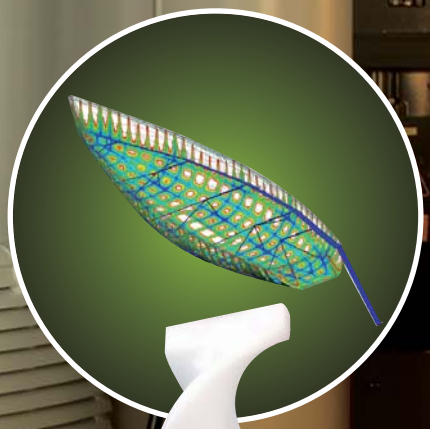
Q2 | Newsletter 2014

IN THE MIX



WHAT'S NEW

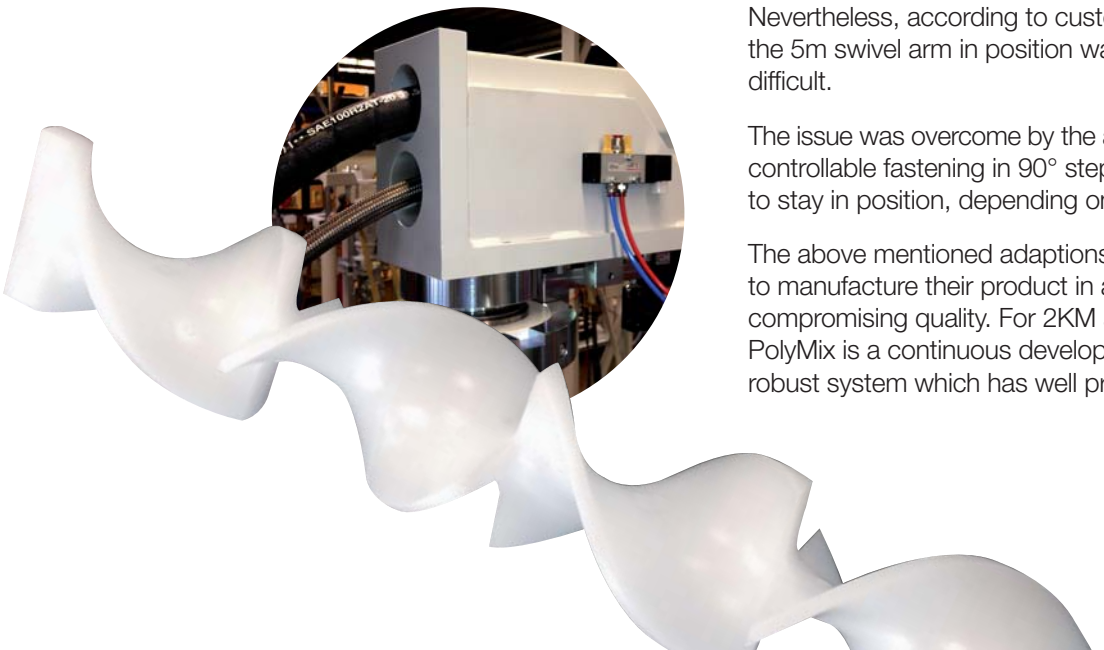
Challenging Vacuum Infusion

The PolyMix Celebrating 10 years

THE POLYMIX

An ongoing development to answer the Market Requirements

It has been 10 years since 2KM released the first version of the PolyMix machine series in the market. The basic principles of a 4-pumps metering system have stayed the same, as it has turned out to be the most reliable concept.



This machine, used in several projects around the world has been subject to many adaptions driven by the customers' feedback and latest industry developments.

The market needs started shifting towards a continuously increased output which the standard static mixers could no longer support. 2KM, responded by developing a new type of static mixer whose diameter is twice as large as that of a standard mixer.

Additionally, a mixing block with inner ball valves with its injector, contributes to a rapid mixing of the processed polymer. Finally, the plastic disposable mixer elements make the service process easier.

As the process of injection moulding kept progressing, many customers started requesting material application directly into the mould. The addition of a high and long swivel arm provides a self-sustaining welded profile able to even include the material hoses.

Nevertheless, according to customers' feedback keeping the 5m swivel arm in position was proven to be extremely difficult.

The issue was overcome by the addition of a pneumatically controllable fastening in 90° steps, allowing the swivel arm to stay in position, depending on the specific needs.

The above mentioned adaptions have allowed customers to manufacture their product in a shorter time, without compromising quality. For 2KM a machine such as the PolyMix is a continuous development process based on a robust system which has well proven its value.

Vacuum Infusion to New Limits

Direct infusion of a 203 ft Motor ship

Since 1976, **2KM** has been working in the manufacturing of mixing and metering units for the processing of liquid polymers. For the past 15 years the units for vacuum infusion from the **ResinMix** range have been an integral part of the product portfolio, placing us among the world's leading suppliers of machines for the production of wind turbines.

The knowledge gained on the specific process allowed us to structure the project in the most effective way. It was for example necessary to prepare the injection resin materials prior to the actual processing, which divided the production process into two separate steps, the processing, followed by the infusion.

Resin Processing

The plan was to vacuum inject 20 Tonnen Venyl-Esther resin into a mould in just one shot. Prior to doing this, the original material had to prepared, i.e. an additive was added to the basic resin material, making the latter reactive.

At the same time, the material was vacuum-degased, to avoid blistering at a later stage of the production process, which would have lead to a weakening of the laminate.

Once activated, the basic resin material had to be processed in the course of a defined time frame – in this specific case that period amounted to 5 days. The injection material was supplied in 1000 litre IBCs. A total of 32 IBCs had to be handled for the production process. However, with regards to the fact that even a shipyard only offers a limited space, it was necessary to develop a special concept assuring both a vacuum processing and at the same time a storage of the material. For this purpose, the material had to be pumped from a container, via the vacuum processing unit, into an empty container.

To make sure that the number of containers needed would not be doubled the emptied IBC was always used for the next processing step. This means that just one extra container was needed for the processing of 20 tons of material or 20 IBCs. The complete procedure was done in intervals and automatically controlled by the vacuum processing unit.

Direct Vacuum Infusion

Similar to the vacuum processing being a special task, the actual infusion, too, meant a step into a completely new direction.

For the first time, the processing was done without the usual buffer container.

Thanks to a specially developed distributor made by Messrs Polyworks BV (Nijverdal, The Netherlands), the resin material was injected directly into the mould, dynamically controlled and metered by a vacuum sensor. To be able to reflect the large dynamic range of this process, the popular asynchronous motors used so far had to be left out of this process. They were replaced by direct-current servo motors like the ones used in the robotics sector. Two redundantly working metering units were used for the expanded dynamic metering range, enabling a cast resin filling into the vacuum moulds of up to 120 kg material per minute.

The total filling process was divided into two steps, during the first of which 15 tons of material were processed, and in the second step another 6 tons were injected.

The successful outcome of this project has offered 2KM the opportunity to use the very same technology, supported by the powerful **ResinMix** series, in smaller scale projects.

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