

European Centre for Brunswick RIMFIRE™ Preform Technology



Plastech are pleased to announce that an agreement has been reached with Sea Ray, a division of The Brunswick Corporation, to implement the introduction of RIMFIRE™ to the European market. Plastech has secured the distributorship agreement and plan to establish a demonstration cell of this exciting new preform technology at their Manufacturing and Technology Centre based in Cornwall near Plymouth, England

RIMFIRE™ (Robotic In Mould Fibre Reinforcement) is a new patent pending, preform technology developed by Sea Ray, which employs a robot spray head to deposit chopped fibre directly into the mould cavity for immediate closed mould injection. Sea Ray received the 2003 Innovation in Manufacturing Process Award from the American Composites Manufacturing Association for this process.

To ensure that the deposited fibre remains accurately in place within the mould cavity - both horizontally and vertically - it is delivered in a dry binder format through an environmentally friendly thermal process directly onto the mould face.

The new system has already been

proven in the production of Sea Ray's many boat hulls and decks, utilising the added benefit of Plastech's MIT system (Multiple Insert Tooling) to feed the RTM production cells with MIT skins that are pre gelcoated, and loaded with the RIMFIRE™ generated glassfibre preforms. This is achieved without the need for any of the traditionally associated preform technology ovens, vacuum systems, or preform specific tooling. The preformed moulds are delivered on line just as easily as the gel coat is applied and therefore no extra labour or storage facility is required.

RIMFIRE™ operates equally well with multiple Light RTM mould faces by delivering the preforms just as efficiently, in fact the system is applicable to a range of closed mould processes including Vacuum infusion and SRIM (Structural Reaction Injection Moulding).

RIMFIRE™ brings tremendous cost savings when compared to the roll mat fibre traditionally used for these processes, reducing glass fibre costs by at least 50%. This degree of automation also delivers a significant labour cost saving by eliminating most of the dry reinforcement lay up time.

The application of glass of varying weight and thickness at specific points within the mould cavity is easily and accurately achieved through the use of robotics which provides consistency from one moulding to the next. For areas of high stress, engineered fabrics can be introduced either on top of, or within the chopped preform as required.

Plastech plan to have the RIMFIRE™ cell in operation before the end of the year and has dedicated 600m³ of their facility space to be used for this production cell, and subsequent moulding demonstrations.

To further provide characterisation, mechanical properties and qualification to RIMFIRE's™ prospective European end users, Plastech have joined forces with the University of Plymouth's Advanced Composite and Manufacturing Centre (ACMC).

Head of Department, Dr. Steven Grove said that the ACMC have enjoyed a long and successful relationship with Plastech and the composites department have agreed to support this new European RIMFIRE™ facility with their focussed research into composite structures, and qualification programs.



Robotic arm carries high output RIMFIRE™ fibre/binder dispense head



RIMFIRE™ offers repeatability, accuracy and cost savings.



RIMFIRE™ control software delivers accurate placement of glass preform.

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Seeing the Light - Safe, lightweight lamp posts look to LRTM for a brighter future



Spectralyte's pole production uses Plastech's PVSensor pressure control

Spectralyte, a newly established Dutch company producing 18 metre long composite street light poles for cities, villages and highways throughout the Netherlands have recently delivered their first major order to the market. The poles have been well received by

the end user as they are cost efficient to buy; are certificated for their unique crash safe properties and require very little in the form of heavy handling gear to install, and once installed they require no maintenance.

In co-operation with Brands Structural Products (technology and FRP suppliers to the region and Plastech's distributor for the Benelux), Spectralyte have developed their own Light RTM tooling variant to mould the exceptionally long tubular poles. Their proprietary tooling system basically comprises of a flexible tooling system over which the fibre layers are placed. A purpose built mould closing mechanism automatically encases the entire length bringing together and sealing the tapered flexible tool. A low internal pressure is used to maintain a concentrically even product thickness whilst the resin is pressure injected

under vacuum.

Spectralyte have achieved an optimized fill time by introducing an internal feed channel over the length of the flow path. The fine pressure balance required between the flexible tooling and the internal vacuum and injection pressure combination is ideally suited to the use of Plastech's PVSensor system. This maintains the precise and critical pressure control from their Megaject RTM Sprint meter mix machine. The Sprint used to inject the mould was supplied with a Catalyst flow sensor system which allows the precise monitoring of catalysation, and therefore production qualification for this structural component.

The streets of Holland look set to become a safer and brighter place with the introduction of Light RTM composite safety light poles from Spectralyte.

Three week deadline - From drawing to production

Dutch company KD Polyesterbouw recently took on the challenge of a production job that required an exceptionally rapid implementation of a closed mould system. With only three weeks to produce the master pattern, the tooling, and the first 10 parts of a floor pan for student housing, the Light RTM system was chosen. Technical support and encouragement was provided by Brands, Holland's main FRP supplies company, who advised that rapid tool build is now possible by using Plastech's LRTM accessories. - Brands offer a full range of seals and mould ancillaries readily available from stock. The application of channel

profiles and mould seals during mould build and provision of inserts and latch clamps ensured an accurate and speedy completion of the production tooling.

Due to the non-symmetrical shape two opposing injection points were chosen, and two catchpots were strategically positioned in the upper female tool half.

The product cavity was filled with Polymat from Flemings Textiles and the injection made using Plastech's Megaject RTM Sprint machine with Distitron 110LS, a special DCPD resin from Lonza. This has a specially adjusted curing system that offers good in-mould curing, resulting in no fibre print through on the surface of the moulding.

Care must always be taken when choosing a mould release agent for use with a DCPD resin system, as mouldings can be more difficult to release than those using standard GP polyesters. In this case Ferroglaze FS 10 series was used providing excellent release properties with the Lonza DCPD resin system.

Their client's target of achieving production just three weeks from master pattern was met, and with the first injection taking 15 minutes to fill the 6m² moulding it was de-moulded



Mr. Kalliski admires the first perfect part within the hour showing zero defects.

Composite moulders, KD Polyesterbouw produce many products for the building and automotive industry by traditional hand lay methods. After witnessing the instant success of the Light RTM system, the reaction of Mr. Kalliski, KD Polyesterbouw's chief was "We should have done this years ago!"

Readers operating in the Benelux countries should contact: Hans Struik, or Leen Schipper at Brands Structural Products - for full technical support, and supplies for the Light RTM process.



The 15 minute DCPD resin fill approaches the final catchpot

Decorative Glazing - Perfectly mixed, 100% bubble free resin

Decorative glazing with a crystal glass appearance is a commercial enterprise probably not associated with the closed mould, frp industry. However, Creative Plastics International has perfected a system of tooling and injection which produces glazing of outstanding beauty combined with advances in resin technology. Collaboration between three UK parties led to the formation of C.P.I. who by using a water-clear, polyester resin system and proprietary tooling techniques, have succeeded in producing this technically demanding, high quality product for their range of glazing designs.



C.P.I. Operative controls the CLEARCAST machine, Plastech's SSB development.

One of the critical production requirements calls for the injected resin mixture to be delivered to the mould cavity through a micro bore injection point with a perfectly mixed homogeneity and zero air entrapment from the meter mix machine.

Plastech and C.P.I.'s combined experience over several months led to the successful development of a machine model that met their criteria. The new 'Clearcast' machine now offered through C.P.I. combines simplicity of use with the accuracy and reliability to safely meter mix upon demand, precise volumes of resin mixture into closed moulds, without any optical distortion being present in the final decorative glazing product.



Examples of C.P.I.'s finished decorative glazing panels.

In essence, water clear resin is injected onto glass sheet to form the many different designs for door and interior window applications.

The high back pressure experienced by the machine's metering system due to the micro bore injection orifice, and

says C.P.I.'s chief Trevor Cox, and with Plastech responding to our demanding needs in the meter mix machine's design we are now confident to expand our licensed decorative glazing market throughout the world.

C.P.I.'s expertise in this field has also led to a patented system of tooling whereby the 3 dimensional cast designs on the glass are seam free with no discernable difference between the clear resin and glass substrate.

Further enquiries of C.P.I.'s licensed decorative glass technology is available from: Jason Ward, Creative Plastics International Ltd, Tel: 01795 43882, E-mail: creativeplastics@btconnect.com



the relatively small amount of resin used for each injection shot led Plastech to design a machine model specifically tasked to deliver bubble free perfectly homogenized mixes at slow flow rates.

There is absolutely no room for error,



New developments from

Film infusion - accurate digital resin pressure

As the film infusion process becomes increasingly more popular, especially for large, low volume composite parts, moulders are seeking a low cost method to accurately determine the vacuum level under the film as the resin is infused.

Spurred on by the success of their PVSensor system developed for the Light RTM process, Plastech has now introduced a new model specifically designed to be placed within the resin stream, directly beneath the film.



New style film infusion PVSensor is shown on the left

The larger PTFE sensor body is easily attached to the chosen zone by sealing it onto the film allowing it to communicate with the cavity through a minute hole pierced in the film. Mixed resin could enter the PTFE sensor body through this hole, however once cured it can simply be lifted free without any cleaning necessary.

Some users already adopt a method whereby the sensor is moved to new locations during infusion, whilst the hole left in the film can easily be plugged without the ingress of air.

In use the PVSensor first gives accurate confirmation that full vacuum has been achieved below the film prior to the start of the infusion, it is then able to detect and indicate the small differences in pressure present as the resin passes the sensor point.

With such a system it is now possible to accurately monitor both the low pressures associated with film infusion, and to control the input pressure to a safe sub atmospheric condition. - This now leads to the real possibility of employing machinery that



4 channel PVS selector

will mix on demand and deliver resin to the delicate film covered mould. This can be achieved with the assurance that the sensor system will control and indicate the meter mix machine's output, whilst staying within the demanding, low-pressure safe limits.

Further options available offer multiple sensor selection with readout on the system's digital display, by the use of a multiway sensor selection terminal box. In addition, the electronics can be configured with an additional 4-20ma analogue output for data logging connection.

New seals for Light RTM and RTM application



Standard and new wing seals

Recently introduced to Plastech's range of Light RTM ancillaries are two new seals. The traditional neoprene outer mould wing seal is now also offered in an alternative material.

The NEW Wing Seal is manufactured from high strength silicon, offering a far greater chemical resistance than the traditional neoprene wing seal, whilst maintaining stability of cross section over a much longer production life.

The existing neoprene wing seal can easily be replaced with the new 'pink' silicon version as their dimensions and profile are identical.

The NEW Heavy Duty Dynamic Seal is also available in high strength silicon, again offering a longer service life.

Consistent with Plastech's position as a market leader with volume sales of seals, channel profiles and tooling ancillaries, Plastech continue to offer the industrial moulder a one stop shop at the lowest prices.

New Turbo Autosprue Position switches



Turbo Autosprue with optional limit switches

An elegant design often offers an ideal solution and Plastech's new Turbo Autosprue Position Limit Switch attachment is no exception.

Pneumatic equipment available to the glass fibre industry is often manufactured from standard off the shelf components, and the automatic injection valves currently available worldwide stand testament to this by their use of standard pneumatic cylinders. Complex valve to cylinder mountings and adaptor plates are common to such designs. Plastech's TAS however goes against the grain in this respect by offering a design that negates the use of such cylinders.

Equally, when Position Limit Switches are required, manufacturers universally employ a side screw-mounted magnetic switch design, which is always subject to being knocked out of position, being adversely affected by the surrounding mould frame work, or just prone to the delicate wires and sockets being insufficiently robust for general production use.

Plastech's design team

Plastech's answer is to supply a combined valve and cylinder in one body, by designing the optional attached limit switches into the body. This illustrates a neatness of approach, and it could be argued that its design is far more appropriate to the task. Encapsulated mechanical switches are mounted inside the top limit switch block, providing reliable service even under magnetic interference. Featuring a robust, single cable connection with a locked and secure internal switch setting, the entire unit is protected by a fixed, 3mm thick machined aluminium housing.

It takes a little more effort and a degree of innovation to come up with a truly better design, but for Plastech, innovation is an inherent part of the design process and in turn this ensures that their equipment is constantly being improved to meet the harsh environment found in the real world of composite moulding.

New Heat Controlled Day Tank provides accurate resin injection temperatures



Day Tank with Mixer and PID control

The advantages of heating resin before injection are well documented - it

provides consistent and reliable production times, and in the case of epoxy resins it gives a marked decrease in resin viscosity which allows efficient flow into the mould fibre pack.

Plastech's new insulated, heated day tank not only provides the efficient heating of resin, but also recirculation and mixing features with efficient degassing qualities. Whilst the in line resin heater option is still available, the alternative new day tank system supplies heated resin to the machine from the very start of the injection at far more accurate temperatures.

The 60 litre stainless steel tank is wrapped within a large 0.5m² (5ft sq.) insulated jacket which has the electrical element safely bonded into the silicon jacket. A clamped tank lid supports the safe pneumatic mixer motor featuring an infinitely variable speed control that facilitates the mixing of resin and filler. At slow speed the recirculation / agitation of the contents maintains their even temperature, whilst providing an efficient aid to degassing and filler / resin homogeneity.

The lower tank outlet is supplied with a fluid filter, which can if preferred be fitted in line with the pump feed pipe. As all of Plastech's Megaject machines have the fluid recirculation feature, a fitting is provided at the top of the tank for this return flow and a clear glass window in the lid allows for safe observation of the flow during recirculation.

The Heater jacket is controlled using an electronic PID controller which gives digital indication of both set point and resin temperatures. A high level alarm can also be set, which will automatically and safely turn the heater off whilst indicating the alarm condition.

Clear thinking brings new development to Catchpots

The demand for Catchpots with clear lids remains high however the polycarbonate and other clear lids currently available carry the inherent problem of styrene attack which leaves them opaque and redundant after only a few injections. Plastech can now offer the answer to moulders' dreams - a Catchpot with a removable 120mm diameter, high temperature toughened GLASS window that is 100% resistant



New catchpot in use

to solvent and styrene attack. Should the glass ever need cleaning it can be immersed in clean solvent and dried without any loss of optical clarity.



New catchpot fitted with removable sealed window and resin arrestor

Light RTM moulds - Locking in repeatable accuracy

The need for accurate location on the x and y axis of LRTM matched moulds is often overlooked when building production tooling. It can be argued quite correctly that no location device is necessary in circumstances where a mould with a deep draw cavity is sufficiently deep to provide accurate x, y location. This is due to the voluminous style of fibre employed, and when loaded between the two matched mould halves it creates an equal pressure that is exerted globally. This positions the mould faces in equilibrium providing a natural positional accuracy.

This argument is not true however if the mould's draft is not equal on all sides, or in another case where it has very little depth of draft. For example: A truck hood shape would have three sides of reasonable draft depth, but the fourth side would be 'open'.



One M24 clamp/dowel station replaces at least 5 latch clamps

Equally a flat door skin mould would have almost no depth of draft.

In the truck hood example, when closing the mould there would always be the likelihood of the back half of the mould sliding out of true registration towards the 'open' edge, as there would be little or no fibre resistance to prevent it from doing so.

With the flat door skin example, by the very fact that the mould has little or no draft, the mould could easily be closed out of line, thus creating the prospect of unpredictable peripheral resin fill characteristics.

To overcome the possibility of these scenarios it is wise to design the mould with location pins more commonly known as mould-tool dowel locators to avoid such inaccuracies. We see a variety of such devices and designs for mould location - some are built into the



Clamp/Dowel Station complete

mould flange in the form of moulded, shaped cones, whilst others prefer flange corner angle protrusions locating on the edge frame it is a simple task to fit the corresponding contra mould half.

Plastech have for many years been manufacturing the more accurate, heavier duty, steel framed RTM moulds and many applications have demanded repeatable accuracy able to hold better

than 0.1mm tool location. With this background it has been proven that some of this technology has now found a place in the manufacture of LRTM moulds. The use of Plastech's proprietary M24 clamp/dowel station is found to be the most cost effective method to not only locate precisely the matched moulds, but also to

provide a very effective and fast pre-injection clamp fixing.

Unlike RTM moulds that required the clamp/dowel locators positioned every 600mm around the mould edge, it has been found that one set every 3 - 4 metres of mould edge is sufficient. As larger LRTM mould designs are fitted with a light steel edge frame it is a simple task to fit the heavy duty clamp/dowel sets to this frame at the appropriate locations.

As an example of this technique a mould with a peripheral flange length of 7 metres has proved that just two clamp dowels are sufficient to provide both a high x, y location accuracy, and the initial clamping force required before flange vacuum is applied, without the need to fit further latch clamps to the remaining flange edges.

To further provide a service for LRTM mould builders, Plastech now offer the CNC machined M24 clamp/dowel sets at an amazing price reduction, with this proven piece of equipment now costing no more than the simpler latch clamp, which although giving a means of clamping, does not provide any form of mould location.

At these low purchase prices the M24 clamp/dowels are highly cost effective, bringing further technological advances to LRTM.

Springtime in Paris

Springtime in Paris, what more could you ask for? - Dining in Montmatre, shopping on the South Bank, or just idling away the hours in a street café, the options are endless. - Endless that is if you have nothing better to do with your time...

Each year, April sees the composites industry descending on the Porte de Versailles to attend the JEC Composite's show, and as in previous years Plastech was no exception.

The stand exhibited a full range of their Megaject resin injection machines, from the SSB up to the double headed Megaject RTM-Pro with progressive catalisation and full PLC control. Alongside the machines, Plastech's extensive range of RTM and LRTM tooling ancillaries, mould seals, and channel profiles were on view, encouraging many customers new to the closed mould process to consider the benefits of attending one of the LRTM training courses run in the UK and abroad throughout the year.

New to the trade this year were the Turbo Autosprue, and PVSensor which were universally met with high praise by the many visitors to the stand.

This year Plastech's UK team were



Plastech's busy stand at the JEC 2004

joined by their distributors from Italy, Spain, and the Benelux, and with France being represented by Diatex on the adjacent stand it allowed all European customers to discuss future projects with the support of Plastech, and to see first hand how the Plastech range of machines and the new innovations on display could be introduced to improve their production.

During the course of the 3 days, live, clean, styrene free LRTM closed moulding demonstrations took place on the stand, using the popular SSB fitted with the new heated SP3 water based solvent tank. - Materials for the demonstrations were supplied by Flemings, Norac, Nidacore and Reichhold.

All those who visited Plastech's stand were invited to enter a competition in which they had the chance to win, either an SSB injection machine, a Turbo Autosprue, or a place on a 2 day Plastech LRTM training course. Many entries were made and in a few cases many entries were made by the same person!



Claire de Longeaux selects the winners

However at the end of the show, the following lucky winners were picked from the hat by Claire de Longeaux of JEC Composites.

SSB: Oxford & Cherwell College, UK
TAS: Advanced Composites, UAE
Training: Poliplastas, Lithuania.

Rodney Hanson, SSB Machine winner says: "We work closely with a number of partners from the composites industry. To keep our training materials, processes and techniques up to date the size and specification of the Megaject Sprinter is ideal for our needs and we are currently updating our 'Using Resin Infusion Systems' course to include the RTM Light process. We have huge smiles on our faces whenever we tell people that we won the machine and we see a place for the machine within both existing and future courses and look forward to working closely with Plastech in the future." Rodney Hansen, Rycotewood Centre, Oxford & Cherwell College.
Tel: 01844 212501.
E-mail: enquiries@rycote.occ.ac.uk



Rodney Hanson and colleague install their SSB at the college

Some important dates for your diary ...

Event	Date	Location
RP Asia 2004	1st & 2nd September 2004	Shangri-La Hotel, Bangkok, Thailand
Light RTM Training Course	29th & 30th September 2004	Cornwall, UK Contact Kim on Tel: + 44 (0) 1822 832621 kim.harper@plastech.co.uk for further details
JEC Composites Show 2005	5th - 7th April 2005	Paris Expo - Porte de Versailles, Paris, France www.jeccomposites.com
Training Course	Spring 2005	Cornwall, UK Contact Kim on Tel: + 44 (0) 1822 832621 kim.harper@plastech.co.uk for further details

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