Germany for us: "an essential presence"

Cannon have been present in Germany since 1977, when an Agency contract for the distribution of Polyurethane machines was signed between Aeros and Promotec, a representative office dealing with various chemical technologies. Their staff and activities were absorbed by Cannon in 1985, when Cannon Deutschland was created in Ditzingen.

Today it is based in Hamau, and distributes all Cannon plastics technologies in the German-speaking European countries. Automatika GmbH was founded in Dachau, near Munich, in 1989, to develop industrial electronic controls. Since then, many developments have led to the current presence of Cannon in Germany.

Counting a local staff of 42 specialists in total, Cannon represents an exception among other manufacturers of similar industrial products. Very few non-German makers of industrial machinery invested substantial human and financial resources in a country that is the house of their fiercest competition. The bold decision taken thirty years ago — to absorb an agency and open a direct office — still contributes to the establishment of a stronger corporate image for Cannon. In spite of the economic turmoil that hit Europe in recent years, Germany is still a strong driving force for the world's economy. Its technological developments and flagship products (in mechanics, automotive, house holdings, electronics) always represent a reference point for the rest of the planet. Therefore Cannon must be in Germany!

The main competitors of Cannon are based here: being associated to large industrial groups they have always represented a reference point for the growth and the development of new ideas. The main suppliers of Cannon are based here: a correct, frank dialogue with these fundamental players in the production chain have allowed Cannon to maintain high competitiveness and state-of-art technical level. The main suppliers of chemical raw materials are based here: large companies to which they offer always a new innovative and process.

The automotive field is a very important area for Cannon as well, being the vanguard of the industry and many other competitors. This was obtained also thanks to the innovative use of Polyurethane parts, Carbon-based components, and Aluminium cast elements. All these fields saw the active presence of Cannon in the supply of innovative solutions to German customers.

We are glad and proud to be part of their success.

The Cannon Group presents at K 2013 their most innovative developments in the fields of processing technologies for Polyurethanes.

Epoxy, Composites and Thermoforming.

You can find in the stand (Hall 13 – B76) all in this Cannon News several examples of the most innovative solutions recently introduced by Cannon.

Dedicated technologies for the manufacture of automobiles and industrial vehicles, of domestic refrigerators and other key components of the cold chain, of flexible foams for the furniture and bedding industries, of insulated panels and pipes for the building, construction and industrial insulation sector, of Carbon- and glass-reinforced composites for all their possible applications are illustrated in detail with dedicated videos, samples and dedicated articles published here and in the corporate website (www.cannon.com).

Several new or totally re-designed mixing heads for reactive components are on the show, specifically conceived and optimised for rigid foams for thermal insulation and refrigerators, flexible foams for automotive seating, co-injection of PUR and glass fibres (InterWet and RFRM technologies), fast RTM moulding of epoxy-based composites (ESIRTM technology).

Read more on page 9 and 10.

The Vacuum Assisted Injection (V.A.I.) of rigid Polyurethane foam in refrigerator cabinets and sandwich panels for insulation represents a suitable manufacturing method to obtain superior filling properties, optimum adhesion to metal facings and very interesting thermal insulation values. Several foaming plants using this Cannon technology have been supplied in the past three years, providing numerous technical and economic advantages to the end users.

Read more on this subject at page 9 and 10.

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In the automotive field, numerous Cannon machines have been recently supplied to primary car makers for the injection of PUR formulations against noise, vibration and harshness (NVH) in the cavities of a car body. See a specific article at page 6 and read more on the latest developments on automotive seating at page 4 and 5. A new dedicated equipment conceived for the manufacture of glassy, clear-coated decorative parts for the transportation industry — including applications for luxury boats and private jets — is illustrated at page 7.

The manufacture of special grades of flexible slabstock foams (extra-soft, very low-density, highly-filled, etc.) made possible by the introduction of the patented CarDis® technology years ago, are illustrated at page 16 and 17, within the wider range of Cannon Viking continuous and discontinuous plants for flexible and rigid foams.

Innovative and complex thermforming packages are available for the most demanding applications: those involving the process of thick sheets made with multiplex-layers of different plastics for automotive fuel tanks, the use of Twin Sheet forming technology, the manufacture of very large parts for acetic generators nacelles and other wide bodies, the production of domestic refrigerators with high-productivity in-line models. We talk about this at page 24 and 25.

We pay special attention to the field of energy efficiency, a playground where Cannon is particularly active with numerous solutions developed by different Companies of the Group:
- Dosing machines, infusion and gluing solutions designed by Cannon Aeros for the production of the blades in glass-reinforced epoxy resins used in the aero industry. See page 20 for this.
- Turn-key plants for large insulated panels, used for the construction of refrigerated vehicles, containers and warehouses for perishable goods, made by Cannon Ergos. See page 6, 11 and 13.
- Turn-key plants for large and small Composites and Thermformed parts, used for the construction of lighter vehicles and aeronautic components, also designed and built by Cannon Ergos. Details available at page 22.

- Thermal energy and cogeneration plants, utilising both conventional and renewable fuels, designed and manufactured by BONO Energia and BONO Sistemi with the greatest attention for the efficient use of energy. More at page 15, 19.

Cannon is present today with factories, sales offices and agents in more than 40 countries. More than 1,000 employees are working in 26 Manufacturing Centers and 17 Locations, that occupy a total area exceeding 200,000 m². We serve today more than 25,000 clients. The vast experience gained by the Cannon Group in more than 50 years of leading presence in the field of Polyurethanes, Composites, Thermforming and Energy can be shared with you at K 2013.

An international staff of specialists, dedicated to the various technologies, is here to discuss the best possible solutions for your manufacturing needs.

Welcome @ Cannon, Your Technology Centre!
Cannon: the right heads for your needs!

Fifty years of dedicated research and development in the field of mixing technology for reactive formulations allowed Cannon Afros to establish a worldwide leadership in this specialised market segment. Over 32,000 mixing heads – most of them are still in production – have been installed on more than 14,000 metering units, in all continents. The output capacity of these heads covers a range from 1 to 10,000 g/second, meeting and exceeding the expectations of a wide network of end users of Polyurethanes, Epoxy, Silicone, Phenolics and DCPD. Dedicated models have been specially developed for different applications, chemical components, injection or pouring methods. Every chemical innovation in this innovative sector of the polymers industry has been analysed for years before appearing on the market, to ensure that the processing tools are available on the release of the new formulation. Cannon presents at K 2013 several new versions of its high pressure mixing heads, designed to cope with the latest available developments for rigid, flexible, reinforced Polyurethanes and for fast RTM Epoxy resins.

Faster foams for modern refrigerators, panels and pipes

In the past few years, important developments have been implemented in the fields of chemicals for rigid Polyurethane foams, to improve thermal insulation properties and faster moulding times, particularly for refrigerators, freezers, insulating panels and pipes. Thermal insulation is greatly improved by reducing the average diameter of the foam cells, and this can be obtained with very fast-reacting formulations. As a consequence, since these end products are becoming larger, these quickly-setting foams must be injected at higher output rates than in the past.

Cannon J.L., an industrial success

Roughly 100 of these sophisticated devices are today in operation around the World, bringing a true revolution in the PUR mixing technology. The Cannon J.L. is designed without the conventional jets utilised to regulate the injection pressure of the chemical components. Thanks to its unique mixing concept – that works by speed and not by pressure – it provides superior mixing efficiency: mould cavities are perfectly filled with a lower “minimum fill” density, allowing for a substantial saving in foams. This patented Cannon J.L. mixing head provides a unique opportunity to the manufacturers to inject in a new philosophy. Both foams and pipes can be designed with a higher customisation level, thanks to the longer nose of this device.

Read more on this revolutionary head at page 10 of this Cannon News, in the “Refrigeration Industry section”!

PFL SR, the evolution of a flagship head

Cannon have designed the PFL SR mixing head as an evolution of the classic PFL head. The new head features several significant improvements in terms of laminarity of the flow, reliability, cleaning and maintenance. This new PFL SR Series head is being manufactured in all the diameters (18, 24 and 26 mm, diameter of the external nose) required by the user. Reaction times improve, conventional foaming jigs and plants worldwide is widely used with success. The advantages obtained through the above mentioned improvements have been progressively extended now to the whole range of Cannon PFL mixing heads, aiming at another long season of success in many different industrial applications. About this head as well you can read the whole story at page 10 of this Cannon News.

Second-generation InterWet, for a superior fibre wetting

The InterWet Technology, a well-known method for the co-injection of Polyurethane and chopped glass fibre into an open mould, allowing for the manufacture of large, thin sections. Widely used worldwide, this technology benefits today from a very significant improvement applied to its proprietary mixing head.

Cannon Afros designed and patented a totally new mixing head that provides an even superior wetting to the chopped glass fibres working at higher total output values than in the past.

The new system concentrates all the chemicals on a real local level of the discharge of the flow of pure PUR around the crossed fibres, thus providing a superior wetting effect on the fibres: their straight, vertical flow is also somehow devoted from the discharge of the crossed discharge duct. This feature improves the random distribution of fibres within the mass of blended material projected onto the surface of the mould, contributing to superior mechanical performances. This better orientation of fibres is enhanced by the pneumatic deflector mounted on the exit of the head and utilized to evenly cover the whole surface of an open mould with the blend of glass and Polyurethane. The four air nozzles, positioned symmetrically around the head’s nose, blow a vortex that flows tangentially to the flow of the reacting bold: this feature provides a post-process, a more horizontal distribution of the single fibres over the mould surface, and a “flattening” effect over the mass of blended material. All in all, it provides a much more efficient distribution of the reinforced polymer around the moulded part, leading to superior mechanical performances.

Featuring a brushless electric motor controlled by an encoder mounted on the Polyurethane cylinder, opposite to the blade-holding wheel, a new fibre-cutting tool operator thanks to a closed-loop control concept. When the blades are worn-out and the cutting efficiency decreases, the encoder measures some deviation from the set speed and sends a signal for the operator to replace the blade holder. This device is now characterised by a larger diameter, holding 90% more blades than in the previous model – thus lasting longer, since they are really work less than in the past – and allowing less interruptions during the production cycle.

The higher wetting capacity of the new InterWet head allows the use of very high percentages of glass in the formulation, ensuring that the whole surface will be fully coated with a proper layer of reacting Polyurethane. In industrial applications, the level of glass percentage equal to 70% is regularly attained at a total output around 500-700 kg/sec. A higher total output – up to 1,000 kg/sec of Polyurethane mixed and dosed in open mould without much turbulence – can be reached at a proportionally lower percentage of glass; the current output of chopped fibres is around 300-350 kg/sec, for a maximum total output around 1,200 kg/sec of blended material.

Fully self-cleaning thanks to its design, the new head features an additional unit to clean the last external portion of the air distributor, mounted on the head’s nose. Using an eco-friendly cleaning system, this device thoroughly washes the air jets on the deflector and removes all dust and debris of chopped glass from the surface. After its activation, the solvent is recovered and reused several times.

The new AK, for multi-component PUR formulation destined to automotive seats

Launched long ago as the most compact multi-component mixing head available for the manufacture of moulded automotive seats, the Cannon AK is today widely used by the leading producers of cars and car parts. With a laminar flow in open mould reaching up to 600 kg/sec, with 5-components MDI-based formulation, the head still represents the fastest in operation and the most compact alternative for this application. It is today available in three sizes: 14.18 and 26 mm of external nose diameter. Its design reflects in easy mountability on standard robots, in limited number of pipes for components and hydraulic fluids, in fast set up of pouring pressures and in easy maintenance. Today the latest version is available: it is characterised by an optimised external layout of components, with a connector bar for all its pipes mounted above the robot, so to get a more rational replacement of the whole head in case of maintenance.

Improved thermal treatments on the most stressed mechanical components have extended its reliability and operational time: replacing its seal packs every 700,000 shots is now quite common.

R&D work continues at Cannon Afros, to make the use of modern搬迁-component formulations possible, through a new design and a compact solution.

ESTRIM L6N, the Fast RTM compact head

Cannon announced at JEC Composites Show 2013 in Paris the three-component dosing method for ESTRIM, a Fast RTM process for the production of Composites made of Epoxy resin formulations reinforced with Carbon fibres. The kind of head used for this process is ESTRIM L6N. Designed specifically for these chemicals, it keeps all its external components in a circular section of 120 mm diameter, injectors included.

This very compact footprint and its 45 mm nose allows it to be mounted on thin moulds, widely used by the automotive parts manufacturers to produce very small CFRP (Carbon Fibre Reinforced Composite) components.

In order to enhance its mountability on moulds characterised by a complex three-dimensional design, with an impervious access to the injection hole, the L6N head has been conceived with all fittings and controls mounted on the rear side, opposite to the nose. This configuration leaves a very sleek design on the sides, basically on its circumference, since it has an almost cylindrical shape – so to reduce its impact on the mould even further.

Mounting the pressure injectors parallel to the cleaning rod requires a special trick for their regulation!
The new L110 model, designed for output values up to 400 g/sec, is currently under industrial development and will be released early in 2014.

New solutions for filled materials
Filled and reinforced, new Polyurethane formulations appear on the market to fulfill the needs of the manufacturers of parts that must accept high compression forces. These materials contain glass or carbon fibers, either in their foams to reduce the costs, or to improve their flame resistance, or to impart superior mechanical properties in the case of reinforced technology. For all these needs Cannon have developed suitable solutions during the past 50 years. Now a new generation of heads is available, with improved mixing efficiency, new design of the mixing chambers and significantly higher resistance to abrasive or corrosive fillers and reinforcements.

Put a Cannon mixing head at the heart of your Polyurethane plant!
Efficient mixing, fast operation, compact design, ease of regulation and service, low TCO (Total Cost of Ownership) are the characteristics of Cannon mixing heads, having them be appreciated and widely used around the world. A continuous commitment in excellence is the driving force that pushes Cannon to search for new solutions, so to provide reliable and profit-generating tools to its customers.

Put a Cannon mixing head at work, and start exploiting 50 years of experience in this sophisticated field of the reactive polymers technology!
Have you noticed that the two parts in your car that you touch most often - steering wheel and seat - are both made of Polyurethane? And do you know that the set of seats - the internal element of vehicles - consumes 35 percent of the total technological and not very noteworthy - is the second most expensive part in a car? Since a long time ago, Cannon has conquered a leading position in the industrial field of car seats manufacturing made of Polyurethane foam, and provides the leading car and component manufacturers with its own products, the so called "first assembly".

The car seat is the part that a passenger touches most often, so its level of comfort has a huge impact on the overall opinion about driving comfort. A wisely measured combination of foams, fabrics, supports and metal levers soldered and assembled, electric accessories and various sensors make up a sophisticated "set of seats" which may cost the car maker from 600-800 Euro for an economy car up to 1,500 Euro for a top-of-the line car. Next to the engine, the set of seats is the most impacting element on the cost of vehicles. A considerable project effort is constantly made by designers and manufacturers in order to grow the comfort and to lessen the weight of this essential element. It is to be reminded that, with up to 25 kilograms of foam used for each set of seats, a car is the heaviest element in synthetic material on board of a car! Every kilogram saved in this process contributes to remarkably improve the fuel consumption of the vehicle, thus bringing towards each model a higher and higher number of users.

The market is wide and global
Despite the crisis in this sector affecting many geographical areas, the automotive market is still huge: in 2003, for the first time in history, the threshold of 60 million vehicles produced has been overcome. To that amount we must add about 20 million of commercial vehicles, trucks, buses and miniature buses. We remind you were a little over 40 million in the year 2000. If we multiply the number of vehicles produced every year by six (foamed parts) (two seats bittes and two single front backseats, then a large seat and a large rear seat-back) the result will be a remarkable number: over 360 million foamed parts for cars only. Besides, an indeterminate number (yet computable as not less than some 1000 million more of foamed parts - rounded off) in the fields of commercial, industrial and special transportation.

One could think: "The market is working; there must be many competitors", yet it is not that simple. The supply of the complete set of seats requires its manufacturer the use of a series of particularly sophisticated processes in the field of chemistry, of foams, of steel industry and of electronics; therefore, those firms able to compete at high technological levels are not many, and their business is with car manufacturers working in at least four continents. Therefore, entry barriers in this field are rather high, and the players are relatively few: the leading ones are located in the United States, in Europe and in Japan, with their local factories scattered all around the world.

Names of suppliers of complete seats such as Johnson Controls, Lear, Magna, Faurecia, Fehrce, Toyota Boshoku, Kurobo, Copo, Woodbridge, TS, and TACHI are well-known for all manufactures of vehicles, and almost all of them produce in their own plants the polyurethane foam elements making a seat comfortable and attractive.
Many of them have established one or more branches in China, where the extremely high manufacturing of vehicles - nowadays, one car out of four produced worldwide comes from there - matches with an always available economic manpower. They all must face a market where the tension is increasingly strong, where stricter and stricter safety regulations confront the above-mentioned constant search for reduction of weight and cost, and where users‘ needs are more and more sophisticated: users always ask for more positioning automatisms, individual heating, plants, customization and memorization of driving ergonomic arrangements, readers for digital devices plugged in the front seat-backs, etc...
These are all heavy parts needing to be motorised and handled - which is not the best way to reduce vehicles weight!

Cannon produces seats destined to hot cars
Since a long time ago, Cannon is at the forefront for the supply of finished plants destined to the foaming of car seats.

Already since the early 80s, the introduction of electronically controlled dispensers and of mixing heads suitable for pouring in open moulds with instant capacity- as well as high capacity - has paved the way to the supply of moulds, mould carriers and carriages, units for dosing of additional parts, head robots, pre-mixing stations, piping for chemical components, "Zero time" mould change systems, exhaust gas abatement and suction units, built-in units for programming and control of the manufacturing and of certification of the quality produced.

Early on, those full packages of technologies have been introduced at the leading car manufacturers and at Tier One suppliers supplying all over Europe, and then they have been exported to the rest of the world.

The availability of patented solutions, able to increase the productivity and the quality of foamed cushions, supplied by manufacturing units within the Cannon Group, specialised and dedicated to cars, has allowed to rapidly extend such solutions by the leading players in this field. And when the latter have decided to establish branches in those having the highest development index, Cannon has followed them: in 2006, the decision to create a production unit in Southern China - in Shanghai, in the Guangdong region - has allowed Cannon to create fifteen plants of car seats foaming so far, most of which including dispensers, mixing heads and pouring robots.

Having been established in different countries worldwide (China, Japan, Vietnam, Malaysia, as well as the United States, France, Spain, France, Poland, South Africa and Mexico) for the leading manufactures of vehicles, Cannon has become the latest high pressure dispensers, with output control carried out in real time, produced in Italy, to be supplied in China to the USA, according to the end country of the finished plant.

About three hundred mould carriers for seat and double cushions have been wholly manufactured in China and distributed all over the world, together with the supplied carousels.

In 2013, Lear in Mexico has been provided with a Cannon foaming plant which includes a 24-module carousel, while Ford – independently manufacturing the finishing of its own seats in Spain - has been provided with a similar plant including a 24-module carousel.

Flexible and modular plants that fit the changed market needs
The foaming lines carried out by Cannon are characterised by the use of carriages supporting individually motorised moulds or having one engine for every carousels.

This technical solution allows to release the supporting moulds from a pulling chain, common solution adopted in the market - thus realizing layouts which can fit the rooms available inside factories, in the place of traditional oval or rectangular format. The flexibility of this concept allows to expand or divide an existing plant through a technical intervention lasting few weeks and carried out by a small team of specialists.

The ability to supply, install and test a finished product, through one single firm responsible for performances on entire project, has increased Cannon's reputation as the ideal "One-Stop-Shop" for all cushion manufacturers.

We use our head...providing heads!
The Cannon AX mixing head, with recycle of five streams up to the line, itself produces a high luminosity of the flow of the components. This multi-component formulations have been successfully applied on highly precise and precise manufacturing lines, thus obtaining high-quality and high comfort cushions through an uninterrupted sequence of pouring within the same mould; the distribution of the material in the mould is thus a single one, or rather that of an "injection", with all the advantages of this process.

The size of these heads - both compact and lighter than these offered by competitors - allows their use at a high linear speed, using traditional foaming robots.
So one can obtain much faster pouring cycles, higher speed of the foaming lines, as well as the possibility to use more reactive formulations.

The special design of these heads reduces the complexity of the piping transporting the fluids required for the manufacturing of the foam and for the control of heads. During the pouring phase, the originating benefit is the possibility to better access to the part of the mould that is to be covered in foam.

Today, a new head produced by Cannon is available for those manufacturers willing to employ on the same foaming line both TDI- and MDI-based formulations. Cannon PPL-4, is characterized by two opposite and individually activated mixing chambers, where you can blend four components per each side: this way it is possible to use TDI plus three polyols on one side and MDI plus two polyols and also a colour on the other. This allows the production of cushions with different resilience (foamed in a rapid sequence on the same plant), density and colour, even different for car manufacturers.

A modern foaming plant for automobile seats
The leading South-American country has become the second market for Volkswagen, next to China, overcoming 700,000 vehicles per year.

India is one of the countries richest in projects for the automotive industry. New initiatives by manufacturers to increase the production in the Indian country and continent are made known every week through the press. Just in September 2012, Toyota has confirmed its intention to establish its third manufacturing plant in India, where it had just allocated a $127 million Euro investment to enlarge its factory in Bangalore, having its manufacturing go from 210,000 to 300,000 units per year.

India factories are mainly used as base for manufacturing and exportation towards several emerging Countries, in Asia and in Africa. However, what makes India an automotive market with a remarkable outlook are the production of growth in its domestic market.

Russia is one of the new leading automotive markets; it is shown their growing growth over these years and it is going to reach a car sale equal to 4,000,000 per year, before long. Over a couple of years, Russia is going to become the leading European market, actually covering Germany too.

All major global car manufacturers are particularly investing in Russia and have carried out joint ventures with local manufacturers and/or new firms, in order to be able to manufacture in the area.

Nowadays, a large number of car clusters are already present in Russia and they are located especially in the regions of Saint Petersburg, Moscow, Izhevsk, Nizhni Novgorod, Togliatti, Chelyabinsk, Naberezhnye Chelny, Ulan-Ude, Taganrog and Vladivostok.

As a consequence, all major manufacturers, both at global level and Russian, producing mechanical components have established in the different car clusters and are increasing their manufacturing capability, in order to cover the growing demand of parts and units.

Cannon is well established in the Russian automotive field and has recently provided several finished products for the manufacturing of dashboards, components destined to the sound insulation, items that are molded in dipolepolyamide (DCP01), etc.

We are ready... what about you?

In all these countries showing a simultaneous development, Cannon is present with one or more direct branches, capable of assisting old and new customers in this field.

As we saw at the beginning of this article, every new vehicle produced will need a set of six cushions molded with Polyurethane foam. Someone will have to produce them!

We are ready, what about you? If you think you can manufacture some, let’s talk about it! Whatever the size of your firm is, you are always welcome at Cannon!

New dosing units for a new generation of reactive chemicals

Multiple simultaneous injections in the same mold are now possible, using the twin machines connected to multiple mixing heads. Progress achieved in mechanics, hydraulics and electronics have allowed Cannon to make very fast-setting mixing heads, that are able to switch from one to another formulation, in a matter of seconds. Now the real challenge is to adapt the whole circuit of components to each supplier and to the needs of the desired formulation at the right pressure and temperature, according to a short time line!

Here again Cannon plays the game, using dedicated electronic controls, fast servomotors and a new generation of stream distributing valves.

This allows to reduce the inertia of the system – especially on large plants with very long pipelines – to obtain a repetitively repeatable result in terms of injection weight, chemical’s ratio and mixing precision.

Last but not least, let us remind here the important developments run by Cannon in the field of measuring and mixing Epoxy resins, both in low-pressure injection and high-pressure injection methods, to manufacture composite parts for the Aerospace, Automotive and Transportation, Sport and Leisure fields.

Various applications, with a common target: energy production, energy saving, energy efficiency – three tunes played in harmony by the various Cannon companies, all together, to make a better world!
Automotive news from Russia: new or refurbished? Both solutions are available @ Cannon!

New and refurbished Cannon plants have been recently supplied to Tier One Russian manufacturers of a wide range of car interior components.

Cannon Eurasia – the Russian Company who distributes and services the CSI the whole range of products supplied by the Cannon Group – is currently installing numerous plants to the manufacturers of automotive interior parts.

Among these a special mention should be made for the new and refurbished equipment that an important European Tier One supplier ordered to Cannon.

Two different factories have been involved in this development project recently implemented by the Russian branch of the Company.

The Customer manufactures a wide range of automotive interior components and needed to extend their production capacity, with a special attention towards the investment budget constraints and the search for flexible solutions.

Being already the supplier of international car makers, they had a number of production tools – molds and mould carriages, purchased in Germany a few years ago – that needed modernization and updating to manufacture new series of instrument panels and floor carpets for larger vehicles.

Cannon was consulted to quote both the refurbishing of existing equipment and the supply of new one. More than five years of experience in installation and re-location of important manufacturing plants allowed Cannon to help several customers around the World in saving significant amounts of money AND avoiding a lot of troubles when replacing their existing equipment.

The request was duly evaluated and a suitable solution was found for the two different series of products.

**Foam-backed floor carpets**

This projects involved the design of a modular solution, able to start with a limited number of parts and evolve within one-two years towards a truly manufacturing capacity. Therefore a moulding line, based on fixed polymerisation presses and one moving preformer for the heavy layers, was suggested.

The concept uses a well-known Cannon solution based on book-opening presses that receive an heavy layer drapes from an IR-heated preformer working nearby.

The hot layer is automatically deeped in an open mould, while two operators assist during this phase of the process to adapt the contours of the drape to the outer edges of the die.

Vacuum is applied to the lower mould half, so that the preformed layer perfectly adheres to its surface.

Immediately after, the press is closed and flexible Polyurethane foam is injected and a Cannon PFL 24 mixing head, fed by a Cannon 60 Servo high pressure metering unit mounted on a mezzanine, above the press. The foam fills the wide mould cavity with a layer of material that can be easily adapted to the geometry of the vehicle’s floor: more sound-insulating material is deposited in the deeper parts, and softer and lower vibrations are known to come from, while a thinner layer can be applied where this is less stringent.

This allows for a substantial saving in chemicals and weight. At the end of the process, the press automatically opens, with the second movement of the upper mould, feed-open with an angle of 45° – to allow for an easy disengagement of the part from the mould cavity.

Part-to-part cycle is around three minutes.

The foamated carpets are then trimmed to perfect size in a nearby punching station.

The first step of this installation was completed when one polymerization press was installed under the mezzanine holding the preforming unit, and the preformer was set in position.

A refurbished carpet foam-backing plant

The ancillary equipment needed for the process – such as the vacuum pump, the release agent dispensing station, a semi-automatic mould-changing station and an in-line 1kg storage and loading system for the chemicals – was also installed at this time.

**Foam-backed Instrument Panels**

Both the Russian plants of this Customer have been involved in the refurbishing of existing mould carriers, in different times. The first factory started in 2011, supplying to Cannon a few old presses that needed modernization. The equipment was completely stripped down to its basic elements, sanding and repainted, fitted with new hydraulic and electrical controls, a new safety system and complete thermal conditioning for the moulds.

A mezzanine structure and side walls built, to host one Cannon A60 Servo metering unit and the mould carriers. The first refurbished press was set in place, in a foaming area able – at the project’s completion – to host four equal foaming stations.

The process here involves the manual positioning in mould of a thermostored skin – held firmly in place by vacuum – and of several inserts, followed by closed-mould injection of impact-absorbing semi-rigid Polyurethane foam. One Cannon PFL 14 mixing head is used in this case, fitted in the middle of the upper mould.

The initial step of the project was executed in the first plant, followed by the second press, second location and a third one to be made.

The layout allows for a future doubling of the foaming stations, adding two more refurbished presses to the ones already supplied.

**New or refurbished? Easy decision, with Cannon!**

When confronted with the decision of redeveloping an existing foaming plant of investing in a new one, each manufacturer is always debated between the vision of a potential saving and the certainty of a lot of headaches.

Cannon can help.

The story mentioned above tells of a Customer that, in one case, recovered an existing good foaming line and had it in production, in an even better execution, in a very short time and at a fraction of the cost of a new one! And that, in another case, went for new equipment, to face a new request from his customers.

Cannon did it well for them: why couldn’t we do it for you as well?

Cavity Filling for a Wide Variety of Applications

Automotive cavity filling applications are on the rise. Last year more auto makers decided to inject semi-flexible Polyurethane foam into the body cavities of new cars to obtain better sound insulation for their vehicle’s interiors.

To answer the needs of this specific sector, Cannon has developed specialized metering and mixing equipment suited for worldwide use. Some recent successful launches of this equipment have been with AUDI in China and Chrysler in North America.

We have reported in several previous editions of the Cannon News about the ongoing developments done by Cannon in the field of cavity filling, especially in the USA.

A specific mixing head, the three-component TR-73, proved at that time to be an ideal mixing tool for the different types of formulations (Noise, Vibration & Harshness - NVH foam) that are used in this market.

A conventional 2:1 ratio foam was quite common among various chemical suppliers, while a special 2:4:1 ratio formulation had been developed by how to provide not only sound deadening benefits but had additional features such as resistance to corrosion from moisture since a special machine was designed as a variable ratio machine – so far, a unique feature among the manufacturers of this special equipment. It can be used with all types of foams.

A 2:4:1 ratio is effective with the chemical and the lowest flow. An high-pressure diaphragm pumps with the proper gearbox guarantees a consistent flow of chemicals to tanks. Million of cavities have been injected so far and the trend is on the rise. Since auto makers are realizing the advantage of a foam system that insulates the passenger compartment from engine and road noises, they are employing this solution over a wide range of models. Their continuing request for light weight brings the manufacturer to use thinner and stronger steel for the chassis, therefore the cavities to be filled are getting smaller. Short of less than 20g are more and more common. Cannon machine is able to reach such small shots and guarantees a consistent filling.

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

The new handy LN 4 head for Cavity Filling

The new mixing head performs well with all types of chemical systems used in this sector and works well either mounted on a robot in a highly automated environment as seen at Chrysler, or in a more manual application like at Audi in China.

Audi’s use of Cannon equipment in China

German cars made in Changchun, Jilin Province, China by the Audi-Volkswagen Group at their giant First Automotive Works factory are running around the clock all year long using cavity filling foams in their 26 model.

A complete Canon plant for this application was delivered during 2011 and included a bulk storage system (comprised of stainless steel) serving two Cannon C50 dosing machines and four LN 4 mixing heads. All associated piping, supports, automatic drum-filling equipment, all safeties and controls completed the scope of supply.
Clear Coating evolution from Cannon

The application of a transparent, glossy, hard layer of Polyurethane over natural or synthetic materials appeals to the makers of car and boat interiors, furniture and aesthetic parts. The high-gloss transparent finish that this coating technology imparts a "luxury feel" to the moulded piece, allowing for the automated production of desirable decorations for interior trim, replacing manual painting.

A demanding formulation

The metering, mixing and injection concept required for the design of a solution suitable for the Clear Coating technology had to comply with the specific requirements demanded by this process.

High-Viscosity Materials: The typical viscosity of a Clear Coating formulation ranges around 25-50,000 mPa.s. Both components look like thick honey, making their handling a very difficult task until the viscosity can be reduced by proper heating.

Unbalanced Ratios: As a further complication, the stoichiometric ratio at which they must be mixed is quite imbalanced, with typical formulations working in a range between 170/100 and 300/100 (Isoc/Polyol). This increases the difficulty in obtaining good mixing with a conventional mixing head.

Thorough Degassing: The main requirement for a Clear Coating part is its high-gloss, transparency, and visibility. What is important to notice is the substance, the shiny feeling of a running technology. The protective coating must be there, but invisible. This characteristic can be spoiled by the presence of air dissolved in the formulation's components. Small air entrapments or "clouds" of microscopic air bubbles may be permitted in these objects, therefore, the chemicals must be degassed accurately before use.

Fast Reacting Formulations: These chemicals are characterized by a high reactivity, in order to provide the highest mechanical resistance (to most abrasions) and the clearest final aspect. This feature demands short injection times, especially during the head closing phase that requires fast-setting mixing heads.

Complete Mould Filling: Over-moulding natural materials, which are by their own nature irregular and very sensitive to external factors (humidity, temperature, etc.) complicates the moulding process, since the quantity of chemicals that must be injected at each shot cannot be predetermined.

Dedicated equipment

A number of solutions were developed that allowed for the design of a suitable prototype machine.

Heating Circuits: The most suitable solution for reducing the component's high viscosity is heat.

The chemicals are formulated to withstand temperatures up to 85-90 °C, therefore the machine has been designed so that the liquids are continuously kept at temperatures between 60 and 80 °C. This ensures that the components line is maintained at or near this temperature, without exception and cold spots. An external hot oil heater supplies a continuous flow of thermalised fluid to avoid temperature spikes. This is ensured for two major uses: chemical components conditioning, and supply of heat to an insulated box that contains the dispensing unit. This box, built in two mirrored halves, stands between the component task and the exit of the pipes conducting the fluid to the mixing head. It contains a heated oil-air heat exchanger that uniformly distributes the temperature to the various required parts of the machine. The components tank is automatically fed with fresh liquid when needed. The drums are pre-heated using a dedicated oven outside the machine, or the materials can be fed as they are, using a special transfer pump designed for handling extremely viscous materials, that is also housed in the heated box.

The temperature conditioning of the chemical's tank is obtained by surrounding them with a hot oil jacket and by providing continuous motion of the oils using motorized stirrers. When the metered liquids leave the heated box, they expand inside the mixing head through a sequence of rigid and flexible pipes, electronically controlled to maintain the desired temperature. The mixing head is fully heated. Therefore, the liquid components never have the opportunity to cool down, increasing their viscosity or decreasing their fluidity in closed mould.

Degassing System: A thorough degassing is required to eliminate any trace of gas from the chemicals. This function is performed inline, directly in the component tank. A vacuum pump, fitted on the same frame under the storage section of the machine, provides a constant level of negative pressure.

Double Pumps System: The chemicals are continuously recirculated in a heated circuit. A vacuum pump, fitted on the same frame under the storage section of the machine, provides a constant level of negative pressure. The feeding line sends the material to the oil-heated heat exchanger through a low-pressure filter, and then to an axial piston-type high-pressure metering pump. This has been designed by (and exclusively manufactured for) Cannon with specific details aimed at the most linear metering response when pressure changes. Its efficiency curve remains very constant when working; the lowest and at the highest limits of the pump's working range. A magnetic joint avoids any contact of the chemical component with the component shaft, avoiding leakage.

When the two liquid components flow towards the mixing head, they are re-entrained in high pressure through the injection nozzle and -- when all the parameters are in accordance with the set ones -- the mixing head's plunger opens and the injection starts.

A dedicated solution for the flow control

A typical recipe for the Clear Coating technology demands a mixture of Polyol and Isoc, up to 7 or 9 of Isoc. A dedicated flow control device has been designed and made by Cannon to equally divide the flow of Isoc into two of the three streams feeding the mixing head. A mass-flow sensor measures the flow rate of each component and feeds this information to the control computer. Should any deviation from the set value occur, the system works immediately and corrects the metering pump's output by means of a frequency variation from the inverter controlling the pump's electric motor.

A new mixing head for Clear Coating

This high-index formulation would normally be handled with difficulty with a conventional two-component "L" shaped mixing head. A new version of a Cannon 90/70 head has been designed to handle the specific requirements of those fast-reacting, high-viscosity unbalanced-ratio formulations. The Cannon LN 2/7 head features three component lines feeding a very small mixing chamber.

The high-pressure recirculation of the components occurs through the mixing head and the injectors, therefore all of the liquid is kept in motion throughout the circuit at constant temperature and pressure. Heating blocks are mounted on each component section, to keep the last part of the components circuit at the same temperature as the rest of the circuit. Pressure and temperature of each component are measured in the head, and the relevant signals are sent to the computerized control to allow for closed-loop regulation. The reduced diameter of the mixing chamber, 7 mm, and the unique orientation of the three high velocity jets of liquid provides a mixing efficiency that has been evaluated to be far superior than that obtained with a conventional "L"-shaped two-component or three-component head. The short stroke of the head's plunger allows (30 mm) makes it possible for a very reduced volume of liquid (approx. 1 cc) to be “pushed” through the injection hole at the end of a moulding cycle.

Optimum results

Cannon has supplied several complete systems for Clear Coating technology to a number of part manufacturers that are supplying major car makers in America, Europe and Japan. The complete set of tools required by this complex technology (chemical storage, metering unit, mixing head, mould carriers, moulds, robotization system, controls and safety system) is supplied by a single interface, optimizing the product development and the industrial manufacturing process.

R&D continues

Interesting developments for new products are currently underway with every customer, but considering these are still covered by secrecy agreements, the details cannot be unveiled at this time. In its central R&D center in Carano Pertusella, near Milano, Italy, Cannon offers permanent, dedicated equipment where the interested customers, material suppliers and end-use customers of Clear Coating application can, with the support of a trained staff, start their project with the desired efficiency and short-time-to-market. The availability and the integration of different skills (viscous material handling, high-temperature injection, superior mixing efficiency with unbalanced ratio formulations, mould making and mould carriers technology, process control) provided by a single source is a guarantee for the smooth and cost-effective industrialization of a sophisticated moulding process.
Maersk buy again from Cannon

An extraordinary engineering and logistic effort is required to deliver this large foaming plant for insulated reefer: Cannon Ergos coordinates the combined efforts of four Cannon Group Units.

Maersk Container Industry, a business unit in the A.P. Moller - Maersk Group, has selected again the Cannon Group for the supply of a complete foaming plant for their reefer, the temperature-controlled containers used to transport frozen or refrigerated goods. The equipment will be installed in Maersk Container Industry (MCI) new factory in San Antonio, Chile. This will be the first reefer manufacturing facility in some time to be located outside of China and the first in Latin America. Scheduled to open in 2014, the new plant will have an annual capacity of 40,000 40ft cube reefer and Star Cool reefer machines.

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The reasons for choosing Cannon for this major contract were mainly linked with our experience in the field of automated production of extra-large insulated panels and the capacity of assembling a team of specialists able to provide quick answers and innovative solutions for Maersk’s new factory expectations. Cannon will be the single interface for the whole supply, that will be manufactured by several Group Units,” said Marco Volpato, MD of the Cannon Group.

Scheduled for start-up in 2014, the plant will be the first recent reefer manufacturing facility to be located outside of China and the first in Latin America. All volume of reefer manufacturing capacity has been so far located in China, where MCI operates a plant in QinGdao.

A massive engineering effort

The foaming equipment will cover an area of 4,300 m². Cannon Ergos – the Cannon Group company in charge of turn-key plants – coordinates for this project the activity of four Cannon Group Units.

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Manni of Mantova, Italy, supplies press technology. Nine large polymerisation presses – six of which will be used for the manufacture of large and small sandwich panels made with foam steel, rigid PUR, rigid sheet. The presses are manufactured with a concept that allows for the future implementation of new foaming technologies and of further polymerisation equipment, to enhance the plant volume output and the quality of the foamed panels.

Part of the large polymerisation presses is in assembly phase in Cannon Ergos new hall

The plant – that will operate in San Antonio, the largest Chilean port in terms of freight handled and the busiest port in the western coast of South America, 110 km west of Santiago – is expected to create 2,500 jobs in and around the town. The city of San Antonio is ideally located in the largest reefer-exporting region in Chile and also in close proximity to the other container busiest terminal, Valparaiso Port. The core of the plant will be the Polysiloxane injection plant, where all the foam-imbibed components of the box reefer – side walls, roof, floor, front, doors and corners – will be manufactured at a rate of one complete box assembled every 5 minutes.

For this large contract MCI launched a bid among the leading suppliers of this type of equipment. Cannon, that back in the 1990’s had supplied a similar plant to Maersk in Tuglavl, Denmark, was finally selected to provide also this large foaming complex.

Logistics will be fundamental

It goes without saying that such a massive project requires accurate planning and perfect coordination. Cannon – in addition to the design all, construction and assembly tasks – took charge of all the shipment and logistic aspect of the supply, starting from the selection of the new Chilean site that MCI will be building in San Antonio.

In a well-scheduled sequence of shipments, totally 900 containers will be shipped to Chile;

Foam will be injected manually on the long side of the panels, and all the press will be flanked by flanking and winding equipment that will assemble the panels on two different sites, the first in China and the second in Chile.

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South America, a strategic positioning

Total investment in the project is put at US$720M. According to MCI, the new factory will help correct the reefer trade imbalance that disfavour exports of fresh produce, fish and meat from western South America. The new factory will produce 12,000 high-tech reefer units a year. The company estimates that the new factory will generate 1,500 jobs in the local community.

Cannon, a strategic partner

The acquisition of the MCI San Antonio contract represents for Cannon a unique opportunity to confirm their ability to administer complex projects, challenging installations, international presence. Only the networked structure that Cannon have created in the past has allowed complex jobs like this, without affecting the regular flow of orders coming from the rest of the world. Cannon will deliver in time this project in order to meet the required market expectations.

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Cannon, your reliable partner for difficult jobs!
Cannon proudly announce another order from China for a mass-production Polyurethane foaming plant for the production of refrigerators manufactured with Cannon V.A.I. technology. Haier, the world leader in cold appliances, placed their second order for one 6-foam line, for their Qingdao factory.

Haier's repeat purchase of a Cannon Vacuum Assisted Injection (V.A.I.) foaming equipment reinforces the commercial success of the innovative PASCAL™ Technology that was launched in 2011.

By applying vacuum into the cavity mould cavity where a domestic refrigerator is filled with rigid Polyurethane, the V.A.I. technology facilitates the expansion of the foam in the cavity, providing substantial benefits that convinced Haier to confirm their trust in this Cannon solution and repeat their first order.

By increasing productivity per foaming station thanks to the use of highly reactive formulations that provide a faster demoulding time, a 3x faster curing cycle is now the reference for a wall thickness of up to 12 cm, using the appropriate Polyurethane chemical formulation by The Dow Chemical Company (Dow) for this technology.

- Optimized distribution of foam throughout the whole cavity: a uniform density of 43 +/- 1 kg/m³ is consistently achieved.
- Substantial foam savings: up to 56% savings in PUR chemicals are regularly obtained in their first tuned plant.
- Optimum insulation performances: the foam Lamba value is as low as 0.86 +/- 1/m²K.

A tight cooperation with Dow allowed for the joint-development of PASCAL™ technology, an innovative technological solution that draws new frontiers in the production of refrigerators.

The Polyurethane chemistry developed by Dow for this technology reduces the foam thermal conductivity to a new reference level and allows for a significantly shorter polymerization time.

The first industrial plant working with the Cannon V.A.I. technology, delivered to Haier Chongqing (China) plant, has been producing 6~8~12 refrigerators since 2011. The second plant, destined to the Yellow Island, Qingdao factory, will make their high-class side-by-side model.

Further curing jigs, aligned in two 8-foam rows, will once again be supplied, providing an output capacity of four foamed cabinets per minute.

Two Cannon A-System metering units, connected to four Cannon S24x mixing heads, will precisely feed the amount of foam required by each cabinet. A centralised vacuum station will provide in each mould the negative pressure required at a constant level for the whole period of the chemical injection and of the foam's expansion. The delivery and start-up of the new plant is foreseen for the end of 2013.

Another Cannon V.A.I. plant is in operation in China since September 2012 at Melling's Hefei factory. The new line of Melling's ATHENA models, side-by-side "Intelligent refrigerators" available in a variety of "flavours" and colours, was launched on November 20, 2012 in Peking, with a dedicated presentation to 1,000 Chinese dealers and distributors, with more than 100 media representatives witnessing the event.

The assembly phase of the third Cannon foaming plant using the Vacuum Assisted Injection technology.

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Making fridges in the desert

Egypt must be a dreamland for a refrigerator maker: the market for a domestic cold storage is definitely there, in millions of homes! Indeed, many Egyptian households have no refrigerators, and many still have irregular supply of electricity at home, but a large percentage of the population lives in big cities and already has a refrigerator, or will have one soon. The country has manufactured domestic fridges for many years, in sizes and shapes adapted to the local housing and shopping habits. The multinational Electrolux Group is present in Egypt with a factory equipped with state-of-art machinery and manufacturing methods.

Their next foaming factory will come from Italy, made by Cannon Ergo, a long-time customer of Cannon. The new factory will produce the next generation of advanced technical solutions, with a design very similar to that successfully operating in their Hungarian factory since 2006.

Multiple injection for cabinets

In order to obtain the best mechanical and insulation characteristics from their quickly-reacting foam formulation, they required a high-output injection solution: this will allow for a faster foam filling phase, so that the cabinet will be full of expanded, stable foam in less than 45 seconds.

A specific foaming technique is used to achieve this ambitious goal: four FPL.SR 24 mixing heads, fed by two Cannon Pentas twin 200, double dosing units, will simultaneously inject the formulation in the two lateral walls of the fridge, using injection holes drilled on the back of the cabinet.

Ten foaming fixtures, set up in one row and two double moulds carried along their shorter side to perform in sequence the injection of foam in the cabinet.

The Pentane-blown formulation is prepared with a Pentas EasyFroth in-line premixing unit, fed by a nearby underground storage where all the chemicals are kept at a constant temperature.

Twenty four moulds, adjustable to fit all the sizes and models specified by the customer, and with complete temperature conditioning line for the water-heated moulds are also within the scope of supply for this innovative cabinet line.

A sophisticated solution for doors

The doors for this new line of refrigerators will be foamed in a highly-customised version of the concept of a pallet transfer line, this equipment is composed by four linear transfer stages where the mould carriers - each of them containing two foaming tools for the doors of a complete fridge - proceed in a step-by-step movement. A peculiar two-story design allows for the best use of the existing floor space, and guarantees high productivity with a 32-second cycle time for each pair of doors.

Also for this part of the factory a solution with two FPL.SR 24 mixing heads, fed by one Cannon Pentas twin 20, double dosing unit, has been selected to guarantee quick open-mould pouring and high-quality foam cell structure. The door line will be supplied with 28 moulds, sufficient to cover all the desired sizes and models.
Cannon have designed the SR mixing head as the evolution of the classic FPL model. The new head incorporates several significant improvements in terms of laminarity of the flow, reliability, cleaning and maintenance.

Today's faster formulations require higher outputs while maintaining a laminar flow during the closed-mould injection or open-mould pouring phase. In order to obtain this result, Cannon Afrom has optimised the design of the mixing chamber and of the dispensing nozzle of its "L-shaped" family of mixing heads, still keeping their traditional compact dimensions. The new FPL SR Series has been specifically conceived for those refrigerator manufacturers wishing to upgrade their current foaming plants, in order to use fast-reacting foams by using machines and mixing heads with a higher output. Most of them are confronted with a basic problem: hundreds of existing moulds cannot be easily modified to accommodate the larger injection nozzles that are typical of higher output machines. These are not designed by the existing geometries and shapes of their plunger, but they need the component output, avoiding the generation of more turbulence, which creates air entrapments and voids in the insulation layer.

This new head FPL SR Series is being manufactured in all the diameters (18, 24 and 26 mm) required by the refrigerator manufacturers running conventional foaming jigs and plants and it is widely and successfully used worldwide.

The FPL SR features a longer injection nozzle, extended, in average, by 90% over the current version. The newest model, FPL SR 25, is now available for those manufacturers using foaming moulds already fitted with this size of injection hole. Its total output with laminar flow at the nozzle, can reach 1,800 g/s under standard processing conditions.

For lower output applications (open mold foamed refrigerator doors and small moulded items), a version having a 18 mm diameter is also available.

Reliable
To improve the reliability on the long-term use, the potential head's sticking problems created by modern high-Isoocyanate-index formulations have been solved using a more efficient design of the self-cleaning plunger. New designed as a "scrapcer" - a double-diameter cylinder whose only last part is in contact with the walls of the discharge duct - the new rod provides a very efficient removal of the smallest traces of foam from the head at the end of each shot. The small surface of plunger in contact with the duct significantly reduces the heat generated by the friction of the parts, thus eliminating the main cause of sticking. A new patented solution has also solved the problem caused by the possible leakage of low-viscosity chemicals (usually Isoocyanate) from the mixing chamber when the head is closed: a groove is carved in the circular wall that surrounds the last millimetres of the mixing chamber's rod, and is filled with a resin that self-regenerates during the use of the head. At each shot, a thin film of PUR is deposited on the existing resin seal that fills the groove, providing a tight barrier against any possible leakage of fluids into the discharge duct.

Easier cleaning
When in operation, a small amount of hardened foam might accumulate on the upper portion of the cleaning plunger, leading to the sealing pack. In order to simplify the periodic cleaning of this part of its heads, Cannon Afrlos improved the plunger's lubrication system and designed a more generous space between the discharge duct and the hydraulic drive of the self-cleaning plunger.

Simplified service
Maintenance operations have been simplified in the new FPL SR Series: a new kit of self-cleaning rod and delivery bushing is now available for those Cannon locations providing a heads repair service, allowing them to replace a worn-out plunger in a much faster and economic way.

The advantages obtained with the above mentioned technical improvements are now progressively extended to the whole range of Cannon FPL mixing heads, fostering another long season of success, in many different industrial applications, for this series, a fundamental milestone of the Polyurethane mixing technology.

Don't run any risks, purchase the original one: buy a Cannon mixhead!

**Cannon JL, a revolution in PUR mixing!**

Roughly 100 of these sophisticated devices are today in operation around the World, bringing a true revolution into the PUR mixing technology. Designed without the conventional jets used to regulate the injection pressure of the chemical components, the patented Cannon JL mixing head provides a unique opportunity to those manufacturers investing in a new foaming plant. Their moulds and jigs can be designed with a higher customisation level, thanks to the longer nose of this device.

The JL saves foam! The speed-based mixing concept allows for the use of lower injection pressures. This provides a better exploitation of the chemical recipe and a more efficient use of the blowing agent, that performs a better foam-expanding action. As a consequence, mould cavities are perfectly filled with a lower "minimum fill" density. Up to 5% savings have been measured by several industrial users. The cell structure is improved, obtaining a finer average size, a uniform rounded shape, thicker walls, uniformity between the cell's walls and pillars: in simple words, a better insulating foam.

All this is confirmed by the Creep Test that measures the alteration of a material after it has been put through different forms of stress: independent tests showed that there was no Creep shrinking of the foam, at standard testing conditions. An interesting aspect of this head concerns the possibility of varying the length of the trajectory along the mould through which the liquid formulation goes after leaving the nozzle, by changing the output during two subsequent shots, the laminar flow of Polyurethane starts reaching the farther part of the mould cavity at the beginning of the first injection and can progressively be oriented towards the nearer part with the second shot. This longer area of mould that can be wetted with the chemicals - in a multiple sequential injection - allows a better distribution of the rising foam even in a complex mould setting, such as for instance in a multiple-door large refrigerator cabinet or in a very long cavity, such as for a large panel or a long insulated pipe for district heating or Oil&Gas applications.

*Just to quote a recent example, a leading manufacturer of insulated pipes tried the JL in the R&D laboratory of Cannon. At the end of just one day of trials they ordered this head for their new Cannon foaming equipment: the results - in terms of foam quality and of minimum density obtained to fill their large pipes, compared with their current foaming method - were so evident and superior that the head could be paid back in six-eight months of activity.*

An optimised design
Since its introduction, in 2007, the JL head has been refined, optimised, simplified. As a quite sophisticated piece of precision mechanics, this head is today available in three sizes (injection nose external diameter of 18, 24 and 32 mm) and new important developments are currently on the drawing board in Cannon Afrlos R&D department for a lower throughput model.

The use of this innovative device with flexible moulded foams is now under evaluation for those applications requiring high-output, laminar flow, superior foam structure.

**Advantages**

- Significant foam savings, thanks to its higher mixing efficiency and lower working pressures
- Optimum mixing and very laminar injection at a very high rate, in a range level, going from 200 to 2,600 g/s, according to the head size.
- Possibility to reach remote injection holes, thanks to the long injection nozzle (1200 mm, according to the model) and a sleek head's exterior design.
- Possibility to vary the foam's output with a multiple sequential injection, in order to wet a very long portion of the mould cavity during the deposition of the foam.
- Better performances using low-boiling point blowing agents: its peculiar shape avoids the "flash out" effect, typical of many other heads.

For the JL range Cannon Afrlos provides its customers with a special installation and training service, in order to let them fully exploit the revolutionary potential of this new mixing concept.

Be part of a revolution: try a Cannon JL mixing head!
Montreal Multilateral Protocol: an ongoing project

The second step of projects aiming at the acceleration of the phase-out program of ODS (Ozone Depleting Substances) started in 2010. Several Implementing Agencies – The World Bank, UNDP, UNEP and UNIDO, each of them specialising in a segment of market – have been appointed by the Montreal Multilateral Fund (MMF) to administrate the financing of local projects with the same methods used several years before for the first step. It is foreseen that the funding will reach its peak point around 2015, working on projects that are being presented right now. The total available funds will probably reach the US$ 2 Bn level.

Some background

The Montreal Protocol on Substances that Deplete the Ozone Layer in the earth’s stratosphere is an international treaty designed to protect the Ozone Layer by phasing out the production of numerous substances believed to be responsible for its depletion. The treaty entered into force on 1 January 1989 and, since then, it has undergone several changes.

It was believed that if the international agreement was adhered to, the Ozone layer would recover by 2050. Due to its widespread adoption and implementation, it has been ratified by 197 states and the European Union – it was hailed as an example of successful international cooperation.

Several Implementing Agencies (The World Bank, UNDP, UNEP and UNIDO – each of them specialising in a segment of market) were charged by the MMF for the administration of the financing of local projects with the same methods used several years before for the first step.

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A number of Implementing Agencies were involved in the administration of the funds collected by the Multilateral Fund among the most wealthy countries to help the interested portion (manufacturers of these substances) to comply with the reductions and to adapt to the new market conditions. The first phase of the implementation ended in 2004 with the elimination of CFCS (Chloro Fluoro Carbons) and other non-Chlorinated ODS.

The replacement of the CFCS took place in several countries – mostly those under US influence – by utilizing alternative HCFCs (Hydro Chloro Fluoro Carbons) substances. The interested governments agreed to proceed further, eliminating these HCFCs with even less harmful chemical in due time (by 2040), remaining to the international funds and subsidising these projects with domestic resources.

Kyoto plus Montreal effect

Unfortunately these HCFCs, much less harmful for the Ozone layer, proved to have a quite significant Green House Effect, heavily affecting the planet’s global warming.

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) – an international treaty that sets binding obligations on industrialised countries to reduce emissions of high-GWP (Global Warming Potential) gases with the goal of preventing “dangerous” human-induced interference of the climate system – urged the parties involved in the Montreal Protocol to ban also these HCFCs much faster than originally foreseen in their international treaty.

The 14th Meeting of the Parties to the Montreal Protocol ratified in 2007, in Montreal, the early elimination of all HCFCs from all industrial countries within 2030, twenty years faster than originally foreseen. In order to achieve this challenging goal the multilateral funding scheme was revived also for the countries that originally agreed to self-finance the switch over from HCFCs.

Project funding restarted

The second step of projects aiming at the elimination of these GWP gases was funded in 2010. Several Implementing Agencies (The World Bank, UNDP, UNEP and UNIDO – each of them specialising in a segment of market) were charged by the MMF for the administration of the financing of local projects with the same methods used several years before for the first step.

It is foreseen that the funding will reach its peak point around 2015, working on projects that are being presented right now. The total available funds will probably reach the US$ 2 Bn level, made available for the conversion of industrial sectors:

- Production of (HCFCs) – Foaming (Blowing Agents) – Refrigeration (Compressors) – Air Conditioning and Refrigeration.
- Pharmaceutical: Disposal of substances in storage, gas contained in products, etc.

Cannon clients operating in any Polyurethane foaming field and still using HCFCs as blowing agents are now confronted with a great opportunity – the financing scheme – and with great challenges – the capacity to obtain the funds!

Cannon is here to help in this challenging task.

Manholes in PU: KIO widens their offer

Cannon InterWet provided to POLIECO, Italy, the solution to replace conventional cast iron with glass-reinforced Polyurethane in the production of heavy-duty manholes. The series of KIO synthetic manholes is now growing, offering attractive colours and a wider selection of shapes and sizes. Cannon doubled this year their production capacity, and the requests keep flowing in!

The InterWet technology – the co-injection of rigid Polyurethane and chopped glass fiber – features numerous interesting references in several fields of the industry, from transportation to industrial air conditioning.

The products developed by the Italian firm POLIECO stand for their originality and final use: a consolidated leader in the production of large corrugated pipes in Polyethylene, the company is present with sites in Italy, France, Spain, Greece and Slovakia. Four years ago they conceived an interesting diversification from their traditional business, designing a series of round, square and rectangular manholes that are manufactured with a reinforced Polyurethane formula. These innovative products are produced at a very serious daily rate using a complete production cycle supplied by Cannon.

Characterised by a high look and a perfect surface finish, the manholes manufactured under the KIO trade name are moulded in several shapes, dimensions and functions. Conventional flat covers or hole grills can be produced in sizes from 400x400 mm up to 700x700 mm or 800 mm diameter for the round models.

Several advantages characterise these polymeric manholes:

- Lightness, which makes the operations of installation and maintenance easier and safer: the KIO covers weigh 20% less than the cast iron ones!
- Solidity and resistance: a standard model can stand the weight of up to 40 Tons
- Electric Insulation: it protects pedestrians from electrical shock in humid environments and presents little interference with cell phone signals

Work with the experts

The great deal of experience – accumulated by Cannon in actively cooperation in every country that obtained the grants for the industrial conversion – is today available for the old and new Cannon customers willing to upgrade their foaming facilities in accordance with the new environmental rules dictated. Every local Cannon office, coordinated by the central manufacturing centres, has the right know-how for the correct interpretation of the technical specifications defined for financing each type of project.

They can suggest the most convenient solution and the procedures to obtain these public funds. Special machine configurations have been prepared, perfectly matching the stringent limits imposed by the Fund in order to avoid waste of public money and irregular financing procedures.

Contact the nearest Cannon office: more than ever, and especially in this case, Cannon is Your Technology Centre!
Rigid foam laminators: a continuous progress

Quality and performance: this is what Cannon Ergos delivers with their foam laminators, used to produce — with a continuous foaming method — the metal/metal-lined sandwich panels. A consolidated double belt design, with a patented drive that eliminated the polygon effect, is coupled to the most rational dosing group today available on the market. This winning combination provides manufacturing consistency and quality foamed profiles. These are the reasons for a continuing flow of orders from existing and new customers. Their satisfaction is the base for Cannon success.

Rigid foam laminators constitute a relevant share of Cannon Ergos activity. The new company — based in Carrara, central Italy — is in charge of the turnkey plants designed, manufactured and installed on a worldwide basis by the Cannon Group. Their staff of plant specialists — a team of 65 persons — consolidates since 2002 the activities of some former Cannon Divisions (Crist, Foruma, Tecnos and T.C.S.) under one roof, developing dedicated plants mainly for the Refrigerators, Thermal Insulation, Automotive and Aluminium Diecasting markets. New solutions for Polyurethane, Thermoforming, Composites technologies are developed here making a rational use of the existing skills and logistics resources.

A dedicated set of technical solutions

There are reasons for this continuing flow of orders, in a market well supplied by numerous competitors both on the upper- and on the lower-end of the price structure. The availability of superior technical solutions for both the “wet-side” (premixing units, modular multi-component metering units, mixing heads) and the “dry side” (metal profiling, double-belt laminator, cutting device) allowed Cannon to supply repeat orders to a number of loyal customers and to acquire new ones, attracted by the advantages deriving from the use of quality equipment. On the metering and mixing side, Cannon supplies modular dosing units adapted to the use of formulated or multi-component recipes. These plug-in modules can be combined in a number of options, allowing for the use of 4, 6, 8, 10, and 12 components metered separately up to the mixing head, or for the use of pre-blended polyols formulated nearby with a premixing unit or a static mixer.

The design of the components circuit from the tank to the head is extremely rational and allows for a very useful flow of the liquids throughout the whole piping, in spite of difficult ambient conditions such as varying room temperature or possible pressure drops due to low piping design. A lightweight mixing head provides optimal mixing even under a varying output of components, a typical situation that occurs when the thickness of the panel changes during the same shift.

Energy efficiency, an ongoing research

Numerous energy-oriented actions have been implemented in the design of Cannon laminators, in order to reduce the energy required to operate them. Significant results have already been achieved for the heating system of the metal slabs of the conveyor, and further research aims at a total energy saving of 45% versus a conventional line.

More space for sandwich panel plants

Rigid foam laminators are manufactured in a new large hall, inaugurated in December 2012, where there is ample space available for the simultaneous assembly of up to five complete foaming plants. This allowed Cannon Ergos to build, in the past twelve months, a number of new foaming lines for existing and new customers from Germany, Turkey, Russia, Malaysia and Brazil.

A traversing or a fixed mixing head can be used, in accordance with the profiles to be covered with reacting liquid. Nucleation air can be added to the pot on both low- and high-pressure circuits, to enhance the foam distribution in the panel and its overall thermal insulation quality.

A patented drive

The double belt laminator is designed following a well-consolidated experience, using a patented driving method that works on the length of the conveyor rather than on its final section. This mechanism avoids the irregular distribution of the foam due to the “polygonal” effect imparted by conventional motorised drives that work on an axle: the traditionally-used round spur gear — which pulls the chain of metal slabs constituting a conveyor — tends to impart an irregular speed to the whole belt, due to irregular distribution of force in the line along which the section between the gear teeth and the conveyor is directed.

Optimum foam quality derives from the geometry of the lightweight mixing heads designed for this application. By working through a worm-and-gear linear drive, the patented Cannon solution ensures an oscillation-free drive of the conveyor. This system provides several advantages over the conventional one:

- Reduced energy consumption;
- Reduced vibration in the overall system;
- Better distribution of foam on the length of the panel, due to an absolutely constant speed of the conveyor during the liquid laydown operation.

A patented drive operates all Cannon foam laminators, providing numerous advantages.

Quality and performance characterize Cannon sandwich panel lines

An international success story

Repeat orders have been secured with a major Russian sandwich panels producer, that operates now in different parts of the country with three Cannon laminators and has seen their business grow significantly. Same number of lines for a Turkish manufacturer that started from zero his activity four years ago, to supply domestic and Middle East markets with sandwich panels for industrial buildings: they are running with three 24-m long laminators, five-component metering machines, Pentane-blown formulation, oscillating head with different.

A 36-meter laminator has been supplied for the new factory that a European firm, that already owns non-Cannon continuous plants, installed in Germany. A special three-wheels panel saw allows for faster cutting of customised panels and for overlapping. A significant reference for Cannon, both for the complexity of the supplied solutions and for the location, rich of highly qualified competitors.

Two more plants have been delivered this year to Russia, to different new customers, to confirm the high level of penetration that Cannon Ergas has achieved in this market. Their commercial and local technical service strength is well appreciated by the local industry.

Outside Europe things are also progressing steadily. An important cooperation agreement has been signed with the Indian group of Finsheba, near São Paulo in Brazil. Well-known manufacturers of metal profiling equipment (transverse and longitudinal cutting lines, forming machines, tube cutting lines etc.), with a vast presence in South America and a long experience in the field, Maranď (www.gropomarandão.com.br) and Cannon will jointly supply turn-key sandwich panel lines, complete of all the required components from cooling units to the finished panels storage. This agreement allows Cannon to have a presence in Brazil with a strong local support, both technically and logistically, able to overcome the import difficulties that still characterise the country. As a first practical fruit of this cooperation, a foaming plant was commissioned to Cannon: featuring a 24-m long conveyor feed by a 4-component dosing unit, the plant will be delivered this year in the state of São Paulo.

In the Far East Asia region, Cannon Far East has secured an order from a new panel manufacturer based in Malaysia. This metal/metal foaming line will be in operation by the end of 2013. By sourcing the metal profile locally they were able to save some money and invest it in a Cannon line, which is definitely more expensive than those made in Asia, but brings a number of technical advantages that will speed up the payback time and provide higher return margins on the medium term.

Once again, quality awareness and local service won over a cheaper price: this message, coming from a Far East country, is encouraging for the suppliers of quality equipment.

Several foam laminators are currently in assembly phase at Cannon Ergas in Italy.
A new Cannon-Manni solution for the flexible production of very large building panels

The request for large foam-insulated sandwich panels is on the rise in Europe, and Polyurethane's characteristics perfectly meet the processing difficulties linked with these huge products. A big Cannon - Manni foaming plant has just been delivered in Europe to produce very large building panels in a "just in time" sequence, according to the method used to assemble the final building. Sized up to 20 m long and 4.2 m wide, these are produced by the expansion of the propylene in one shot without any separation or compartments inside the foamed cavity.

Featuring two thin steel facings on both larger sides and a wooden frame around, these wide panels are characterized by the fact that the wood beams, about 3 m long, and are not fixed, glued or nailed to the facing sheets. The pressure of the foam from the core keeps them in place at the edge of the panel, against the side shoulders of the mould. A dimensional accuracy better than 1 mm is requested for the finished panel.

A wide product mix

The requested product mix is quite vast: wall and roof panels of different dimensions are mixed during production. There are about 100 lengths, each in 10 different widths, for the walls, while the roofs are made in about 80 lengths, each in 2 widths. When the shorter panels are produced, up to four of them are laid side-by-side on the same press plate. Provision must also be made to occasionally produce tailor-made sizes. The wall panels are flat, with some architectural design for the outside of the building, while the roof panels are of the pitched roof type and the outside facing is a trap ezoidal commercial sheet. Special moulds, that can be removed easily when switching mode on the same plate, are necessary. It is also well known that commercial facing sheets are not at all accurate (discrepancies of 5 mm are not an exception) and this inaccuracy is cumulative over the 20 m length. The moulds must also compensate for these defects.

Two types of PUR foam can be used, a standard type and a fire resistant one, that need a pour-in-place production technique: an open-mould pouring system is mandatory. All the moulds obviously made the design of side moulds and setting tools a nightmare.

The largest Manni press ever built

The press, an open-mould type with platens of 20,000 x 4,000 mm, is the largest ever built by Manni in their long history. It has one fixed upper plate with vacuum suckers to load in advance the upper sheet of the panel. Pour extractable motorized panels are used as respectively service trolley to load the upper sheet, one trolley dedicated for wall panels, one for roof panel and one flexible that can be used for both types. All the platens are water-heated, inside as outside the press, for a precise temperature control. A trolley, with a zero-weight balance system and a vacuum frame, runs over the platens to allow for a quick change of moulds. To allow for the panel's demoulding an hydraulic movable system, giving a 50 mm vertical stroke, is used. The complete mould system has an accuracy of a fraction of a millimetre. The foam deposition, in open mould, is done while the movable platens enter in the press. An accurate position system gives the signal for the start and stop of the pouring, taking into account not only the variable speed of the platens but also the inertia of the dropping foam to obtain an exact laydown of the foam. The production line is about 150 m long.

A very generous "wet end"

In an open-mould pouring system the most critical point is to get a fast movement of the panel, linked with a high-strength components output, so that the press is surely closed before the foam reaches the edge of the mould.

The installed Cannon "wet end" allows for a maximum total output of more than 1,000 linia, given by three dispensers with three large Cannon J3,52 mixing heads. Allowing for a single output of more than 6 Kg/sec, this head is a real concept of high pressure, self-cleaning mixing head without injection nozzles. Besides its high output, this head provides a better mixing efficiency than the classical "L-shaped" head at this output level. This provides less foam overpacking and, as a welcome consequence, some chemical's savings.

The three mixing heads are fixed on an automatic portal placed over the entrance of the mould cavity, on one of the short sides of the press. The heads can be used as to pour three individual streams of foam or, equipped with perforated pipes, to pour in place over the whole panel width.

At the end of the foaming operation the whole pipe is automatically closed inside or outside of the panel. One or the other pouring system can be used according to the output or to the type of foam used.

Controls

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

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

A good cooperation provides good fruits

This fully-automated, high capacity line has been a real challenge for Cannon and Manni, assisted by the Cannon local Sales office.

With a good cooperation, especially with the customer, the results have been very positive since the very beginning.

Three Cannon J3 mixing heads feature a combined output capacity of more than 1,000 linia of Polyurethane!

Panguaneta Plywood For Life!

Panguaneta is an Italian company specialized in the production of plywood panels, marine plywood and poplar multilayer boards. Operating in Sabbiplena, near Mantua, the company owns a vast area and cultivates poplars using state-of-the-art farming technologies. A relevant portion of their raw material - the wood unusable for their boards - has always been used to supply the heat required by the process.

A new Cannon BONO Sistemi solution will now improve the efficiency of this energy recovery activity.

A Dedication to Poplar Products

The Po Valley represents today the most advanced and industrial area in Italy. Right near its middle course, not far from the confluence of the River Oglio, there was a small coastal village called Panguaneta. From there, the ancestors of the family still owner of the Company moved to Sabbiplena when the Po River changed its course, submerging the village once and for all. Like poplars have roots submerged in high-water beds, the company founders - four local families - found that significant to pay homage to their own roots, submerged in water too. This way, Panguaneta, today a leading company in the production of poplar products, was established in 1950. Sabbiplena is an Art City, inscribed in the World's Heritage List by UNESCO in 2008. Its walls surround a sixteenth-century masterpiece, the idyllic city dreamt by Vespasiano Gonzaga, the Prince of Mantua. The Panguaneta factory stands and has expanded over the years south of the walls, parallel to the ancient road leading to Mantua from the Parma region. This rural landscape is characterized by vast tracts of poplars creating picturesque woods and a unique skyline.

Therefore, the factory place is located in a district characterized by a high historical, artistic and environmental vocation. The Panguaneta Reality

Traditionally dealing with the processing and manufacturing of plywood and chipboards, over the years Panguaneta has become one of the most important European companies of the sector, thanks to the expansion of the product range and the industrial sectors served. On the eve of a new and even more important expansion, today Panguaneta occupies a surface of 160,000 m², 30,000 of which are covered.
Cannon & District Heating: a wide experience in energy networks

Cannon, through BONO Energia — the daughter company devoted to thermal plants — has matured a long experience in the district heating market segment, having developed dedicated heat generation units. Numerous large machines have been installed in the past ten years in Italy and other countries, serving the heating networks built by municipal authorities, airports and large communities.

BONO Energia counts on several important references in the district-heating sector: plants have been installed in Italy, France, Switzerland, Kazakhstan, Vietnam, etc. The most popular type of equipment supplied for this challenging application is based on a new generation named CTH, a multi-tubular water tube design: 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 flux gas temperature consideration, the CTH have been extensively installed in many large Italian district heating applications.

Main advantages offered by CTH design are connected to the package configuration — they are shop-assembled up to 40 MW — and to their quick response time to load variation. Furthermore, the possibility for shop prefabrication of many parts of the heaters in a modular concept provides for very short delivery and installation times for field erected units (up to 60 MW).

Simplicity of the water treatment, elimination of the thermal physical deactivation, rationalization of the primary and secondary water distribution lines are all important aspects to be taken into consideration.

This 40 MW plant for A2A supplies hot water to the district heating network of Sesto San Giovanni, near Milan, Italy.

High efficiency, low emissions, competitive cost

The thermal efficiency up to 95/96% and ultra-low emission levels (100 mg/mg of NOx levels @ 3% of Oxygen in the flue gases) are absolutely significant in the emission reduction as required by Kyoto Protocol. 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 10 MW.

For all these reasons BONO thermal machine has become a preferred solution for the important district heating plants operated by utility companies in various Italian cities (A2A in Milano, Bergamo, Brescia) and airports (Milano Malpensa and Linate, and Roma Fiumicino). Even the CERN (European Centre for Nuclear Research) large compound of offices and laboratories in Geneva has been provided with BONO district heating solutions.

Stringent emission levels have always been a “must have” specification from the utility companies, facing tough daily exams from the public opinion and environmentalist groups. Always keen in keeping them under a strict scrutiny for emissions and pollution. The law-allowed limits, valid at the time of starting a new plant, are always drastically cut by the client, in order to be safe with their emissions also in the future.

A2A district heating in Milano Farnagosta Plant, Italy

when those limits will be more restrictive. BONO always complied with the imposed specifications, combining high thermal efficiency and low emissions.

IHRSG — recovering waste heat from power generation to feed the airport thermal conditioning systems

An airport is a complex system of buildings and facilities with costs comparable to, if not higher than those of major sea ports and definitely more difficult to manage. Good temperature-conditioning in lounges, offices and areas devoted to passenger services is key to ease the tension of long waiting hours and to provide a pleasant break for those who are required by their business schedule to spend the day at the airport.

Three major airport terminals in Italy (Milano Linate, Milano Malpensa, Roma Fiumicino) are demonstrating the Cannon Group capability to focus on advanced technological solutions in the district heating. Specifically, the air-conditioning system of Milano Malpensa is driven by a BONO Energia thermal station with an installed capacity of 46 MW, roughly equal to the amount of power used by a city district composed of 2,000 medium-sized flats.

BONO Energia has supplied two gas-turbine recovery boilers to produce superheated water at 150°C that is transferred to a thermal cycle to provide heating conditioning to all airport facilities. BONO Energia has also supplied the district heating plant for Roma Fiumicino international airport, which requires an overall capacity of 30 MW.

Superheated water at 150°C, with a return temperature of 80°C, is distributed by a network of pressurised systems at 16 bar. The availability of sophisticated electronic controls, developed by BONO and AUTOMATA, the Cannon Group division in charge of industrial electronics, has enriched the portfolio of products offered by BONO Energia and contributed to achieve significant results in the supply of complex technologies to the utility companies managing the energy networks of important communities during these years.

Cannon products for district heating (DH) plants

- Superheated water generators CTH (up to 40 MW package configuration 80 MW field erected)
- Fire tube steam/hot water generators SG (up to 15 MW package configuration)
- Water tube steam/hot water generators CT (up to 40 MW package configuration 100 MW field erected)
- Heat recovery modular boilers/heaters from gas turbines or engines CTR
- Biomass fired boilers/heaters (up to 40 MW)
- Water treatment plants for primary waters as well as for seawage
- Heat pumps or cooling systems with co-players
- Polyurethane heat insulation systems for DH network pipelines with Cannon foaming equipment.

A2A district heating in Bergamo, Italy

A2A district heating in Milano, Italy — Cannove Plant

This 40 MW plant for A2A supplies hot water to the district heating network of Sesto San Giovanni, near Milan, Italy.
Pipe Insulation: the solution is Polyurethane

Rigid Polyurethane foams are commonly used for the insulation of pipelines where hot or cold liquids are being carried through them. They minimize the exchange of heat within the pipe and surrounding environment. The main applications of rigid foam insulated pipes are chemical plant construction, district heating and oil and gas pipelines. Various techniques are used to apply foams to the pipes, according to their sizes and applications. Cannon have developed suitable solutions for all the needs, providing consistent savings in chemicals, high foam quality and efficient methods of application.

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 performance and ease of application they are progressively replacing other insulating media.

The most popular areas of use are:
- district heating systems
- oil and gas pipelines
- heating services for power stations, chemical plants and refineries

Polyurethane foam's superior insulation properties prevent heat loss or maintain temperatures in cold environments to prevent freezing. These energy saving performances improve the quality of customer's fluid distribution lines. If we add their high mechanical strength, excellent adhesion, flexibility and good flowability, required to properly fill the cavity around the pipe, we understand why this reliable, efficient and long lasting material quickly gained the confidence of architects and end users. Polyurethane foams can be efficient over an extremely wide range of temperatures, from the extreme extremes of cryogenic applications, where temperatures can be as low as -190°C, to an intense heat approaching 150°C.

According to the needs, insulated pipes' dimensions stand in a range from 10 mm in diameter of small plumbing pipes, up to 2,000 mm diameters of the largest heating pipes. Insulation thickness varies accordingly, up to 200-350 mm for the most severe working conditions.

Pipe manufacturing techniques

In order to ensure the most effective insulation to a 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.

Continuous manufacturing

In continuous production methods - adapt to large pipes produced in huge quantities - foam is applied to the inner pipe either by a moulding or a spray coating technique. The exclusion of an external projecting film is extruded or wound around a quasi-stable foam.

Cannon continuous pouring system is based on an inflatable balloon surrounded with an outer cylindrical casing. The balloon is extruded over a flexible projecting film which is unravelled under the steel tube and is immediately "closed" around it when the foam starts rising. The pressure exerted by the rising foam is contained using a cylindrical water tank, which clamps both sides of the "casing" (pipe, foam and protective film) accompanying it for a period of time sufficient to guarantee the mechanical stabilisation of the foam and its even distribution in a precise annular circle between the inner pipe and the outer lining film.

For the manufacture of large pipes Cannon have recently supplied several large spray machines for the continuous spraying plants of the leading manufacturers of oil and gas piping systems based in the Arab Emirates, India, Scandinavia and Austria. All these supplies are characterised by high pressure metering machines, able to supply up to 40 l/second per minute of rigid foam, dedicated - and recently developed - shaped spray heads, their supports and all the ancillary equipment required by an automatic foaming process. The computerised flow control monitors the performance of the pumps every few milliseconds, and immediately reacts to any deviation from the set values. This guarantees that the mixing operation, occurring just before the spray nozzle, is performed at constant conditions of temperature, pressure and composition of the foam. Superior foam quality and reduced overspray - compared with their existing foaming equipment - were immediately noticed by all the clients, where foaming trials were executed in Cannon Aeros R&D labs in Italy.

This can lead to poor foam structure and to excessive use of chemicals. Just to be sure that the cavity gets filled, Cannon have recently supplied various complete plants, for small and large diameter pipes, in France and Russia. These orders are the fruit of a combination of factors that Cannon have been able to offer to their customers:

- superior mixing technology for high quality foams, combined with significant savings in PUR chemicals, deriving from the use of the Cannon J.L. mixing head.
- up to 30% of formulation was saved by a new customer for its large district-heating pipes: it's a huge lot of money, by the end of the year! See the article at page 9 of this Cannon News to understand all the advantages of the J.L.

- the capacity to handle entire projects, from the large storage tanks for the raw materials till the mixing head, including all safety and production planning & control protocols.
- the capacity to speak to the customer language, technology-wise, proposing solutions tailored on their actual needs and not on "off-the-shelf" equipment.
- a local presence with direct offices, offering qualified service technicians and stocks of spare parts.
- an international experience upon the latest news and developments in several fields of the PUR technology, easily and quickly transferable from one to another country.

This allowed Cannon to gain significant contracts - even exceeding one Million Euro value each - from customers that, before, were regularly buying from Cannon's most qualified competitors in the Polyurethane equipment field.

Piping business: small or large, few or many, talk to the local Cannon office. They can offer you some smart ideas!

Discontinuous manufacturing techniques

Discontinuous production usually involves the injection of foam in the cavity between the steel inner pipe and the outer high density polyethylene casing pipe. Standard steel pipe lengths for this process are 5, 12 and 15 m. Depending upon the size of the pipes, the injection technique involves the manual or mechanically assisted insertion of the inner steel pipe in an outer plastic casing, normally keeping them at regular distance using hollow plastic spacers with a spiral design. After this preparation, both the ends of the pipe are sealed with caps, the pipes are placed over an inclined support and the injection of foam is performed through the forming head in a pouring hole placed in one of the ends. The foam flows throughout the entire cavity and fills it evenly. To make sure that no air is entrapped in the cavity, various techniques are employed to prevent the air from being trapped in the cavity, such as the use of a vacuum system to ensure that the cavity is completely filled.

In discontinuous manufacturing foam can be injected filling the mixing head in a pouring hole positioned on the top, on the bottom, or in the center of the mould.
**Slabstock foams**

Big foaming machines changing the rules of the game

Slabstock Foam producers all around the world, especially in the developing markets, are investing in high quality technology and high production capacity to consolidate their position & expand their business.

Having spent many years struggling with problems with low technology foaming machines, many medium to large foam producers in markets as diverse as Colombia, Libya and India have taken momentous decisions to invest in state of the art Cannon Viking Maxfoam machinery.

Most of the machines supplied by Cannon Viking in the last three years have been of capacities equal or higher than 350 l/s/min (chemical output), with Maxfoam trough or Liquid Laydown production technology and fitted with various other features such as –

- Thalblock Top Paper/Flim system for optimum block shape and minimum waste.
- RS system for minimum side waste and flat top square block profile.
- Silicone Air Mixer for fine cell low pinhole foams.
- Conveyerised Driven Sidewalls for improved yield and easier processing of Specialty foams.
- OMAC™ Computer control and monitoring system for precision operation and repeatability.
- Dedicated chemical metering lines for the production of Standard foams, Filled foams, FR foams, Visco foams, High Resilience foams, Polyester foams, Supersoft foams, etc to give the foamer a wider product base.

Many of these plants have been supplied with high pressure metering lines to enable production of optimum quality Polyether and Polyester Foams & to benefit from the cost savings on expensive raw materials.

Cannon Viking has recently supplied these large machines to customers in Australia, Senegal, Egypt, India, Mauritius, Libby, Poland, Qatar, Russia, South Africa and Venezuela with other equipment currently under manufacture and supply to other markets.

Photographs of Maxfoam Omega 800 Elite machine under final construction fitted with Thalblock Top Paper system, Combined Maxfoam Trough and Liquid Laydown Production, Silicone Air Mixer and Conveyerised Driven Sidewalls for supply to a major Indian Foam Producer.

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**Cannon Viking Blockmatic used for high productivity semi rigid foams**

The Challenge

The Blockmatic range of equipment has been developed to manufacture blocks of foam on a continuous basis. In this case the end product is to be used in the highly productive market of automotive manufacturing; keeping up to the production rate meant that the machine needed to produce up to 15 blocks per hour. The block size was 8,000 x 1,900 x 800mm and differed from normal foam with the additional requirement to add graphite powder.

The Solution

Working together with our customers engineers the Cannon Viking team designed a Blockmatic that was integrated with a turntable carrying two mould boxes accurately positioning them in the pouring and unloading areas. A robot was used to carry the bucket into the mould, pour then replace the bucket in a position to be cleaned and then made ready for the next pour. By allowing the robot to release the bucket we created a window to use the robot for placing the lid on and off the mould box and also to assist in the manufacture of a square block by programming the robot to lift the lid matching the rise profile of the foam.

Using the robot also kept the operators away from the foaming area which meant the operators on the plant were those unloading the blocks.

All metering pumps were controlled in a closed loop format using mass flow meters; the graphite was loaded using a screw conveyor with closed loop control on the revolutions. Graphite produces a lot of dust when being transported. The metering system chosen had the added feature of a sealod loading hopper to maintain a dust free environment.

The Outcome

One very satisfied customer added to the ever increasing list of satisfied customers using Cannon Viking equipment. Come and join them, you can benefit from the experience of a team dedicated to improving processing equipment used in the polyurethane industry.

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**Foamco grow with us**

Cannon Viking have recently completed the installation and commissioning of a state of the art High Pressure Varimax foam plant in Australia supplied to Foamco Industries, a part of the KJP Group.

Foamco have been a major flexible foam manufacturer and supplier of converted foam for more than 20 years with locations throughout Australia and production facilities in Sydney, Melbourne and Brisbane.

The new state of the art, fully computer controlled Varimax Omega foam plant is built to the highest and latest specification with the capability to operate in both separate, high pressure chemical metering units to enable the production of a wide range of polyester foams, including standard foams, HR (High resilience) foams, hard high density foams, Supersoft foams, FR (Fire retardant) foams and VE (Visco elastic) foams all on the same plant.

The Varimax plant is also equipped with Cannon’s CarDiOM liquid carbon dioxide technology for the production of low density foams without the use of ABA’s and CPC’s using liquid CO₂ as the blowing agent. With the latest generation of CarDiOM equipment to reduce expensive and timely production shut downs and start ups, mass flow meters are fitted on all of the chemical metering lines which are linked in with the Omega control and monitoring system to give precise closed loop control with optimized chemical metering accuracy to maximize efficiency and raw material usage.

Cannon Viking’s integrated VCO Block Cut Off machinery was also supplied with the Varimax plant to Foamco. The latest generation of VCO Block Cut Off machinery has been fully upgraded to make it ideal for cutting wet and soft block foams like Visco elastic and Supersofts and is fully integrated with the Varimax foaming lines.

Cannon Viking has more than 700 customers throughout the world using our range of foam block production equipment, with more than 50 years history and experience in this industry. Tell us, we have a lot of experience to share with you.
Chemical raw material storage solutions

Since 2010 Cannon Viking have taken responsibility for all bulk storage enquiries and projects within the Cannon Group. Bulk storage projects are not new to Cannon Viking, we have designed and supplied storage solutions all around the world for integration with our specialist foam block slastosack equipment.

Cannon Viking have recently secured a prestigious order alongside Cannon Ergos for the supply of a complete seat production plant for the automotive industry. Viking have designed and supplied the bulk storage and metering system for the Ergos supplied manufacturing plant for the client in Mexico.

The Challenge
The Cannon Viking bulk storage solution had to be designed to efficiently offload and transfer a total of four chemical streams at a controlled temperature of 25°C. Due to the high production rates and large chemical consumption the system needed to be capable of offloading the delivery tanker quickly and cleanly without any of the chemical streams degasing at temperature before they reach the storage tanks. From the tanks each stream has to be transferred accurately to the day tanks of the Cannon Afros dispensing machine.

The Solution
The complete scope of supply was detailed and agreed between engineers from the customer, Cannon Viking and Cannon Ergos with the bulk storage design tailored and calculated to meet the high output requirements of the customer. Four 40,000 litre tanks were designed and installed complete with full insulation and an additional temperature control system to 250 litres per minute offload pipes were supplied to quickly transfer chemicals from the road tankers to the storage tanks. All offload pipework and valves were insulated and cladded to maintain chemical temperature and to protect against the Weather & damage. From the bulk tanks each chemical stream was pumped to the Cannon Afros machine tanks to provide a constant supply of material to the production line.

The Outcome
The customer was extremely satisfied, they received a highly efficient bulk storage system that was integrated seamlessly with the Cannon Ergos manufacturing plant. This was a truly international project involving top quality equipment from various divisions of the global Cannon manufacturing network.

Waste water biological treatment: the solution for heavy pollution

The mission of ARTES ingenieria: to transform waste liquids in reusable water, contributing to a lower consumption of this precious resource and to a reduction of electricity use. No need to resort to "magical" solutions: it can be made by developing new technologies and optimising those already consolidated. A recent example worth mentioning is the development of a mono-block biological treatment unit used in the presence of organic pollutants, which integrates the MBR technology (Membrane Bio-Reactor), a Powdered Activated Carbon (PAC) carrier and a cellular polymer support developed by Cannon Viking.

MBR — by combining a biological reaction with membrane filtration — is currently the most advanced technology for biological treatment. This system has a substantially lower footprint than that of a traditional biological plant, which requires the use of large dimension oxidation tanks; it is also very effective in the treatment of the most contaminated wastewaters, characterized by high values of pollutant parameters: treated water becomes then so pure that it can be used for non-potable reuse and sometimes, by adding a new treatment step, even classified as drinking water.

This system can replace traditional separation phases of activated sludge (sedimentation and filtration that take place inside a tank with a membrane filtration step and, thanks to the integrated system developed by Cannon ARTES, substantial reductions in energy consumption — up to 40% less compared to traditional systems — can be achieved.

Mechanical, continuous cleaning
The membranes used by ARTES are predominantly produced by MICROMYN NADIR. This German supplier has developed a simple, thus effective, system that, based on the mechanical action of numerous plastic microspheres that continuously hit and brush the membranes, removes impurities deposited on their surfaces. Its peculiarity: its removal takes place continuously, while the treatment system is in operation, without stopping the plant. Thanks to this method, the filters can be chemically cleaned less frequently: when a conventional membrane plant requires one cleaning cycle per week to remain perfectly efficient, the new MICROMYN NADIR system supplied by ARTES can of the most recently delivered plants was stopped only after more than 18 months of continuous, successful work.

A flexible approach to the digestion
ARTES has integrated the MBR technology with a system in which the activated carbon is trapped in an inert, polymeric cellular matrix for the adsorption and oxidation of organic compounds; the inert matrix holds in billions of microcarbon cells the activated carbon promoting the growth of biofilms, used for the "digestion" of organic substances.

Furthermore, the new technique in which the activated carbon is enclosed facilitates the distribution of the Oxygen required for pollutants oxidation and the self-regeneration of the carbon particles. The microporous structure facilitates the growth and the concentration of a bacteria-rich sludge, that can stay for a longer time in contact with a large quantity of Oxygen. This high cleaning efficiency allows for a discontinuous feed of the oxidation gas, thus reducing significantly the amount of energy spent for running the plant.

The new technology is currently under further development within a LIFE-Plus EC-sponsor research project, run by ARTES in conjunction with

Cannon Afros machine to control chemical supply to the day tanks. An operator touch screen control panel was located within the main operator area to give access to the bulk store system, this allowed one operator to manage and control the complete plant from one location. Individual offload controllers were supplied for each tank, this gave a user friendly interface for the tanker drivers ensuring a safe and efficient offload process.

If you have any bulk storage needs don’t hesitate to contact Cannon Viking, we are happy to use our vast knowledge and technical expertise to move your business forward.
Automata, a Bosch Rexroth system integrator

Automata has been recently accredited as a Bosch Rexroth system integrator. The Cannon Group's Industrial Automation Division is able to provide worldwide certified solutions and services, to create added value for your system or your industrial automation plant. The wide range of Bosch Rexroth scalable control systems and drives and the company's know-how in innovative automation solutions in mechanical engineering and plant design.

Automata is a globally successful enterprise. Operating with two units – in Italy and Germany – it is present worldwide through a network of offices.

For more than 30 years it has been researching, developing and producing automation technology solutions, offering its customers high modern and flexible automation systems from a unique source, providing a significant "added value" in the engineering of machines and plants.

A first-class product portfolio, a problem-solving approach and an empty customer relationship are the key factors of its success.

**Automata System Integrator**

**Skills for an intelligent automation**

Bosch Rexroth accredit their System Integrator only after verifying its ability to ensure the best use of their products. The ease with which technology modules, library features and drive functions are integrated can open up new horizons in automation. Regardless of the complexity of the application, thanks to certification and regular training, Automata guarantees optimum implementation of the Bosch Rexroth components and provides the best possible value for money.

**Your complete solution: from consulting to commissioning**

Automata develops customized automation concepts for your company, providing turnkey solutions, from consulting to commissioning and beyond.

Automata – by combining expertise and broad experience from various application areas and industries – provides customized solutions, tailored to the needs and specifications of each individual market. The goal of Automata's technical teams is to establish a partnership relationship with its clients, always ready to assist them in all phases, from development through production and post-production of their product.

**Automata System Integrator: your added value**

Shrink packer Smiflex SK 600T: simple architecture for fast format changeover

More flexible, faster, easier: in the packaging industry, more and more machine builders use SERCOS protocol to reach a higher overall productivity with innovative machine concepts. Often, a recent example comes from the Smimex, an Italian world-class manufacturer of packaging machines. In their shrink packers of the SK series, manufactured by the Smimex division, they use SERCOS as universal bus for the complete automation, combining a short format-changeover time with an increased line's throughput.

SMI and AUTOMATA have partnered, combining the most sophisticated expertise in the field of secondary packaging machines with the high-end electronic controls, developing new solutions that integrate the expertise of the two partners into multidisciplinary projects. Both companies have defined a working program that combines the knowledge grown in their respective fields of operation and can offer extensive expertise in all areas of action. By realizing that success is strongly determined by the ability to provide working tools and design methodologies that will generate a high added value, they agreed this important "game" by combining the skills of both teams.

Moreover, not a secondary aspect, SERCOs III is also indicated for use on safety level 3 or 4 in accordance with IEC 61508. The advantage of SERCOS interface extends well beyond the performance of mission-critical communication. The real strength is that communication between the control and the periphery is completely described by standard parameters and is accessible to the public.

Many manufacturers of automation components already provide Input/Output modules and other devices, ensuring to the user a full interchangeability and safeguarding their investments. For the SMI and users this means higher productivity, greater use in the management of parts, easy installation, integration with other systems and diagnostics in case of problems.

The integration of components from different Sercos manufacturers can be easily achieved, including Sercos Rexroth drives for brushless motors, Phoenix Contact and WAGO distributed I/O modules, panel PC market and Siemens products, providing the Ethernet connection provided by Sercos III.

The automation solution MNS - MotorNet System* strengthens the trend towards Sercos II, and opens the way to the use of standard components. The companies concerned by the partnership are pleased to say that the synergistic partnership between SMI and Automata is able to work in perfect coordination and complementarity to achieve the best result. Since 1997 the SMI Group has been operating the Sercos III interface, becoming today a leader in the packaging sector.

The continuous technological innovation, the careful analysis of customer requirements and excellence in the production are the three pillars on which the SMI Group has built its own success. Not by chance, their reference list shows the leading producers of food and beverages, including Nestle, Danone, Unilever, Coca Cola, PepsiCo, Procter & Gamble, Heineken, SAB Miller, Inbev and Carlsberg.

**An expert support**

Automata has contributed to the project providing to SMI the support of experts, both HW & SW development as an effective technical coordination, ensuring the utmost conformity with the requirements of functionality, performance, reliability and quality. Today the capacity to know one's products closely and efficiently is essential to maintain and expand the market share. Relying on an external resource as Automata, SMI has been able to achieve numerous advantages:

- **Reduce time-to-market**
- **Competitive and reliable products**
- **New product features**
- **Enlarged market share**
- **Reduction of its variable costs of R & D, concentrating investments where and when needed.**

The goal of Automata is to support its customers establishing a partnership with them. The technical team of Automata is always ready to assist their clients in all phases, from development through production and post-production of their projects.

**Sercos III communication**

Sercos III comes with the real-time characteristics of the previous standard SERCOs (communication in real-time with IEC 61784-2) with the Ethernet standard, by now widespread and economically advantageous.
Energy Efficiency for Plastics Industry

Making “Energy Efficiency” means “to make more with less.” Being helped by an expert means making this run more quickly, avoiding mistakes and wrong investments. The mission of Cannon is to assist their clients - both the energy makers and the energy users - in this delicate process of efficiency improvement of their own sources, respecting the environment and the local rules, using the available subsidies. Their experience with the Plastics, Rubber and Pharmaceutical industries is vast, you can trust them!

The term “making energy efficiency” is defined as “a set of activities involving programming, planning and implementation of operational tools and strategies allowing for the consumption of less energy to obtain the same results.” Energy efficiency, in these terms, should not be confused with energy saving. As the EU says in their Green Paper for Energy, making energy efficiency does not mean “saving” but “making more with less.”

Where and how it is possible to make “energy efficiency” in an industrial environment? At home - where we can work on the intelligent use of domestic electrical appliances, using them when they’re more convenient and in the most efficient way of exploitation - but on a larger scale. Using the energy conservation concept, by providing a better thermal insulation of the factory’s space, walls, special warehouses, pipes, windows, etc. For sure by using condensing-type boilers for the heating system. The most energy-consuming components of an equipment - industrial motors, fans, blowers, air conditioning networks - must undergo a severe examination, to be adapted or replaced with more efficient models.

Up to 2012 more than 360 BONO steam boilers and 580 Thermal Fluid Heaters have been supplied to industrial clients of these sectors, on a worldwide basis, and they’re still counting! This year, just to remind only the latest efficiency projects done by BONO in this specific field.

MOMENTIVE Speciality Chemicals purchased a large OMP 4000 thermal fluid heater for their production of silicone resins in their plant in Italy. The same equipment was supplied recently to CHEMOMID Inc in Middleburgh, UK for their 16.7 MW condensing boiler. A second larger model was supplied last year to Chemtex, Mexico, a Molsid-Ghiolfo company producing PBT with a huge OMP 14000 rated 16 MW of thermal capacity.

DOW has recently made an efficiency investment on an existing OMP 5000 heater in their low-temperature resin factory located in Fombio near Milan, Italy. The list would be too long for the space allowed to this article, we just remind some projects in Russia, Israel, Italy, Gnosis Bioresearch and Gentium, both Italian pharmaceutical companies, Evonik and Elastogran, and many more.

Through the Salerno-based Company ARTES Ingegneria Cannon now also know how to reduce the consumption and the volumes occupied by the treatment of primary and secondary water. By exploiting their synergic integration with other Cannon Group companies - BONO joined in 1995 ago - they apply the latest Cannon Automata electronics to monitor the emissions, with closed-loop control in real time of all the combustion parameters.

An international experience

Most of all, they have been very early beginning, improving the efficiency of thermal units still able to guarantee good yield and running costs economy for many years to come. All the innovative solutions all over the World, they got used to work side-by-side with domestic and international authorities in dissemination of global energy efficiency programs. Today, more than 18 years, an increasing number of governments understand that it is convenient to use energy in an industrial way, that saves fuel in its industrial process, and that pays to contribute financially when he invests in innovative equipment that would provide him with further savings in energy and contribute to preserve the environment by reducing losses.

In Europe these thermal subsidies are already effective, opening new frontiers to companies willing to invest in BDO, even in cooperation with venture with other firms of the same field of activity or territory.

Talk to a Cannon Company!

Energy efficiency is for Cannon a strategic field of activity; their interpretation of this difficult exercise is that only by working on both sides of the energy production - with the producers and the industrial end users - the efficiency will bring the expected returns. Cannon already helped numerous clients in this exercise, successfully sealing a number of energy efficiency projects assisted by domestic and European public bodies.

They will be pleased to analyze the energy efficiency problem of your manufacturing site and to suggest the most appropriate solution.

An important energy efficiency plan has been recently implemented by Chilider S.p.A, in Bressa, Italy, for their plastics and rubber industrial factory, using BONO Energy Know-how.

Focused on an Energy-hungry industrial sector

Materials in general, and plastics especially, are not the only factors to illustrate BONO’s activity in the energy efficiency improvement of Plastics, Rubber, Pharmaceutical and Chemical Industries, a field where the energy bill represents a major component of the industrial costs.

A substantial efficiency program

The entire quantity of produced steam is destined to the plywood process, where large heated presses require a steady supply of vapour to assure the continuous cycle of compression required to produce plywood and chipboards for a wide range of end uses. The new plant will significantly improve the thermal efficiency of the Panganuta factory: in fact they will be able to reduce by more than 30% the use of natural gas, until now important – and expensive – ingredient of their process.

The plant’s start-up is foreseen by the end of 2014, after several months of assembly of the sub-components in BONO Sistemi factory in Pescasseroli, Borno, near Milan, and the final erection phase of all the parts in Sabloneta.

A sophisticated BONO solution

The peculiar place where this unit operates – Sabloneta, a World’s Heritage city – required particular attention towards the gas emissions levels of this large thermal plant. Local and central authorities imposed in this community reduced levels of NOx and CO much more severe than those demanded by the current laws: this in view of a possible future application of stricter emission limits required to comply with the Kyoto Protocol targets.

BONO Sistemi designed a complete system, including the whole power generation, the storage tanks for chipboard, the handling and feeding lines to bring the wood to the combustion chamber, where it is burnt on a large moving grid specifically designed for this type of fuel. Steam is produced here at a pressure of 200 bar. All fuel burners are equipped with on-line monitoring systems and air/fuel flow meters, conveying the ash to a central collection point. An electronic emissions-control unit monitors continuously the combustion chamber, checking that the final emissions are within the limits set by the emission standards.

The whole plant is controlled by a software programme developed by BONO Sistemi.
A new degassing unit has been designed by Cannon Afro to remove the air from the epoxy resin before dosing and mixing it with the hardener. An ancillary piece of equipment much demanded by the manufacturers of collic blades, the new degassing unit improves the quality of the blade by dramatically reducing the presence of air bubbles in the cast resin, one of the major sources of post-production repair operations, which bear an unacceptable industrial cost.

The solution designed by Cannon Afro consists in a frame housing a 350 l tank. The resin is moved from an BIC (Intermediate Bulk Container) to the tank in batches of about 350 l and it's recirculated in it for a few times, where a negative pressure removes the air from the liquid; then it's sent to another empty IBC, ready for being moved close to the metering machine used in the infusion process.

The degassing tank is equipped with a specially-shaped diffuser to increase the exchange surface with the deaerated area. Vacuum is obtained with a specific circuit including vacuum pump, trap filter, accumulator, valves and vacuum meter. The speed of the pump transferring the resin is controlled by a frequency inverter to ensure optimum energy consumption, and is fitted with a magnetic coupling to avoid leaks.

The removal of gas dissolved in the resin helps in solving a problem that usually costs a fortune to the manufacturers of these giant glass-reinforced parts: the presence of large air bubbles and distorted zones of 'pinholes' (small, grouped cavities full of air that damage the aspect of the finished part and provide a concern for the potentially weaker mechanical properties of the interested areas).

No more air in the resin, no more problems in the blades!

Blades glued to last, with Cannon G-System!

The equipment package available for the manufacture of collic blades grows: the new glue dispenser Cannon G-System is now available. Cannon target is to become a "One-Stop Shop" supplier for the wind blade manufacturers: with this machine another piece of the puzzle is set at the right place!

Cannon Afro announces the availability of the new G-System dosing machine required to dispense a bi-component epoxy adhesive on the edges of the half-shells that compose a conventional blade for wind turbines.

Accurate metering precision (thanks to the continuous recycling of components), uniform dispensing, maintenance-friendly design and ease of operation characterize the new dispenser.

The viscosity of the chemical components demanded a special execution of the dosing system, with a dedicated solution to extract the resin from the storage drums and a double set of pumps. A static, disposable plastic mixer mounted on the mixing head ensures the perfect blending of resin and hardener and the disposal of a uniform layer of mixed adhesive over the edge of the lower half of the blade. Mounted on wheels, the receiver is designed to be moved around the moulds that, in some cases, can be 80 meters long.

When the application of the adhesive ends, the upper half of the blade is deposited over the lower edge and the two parts are perfectly matched and joined. After some hours the collic blade is finished, a sturdy piece of glass-reinforced Epoxy that must be able to withstand the power of strong winds for many years. A perfect application of the adhesive is a fundamental piece of the complex puzzle characterizing this manufacturing process: with this new, dedicated machine Cannon extends the offer of available equipment, confirming its presence on this market as an ideal "One-Stop Shop" supplier for the wind blade producers.
A new factory for Cannon Ergos turn-key plants

A new Cannon factory, designed for the assembly of large manufacturing plants for Polyurethane and Composites' technologies, has been completed in December 2012 and is now in full operation in Caronno Pertusella, north of Milan, Italy. The new facility allows for the simultaneous assembly of large moulding lines for automotive parts and long foam laminators for insulated panels, increasing the efficiency of the newly created Cannon Ergos, the Group's unit dedicated to the construction of turn-key plants.

Cannon implemented last year a reorganisation of their manufacturing centers specialised in Automotive, Refrigeration, Composites, Aluminium Die-casting and Thermoforming, grouping them under one roof. The new Cannon Ergos incorporates today the activities, assets and personnel of the existing Tecnos, Crios, T.C.S., and Forma companies. Cannon problem-solving approach has significantly increased, in the recent years, the acquisition of complex projects for turn-key plants.

These Cannon installations are fully manufactured and mounted in-house for final testing, before being shipped to the final site of installation; this philosophy requires wide manufacturing halls, simultaneous presence of different technical specialists and proper logistics and IT resources.

The structural change deriving from the creation of Cannon Ergos included the decision of building a new manufacturing hall able to host under the same roof the assembly of different types of large, complete manufacturing equipment.

Exploiting a large plot of land available in the existing premises of Cannon Pertusella, north of Milan, Italy – hosting the headquarters of the new company – Cannon commissioned a 5,000 m², 12 meter high factory able to host the simultaneous construction of several different types of equipment for different final markets and final applications.

The existing office building has been fully restructured and extended, to accommodate a unified engineering department, manufacturing, marketing and sales, finance, logistics and management staff. More than 4,600 m² of workshop and 1,000 m² of offices are now dedicated to the manufacture of automotive plants for seats and sound-insulation elements, compression moulding and RTM presses for Composites, rigid foam laminators for sandwich panels, large industrial thermoformers.

Cavity Filling for a World of cars

Featuring high pressure Cannon metering pumps, the machines are designed to deliver from 40 to 300 grams of a 2:1 ratio N6H foam in each of the 4 to 6 injection points required in the various models. High pressure and low pressure recycling of the components ensures perfect conditioning of the chemicals which, for their optimum performance, must be kept at a working temperature of 40-50 °C according to the type of foam being used. This continuous recirculation also provides for a very tight control of output and injected weight; flow transducers interact in real time with the control system controlling the output in a closed-loop mode. The injection takes about one minute and is performed manually by two operators working on opposite sides of the vehicle. The special tapered design of the mixing head's nozzle makes it ideal to function as the plug for the injection hole; the foam's reaction time is extremely fast as is the cavity filling time.

A new cavity filling system for another Audi plant in China has been recently supplied to the new Foshan plant in Guangdong Province. Two Cannon CFA machines are used for the production of the A3 model. Based on the same design of the equipment successfully operating in Changchun, this plant features the newest L4A mixing heads for injections in pouring holes as small as 6.5 mm.

The American Way

to date, Cannon USA has almost thirty machines in the field. Most of the machines operate in Chrysler's assembly lines with compact mixing head mounted on light duty robots for a completely automated foaming cell. The reduced diameter of the head's mixing chamber and cleanout piston allows for injection in holes of little more than 6 mm in diameter. The presence of grooves in the cleanout piston guarantees constant recirculation of the chemical components through the mixing head for perfect foam quality shot after shot even after a long pause. This feature separates Cannon mixing head from the competitors, in that they recirculate the components outside of the mixing head, which leaves over chemicals cooling in this. This forces the operators to purge the head very often, leading to a waste of chemicals and to a disposal problem of that material. As a result of cooperative efforts with Dow, a number of successful projects have been realised.

A tank-less machine, developed with Dow Automotive's valuable input, can be quickly installed in their Application Development laboratory so that foaming tests, directly in the car bodies supplied by various auto makers, can be performed. Judging by the amount of the materials being consumed, it is clear that a growing number of US manufacturer's are considering the use of N6H foam. The tank-less unit developed by Cannon USA allows a faster start up time and material saving. Since the prepolymer has to be heated up to 60-65° C, it is clear that a lower quantity of liquid present in the machine allows for a faster reaching of the operating temperature. With the tank-less components circuit the total quantity of material on board is reduced to a few litres. The return line to the bulk system is always present and this reduces the risk to overheat the chemicals. Moreover, in case of extraordinary maintenance there is only a few litres of material that have to be flushed and dumped. OME are always concerned about productivity and reliability of the system they install. In one of the most recent projects for a major US car manufacturer Cannon USA supplied a tanker solution with 6 cavity filling machines (two on each side of the vehicle) and two as back-up and a bulk storage system. Two medium size tanks guarantee a continuous supply of the chemicals to the line and a refilling system allows the operators to transfer the chemicals from the drums to the tanks. One of the chemicals has to be maintained at about 60°C along a long and very tangled pipeline. Cannon provided a suitable components circuit, by heating and properly insulating the whole feed and return lines of the chemicals.

Not anymore for a lucky few!

The noise insulation provided by these foams will not, in the near future, be an exclusive feature in the most expensive car models. Some manufacturers are thinking of applying them to their entire range of vehicles. Stay tuned...more news to come!

Structural Cavity Filling... interested?

If you work in this field and are seriously looking into a different type of cavity filling foam for structural purposes such as imparting strength to a hollow composite structure rather than filling a metal pillar, why don't you talk with us? We have interesting developments that cannot be written on these pages... and all the equipment required to apply them industrially!
Fast RTM for Epoxy-based moulded composites: more solutions from Cannon

Cannon have introduced three different impregnation systems for the manufacture of Epoxy-based moulded composites, all based on high-pressure technology.

Cannon supplies today a whole range of solutions, including dispensing and mixing devices, preforms, presses, moulds, manipulators, ovens and controls, to respond to different needs and processes.

The new process launched by Cannon three years ago, called ESTRIM (Epoxy Structural Reaction Injection Moulding) paved the opportunity to the industry to use new, fast reacting Epoxy formulations, or a rising number of structural composite parts.

Based on a series of integrated products - Carbon reinforcement handling systems, dedicated preformers, high-pressure dosing units for Epoxies, multi-component mixing heads with different distribution methods, moulds, large-size hot press with accurate parallelism control (for part forming), low-tonnage cold press (for part controlled cooling) and relevant handling systems of preforms and moulded parts - the ESTRIM process immediately received a positive response from the market.

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

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

- **ESTRIM SL** (Spray Laydown) – the Epoxy formulation is sprayed directly over the reinforcement, covering each square centimetre of mould with extreme precision, applying the desired amount of liquid resin where it is required by the part’s geometry.

- **ESTRIM LL** (Liquid Laydown) technology

This technique, wetting uniformly the huge, almost flat preforms that characterise parts such as roofs, engine hoods, fenders and doors, is suggested for very large parts. Since the reactivity of the systems is controllable on a part-to-part basis, this system allows for a comfortable laydown time even for the largest pieces. As in the SL alternative, the formulation does not need to flow through the mould, therefore guaranteeing the most homogeneous distribution of liquid resin in the Carbon reinforcement. The optimisation of the above process not only keeps low part-to-part cycle time, but also requires lower compression force, and thus reduced capital investments which in the end leads to lower part cost.

We should not forget the development of new alternatives for the traditional high-pressure injection in closed moulds, performed with the original ESTRIM technology. The experiences matured in the past in the field of short-stroke polymerisation presses have allowed for at least two more injection methods:

- The resin can be injected with a variable output, commanding the operation by reading the internal pressure in the moulds. The signal is sent to the unit’s PLC, that defines the new output value to be applied and commands the dosing pumps in real time, working in closed loop control. The press does not move during the injection.

- The injection-compression method can be applied, by leaving the mould partially open during the injection (still guaranteeing the tightness of the cavity) and applying the final compression stroke at the end of it.

**Further developments**

A three-component dosing method for ESTRIM was announced by Cannon at JEC Composites Show 2013 in Paris. The third component, a release agent, is metered at a very low output (few grams per minute) by a separate new plunger-piston high-pressure dosing unit: the flow of release agent enters in the resin stream immediately before the relevant injector, on the mixing head.
The laboratory version of Cannon ESTRIM machine allows for a wide flexibility during formulations development.

Thoroughly blended in with a static mixer, this non-reacting chemical is dosed with extreme precision to the reacting formulation. Read more about this head at page 2 of this Cannon News.

Two versions of the Cannon K-System machine are now available: one extremely flexible for laboratories and development projects and another, very cost conscious, dedicated to industrial production. The first, fitted with numerous options that make it suitable for the flexibility demanded by a team of an R&D department, features small tanks and a components circuit very easy to be purged, allowing to run numerous sets of trials with different formulations in the same day. The second is designed for a more standard, repetitive sequence of injections, providing a reliable workhorse at a very appealing price.

New tools for customers in Cannon R&D facilities

The search for new solutions and the intense cooperation with the major players involved in this business convinced the Cannon management to invest even more resources in this field of activity: in the central R&D laboratory in Canossa Pernigata, near Milano, Italy, more floor space and equipment have been dedicated to the development of Epoxy-based composites.

In addition to the just announced high-pressure machine with a three-component dosing method, a new 650 Tons hot press is now available, allowing for the production of large parts with the customer mold. It will add to the existing 200 Tons hot press that has been extensively used for test plates and small parts.

The new press speeds up the development of proper processing solutions that require a high degree of integration between dosing machine, mixing head, mould and press.

A new 650 Tons hot press is now available in Cannon R&D laboratory.

This release agent dispensing unit works in combination with a Cannon ESTRIM machine in industrial production.

Dedicated R&D continues

With the fundamental contribution of the interested end users and Raw Material Suppliers an intense calendar of trials is under execution: should you have a real interest in exploiting these resources for a project related with fast Epoxy-based RTM production, please contact Cannon Afros at marketing@afros.it to be put in contact with the relevant team of specialists.

With their available, proven industrial solutions for a vast range of needs, Cannon is today the ideal partner for complex - and also for simple - Epoxy processing projects for the composite industry. Once again, the concept of “One-Stop-Shop” for all the chain of equipment and tools can be the winning move for both parties.

Dedicated presses of various clamping force are available for fast RTM process.

Dedicated equipment is available at Cannon R&D laboratory for the CRESIM Carbon fibre recycling project.

Cannon is now looking for companies interested in a partnership for the development of the applications and the process methods identified during the development project.

The ideal partners are the producers of Carbon fibres (for the scrap originated from the initial production of these fibres), the moulders of Carbon-based composites (for their moulding scrap and faulty parts) and the large companies using these composites - for automotive, naval and aircrafts applications - to recycle the large parts at their end of life.

All details of this project are available online at www.life-cresim.com, where all the interested parties can find interesting hints for a possible cooperation with Cannon Afros.
Large thermoforming machines

"TRIPLÖ" & "CAMBIO": effective and flexible solutions also on large thermoforming machines

Cannon Egos has recently delivered two oversized thermoforming machines that can process extremely large thermoplastic sheets (up to 4,250 x 2,500 mm) assuring high flexibility for tool change.

These thermoformers have been equipped with adjustable reduction plates of Cannon's patented design "TRIPLÖ" (Thermoforming Reduction Instant Plates Operating) and "CAMBIO" (Changing A Mould Becomes Instant Operation) system, the ideal solution for those customers demanding for quick and easy mould changes. The range of adjustment of "TRIPLÖ" system is the widest available on the market.

Cannon Egos, namely its Forma Division dedicated to thermoforming machines, thanks to a long recognized experience in building large machines, has the exploitation of the study right solution to overcome the critical aspects this complex forming may arise.

End users of these special machines produce thermoformed parts such as drip-off oil containers to be used under big gear boxes in wind power generation, motor hoods for caravans, headliners for vehicles, or multiple impression moulds to speed up production. Cannon take to the largest sizes the benefits typically related to the "European" thermoforming style: material saving by zone heating, sag control during heating and pre-stretching bubble during the forming cycle, heatable mould box.

Processing big format thermoforming sheets to capital intensive equipment means that each thermoformed part has a high value; no scrap is allowed. Each critical aspect is considered to conceive the right design solution to guarantee a high reliability also during shift production.

Mechanics

For these large-size machines a correct alignment between the structural elements is very important in order to allow for a controlled thermal expansion and straight movements. Machined tool connections of the frames are the key for the perfect alignment.

Besides this when a new set of tool is required there is no need for adjustment or thicker gaskets to solve larger problem. Cannon's manufacturing culture has been since many years sensitive to these aspects. Machine tools of large size are to fulfill even the most demanding needs.

Cannon have studied and proposed an original solution for driving the mould table; the mechanical parts are moved away from the mould box, thus protecting them from excessive heat. The mould box, free from these components, allow easier cleaning and apertures mould so that on the thermoformed part no debris lays down damaging the part itself.

Clamping system

Cannon improved clamp frames have toe sections to allow for the heating on the edges, despite the telescopic adjustment. The clamping frame distributes the clamping pressure evenly on the perimeter of the sheet; considering that this perimeter is 13,500 mm long and exposed to serious heating this is not so trivial! Furthermore, the rigidity of the clamp frame and the reduction plate system have to withstand enough clamping force to avoid the sheet slipping during the pre-stretching phase or the forming process. The "TRIPLÖ" reduction plate system is still enough to withstand the force produced by the clamp frame; this is realized also with the minimum opening size which is the most critical in this respect.

Heating and process control

Sag control of the plastic sheets is fundamental for material saving; big sheets are heated between hot surfaces at nearly the same distance as for smaller sizes. The sag control is assisted by photocell helping in avoiding contacts between the sheet and the heaters.

Large heating elements, in air flow, therefore strong air draughts are to be kept under control for a uniform and stable heating. Cannon mount standard components for their heating system, which is designed with focal length control ensuring heating uniformity to all areas of the plastic sheets.

Cannon offer all sort of heating elements according to customer's specific needs. For bigger machines, heated elements (halogen, quartz or even fast ovens) can be selected, as warm-ups and stand-by time turns into energy cost savings. In any case, heaters are positioned over reflective panels avoiding IR emissions dispersion while in rest position.

The heating bank of a Cannon thermoformer able to form sheets as large as 4,250 x 2,500 mm

Extra-Large thermoformed parts are regularly produced with Cannon thermoformers

Cannon care about a properly designed mould table, steel and manufactured. PIM analysis is an invaluable tool for right dimensioning, as well as proper milling of the table: low flowability plasticity needed for sealing. Increased tooling weights and heavier material cans require suitable forces. Cannon supply servo motors, thus granting the best control of table movements and the possibility to set different start/stop positions of the mould table.

Heat dispersion must be reduced to minimum and the heater banks have properly designed heating panels, reflecting emitted energy back to the plastic sheet. The rest position on automatic close loop control decreases the heater's output maintaining the data set point. Energy saving can reach 20-30%

A patented two-axis adjustment system characterises the Cannon thermoforming machines

Ergonomics

The attention to the ergonomics of the working place requires that material handling is accomplished by automatic loading/unloading systems.

Sheet separation: is less problematic because of sheet weight, but clamping the part with lifting fingers for unloading can generate issues in cases of heavy thickness HDPE and double impressions. Cannon "TRIPLÖ" nears the forming area to the operator. The obvious advantages are concerning visual control of the process and the easier handling of the sheet in case of manual operation.

Operator interface

Cannon thermoformers are widely appreciated for the HMI Operator Panel. This is really user-friendly and it offers a high degree of control on the process operations, allowing the operator's intervention in any condition or phase of the thermoforming cycle. This is especially important when the operator's prompt intervention can "save" a forming. Quick parameters set (like heating power settings or bubble flow duration) can be adjusted on the fly while looking at the part processing. Changes can then be saved and become the working parameters for the next cycles.

Safety

Due to the extreme importance, the clamp frame is secured from uncontrolled movements by three independent locking systems. Safety catchers are used to lock heavy loads thus preventing unexpected failures.

Flexibility

The "CAMBIO" tool change system is the best solution when moulds are to be changed in a fixed and fast time, guaranteeing no waste part after the operation: tools need to be simple and storage room reduced to a minimum. Cannon can offer "CAMBIO" tool change systems for large dimensions where only the mould (plug, when needed) and the pallet of plastic sheets are dedicated.
Cannon is now able to supply top-quality moulds for any type of plastics and Composites process: DMC, a mould-maker with more than 50 years of experience in various fields of plastic processing, has recently joined the Cannon Group to complete the range of the available technological packages for the plastics and Composites processors. DMC works in strict cooperation with the Cannon Group: the synergy between the moulds and the processing plants of the new engineering company of Cannon will promptly reflect into a much easier contact with the final user, a more streamlined flow of information - and a single interface for the customer - when dealing with a complex moulding project.

Not only moulds... A long tradition of 362° service to its customers has lead DMC to supply a complete set of ancillary components to the users of its production tools: - prototyping moulds in various resins or light alloys, - trimming and punching tools, - measuring stations that stimulate the assembly of the moulded part on the body of a vehicle in the assembly line, - service trolleys to hold the moulded parts during the cooling phase, or to handle them under a water jet trimming unit, or to keep them in position during the assembly of metal inserts, lights, decorative elements, - control templates used for mould testing and fine tuning, - gripping hands for robots and handling systems for manipulators.

A reliable and structured supplier DMC’s is able today to supply moulds and moulds as large as 4,000 x 1,800 x 800 mm, made in various Aluminium and steel alloys, expanded and compact resins, epoxy-glass fibre laminated Composites, up to the use of Titanium if needed. Their moulds are mostly used for interior and exterior automotive parts, refrigerator inner liners, large technical parts, furniture, tractors and earth-moving machines, housings for medical applications, exhibition make-ups for bike and automotive sectors, crash helmets for different sports.

A new Cannon Company! DMC joined Cannon in 2014, allowing the Group to complete their range of plastics processing solutions. Working in strict cooperation with Cannon Eros - the new Group’s company dedicated to the supply of turn-key plants - DMC provides the right tool to guarantee a much easier contact with the final user of the technologies. A simplified flow of information - and a single interface - is now possible when dealing with Cannon a complex moulding project.

Thinking big? Think Cannon!

Large thermoformer for automotive spoilers

**Customer: USA custom moulder**
- Max sheet size: 2,200 x 2,200 mm
- Technologies: single sheet thermoforming, twin sheet and pressure forming
- Max closing force: 600 tons
- Max forming pressure: 3 bars
- Adjustable reduction plates (min size 1,000x600)
- Halogen heating
- Servo upper and lower platens
- Double sheet loader (2 sheets side by side)
- Machine adjusted automatically from minimum to maximum size

A recent success story

DMC: hi-tech moulds with a human touch!

Cannon moulds with a human touch!

A long passion for moulds

Based in Carate Brianza, north of Milan, Italy, DMC designs and manufactures moulds since 1962. Started by Angelo Colombo as a model making shop for foundry in aluminium and cast iron, the company soon approached the Polyurethane technology contributing to the success of a famous supplier of automotive interiors and body parts, Monza Auto, based in the nearby Roncoli Brianza. For almost 50 years DMC supplied increasingly complex moulds for foamed, integral skin, semi-rigid, compact and reinforced Polyurethanes to Italian, at that time a preferred supplier of Alfa Romeo, Fiat, Ferrari, Maserati, Opel, GM and other famous car manufacturers. Their mould-making experience expanded to a wider range of plastics processes, including injection moulding, thermoforming (classic and twin-sheet) blow-moulding, compression moulding of thermosets and thermoplastics, RTM, FRP, viscosity preforming (glass, carbon, aramid).

If needed, they also supply tools for Injection moulding, Resin Moulds for prototype parts, Blow moulding. Aluminium die-casting and metal foundry.

Following the customer step by step, helping him to choose the best procedure for each phase of their process, to reach the final objective timely and with the best quality: this has been the company philosophy since the beginning.

Up-to-date with the progress of technology

Today - led by Marco Coombo, the founder’s son - DMC employs 12 skilled mould-making specialists; some of them are still able to manually reproduce any sort of three-dimensional object and render it in wood, resin, glass-reinforced polymer or other material - as it happened when they had to supply a giant wooden Mickey Mouse to the Italian headquarters of Walt Disney Corp.!

Equally divided between CAD designing, CAM modelling and workshop, their specialists approach every order with a long-practiced team approach, in order to minimise possible inefficiencies deriving from a lack of communication in the engineering phase of each project.

Either starting from a 3D CAD drawing of the customer’s part or from a physical sample digitizing it, or in case with a reverse engineering CAD system - the designers prepare a CAD project of the new mould, test it with finite elements probing software, convert the final result with a CAM module into a sequence of operating machine operations and execute them on six numerically controlled 5-axis machining islands, where finally the mould takes shape out of a block of metal. As Michael Angel said, the masterpiece is already inside, you must simply take it out from the raw stone! When the machine ends its work, the man starts the manual finishing, bringing to shining perfection the surface of the mould and fitting all the hydraulic, pneumatic and electric controls required to move the various parts. Completely designed and assembled in-house, these peripheral equipment are fundamental to ensure the smoothest operation of the mould during its movements and when demoulding a finished part.

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Fully-automatic door manufacturing

Insulating is synonymous for energy savings. This is not only aimed at industrial or public buildings, but of course also for residential homes. Long being, roofs and facades have been the first areas that come into consideration for insulation.

Windows and doors are often unattended. The company Hörmann KG – Europe’s leading manufacturer of doors and frames and corresponding drives – has made the task to develop and manufacture more insulated doors with modern materials in a modern design.

The experts associate with the term “insulating” not only energy savings but also think differently of rigid Polyurethane foam. Because PUR – the only insulation material that fills each cavity well thanks to its raw state and light material – is an efficient and cost-effective process that can be permanently made with each other, again manifests itself as an ideal partner for the manufacturing industry.

Cannon, for decades a leading supplier of machines and plants for Polyurethane rigid foam processing, has provided its expertise in many projects.

Hörmann KG is a key customer in this market segment and currently the two companies jointly develop solutions for automated production and production processes for the individual Hörmann requirements. In close cooperation with Cannons a reliable partner for the development and production of sandwich panel presses, Cannon was the first PUR plant manufacturer which has developed an optimized multi-daylight press with flexible unit and individual feeding line for Hörmann KG.

The already delivered systems act new standards in the fully automatic process of doors and other flat sub-assemblies. It was integrated into a complete manufacturing line for insulated doors and is composed of the components:
- Transfer shuttle with belt conveyor
- Loading unit with belt conveyor
- Multi Daylight Press with 10 independent daylight
- Unloading unit with belt conveyor
- Fully automatic 3-axis mixing head carrier
- Automatic laser system
- 2-component high pressure dosing unit type A-Comb 200 IC
- Mixing head type J18

Pre-assembled door panels are passed by feeding lines to the transfer system of the Cannon plant.

At the same time, the order number and all production-relevant data are transferred from the on-site host to the Siemens S7 - 315 control of the multi-daylight press, which acts as the master for the entire press system. Thus, all product specific information for setting each unit are available here. Via the master control it will be decided which daylight will be used for each production run. The information state before Polyurethane needs different polymerization times – depending on the thickness of the foam material.

Conventional multi-daylight presses are fully open – the cycle time / press time has to align with the most thickened panel, thus with the longest polymerization time. Not to think of everything.

In a total of 20 daylight (max 12 are possible) different panel thicknesses can be foamed without interfering each other in the cycle time. Each daylight can be opened independently of the other. Not only the panel thickness can be set automatically and individually, but also pressures and temperatures can be adjusted.

Therefore the use for adhesive processes with different pressure and temperature conditions is an alternative or - as in this project - even combined applicable.

According to the upcoming production order one daylight of the press is open, a foamed door panel is moved out and transferred to the unloading unit.

Simultaneously a pre-assembled door panel is transferred to the still open daylight.

A Cannon J18 provides optimum foam quality and easy access to remote injection holes.

The achievement of the predefined end position is the signal to close the daylight and to start the curing time of 30 minutes.

As next step the 3-axis mixing head carrier positions the mixing head prior to the front faced opening. Multiple foaming holes per door leaf can be provided. A laser system checks availability, location and size of the hole and gives the release signal to move the mixing head.

Set point and actual value are compared with the limit values, checked and - if necessary - corrected again automatically.

Now the newly developed mixing head Cannon J18 comes to use. In addition to a number of advantages, it is equipped with a self-cleaning outlet nozzle with a flushing function. Immersing the mixing head through the hole in door frame into the cavity is problematic. The entire foaming cycle is realized automatically. A blow or additional cleaning of the extended outlet nozzle is not necessary.

The dosing machine is equipped with its own control unit of the same series as the press. As interface to the operator (HMI) a Siemens touch screen operator panel with a 10 "display is used. With the integrated diagnostic system a troubleshooting is simply possible and with the additional installed maintenance program, important tasks can be planned routinely. As required, the system is also prepared with an extension for Teleservice.

With the new Cannon plant the production process of Hörmann KG has become much more flexible: not only the material combinations of the layers can be changed quickly, but also the dimensions and colours.

Manufacturers combine experience

Since the beginning of 2013, BASF Polyurethanes GmbH, Lemförde, has a new complete production system for foaming of large panels for Hörmann. In a press length of 10,000 mm, diverse technologies can be tested and production processes can be simulated.

Every day a multitude insulated panels are manufactured worldwide. Typical examples are the so-called sandwich panels with metal foils on both sides. Moreover, different materials can be used: glass, wood, composites and honeycombs as well as flexible materials, such as EL-Siropon, just to name a few. Each application requires its own conditions, other technological details and different materials. Only one thing remains the same elements have in common: The material of interest is Polyurethane rigid foam, which effects a permanent bond between all the different materials.

In order to respond to every specific requirements of their customers, BASF Polyurethanes GmbH works for many years in improving the positive characteristics of Polyurethane foam for discontinuous panel production.

The successful combination of the extensive BASF experience in the development of Polyurethane systems and the innovative solutions of the Cannon Group in manufacturing plants for Polyurethane processing is available in Lemförde since the beginning of 2013 for testing purposes.

A complete production line, consisting of:
- 1 Cell- and coating station with spray for metal layers
- 1 Multicolor press PMC 280, System 1 + 0 - 10,000 x 1,450
- 1 Platform for dosing units and ventilation
- 1 Dosing unit A-System 200 Pentac Basic Double with 2 mixing heads PFL 24 SR
- 1 Dosing unit A-System 350 Pentac Basic with 1 mixing head J18
- 1 Raw material feeding system from BGC and drum
- 1 Vacuum handling manipulator for sheets and foamed panels
- 1 Saw station for foamed panels
- 1 Pentan safety control unit
- 1 Ventilation system

Designed for the use of flammable blowing agents (pentane), the entire system represents a homogeneous combination of all different machines. A pressure chamber was installed in a space saving and clearly way on a platform above panel press and coil station. A vacuum manipulator and a sawing station are completing the dry part of the system.

The shuttle press is coming from Manni Spa - for dosing data and processing of a packaging press – and is made according to a practical configuration that is already in operation at many companies in Germany and worldwide.

Two 2-component high-pressure metering units Cannons A-Combi 200 IC are the heart of the system. A highlight is the double version of the A-System 200 FC Pentac Basic. Equipped with two high pressure pumps, the PFL 24 SR can be used individually or simultaneously, all versions of the so-called open foam application can be tested. Output capacities of up to 5 l/min per mixing head allow the foaming of large panels with a foam thickness up to 200 - 300 mm. The machine is prepared for the use of foaming with mixing head. Thus, for example, tests with the Cannon J18 mixing heads on the foaming portal are not a problem.

The A-System 200 FC Pentac Basic double dosing unit can feed two mixing heads simultaneously.

The second high-pressure dosing unit, model A-System 350 FC Pentac Basic, was installed for the foaming of the closed press and is equipped with the newly developed J18 mixing head J18. Focus here is the high laminar and variable discharge rate during injection.

The production cycle starts with the placing and fixing of the cover sheets. The handling manipulator is positioning the lower sheet onto the press table, shielded out of the system, the upper sheet is shuttled into the press and there a vacuum system integrated into the upper press plate holds the upper sheet inside the press. The press plunger is heated so that optimal conditions for the foam to be applied are given. Flexible adjustable foaming tools are mounted according to the desired panel size and offer best conditions for the foaming into the closed press by injection openings with shutters. The movement of the upper table into the press during foaming onto the lower sheet is synchronized with the output rate and the programmed total output.
A global technological Service, 365 days a year!

More than 100 specialised Service persons in all continents ensure the smooth operations of thousands of Cannon plants, every day of the year. Today, 90% of the technologies built into a Cannon metering unit, mixing head and plant requires the intervention of a specialist, at least in the crucial training and start-up phase that follows the installation of a new equipment.

Internationality, together with Independence from Raw Material Suppliers and Innovation, is one of the three "Ts" that characterise Cannon cultural traits. Being close to the customer has been a fundamental line for the Cannon Group success in the field of Polyurethane technology, in the past 50 years. The tradition of being present near their customers continues, in spite of economic turmoil that has overcharged several competitors to consolidate their staff near production centres, or to reduce the number of their local employees.

A fundamental share of Cannon's international presence, in terms of staff, is represented by the Technical Service and Spare Parts functions. Today the Cannon Group is present with local specialised technicians in more than twenty countries, in all continents. Coordinated by the central Tech Service & Spares division of the Manufacturing Centres, the local specialists in charge of Canon Service have running the vast number of installed Cannon machines and plants.

The trouble-shooting activity report only a small fraction of the daily workload, installation of new plants (banking the colleagues sent from the factories), of new standard metering units (a task usually performed with complete autonomy) and running instruction and training courses on the use of the latest innovations takes most of their time.

A good start, for a successful project

A fundamental job is represented by the proper start-up of new equipment, run in strict cooperation with the production and maintenance operators of the customer: the Polyurethane process includes sometimes a bit of wizardry, standard procedures are accompanied by a lot of experience, and a clear decision-making capacity. The dosing unit and the mixing head are the fundamental components for the success of the foaming process, and only their perfect tuning with the used chemicals can generate a quality part.

A skilled Tech Service technician - whose experience has been accumulated with years of side-by-side work with those colleagues who designed and assembled the equipment - can solve in minutes a problem that would take forever - sometimes an infinite time - to a cheaper, generic service supplier found around the corner. This technological support - to help the customer to obtain a perfect product and the desired productivity - represents one of the most common, and challenging, jobs of Cannon Tech Service people.

More than 100 technological training courses are delivered every year to new customers, or for new types of equipment supplied to existing ones.

Update, update, update...

The continuing evolution of the various technologies contained in a modern foaming plant (mechanics, metal treatments, hydraulics, electronics, chemistry, etc.) requires a continuous update of the Tech Service staff at any level. Training updates are regularly organized, centrally and locally, to teach the whole network about the latest innovation. A certification of the acquired know-how is released to each specialist, to guarantee to the customer that the Cannon people operating a repair or a technical training has the right qualification in that specific field of the technology.

Original Spare Parts - Guarantee of Quality

A well-established activity since the very beginning of Cannon life, the Cannon Spare parts supplies the original parts that were used to assemble the piece of equipment needing periodical or extraordinary maintenance. It goes without saying that several components of Cannon machines can be found on the free market at a cheaper price, but the variety of available models not always allows for the precise identification of the right piece to be purchased. Cannon tracks all its machines with individual codes, and can identify in minutes what exact spare part is required for that unit - and most of the times can deliver it in a matter of few hours from the local storage of original parts. Tight Quality Control checks are run on the purchased goods, and all Cannon original parts (such as mixing heads, metering pumps, stream distributors, special valves, etc.) are supplied only after a verification of compatibility with the unit that must be repaired or maintained.

Refurbishing - a profitable decision

An old-but-still-performing machine can be refurbished after several years of use, for several reasons - upgrading it with state-of-art controls, extending its number of mixing heads, replacing damaged parts - to give it a new life. Cannon local offices are able to dedicate part of their daily activity to the refurbishing of existing Cannon equipment, either taking it at home or working at the customer premises. A profitable business for both parties, the reconstruction of existing foaming plants represents a valid alternative to the purchase of new ones, under a lower financial condition. The availability of original parts, sometimes even outside of stock, guarantees the machine to the customer.

Service, training and original spare parts are fundamental, for smooth plant's operation: ask Cannon, they know how!

"Reporting Cannon Life" from our Locations

Cannon in 2013 asked their employees to contribute to make Cannon News by reporting with a short article in three parts of the story of their professional activity within the Group. Among the various articles received within the framework, this one was selected by an internal jury because of contents, pathos and a true spirit of corporate belonging that distills from the submitted text.

Mr. Doan Minh Bay - the Cannon Far East Vietnam Office resident - will be awarded for this article at K 2013 by Mr. Marco Volpato, Cannon Group President.

Reporting My Cannon Life - from Vietnam

I joined Cannon Asia in 1996 after USA filled embargoes for Vietnam. At the time, I was working for state company in tobacco field with technical management position. USA embargo lifted created condition for foreign companies to enter Vietnam, a nation isolated from the world for long time with 80 million population and important geographical location in south East Asia, for doing business.

I decided to leave state company to looking for a job in foreign company to improve my life and to develop my own career. Within one month, at the same time, I employed by three foreign companies. At last, I chose to work for Cannon Asia. The reason why I chose Cannon is that I like to learn a new technology, a new technology, which till that time its applications were very strange in Vietnam and that I worked at Ho Chi Minh city nearly my home to my home. Cannon Asia via an agency, a Vietnamese company.

In 2000, due to complicated problems and poor management of this company, I wanted to leave Cannon Asia for other company. Fortunately, Cannon Far East Vietnam was opened at that time. As a result, I continued to work for Cannon with sales manager position. Now, I am working for Cannon as salesman selling Afriso machines, Plastics, Machines, Forms, Media, press, I have several events that played important milestones in my career. This is the year I was transferred to the company and started working in Vietnam. In the future, I will continue to contribute to the development of our company and our country.
Cannon Eurasia shows the way

Any local Cannon Office — we call them Locations — has been undergoing the last few years something of a process of maturation, a true "mutation" of their mission: once a dedicated technical and commercial office, now a fully-fledged business. This transformation started with the Polyurethane-related projects, it has now progressively followed the diversification process initiated in 1988 by Cannon Europe. In the last few years, the company has been growing activity with BONO, the Energy and Water Treatment divisions of Cannon Europe.

A change of dress, a change of habits, an evolution towards a wider range of innovative technological solutions offered to customers, in certain cases, to the very same customers.

Andrea Castellan, the chief of the Russian Location’s continuous efforts about his pioneering steps in this direction.

Cannon News: Andrea, tell us something interesting about your being one of the few people worldwide on this migration towards a Multi-Technology Location. Cannon Location: Andrea Castellan: We, at Cannon Eurasia in Moscow, have been the first group's Location that has started to diversify from the traditional Polyurethane-only production. We had already experienced a partial diversification of our market when we started selling non-Polyurethane machinery for the first time that was an easier job: the customers are quite similar, if not the same, that we meet daily for our food equipment. Same sales, mentality and markets: Automotive, refrigeration, furniture, large technical articles. No big deal in making this change. But the Energy and Water Treatment business is one order of magnitude larger, in Russia and CIS countries! We welcomed the promotion that the Group's management launched during a sales meeting a few years ago: look inside these markets, make a business plan and a decision, take your own local risk and hire a few specialists to follow the Energy and Water Treatment lines of products that BONO sells on their own worldwide since more than 50 years. We looked around and saw that in our region there is an over 12 time-covers area — the opportunities for the Energy-related business were by far larger than those confined within the tighter borders of the former Soviet Union. It was a challenge, but now I'm happy for the move.

CN: So, how a specialist and let him go door-to-door to collect orders? Was it so simple?

No. Of course not. No one can sell a specialist in building confidence in ourselves. And I mean internally, first! The first customer we had to convince was... BONO! We needed to train our man on the range of sections supplied by BONO Energy and ARTES Ingegneria, first in Moscow and then more in deep in Italy. Then we had to focus on few, really credible targets, and then we needed to convince a second customer... Cannon Eurasia!

CN: What cultural and organisational traits did you have to modify, in order to succeed internally?

AC: General marketing. Well, something that ought to be immediately defined with the Group management is "Who runs the show in my country?" The Group's Manufacturing Centre owns the product and the technology, I own the territory. Let me work on it "our way" as far as marketing and sales are concerned. We need support on the product, not on the way we deal with our customers. Let us handle that critical aspect of the business. (This is clear — and accepted — thing is much easier. We are not the Agent that sells whatever for a small commission, and drives Mr. Specialist from the air to the ground. Forget that, it's another way of working. We invest, we take our own risks, we run the commercial show, they provide what we sold, in time and in order. Pretty much as expected.

Talking organisation, the consolidated presence of general service staff in a Location — I'm talking of the Management, Administration & Finance, Shipping & Logistics, a Secretary's pool, Spare parts Service, etc. — helps immensely to reduce the overheads on the new line of products. A lower margin of profit is acceptable to get things started, then you can optimise costs and the margins become more interesting, and the boat starts sailing on its own. We have today for BONO in Russia two Sales & Marketing persons, and a Technical responsible. That's enough for the start, the rest of the staff will help.

CN: To conclude, give us a few recent success stories about this integration of another Technology in your organisation:

AC: Fireell ordered 5 large boilers for their type plant in Vrnoshen. The contract is worth 4 million Euro, but the payment had to be in Rubles, or nothing. Being Cannon Eurasia a Russian Company we could make it. I got convinced that we had to obtain the local SRO certification to be allowed to install these machines: thanks to it we can now design, produce, install and certify thermal plants in Russia! And, to finish, a nice order involving both our main business lines: a large boiler for the Askoy Thermal Power Plant in Turkey. A nice order involving both our main business lines: a large boiler for the Askoy Thermal Power Plant in Turkey.

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