In a recent interview with Marco Volpato, Cannon’s Managing Director, the Group’s performance in the recent past, the present situation and an outlook on the near future are briefly analyzed and discussed. We publish an article in our magazine, thanking the editor of PU Magazine for the permission given. During the most economic crisis a lot of companies experienced a dramatic decline in their business. How did Cannon perform during these challenging times?

Marco Volpato: Cannon operates not only in Polyurethane technology, but also in industrial thermo-forming, in technologies for composites, in Aluminium die-casting and manufactures industrial electronic controls. We are strongly present in the energy sector manufacturing industrial heat generators, and we produce plants for industrial water treatment. The crisis has affected all sectors in the same way: we have seen a significant counter-cyclical behaviour in the field of Energy and Ecology with increased sale revenues and all related economic indicators. On the contrary, regarding the Plastic field, we took prompt actions with a strong focus on costs as well as a review of the organizational structure of our Group in some parts. We simplified and grouped activities not strictly necessary in recession. The efforts and sacrifices endured also by the staff, involved in working time reduction measures, helped maintain an adequate economical profile. Today we can appreciate the results of this hard work done “on the fly” with an extremely tight reading the 2009 actual data. We recognize with satisfaction the efforts and sacrifices endured also by the staff, involved in working time reduction measures, helped maintain an adequate economical profile. Today we can appreciate the results of this hard work done “on the fly” with an extremely tight reading the 2009 actual data. We recognize with satisfaction the efforts and sacrifices endured also by the staff, involved in working time reduction measures, helped maintain an adequate economical profile.

We know our culture and serve them in their language. In India our presence is strengthened by the widespread knowledge of the market provided by our agent. For emerging markets, I think of Central and South America, North Africa, the Middle East, we have been streamlining to be present with technologies that these countries can afford and our constant presence on the territory. Everywhere we pursue advanced solutions using polymers for renewable energy - I think of wind and solar power generation - for advanced energy-saving household applications. Energy saving is one of the crucial points driving markets, products and technology now and into the future. Cannon is exhibiting at the K-Düsseldorf under the slogan “Smart Technology, Save Energy!”. Can you provide a little more detail about what Cannon can offer its customers and on what new ideas your company is working at the moment?

MV: We are going to present in other trade shows the different solutions of our Energy & Ecology Division, and our confidence in these systems leads us to consider our large engineering companies and institutions, both national and international, with which we deal with issues such as the greenhouse effect, the air pollution, combustion efficiency leading to fuel savings, the use of alternative energy. This communication activity makes us understand that the way of energy saving is certainly one that will offer even more opportunities also for polyurethane, and gives us an inspiration for development: pipe insulation made with accurate technology for district heating, window frames with high thermal efficiency, insulation panels for specialty applications: these are all innovations to be discussed at K 2010, in addition to all of our existing technologies.

In Düsseldorf we show the most innovative solutions for energy saving both in manufacturing and final use products. For example, a new concept of foaming system that saves 70% of factory space for producers of domestic and commercial refrigerators, or various solutions for the manufacture of door and window frames which provide an excellent thermal insulation of the premises where they are installed. And much more!

It’s of course a look into the crystal ball but where do you see Cannon in five years time? MV: Cannon is now and has always been the only Group of an international significance manufacturing PU machines and plants, family owned and independent from the world of capitals and the need of maximizing profit. This means for the management and staff, spread in various countries, to have the freedom, satisfaction, and pride to work, excel, gain credit, inspire confidence in an increasingly large and culturally distant number of customers in difficult and diversified markets. These shared values make me believe with confidence that, whatever happens five years from now, Cannon will still be there, and will be as alive and vital as ever.

Where do you see the current and future opportunities for your business as a well known machine manufacturer in terms of both technology and geography?

MV: Cannon presents itself as a global supplier in the sense that we aim to provide solutions for most polyurethane technologies, while conscious of being present with different degrees of success in various fields. We are not only geared towards polyurethane applications of greater volume, but also to some niche applications. In Europe the greatest opportunities we see in the near future are in Germany and the Nordic countries, for special applications in the transport sector such as cavity filling, or the production of lightweight body components in carbon fiber and epoxy resin. In Russia and Turkey our presence is historical, we have two direct branches for many years and hundreds of customers. We know their culture and serve them in their language. In India our presence is strengthened by the widespread knowledge of the market provided by our agent. For emerging markets, I think of Central and South America, North Africa, the Middle East, we have been streamlining to be present with technologies that these countries can afford and our constant presence on the territory. Everywhere we pursue advanced solutions using polymers for renewable energy - I think of wind and solar power generation - for advanced energy-saving household applications.

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A whole life, shaping Polyurethanes!

Constantly driving the development of innovative Polyurethane processing technologies since 45 years, Carlo Fiorentini - who will turn 80 the coming month of December, 2010 - still inspires the R&D activities of the dedicated team of specialists who continue Cannon’s tradition of application-oriented innovation. We ask him his definition and vision of innovation, and its strategic importance for the Group’s future.

Cannon News: You have contributed to the Foundation of the Cannon Group, back in 1967, when you joined efforts with Leonardo Volpato bringing your chemical expertise to solve the processing problems of the young Urethanes industry. Since then, for 45 years, your contribution to the development of this industry has generated important achievements and results. What is, according to your long experience, the definition of “innovation” at this respect?

Carlo Fiorentini: Innovation is the capacity of supplying something new to the final users of a product or process: this novelty must be exploited successfully and generate profit for both the inventor and the end user. Technical pride for an ingenuous solution should not mislead the inventor: if it’s not good for the customer, it’s not innovation, it’s a waste of time and money.

CN: Can you describe an early example of this philosophy, related to your and Cannon’s history?

CF: When I started, back in the mid 1960’s, the solutions for blending Polyurethanes were quite simple, and they were not able to follow the developments of the chemical industries. When high-viscosity Polyols were introduced for high-density wood imitation applications, processed with low-pressure technology equipment, the existing mixing chambers started showing all their design limits. The parallel flow into the current mixing chambers of two chemicals, characterized by very different viscosity and unbalanced ratio, was creating important pre-flows and unbalanced portions of foam. We understood the problem and introduced a diverted path to the chemicals, in order to feed them radially in the mixing area, rather than axially, generating a counter-current blending effect which absorbed all viscosity differences and provided dramatic improvements in mixing quality and foam’s structure. The resulting radial mixing heads were shorter, therefore easier to flush with less solvent after the shot, and more efficient. This provided great advantages to the foamers: the wood imitation industry in Italy, where we were closer to them, boomed - more than elsewhere.

CN: How did you proceed from that stage? What came next?

CF: The next logic development was the elimination of the flushing operation, that is a must when employing a mechanical mixer. Straight heads working by impingement were already used by our German competitors, and a patent was blocking further development. When the patent expired, in the early 1970’s, we were able to quickly develop and patent our own innovative solution, the RIM head, in 1972. Reaction Injection Moulding was, at the time, a very young technology. Processed with straight heads, whose injectors were opened by the component’s pressure, they were showing the same defects described before for the low pressure technology: differences in viscosity and unbalanced ratios were creating an anticipated supply of the less viscous component, with obvious problems of pre-flows and wet marks in the moulded parts. We introduced a mechanically-synchronized feeding system that guaranteed simultaneous arrival of the two components in a small mixing chamber, where their kinetic energy was fully discharged and transformed in mixing efficiency. Structural rigid parts started being made with much nicer surface aspect and no wet spots under the injection hole. This opened the path to the development of lightweight and robust automotive body parts with optimum surface aspect: this was impossible to achieve, before! Again, also in this case, the application drove the process.

CN: The next consequence, then? What came after?

CF: When people tried to use those heads in open moulds for new applications or to replace low pressure technology in existing ones, the turbulence was excessive and foam was splashing everywhere. We identified their main request as “laminar flow free pouring” and tried to tackle that aspect of the mixing process. The innovative intuition was to understand that a substantial effect which absorbed all viscosity differences and provided dramatic improvements in mixing quality and foam’s structure. The resulting radial mixing heads were shorter, therefore easier to flush with less solvent after the shot, and more efficient. This provided great advantages to the foamers: the wood imitation industry in Italy, where we were closer to them, boomed - more than elsewhere.

CN: After 30+ years of successful operation is the FPL head still an innovative tool? Or did you find something to replace it more efficiently?

CF: Innovation requires the intellectual capacity of being able to understand when a totally new solution is required, and when, on the contrary, the existing product can simply be modified to achieve better performances. The latter case involves dozens of different models that we have designed in the past years to adapt the concept to new processing conditions and new chemical compositions. The list is long, I’ll skip that. The former case attracts us more: our latest development, which can replace the FPL in applications where we see its limits, is the JL head. It all started when we approached the mixing efficiency problem from its core. Impingement mixing generally occurs by components’ pressure, that is obtained through various types of injectors mounted on the mixing chamber. This has limits. We conceived a mixing device able to produce the required turbulence through speed and not through pressure. We identified their main request as “laminar flow free pouring” and tried to tackle that aspect of the mixing process. The innovative intuition was to understand that a substantial effect which absorbed all viscosity differences and provided dramatic improvements in mixing quality and foam’s structure. The resulting radial mixing heads were shorter, therefore easier to flush with less solvent after the shot, and more efficient. This provided great advantages to the foamers: the wood imitation industry in Italy, where we were closer to them, boomed - more than elsewhere.

CN: Thanks for your time and comments! You’ll turn 80 in December: as Marylin did many years ago for JFK, let we wish you “Happy Birthday, Mr. President!”

It was an immediate success, it opened the way to open-mould pouring technologies that would have provided dozens of new products to the market: from car seats to intermediate parts to integral skin microcellular headrests, just to mention a few.

CN: Where do you see the next Cannon innovation in the Polyurethane field?

CF: Our R&D staff at Cannon Afros is now in the capable hands of Maurizio Corti, Alberto Bonanza and a numerous technical staff including experts in fluid dynamics, material surface treatments and chemicals’ ecology. They have a busy schedule and ambitious targets: I can disclose without problems new development areas for spray applications for integral skins, filled and reinforced formulations and the insulated piping business. For confidential subjects I’ll keep a due secrecy, but one thing is sure: the rising market of composites for automotive parts will contribute greatly to the desired weigh reduction and energy saving. This will happen thanks to the marriage between carbon fibers, Urethanes and other reacting chemicals. We can’t wait for someone else to come with innovative solutions, can we?
"The head is the heart of the system" is a well-known statement used in manufacturing. In our company, we have maintained this tradition, primarily in the form of a document, web page and presentation referring to the Group’s Polyurethane Division. We interview on this fascinating topic a – FPLZ 32. Alberto Zarantonello, Cannon Afros Division General Manager: he is the head of the Group’s founding company, fully dedicated to mixing and metering technology for Polyurethanes and other reactive formulations.

Cannon News: The development of innovative and efficient mixing heads has driven the growth of Cannon Afros and – as a logic consequence – to the establishment of the Cannon Group in the late 1980’s. How important is it for you, after so many years and so many produced models, the development of new mixing heads? Alberto Zarantonello: Very important! We could not think of stopping here and simply consolidating our vast range of models. It simply would be wrong for our future. All the large chemical Groups supplying Polyurethane, Silicones and Additives are characterized by a vivid R&D spirit. They constantly generate chemical innovation and search for the highest performance. All the aforesaid provide new challenges to us, the machinery guys, because their formulations require dedicated mixing and metering solutions to provide the highest performance. Unfortunately the existing hardware not always provides the optimum results. Therefore we must keep a far-sighted approach and continue the search for new, more performing solutions.

CN: OK, now you give us some recent examples of this evolution?
AZ: Sure, but let me first set the starting point of our philosophy. We start with the final product: we listen to our customer, examine his specific problem, define what he needs. If a solution is available we recommend it, otherwise we evaluate if that new request is worth a dedicated development. In the latter case we start a project and – most of the times – we end up with a proper solution. This is our approach. The head comes first, then we define which dosing machine is required, and the rest of the plant follows. Recent examples, you say? We’ve got quite a number of interesting ones. I could start with an automotive Cavity Filling project. We usually meet – for Noise, Vibration, and Harshness (NVH) applications – two different types of formulations: one is an ideal tool for end users moulding RRIM, structural and compact formulations with heavily additivated polyols. In addition, it is also lighter and more compact than other heads available on the market, allowing for easier positioning on closed moulds. The same “hardening” concept were used to design the FPL AD model, an “armoured” version of our most successful head adapted for open mould pouring of abrasive formulations. These may contain Aluminium Dioxide, Wallastonite, Bursas mill-glass, and are quite popular among the manufacturers of NVH-shield, even when they are made with slices of foam cut from large moulded blocks.

Let me remind here a further innovation introduced into a prior development, the Cannon AX head, which confirms its position of preferred head for the automotive sector production. We have more than 50 AX in production worldwide at the manufacturer plants of the major car seat producers, in the two available sizes of 18 and 24 mm outlet diameter. The 3-component mixing features now an improved operational speed: the opening and closing times of the head have been further reduced, optimising hydraulics and software. The head’s reliability has been maintained even cutting significantly the dry cycle time.

At the application of expanded Polyurethane foams in automotive industry, which opens a totally new perspective for your business!

Installations have been recently supplied, directly in the OEM plants of the major car seat producers, in the two available sizes: 1.6 kg/sec for the smaller and 2.2 kg/sec for the larger. Those heads have been used since for all sorts of applications. This new four components RIM head is simpler, lighter and faster than its two-component predecessor. All the metal surfaces in contact with abrasive chemicals have been designed, machined and hardened thinking to the worst possible “abrasion scenario”. An ideal tool for end users moulding RRIM, structural and compact formulations with heavily additivated polyols. In addition, it is also lighter and more compact than other heads available on the market, allowing for easier positioning on closed moulds. The same “hardening” concept were used to design the FPL AD model, an “armoured” version of our most successful head adapted for open mould pouring of abrasive formulations. These may contain Aluminium Dioxide, Wallastonite, Bursas mill-glass, and are quite popular among the manufacturers of NVH-shield, even when they are made with slices of foam cut from large moulded blocks.

For a double mattress we’re talking of injecting 20 kg of liquid in high instant output, since they had to inject in closed mould the whole lot of a fast-reacting material before it started to rise. For a double mattress we’re talking of injecting 20 kg of liquid in 19-22 seconds, to avoid air entrainment in the foam. A single injection point was used, for the very same reason. The most suitable head was defined as a FPLZ 32. Two different mixing heads: two opposing two opposite mixing chambers, each capable of 3 components, feeding alternatively the blended material into a common discharge duct. This allows for the non-radiation of two different formulations (a Visco-elastic foam or a conventional High Resilience one) with an output rate of 2.2 kg/sec.

The head can use different colours (required to colour-code the various densities of foam), or different additives, including metal-flakes, providing a high degree of flexibility in the production mix. A 3-component closing unit was designed to feed the selected head with the required choice of formulation.

The plant was equipped with a turning table holding four large presses – 200X1100 mm – characterised by a very ergonomic design. The operator stands in front of the open mould, dons easily a full mattress and cleans both lower and upper plate very comfortably. The operators很简单地走向了这道工序.

The second manufacturer preferred a open-mould pouring technique, using two heads simultaneously for a faster operation. In this case the inner bore was chosen to handle the two FPL 24/3 mixing heads. Two “A-Cone” 60 with remote mixing head was preferred to the FPLZ32, and a set of large mouldcarriers was supplied, together with a complete mould circuitulation system.

In this case we’ve got both heads from the end product and the orders were secured thanks to the availability of suitable mixing heads!

CN: From the above examples it seems that you mostly work for flexible foams: anything new to mention for the rigid applications?
AZ: Of course yes, a lot also in this area, I’d say! We’ve developed special equipment for insulated pipes starting from the requirements of two different segments: those that need to spray foams over a rotating pipe – this is the most common case for the largest diameters – and those who must inject, or rather “deposit” the foam between the inner pipe and the outer protective liner. In both cases we’ve achieved significant success thanks to the availability of the proper heads and we surely have interviewed one of my colleagues on this subject, I do not want to repeat. Let me concentrate instead on the continuing success of the Cannon JL, the latest large head designed for rigid foams blown with LRBA (Low boiling point Blowing Agents) such as Isobutane or similar Hydrocarbons: repeated orders from East Europe, Korea and Mexico confirm that this innovative device really solves a number of production problems in the field of domestic and commercial refrigerators! The absence of jets, or injectors, in its design allows for a much easier operation and regulation.

Lower melting pressures can be used, at the advantage of the equipment’s lifetime and energy requirements. Its long nose permits an easy access to remote injection holes, with more freedom in designing the final products. A new version with an extra long nose – up to 200 mm! – has been specifically made after having heard of a serious requirement in the manufacture of insulated pipes: the need to automate the injection eliminating a clearing operation in the flanges mounted at the end of a pipe. With this new long nose the JL can Polyurethane foam directly into the cavity between the inner pipe and the outer liner, leaving the flange clean. This removes any manual intervention and allows for high degree of automation.

CN: You mentioned before other resting formulations, on top of the classic Polyurethanes. Anything new in this area, too?
AZ: We’ve been active in the area of Silicones-gaskets for lighting applications, with a special 4-components low output head able to mould alternatively a bunch of gaskets with a Polyurethane formulation and immediately after a bunch in Silicone. As we know, the two materials are highly incompatible and one should keep them well apart, but this head did very well and the two resins can co-exist in the same dosing machine without any problem. A more recent development, but I’m sure you’ll cover this subject elsewhere in this Cannon News, is the one allowing for the high pressure injection of Epoxy resins in closed moulds.

For this application we started our development from the existing FPL model, which presents some serious limitations in terms of output rate and pressure. Also our T7 shows the same good performances with Epoxy, allowing for a wider range of mixing ratios, for very innovative device really solves a number of production problems in the field of domestic and commercial refrigerators! The absence of jets, or injectors, in its design allows for a much easier operation and regulation.

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The recent development of new applications has widened the range of Cannons technologies for the rising market of Industrial Spray Polyurethanes. Flexible or structural, filled or reinforced, aesthetic or functional, almost every type of PUR formulation can be today applied with a Cannon Spray head and its relevant dosing unit. The intended end uses include the whole transportation industry (cars, bus and trucks), agricultural, earth-movement and mining vehicles, sanitaryware and householdings, the insulation of pipes for every possible application. With the exception of walls and roofing spray applications (a market that Cannon does not want to approach) a suitable spray solution is available at Cannon!

We interviewed on this subject Davide Lucce, Sales and Marketing Manager of Cannon Afros, the Group’s Division in charge of all Polyurethane metering and mixing technologies.

Cannon News: Numerous new spray foam applications have been tackled recently by Cannon: can you tell us more about your involvement in this field?

Davide Lucce: Cannon Afros has always been involved in spray foams: when you enter our offices in Cannonsenna, near Milano, Italy, you see a large black and white poster of the early 1960’s showing one of the first dosing units made by our Company: a C3 spray unit designed for roof spraying and EuroSpray in the early days we proudly made hundreds of them. Things have changed, during the years, and for several years Cannon concentrated its activity on the moulding applications. Roof spraying demands a size of machines and a distribution system that is not compatible with the industrial markets successfully pursued by our Group. Around twelve years ago the development of new Industrial Spray applications started and we started building a complete family of spray technologies, since the market was very keen towards this method of manufacturing Polyurethane parts.

CN: What is the current situation, then? What did you achieve?

DL: Well, a good number of new technologies have been developed in the recent past. Significantly, nearly all of them derive from the availability of an ideal mixing device. Various configurations of this successful head have been adapted for the spray market, and their efficiency in mixing the most diversified formulations has only improved with the years. Initially we developed the InteWet process – a method for projecting a blend of Polyurethane and various reinforcement fibres or fillers using an internal-rotating concept, i.e. that the whole mass is blended within the mixing head before being sprayed in open mould, usually over another layer of plastic or fabric; immediately after the mould closed and gives to the manufactured a perfect shape. A thin, strong, lightweight composite part is obtained, characterised by high impact resistance and good surface aspect.

After that we developed almost at the same time two different new ideas: a method for spraying aesthetic PUR skins using conventional two-component formulations, and one for spraying flexible expanded foam over textile substrates, with comfort purposes. Both these techniques have a very specific market, limited to a few customers in the world, but we are open to discuss ideas that could come out from a wider panel of potential customers operating in different markets.

Then came the OuterWet, the technology which allows for the spray-application of multiple layers of glass-fiber-filled or unfilled Polyurethane, until a thick layer of rigid foam is obtained. This is usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, ambulances – usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, ambulances – usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, ambulances – usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, ambulances – usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, ambulances – usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, ambulances – usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, ambulances – usually applied over a rigid plastic substrate – like a bath tub or a shower tray, but also for parts for caravans, campers, am...

Again, this is true with both filled and unfilled foams, so the final end uses can really be numerous. Another development of the early years of this century refers to the application developed for processing Bayatpur®* surfacers, a Binder Material Science Polyurethane applied over a sandwich of glass mat and honeycomb. This process allows for the production of very light, stiff composites appreciated by the automotive industry per their high fuel-saving efficiency. They can be obtained only where this is necessary, using the optimisation of raw materials for. This fruitfully developed our patent a special “Spray-and-thick” method which uses Liquid Natural Carbon Dioxide (CO2) as frothing agent, able to immediately stop the dripping of the formulation when it is applied to vertical walls. This is, in a way, another idea worth being discussed with the manufacturers of other parts, which could benefit from the R&D done for a completely different end use! The good result achieved with these developments encouraged us to continue, and we approached a more different field, the spraying of alternative formulations: The 30-years experience we have in handling milled glass fibre and bubble in RRIM moulding has generated a number of metering and mixing components that are well applied to a spray technology. That’s how we have made the SolSiSpray, a few years ago. Designing a machine and a mixing head able to spray a “mud” – made with 70% of abrasive Saltophane and 30% of PUI – was a successful experience, at the end! This formulation is used to manufacture sound and vibration absorbing products, mostly, but not exclusively, for the automotive industry. Think of a waste absorption panel of irregular shape, where it is difficult to manually apply an insomination element, and this is a viable solution for it. Is a challenging job, and got good results with it.

CN: What’s new, now? What are you developing?

DL: An interesting technology, characterised by a tremendous growth rate and where we are managing significant experience and results, is the application of insolation foam over pipes of medium-large diameter. They have dozens of end uses industrial applications, food & beverage, pharmaceutical, petrochemicals, chemicals plants and refineries, pulp & paper, mines, oil & gas pipelines, heating services, buildings & leisure, district heating & cooling, marine systems, you name it ... in every modern industrial activity hot or cold fluids and gases are transported: a proper insulation of the pipes avoids a huge loss of energy. We have some interesting ideas for these end users, and not only for the metering and spraying part of the equipment. Turn-key plants are available, complete from the chemicals storage to the piping-handling solutions. Another spray-related development involves the use of chemicals different from Polyurethanes, but let me keep that confidentiality, until the project sees the light. Nobody does that, yet, and we do not want to “spray around” valuable information!
The GWEC’s 2009 Annual Report illustrates well the situation of this booming market during a very turbulent year, 2009, when all sort of industrial activities have been severely limited: “Since the financial debut of 2008 and the subsequent economic crisis, the renewable energy industry has had to put up with a lot of knocks. Though the year 2008 ended with a record total of US$155 billion investment in clean energy, the renewable power capacity added to the EU and US fossil fuels and nuclear combined, a downward spiral had already started in the last quarter.” Throughout most of 2009 it seemed that investment in renewable energy was going to be far lower than in the previous five years of meteoric growth. By the end of the year, however, the sector had come back, and Bloomberg New Energy Finance reported US$145 billion in total investment in clean energy, only a 6.5% drop from the record year 2008. And the report adds: “The world’s wind industry defied the economic downturn and saw its annual market grow by 41.5% over 2008, and total global wind power capacity increased by 37.7% to 158 GW in 2009.”

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Reading the annual figures by country, we see that China leads the world in wind energy development and plays a significant role in combating climate change: The China Wind Power Report predicted in 2007 that “China’s installed wind power capacity could reach 122 GW by 2020, equivalent to the capacity of five Three Gorges Dam.” What is a fact that only in the past two years (2008-2009) 26 GW of capacity were installed in China, 20% more than in the whole Europe, and that the figure forecasted in 2007 is already write.

Cannon supplies worldwide the viable solutions Cannon introduced at the JEC show in Paris in March 2009 the range of available products for the industrial segment of wind energy. Eighteen months later – in spite of the economic turbulence – also the report for this segment of equipment looks good: several Epoxy infusion machines have been sold and the output range has been extended. The countries of destination for these machines have also increased, with a significant shift from Europe towards the USA and – needless to say – to China.

Siemens Wind Power, a major manufacturer of wind energy plants very satisfied with the technical solution – supplied by Cannon Afinos and their Nodico local office NorTec – for the infusion of Epoxy formulations in the giant blades made in their Danish plants, have repeated orders for their new plant in Fort Madison, Iowa (USA) during 2009 and for their new giant installation in Lingang near Shanghai, China, during the first half of 2010. Availability of a local Cannon unit placed an important part in securing the two orders. Cannon is present in the USA with a fully-owned subsidiary since 1977, and in China three Cannon Far East offices and one factory near Guangzhou guarantee prompt service and spare parts only in Shanghai ten qualified Service Technicians are available, one hour away from the customer's factory! International competitors, supplying the same type of infusion machines to the Chinese market, are present with a modest number of service technicians and almost no spare parts available for a quick local delivery.

The availability of a wide range of different technologies and the capacity to integrate them into complete, turn-key solutions, makes the Cannon Group an ideal partner for the investor, small or large, working on a worldwide basis in this segment of market. The broad network of interconnected Cannon offices and technical service centres provides an ideal support is experienced – as well as to new-coming – Companies who decide to install their production sites in countries where the right equipment for this technology is not available or not properly supported.

President Obama visits wind power plant in Iowa

For the first time in the company’s 163-year history, a U.S. President has visited a Siemens factory. On Tuesday, April 27, 2010 during his tour of the Midwest, Barack Obama made a stop at the 60,000 sqft plant manufacturing components for wind power generation in Fort Madison, Iowa. The plant, which was opened in mid-2007 and has recently expanded, has a workforce of 600 employees and produces 160-ft-long rotor blades, weighing 11 tons each, for 2.3 MW wind turbines.

The injection of Epoxy resins in the blades, using a Siemens proprietary technology, is made with Cannon dedicated metering and mixing equipment, specifically developed by Cannon Afinos for this application. Barack Obama highlighted the Fort Madison plant as a successful example of how clean technology can help revive a local economy.
Pipe Insulation: a complete set of solutions is available!

Rigid polyurethane foams, used for the insulation and protection of pipes for more than 30 years, are now more extensively used than ever. Thanks to their outstanding performances and ease of application they are progressively replacing other insulation technologies that are applied to foams to the pipes, according to their sizes and applications.

Cannon have developed suitable solutions for all the needs, providing high foam quality and efficient methods of applications.

Rigid polyurethane foams are commonly used for the insulation of pipelines because they minimize the exchange of heat within the pipe and surrounding environment; their easy processing adds a substantial number of benefits, that can be summarised as follows:

- Their low thermal conductivity prevents heat loss if the transferred media is hot and protects it from freezing in cold environments.
- They are effective across a wide temperature range from the extreme cold of cryogenic applications, where temperatures can be as low as -190°C, up to intense heat approaching 150°C.
- They can be manufactured either in a factory or in situ: this production versatility suits a large number of applications.
- They are compatible with numerous pipe materials, such as steel, PE, PVC, HDPE.
- Their longevity allows for a low maintenance and a long replacement cycle.
- Formulations can be tailor-made, meeting the widest range of specific customer needs.

Their energy-saving performances improve the cost efficiency of customers' fluid distribution lines, just as an example, we summarise in the following table a comparison between various insulating materials, their density (which affects the total weight to be used in plant) and their relative insulation thickness required to achieve the same heat loss from a pipe.

The most popular areas of use, both traditional and recent, are:

- District Heating & Cooling systems, for transmission lines, distribution, house and building supply.
- Oil & Gas Pipelines: On or Off-Shore, for transmission pipelines, wells, spools, oil and gas terminals.
- Heating Services: for power stations, chemical plants and utilities.
- Buildings & Leisure: applications, for cooling and heating circuits, air conditioning and swimming pools.
- Marine Systems, for instance in onboard carriers (chemicals, hot water condensates, LNG, LPG) or for cooling and air conditioning circuits.
- Industrial Applications: food & beverage (ice water, beer, milk, mineral water), pharmaceuticals, chemical plants and refineries, pulp & paper, petrochemicals, automotive (LPG, LEJ, LMG), mines (bitre).

Pipe manufacturing techniques

According to the needs, insulated pipes' dimensions stand in a range from 10 mm to diameters of small plumbing pipes, up to 200/300 mm diameters of the largest heating pipes. Insulation thickness varies accordingly, up to 200-250 mm for the most severe working conditions.

In order to assure the most effective insulation to this vast array of pipes, different in diameter, length and type, various application techniques have been developed and applied, and both discontinuous and continuous manufacturing processes are applied.

Trying to schematise them, this table can be used:

<table>
<thead>
<tr>
<th>Insulating Materials</th>
<th>Density (kg/m³)</th>
<th>Thermal Conductivity 50°C (mW/m°K)</th>
<th>Relative Insulation Thickness at equal Heat Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid PU Foam</td>
<td>70</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>Mineral Wool</td>
<td>200</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Foamed Glass</td>
<td>125</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Blutten/Cork Mixture</td>
<td>880</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Foamed Concrete</td>
<td>400</td>
<td>5.9</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Discontinuous and discontinuous of the two foaming systems (discontinuous vs. continuous) are shown in this table:

### Discontinuous PU Filling

- **Advantages**
  - easy set-up
  - conventional hardware
  - large range of pipe dimensions
  - technically less demanding

- **Disadvantages**
  - high foam overpack required
  - even property distribution difficult
  - labour intensive

### Continuous PU Filling

- **Advantages**
  - lower foam density
  - thinner HDPE casing
  - even distribution of foam properties
  - more automation in process

- **Disadvantages**
  - specially skilled operators required
  - limited flexibility
  - complex hardware

Each manufacturer, in accordance with their own needs, can find a Cannon technology suitable for their requirements.

**SPRAY**

Using the Continuous Process with a Spraying Technology the Polyurethane insulation layer is polymerised directly on the inner metal pipe while this advances in front of a Polyurethane spray gun. This method provides good foam quality, very regular foam thickness across the whole sprayed surface, relative materials savings (HDPE). Densities of foam can be optimized and its over-packing is no anymore necessary to obtain the desired thickness. The use of a thin HDPE layer also provides further cost saving.

Various types of Cannon mixing heads are available for the Spraying Technology, as shown in this table:

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Output (g/s) *</th>
<th>Filter Handling Capacity</th>
<th>Airless Spray</th>
</tr>
</thead>
<tbody>
<tr>
<td>LN 5 Spray</td>
<td>Yes</td>
<td>20-80</td>
<td>No</td>
</tr>
<tr>
<td>FPL 7 Spray</td>
<td>Yes</td>
<td>20-80</td>
<td>Yes</td>
</tr>
<tr>
<td>FPL 10 Spray</td>
<td>Yes</td>
<td>50-200</td>
<td>Yes</td>
</tr>
<tr>
<td>R Head</td>
<td>No</td>
<td>30-50</td>
<td>No</td>
</tr>
<tr>
<td>Atomair Head</td>
<td>No</td>
<td>30</td>
<td>No</td>
</tr>
</tbody>
</table>

Among these, the Cannon LS 10 model, an EFL modified for spray applications, proved to be very versatile and efficient: it’s a 2-component mixing head whose lightweight allows for fast spray operations with low-investment robots. Its reduced overspray and excellent mixing characteristics allowed to reduce foam consumption in some cases up to 4-5% versus previous competing solutions.

Provided with a mechanical stroke adjustment of the self-cleaning piston, this head allows for an output range of 100-200 g/s at an L/P ratio of 130:100. A typical performance is summarised in this table:

- Pipe diameter: 600 mm
- Pipe speed: 15 mm/s @ 18 rpm
- Foam thickness: 90 mm in one step
- Final density: 62-65 kg/m³
- Overspray reduced from 6% to 4% in average

**Discontinuous manufacturing**

Among the Discontinuous Process methods, mostly used to insulate large pipes, the Spraying Technology plays an important role: the Polyurethane insulation layer is sprayed on a single pipe in a dedicated area and the HDPE expansion is done over it in a second step. In this case the pipe stays still and a translating foaming station carries metering machine and spray head along its length. This method provides a different insulation quality and allows for a very mixed production schedule, with several different diameters and thicknesses produced on the same line in random access.

**INJECTION - Discontinuous manufacturing**

Using the Discontinuous Process several options are available: the Pipe-in-Pipe Injection Technology requires the presence of an inner pipe within an outer casing or liner. The two parts are placed in a cased mould and foam can be injected fitting the mixing head in a pouring hole positioned on the top, on the bottom, or in the center of the mould. Whatever the chosen method, one fundamental aspect must be taken into account: these insulated pipes are built with a generous portion of the metal inner pipe left nailed on both ends, to allow for safe welding operation when the pipes are joined and laid underground or mounted on proper supports elsewhere. If the taken part of the metal pipe is too short, a high risk of developing a fire while welding it is taken by the operator. Therefore several centimeters of metal pipe must remain free from foam: but this immediately collides with the geometry of the injection holes used to dispense
the foam in the cavity of the pipe: a long “nose” is requested to fit the head in the pouring hole, otherwise it will collide with the inner steel pipe, and the foaming operation will not be possible. Cannon have recently developed and patented a specific mixing head with a very long “nose”, the Cannon JL model. It provides a more efficient mixing method compared to the traditional heads, even when working with a reduced mixing pressures. The name JL means “Jet Less”: this head features no pressure-inducing nozzles to regulate or to worry about, therefore it is very simple to operate and maintain.

Its very long discharge duct guarantees a very laminar flow at high outputs that avoids air entrapments during the mould filling phase: this generates bubble-free and uniform foams especially when using Low Boiling-point Blowing Agents. Its high mixing efficiency also provides better cavity filling in general, with the need of reduced overpacking – thus a saving in foam – an effect which has already been measured and appreciated in other production fields.

Also the use of a Lance System is quite current, with the thin, curved “Z” type head introduced between the two pipes up to the end of the mould and then progressively retracted while the foam is deposited on the whole length of the pipe. A specific field of the Industry, the Oil & Gas sector, requires sometimes – because of the extremely stressful ambient conditions where the pipes are installed – the use of Syntactic Foams: these are made with a Polyurethane formulation filled with glass or plastics microspheres. These hollow capsules provide extremely good compression resistance to the polymers they are blended with, but require careful handling during the metering and mixing phase, otherwise they break and their positive effect is lost.

Dedicated low-pressure metering unit and mixing head are available for these applications; they can be used for the discontinuous moulding of long half-shells, to be manually glued around conventional steel pipes, or for direct injection onto the pipes' surface aspect. These hollow capsules provide extremely good compression resistance to the polymers they are blended with, but require careful handling during the metering and mixing phase, otherwise they break and their positive effect is lost.

A new concept from Cannon

Stimulated by the request of several customers – unparallel with the conventional foaming technologies – and always looking for more efficient mixing devices, the R&D lab of Cannon USA developed and patented a new concept of foam distributor specifically conceived for the pipe insulation applications. With this system the mixing head is connected to a special device that distributes uniformly the foam on the whole pipe surface. The final result is a very flat pipe with no visible overpacking effects – as common in most of the spray methods – and no overpacking waste as in most of the injection methods. The method simply uses “the right amount of foam”.

When applied to a Continuous Process the new technology features interesting advantages versus the “One point pouring”: the foam distribution devices are disposable and a new one must be used for each run of production. But they are also rather inexpensive and this reduces the... pain.

Still talking of Continuous Process, the new technology features significant advantages also versus the “Spray method”:

- No over spraying is created, removing all irregularities from the pipe's surface aspect.
- No pollution is generated around the foaming phase.
- Materials savings have been appreciated already in a prototype phase.
- Uniform foam thickness is guaranteed by a mechanical constraint.

A couple of disadvantages versus the Spray process must be quoted: a Lance-system is required for the polymerisation and, as above, the foam distribution devices are disposable.

The new technology can as well be used for the Discontinuous Process, in two methods: Pipe-in-Pipe and Pipe Moulding. When working with a pressurised system-in-Pipe system the foam distribution device is positioned at the end of a Lance system and its dimensions is equal to the gap between the inner and the outer pipe. The lance is introduced up to the end of the pipe and, during pouring, is retracted until it has reached the end of the pipe.

Advantages, working in Discontinuous, versus the “One point injection”:

- Suitable for big diameter pipes
- Superior foam quality (No voids)
- Densities can be optimised and over packing is reduced
- Shorter cycle time
- No spacer required

Disadvantages in comparison to the “One point pouring” are, as usual, the disposable foam distribution device and the fact that a Lance system is required.

Only one minor disadvantage has been identified till now, versus “One point pouring”: the foam distribution devices are disposable and a new one must be used for each run of production. But they are also rather inexpensive and this reduces the... pain.

Piping business: small or large, few or many, talk to the local Cannon office. They can offer you some smart ideas!
Aquatherm introduces PUR in their vast range of plastic pipes

The most efficient method to transport energy—either for heating or for cooling—over long distances in the use of pre-insulated burial tubes” states Aquatherm located in Attendorn, Germany, Aquatherm (www.aquatherm.de) a medium-sized family owned company, pushed the technical developments in the field of piping technology over the past thirty years essentially. The production of pre-insulated fiber composite pipe work—whose fields of application include construction of heating systems, climate and chilled water technology, potable water supply, process and industrial water plants—represents one of their most recent challenges.

Aquatherm’s target for this ambitious project was the definition of a proper solution for filling with Polyurethane foam, in a discontinuous process, their pre-assembled fiber composite pipes, up to a length of 12 m and in a range of diameters from 32 to 315 mm. Considering also the production of pipe chows and the bushings, the already ambitious project definition became even more complex. In search for qualified partners for the foaming technology the first meeting with Cannon Deutschland took place at the beginning of 2009.

Cannon was highly motivated in starting this interesting project, the development of an efficient plant for the discontinuous foaming of pre-assembled pipelines. A master plan was promptly developed, with some assistance of further partners. After the definition of all the technical necessities, the necessary performance parameters were quickly established and the selection of the foam’s blowing agent (Pentane) was done in cooperation with the Polyurethane’s raw material supplier. Finally, all the proposed plant concept satisfied the customer completely, confirmed in his decision by the long experience of Cannon in this field, and the plant was ordered. Only a few months passed by until the complete plant was installed. Effectively working was routine activity for all project partners and so the first pre-insulated pipe was foamed within the same year.

The 

The technical activities performed by Cannon included:

• Engineering of the complete plant
• Raw material storage, conditioning and delivery to the tanks
• Preliminary station for the Polyurethane blending: dosing, mixing, filling; in a storage cabinet, equipped with alarm logic and special software, processes the data, the sensors and controls the correct function of the ventilation.

Nitrogen pressurisation of the certified raw material tanks and automatic inreration are a must for the pouring process, completing perfectly the Cannon safety system. For the inreration of the mixing head a Nitrogen storage tank, with a capacity of 2,000 l, is equipped with a flow transducer—which is feeding the value integrated in the mixing head—giving an automatic monitoring of the supplied quantity of gas.

Axial-dosing piston pumps with a flow rate of 107 cc/round, driven by frequency controlled AC motors, provide a maximum output up to 5,000 g/s, depending on the mixing ratio of the chemical components utilized.

Two high-pressure mixing heads Cannon FPL 24 HP (high-output version) are configured for variable outputs from 800 up to 3,500 g/s.

The solution

The high-pressure dosing unit series Cannon AP meets the required characteristics, in comparability, flexibility and an easy integrability, and allows for both manual and automatic handling of the mixing head. In combination with the smallest Cannon mixing head, the LN 5, or the AP 10 dosing units covers an output range from 20 to 120 g/s—according to the Polyurethane rate. This type of machine is always used when small but powerful solutions are demanded. In case of higher desired output another model of this series is available, the AP 30. Equipped with two 241 l tanks, said piston pumps with 6 cm³/round and a high-pressure LN 5 mixing head, the AP machine offers to the operator the comfort which is expected from a modern dosing unit nowadays.

The self-clearing mixing head enables the clean and precise working requested for the frames production by the window specialists. Washing operations are not necessary. The mixing head has very small dimensions and is light-weight with just about 1.1 kg a comfortable manual handling is ensured to operators of all sizes and strengths.

The complete satisfaction of the customer was reached by a conclusive master plan and professional support by Cannon and a purposeful cooperation of all involved parties.

The output is controlled via the interaction of the flow transducers, the PLC and the frequency inverters and is automatically adjustable in a range between 10 and 60 Hz. It can be assigned to the relevant mixing head, so different output values can be programmed for each mixing head at the same time. Working in a closed-loop system pressure and process data are monitored further extensions of the plant.

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A person spends one third of his life asleep in bed. Mattresses have to support and strain and keep their shape for many years. It is very important that a mattress keeps its quality characteristics and supports us every night as much as possible, so that body and brain can relax optimally. A silent night enhances the personal well-being and increases the effectiveness during the day. Therefore the manufacturers of mattresses are permanently controlled by the industry with quality inspections. New Cannon manufacturing plants for manufacturing Polyurethane foam mattresses have been installed recently in Germany, after many years of successful use in other world’s countries: the high quality of the produced mattresses has been certified by the leading German institutes as “Stiftung Warentest”, “ÖkoTest”, “ILAV” and “Blauer Engel” (“Blue Angel”).

Conventional production of mattresses

Mattresses are produced with different technologies and materials. Until now a combination of latex foam and coil-springs as a core, bordered by different surfaces including cut PU-foam, or a combination of different PU foam grades cut in complex contours, is assembled inside a linen cover to make a finished product. In their own in-house “sleep laboratories” the mattress manufacturers are constantly working on the extension of their existing product range as well as on the development of new innovative solutions. Above all lie characteristics, durability, deformation indices and elastic force at special points, which are verified in success tests.

New manufacturing technology

Sophisticated technical solutions are often hidden within many common articles that we use everyday … and nobody suspects their intervention! Also the new Cannon manufacturing plants for mattresses belong to that kind: thanks to the availability of properly-sized metering and mixing devices, a complete mattress foam can be produced in one moulding process even using a fast-reacting foam. Cannon Deutschland (www.cannon-deutschland.de) installed two of these new plants at two dedicated mattress manufacturers in Germany - Brecke GmbH (www.brecke.de) located in Northeim and Dunlopillo GmbH (www.dunlopillo.de) located in Hanau. For both Companies the ultimate target was to permanently control the mattress size, either with complex contours or with the multiple zone pouring technology. Zones with a different hardness has to be signed with a different colour.

Different approaches

The solutions for the foaming technology of the two plants are totally different, while the approach for the mold’s manipulation is very similar. The alternative for the introduction of reactive blend of Polyurethane chemicals into the moulds are: open mould pouring and closed mould injection. When pouring into open moulds the foam is dispensed with two mixing heads travelling very quickly across the mould defined foam grades, hardness and eventually also special cores can be colour-marked. For closed mould injection technology the entire quantity of foam must be to be quickly introduced into the mould via an injection hole bored in the mould. With a optimum inclination of the mould a perfect part is produced, with complex contours and no voids, opened only by air pockets remaining in the safety escape blind cavities of the mould’s surface. Also here specific qualities can be colour-marked to ease the work of logistics and assembly personnel.

Advantages of both techniques

• Less logistic effort
  o One raw material (PUR) as input – One ready product (a moulded mattress) as output
  o No need to transport and store different grades of block foams
  o No time-consuming intermediate steps as block production and compression or cutting
  o Storage areas and waste are considerably lower.
• High flexibility
  o In the production of moulded foams in different grades
  o In the processing of orders, as it is possible to change the foam quantity from shot to shot while the mould is still installed – a minimal lost of one part will become economically feasible
  o The production capacity can be adapted to the incoming orders in any moment
• Energetically a very positive production process

Cannon supplied to both customers a similar set of basic equipment, although positioned differently in their production halls, due to the different foaming technologies used:

• The turntables handling the mould carriers
  • the mould carriers on their energy supplies
  • the automatic pouring process
  • the dosing technology as two- or multi-component plant
  • the several auxiliary units for lubricants and activators
  • the automatic release agent spraying
  • the suction hoods
  • the safety equipment
  • the plant control unit

A turntable plant with four stations proved to be the most reasonable configuration, allowing one “plant” for each foreseen automatic dosing and release agent, foam pouring or injection, polymerisation and unloading. The mould carriers are planned to carry moulds for all established mattress sizes – for widths from 800 to 1,400 mm and lengths up to 2,000 mm. The operation of both types of plant can be run from one person on each charge. A lot of designed tasks were assigned to ensure an easy and ergonomic access to both mould carriers, for fast, easy and careless demoulding and cleaning operations.

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Blue Angel mattresses – because sleeping is a celestial experience!

The fully stable process guarantees optimum access to both platforms to the Dunlopillo operator.

Whether poring into open moulds or injecting into closed moulds – the foaming technology is heavily affected by the used mixing heads.

Closed-mould injection

For high compactor’s outputs and the option to work with several Polyurethane systems plus additional components (colour/actuator) which can be varied from shot to shot, the mixing head type FP32.12 – AN is recommended, injecting in closed moulds. A 3-component “A-System Servo” 200 dosing unit has been applied in this case. For the injection of foam either a commercial robot or a dedicated Cannon head holder, designed to insert the mixing head into five pre-determined fixed positions, can be used.

Open-mould pouring

When poring in open moulds these large parts – which can weigh up to 20 kg each and whose foam must be completely dispensed in the mould within a time frame of 10 sec – must be produced using two heads pouring simultaneously. Therefore two moulding machines working in synchronised tandem are required. Two FPL 24/3 heads perform this task, fed by two “A-Compact” 60 with two CCS units for the colour dosing. The automatic distribution of foam in the open mould, following repetitively precise and pre-defined pouring paths, can be done either with a commercially available robot or with a cartesian Cannon robot with two mixing-head’s arms.

The core piece of the plant control system is the product management system, a data base where the required product-related data can be easily assigned to the installed mould carriers. Each data record is consisting of:

• The raw material formulation
• The desired shot weight
• The turntable plant for the pouring robot
• The turntable plant for the release agent robot

All plants are working with high efficiency, producing quality mattresses in the required foam grades. The satisfaction of both customers was reached thanks to the supply of a turn-key solution and by the professional cooperation of all involved parties. The mattresses of our customers are certified and approved by the “Blue Angel” testing institute: is it, maybe, because sleeping on these mattresses is a real celestial experience?
Therefore the market segmentation could be described as follows:

- **Aesthetic aspects** are predominant in the design of energy-saving presence in this strategic sector forecasting double digits growths in performance “green buildings” in the developed countries as well as in the developing countries. In this frame, Polyurethane sandwich panels bring essential support to develop – or even simply to scale-up – new technologies, but the application of the energy is a different one, the energy used is renewable and more efficient. A pure, clean, and quick process.

As a matter of fact Cannon is strategically present in this market where the eradication and the promotion of energy efficiency on a worldwide basis to achieve healthier economy, a cleaner environment, and a greener planet is more than a wish. If we consider that another major activity of our Group deals with energy production and environmental sustainability, then, according to our CEO Marco Volpato opinion, the Cannon strategy of “Environmental Production & Energy Saving”, implemented through our network of local offices with a global approach, is perfectly matching the above mentioned concepts. We want to help our customers to produce energy in a very efficient way, using renewable resources wherever this is economically wise, we want to help them reduce their emissions efficiently, and we want to provide them with the best thermal insulation tools to avoid unnecessary waste of produced energy.

I have played the first time of this game for many years at BonO Energia, leading the Sales and Marketing Group in charge of Energy Plants, and I am now trying to play the third time dealing with the insulation panels plants.

CN: Can you tell us something more specific about the characteristics of this market, and how you approach it?

FA: In the developed countries (Europe, USA, Japan) we often hear that new “Energy Standards for Buildings” are set in order to promote energy efficiency improvements, which will be of at least 25% within the next 5 years and of up to 75% in the next 10 years. In this frame, Polyurethane sandwich panels bring essential solutions to the design, construction and planning for high performance “green buildings” in the developed countries as well as for basic construction of “affordable houses” in the developing ones. The potential growth of this market is justifying Cannon presence in this strategic sector forecasting double digits growths in near few years. While in developed countries architectural and aesthetic aspects are predominant in the design of energy-saving buildings, in developing countries economy, quick and easy installation are fundamental aspects for local standards.

Therefore the market segmentation could be described as follows:

- **Architectural Market**, where form leads function and the aesthetics is driven by architects and designers; manufacturers provide design and details for integrated systems and solutions.

The products can be horizontal or vertical with very good finishes, finishing and innovative design. In this market segment garage and sectional doors are playing an important role. The sandwich panel in this market segment is mainly used for face finish-including, but not limited to, pre-painted steel sheets for cover not excluding aluminium, stainless steel, copper or other valuable finishing materials.

- **Commercial-Industrial Market**, where function leads form, product decisions are driven by owners or contractors and architects have only a marginal involvement. The growth in this segment is really high, driven by big retailers, car dealers, manufacturing plants. Energy is required minimal design and detailing but competitive prices and fast “time to market”. Panels are usually made with rigid facing including pre-painted steel sheets; sometimes one facing is flexible to reduce the costs as much as possible.

- **Insulation**, where the function and insulation properties are the key features and no importance is given to form, since very often these panels are hidden by other construction materials. Contractors and architects have an involvement here just to grant the right performances in term of insulation properties. Normally these panels are designed to be coupled with other materials and are made with flexible facing in order to reduce the cost.

- **Cold Storage Market**, where specialized owners and contractors are leading the market, usually a niche for the Commercial-Industrial sector. Function and form are equally important; very high thicknesses are necessary in order to get the right insulation properties required for food conservation.

- **Roof Market**, where function leads form, product decisions are driven by owners or contractors. Architects will have more involvement due to the aesthetics part taking the decision. In Europe “tile roof” style is taking place in the market in the countries where historical reasons are matching the insulation function.

- **Air Ducting Market**, where economic, aesthetic, functional aspects are sharing equal importance in order to allow contractors and engineers to design effective ducting at reasonable or low costs. This technology is slowly taking place since it needs an efficient distribution network.

CN: Then the products required by these various segments are quite different: how do you approach these different needs?

FA: In terms of panel-making technologies Cannon can offer the widest product portfolio: coating on the proven experience of a solid staff of technical and process engineers, we are able to offer, design, manufacture, test and run the most sophisticated continuous, discontinuous and discontinuous production lines for sandwich panels. When the targeted panel is hidden and the aesthetics plays the first role, due to their high productivity, are the most effective solutions for satisfying highly demanding panel producers. Citro, the Cannon Division dedicated to continuous sandwich panel production, can benefit of the customer’s opinion about the qualifying points that can be summarized according to:

- **Complete “in house” production** – in our Italian qualified plants, where economic, aesthetic, functional aspects are predominant, in the design of energy-saving buildings, in developing countries economy, quick and easy installation are fundamental aspects for local standards. Therefore the market segmentation could be described as follows:

- **Architectural Market**, where form leads function and the aesthetics is driven by architects and designers; manufacturers provide design and details for integrated systems and solutions.

The products can be horizontal or vertical with very good finishes, finishing and innovative design. In this market segment garage and sectional doors are playing an important role. The sandwich panel in this market segment is mainly used for face finish-including, but not limited to, pre-painted steel sheets for cover not excluding aluminium, stainless steel, copper or other valuable finishing materials.

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- **Complete “in house” production** – in our Italian qualified mechanical shops – of the most critical and sophisticated parts of the plant, including the dosing machine, decoders, rolling forming machine, double belt, cutting and stacking equipment and, last but not least, the control system for supervising the line. The quality of the final products strictly depends on the precision applied in manufacturing the whole line. Engineering and design of the equipment together with machining accuracy and quality controls allows for efficient panel production line.

Cannon provides complete “in house” production of the most critical parts of the plant, including the mixing machines, decoders, rolling forming machine, double belt, cutting and stacking equipment and the control system for supervising the line.

CN: And, in conclusion, can you disclose what’s going on in the “renewable energy” market?

FA: More projects – some of them involving innovative solutions – are being currently discussed and contracted with existing and new customers in USA, Far East Asia and Middle East, but let me keep them confidential until the contracts are signed!

I can only tell you that the increasing interest towards the economic and quality results provided by our complete production lines testifies that Cannon is recognized by the market as a leading supplier for PUR/PIR sandwich panel equipment. We like to handle complex form-finding problems, and we like to solve them for the interest of our customers! We can’t have success unless they do, at the end!
stable the polymerisation occur in the upper floor. A dry cycle of 60\(^{\circ}\)C has been achieved, which allows for a very high production rate per foaming line. Actual part-to-part cycle, of course, must be calculated in accordance with the reactivity of the used formulation: the gel time will set the moment when the fridges can be safely rotated without spoiling the foam's quality, and the curing time will set the moment when the fridges can be safely extracted from the jig without making post-expansion deformation.

The proposed solution is very convenient for manufacturers of large forms of the same model in this case, in fact, the mould change will occur as it was done many years ago, before the Rotoplug revolution, by translating the old plug out of the jig in a service cabinet, and fitting the new one in place with the same method. For large-scale production the Rotoplug brings numerous advantages, in terms of investment, space occupancy and plant's energy management:

- A 50% reduction of all loading and unloading lines and ventilation systems (a particularly expensive item in case of Halocarbons blown foams).
- A 50% reduction in mixing heads and related hardware, controls and software, when using fixed injection heads.
- A significant cost reduction when buying a double foaming jig rather than two simpler single stations.
- A much smaller plant's footprint and total volume, as well as space occupancy and plant's energy management:
- A 50% reduction in mixing heads and related hardware, controls and software, when using fixed injection heads.
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- A much smaller plant's footprint and total volume, as well as space occupancy and plant's energy management:
- A 50% reduction in mixing heads and related hardware, controls and software, when using fixed injection heads.
The Automotive sector is looking with great interest at the industrialisation of the injection process involving the use of Epoxy resins and Carbon or other continuous fibers, provided that this allows for early cycle-part cycle times of 3 minutes or less. Until now this fast production has not been possible, for a reason of metal linked with the interlaced chemistry and with the manipulation of the fiber’s substrates. Thanks to ESTRIM – a fast-moulding, high-pressure injection technology recently launched by Cannon onto the lightweight, thin-wall composite moulding of complex shapes and medium-large dimensions can now be produced at very reduced cycle times. An interview with Antonio Cossoio, Cannon Group’s Product Development, details the various aspects of this innovative application.

Cannon News: Epoxy-based composites produced with high pressure injection: what can you tell us about the innovative aspects introduced by Cannon for this technology?

Antonio Cossoio: The innovation introduced by Cannon consists in providing the right mix of technologies able to achieve Automotive industry’s production cycles for mass production of large composite parts.

• High-pressure technology for metering, mixing and injecting a properly formulated family of liquid Epoxy resins in a closed mould: this decreases demoulding times from up to 30 minutes to 2 – 3 minutes, maintaining optimum mechanical properties of the end product.

• Self-cleaning mixing heads eliminate the use of flushing or cleaning solvents, achieving significant economic savings and environmental benefits, which can be permanently fixed on the tools, speeding up the production and eliminating leakage problems from the injection points.

• High-pressure metering equipment and closed-loop controlled metering systems, guarantees optimum repeatability of the dispensed weight from shot to shot. This provides high standardisation of the moulded parts and avoids unnecessary overfilling of the mould, with all relevant advantages (material savings, no leakages, no loss of the environment, no emissions of vapours from the moulds, much lower scrap rate, etc.).

• Dedicated preformers provide repetitive and fast production of parts and components mounted in the moulds prior to the injection, avoiding long manual preparation of the preformers, increasing the profitability of parts and dispensing equipment.

• Dedicated mixers are designed and supplied dedicated preformers for composites development of dedicated solutions for the Automotive sector – in a field where the two basic problems described above. The experience grown by Cannon and Huntsman in another field of the plastics industry – in the Polyurethanes, in which both Companies are recognised leaders for their R&D – joined forces to develop an alternative process, designing and manufacturing high pressure metering and mixing technology that has allowed the industry to reach production rates and mechanical properties once unheard of. The same approach has been used for Epoxy.

Cannon FPL Functional Scheme

CN: What does this mean in terms of advantages for the end user?

AC: A production rate up to ten times faster than that provided by the traditional methods is possible, due to:

• Pressure and moulds generate ten times more parts per unit of time, compared with the same moulds;

• Production lines can be automated, making use of 40+ years of industrialisation experiences matured by other plastics processing equipment’s producers and systems;

• The advantages are significantly reduced cycle times for the moulding process, increasing the profitability of parts and dispensing equipment.

Multiple heads can be connected to a single dispensing machine to serve several moulds in a row, reducing the required equipment’s investment per point of injection and optimising the performances of formulation and dosing machine. Automotive, transportation and aerospace industries can think in new terms the production of structural or decorative lightweight composite parts, since their production rates can be brought nearer to their assembly lines’ timings and logistic needs.

CN: What is the “state of the art” for Epoxy-based Composites?

AC: Traditionally, manufacturers and end users were forced to select a combination of liquid formulation, which required manual preheating and different reinforcing mats or tissues of glass or carbon fiber.

• The long polymerisation time, deriving from the intrinsically slow and with the manipulation of the fiber’s substrates.

• The availability of high-pressure equipment for very fast injections of Epoxy opened a world of opportunities to Huntsman Advanced Materials: they were able to supply, with this technology, a wide range of Araldite® resins and Aradur® hardeners and catalysts – the right combination, providing high reactivity but also the right viscosity at the injection temperature and viscosity build-up characteristics in order to cope with the performances demanded by this new process.

CN: How did you proceed with the development of the process?

AC: Several sets of trials were organised during 2009 and 2010 at Cannon Afros R&D lab near Milan, Italy, using high pressure metering and mixing equipment specifically modified to cope with Huntsman’s Epoxy chemical behaviour and viscosities. Handers and resin required very different processing conditions, and chemical compatibility suggested us the use of plunger-dosing pump for the hander side rather than the use of the conventional high-pressure pump used for the resin.

• Moulding trials were run with radically higher pressures, in order to obtain consistent results using various types of reinforcing materials.

• Successful experience was repeated with a moulding time as low as 2 minutes, with resin processed at near 90°C and mixing temperature Reins/Harders /Tg by 10°C.

The resulting test plates were submitted to characterisation in Huntsman Advanced Materials’ Landshut Innovation and Technology Centre (LITZ), within the frame of a major development project started at the beginning of 2010. A final joint cooperation with the prestigious client allowed Cannon to supply the Automotive sector with the new technology, now carrying the whole production of preforms for the composite parts manufactured in house by BMW for their M3 and M6 models. For the annex article to get more details on this innovative project.

CN: What are the benefits of this new ESTRIM process?

AC: The advantages over a conventional technology are evident:

• Presses and moulds generate ten times more parts per unit of time, potentially with the same manpower.

• Production lines can be automated, making use of 40+ years of industrialisation experiences matured by other plastics processing technology.

• Production costs and scrap are significantly reduced.

• Multiple heads can be connected to a single dispensing machine to serve several moulds in a row, reducing the required equipment’s investment per point of injection and optimising the performances of formulation and dosing machine.

CN: Where do you think that this process will be applied in the near future?

AC: Automotive, transportation and aerospace industries can think in new terms the production of structural or decorative lightweight composite parts, since their production rates can be brought nearer to their assembly lines’ timings and logistic needs. The Cannon Group can supply, as a One-Stop-Shop supplier carrying the whole responsibility of the line, all the equipment required by this technology.

• High-pressure closed-loop controlled metering and injecting machine, and self-cleaning mixing heads.

• Dedicated preformers for repetitive and fast production of inserts.

• Dedicated moulding clamps and moulds, in various lay-out configurations.

• Water-jet trimming equipment for the finished preforms.

• Storage tanks and distribution circuit for chemical components.

• All the ancillary equipment required by the process.

CN: “Dedicated preformers” seem to be a winning ble, for AC: The Cannon Group and Huntsman Advanced Materials have aimed at the automated high-yield manufacture of injectable composite parts based on Epoxy resins.

One of these preformers has been specifically designed and patented in 2001 by BMW in cooperation with the Landshut Innovation and Technology Centre (LITZ), within the frame of a major development project started at the beginning of 2010. A final joint cooperation with the prestigious client allowed Cannon to supply the Automotive sector with the new technology, now carrying the whole production of preforms for the composite parts manufactured in house by BMW for their M3 and M6 models. For the annex article to get more details on this innovative project.

CN: For the success of this project a smart chemistry must have been used: what did you do in this case?

AC: The availability of high-pressure equipment for very fast injections of Epoxy opened a world of opportunities in Germany in other reacting processes – such as Polyurethanes, DCPD resins and others. Epoxy- based composites can be obtained from ESTRIM technology – used in combination with properly designed dosing machines, mould carriages, preformers and auxiliary equipment – with a production rate up to ten times faster than that provided by RTM technology.

CN: To summarise, then what are the benefits of this new ESTRIM technology?

AC: The advantages over a conventional technology are evident:

• Pressures and moulds generate ten times more parts per unit of time, potentially with the same manpower.

• Production lines can be automated, making use of 40+ years of industrialisation experiences matured by other plastics processing technology.

• Production costs and scrap are significantly reduced.

• Multiple heads can be connected to a single dispensing machine to serve several moulds in a row, reducing the required equipment’s investment per point of injection and optimising the performances of formulation and dosing machine.

These data confirm the success of the project. Mechanical characterization tests carried out in cooperation with the Composite Materials Laboratory of the University of New South Wales for their intrinsically slow and with the manipulation of the fiber’s substrates.

CN: For the success of this project a smart chemistry must have been used: what did you do in this case?

AC: The availability of high-pressure equipment for very fast injections of Epoxy opened a world of opportunities to Huntsman Advanced Materials: they were able to supply, with this technology, a wide range of Araldite® resins and Aradur® hardeners and catalysts – the right combination, providing high reactivity but also the right viscosity at the injection temperature and viscosity build-up characteristics in order to cope with the performances demanded by this new process.
Purpose design – the LifeDrive concept. Lightweight design, however, is just one facet, albeit a very important one, of the development work which goes into modern body architecture. For the BMW Group engineers the opportunity to completely rethink the vehicle architecture and to adapt it to the demands and realities of future mobility. With the LifeDrive concept they used purpose design to create a revolutionary body concept which is geared squarely to the vehicle’s purpose and area of usage in the future and offers an innovative use of materials. Similar to vehicle structures, built around a frame, the LifeDrive concept consists of two horizontally separated, independent modules. The Drive module – the aluminium chassis – forms the solid foundation of the vehicle and integrates the battery, drive system and structural and basic crash functions into a single construction. Its partner, the Life module, consists primarily of a high-strength and extremely lightweight passenger cell made from carbon fibre-reinforced plastic (CFRP). With this innovative concept the BMW Group adds a totally new dimension to the areas of lightweight design, vehicle architecture and crash safety.

The right strength in the right places.

The secret of this high-strength material lies in the carbon fibres. In contrast to quasi-isotropic metals 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 tensile/compression axis. This is its key advantage. The stress resistance of components can be optimally matched to the loads they will have to endure. As in nature, where bones or plants use thicker structures only where really necessary, so the BMW Group engineers likewise tailor the thickness and fibre alignment of CFRP components to their actual requirements, varying the quantity of fibres used and aligning them in the direction or directions along which loads will be exerted in the future product. This precisely gauged component parameters also help to minimise weight. Using CFRP is more than simply using aluminium or steel. With its special properties, this high-tech material opens the door to completely new approaches and design concepts. Elastic mobility is a case in point, where CFRP offers great potential as a material for vehicle body components since its lightweight properties result in a higher power-to-weight ratio, and therefore an extended driving range. Provided that this material is properly understood, it can be strategically deployed to achieve cost improvements in a wide range of lightweight products.


text continues...
"The continuing growth of the Far East markets, propelled by the steady development of China, has substantially helped us in these past two-three turbulent years" says Marco de’ Guidi, Corporate Sales Director of Cannon, "Refrigerator and Automotive industries keep investing significantly, and we secured a good portion of those orders thanks to the invaluable contribution of our local people!"

Cannon News: When we talk about China and Far East today, we always risk to be obvious. Everyone perceives the "great wave of energy" coming from those countries, and the feelings about that are mixed: competition and opportunities, fears and hopes, jobs are lost elsewhere and generated there… What can you tell us about the Cannon version of this complex phenomenon?

Marco de’ Guidi: It’s definitely a complex scenario. Expansion in China is driven by the need to recover 90 years of substantial poverty. The risk of developing a new society whose fixed idea is to catch up with western lifestyle and its status symbols is huge. If nothing else, when the average salary increases the first thoughts are oriented towards consumes: a car is better than a bycicle, a fridge provides healthier food, a comfortable bed is better than sleeping on a hay sack. This drives the consumes, factories are mushrooming, a car is a symbol of status, a fridge provides healthier food, a comfortable bed is better than sleeping on a hay sack.

Shinnon moved for the second time, due to space reasons, and have now secured a good portion of those orders thanks to the invaluable contribution of our local people! The analysis is much more complex than that. I leave it to the economists. What I see is a world of opportunities for at least ten more years. We have realised that back in the year 2000, the USA, and so on… The analysis is made more complex than that. I leave it to the economists. What I see is a world of opportunities for at least ten more years. We have realised that back in the year 2000, China and Far East today we always risk to be obvious. China is the Number One producer of domestic refrigerators has grown in the past 12 months of 25 million pieces per year. And I'm only speaking of the investments made by Haier plus the top four-five major manufacturers. It's an unfathomable growth, just to face the forecasts, one third of the early simple model with more sophisticated ones, plus the supply of high-quality models with "western" standards for the export market. Local equipment suppliers cannot cope with the rising demand of refrigerator foaming plants, both in terms of quantity and of quality and reliability, so, there is still space for sophisticated "western" solutions at prices that are very justified but still profitable, if you know where and how to build plants.

The technological change is equipped to the manufacture of advanced metering equipment for Chinese Polyurethane transformers.

Western technology is employed for the manufacture of advanced metering equipment for Chinese Polyurethane transformers.

CN: What was Cannon’s involvement in the move of refrigerator plants’ orders?

MdG: In the first half of 2010 we secured orders for two thirds of what we have been invited to bid for, and that's already a lot of work. Innovative equipment has been supplied to Haier, the largest Chinese manufacturer, and to four others among the major suppliers. Other significant references, because of their names and activities, include for instance Galanz, world leader in microwave ovens, and BYD, a giant in the field of batteries for hybrid cars. They all understand the difference between innovative, reliable solutions and cheap local steel. Cannon Far East and Cannon Nippon have significantly increased their business volume in 2010, thanks to this, with historical record figures for our Singapore-based branch, who are managing also the rest of the Pacific area, excluding Japan.

CN: Let’s talk about this, there: what is going on in the rest of Far East?

MdG: Well, still talking about refrigerators we gladly welcome Sharp in our reference list! For the first time they have bought a "western" plant, after many years of loyalty only to Japanese equipment suppliers. Two Drum Units of new design will be installed in these days to their Thailand plant, to make refrigerator doors in a very flexible way, using our most recent mould-handling concepts. Another Japanese fridge manufacturer, Sunyu, just completed the conversion to Cyclopump blowing of their freezing plant in Vietnam. And I could continue…

CN: In, "mostly" or "only" refrigerator plants in your order’s book, for that area?

MdG: No, not "only" refrigerators, of course: we know how to make other things! The automotive industry represents our biggest opportunity and a valuable resource, in this area. We are supplying, through our Shanghai factories, the whole "sky side" of our plants for foamed seats, the moulding lines for steering wheels and dashboards, and most of the required multi-component foaming units. This allows Cannon to stay in direct competition not only with the half of the Chinese manufacturing capacity for domestic refrigerators that has grown in the past 12 months of 25 million pieces per year. And I'm only speaking of the investments made by Haier plus the top four-five major manufacturers. It's an unfathomable growth, just to face the forecasts, one third of the early simple model with more sophisticated ones, plus the supply of high-quality models with "western" standards for the export market. Local equipment suppliers cannot cope with the rising demand of refrigerator foaming plants, both in terms of quantity and of quality and reliability, so, there is still space for sophisticated "western" solutions at prices that are very justified but still profitable, if you know where and how to build plants.

China is the fastest growing country for alternative energy resources: what are you doing at this respect?

MdG: Wind generation and use of fuels from renewable sources are two different areas where our Policarbene and Energy Divisions are very active. Cannon Far East distributes them both, and the market is huge, even with the limitations that I already explained before: China have quickly developed both an environmental conscience and a tremendous manufacturing efficiency in this field. If they want to tackle foreign markets too with their wind generators, they cannot stay still using old technologies, they must evolve: and they know it! “In the wind business” we are entering the specialty market following our main client, Siemens Wind Power near Shanghai, with the target of reaching the top five producers that work here with western companies and technologies. Our solutions for induction of Epstein in glass mats are well accepted, even if a bit expensive compared with the simple equipment available locally. Even Policarbene can find their share here, with expanded rigid foams proposed as an alternative to expensive balsa wood for the blade’s inserts and spacers. For the Energy division it is still a long way to go to big car producers are not the most convenient thing to buy from Europe, for a local Chineese Power company. And we do not produce them here – yet.

CN: What does all this growth means in terms of structure, people, organisation, for the Group?

MdG: It means a lot of effort! We have moved for the second time our Shanghai factory, due to space reasons. Now we have enough room to handle the best service for the biggest customers in the world, like the one we have just quoted. But that's what we said when we made the first move, three years ago: everything happens so fast, in this country! Our technical office and engineering departments have been miniaturised in number, experience and training: we can handle very difficult projects with local resources and less "western" supervision. Of course we must adapt the Service Teams to the growing number of installations that we have sold until now: for this reason we have also moved the Shanghai office to larger premises, able to host the teams of service technicians that are based there – even if they are constantly on the road serving customers!

CN: What do you expect for the next year, then?

MdG: It is not difficult to predict a busy year for our technical office and manufacturing departments, to define all that has been sold. Our Service technicians of Cannon Far East will have to follow all the refrigeration plants going in place from Europe, to help in the start up and to make practice with some recently introduced solutions. And the sales guys will collect a lot of airlines miles, looking for new prospects in the developing segments of the market. That is what I foresee: a lot of work! Cannon moved the Shanghai office to larger premises, able to host ten service technicians and the sales team.

China finds itself competing, but even with the most experienced local suppliers of equipment, those that have literally mushroomed here in the past ten years. We have a lot of space for growth, but we know that the market segment which can afford our prices is limited to the top producers, those which are working here in joint venture with the largest westerns our companies. They are used to work with us in Europe, Japan and the USA, and when’s it’s investment time they know they can rely on our tradition, technological innovation, local service and international experience. It’s a long way from any local supply, in both senses of course! They could spend less here, but they know it’s a fake saving, when you are in troubles later. And we serve them promptly with qualified local technicians, and they love it.

Our strategy was “belong and control” rather than “stay out and suffer”. Opening a manufacturing presence in the Guangdong province has been substantial to our development. Shinnon today operates from their third location, in less than 5 years of life. We keep growing in all our areas! The Company President, Carlo Fiorentini, in the new factory.

Cannon moved the Shanghai office to larger premises, able to host ten service technicians and the sales team.

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Shinnon moved for the second time, due to space reasons, and have now enough floor space to handle the largest freezing plants. Our strategy was “belong and control” rather than “stay out and suffer”. Opening a manufacturing presence in the Guangdong province has been substantial to our development. Shinnon today operates from their third location, in less than 5 years of life. We keep moving in all our areas!
Envisioning new methods for a substantial reduction of the use of wood in conventional applications -- such as those typically applied in the building industry -- will optimise the use of precious oil resources. When this is obtained also lightening the foreseen problem of scarcity of good timber in the near future, the result will be even more appreciated by the “end users”, that is, generally, all of us. MjøsCon AS, based in Norway, has successfully tackled the problem with an innovative product which combines the traditional use of timber with the efficient insulation provided by rigid Polyurethane foam. A Cannon turn-key solution helps the client to produce it very efficiently.

Over the next twenty years, economists predict that the demand for natural resources such as wood, fossil fuels, energy and water, will place tremendous pressure on a planet that's already under huge stress. Production of natural oil and of wood products will be insufficient to meet future requirements. The oil reserves problem is well documented and is not new. However, although not enough efforts have been made to tackle it as seriously as deserves – but another problem has not yet made the headlines of the daily press: shortly, the global production of wood products will be insufficient to meet the new requirements. Competition for the land base will be fierce, and to keep up with demand by establishing fast-growing plantations in the tropics will compete with the growing need for food (both agricultural and animal proteins) and the growing need for bio-fuels. This will give a significant market advantage to those companies who can produce goods sustainably without displacing additional land that could be used for other purposes. If these assumptions are valid, it goes without saying that a more rational use of wood and energy even in current purposes. If these assumptions are valid, it goes without saying that a more rational use of wood and energy even in current applications will contribute to a substantial saving and economic advantage for the community.

This philosophy has been applied in practice by MjøsCon AS, a subsidiary of Mjøs plast AS based in Moa, Norway, where the wood industry represents the main economic resource. Working in cooperation with Bayer MaterialScience’s Nordic BaySystems polyurethane systems house in Otterup, Denmark, they have developed an intelligent solution for the year-round usage of wooden houses, based on rigid Polyurethane foam, which has the highest insulating capacity of any material on the market. If conventional insulating materials were used, walls would have to be made much thicker, and windows smaller, in order to achieve the same level of heat insulation. The adverse effects of this would be reduced living space and less natural light. With the MjøsCon system, two wooden beams - one with a cross-section of 78 by 47 mm, the other 40 by 47 mm - are placed in a mould and the space between them is filled with a liquid Polyurethane system. The mould is then sealed and the composite material is cured at a temperature of around 45 °C.

The “A-Compact” 100 dosing unit, with one FPL 24 mixing head mounted on a rotating boom, able to feed eight 3-meter long moulds placed in a fan-shaped layout in front of the operator. The rigid foam’s formulation, characterised by a final moulded density around 300 kg/m³, is injected in sequence in the eight moulds, where the two wood beams have been manually placed and duly spaced, from a single injection point placed in the middle of the longer side. The Polyurethane system adheres extremely well to the wood substrate, thereby ensuring that the composite is also mechanically stable. The finished wood/Polyurethane beam can be removed from the mould after only a short time. With the addition of the 60-mm-thick layer of Polyurethane rigid foam, the composite timber now measures 198 by 47 millimetres. The board can be machined or nailed traditionally, but now its heat transfer properties are by far superior to those of a standard wooden plank having the same dimensions. Most importantly, thermal bridges between the interior space and the exterior are precluded.

The inventors have applied for patents for the product and production process and MjøsCon won in 2008 the prestigious DnB Norway Innovation Award in the New Creativity category for their development.
Based on thirty years of experience, the Hutchinson plant located in Ingardes-sur-Vienne, France, designs, manufactures and delivers in sequence to the customer’s assembly line composite body parts and semi-structural parts, for the transportation, aeronautic and industry markets. Body parts are moulded in material such as Polyurea, Polyurethane, and PDCPD – which allow for big dimensions. The new large horizontal clamping press recently put in by Cannon, with platens of 3,500mm by 3,500mm, will be used for the moulding of parts of over three meter long. Due to the giant size of the press a hybrid drive solution was put in place, with significant advantages in terms of cycle time and energy savings.

Early in 2009 Hutchinson contacted Cannon France to obtain a quotation for a turnkey package of equipment to manufacture composite vehicle components using the PDCPD (PolyDiCyloPentaDiene) process. The Cannon Group over the years have provided numerous plants to process this material and have a great deal of knowledge regarding the metering of the chemicals and the handling of the moulds. PDCPD is a well established thermoset material used to manufacture large and paintable parts requiring high impact strengths, a collection of attributes required by Hutchinson’s customers. Hutchinson is a major supplier within the industry of transport and have a great deal of knowledge in processing components in Polyurethane (RIM) and in PDCPD, with an established track record of quality and consistency. During the early days of the discussions between Hutchinson and Cannon France it was obvious that very large parts had to be manufactured and that the investment being considered would also in some way be used to allow even larger components production.

In turn brought into question the design requirements of the metering unit and the mould carrier. The following elements must be considered when proposing a mould carrier to be used in the production of PDCPD parts:
- Cycle time
- Operator access
- Power consumption

The typical mould carrier would be a vertical clamping type which has a down-stroking platen. However, in the case of Hutchinson, the size of the parts was so huge that a deeper reflection was required. Cannon Solutions (UK) – the Manchester, UK, based Group’s manufacturing center that has gained the widest experience in designing, building and installing large carriers for PDCPD – responded to the request of Hutchinson to design a horizontal clamping type press because of the special characteristics required: a platen of 3,500 by 3,500mm with a stroke of 3,000mm and a clamping force of 230 Tons.

Since the calculation of power consumption in hydraulics is determined by the pressure required and the flow rate, to match the movement times achieved by the motor gearboxes on the platens would require a large amount of power. More over, to achieve fast opening or closing, considering the maximum tool weight per platen up to 15 tons, a tremendous amount of oil would be required.

For those reasons not only was the decision to go horizontal clamping but also to go “Hybrid”, just like a car: using a mixture of electrical and hydraulic power reduces significantly the total power consumption.

The platens are opened and closed using electro-servo drive systems which allows for fast stroke speed and stroke optimisation, depending on part’s overall depth and mould thickness. The clamping pressure is applied by large diameter independent hydraulic cylinders with a short stroke; each cylinder is electronically controlled to achieve positional accuracy.

The platens and the cylinders can also be moved together, thus reducing the cycle time. The design also offers a time window at which it is ideal to open the mould carrier and quickly allow the operator access to demould the part. The very long stroke allows operators to walk inside the mould carrier to access both platens without being constrained by tools.

The choice of the correct metering unit is also extremely important: the high pressure Cannon “A-Compact” 200 is ideally suited to this process, being specifically designed to meter and mix the PDCPD chemical components in the precise quantities required. The combined output of the machine is 200kg/min., meaning it is ideal to produce mouldings up to 80 kg, maintaining perfectly the characteristics of the mould carrier.

Safety is paramount in the design of Cannon equipment and the specifications of the metering unit with the selection of ATEX certified components means that one can be assured that the plant is fit for purpose.

Quick and qualified Technical Service and local availability of spare parts played a major role in Hutchinson’s decision to chose Cannon as supplier for this jumbo press and metering unit: Cannon France provides both services since 1978, as hundreds of satisfied customers in France and French-speaking countries of North Africa can witness.

With this new installation Hutchinson offers new facilities to realize huge PDCPD parts for all European customers looking for high quality and productivity rate.

Telene, the French Team for PDCPD

Telene, based near Paris, France, is a 100% owned by Rinnor Corporation, the Japanese manufacturers of PDCPD. From their Donssou’s headquarters they are in charge of R&D and sales for the EMEA (Europe, Middle East & Africa) markets. Their culture of “customer centricity” is evidenced by the key developments and successes that have taken place through very close customer cooperation: A strong team, where everyone is ready to roll up their sleeves and contribute, works tirelessly on application and product development when delivering a competitive performance advantage to their customers is the number one goal. (www.telene.com)

PDCPD (PolyDiCyloPentaDiene) is the most advanced solution for the manufacture of large parts, from low to high volumes, with a very large range of applications. Mixed under pressure, the chemical reaction of components A and B gives the thermoset polymer.

Reaction Injection Moulding (RIM) of the low-viscosity resins is the preferred method of production of PDCPD parts, which feature high rigidity, excellent impact resistance, as well as good surface appearance and corrosion resistance for a wide range of applications.

The PDCPD catalyst system makes it possible to control the starting point of the reaction. This opens up the processing window to the moulder by increasing the time available to fill the mould. This makes it possible to make very large plastic parts (up to 100 Kg and over) in a very short time. PDCPD stands apart from all other liquid resin RIM systems because of the unique patented catalyst system. This catalyst system makes it possible to vary the gel-time (which marks the start of the polymerisation) in accordance with the requirements of the moulder and the part to be moulded. Not only has the moulder full flexibility in production, but new concepts in engineering plastics have been made possible by PDCPD RIM resins.
Inbraspa – Indaiatuba Brasileira de Plásticos – specialises in processing tough plastic resins for the production of complex parts destined to a vast range of vehicles for automotive, aeronautics, buses, agricultural and earth moving applications. The Company pursues research and joint-development, together with qualified suppliers in Brazil and abroad, in order to develop new, innovative technologies, keeping - as the priority target - the quality of its products.

Inbraspa is a Brazilian pioneer in the field of PDCPD processing: this innovative resin provides several advantages over competing plastics, mainly in the field of impact resistance.

The growing development of this technology and the increasing demands of the business in this specific process have allowed the Company to invest in large injection equipment and polymerisation presses. Their production capacity in terms of units per year, goes as far as 40 kg; in this way, it is seen that the moulded components are extremely attractive for the manufacturers of large vehicles (automobiles, trucks, buses, agricultural, and earth moving engines). A few examples of their most significant recent projects include 40 kg parts for John Deere tractors, 16 kg hammers for a very complex 11.5 kg front grill for the Scania Sims truck, and an Aeronautics kit for F4 weighing 13 kg.

Illustrating the PDCPD’s advantages Edson Rodrigues, the Group’s Corporate Industrial Maintenance Manager in charge of all the manufacturing equipment, says: “PDCPD exerts very interesting features as high impact resistance and stiffness over at very low temperature, high pressure –20°C – and dimensional stability. High chemical resistance in acids and bases, a paintable surface and optimum compatibility with adhesives. Also, it has high density, which contributes for the weight reduction of the vehicle. It is possible to produce very large parts with a relatively limited investment, and the material show easy processability: its injection time is about 10 seconds and a fully cured part is obtained in 60 seconds. The typical part to part cycle time is 4 to 6 minutes. Usually, mould reuses is not necessary – as well as post cure.”

The Company actively pursues a strategy based upon research and joint-development, with qualified suppliers in Brazil and abroad, in order to develop new, innovative technologies for the PDCPD chemical formulation they have selected. METTON LMR (www.metton.com), manufactured in Houston, Texas (USA) and distributed locally by Sojitz do Brasil (www.sojitz.br). The worldwide-acquired experience in the production of very large “body parts” allowed METTON’s specialists to take the most appropriate combination of reactivity and polymer’s mechanical properties, suitable for the full range of their mouldings.

The Cannon Group was selected for the equipment, thanks to a vast area of technical solutions and a capable local Service, provided by the São Paulo-based Cannon do Brasil branch. A “full optional” high pressure dosing machine “A-Compact 200 FC” – with all the necessary specific modifications required by PDCPD process to work safely – was supplied. The dosing group is made by a twin mixing head, where the polyurethane is injected in a rapid sequence, filling all the available mould carriers. Each mixing head is rated to assure an output production mix, the dosing machine was supplied with three PPL 24 PLUS mixing heads mounted on a double head holder travelling along a metal guide, able to punch, cut to measure and ready to be loaded in the press.

Prefabricated panels made with Polyurethane insulating sandwich panels will be provided to a million of Brazilian families citizens living in rural and peripheral urban areas, to their standard of living and health. The governmental project “Minha Casa Minha Vida” – My Home My Life – financed by the Caixa Economica Federal, will be handled with steel/PU/steel panels made by the Fischer Company (www.fischer.com.br), based in Brusque, in the Brazilian state of Santa Catarina. For high efficiency and superior quality standards the client has selected the Cannon Group catalogue which has been present in Brazil with a local office and technical service staff for more than forty years.

A complete solution has been designed for this project, starting from a Sabugnitive’s automatic FMS 84+94 line able to punch, cut to measure and bend, with absolute repeatability and precision, the two steel sides of each sandwich panel. These are positioned in a large “2+2” Mistral press, that features four movable dies of 13.5 by 2.7 meters; ten metal sandwiches of various design and size (to produce flat panels, cornices and “X” shaped roofs). The sandwich panels are side by side, in each of two trays, allowing for the simultaneous production of 20 insulated finished elements.

The injection of the Polyurethane foam in the metal sandwiches is performed by a double “A-System” 100 high pressure dosing unit made by Cannon Afros, that simultaneously feeds two Cannon PFL mixing heads. Mounted on a double head holder travelling along the longer side of the press, the two self-cleaning heads perform a series of 20 injections in a rapid sequence, filling all the available metal sheet sandwiches.

The productivity of the plant is optimised by the fact that while two trays are in the polymerisation phase in the closed press, the other two trays are positioned outside, on the opposite edges of the plant, to be serviced: here the sandwich steel sheets are automatically loaded, the ducts for electrical cables and plumbing are manually positioned, and the finished panels are automatically unloaded at the end of the cycle. This allows for a combined productivity of one family house of 40-50 m² per working hour.

The Sabugnitive Group (www.sabugnitive.com.br) operates with success for more than 40 years: they design, build, sell and service flexible machines and systems for processing sheet metal. With its complete and diversified range of machines, Sabugnitive is able to intervene in countless application sectors, providing secure and innovative answers for companies of all sizes. These solutions, recognized the world over as the state of the art in sheet metal processing, currently comprise automatic panel benders, integrated punch-sheeting systems, complete panel production FMS lines, laser cutting systems, high-dynamic punching systems, automatic boundary automatic pick or tray stow-towers and integrated systems for factory logistics. Operating with four plants (two in Italy, one in Austria and US) and 17 regional offices worldwide, Sabugnitive provides local technical consultancy and prompt service, fueled by the international experience of its multinational Group. These factors have secured to Sabugnitive a worldwide leading position in this field of activity.

The Gunnite press (www.munazapress.com) was founded towards the end of the 1940’s to produce hydraulic presses for the growing furniture market. When Polyurethane insulated panels appeared with success in the building industry, the company began to offer suitable solutions to produce them, adapting the acquired expertise to the new process. For the last 25 years Muni has diversified production and concentrated in R&D on engineering and manufacturing solutions for Polyurethane foam filled panels. Today Muni is the only Company wholly dedicated to the engineering and manufacturing of plants for the production of discontinuous insulating panels and for this reason is inevitably the ideal partner to find the most suitable and efficient solution.

A long and fruitful cooperation with the Cannon Group’s manufacturing centers and commercial network allowed Muni to develop innovative packages and to distribute them worldwide.

The leading brazilian manufacturers of insulating panels for building industry, domestic and commercial refrigerators, automobiles, furniture and technical articles have been using for various decades Cannon equipment for their Polyurethane, Thermoforming and Aluminium Diecasting technologies. Cannon have been present in Brazil for many years through local Agents, providing service and spare parts with local technical staff. To ensure continuing presence in this growing market the Group opened in 2008 Cannon do Brasil (www.cannondobrasil.com), a fully-owned Cannon location in Santos, near Sao Paulo’s international airport. An experienced staff provides to the numerous brazillian clients commercial assistance for all the products manufactured by the various Group’s Companies and technical service for Polyurethanes.

Cannon do Brasil is a technological partner that brings the support and the international experience of a leader to the domestic Companies and that supports – with the highest quality standards applied in the western countries – those international Groups which decided to invest in a braziliand manufacturing unit.

The injection of foams is manually performed by two operators along the long side of the press.

The Company has already installed a “braziliand Success Story”
Futura+ opens windows on the future

Idealcombi, a family business founded in 1973, disposes of the “largest window production under one roof” in Denmark, and has reached in Europe a leading position thanks to the variety of their products and to the quality of their windows. The high quality standards pursued by the company derive from a mixture of solid Danish craftsmanship and tradition with state-of-the-art technology, providing solutions with the industry’s best energy performances. They have selected a Cannon solution for their innovative Futura+ series of trendy windows.

Based in Hurup, in northern Jutland, Denmark, Idealcombi (www.idealcombi.dk) produces quality windows in a wide product series: five individual window’s lines are offered to the European market, with technical characteristics that comply with, and often surpass, the energy efficiency standards set by the EC norms.

The latest and most trendy series, the Futura+, combines wood and Aluminium with a core of Polyurethane, whose structured and thermal insulation properties ensure to the manufacturer longevity, strength and a uniform surface requiring no maintenance. Its dim profile, obtained thanks to the insertion of Polyurethane, ensure the largest possible glass section and allows plenty of light in the rooms, in addition to an extra heat gain and an elegant and modern look.

The series has been designed to suit the requirements of modern and visionary new buildings, focusing on sleek functionality and energy-efficient solutions. The windows and frames are designed with the exterior side finished in powder-coated Aluminium and the traditional interior in wood.

Both materials have been retained in the product to offer all the advantages of a differentiated choice of colours both inside and outside, as well as minimum maintenance requirements. A high-insulating core of Polyurethane between the inner and the outer elements provide the required low values in the energy performance calculations. By combining Polyurethane with fine glass fibers Idealcombi has obtained a Composite structure which sets new standards for reducing cold bridges and energy loss.

The peculiar design of the Futura+ series requires a number of specific solutions. The long and narrow design of the windows profile leads to the choice of an open-mould pouring solution, rather than a closed-mould injection that would not guarantee optimum surface aspect in the remotest corners. Therefore a proper mixing head is demanded, able to pour with a laminar flow a viscous formulation.

The length of the moulds suggests the simultaneous use of two combined mixing heads, pouring simultaneously, starting from the center. The wide profile of available profiles implies numerous different moulds, to be properly and precisely handled in an automatic foaming plant. Therefore a logic connection is required between a mould identification device and the dosing machine’s and pouring robot’s foaming programmes.

Norte, in cooperation with Cannon Africa, the Group’s unit responsible for metering and mixing technologies, proposed a complete plant based on a 2514 m rectangular mould carrying transfer line. In the middleware of this area stands a chemicals pre-blending and dosing station, based on a double Cannon HE dosing machine for glass-filled formulations; this metering unit is linked, through an aerial rigid piping, with two FPL mixing heads, specially armoured to be abrasion proof and provide long-lasting operations and laminar flow pouring. A prototype mixing head carrier, positioned in a side angle of the mould carrying transfer line, drives the two mixing heads over the nearly 7-meter long-open mould foaming occurs starting from their center and moving onwards in the opposite directions. When foaming ends, the mould is automatically locked and moved forward, making space for the next one to be foamed.

When Polyurethane has polymerized, the moulds are opened automatically and the finished profile is extracted. A set of new Aluminium profiles is positioned in the mould, before this enters in a pre-heating oven where it is brought to the right temperature for the next application of Polyurethane. When the mould leaves the oven it travels briefly through a buffer station, then it goes under the foaming portal, and the cycle repeats.

This 350m² plant can foam up to 60 profiles per hour, using two operators only.

The new Cannon foaming plant will enhance Idealcombi’s capacity of providing constructive solutions and knowledge as parts of a joint objective for sustainable buildings and good cost efficiencies. Far more than a supplier of windows and doors, Idealcombi plays an active role in the overall building process, not just as a supplier but also as an active partner. The same can be said for the Cannon units involved in this sophisticated project.

As the old Cannon slogan says, “Together We Can Make It!”

Energy saving regulations are becoming a very serious matter in the EEC, since they dictate very stringent norms and insulation coefficients for the future buildings, as of 2014 something so far unbelievable will happen. Wood alone will not be anymore sufficient as building material, its heat transmission coefficient is too high! The oldest and most traditional construction material will require a substantial technological help to remain in business. Rigid Polyurethanes come to help, once again!

We got bad and good news for you, European folks: bad news is that plain old wood won’t be anymore sufficient to guarantee a proper degree of thermal insulation to European houses, according to new building codes effective January 1, 2014. Good news is that there is an available and affordable solution: the result will save you a ton of money, in the medium-long term.

We skip for a while the well-known solutions for insulating walls and roofs, where Polyurethanes play a major role since decades.

Either sprayed, poured in cavities, applied as a slab of foam (cut from a block or laminated between proper facing materials), a rigid Polyurethane foam features superb insulation properties, ease of application even in the remotest cavities, resistance to humidity and rodents, all at an affordable cost. Although innovation keeps fuelling new solutions, we consider this an history of the past.

We concentrate, in this article, upon a major source of energy leaks in a building, the “black hole” where the window is mounted.

In spite of using double- or triple-glazed low-transmission glass panes, the window frame remains the weakest points when building an energy-efficient house. Heat leaks from the window support fixed on the wall and from the frame building the glass pane. A thermal photography of a façade of a well-insulated building shows mercilessly this effect: money literally pours out of the window.

Woden frames have been replaced by more technological Aluminium profiles, sometimes in combination with an internal wooden structure, for aesthetic purposes), extruded PVC or pultruded Composite bars, with extended use of rubber gaskets to ensure the air-tightness. Whatever the alternative, you still use conductive materials, and – unless you find the appropriate solution to cut the thermal bridge, the final result might fail to pass the most stringent regulations coming into effect in the future.

“Cutting the thermal bridge” is the key word, in this matter. The adopted solution must be thermally safe, mechanically robust, long lasting even under the most severe weather conditions, not difficult to place in position in the highly-automated windows-making manufacturing process. And economic, of course.

A range of alternatives has been found, using Polyurethanes – but not only as an insulating material. Its outstanding structural characteristics offer numerous interesting solutions, where this polymer is used to build part of the structure and to ensure the requested thermal cut. A rigid Polyurethane formulation with a density around 500 kg/m³ is the optimum choice for most of the cases, providing the desired strength while maintaining good thermal insulation properties.

Various structures of wood, Aluminium and PVC can be used in combination with Polyurethane, to provide the best solution to the different (and sometimes conflicting) needs expressed by architects, constructors and end users.

Cannon, in cooperation with numerous manufacturers of different types of frames, have developed a series of “packages” able to cope with every technical alternative. See in the pages of this Cannon News some customer’s stories that speak for themselves, and do not hesitate to contact the nearest Cannon office to discuss your own, specific request.

Isn’t Cannon the specialist of complex moulding?
Numerous, innovative and all focused on automation and savings in manufacturing: Cannon Tecnos’ technical solutions are applied in automotive applications – and not only – all over the world. The most recent projects are described in this article by Massimo Castiglioni, Sales and Marketing Manager of the Tecnos unit.

Cannon News: For more than 25 years Cannon Tecnos has developed dedicated solutions for the production of automotive parts, using mostly Polyurethanes but also other plastics and other materials. Where is Tecnos focusing its business, at this stage of its life?

Massimo Castiglioni:
The automotive still represents most of our business, for sure. In the past five years we have done more than 80% of our turnover in the transportation industry, dealing as usual with manufacturers of plastics parts for automobiles, trucks or buses. The remaining 20% has represented our playground, where we have applied the acquired know how for new applications and new markets. We applied, just as an example, AGV transports to the insulation panel industry and, this year, to the aeronautics.

CN: Can you be more specific about this? What do you offer?
MC: For the car seat’s moulding lines we designed easy mould change systems, simplified service operations, off-line mould handling for difficult models. For instance we have developed industrial solutions for in-situ foaming of seats and backrests that can contribute to the volume and weight reduction of urban cars, a segment of market which is on the rise. Our Pit-Stop solution allows Copco Iberica in Spain (www.grupocopo.com) to attain very good results on their seat’s moulding line working for Citroen and Peugeot. All time-taking or complex operations – such as part demoulding, mould cleaning, release agent application, fitting of the textile liner – are carried off-line, leaving the polymerisation-coured piece free to run at its optimal speed after the foaming station. Add to that the reduction of the footprint of our plants, thanks to new methods for handling a numerous lot of mould carriers, and you already get a significant saving.

Talking about thermoformed fuel tanks, an interesting development followed the purchase from the Magna Group of existing Cannon “Twin Sheet” thermoforming lines originally made for Visteon. They moved one line to manufacture the fuel tank of the locally-produced Audi A6. In our factory we have carried the prototyping service for Magna and Daimler, forming dozens of tanks for their prototype vehicles. The car makers love to use serial components for their vehicle’s extended evaluation tests, to be sure that part’s weight and performances will be exactly matching the “real life” conditions of a serial vehicle. Only four months passed between the order and the delivery of the finished tanks.

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Cannon Viking Maximises Raw Material Efficiency

With the ever increasing costs of polyurethane foam raw materials Cannon Viking have been focusing in recent years in machinery efficiency to maximise foam yield and profitability for our clients. Key areas of concentration with equipment design have been to:

1) Further improve the foam block shape to enable the production of perfect rectangular shaped foam blocks.
2) Reduce bottom, side and top skins and therefore less raw material waste.
3) Reduce foam Pits, holes and gas bubbles with Liquid Laydown technology available as an addition on all Cannon Viking Maxfoam continuous machinery.
4) Create a Uniform and Regular Cell Structure available on both Low Pressure and High Pressure continuous foam production machinery with better mixing and pre mixing as well as custom made injectors on High Pressure continuous Cannon Viking foam plants.
5) Further refine and develop Foam Plant Controls to ensure precision and yet simple foam plant operation.

Foam block Shape:
Cannon Viking offer various solutions to produce rectangular shaped foam blocks which can be part of a new continuous foam block production plant or added as a later addition to existing continuous machinery, the solutions are as follows:

RS (Rectangular Section) Side Film Equipment – this technology works on the basis of pulling the side shoulders of the forming foam block to improve the rectangular shape.

RS (Rectangular Section) Side Film Equipment

Conveyorised Moving Sidewalls - High density flexible foams, Specialty foams such as Viscoelastic and HR foams as well as Semi Rigid and Rigid foams tend to be more difficult to process on a continuous foam block production plant. For this reason Cannon Viking provide the option of conveyorised moving sidewalls on all their continuous foam production plants. These conveyorised sidewalls are electronically synchronised with the bottom conveyors to ensure a smooth and uniform support to the foam. The Conveyorised Moving Sidewalls can also be used in angle to counteract the taredfresnel block effect on heavy foams such as HR foams.

Conveyorised Moving Sidewalls

Maxfoam Liquid Laydown Module

Improved Foam Cell Structure for Low Pressure Continuous Machinery
To further improve cell structure Cannon Viking introduced a special patented mixing unit back in 2008. The design of this patented unit is to give better mixing and control of nucleation air on Low Pressure continuous foam production machinery. This additional mixer unit is fitted prior to the main continuous machine mixing head and is used to create a homogeneous blend of air and activators which has proven to greatly improve the foam cell structure and quality. This technology also greatly reduces top skin waste and ensures that the block is totally rectangular in shape.

Maxfoam Liquid Laydown Module

Improved Foam Cell Structure for High Pressure Continuous Machinery
Cannon Viking have for many years been producing high pressure continuous foam production machinery with LLM liquid laydown technology know as our C-Max equipment range. From experience a key part of this technology to help ensure fine cell structure is the control of the high pressure injection where the material enters the mixing head, these units are critical to ensure good quality mixing but can be very difficult to set and maintain especially on key streams like TDI and Water. To overcome these very common problems Cannon Viking have developed their own solution with a range of custom made injectors. These injectors are very simple to use and maintain and can be manually controlled or motorised dependent upon the end client requirement. These injectors are manufactured in a range of sizes from very small chemical output for materials such as Stannous Octate through to very high output materials like TDI and MDI with the added of benefit and simplicity of one injector unit being used for each metering line making set and operation much easier.

Foam Plant Control – OMEGA The Latest Generation
Cannon Viking continues to set the standard in Foam Shotblock technology with the latest version of the highly successful OMEGA computer control system which is now in operation with more than 170 clients worldwide. The OMEGA system has been developed in house by Cannon Viking with our own team of four specialist computer and software engineers and is fully supported from within the company.

The latest enhancements to the OMEGA system include:
- An easy to use industrial touch screen, designed for chemical environment from which full plant control and monitoring is undertaken
- A Modem to allow direct remote access via a phone line or via the internet – this allow our clients to observe and monitor production remotely - an invaluable tool in the modern factory where production is across different sites or even different countries. The Modem also enables direct support and assistance to be provided by Cannon Viking if necessary
- A UPS is provided as standard where power supply to the factory or foam plant may be an issue or problem
- Raw Material Tank Farm display can also be included to show tank levels and temperatures on the OMEGA control system
- Cannon Vikings VCO Block Cut Off Machine can also be integrated with the OMEGA control system which allows the Block Cut Off Machine to be configured and set up from the foam plant to cut the required number and lengths of foam block based upon the production and formulation database.
- A completely modular and upgradable Control System which can be easily expanded as further features such as additional metering units, square block equipment etc. are added to the existing foam plant
- All existing key features such as closed loop control, formulation management, full plant control and monitoring with data reporting remain

OEGLA - Foam Plant Control

An OMEGA retrofit package is also available to enable the earliest versions of OMEGA control systems to be upgraded to the latest generation of controls, a specialist Cannon Viking controls engineer is provided with the retrofit package to install, commission and retrain the plant operators on site.

With the increasing costs of raw materials set to continue for the long terms future Cannon Viking is hard at work trying to maximise efficiencies and developing cost saving initiatives which can be an integral part of a new foaming plant or can be added to existing machinery of Cannon Viking or non Cannon Viking supply. Please contact Cannon Viking or our local representative to discuss your requirements in more detail.
Cannon Viking consolidates its position in India

Global Polyurethane Slabstock market is expected to grow at around 5 percent over the next years with major growth in Asia and Latin America. However Indian slabstock market is expected to grow at around 15 percent over the next few years.

The Indian economy continues to be on a growth curve, aided by a growing agricultural sector, industrial resurgence and faster development of the country’s physical infrastructure.

Taking strength from this, Cannon Viking has consolidated its position to emerge as the leading machine supplier in Indian Polyurethane Slabstock industry and has booked a number of prestigious new orders in the last two years.

In 2007, Cannon Viking along with Expanded Inc, their Mumbai based sole Indian representative, identified the growing demand of Slabstock foam in the Indian market and decided to strengthen and re-organize to increase its market presence. Mr. Cural Kalaria, General Manager, Expanded Inc, with 30 years of experience in global slabstock Industry, took charge of all marketing activities for Cannon Viking.

The first major step was Cannon Viking’s active participation at the PU Tech Exhibition held in New Delhi in early 2008, where visitors were introduced to Cannon Viking’s comprehensive range of foam block production machines to suit different applications and budgets. Later technical developments and various projects were discussed with major Industry players. Visitors went back with the knowledge that Cannon Viking is the only company with an exhaustive list of machines and technology.

The Sales Team for India was further strengthened when, in mid 2008, as a consolidating step Cannon Viking appointed Mr. Saurabh Prasad to look after India, Middle East and East Africa, based out of Mumbai. Saurabh had previously worked in the Indian Polyurethane slabstock Industry and was with a leading Indian foam manufacturer for a Cannon Viking sales and marketing activity for Cannon Viking.

This new Sales Team evolved a new three-pronged marketing strategy – showcase all Cannon Viking machines and technologies to the Indian slabstock industry, expand client base by concentrating on existing and peripheral industry players, and develop the Cannon Viking machinery range to suit local requirements.

New Strategy yields results

One of the major successes came when Rudrakash Laminates of Gurgaon (near Delhi) decided to produce foam for their own consumption instead of buying from the market. Soon the plant grew into establishing a full fledged factory to produce foam for self consumption and for the market. The computer controlled and monitored Maxfoam Omega 400 ordered is state of the art in terms of controls and technical features suitable to produce high quality foam with low pinholes for lamination use, and is also suitable to produce standard foam for the market. This machine includes Cannon Viking’s patented pre mixer unit for premium and regular cell structure.

The new re-organized Sales Team has worked tirelessly to achieve success with other clients across India. Springfoam Polysterethanes, an existing client and the leading foam producer in Chennai, South India, upgraded their Computer Control System with the latest generation of Omega Control System and has also added further metering units on to their machine to enable the production of an ever expanding and more diversified range of foams to meet the developing Indian Flexible foam market.

The modular design of Cannon Viking Maxfoam machinery and Omega control system makes upgrading easy. The latest addition to the Springfoam plant has been the addition of a pre mixer unit to further improve their foam quality and cell structure.

Amid growing requirement for high pressure production technology, Cannon Viking has successfully concluded an order with a leading Indian foam manufacturer for a Cannon Viking High Pressure combined liquid lardow and Maxfoam known as a C-Max machine. When installed, this machine will be able to produce a very wide range of foam grades including Standard, Visco-elastic, Supersoft and Fire retardant types among others.

For new and small clients, the Blockmatic and EasyMax machines are the best alternative to both Indian and Far East competition. The advantages and adaptability of these machines have given clients compelling reasons to consider them for their future plans. A Blockmatic single block foam machine is now under construction for a new foam producer in Northern India whilst the Sales Team is in advance discussion with various clients and expects to conclude more orders in 2010.

The pioneering initiatives by the Sales Team have made inroads within the industry and helped create win-win relationships with industry players. Cannon Viking is now able to support the industry through training, local technical support and spare parts.

Through conscientious implementation of the new marketing strategy, it has emerged as a major player in the market. Having a finger on the pulse of the market with highly concentrated and experienced local personnel has helped to reinforce and recreate a new Cannon Viking suited for the Indian market - a total solution supplier for machines, technology and after sales service.

Cannon Viking install the largest fully integrated foam plant in South America. Corporacion CLC, one of Venezuela’s largest foam and mattress producers, are now in the process of installing their latest Maxfoam Omega 800 continuous Polyurethane foam block production plant in Maracay, following a major fire in their mattress plant back in 2008. Their original foam plant was a Viking conventional machine supplied back in the 1970’s. The Company decided the unfortunate event of the fire was the correct time and best opportunity to re-establish their business and renew many old pieces of machinery.

The new state of the art, fully computer controlled Maxfoam Omega 800 foam plant is built to the highest and latest specification and includes more than twenty separate chemical metering units to enable the production of standard foams, HR, High resilience foam, high hardness foam, FR (fire retardant) foams and VE (Visco elastic) foams all on the same Maxfoam machine. The Maxfoam plant has been supplied by the leading and largest machinery manufacturer in the Polyurethane slabstock industry.

Corporacion CLC, one of Venezuela’s largest foam and mattress producers, contacted Cannon Viking in 2009 with many additional features such as RS square block equipment and Cannon Viking’s VCO Block Cut Off Machine, which is ideally suited to cutting wet and difficult slabstock foams like Visco foam.

During 2009 visits were made by CLC in Europe to see a number of foam plant installations including a visit to Sun Garden in Poland where Cannon Viking recently installed a similar Maxfoam Omega 800 foam plant with a fully integrated chemical plant. Following these visits in Europe the owners of CLC decided that they would also like Cannon Viking to supply a complete, integrated turn-key foam production facility.

Cannon Viking’s scope of supply consists of:

- Maxfoam Omega 800 Continuous foam block production plant with full Siemens PLC control and monitoring with modem link.
- RS Square Block equipment using side film technology to further improve the Maxfoam block shape and reduce waste.
- Cannon Viking VCO Integrated Block Cut Off Machine for block length cutting.
- Detailed designs and construction drawings for twenty two 30-tonne bulk chemical tanks and all feed and recirculation pipework for Polyols, Isocyanates, fire retardant and powder filter feeding to enable local construction in Venezuela.
- Tank farm parts consisting of valves, filters, tank level indication and control equipment, in line flowmeters, temperature control equipment with heat exchangers and chillers units for each tank unit, chemical drum and road tanker off loading pump units, powder measurement, feeding and blending equipment.
- OMEGA integrated PLC control and monitoring for the Maxfoam Omega 800 foam block production plant and the tank farm to ensure a complete integrated foam production operation with full traceability and data on each raw material, production run and it can be grade with detailed MRB.
- Cannon Viking Technical Service Team for installation, commissioning and training with modem link for future on line support via phone or Internet.

The equipment is now under final installation and commissioning and once completed will be the largest fully integrated foam plant installation in South America.

Mr Rahul Nagpal – Director of Rudrakash Laminates company (right) and Mr. Saurabh Prasad, General Manager Expanded Inc, (left) the cannon Viking plant installation in South America.
District heating and cooling provide several benefits to the community (energy cost saving and reduction of investment in individual household or building heating equipment) but it has always been considered as a long-term commitment. Cogeneration, power plants, networks have a high construction cost and the district heating/cooling system become profitable only after several years for the power operators. The profitability of this system is higher in those areas with high concentration of large buildings (business centers, shopping malls, etc) or high density of population, due to the reduced cost of connection of the networks in comparison with that of single family houses in low density areas.

The above statements lead to the key market requirement of auxiliary equipment for heat generation plants having low investment costs, high availability, easy operation and maintenance and a fast response to the network load change, considering its high variability during the 24 hours added to the fact that the peak demand cannot be covered by the main electrical/heat generators due to their inertia. Keeping in mind the above key point, Bono Energia has constantly focused towards the supply of most of auxiliary boilers design suitable to be installed in CHP plants or traditional boiler houses.

The energy consumption for district heating/cooling increases every year, especially for residential and commercial applications. District heating is a system for distributing heat generated in a centralized location providing higher efficiencies and better pollution control than localized smaller sized boilers. The most efficient system is the one in which the heat is usually obtained by the recovery of waste thermal power from the combustion of primary energy carriers that would otherwise be dissipated into the environment. As a matter of fact the main element of a district heating system is a cogeneration CHP plant or a traditional boiler power station (firing traditional fuels or biomass) in which electricity and heat are generated simultaneously. These plants give the constant base load for all district heating system.

District cooling works on similar principles to district heating, delivering chilled water to buildings containing offices and factories needing cooling. This sector has become of great interest since high capacity ARM (Absorption Refrigeration Machines) driven with thermal energy are nowadays available instead of Compressor Refrigeration Machines which are driven by electricity. The possibility to use locally produced hot water in a generation plant, both for heating and cooling, is granted since the hot water temperature required in an ARM for the evaporation process is of about 120°C, a value close to that used for winter heating. The main difference between heating and cooling remains the hot water differential temperature, that increases for the heating operation.

High Capacity Hot Water Generators

In order to cover the peak demand of the network, high capacity high-speed generators have to be installed as auxiliary heat source aiding the boiler load production. Having an intermittent operation, these machines provide a high on-demand reliability and the possibility to be automatically operated by a remote control system (auxiliary boilers are usually located in a peripheral position to the main generation units). Local flue gas emission of the auxiliary generation units must be kept to minimum since the installations are usually located near or inside high density population areas.

Bono Energia has experienced several application in this market segment having developed two types of generation unit design.

The first is based on a dedicated heater solution named CTH, having a multi-inlet hot water tube design with power capacity up to about 60MWt; these heat generators can be installed directly on the district heating networks – where network hot water circulates directly in the CTH tubes – or through heat exchangers, depending on water characteristics. Having no practical limitation on the pressure design, that can reach values higher than 40 bar, and on hot water inlet temperature, limited only for flue gas temperature consideration, the CTH have been extensively installed in most of Italian district heating applications. The CTH design grants a reduced start up time permitting to stop the heater when the network load is on a low demand. Finally the CTH can reach very high efficiency as well as very low flue gas emission levels. With a very simple design involving a reduced number of components, the CTH generators have a competitive price for a wide threshold range starting from about 10MWt.

The second solution is the traditional water tube boiler with steam-hot water exchanger. In this design a CTD type water tube boiler produces saturated steam which exchanges heat to the hot water network through an exchanger in a closed loop system.

This solution involves a more complicated network having the necessity of an exchanger installation, although this allows for high capacity demand (more than 60MWt) the possibility to handle very high flow rates of hot water. The efficiency of the CTD type is limited by the fact that the generator works with saturated steam temperature limiting the flue gas temperature and the achievable efficiency, although this can be avoided with in-line flue gas hot water exchanger. One critical aspect is the start-up time of the system, due to the necessity to reach the saturation temperature of the steam before delivering heat to the network. Although the decision of installing one single high capacity generator instead of multiple lower capacity generators has to be analyzed according to the above statements lead to the key market requirement of auxiliary equipment for heat generation plants having low investment costs, high availability, easy operation and maintenance and a fast response to the network load change, considering its high variability during the 24 hours added to the fact that the peak demand cannot be covered by the main electrical/heat generators due to their inertia. Keeping in mind the above key point, Bono Energia has constantly focused towards the supply of most of auxiliary boilers design suitable to be installed in CHP plants or traditional boiler houses.

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Bono Energia steps in one of the “Big Four” of Russian Oil & Gas market

Russia has the largest reserves, and is the largest exporter, of natural gas. Before being exported, the gas must be treated and consequently, Russia hosts a list of gas processing plants. Natural gas processing plants, or fractionators, are used to purify the raw natural gas produced from natural gas fields or extracted at the surface from the fluids produced from oil wells. A fully operational plant will deliver pipeline-quality natural gas, which is then used as fuel by residential, commercial, and industrial consumers. Bono Energia, through Thermo Design Engineering, has been selected for the supply of two water tube steam boilers for the TKN-SP Zaklinsky gas processing plant (Russia, Orenburg region).

TNK-BP, owner of Zaklinsky gas processing plant, is one of the big world giants of oil and gas and shares the Russian fields with the well known companies of Gazprom, Lukoil and Rosneft (a subsidiary of TNK-BP) in supply on a turnkey basis a Gas Processing Plant to process a maximum of 200,000 Nm³/hr of natural gas and to complete the design services for the future phases of the plant expansion, including oil stabilization and a mini refinery. From the raw gas to the purified gas, which is pipelined to the end user markets, several processes – such as acid gas removal, dehydrogenation, Merox removal, Nitrogen rejection and NGL recovery – are required. Moreover, the in Zaklinsky plant, a fractionation train and a sweetening process produces Ethane, Butanes, Pentane and Propane. Concenrations must be monitored and long chain hydrocarbons captured for other commercial uses. All these processes are supported by utilities that need large amount of high quality steam. The knowledge and experience on special Russian codes and certification has been of basic importance for Bono Energia in the award of this contract with TDE for the two package boilers, natural gas fired, with a net steam production of 30 t/h each, complete with auxiliaries. Bono Energia equipment has been designed in compliance with SNIP construction codes and obtained GOST as well as RosTechNadzor certification. The 50 t/h of steam will be granted from the package water tube CTD steam generators, high efficiency water tube boilers with natural circulation, suitable for firing both gas and oil fuels. The CTD model combines high performances with low emission levels, compliant with the most stringent environmental standards.

A task achieved with a 12-month building in Tobolsk, West Siberia for Tobolsk Polymer LLC, a company belonging to JSC Sibur Holding. Maire Tecnimont, a leading engineering and main contracting Group operating worldwide in the Oil & Gas and Petrochemicals, Power, and Infrastructure sectors is present in four continents and in more than 30 countries and has over 40 operating companies and about 5,100 employees.


Siberia, that was once a punishment destination for former USSR dissidents, is now a much sought-after target area for top ranking Companies capable to supply equipment and technology: one of the world’s largest petrochemicals plants in the world is under construction in that remote and chilly land.

Artes was in fact contracted by Maite Trentimon to supply a ZeroGas™ Deaerator to be installed into the 51,000 tons per year Prepyat Dehydration (PFD) plant. Trentimon is building in Tobolsk, West Siberia for Tobolos Polymer LLC, a company belonging to JSC Sibur Holding Maite Trentimon, a leading engineering and main contracting Group operating worldwide in the Oil & Gas and Petrochemicals, Power, and Infrastructure sectors is present in four continents and in more than 30 countries and has over 40 operating companies and about 5,100 employees.

Scope of ARTES’s supply is a 540 ton/h ZeroGas™ deaerator, one of the largest ever built by Artes in its own workshop in Oliveto Citra, Italy. It is characterised by a deaerating tower, arranged in a horizontal geometry in order to accommodate the huge mass and heat transfer section, and, at its feet, a 4.5 m diameter by 20 m long storage tank capable to contain more than 200 m³ of boiler feed water. In boiler feed water dissolved gases, such as Oxygen and Carbon Dioxide, must be reduced to the lowest level in order to prevent boilers and steam circuits from corrosion. Deaerators are designed by BONO Artes upon its own ZeroGas™ proprietary deaerating technology developed with dedicated heat & mass-transfer simulation models leading to the complete understanding of the most variegated process conditions. Artes’ ZeroGas™ thermo-physical deaeration process is based on a “Spray and Tray” principle and is by far the most applied technology when a reduction of oxygen to negligible concentrations is required. That taking in due account process issues was not the sole challenge. Among others ARTES was requested to define and procure construction materials suitable for a minimum design operating temperature of -30°C, to provide the complete GOST certification dossier necessary to export equipment in Russia and to meet a very strict delivery schedule.

The only way, in fact, to deliver such an equipment to site was by barge, navigating from the Arctic Sea through the Ob and Irtysh Rivers when they are not frozen, which is normally not more than three months a year: missing the contractual schedule may result in waiting for next ice melting.

This is the result of a two years contract developed in partnership with an Italian EPC contractor for the final Swiss customer Holcim Group. The boiler itself represents for Bono Sistemi a successful example of medium-size biomass thermal plant fully engineered “in house” and manufactured with the key supplies of Bono Energia for boiler parts, Bono Netro for the combustion system and Aromas for the fuel control system. The plant has been nicknamed “The Ship in the Bottle” due to the difficulties met during the engineering phase first and in the construction on site. After, in order to assemble a 600-ton weight boiler inside an existing 48-years-old concrete factory without modifying any external volume of the plant, as required by the building authorization. A task achieved with a 12-month on-site present of up to 10 skilled technicians of Bono Sistemi.

Green Energy for Tuscany

On May 27, 2010 the first Bono Sistemi full turn-key biomass co-generation plant has been inaugurated at Calenzano, few kilometres far from Florence, Italy. The plant, the first one in the centre-south area of Italy based on ORC (Organic Rankine Cycle) technology, will supply 300 electrical kW/h to the national grid and 3,000 thermal kW/h as hot water to the 5.3 km municipal district heating network of Calenzano. The fuel will be supplied by the neighbouring green areas: 12,000 tons of virgin wood, mostly agricultural residuals from farms and forest maintenance, will be reused every year!

Mrs. Anna Rita Bramerini, Energy end Environmental Alderman of Tuscan Regional Council attending the event, underlined in her speech the key role of the plant in outlining a new sustainable energy path in the area, a path that should lead to a widespread spread of biomass plants with a special focus on the area of Calenzano, as strategic territory of the Tuscan Regional Council attending the event, underlined in her speech the key role of the plant in outlining a new sustainable energy path in the area, a path that should lead to a widespread spread of biomass plants with a special focus on the area of Calenzano, as strategic territory

Bignaenerga represented for Bono Sistemi a key-reference project boosting broad new orders for the Italian market.

- La Thuile (Aosta), wood-based ORC co-generation plant generating 400 kW/h electrical and 4,000 kW/h thermal as distinct heating, completed during summer 2010.
- Tregole (Città), an ORC power generation plant working on a mix of wood and olive husk, providing 1,000 kW/h electrical, to be completed on spring 2011.
- All these plants will benefit of the special Italian “Green Taxt” (280 €/MWe electrical) reserved to biomass energy plants sized within 1,000 kW/h of power generation capacity.

A giant “ship in the bottle” mounted on the Italian Alps!

Bono Sistemi completed on March 2010 the start-up of a 28 tons/hour superheated biomass steam boiler, main item of a power plant able to generate 6.8 MW/h electric burning virgin wood in Fosso, Lombardy Region, Italy.

This is the result of a two years contract developed in partnership with an Italian EPC contractor for the final Swiss customer Holcim Group.

The boiler itself represents for Bono Sistemi a successful example of medium-size biomass thermal plant fully engineered “in house” and manufactured with the key supplies of Bono Energia for boiler parts, Bono Netro for the combustion system and Aromas for the fuel control system.
Forma (Cannon's thermoforming machinery manufacturing division – www.cannonforma.com) has deeply delivered two thermoforming machines to the Marrur Group, a tier one supplier to FIAT.

These machines are dedicated to the manufacture of sets of interior trim (eco-ordinated dashboard, front and back door panels) for the FIAT Doblo model year 2010, that has been awarded of the title “Van of The Year 2010”.

The production technology is “thermo covering”, a special technique of thermoforming. An injection moulded insert (also called “substrate”) in ABS is treated with reactive hot melt adhesives developed especially for the automobile's laminating processes. A PVC skin is thermoformed on top of the insert, while the substrate stays in the process station of the thermoforming machine. This carrier is clamped on the lower plates of the thermoforming machine, in the same place of a conventional thermoforming mould. Special care has to be observed in the heating process both for the skin and for the substrate. The skin, according to the high-quality standards defined in the automotive industry, has to be perfect in the appearance, free from any marks or deformations on the surface with a structure giving mechanical properties and a good finishing. The forming-secure adhesion and material distribution has been particularly demanding; in this particular case, due to the geometry engraved on the surface of the skin: small circles that were highlighting any excesive elongation.

In the same way, the insert needs a precise control in the process to prevent any excessive elongation.

CN: And that’s already an important statement. What are the other features and advantages of this system?

FF: With the new Cannon Forma series, also, do not make without all the features were needed, and here the tool is very flexible:

• Working from reels, automatic material transfer to the pre-heating station, in a dedicated heating station. This feature is unique on the market, original and patented. It’s a stepless system: it can be adjusted continuously along its whole range. The top level of the plates is made in a way that the plastic sheet fits flat on the vacuum table. The bottom level of the plates as well allows the mould to completely seal this clamping area.

• Temperature control of the plates avoids the machine getting too hot and to loose control of the perimetere's edge of the parts and their flame. We can accommodate into the adjustable plates channels to let water flow on or, when the case, to oil to temperature control the perimeter close to the boundary of the plastic part.

• The plate system is compatible with existing tools. As long as the tools have a sealing edge, there is no problem. The same if it has a flat gasket on it. There is no problem if the gasket slide against the aperture plate. If foresees from the beginning, it is possible to use a universal mounting plate with a vacuum sealing ring on the perimeter under the adjustable plate system.

Reduced floor space is required for these machines: the plates fit in a limited room thanks to their overlapped concept. Maximum range of adjustment in a minimum lay-out.

Marrur Group has selected Cannon Forma thermoforming machines because of the state-of-the-art configuration for the specific application, the sophistication of the heating control and the reputation of the Cannon Group.

The main characteristics at the basis of this success are related to the flexibility and the easy and rapid tool change to the customers. Cannon have developed a new patented system already in production by different customers around the world. Forget about the hassle of the defective production lines and finding the room to store them. Also no need of extra money invested in new tooling whatever you have a new tool for production. This flexible system of plates slides to the desired mould size from 100% of the machine maximum size to a minimum of almost 20%: yes, this is the range of adjustment and the machine doesn’t need to be bigger: Simply unclip the receipt of the part in the operator panel and the plates slide automatically, drop in a small bar with snap connections and you are back in production in seconds. This makes the system right for low production and for Vernon forming.

The loading system suites to customer’s needs: carriage loader or simplex transport and adjustable plates! This makes the system right for low production and for Vernon forming.

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Automatic adjustment of plates and clamp frame is possible:

• High degree of control of the heating system, by -high quality IR heating elements, -automatic control of heating power and compensation of the voltage fluctuations.

Under the adjustable plates to monitor actual temperature of heating elements -built-in control on the heating system -multiple pyrometer reading on substrate temperature and skin surface.

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While talking about heating let us remind that the best option today on the market is the Speedium heating element. It gives its best option today on the market is the Speedium heating element. It gives its best option today on the market is the Speedium heating element. It gives its best option today on the market is the Speedium heating element.