

E-System Enhanced The New Generation of Dosing Units for HP-RTM





Cannon E-System Enhanced

The New Generation of High Pressure Dosing Units for HP-RTM

Cannon E-System Enhanced is the latest version of Cannon's E-System high pressure dosing units for the HP-RTM process.

The machine has been engineered to give an answer to the demanding needs for precision and reliability, typical of the High Pressure Resin Transfer Moulding process, featuring a range of new innovations that take the technology one step ahead.

The Dosing Unit

Metering Accuracy and Repeatability:

HP-RTM resins need extreme metering precisions that cannot be achieved with conventional control techniques. Cannon E-System Enhanced features the most advanced closed loop control techniques to ensure perfect and accurate metering of the components to match the demanding targets of the structural composites industry.

Chemical Compatibility

Highly reactive HP-RTM chemical systems can severely attack mechanical components and gaskets of pumps, transducers, flanges and valves. Eventually, this can result in corrosion, excessive wear and, in the worst case, even block the machine.

Cannon have engineered and designed the E-System Enhanced using the most suitable materials to effectively resist the aggressive nature of the chemicals used in the HP-RTM process.





E-System Enhanced benefits from the results of this extensive study and features a range of innovative seal and gasket materials, that are capable of resisting to the severe chemical properties of the most recent HP-RTM chemical systems.

In addition to this, hardener is pumped with a high pressure hydraulic plunger, a proven and effective pumping solution for aggressive components, successfully operating every day on many Cannon machines around the globe in the most demanding applications.

The result is a robust and reliable dosing unit that can match the demanding productivity targets typical of the HP-RTM process, minimizing maintenance downtimes.

Release Agent Dosing

The need for automation and productivity has driven major composite parts producers to include an in-mould release agent in the matrix stream in order to reduce set-up times. The release agent is dosed in very small quantities and with outstanding precision, in order to achieve the desired performances.

Cannon E-System Enhanced adopts a separate dedicated unit for release agent dosing that can be positioned near the mixing head in order to minimize the flexible piping length and to increase precision.



Dedicated unit for release agent micro dosing

The dedicated unit features a special micro dosing pump, capable of achieving high precision at very small flow rates.

Tank Degassing

Air bubbles in the resin can result in severe defects in the final product, creating small irregularities in the matrix opening the way for cracks and delamination.

Tanks can be equipped with continuous vacuum degassing systems to remove gas content from chemicals, enhancing the quality of the final laminate.



Advanced degassing system



Temperature Control

HP - RTM resins need to be processed at high temperatures. To make the process even more challenging, they are extremely viscous at room temperature making the startup of the machine after a period of inactivity long and time consuming. Cannon E-System Enhanced features a temperature control system composed of:

- Dedicated thermoregulator for each component line
- Insulated box with active heating on resin line to heat up the dosing line before starting production
- Jackets around tanks
- Heat exchangers
- Heated hoses



Each Component has a Dedicated Thermoregulator





The Mixing Head

LN EPX Mixing Head

LN EPX series is the brand new Cannon Mixing Head specifically engineered for HP-RTM and represents the perfect match for the E-System Enhanced machine. LN EPX Mixing Heads are the perfect answer to the demanding mixing performances needed in composites manufacturing.

Minimized Footprint

Lots of engineering efforts have been invested in trying to minimize the footprint of the mixing head body in order to reduce the size of the mould cavity required to house the mixing head.

The result is a less invasive mixing head that can help in achieving stiffer moulds and therefore better part planarity.



Integrated Premixing of the Release Agent

The head incorporates a static mixer for premixing the release agent with the resin stream. It also incorporates a hydraulic double seal recirculation valve for accurate and precise control of the release agent.

Patented Vertical Injector Control

A new revolutionary spring loaded injector control has been specifically developed and patented to allow easy regulation of the component injection pressures.

The pressure regulating screw can in fact be easily operated without disassembling the head from the mould.

As a matter of fact, the vertical injector control also reduces the overall footprint of the mixing head.

Integrated Mould Fixing Screws

The mixing head incorporates two screws to properly fix it to the mould, without needing brackets or dedicated supports.

Assembling and disassembling the head from the mould is therefore an easy and fast operation.



Injectors with lateral vertical control. The pressure is easily settable from the back of the head without the need to remove it from the mould



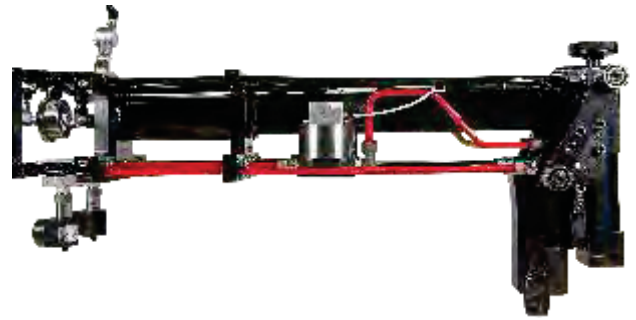
Integrated screws for mounting the head on the mould



Dedicated Support

In production environments where many different parts are to be produced on a large number of different moulds, mixing head coupling and uncoupling from the mould can result in a considerable increase in setup time.

LN10 EPX mixing heads can be equipped with special supports to drastically reduce the head docking and undocking operations, minimizing the setup time.



Dedicated support for easy mould change

Liquid Laydown Kit

Liquid laydown is an open mould technology where fibers are impregnated through a laminar flow of epoxy resin.

As a result, the main cause of high in-mould pressure is eliminated and fully impregnated CFRP parts can be obtained with a relatively low in-mould pressure.

This can also result in an improved part cycle time.

In fact, the wetting can be performed in parallel with the pressing, consequently saving time.

To implement the liquid laydown technology, E-System Enhanced can be equipped with a dedicated head that is specifically engineered to dispense three component liquid matrix over the reinforcement with a laminar flow at the required machine operating flow rates.





Cannon Composites R&D: Delivering More than Equipment

Cannon is equipped with a state of the art development centre for composites technologies where highly skilled composites engineers can assist customers on the most challenging and innovative projects.

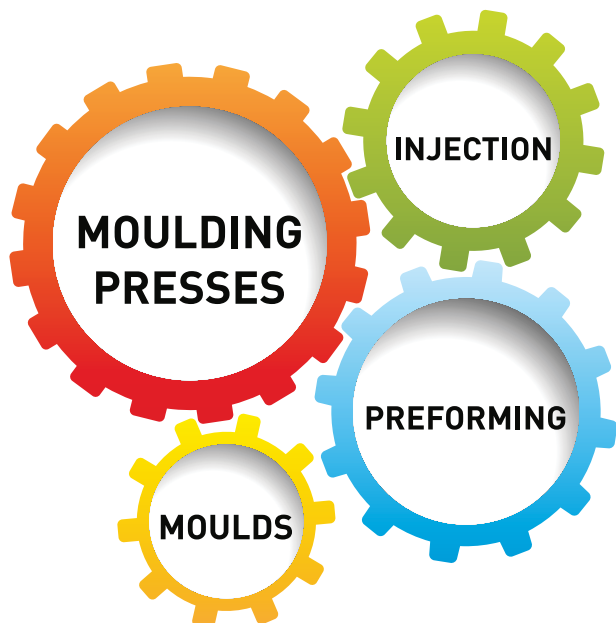
Cannon customers and partners can therefore not only find advanced laboratory equipment to test many different applications, but also a highly skilled and enthusiastic team, ready to transform their ideas into reality.

The composites laboratory is composed of:

- **Dosing Units**
 - Epoxy 3 components
 - PU 3 components
 - In-mould coating
- **Press**
 - 1000 tons
 - 1500x2500
 - Shuttle table
- **Handling**
 - 7 Axis Robot
 - Gripping hand for dry fibre
- **Data Sampling**
 - Cannon Advanced RTM data acquisition package



Cannon Composites R&D Cell



Turn-Key Supplier of High Productivity Composites Manufacturing Solutions

E-System Enhanced is just one part of the wide range of Cannon products dedicated to composites production.

Cannon can deliver and integrate complete turn-key plants consisting of preformers, presses, dosing units, moulds, automation and handling for HP-RTM, S-RIM, Interwet, BMC, SMC, GMT, LWRT and much more.

Afros SpA

Via Galileo Ferraris, 65 - 21042 Caronno P.Ia, (VA) Italy - Tel. +39 0296531 - www.afros.it

