin, the mixing tube can simply be discarded and a new one fitted, avoiding entirely the necessity of flushing with solvent.

The system has proved to be a great success and has achieved the objectives of saving costs and time as well as improving quality.



DOPAG ECONO-MIX C



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# Speeding up encapsulation



## Scottish automotive electronic assembly manufacturer increases production with help from DOPAG MICRO-MIX

Founded in 1974, EMA is a privately owned contract electronics design and manufacturing company located in Glasgow, Scotland.

With an annual turnover of around £3 million their specialist expertise lies in the design and manufacture of RF, automotive, and security products and they believe they are probably the only contract design and manufacturing company in the UK to combine Tier1 design and manufacturing capabilities with a focus on mid-to-low-volume products.

One such product currently in production for the automotive sector is a housing for an exhaust gas recirculation sensor.

The production process includes the requirement to encapsulate a 10 mm square Printed Circuit Board which has been inserted into the component.

When completed, the assemblies are loaded into trays before being presented by the operator beneath a dispensing point where 1 ml of mixed two component silicone is metered into each housing to encapsulate the PCB.

The silicone is mixed at a ratio of 100:100 by volume and it is important that when cured there remains a degree of flexibility to counter any vibration that may be caused by the movement of the vehicle's engine.



Metering the mixed silicone onto the assembled PCB's

The two components of the silicone encapsulant arrive at the factory in 18 kg drums and are fed separately to a DOPAG MICRO-MIX E metering, mixing and dispensing system by a pair of diaphragm pumps.

The MICRO-MIX E is a pneumatically driven shot type piston pump plural component metering, mixing and dispensing system, designed to meter pre-selected shots of two component materials on demand.

It has a variable mixing ratio capability that can be set between 100:100 and 100:20 ratio by volume.

The two shot pumps are driven by a reciprocating air motor that transfers its power to the pumps via an adjustable lever system that allows both the mixing ratio and the shot size to be adjusted.

The system is fitted with a twin snuffer dispensing valve which is able to create a vacuum in its outlet when shut off, ensuring that unwanted drips do not occur.

The two components of the proportioned silicone are kept entirely separate until they reach the outlet of the twin snuffer valve, at which point they enter a disposable, plastic static mixer.

In order to ensure consistency of the dispensing location, the plastic mixer tube is inserted into a metal shroud that compensates for any longitudinal inconsistencies that might be present in the plastic mixer tube.

In the event of mixed material exceeding its pot life and subsequently curing in the mixer, it can simply be replaced at minimal cost, whilst avoiding the time consuming, expensive and environmentally damaging alternative of solvent flushing.

Since installation of the MICRO-MIX E system, EMA have been able to speed up the production of these components by approximately 50%, thereby satisfying the high volume production requirements of their customers.



# The world's leading composites event



JEC lays claim to be the largest composites show in the world, with around 900 exhibitors. The exhibition is held annually at the Paris Expo at Porte de Versailles and in April the Hilger u. Kern / Dopag Group were again exhibiting in the form of DOPAG France and Hilger u. Kern.

With major increases in demand particularly in the leisure and wind energy markets worldwide for composite materials, the Hilger u. Kern / Dopag Group are well placed to take advantage of this increase with a newly developed range of ELDO-MIX resin application systems.



## International sales meeting at Electrolube

In April DOPAG (UK) Ltd., were given the opportunity to present their capabilities in the grease metering and two component encapsulating markets to delegates from Electrolube at their international sales meeting, held in Ashby de la Zouch in Leicestershire. 25 delegates from France, Germany, Brazil, Australia and China as well as the UK, were in attendance.

Electrolube are a division of HK Wentworth Ltd, who are a leading manufacturer of electro-chemicals for electronics and industrial manufacturing as well as specialist lubricants to the automotive, industrial and domestic switch manufacturing sector.

## See us around the world

The Hilger u. Kern / Dopag Group will be exhibiting at the following exhibitions during the remainder of 2007. Please come along and see us if you can.

- |   |                        |   |
|---|------------------------|---|
|  | 24 - 27 September 2007 | EXPOBOND on MOTEK, Hall 7, Stand 7222<br>Stuttgart, Germany |
|  | 03 - 05 October 2007   | EUROFINISH, Gent, Belgium                                   |
|  | 16 - 18 October 2007   | MAINTAIN, Hall 3, Stand 303, Munich, Germany                |
|  | 24 - 28 October 2007   | KOMAF, Goyang, Korea  |

### Editor

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## Hilger u. Kern / Dopag Group

Hilger u. Kern Dosiertechnik • Käfertaler Strasse 253 • 68167 Mannheim • GERMANY  
Tel. +49 621 3705-0 • Fax: +49 621 3705-200 • dosiertechnik@hilger-kern.de • www.hilger-kern.com  
DOPAG Dosiertechnik und Pneumatik AG • Langackerstrasse 25 • 6330 Cham • SWITZERLAND  
Tel. +41 41 7855-757 • Fax: +41 41 7855-700 • info@dopag.ch • www.dopag.com