Welcome to UTECH 2012!

Cannon: integrated high-productivity solutions

We all know it: every decent cook can put together a meal, but you need an experienced chef to build a smart menu. It’s the details that make the difference. It’s the balance of calories, proteins, vitamins, flavours, tastes, consistency of the various components, their look and the final presentation.

All senses must be satisfied, all details must be cared of. The same - if you regard the analogy - goes for the supply of technologies.

Every decent shop can put together one machine that will work, and probably for a very reasonable price. But when you are confronted with a major project, involving high productivity, a quality product, a new mould, costs of safety for your employees and respect for the environment, you feel the need for a chef.

Knowing the right ingredients that you use - your raw materials - and the different processes to treat them helps in suggesting the best equipment and methods to transform a bag of plastics into an award-winning finished product.

Knowing a lot about several aspects of your business helps in understanding your precise priorities.

Knowing what your competitors are doing (tomorrow) on the other side of the World helps in suggesting you how to face a long-term industrial project.

Knowing how important it is for you the presence of a local helping hand, able to speak fluently with your plant manager and his assistants, helps when you are in troubled waters.

Knowing that the chef has been there for more than four decades - and his customers keep coming to his place, because the food is good and the bill is fair - helps you in making your decisions.

Welcome to the Cannon place: talking of Polyurethanes, we know how to process them the way you need.

Five decades of experience in Polyurethane moulding – Cannon Aflos will celebrate them very soon – and in Slabstock technology – Cannon Viking has been in this business since 1959 – mean something to those who pay the due respect to experience and history.

Thirty years of activity with dedicated Divisions providing specific solutions for the Automotive, Refrigeration, Furniture and Construction industries mean something to those who care for dealing with a technical specialist rather than with a generic salesperson.

A deep knowledge of all the technologies involving low- and high pressure process of reactive materials – Urethanes, Epoxies, Silicones, ICDP, Nylon RIM, Phenolics, etc. – with any kind of filler and reinforcement, compression moulding process of thermosetting and thermoplastic pure and reinforced resins, thermforming process of plastics and fibre reinforcements, precise handling and manipulation of large moulded components and of their unstable preliminary sub-assemblies, all this means something to processors searching for dedicated high-productivity solutions.

Throw in the fact that we do this with our own people, in the whole World, exchanging experiences and sharing tasks, thinking globally and acting locally.

Cannon is your reliable partner for the Polyurethanes, Composites and specialty plastics process.

We would like to talk with you about your next project concerning the thing we know best: your success and your satisfaction, without which we would not be here after half century of passionate work.

Welcome to Cannon. We Know How.

A new company, to serve you better

Fresh News from Cannon: a new Engineering Division has been created to focus on your needs and serve you better.

During the next few months the new born Cannon Ergos Division will grow around the professional and technological experiences matured in four existing Group Units which provide since many years dedicated two-key plants: Cetos (plants for refrigerator and thermal insulation industry), Forma (industrial thermoformers), T.C.S. (compression moulding presses for Composites and Aluminium Die-casting) and Tecnos (plants for the transportation industry).

Alberto Zaramanetello, General Manager of Cannon Ergos, explains the reasons of this important organisational move.

“The industrial world is changing quickly. Our customers are living a geographical revolution. Internet and modern communications distane new timing for our interaction. Modern designing and fast prototyping techniques make the ‘time to market’ of the new projects dramatically. We must be ready for further evolutions in these directions. The current industrial structure of the Cannon Group has to be tuned to better fit the new scenario.

We must streamline our communication with the market, provide faster response and make a better use of the invaluable human potential that we have accumulated in different corners of our organisation. We can focus much better on our customer’s needs by integrating resources of B&K industrial engineering, manufacturing, sales and finance into an integrated, new, structured Unit.

Our customer will benefit from this move, because we will increase our competitiveness, our problem-solving attitude and the availability of experts for a prompt response. More competent brains will be dedicated to the resolution of a complex problem.”

Welcome to Cannon.

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The Cannon Group present at the 11th edition of the Utech Conference their latest technological developments in the field of Polyurethane and Composites processing:

- High and Low-Pressure Polyurethane Mixing Heads & Dosing Units: advanced solutions for general purpose frames up to specialised applications such as filled and reinforced foams, multi-component and multi-hardness foaming, micro-shots, high-corpus, spray, cavity filling, pipe insulations, groundin and potting.
- The new Vacuum-based foaming technology, Canon V.A.L. (Vacuum Assisted Injection), a major achievement in the field of domestic refrigerators, used in combination with the PASCAL™ PUR chemical system developed by Dow Europe.
- The Cannon JL Gleashead, whose design significantly improves the PUR mixing method and brings important operational advantages: a more laminar flow, higher output and no injection to calibrate and operate. The Cannon JL enhances the foaming performances of several blowing agents currently used in production (Isocyanates, HFC 245fa, Methyl Formate, Carbon Dioxide, etc.). This mixing head meets the expectations of the world largest manufacturers of domestic refrigerators and already found a place in their most modern production lines.

- The complete range of products designed for ESTRIM, Cannon high pressure injection technology for the production of moulded Epoxy composite parts: E System dosing units, EN 7/3 mixing head, dedicated preformers for Glass and Carbon fiber preforms, large presses and modular sets, robots and auxiliary equipment for the part’s handling. This innovative solution successfully replaces the slow RIM process in the production of large structural and decorative elements for the automotive and the transportation industries.
- Equipment for the production of Composite parts (large decorative ceramic tiles, plastic manholes and other accessories) for the road, railway and construction fields.
- Dedicated solutions for the Eotic industry: the range of Cannon IX machines for low pressure infusion of Epoxy resins, plus several other machines for the power generation industry.
- Complete plants for the production of flexible and rigid Slabstock foams, including modern high-pressure mixing solutions, with metering and dispensing equipment for alternative blowing agents.
- Technology for the thermal insulation of residential, commercial and industrial buildings: a wide range of proven, reliable, economically and technologically advanced solutions based on discontinuous and continuous methods for the production of insulated boards, sandwich panels, insulated window frames, sectional garage doors, pipes and other insulating elements.
- The range of Cannon solutions dedicated to the Automotive and transportation industries, in particular for flexible seats and car interior parts.

In line with its tradition of diffusing specialized information, Cannon presents at this Utech Conference edition three technical papers:

- “Developments in Processing Equipment and Techniques”
- “Innovative Method for the Production of Structural Elements for the Construction Industry”
- “Vacuum-Assisted Injection Technology for Refrigerator Production”

You Are Welcome, at Cannon!
A new management for Afros

The meting and dispensing Unit of Cannon expand their field of activity beyond Polyurethanes and reinforce the organisation with a younger management, to meet new challenges and an ambitious manufacturing schedule.

Giovanni Pilieri, 42 years, is now in charge of the Technical Office that designs machines, heads and auxiliary equipment. Roberto Gagliardi, 49 years, manages Afros’ Manufacturing after a few years of experience in Teicos. Adriano Fontana, 40 years, manager of Manufacturing, joined Afros last year. Pier Giorgio Brocca, 50 years, leads the Purchasing group: he comes from another Group’s company, Bruno Energia, where since 1984 he matured significant experiences buying equipment for large installations and projects. Davide Luca, 44 years, is the Sales & Marketing Manager. With Afros for 18 years, he coordinates the commercial activity of the numerous Afros agents and locations. Ivan Iannone, 41 years, with Afros since year 2000, has recently been assigned to manage the Technical Service Global Network. Paolo Villa, 54 years, spent his entire career since 1978 in the Administration & Finance department of Afros, that he manages today coordinating the activity of eight people. Alessandro Bossi, 52 years, manager of the Information Technology Services of Afros and of the Cannon Group, celebrates in 2012 his first 25 years with the company. Cinzia Banfi, 47 years, in charge of Quality Assurance and Safety, is another employee who spent all her life in the company, on the trail of her father who was one of Afros’ first technicians. Alessandra Monetti, 32 years, coordinates since a few months the Human Resources team of the largest Unit of the Group.

The whole Afros team looks forward to a challenging year: a positive 2011 yearbook provided numerous heavy projects for delivery during 2012 and 2013, and the manufacturing schedule is already tight. The new management - and all their colleagues - will be very busy to maintain all the promised deliveries!

A new R&D laboratory with more dedicated islands

With 1,000 m3 of high-roofed space and seven dedicated dosing units - plus three presses, three robots, three refrigeration foaming units and numerous auxiliary components metering units - the Cannon Afros R&D laboratory is probably the largest development centre for the processing technology of Polyurethanes and other reactive formulations.

The current dedicated islands - housed in a comfortable environment that has been totally refurbished and extended during the past six months, without affecting the already existing ones - are dedicated to various Composites processing methods (InterWeb, OuterWeb, SoldSpray, ESTRIM injection for Epoxy, Gasketing, Clear Coating, Refrigeration for conventional filling and vacuum-assisted technology, for both cabinets and doors) and multi-purpose applications.

Various mobile digital working positions are collecting from the various dosing machines the process data for each experiment.

Alberto Bonansea, the R&D Manager, coordinates the activity of seven specialists, bearing an impressive number of experience year in various aspects of the process technology. Asked to comment their future projects, he comments: “Several additions to this comprehensive list of dedicated machines are expected during 2012, to include those technologies that will generate most of the equipment business in the next few-ten years. Our curiosity and dedication to reactive polymers keeps feeding new projects, and we need the appropriate tools to generate new solutions. Our customers - both current and future ones - love the opportunity that we offer them to try their formulations, their molds and their ideas in our lab, surrounded by people who know what they are looking for.”

The new managerial structure of Cannon Afros (above, left to right): Maurizio Corsini (General Manager), Davide Luca (Sales & Marketing), Roberto Gagliardi (Production), Maurizio Colt (Technical Director), Paolo Villa (Finance and Accounting), Giovanni Pilieri (Technical Office of Manufacturing). (below) Adriano Fontana (Manufacturing), Cinzia Banfi (Quality Assurance and Safety), Alessandra Monetti (Personnel), Alberto Bonansea (R&D), Alessandro Bosi (KT), Pier Giorgio Brocca (Purchasing).

Cannon reports a number of successful sales in the past few months for processing Baypreg®: a Bayer MaterialScience Polyurethane system applied over a sandwich of glass mat and honeycomb.

This process allows for the production of very light yet structurally sound composites valued by the automotive industry for their fuel saving efficiency. Parts can be suffered only where necessary thus optimizing the use of raw materials and saving weight. For this moulded automotive application Cannon patented a special “Spray-and-stay” method which uses liquid Isocyanate Carbon Dioxide (CO2) as a foaming agent which serves to prevent dripping of the formulation when it is applied to vertical walls.

A North American manufacturer, supplying large interior parts to Ford and other auto-makers, is using a Cannon high-pressure dosing unit equipped with a Cannon feed kit to disperse liquid CO2 directly into the mixing chamber of a robot-mounted FPL head. The resulting parts are used in luggage compartments as spare tire and storage bin covers. The reason the Cannon solution was selected by this flange was the better technical advantages of metering the expending agent directly in the mix head rather than a component tank as is usually done. The main advantages of method are the ability to control the exact amount of CO2 being used and the ability to apply it only when and where it is needed.

In 2011, another major manufacturer of auto parts in the Far East Asia purchased a complete production system to make a similar product for a large vehicle supplied to the Chinese market.

An interesting note regards the PUR application technique. There are two ways to handle the spray head when producing a Baypreg part: one is to have it mounted on a robot and moving, whilst the other is to fix it at a point 1-1.5 meter above the sandwich (glassfiber + honeycomb + glassfiber) in the spray booth. When moving the mixing head two robots are needed, one for the head and one for moving the sandwich, while with the fixed head version only one robot is required, for the sandwich. The second solution means a lower investment, less programming and maintenance operations, more simplicity in the process. Cannon can provide both solutions, but are successfully installed and running in China today for different products.

Just this year, a Japanese supplier of PUR chemicals and formulations equipped their R&D laboratory with a complete Cannon system for processing Baypreg formulations in order to develop applications for their local automotive manufacturers and Tier 1 suppliers of energy saving auto parts.

Complete solutions for the production of Bay preg® parts are available at Cannon (above), including the patented “Spray & Stay” foam application system (left) that avoids any dripping of chemicals during the sandwich rotation and manipulation phase.
Automotive cavity filling applications are on the rise. Last year more auto makers decided to inject semi-flexible Polyurethane foam into the body cavities of many models to obtain better sound insulation for their vehicle’s interiors. To answer the needs of this specific sector, Cannon has developed specialized metering and mixing equipment suited for worldwide use.

Some recent successful launches of this equipment have been with AUDI in China and Chrysler in North America.

We have reported in several previous editions of the Cannon News about the ongoing developments done by Cannon in the field of cavity filling, especially in the USA. A specific mixing head, the three-component TRIO 7, proved to be an ideal mixing tool for the two different types of formulations (Noise, Vibration & Harshness - NVH) that are used in this market.

A conventional 2:1 ratio foam was quite common among various chemical suppliers, while a special 24:1 ratio formulation had been developed by Dow to provide not only sound deadening benefits but had additional features such as resistance to corrosion from moisture. Since the Cannon machine was designed as a variable ratio machine, it can run either formulation with ease.

The Cannon mixing head performs very well with all types of chemical systems used in this sector and works well either mounted on a robot in a highly automated environment as seen at Chrysler, or in a more manual application like at Audi in China. Millions of cavities have been injected so far and the trend is on the rise. Since auto makers are realizing the advantages of a foam system that insulates the passenger compartment from engine and road noise, they are employing this solution over a wider range of models.

A newly designed Cannon mixing head, the L5 series, is now available to satisfy their needs for compactness, foam quality, ease of use and long lasting operation in critical manufacturing environments such as a continuously-running assembly line.

Audi’s use of Cannon equipment in China

German cars made in Changzhou, Jilin Province, China by the Audi-Volkswagen Group at their giant First Automotive Works factory are running around the clock all year long using cavity filling foams in their A6 model.

A complete Cannon plant for this application was delivered during 2011 and includes a bulk storage system (comprised of stainless steel) serving two Cannon CF22 dosing machines and four LNS mixing heads. All associated piping, supports, automatic drum filled equipment, all Batteries and control, completed the scope of supply. Featuring high pressure Cannon metering pumps, the machines are designed to deliver from 40 to 300 grams of a 2:1 ratio NVH foam in each cycle of the 4 to 6 injection points required in the various models. High pressure and low pressure recycling of the components ensures perfect conditioning of the chemistry which, for their optimum performance, must be kept at a working temperature of 40-50 °C according to the type of foam being used.

Cannon entered this field when it became clearer… sorry for the pun! The meaning is that Cannon became interested in this niche market when they noted the advantages of not mixing head from the competitors in that the competitors recirculate the components outside of the mixing head which leaves them off chemicals cooling within their head. This forces the operators to purge the head very often leading to a waste of material and ultimately the disposal problem of that material.

As a result of cooperative efforts with Dow, a number of successful projects have been realized. This system, developed with Dow Automotive’s valuable input, can be quickly installed in their Application Development Laboratory so that it is possible to use this equipment for the first time in the factory to test several different foam formulations in a short time.

Cavity Filling: a Worldwide project

A well-known technology for some years, the Clear Coating attracts more and more end users. The application of a transparent, glossy, hard layer of Polyurethane over natural materials, like wood and veneer, or synthetic ones, like a mat of carbon fibre, appeals mostly to the manufacturers of car and boat interior parts, furniture complements and aesthetic parts in general. The transparent layer imparts a “luxury feeling” to the moulded piece, allowing for the production of very nice decorations interior trims.

The solo-chemical is very peculiar: the liquid components are chemically aggressive and require stainless steel execution for all the parts in contact with the liquids.

Temperature control is fundamental for obtaining repetitive results, required by the car makers for the medium-large series of expensive parts destined to “upper class” vehicles.

The material mixing is made critical also by the component’s ratio, usually around 2:1 [Isoc/Polyol] and Cannon has developed a dedicated head, in order to optimize the moulds and the mixing efficiency.

In addition to this, a very careful selection of the injection nozzle – the final part of the head, entering for the mould – must be done in order to avoid a “mark” on the mould part originated by the head’s self-cleaning piston during its last closing operation after the injection.

Last but not least, any trace of gas must be eliminated prior to the injection, since it would not contribute to the moulded parts.

Cannon developed, upon the solicitation of one of the World’s major manufacturers of Clear Coating parts, a dedicated solution based on:

- High-pressure A-Compact dosing unit in fully-stainless steel execution, with an integral degassing system on all the temperature-controlled components tanks (the daily storage plus machine reservoirs).

Clear Coating: providing a plus!

- An L5/73 mixing head, whose three-component design allows for the feed of the most affluent component – Isocyanate – through two of the three inlets. But the splitting of this flow after the metering pump, is not done so simply! In order to guarantee absolute precision of feed to the injectors (so that the pressures remain constant for the whole injection time) Cannon developed a dedicated flow splitter, based on an hydraulic mechanism that divides the bio flow volumetrically in its path towards the head.

The head’s design – with recirculation grooves positioned very close to the head’s outlet – limit to a minimum quantity the amount of material that is pumped out from the cleaning piston at the end of the injection. This reduces to a minimum the risk of “marking” the moulded part.

After a long period of development and validation in both Cannon Atrio and the customer’s lab, the system has been satisfactorily approved and sold two lines have been delivered and are now in production, one turn-key plant is under manufacturing for start-up in production within this year and another couple of prospects are under discussions.

A dedicated working island is available in the Cannon R&D Centre for those potential customers interested in Clear Coating applications.

...What’s News

Numerous dedicated high-pressure dosing units like this are currently in operation in various countries for cavity filling applications.

The new Cannon L5 and 5 mixing heads provide composites, foam quality, ease of use and long lasting operations.

A wide spectrum of cavity filling chemical formulations can be used!
Cool News from Cannon

Innovative solutions for the Refrigerators and Freezers Industry

The world’s domestic refrigerator manufacturing capacity is undergoing significant change in shape and geographical distribution. Western manufacturers are looking for a more competitive cost structure for their products and their factories are going to East at an increasing rate. Joint ventures are being made with Chinese appliance manufacturers in order to establish manufacturing sites where labour is still cheap and quality can be assured thanks to sophisticated production equipment. Cannon have been present in refrigerator’s Companies in Far East Asia and China for more than thirty years, and keep supplying advanced solutions to these countries. Innovative cabinet and door foaming plants have been designed specifically for Japanese and Chinese fridge makers by the Cannon Group’s Division in charge of this technology.

The technical solutions most recently developed for Sharp consist in a new version of the famous Cannon Drum System, the rotary moulding device that was patented by Cannon back in the early 1980’s and has been manufactured in the hundreds of units and various versions. With the EasyDrum the rotary 6-stations machine is used as a simple carrier for the polymerisation of the foam: the door’s closed moulds are automatically handled in and out from the EasyDrum at every foaming cycle: opening, demoulding, cleaning, insert positioning are performed in the front position of a rotating table holding two mould carriages. When this manual operations are finished the cycle quietly restarts and the open mould foam pouring and mould closing operations can be performed on the rear position of this service station.

The EasyDrum, a rotary 6-stations machine, is used as a simple carrier for the polymerization of the foam; the door’s closed moulds are automatically handled in and out at every foaming cycle.

The polymerisation machine therefore works at its maximum efficiency, not being delayed by dead times.

The moulds can be simpler and cheaper than usual, not requiring a thermostatisation system: temperature conditions occur on board of the EasyDrum, where flat, heated plates of 3 x 1.5 m are covered with wrap-around insulation. The polymerisation efficiency is very high, of course depending from the curing time of the rigid foam two large doors can be demoulded every 52 seconds, and the single required operator has a long-time, at least 48 seconds, to download the filled doors and load the metal frames for the production of the next two.

For the cabinet’s manufacturer an innovative version of the patented Ro-top-joys System has been designed and built. Introduced in the early 1980′s by Cannon, the Ro-top-joys has revolutionized the refrigerator cabinet’s manufacturing methods: the possibility to use a double plug on a single foaming station allowed for easy mould change on one side of the upper rotating platform holding the plugs, while the other, below, was in Polymerisation phase.

In this new version of this successful device, called RonDrig, the rotation of the upper frame involves the complete fixture: plug and lateral walls, and brings a newly foamed cabinet to polymerise in the upper floor of the plant.

Cannon Africo has been developing mixing heads and dosing units for Polyurethanes for nearly five decades. More than 30,000 mixing heads have been sold and most of them are still in production, connected with more than 13,000 metering units. The output range of these heads spans from 1 to 10,000 g/second, for a wide number of applications, chemical components, injection or pouring methods. Among the various fields of applications, the refrigerator and Freezer industry stands out for Cannon as one of the most successful ones. Every innovation in the chemical side of this innovative sector of the industry is carefully analysed to select the most innovative one before it appears on the market – to make sure that the best processing tools are available when the new formulation will be released.

The evolution of the Cannon FPL and JL series are just one example of this ongoing commitment in the field of the reactive chemical’s mixing technology.

Recent important developments have been implemented by the major Raw Material Suppliers to improve thermal insulation properties and faster demoulding times for the domestic refrigerators and freezers made with their foams.

Thermal insulation is greatly improved by reducing the average diameter of the foam’s cells, and this can be obtained only with very fast-reaction formulations. As a consequence, since the refrigerators are becoming smaller and lighter, these foams must be injected at higher output rates than in the recent past.

Japanese manufacturers have solved this problem by foaming their refrigerators with up to four mixing heads operating almost at the same time on the back of the same cabinet, using two dosing machines operating in open frontal face, one for each injection.

Other manufacturers have followed a different approach, working more on the mixing efficiency and on the total output of their mixing heads. Cannon has been working on two lines of development, destined to two different types of end users.

Cannon FPL SR – designed for existing refrigerator plants

Refrigerator manufacturers wishing to upgrade their current foaming plants in order to use fast-reaction foams – thus using higher output machines and mixing heads – are confronted with a basic problem: hundreds of existing moulds cannot be easily modified to accommodate the larger injection nozzles typical of higher output mixing heads. They are limited by the existing geometries of their plugs, but they need to increase the components output avoiding the generation of more turbulence, which creates air entrapments and voids in the insulation layer.

Cannon have designed the FPL SR, an evolution of their classic FPL head, that features an optimised design of the mixing area.

The total output, with laminar flow at the nozzle, can reach 1,800 g/s with an injection nozzle of 24 mm of external diameter.

In addition to this, the head’s potential sticky problems created by modern high ISO Index formulations have been solved using a more efficient design of the self-cleaning chamber that provides a very efficient removal of the smallest traces of foam from the head’s “tongue”.

Practical results in extended industrial units have been very encouraging, and this head is now being manufactured in all the diameters required by the refrigerator makers running conventional foaming jigs and plants.

Cannon JL – the ideal choice for new plants

Designed without jets, the Cannon JL, mixing head provides a unique opportunity to the refrigerator manufacturers investing in a new foaming plant. Their models and jigs can be freely designed to accommodate the longer and slightly larger nozzle of this head. This provides them a wide range of advantages:

- Optimum mixing and very laminar injection at a very high output, in a range from 300 to 2,000 g/s, according to the head size.
- Possibility to reach remote injection holes, thanks to the 200 mm injection nozzle.
- Possibility to vary the foam’s output during the injection, in order to get a very long portion of the refrigerator’s back during the deposition of the foam. During the change of output the components pressure is reduced, but this is not anymore a problem for this head: the absence of nozzles allows for this very wide range of output without influencing the mixing quality in a range of pressures going from 70 to 210 bar.
- Superior performances using low-boiling point blowing agents: the geometry of the JL avoids the “flash out” effect typical of many other heads.

The latest development of the Cannon FPL series, the SR model, is designed for the refrigerator manufacturers wishing to upgrade their existing foaming plants to the use of the modern, faster formulations.

In the new V.A.I. foaming line a certain degree of vacuum is applied inside the cabinet, providing better foam filling and higher thermal insulation values.

- A 50% reduction of all loading and unloading lines and ventilation systems (a particularly expensive item in case of Hydrocarbons-in-foam systems).
- A 50% reduction in mixing heads and related hardware, controls and software, when using fixed injection heads.
- A significant cost reduction when using a double foaming-jig, rather than two simpler single stations.
- A much smaller plant’s footprint and total volume, an especially valuable saving where industrial buildings are sold – and heated – at a premium price.

An optimised use of the polymerisation jig, where all the service stations are “hidden” behind the longer polymerisation phase and productivity per line nearly doubles.

Innovation, at Cannon, continues as usual, in spite of fluctuant world’s economies designing efficient and easy-to-use energy saving solutions is the mission of the Company.

“The Evolution Continues” at Cannon

... Applications

The Canon A, J2, the latest model of this series, broadens its 205 mm long nose and is designed for the foam injection of the largest refrigerators.
Vacuum-assisted injection technology for refrigerators production provides cost-effective eco-design and superior energy savings

Cannon announces the first industrial mass production of domestic refrigerators manufactured with the new Cannon V.A.I. technology, a vacuum-assisted injection method specifically developed for the production of white cold appliances. An injection method introduced in 1998 for sandwich panels, the vacuum-assisted injection has now successfully been applied to the geometrically complex design of domestic refrigerators.

The reduced pressure applied into the cavity during the injection and the expansion of the foam facilitates the filling of the cavity, providing substantial benefits:
- optimized distribution of foam density throughout the entire cabinet;
- the polymerization time per foaming station has been cut nearly in half due to the possibility of using high reactivity formulations providing a significantly higher productivity;
- reduced plant’s floor space in half when using the new “two” foaming fixture – the Rotomig – specifically conceived for this technology.

Initial Developments
An innovative method for foaming sandwich insulation panels using vacuum during the injection phase was jointly developed – back in 1998 – by MISA (an Italian panel manufacturer), Marum (a polymerization press manufacturer), Cannon (the foaming machine producer) and Dow Italia (the supplier of the Polyurethane chemicals).

Its functioning concept relied on the controlled application of vacuum into the polymerization cavity of the press, maintaining a constant level of negative pressure within the polymerization cavity during the entire injection and foam expansion time.

The Vacuum Effect
As shown below, the Pressure vs. Time graph shows the build-up of pressure in the polymerization cavity. Demoulding time shortens because of reduced pressure build-up in the mould.

1. The practice shows that a panel can be demoulded, without the risk of swelling, at a residual pressure of approx. 200 mbar. The upper curve refers to a conventional PUR formulation, and the demoulding time can be reached after 1680 s for a given thickness. The lower curve, referring to a vacuum-assisted injection system, shows that the application of 300 mbar of vacuum in the polymerization cavity allows to fill it faster and with a lower residual pressure.

2. This means that the moment for safe demoulding can be reached earlier, approximately at 360 s.

A faster demoulding that occurs without any loss of mechanical properties, thanks to the smaller structure of the foam results much finer and more homogeneous in density across the entire panel due to the lower effort that the expanding mass must spend to reach the remote corners of the cavity.

What can be concluded at this respect is that the applied vacuum helps the foam flow properties, and the minimum filling density is significantly reduced.

3. Improved flow gives options for improving foam k-factor hence cabinet’s energy consumption using fast reactive PU foam systems without penalties on density and demoulding as it happens with the conventional foaming process.

Gabinet Performances
Refrigerator cabinets produced with the PASCAL Technology are characterized by the lowest levels of k-factor value among all the PUR-insulated fridge made with single injection technology.

Thermal transmission coefficients of 18.5 mW m⁻² K⁻¹ (at 10 °C) have been measured on commercial refrigerators foamed with the PASCAL Technology by a major refrigerator manufacturer.

The first industrial products made with this technology are sold within the A+++ Energy Conservation Class and an Energy Consumption Value of 0.195 kWh per day by HAIER in China (below).

The V.A.I. Project
Cannon approached this project – named V.A.I. (Vacuum Assisted Injection) – with a team of specialists: they identified a number of technical problems and soon started to suggest various hypothetically viable solutions, to be ground tested in Cannon R&D laboratories. The development work took several months.

A completely new, dedicated chemistry was developed by Dow. Cannon in the meantime designed the first industrial solution for the production jig. The new solution (below, left) has the same functionality and movements of a standard jig but in its lateral sides, the upper plate which holds the jig and the top and bottom walls are fitted with special seals that, when the jig is locked, provide an airtight cavity. The vacuum is applied through the upper plate.

The Rotomig Development
In order to reduce the curing time to get full advantage of this new fast curing formulation, Cannon developed a new solution for the polymerization jig (above), by designing a rotating jig holding two fixtures fitted on the opposite sides of a common platform. Curing occurs in the upper station while loading, unloading, foam injection and cavity filling occurs in the lower one. In this way the footprint of the plant can be halved, also reducing the travelling time of the mishandled overhead carrier and the cabinet’s loading and unloading steps.

An industrial foamig plant based on V.A.I. jig is typically composed of eight jigs placed side-by-side. Productivity of this configuration can be up to two cabinets per minute.

V.A.I. – Main Advantages
Several innovative features provide a number of interesting advantages:
- Faster demoulding time, up to 50% less than with conventional foams;
- The system is suitable for difficult cabinet geometries even combined use of VIP (Vacuum Insulated Panels) is possible, since the foam filling operation is much easier;
- k-factor values of the foamed refrigerators are very low, due to the finer cell structure and the even distribution of densities.

Patents
Since 2006 Cannon has filed four international patents related to this process – two of them are published.

DOW – PASCAL
Within the Dow-Cannon partnership agreement, Dow made a fundamental R&D work that led to the development of a completely new series of PU systems that are the core of the Dow Pascal™ technology, which in essence, combine the application of lower in-mould pressure to achieve maximum PU foam insulation and process performance.

Due to the fast demoulding properties of PASCAL Technology, HAIER achieved for this first plant a production capacity of one unit every 15 seconds. The PASCAL Technology used for this refrigerator contributes for 5% to the energy savings.

The emissions deriving from the use of this white appliance are calculated to be reduced by an average of 8 kg of CO₂-equivalent per every year of use of the refrigerator.

The vacuum-assisted injection has been successfully applied to the design of domestic refrigerators. A partnership between Cannon and Dow allowed for the development of a solution that draws new frontiers in the production of refrigerators.

lower in-mould pressure results in easier flow – due to the resulting lower cavity’s back pressure – and better demoulding time, due to the lower foan pressure in-mould at the time of demoulding the units.

HAIER

The first industrial plant for the application of the PASCAL Technology was designed by HAIER, the world leader in the manufacture of refrigerators and a major player in the entire appliance industry. Twelve VAI jigs, in two rows of eight jigs each, are fed by two high pressure metering units through four mixing heads mounted on traverse carriages (below).
An innovative method for the manufacture of large decorative ceramic tiles has been developed in Italy by System, Fiorano Modenese. Large, monolithic porcelain gres tiles that can measure up to 3,000 x 1,200 x 3.5 mm can now be manufactured with outstanding mechanical and aspect properties. These huge stone slabs are used as internal and external decorations for skyscrapers, factories, showrooms, hospitals and other residential or commercial buildings. The innovative process reduces by 65% the thickness of the tile, still maintaining all the good characteristics – impact resistance, flatness, extended variety of surface decorations – in a product which weighs two thirds less than a competitors – even if not yet existing in this size – ceramic tile. The robustness of these shoots-proof decorative elements is provided by a mat of glass fiber, glued onto their back using a very thin layer of two-component Polyurethane adhesive.

A dedicated metering, mixing and spraying solution has been designed by Canon for this sophisticated application. An intensive, joint effort has characterized the development phase of this innovative technology, with System and Canon R&D specialists playing as a team to achieve the desired results.

THE CUSTOMER
System Sp.A. (www.system-group.it) is located in Fiorano, near Modena, the hearth of the Italian ceramic district, and operates in three major areas of activity: Ceramics, Logistics and Electronics. System is today recognized as a leading supplier of automated factories that provide the highest quality standards in the field of ceramics. The range of available solutions includes equipment and know-how for raw materials handling, pressing, decoration, fitting, external tiles production, cutting, quality control and sorting, packaging and handling. They quickly extended the initial ceramics technology to logistics and controls, two fundamental components of success in a very competitive, cost-driven field. Internal development of electronic controls and LGC’s (Light Guided Vehicles) provides their technological offer with a further integration of dedicated equipment.

The System Group includes 28 local branches in 18 countries, devoted to the distribution and service of their equipment, with three local manufacturing sites in Spain, China and Brazil. The Group employs today a staff of 3,300, with a total turnover of 280 million Euros.

All the buildings of the Lamina Group are covered with their Lamina 3x1 m ceramic extra-large tiles.

The Lamina Process
Lamina is a highly automated production process composed by seven main macro functions: deposition of raw material, pressing in process which vary from 15,000 to 26,000 tons, wet or dry decoration, gas/electric hybrid kiln cooking, composite tiles line, dry laser cut of final product and the packaging.

The entire process rotates around a special compacting system which turns raw materials, such as clays and feldspar, into slabs. Lamina also revolutionizes logistic systems for traditional ceramics because it detects the final product storage as cutting and packaging of the slabs happens upon shipment on the basis of the specific order.

The Lamina product
Lamina indicates the assembly of deliverable products which lead to the use of 3.5 mm thick slabs, 1,000 x 3,000 mm or 1,200 x 3,600 mm and specific gravity of only 7 kg/m³. A 0.3 mm glass fiber layer, duly coupled with this laminate, confers notable resistance and flexibility features.

It is therefore possible to obtain different combinations from this fiber laminate (doped or tripled laminates with fiber intervals) for applications where the physical features are essential. Lamina can be applied in the building field for coverings, floors and waterproofing, for interior decoration (partition walls, false ceilings, doors and tables) and coverings, for design and for infrastructure (motorway galleries) including the photovoltaic field.

Lamina-coloured elements are used in Kian’s Underground stations (above) and in highway tunnels (top, left).

The whole production cycle occurs here with a fully-automated concept, completely designed and built by various System Group’s companies: raw materials handling and mixing, distribution of powder batches, pressing, trimming of the obtained slabs, decoration with up to 25 different colors or three-dimensional decorations, drying, cooking at high temperature, composite production, intermediate storage of the large tiles, laser (or traditional) cutting into the ordered sizes, optical control of final quality, packing and labelling.

Lamina’s completely automated factory covers 12,000 m².

THE PROBLEM
The fragile nature of tiles is a fact well known for centuries. Even a porcelain gres tile features relatively poor impact resistance, and shatters in very sharp, dangerous fragments when hit by a violent impact. One can decide to make a thicker tile to improve impact resistance, but the weight, the raw materials, the energy required to cook it, the efforts made to transport and install it, the waste in case of defects and – final and fundamental – the cost increase with a linear growth. System was looking for a different solution.

INITIAL DEVELOPMENTS
When System decided to concentrate on the manufacture of the largest, lightest and thinnest ceramic slabs ever, they realized that the solution to these problems would have been a radical innovation for the ceramic world of ceramics a continuous production process utilizing a non-conventional reinforcement. Several options were examined and – at the end of a wide selection of materials and processes – a true composite part was conceived, combining the aesthetic and wear resistant properties of a surface layer of porcelain gres with the mechanical strength and assembling capability of a flat layer of glass fiber. This approach – due to the peculiar characteristics of the chosen reinforcement, which is commonly supplied in large rolls of glass tissue, called mat – required a number of dedicated solutions.

System started evaluating Polyurethane as the adhesive for the glass mat reinforcing the two layer.

THE CANNON SOLUTION
System contacted Canon Afros to evaluate the availability of a dedicated machine for this application. Canon Afros was at the same time System’s supplier of dosing units for Silicone resin processing (used by System to produce their own cast Silicone printing rolls for the decoration of ceramic and System’s customer, having installed four of their automatic warehouse tending system for their factory in Cavagno Pertusella, near Milano, Italy).

The response was prompt and positive. The specifications were those familiar to Afros for their range of machines, and the application was appealing.

A preliminary set of trials in Cannon R&D labs would have verified the feasibility of the request, to be further refined with the most appropriate technical adjustments. Due to the characteristics of the formulation, a spray application was defined as the optimal method to evenly distribute the adhesive on the back of the large tiles.

All the factors considered, Cannon set up in their lab a suitable Cannon B2 low pressure dosing unit connected to a dedicated spray mixing head mounted on a standard robot and organised a first set of trials with System’s ceramic slabs and chemicals.

The first trials provided very promising results. The layer of adhesive was evenly distributed, although a solution had to be designed to avoid a minimum build-up of material at the two extremes of the pouring pattern.

The idea of applying a method widely used in the painting shops – a controlled air-assisted atomisation of the liquid formulation, immediately after the mixing chamber – was evaluated. This method required the interruption of the flow of material at the end of each stroke. A very fast control and actuation was demanded, to follow the demanding performance of the head’s manipulator. The existing model of low-pressure, low-output mixing head was fitted with an atomiser specially designed and promptly made for the viscosity and output of the chemical formulation selected by System for their needs.

...Applications

This Cannon B2 machine was specifically designed for the spray application of the PU adhesive.

CUMPRODUCTION

The spray head ensures a perfect mix and deposition of the liquid blend, while the closed loop control system of the Cannon B2 dosing machine keeps all the variables (temperature, viscosity, mixing ratio, recirculation), within the desired working range.

Continued on pag. 7
InterWet provides solutions to replace metal in heavy-duty parts

Politeco successfully developed another industrial application for the Cannon InterWet technology: heavy duty manholes made by the co-injection of rigid Polyurethane and chopped glass fiber can replace the conventional steel and cast iron ones, with numerous advantages.

The InterWet technology features numerous interesting references in several fields of the industry, from transportation to industrial air conditioning. The products developed by the Italy-based POLIECO stand for their originality and final use round, square and rectangular manholes are manufactured at a very serious daily rate using a complete production island supplied by Cannon Afros.

The manholes can be easily personalised

Attractive manholes made with Glass-reinforced Polyurethane are now commercially available

This allows the handling by one only man, fully respecting the safety laws that limit to 25 kg the maximum weigh of handled goods.

Several other advantages characteristic these polymeric manholes:
- Solidity and resistance: a standard model can stand the weight of up to 40 Tons
- Electric insulation: it protects pedestrians from accidental electrical shocks in humid or wet environments and prevents little interference with the radio frequency, satellite or cell phone signals of modern transmission systems.
- Noise reduction: these covers do not squeal and rattles under road traffic, avoiding any acoustic disturbance to the inhabitants.
- Resistance to corrosion and to chemical agents: they are not subject to rust, corrosion, condensate. They are particularly suitable for seaside resorts, food and chemical industry and petrol stations, also because they are completely spark-free.
- Environment protection: the CO₂ impact of a polymeric product is several times lower than that generated by a traditional metal casting operation, resulting in a "Greener" product.
- Customization: the frames or the covers can be produced in different colours for different utilities/applications, personalising the upper part of the cover with the name of the customer, service or sponsor.
- Last but not least, these synthetic products are not appealing for the thieves that steal and reach the metallic ones to the scrapyards!

Their main advantage towards conventional products made in steel or cast iron is their lightness, which makes the operations of installation and maintenance easier and safer: the weight of the KIO covers is 70% lower than the weight of European made cast iron ones!

The capacity of every press is from 150 pieces per day for the smallest square model to 100 pieces per day for the largest round one.

POLIECO is now planning to produce covers with a coloured surface, and to increase the range of products to new models and sizes. Cannon Afros will be happy to assist them further during this ambitious project!

Polymers-based KIO manholes are rust- and corrosion-free

STRUCTURAL ELEMENTS FOR THE CONSTRUCTION INDUSTRY

LAMINA is available in a wide range of surfaces, colours and textures
Alenia Aermacchi M346: made with a Cannon plant!

The recent commissioning of a complex assembly line manufactured by Canon for Alenia Aermacchi in Italy gives us the opportunity to interview two top-ranking managers of a major aerospace and defense group. We meet Vito Antonuzzo and Francesco Attucci – former director of Industrial Engineering – who has been recently given the responsibility of the Camera plant, near Novara, Italy.

Alenia Aermacchi is the recent fruit of a merger of the businesses, products, sites and traditions of Alenia Aeronautica and Aermacchi. The name traces its lineage to 1913, when the original Nervi/posts-Machi was founded. The company leads the Aeronautics business of the state-controlled Finmeccanica, one of the world’s top 10 aerospace, defense and security players with a turnover of over €8.5 billion Euros and a global presence securing 73,000 skilled jobs in Europe, the United States and the world. Alenia Aermacchi is a 2.8 billion Euro global group known for its successful products, its balanced portfolio and ability to deliver on leading-edge programs.

They manufacture products and systems of superior quality and performance, including proprietary designs like the C-27J airfield and M-346 advanced trainer, playing key roles in world-class programs like Eurofighter Typhoon, the F-35 Joint Strike Fighter and the Neuron European UCAV demonstrator. Alenia Aermacchi also has a major role in commercial aircraft, designing and building advanced aerostats for state of the art civil projects, developing the next generation Superjet regions and building the marks-leading ATR turboprops. With its wide network of prestigious subsidiaries and important joint ventures, the Alenia Aermacchi group supplies and supports advanced systems in worldwide use. This also allows them to cover the entire product life cycle from design to in-service support to modernization, achieving important synergies among the Finmeccanica aeronautics companies.

Canon News: Mr Antonuzzo, Alenia Aermacchi recently signed the acceptance of a major assembly line built and assembled by Canon in your Venegono plant. Can you tell us shortly what this plant is doing?

Vito Antonuzzo: We produce in Venegono the twin-turbofan M-346 aircraft. This is the most advanced lead-in fighter trainer flying today. With its fully digital flight controls and avionics, which include the latest generation “fly-by-wire” system, together with high maneuverability and flight envelope, the M-346 is fully representative of new generation fighters. It has been ordered, so far, by the Air Forces of Italy and Singapore. Our production schedule was pretty busy for this aircraft, and we needed to speed up its assembly. You can’t build these complex machines in a working island, as we do for a prototype.

CN: Can you explain to our readers, which are not experts in aeronautics, the implications of this process?

VA: A large number of components must be brought together, with geometric precision in the order of few tens of a millimeter, in an upstyled version of the well known assembly line commonly used in the automotive industry. In this 100 meter long line we build the three sections of the aircraft – front, central and rear – and then we fit them together in a dedicated area nearby.

The airplane is mostly built with structural parts, made with special Aluminum alloys and Titanium parts, combined with paneling and aerodynamic elements mostly made with Carbon-reinforced composites. Hundreds of machining, drilling, fitting and painting tasks are performed during this phase.

To do this with high efficiency we conceived a line with the three sections – that are held on dedicated tools – travel through dedicated working stations were a specific number of operations are performed by our specialists. The replacement is performed by an AGV (Automatically Guided Vehicle) that, commanded by the central computer, picks on request the tools and brings them to the next station or, at the end of a sequence of operations, to the rear up area. The main difficulties lie in guaranteeing an absolute positioning precision of the tools along the various working stations, and in the related timing. The logistics driving the flow of single components and the use of the AGV must be optimised to avoid any downtime.

CN-Mr Attucci, you conceived this line. Can you tell us how you ended up in assigning its construction to Canon, and why?

Francesco Attucci: We had very clear ideas about the construction of the main components of our line, and required the intervention of a specialist for the movements and the process control. Examining various potential suppliers – in a field that certainly does not present a wide range of specialised companies – we noticed at Canon an interesting concept for the handling of wide, heavy parts throughout a large assembly hall, making use of AGV. These parts – wide, curved panels for the thermal insulation of industrial roofs – were submitted to a number of different operations in different working areas. Exactly what we required, although in a much different level of precision. We demanded a repetitivity of positioning of few tenths of millimeter, therefore the machining precision of our plant would have been one order of magnitude more sophisticated than that of that panel plant. The technical discussion took some months, but we eventually found a satisfactory response from Canon and we signed the supply contract.

CN: The proprietary design of this plant demanded a certain degree of co-development during engineering and designing. How did you share this important phase?

FA: We joined forces with Canon Tecnos and made a team that worked side by side for several months. We knew what we wanted and we designed it, Canon brought in the know-how related with all the movements and all the logic controls. The specialists cross checked the other side’s work, agreed modifications when this was the case and then gave green light to manufacture the huge plant’s component columns to lift the tools and their payload, wide trimming devices able to hold in place several tons of steel during the most delicate machining tasks, sliding platforms to safely hold the operators around specific working areas, the whole platform servicing every corner of the multi-level installation. The erection took several months, mostly spent in ensuring an absolute positioning precision between the various stations. Several things had to be corrected, but we somehow expected that the project was something new for both the involved parties, all things can’t go 100% right at the first time, when you are making a “first of a kind” complex plant. The atmosphere was cooperative and frank, we re-discussed a few details and the work continued. Another moment of intense co-operation was experienced during the start-up phase. All our ideas had now to be proven, and we required a long time to optimize the interfacing between the airplane’s parts, the tools that are holding them, the AGVs and the manipulation system.

CN: How can you rate the final result?

FA: As you can see, the final result is quite impressive: the Cannon line covers 100x20 metres, reaching 10 metres of height. The parts flow from one working station to the next – we have two for the rear, five for the fuselage and two for the front – with the precision and the timing that we specified. This plant does exactly what we expected, and the electronic control designed and programmed by Cannon Automata helps us greatly in setting all the operative parameters and in saving all the production data, for an accurate and reliable certification of the produced quality. Our standards require a full control of every step, to be able to retrieve every minute of our M-346. Aerostics routines are notorious for their severity!

CN: Do you expect now, having completed his positive experience, to duplicate it for other plants of Alenia Aermacchi?

FA: With the experience acquired we would now simplify some details of this manufacturing concept, but we could definitely apply it to the assembly of other large aircraft parts. Developing a project for the assembly of a new airplane, whose forecasted numbers and complexity of project are similar to those of the M346, it would definitely make sense to apply this method to their production.

This complex line, wholly built by Canon for Alenia Aermacchi’s Venegono factory in Italy, allows for the construction of the twin-turbofan M346, today’s most advanced lead-in fighter trainer aircraft. An Automatically Guided Vehicle transports the three parts of the airplane through the service stations where all the composites and aluminium-alloy components are fixed on the structure. All this happens with a precision of few tenths of millimeter.
Epoxy impregnation: Cannon provides four winning tools!

The recent introduction of new Cannon technologies for the manufacture of Epoxy-impregnated composites forms an overwhelming response from the market. In addition to a significant number of low-pressure dispensing machines sold for the impregnation of the giant blades used for the eolic generators industry, Cannon have introduced three different impregnation systems based on high-pressure technology. A whole range of solutions is now available to respond to different needs and processes. Cannon supplies today the widest set of tools, including dispensing and mixing devices, preformers, presses, moulds, manipulators, ovens and controls.

Exactly two years ago, at Jec 2010 in Paris, Cannon launched their new high-speed RTM technology for Carbon-reinforced composites based on Epoxy resin. The new process, called ESTRIM (Epoxy Structural Reaction Injection Moulding) was making possible the industrial use of new, fast curing epoxy formulations developed to comply with the high productivity required by the automotive industry for their mining number of structural composite parts. Based on a series of integrated tools - Carbon reinforcement handling systems, dedicated preformers, high-pressure dosing unit for Epoxies, multi component mixing heads with different distribution methods, polymerisation presses and relevant handling systems of preforms and moulded parts - the ESTRIM process immediately received a positive response from the industry.

The possibility to cast almost by the tuning cutting of a large moulded part – going from a traditional 30 minutes cycle of conventional RTM down to 3 minutes with ESTRIM – appealed OEMs and Tier 1 companies.

All the major players in the field of automotive composite parts visited during the past 18 months the Cannon R&D laboratory in Italy, either to run moulding tests with their own raw materials and moulds or to discuss directly the supply of equipment for their composite research and production departments.

New Solutions Are Now Available

The intense exchange of experiences matured during these visits introduced the development of new methods for distributing the liquid Epoxy resins in the Carbon parts.

In addition to the ESTRIM RTM (fast injection technology), Cannon have developed two alternative methods for the impregnation of these more or less flat mats, both to be applied in open mould prior to the closing of the press:

- ESTRIM M. (Spray Laydown) – the Epoxy formulation is sprayed directly over the composite part, covering each centimetre of mould with extreme precision, applying the desired amount of liquid resin where it is required by the part’s geometry. This technique allows for the use of various formulations, characterised by low fluidity: being directly deposited in-situ the liquid does not need to flow through the fibres, avoiding any distribution problem. A certain degree of part's three-dimensionality can be approached without problems, since the head can be tilted on a four-axis unit over the vertical sides of a mould during the spraying operation.

- ESTRIM LL. (Liquid Laydown) – the Epoxy formulation is laid over the Carbon mat in “liquid ribbons” of varying width, typically from 10 to 120 mm, perfectly impregnating the reinforcement without the minimum possible of air inclusions in the moulded part. This technique allows for the production of very large parts, thanks to the moulded Carbon, almost flat preforms that characterise parts such as roofs, engine hoods, fenders and doors. The resulting composite is very rigid, controllable on a part-to-part basis, this system allows for a comfortable laydown time even for the largest pieces. As in the M. alternative, the formulation does not have to flow through the mould, therefore guaranteeing the most homogenous distribution of liquid resin in the Carbon reinforcement.

We should not forget the development of new alternatives for the traditional high-pressure injection in closed moulds, performed with the original EpoxyStar 373.

The experiments matured in the past in the field of short-stroke polymerisation presses have allowed for at least three more injection methods:

1. We can inject the resin with a variable output, commanding the operation by reading the internal pressure in the moulds with a series of pressure sensors. The signal is sent to the unit’s computer, that defines the new output value to be applied and commands the dosing pumps accordingly. The press does not move more during the injection phase.

2. We can apply the injection-compression method, by leaving the mould partially open during the injection (still guaranteeing the tightness of the cavity) and applying the final compression stroke at the end of it. This method is very simple and useful.

3. We can inject the resin and apply a low clamping force on the mould, which is finally clamped after the liquid filling phase: at the end of it we apply the full nominal clamping pressure and compress the mould and its content.

Worldwide recognition

Up to date, seven different contracts for these Epoxy-dedicated technologies have been signed with major manufacturers of parts and Raw Material Suppliers, in Europe and Japan, in the past 18 months.

- High-performance mixing heads, specifically developed for Epoxy resin; hardening treatment of the mixing head parts is done not only on the surface but also in the core. - Each component can be calibrated directly at the mixing head, so calibration conditions and working conditions are the same. - A special program “weekend cycle” is highly customizable, for controlling the sequencing of the manufacturing in order to avoid the components stagnation when the machine is not in working cycle for long periods.

Precision is one of the main requirements for low output machines. Therefore the Cannon high-pressure metering unit is provided with high-precision dosing pumps driven by closed loop motor (frequency inverter controlled).

Another important feature is the continuous recirculation of the chemicals near the mixing head. All these items together allow the system to correctly maintain the set temperature within a close tolerance range.

The thermostatisation of the chemicals is a key point of the complete process. Cannon experience in managing these chemicals leads to use jacketed tanks, supplying temperature controlled oil by a thermostat (for the low-viscosity oils) or a gas (for the required temperature heated pipes are used: coaxial pipes with internal channel for the heated oil and traced flexible hoses, for the residuals).
Cannon Global Service

meet to share “the” major project

A 5-day-meeting was organised in November 2011 for the Cannon worldwide After-Sales engineers involved in the PU technology of dosing machines and plants. The event saw 65 people from 19 countries attending a tight training and updating program in the Cannon Afros factory north of Milano, Italy.

A special emphasis was given to the mixing process, with the aim of updating them on the recent developments and deepen the knowledge of skills and practices of intervention on the Cannon machines installed in the various geographical areas, in the different configurations, and for the various applications.

A second target of the meeting was to give the technical people from different countries and cultures an opportunity to meet, to identify each other as members of the same project and to exchange common experiences.

The meeting second, in the final evaluation of the participants, a very positive judgement, with extremely constructive suggestions for the organisation of the next event.

More than 20 tutors were involved in defining, preparing, organizing, and carrying out the various aspects of the meeting, that represented the beginning of a systematic dialogue for all the Cannon Service people with the aim of a constant improvement to meet the challenges of the near future.

Cannon have always participated to the UTECH Technical Conferences presenting their latest developments in various fields of Polyurethane processing.

This constant presence has generated in the Group a tradition of witnessing and showing in public the matured know-how, without worrying too much about being promptlyimitated by less innovative competitors.

In line with its tradition of diffusing specialised information, Cannon presents at this UTECH 2012 Conference edition one historical and two technical papers:

- **“Developments in Processing Equipment and Techniques”:** reminds the past 75 years of Polyurethane processing, reminds the pioneers that have invented this fascinating technology, highlights the milestones, tries to view in the crystal ball looking for some ideas for the future.

- **“Innovative Method for the Production of Structural Elements for the Construction Industry”** illustrates an interesting application leading to the manufacture of large ceramic elements destined to the external and internal decoration of industrial and civilian buildings, hospitals, boats etc. Using a two-component special low-pressure machine and a spray head it applies a thin, regular layer of PUR adhesive, the ceramic slabs are reinforced with a thin glass mat.

**“Vacuum-Assisted Injection Technology for Refrigerator Production”** shows the latest innovation developed by Cannon in the field of refrigerators manufacture: the use of vacuum in the mould containing the fridge cabinet makes much easier the foam filling phase after the injection, generates a better foam thanks to the special PASCAL™ chemistry developed by Dow – and provides higher insulation properties.

All these papers are available for download in the Cannon Group’s website (www.thecannongroup.com/papers.asp)

Enjoy the reading, and contact us if you have a special interest in these subjects!

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## Cannon celebrates their first 50 years with Cannon!

Important anniversaries must be celebrated in special ways!

FSK - the German Association of Cellular Foamers - celebrates this year their first 50 years of activity, and organised a special tour to Italy to make it a date to be remembered. Fifty of their members, led by their Managing Director Dr. Hans-W. Paul Schloz and by their President Albrecht Manderscheid, organised a technical tour visiting a number of Italian companies involved in Polyurethane processing.

Group picture of the FSK visitors at the Cannon Afros factory in Cannone Pernusa, near Milano, Italy.

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## Three new papers @ UTECH 2012

Three new papers were given in two conference rooms to the fifty members of the FSK during their visit to Cannon.

The whole afternoon and evening of Wednesday, March 14, 2012, were spent with the Cannon Group, visiting the Planex Technologies Pole of Cannone Pernusa, near Milano.

A comprehensive program of technical presentations was organised by Cannon, inviting a number of prestigious customers to witness the advantages deriving from the use of the Group’s technologies.

Marco Violato, Cannon Group’s MD (left), receive a commemorative trophy from FSK MD Dr. H.P. Schloz.

FSK’s President Albrecht Manderscheid (left), and MD Dr. H.P. Schloz (right) cut the 50 Years Cake.
Nippon Cannon goes worldwide with their Japanese customers

NCI (Nippon Cannon Inc.) has recently secured many orders from Japanese customers worldwide. Large and famous Japanese brands – mainly manufacturing automotive interior parts and refrigerators – are extending their market share not only in Japan but also around the world. Promptly adapting to their customer's strategy, Nippon Cannon reorganized their resources to become an international player with them.

AUTOMOTIVE
NCI started to supply equipments for closed mold injection of foam in Instrument Panels to Calsonic Kansei’s overseas plants since 2008. At this very moment the following equipment has been added for installation and start up during 2011 or the first quarter of 2012:

- In CHINA (Guangzhou): Two fixture stations. One dosing unit and two multi-component mixing head.
- In THAILAND: Two fixture stations. One dosing unit and two multi-component mixing head.
- In MEXICO: Three fixture stations. One dosing unit and three multi-component mixing head.
- In CHINA (Xiangtang): Four fixture stations. One dosing unit and eight multi-component mixing heads.
- In TAIPEI: One fixture station with one dosing unit.

REFRIGERATOR
The major Japanese refrigerator manufacturer has been using Cannon foaming equipment in their overseas factories since 2009. NCI have recently supplied them a significant number of complete plants for commercial and industrial refrigerators.

- In VIETNAM: One A-System 100PT dosing unit and one A-System 40PT, with four FPL mixing heads and two complete premix systems PentaEasyFinsh.
- In THAILAND: Three A-System 100PTW dosing units, with six FPL18 mixing heads and one complete premix system PentaEasyFinsh for Cyclopentane.
- In THAILAND: Two EasyDrum, one A-System 100 PTW metering unit with four FPL24 mixing heads and one PentaEasyFinsh premix system.

The Japanese customers are actively looking for new products, therefore they are very interested in Cannon new technologies. Several examples can be mentioned, all referring to orders delivered in 2011:

- PUR SPRAY - a plant for Automotive interior parts.
- CLEAR COATING - a machine for Automotive interior parts.
- JLB8 MIXING HEAD - for Insulation sandwich panel.
- CARBON FIBER - EPOXY RTM - one dosing machine combined with one IMC (In Mould Coating) injection machine for automotive exterior parts.

As a consequence of the terrible disaster of March 11, 2011, all the Japanese companies had to stop their production activity, either because of parts delivery delays or of electric power supply shortage. But Japanese were not sleeping. All the automotive manufacturers restored their production soon after, with the usual production rate almost recovered by August, using overnight and weekend production to compensate the short stock. NCI is handling all the above mentioned project with the support of the other involved Cannon Units confirming the already proven validity of the “Cannon Global Network”.

Part of NCI personnel, based in the Satama Prefecture near Tokyo. Total staff counts today 15 qualified employees.

Cannon Eurasia: a dream comes true!

The year 2011 has been a very successful one for Cannon Eurasia. The brilliant results gave further stability to the Russian branch of the Cannon Group, that can now start dreaming about new challenges.

Sales of plants and machines have returned, in 2011, to the good levels attained by Cannon Eurasia before the crisis of 2008. The brilliant economic result allowed for some investments that were kept on hold for a while.

A new office in Moscow
Cannon Eurasia has moved into new, wider, more modern offices.

The new headquarters, inaugurated on November 15th, 2011 at the presence of the Group’s top management, offer ample space to the current 17 employees and to those that are planned to join them in the near future. A welcoming atmosphere, with a beautiful view on Moscow, permits to accommodate properly clients and visitors. A new spare parts storage has been added to the offices, well furnished with custom-coloured parts that can be supplied, without delays and import operations, to the numerous Cannon customers in Russia.

A stock of metering units for prompt delivery
The status of Russian Company that characterizes Cannon Eurasia allows them to keep in Moscow a storage of different Atlos’ metering units, already custom-cleared and ready for immediate shipment to any customer in Russia.

This status is not very common, and this allows the clients to give an immediate follow-up to any decision of investment they might think of in the short term.

Another Russian certification for the Cannon machines
In addition to the already obtained GOST certification, Cannon Eurasia is now entitled to certify their equipment in accordance with the RosTechnadzor norms, so that it can supply its machines as approved by both these rigid Russian standards.

Project Management and BONO Sales
The current team has been improved, with new Project Management specialists and dedicated personnel for the BONO Energy and Ecology solutions. Read more about this at - age 160!

Dreams come true, sometimes! Nobody at Cannon Eurasia would have thought of such a development, just a few years ago. But they already think ahead, and dream of a modern laboratory where customers can try the Cannon machines before buying them, and of a training center for their customer’s technicians... and at this point of time it’s not anymore a matter of “it”, but just a matter of “when?”.

Congratulations to Andrea Castellani and his winning Team!

Windows & Doors: Phenolic foams meet Taiwan’s strict fire regulations
One of the largest manufacturing conglomerates in Taiwan, part of the Formosa Group’s collection of chemical and plastics companies, Nan Ya Plastics primarily manufactures plastics, fibers, and electronic materials. Its primary products are polyester and its derivatives, including polyester staple fiber, polyester chips, PET, and polyester films. Taiwan’s largest plastics maker, the company also operates in the US through subsidiary Nan Ya Plastics USA as well as in China and Indonesia. Nan Ya Plastics was founded in 1958 by industrialist Yung-Ching Wang, whose family still controls the Formosa Group companies. Producing all kind of petrochemicals, plastics, fibers, electronic material and door/window products, with a 2010 turnover of USD 7.3 billion, Nan Ya Plastics is a loyal Cannon customer since many years. They produce and sell globally all kind of SMC/PVC doors and windows.

Since 1992 they make use of five Cannon high-pressure foaming machines to fill rigid Polyurethane foam into the SMC door.

When, four years ago, they decided to produce fire-resistant SMC doors in the strictest fire regulations, since Cannon did not have a low-output machine for Phenolic foam at that time, they brought in one high-pressure dosing machine from a local supplier.

Their nightmare: started since the poorly-designed and built local machine arrived. They were facing a lot of problems both in the quality of material and of the end products.

When their market was at risk, due to the strong confidence on the Cannon technology they finally decided to go for a Cannon solution, and selected a dosing unit and mixing head specifically designed and built to handle the corrosive chemicals used in Phenolic foams.

The new Cannon machine arrived in July, 2011 to solve their problem: a frame of superior quality and aspect was immediately produced, with great relief for the customer and satisfaction for the CFE Taiwan office that handled the business.
Revamping an existing plant? We can do it for you!

When confronted with the decision of revamping an existing foaming plant of investing in a new one, a PUR part manufacturer is always debated between the vision of a potential saving and the certainty of a lot of headaches. Cannon can help. Many years of experience in installation and re-location of important manufacturing plants allowed Cannon to help several customers to saving significant amounts of money AND avoiding a lot of troubles when revamping their existing equipment. An example comes from a well-known German foamer that had to start, in a very tight schedule, a foaming plant in China.

Cannon Deutschland was requested, at the beginning of 2011, to quote for the reconstruction and installation of a complete foaming line for automotive seats. The client was a well-known German foamer specializing in all sorts of automotive interior’s parts that, thanks to extensive experience and availability of internal skilled resources, also used to build in-house parts of their own foaming equipment. But an urgent project occurred in the middle of an already very busy season, and their internal resources simply couldn’t make it in the requested time.

An existing foaming plant – built by Cannon Tecnos several years before – was sitting idle in a Polish factory, and the project involved the refurbishing of 21 double mold carriers running on an oval track, the modification of the chemical’s dosing unit, the replacement of the mixing heads and of the relevant robots, plus the installation of a new control system with all relevant electronics and software. The whole refurbished pack was destined to a new foaming site in China, where it was supposed to start production by the end of October of the same year.

The proposed quotation was accepted by the customer, and numerous trucks unloaded a few weeks later the whole plant in Cannon Tecnos premises near Milan, Italy.

To make a long story short, the 21 individually-driven, motorized presses were completely refurbished and modernised, replacing all worn-out elements, motors, temperature conditioning units and air bags operating the lower platen’s parallel stroke. The dosing unit was completely disassembled, cleaned and transformed in a 6-component version with double pumping groups, able to meter 4 Polyols and 2 Isocyanates by means of 2 new Cannon AX18 heads held by 2 new robots. A new, complex wireless control was put in place to send signals from the central Siemens computer to the individual presses, that are able to perform all their movements independently from the track’s geometry and from the other presses. A dedicated area, at one track’s end, allows for the mould change operation without interfering with the production cycle.

XXL Thermoformer for Aocolis in Scandinavia

Gibo Plast A/S is the leading player in the vacuum moulding sector in Europe’s Nordic region. Since 1962 the company has been supplying high-quality products to a wide range of sectors. Their impressive manufacturing capacity - they operate with at least 22 vacuum moulding machines of all brands and types - allows Gibo Plast to produce technical plastic units in all sizes: everything from tiny components to giant parts measuring - now - up to 4,200x2,300x900 mm!

Gibo Plast specialize in three moulding methods: Vacuum moulding, high pressure and Twin Sheet, and produces parts for the wind turbine and automotive industries, for refrigeration and deep-freezer trade, for cabinets and technical articles for the lighting sector, the medical and other applications

Gibo Plast A/S has recently invested in a very flexible Cannon Forma series CRE 4225. The investment has been done in order to produce parts to the wind turbine industry, mainly parts as internal covers, transport covers and ship trays, made in plastic sheets of ABS, HD-PE and PC.

The machine - the largest thermoformer operating in northern Europe, handling plastic sheets up to 4,200x2,300mm - is one of the largest units built by the Thermoforming Division of Cannon. The delivery took place in March, 2012.

This very flexible thermoformer features automatic adjustable reduction plate system (Cannon patent) for faster and precisely repetitive set-up, and a clamp frame. All the main movements and adjustments are done by brushless motors, for longer life and more precise regulation.

Continuous panel laminators: repeating orders from satisfied customers!

Repeating orders from satisfied customers, that’s the dream of any manufacturer! Continuous foaming laminators for the production of PUR/PUR insulated sandwich panels are not sold every other day, therefore when an existing customer comes back with the request of the third complete plant in less than seven years, the fact is worth a note on the Cannon News.

At Lissaint, the largest producer of sandwich panels in Russia, Cannon is now in the final testing phase of its third complete line for the manufacture of metal-faced, PUR/PUR filled, building panels. This 180 meter long plant operates in Nizhniy Novgorod, South-Russian Region, and - as for its two predecessors - it features a complete Cannon technology from the deposing and metal profiling section up to the panel’s packaging station.

"Thanks for the loyalty, Messer Lissaint!"
A new Cannon-Manni solution for the flexible production of very large building panels

The request for large foam-insulated sandwich panels is on the rise in Europe and the USA. The characteristics of the new solution perfectly match the processing difficulties linked with these huge products. A big Cannon - Manni foaming plant has just been delivered in Europe to produce very large building panels in a “just in time” sequence, according to the method used to assemble the final building.

Sized up to 20 m long and 4.2 m wide, these are probably the largest panels produced in one shot without any separation or compartments inside the foamed cavity. Featuring two thin steel facings on both larger sides and a wooden frame around, these wide panels are characterized by the fact that the wood beams, about 3 to 4 m long, are not fixed, glued or nailed to the facing sheets. The pressure of the foam from the core keeps them in place at the edge of the panel, against the side shoulders of the mould. A dimensional accuracy better than 1 mm is requested for the finished panel.

The requested product mix is quite vast: wall and roof panels of different dimensions are produced during production. There are about 100 lengths, each in 10 different widths, for the walls, while the roofs are made in about 50 lengths, each in 2 widths.

When the shorter panels are produced, up to four of them are laid side-by-side on the same press plates. Provision must also be made to occasionally produce take-off-sized panels. The wall panels are flat, with some architectural design for the outside of the building, while the roof panels are of the pitched roof type and the outside facing is a trapezoidal commercial sheet. Specific moulds, that can be removed easily when switching model on the same plants, are necessary. It is also well known that commercial facing sheets are not at all accurate (disparities of 5 mm in the face of the panel). The accuracy is cumulative over the 20 m length. The moulds must also compensate for these defects. Two types of PUR foam can be used, a standard type and a special one. Cannon used a special one that need a post-in-place production technique: an open-mould potting system is mandatory. All these variables obviously made the design of side moulds and setting tools a challenge.

The largest Manni press ever built

The press, an open-mould type with plates of 20,200 x 4,400 mm, is the largest ever built by Manni in their long history!

It has one fixed upper plate with vacuum suckers to load in advance the upper sheet of the panel.

Four extratable motorized lower plates are used as respectively sub-plates to load the upper sheet, one tretry dedicated for wall panels, one for roof panel and one flexible that can be used for both types.

All the plates are water-heated, inside as outside the press, for a precise temperature control.

A tretry, with a zero-weight balancing system and a vacuum frame, runs over the plates to allow for a quick change of moulds. All of this means that the production line is about 115 m long.

To allow for the panel’s demoulding an hydraulic movable system, giving a 50 x 50 cm area, is used.

The complete moulds system has an accuracy of a fraction of a millimetre or better.

The foam deposition, in open mould, is done while the movable plates enter in the press. An accurate position system gives the signal for the start of the potting, taking into account not only the variable speed of the plates but also the inertia of the dropping foam to obtain an exact laydown of the requested foam.

A very generous “wet end” in an open-mould potting system the most critical point is to get a fast movement of the plates, linked with a high-enough components output, so that the press is surely closed before the foam reaches the edge of the mould. The installed Cannon “wet end” allows for a maximum total output of more than 1,000 U/min, given by three dispensers with three large, new Cannon J32 mixing heads. Allowing for a single output of more than 6 Kg/sec, this new head is a concept of high pressure, self-cleaning mixing head without injection nozzles (J32 “Jetless”)

Besides in high output, this head provides a better mixing efficiency than the classical “L-shaped” head at this output level. This provides less foam overlapping and, as a welcome consequence, some chemical’s savings.

The three mixing heads are fixed on an automatic portal placed over the entrance of the mould cavity, on one of the short sides of the press. The heads can be used to pour three individual streams of foam or, equipped with perforated pipes, to pour in place over the whole panel width. At the end of the foaming operation the blocked pipe is automatically dropped inside or outside of the panel. One or the other the pouring system can be used according to the output or to the type of foam used.

Controls

The whole line is highly automated and can be fully integrated with the factory central control system. A library system, containing all the characteristic and dimensions of the panels that can be produced, is recalled from the production planning department. This list of mixed wall and roof panels is sent to the production department, which collects the information they need to set up the panel and automatically downloads the foaming and press settings to the line, via a simple text file. Modifications to this pre-set program can easily be made according to the effective production needs.

At the end of the shift all the used parameters are collected and stored for the individual panel’s records and for possible later check.

A good cooperation provides good fruits

This fully-automated, huge panel’s line has been a real challenge for Cannon and Manni, assisted by the Cannon local Sales office. With a good cooperation, especially with the customer, the results have been very positive since the very beginning!

Nuclear waste safely disposed of in USA, thanks to PUR insulation!

For many years Paragon D&K, located in Grand Rapids, Michigan, USA, has provided tooling and prototyping for various industries including the aerospace and federal government agencies. They have produced sample parts and low volume production runs in their 3,000 ton injection molding machine, and their 3,500 ton compression presses (SME parts or heated thermoplastic formed parts).

They can also machine, bond, drill and assemble an end product prior to shipping complete assemblies.

Thanks to the teamwork approach taken by Paragon, Dow Automotive and Cannon USA, Paragon was recently approved by the DOE to supply specialized barrels to nuclear facilities for the transport of contaminated items and various radioactive isotopes.

In 2008, Paragon approached Cannon USA with a concept of manufacturing specialized 55-gallon drums designed to transport contaminated items such as clothing, filters, low level nuclear isotopes, etc. from nuclear facilities. These shipping packages had to meet very stringent Department of Energy (DOE) specifications and pass a rigorous testing procedure.

Cannon worked closely with Paragon as well as Dow Automotive in the development phase of the project to design a shipping machine which would be capable of delivering nearly 60 pounds of Polyurethane foam into the interior wall of the specially designed drums and another 10 pounds into the cavity of the double sided lids that are firmly bolted in place to allow the barrel to be tightly sealed.

These drums have to withstand an impact of dropping a 1,100 pound plate of steel that is dropped from 30 feet in the air onto the sealed drum. The drum pass the if scaled barrel does not open upon impact. This design has been as a joint patent between the DOE and Paragon DE.

Thanks to the fruitful teamwork approach taken by Paragon, Dow Automotive and Cannon USA, the DOE recently approved Paragon to supply these specialized barrels to nuclear facilities for the transport of contaminated items and various radioactive isotopes.

... Applications
Varimax CarDio™ Plant for Australia

Foamco Industries located near to Sydney, NSW, Australia are being supplied with a new state of the art Varimax continuous foam plant with high pressure metering units for the production of standard and speciality flexible foam blocks including HIR, Supersoft, High Hardness and Visco Elastic (Memory) foams.

Foamco are one of Australia’s largest flexible foam block producers and suppliers of both foam blocks and cut foam to the furniture and mattress industry throughout Australia with a nationwide network for foam sales and distribution.

This very high specification new continuous foam plant - that will be located at Foamco’s plant located in Minio near Sydney - also includes Cannon Viking’s patented CarDio™ liquid CO₂ equipment for low density foams using a full range of chemical raw materials including filled and high viscosity Polyols. To maximise production flexibility Foamco chose the option of the Varimax equipment which enables the production width to be changed fully automatically without stopping production on the machine giving maximum flexibility in both block width, length and density during the foam pour.

The Varimax Plant for Foamco Industries, Australia, under final construction at Cannon Viking’s factory in Manchester UK.

This new state-of-the-art plant also includes the latest generation of Cannon Viking’s Omega computer control and monitoring system for optimal plant control and feedback. The CarDio™ liquid CO₂ technology was an essential part of the foam plant supply due to changing legislation in Australia where Methane Chloride will be phased out by Australia law by 2013. As part of the foam plant supply Cannon Viking have also supplied one VCO 245 in-line block length-cutting machines especially designed for Visco, as well as standard, foam block cutters. Visco foams require special cutting due to the very soft and heavy nature of their cells structure.

Cannon Viking selected for Chemical Bulk Storage and Blending Solutions

Cannon Viking has been appointed the Cannon Group company responsible for chemical bulk storage and chemical blending solutions with a large number of installations already in successful operation worldwide.

Using Cannon Viking’s vast 50 year experience in chemical metering and handling from the foam block industry the company has built upon this knowledge to offer turn key solutions in other non-alloetsic business areas.

Recent projects include equipment for specialty Phased blending and production for a major raw material producer as well as in-line chemical blending for automotive part suppliers. Cannon Viking offer a flexible approach from design only to complete plant supply with fully integrated controls, equipment installation, technical service and training.

Talk to us, we have a lot to offer!

Technical, fine-celled slabstock foams modular upgrade

With the increasing demand from customers for higher quality, finer and more regular cell structures, reduced pinhole flexible foams, Cannon Viking have developed a modular upgrade equipment package for their range of continuous foam plants.

The equipment package consists of a patented pre-mixer device for precision blending of mattering air with the silicone stream, as well as the upgrading of the TDI and water metering streams from low pressure to high pressure.

Dependent upon the configuration of the existing foam plant a liquid laydown pour plate unit is also added to replace the original Maxfoam trough laydown unit.

This upgrade package has been supplied to a number of existing customers in Far East, Middle East, Europe as well as South America with very positive results.

Cannon Viking consolidates position in Indian Market

Continuing the success of previous two years, Cannon Viking sold more machines last year to customers in India with active marketing efforts from Indian representative Expanded Polymers and Mr. Saurabh Prasad of the local Viking office.

In mid 2011, M/s Libra International Ltd – a leading flexible foam producer based in North India – ordered a Maxfoam 600 Elite version continuous foam manufacturing machine.

The Maxfoam 600 Elite machine is totally upgradeable to high pressure metering streams and can produce foam using Maxfoam trough and liquid laydown technologies.

This machine will produce a variety of foam types – Polyester, Polyester, Visco Elastic, High Resilience, Fire Retardant foam, MDI based foam – and therefore can cater to various demands of the Indian flexible foam industry. With this machine Libra plans to consolidate its leading position in the Indian mattress and foam markets.

Later in the year, M/s Bhagwati Foam Industries, a relatively new company based near Mumbai, ordered an EasyMax Maxfoam 400 continuous machine to replace their present locally supplied machine.

With this machine, Bhagwati Foam plans to manufacture foam for furniture industry and cater to the growing demands of Western India market.

Easymax 400 machine has been a popular choice for Foam producers in developing markets of Africa, Middle East and parts of Asia.

The last 12 months also saw Cannon Viking’s active participation in various Industry exhibitions such as PUTech India, PUCHina, Intermat and ISPA USA where many customers from South Asia region had technical discussion for their machine requirements.

Technical foam production in South America following the high pressure, liquid laydown plant upgrade.

Victorious Young Vikings

Emma Dawson and Sam Payne (above, both 19) joined Cannon Viking in September as Apprentice Technicians. They are currently undertaking approved training schemes, with SETA, a Government Training and Advisory Service.

They recently took part in a walk to raise money to help teenagers with cancer.

We thank the young Vikings for their efforts for this worthy cause. The future is bright at Viking!
Cannon have designed and supplied dedicated preformers for composites for more than three decades. Glass, Carbon, Aramidic and natural fibres of every type and consistency have been successfully handled and precisely dispensed in large or small moulds in dozens of different applications. The availability of these dedicated tools – in addition to a complete range of mould carriers, presses, manipulators and other specially-designed equipment – is a significant plus in the search for a complete industrial solution aimed at the automated high-speed manufacture of injected composites based on Epoxy formulations and various types of fibre reinforcements.

The tight strength in the right places

«The core of this high-strength material lies in the Carbon fibre. In contrast to quasi-casts, it resists like Aluminium or steel, which have equal strength in all directions. CFRP is anisotropic. This gives it very high strength, like a rod, in one direction, namely along the textile’s own direction axis: This is its key advantage. Using CFRP is more than cost if a straightforward substitution, using Aluminium in the use of stocks states a nice 40-page report titled “Mobility of the Future” made by BMW. With it’s usual martsite, this high-iron material also in the shell in very high now – a mess of growth comes too.»

Preforming and preform joining – a component takes shape

As the so-called “preforming” stage, the cut but still flat fabric begins to acquire a shape. During this process a heat source is used to give a fabric stack a stable, three-dimensional contour. The final shape of the component is already clearly visible. Several of these preformed stacks can then be joined to form a larger component. In this way CFRP can be used, for example, to produce highly integrated components with a large surface area, which would be extremely cumbersome to manufacture from Aluminium or steel sheet. This has major benefits for vehicle body design and manufacture. For example, mounting parts or other features can be integrated directly into the component.

Also, complex structural components and entire body modules with varying wall thicknesses can be produced in a single moulding tool. At both process stages – preforming and preform joining – the big challenge lies in ensuring good production processability of the flexible fabric so that the preforms will maintain a stable shape and can be joined with maximum precision. This precise and delicate operation is performed using a sandwich composed by various layers of Carbon fabric, selected according to the mechanical resistance desired for the final, moulded part.

Special needs, special solutions!

Since preforms can be made with various reinforcements for different impregnation methods, Cannon developed customised solutions for several OEMs and Tier 1 parts manufacturers. As an example of special project, the glass preformer made for Mercedes in the USA for the production of a complete track bush and tailstock for the GM’s Silverado pickup. The customer required the deposition of a huge amount of pre-cut glass fiber over a male plug. Cannon designed and built a whole system (below) using four synchronized robots that were more than 25 kg of pre-sorted glass moving in less than 150 seconds, applying a thick layer of fiber over a 9 m male plug. Transferred in a large press and submitted to pressure-forming immediately after, the glass, with the precise of heating and pressure, created a large, compact preformer. This was later on introduced in a mould and impregnated with Polyetherne using the RIM technology, obtaining a monolithic pickup head (and its tailstock) of impressive size and surface-finish quality.

Dedicated presses for each application

More than 45 years of experience in presses for composites, delivering all sorts of models up to 3,500 Tons of clamping force and up to 3,500 x 3,500 mm of platens dimension, characterise the Cannon offer to a sector of the plastics industry that is facing an increasing growth rate.

Designed and built to last, the Cannon press for composites have been used for more than four decades for compression moulding of SMC, BMC, GMT resins. Characterised by a four-column construction, they allow for optimum distribution of pressure over the whole mould surface and for flexible approach from the four sides for all manual and automated loading and unloading operations. The availability of a sliding upper platen and a sliding lower platen (sheath system, that can also be supplied in a double version, sliding towards both sides of the press for an increased productivity rate of the working island) allow for ergonomics service operations and for the manipulation of the largest moulded parts. Presses with platens up to 3,500 x 3,500 mm dimensions have been manufactured, featuring specific pressures from 10 to 100 bar the former is mostly used for materials requiring only a containment in the mould during an impregnation phase, while the latter is specific of true compression processes. When the highest dimension precision is demanded, a short-stroke press can be supplied, featuring a very compact design combined with excellent control of active or passive parallelism during the final clamping stroke and fast operating cycle, due to the limited amount of hydraulic oil used in the circuits. Cannon customers in this field include all the major manufacturers of composite parts: among them Fritzsche, Menard, Polyform, Inoplas, Plastic Omnium, IMR, Regal and several others.

The booming sector of composites for the transportation industry – which requires high-productivity, energy-efficient, proven solutions using new types of formulations and reinforcements – can benefit today from the vast experience manned by Cannon.

A unique set of tools is available, to be used with and around these complex machine handling systems, dedicated preformers with patented slip-control methods, pre-heating ovens, several methods for the impregnation of the reinforce-ments with various families of reactive chemicals, all the safeties around the working areas and a specific electronic control designed for these operations.
**ARTES onboard the World’s first FLNG**

The Cannon Group’s water treatment Division contracted for two process water systems to be installed on the Shell’s Prelude FLNG facility

"We are proud that ARTES INGEGENIA S.p.A. has been awarded the contract by the Technip Samsung Consortium, for two process water treatment plants that will be installed onboard the world’s first floating gas-liquification plant that Shell has decided to build. The announcement, made byPasquale Punzi, ARTES’ Managing Director, marks a milestone in the Company’s history. The Prelude Floating Liquefied Natural Gas (FLNG) vessel, 100% owned by Shell, will be built in Samsung’s shipyard in Geoje, Korea and moored far out to sea, some 200 km from the nearest land in Australia.

Designed to withstand the severest cyclones – those of category 5 - the Shell’s FLNG facility will be 488 metres long from bow to stern, and will be the largest floating offshore facility in the world – longer than five soccer fields laid end to end! When fully equipped and with its storage tanks full, it will weigh around 600,000 tonnes – roughly six times as much as the largest aircraft carrier. The FLNG facility will stay permanently moored for the next 25 years at the Prelude site, producing gas from offshore fields (an estimated 117,000 barrels of oil equivalent per day). The gas will be treated and liquefied onboard by cooling. Ocean-going LNG carriers will offload directly from the facility out at sea the liquefied gas, chilled to -162°C and shrink by 600 times in volume - and other products, for worldwide delivery. Until now, the liquefaction of offshore gas has always involved piping the gas to a land-based plant. As a global, integrated energy company with operations in more than 90 countries, Shell discovered the Prelude gas field in 2007 and first production of LNG is expected in a record-breaking ten years after the discovery. The innovative FLNG technology will allow Shell to develop remote offshore gas fields – in Australia alone there is an estimated 140 trillion cubic feet of such "stranded" gas - that otherwise would be too costly to develop. As a real breakthrough for the LNG industry, this off-shore method will yield a significant boost to help meet the world’s growing demand for the cleanest-burning fossil fuel, while at the same time reducing both the cost and environmental footprint of their development. Contracted to engineer and build the FLNG facility, the Technip Samsung Consortium draws together two leading companies with complementary skills and specialist areas. Technip, leader of the consortium, is one of the largest firms in the fields of project management, engineering and construction for the oil and gas industry, subsea, offshore and onshore; with 23,000 staff and offices in 40 countries. Samsung is one of the largest shipyards in the world with a capacity to build 65 commercial ships and 250,000 tonnes of offshore topsides modules each year.

In the Condensate Treatment Units, pressure vessels loaded with granular activated carbon are designed to remove oil traces from sour condensate.

**New Bono team in Moscow dedicated to Russia and the CIS countries**

In 2011, Bono has made important investments to state a greater presence in the market of Russia and CIS countries. After several years of activity in that market with good results, which have allowed Bono to have several plants installed and operating in Russia and CIS, the Cannon Group decided to increase the structure of Cannon Euraia in Moscow adding a qualified team dedicated to Bono’s solutions, specialized in marketing, sales and after sales service. The Russian market is expanding in all the areas where Bono has been operating since the 60’s, such as power generation and ecology; for this reason Cannon is taking another step forward to be more intensive and closer to the needs of a market characterized by a fast expansion rate in new installations and replacement as well, and by an increasing awareness of energy efficiency, environmental issues and request of services. Bono’s new team is dedicated to the promotion of technologies of ‘main-gardes’ and is mainly working to make available to the stakeholders, all the information about the new opportunities and technical solutions / technologies that Bono is able to offer.

To meet the needs of this market the whole range of Bono industrial boilers has been certified according to Gost and RTZN, and therefore the plants are suitable for immediate operation.

**Service**

The new ENERGY EFFICIENCY service is available: the optimisation of thermal plant will fulfill relevant savings in fuel and electricity consumption, reducing polluted emissions:

- fuel savings till 15%
- electricity savings till 50%
- CO2 emission reduction till 15%
- investment coverage by Energy Savings Certificates
- NOx and CO emission reduction

Furthermore we provide refurbishment and upgrade of existing plants, recovering projects, introduction of control and safety electronic systems.

Nikolay Borovik, Sales Manager Bono Euraia.

**Cannon Euraia**, as subsidiary of the Cannon Group in Russia, is also able to perform all sales procedures, DDP importation, with the scope of providing customers with a complete service. Furthermore it is also able, through the highly qualified technical personnel, to install, operate or assist plants in operation.

In summary, the Cannon Euraia and Bono team can provide the following services:

- Consulting to define the best technical & plant solution
- Sales of machinery DDP final destination
- Installation and start up
- After Sales Service

Do not hesitate to contact us!