

# Machines Italia



Italian Machinery & Equipment for Plastics & Rubber at PLAST 2012 in Milan



PUBLISHED BY: PROMAPLAST SRL - CENTRO DIREZIONALE MILANOFIORI - PALAZZO F/3 - 20090 ASSAGO (MILANO, ITALY)





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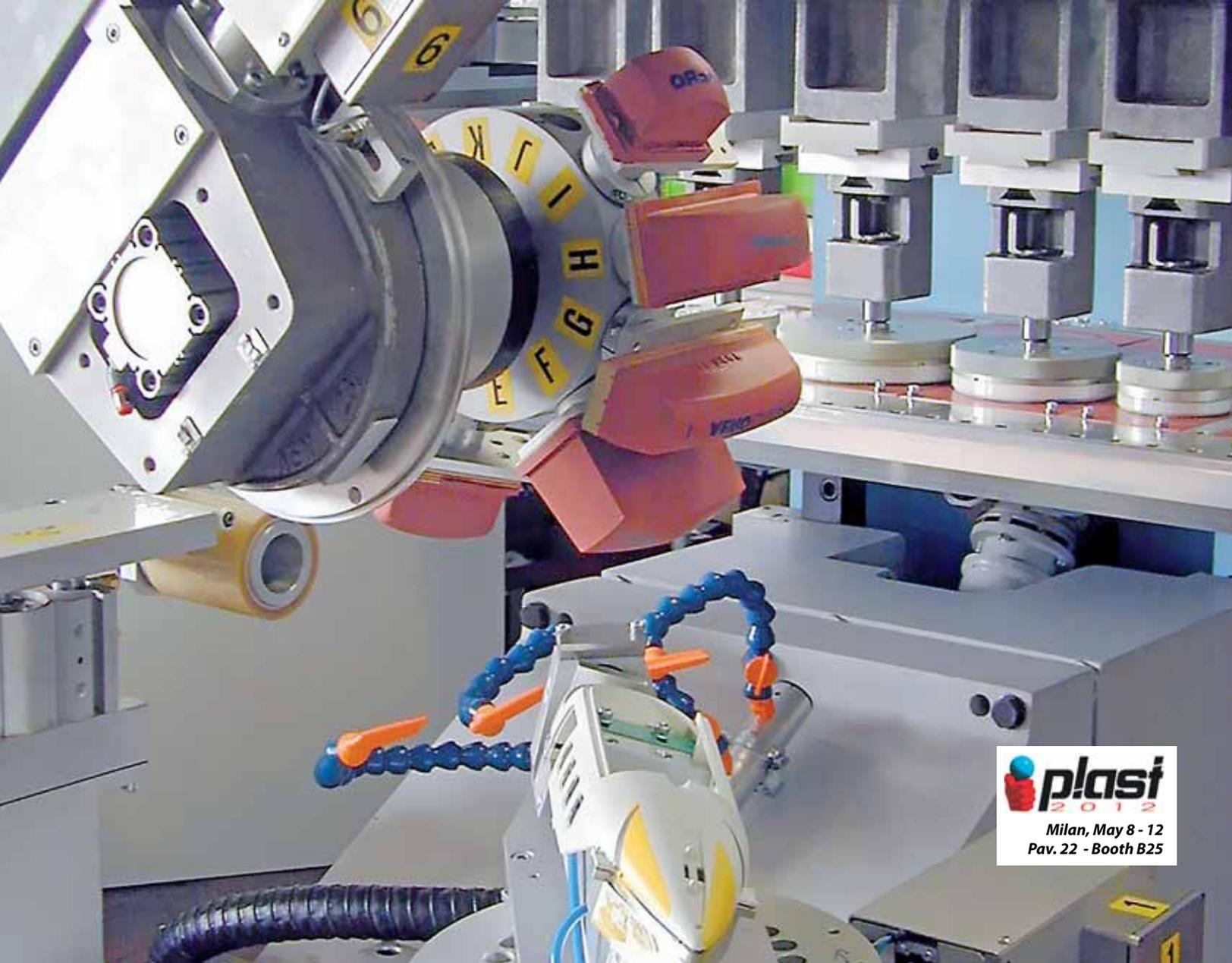
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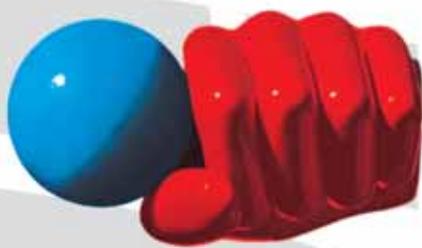
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# PLAST

2012

INTERNATIONAL EXHIBITION FOR PLASTICS AND RUBBER INDUSTRIES



At FIERA MILANO, from Tuesday May 8 to Saturday May 12, 2012, for the international exhibition for plastics and rubber industries. In 2012, PLAST will be the largest specialized exhibition in Europe. As of 31 March 2012, more than 1,400 exhibitors from 46 countries have signed up for the event, but more applications have been recently submitted. Based on data from PLAST'09, when 32% of visitors came from abroad, more than 60,000 visitors are expected from all over the world.

Find more information, special offers for visitors, discounted rates on airfare and hotels, tourism plans in Milan and Italy generally, as well as the exhibitor list and the pre-registration form on [www.plastonline.org](http://www.plastonline.org)

Organizer:  
Promaplast srl  
Assago (Milan) - Italy



## Rendezvous in Milan

This year PLAST (Milan, May 8-12) is the largest specialized exhibition in Europe for the plastics & rubber industries, representing the entire production chain of machinery, equipment, moulds, raw materials, recycled materials, composites, and semi-finished & finished products. At the end of March, more than 1,400 exhibitors from 46 countries had signed up for the triennial international event, covering a net exhibition area of 60,000 sqm approx. The previous edition of PLAST (2009) brought in a total of 1,478 exhibitors (856 Italian and 622 international from 45 different countries) occupying an overall area of 60,000 sqm subdivided into 7 halls. The fair also attracted 55,175 visitors: 37,586 Italian and 17,589 from 114 foreign countries (with Europe accounting for 71% of the total). Regarding the home countries of PLAST 2012 exhibitors, Italy is of course in first place with almost 800 companies, followed by Germany (168), China (51) and the US (41). As previously, the core of the show comprises machinery and equipment manufacturers, with a wide range of technologies exhibited.

A section of this issue - from page 31 to 48 - is dedicated to a review of new products presented at the show by Italian machinery manufacturers.

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With respect to previous editions, PLAST 2012 has many new features underscoring the international character of the fair and highlighting the broad panorama of novel technologies and innovative applications that are prominently displayed in 6 halls of Fiera Milano fairgrounds at Rho-Pero.

A noteworthy feature this year is the return



of the RUBBER "satellite fair". Organized with the sponsorship of Assogomma (the Italian association for the rubber industry), the show draws attention to this specific segment of synthetic materials.

Another new feature of this edition is the Plastic International Award - organized by the fair management and Poli.Design (a consortium of Milan Polytechnics) - an international contest reserved to innovative proposals for applicative solutions relating to the main plastics processing technologies presented by design professionals and students.

Finally, the fair is enriched by a broad program of concurrent events (technical conferences, congresses, seminars etc.) on the following topics:

May 9 - Earth, water, air. Impact and sus-

tainability of PVC

May 9 - Italian research on active packaging, focusing especially on nanomaterials

May 9-10 - SPE national meeting on plastics (I-tec)

May 10 - EPS between energy and environment

May 10 - Certification for environmental sustainability

May 10-11 - Biodegradable polymer packaging (Biopolpack)

May 11 - Thermally conductive polymer nanocomposites (Thermonano European project)

May 11 - Smart plastics for a high quality supply chain in agriculture

May 11 - Innovation in plastics coating (Verplast)

## Machinery in the world

Global demand for plastics processing machinery is projected to rise 6% annually through 2015 to 28.9 billion dollar, a rebound from market declines experienced during the recession-impacted 2005-2010 period. Many nations are building up their plastics manufacturing infrastructure, due to both rising domestic demand for plastics-consuming goods and export opportunities to developed nations. These and other trends are presented in a new study from Freedonia Group.

Gains in developing nations will be the driving force behind advances in the global market for plastics processing equipment. China, for example, will account for over 40% of all additional global demand through 2015, with growth stimulated by strong increases in plastic manufacturing as industrialization efforts continue and income levels rise. Other nations in Asia with

smaller, less-developed economies, such as India, Vietnam and Thailand, will also record healthy market gains. In developed areas of the world, most notably the US, Western Europe and Japan, demand will rebound after a period of decline, although sales advances will not be as strong as those in developing nations.

Among major product types, extrusion

equipment will post the strongest gains through 2015, benefiting from growth in global construction spending, which will fuel demand for extruded goods like pipe and siding. Injection moulding equipment will remain the largest product segment, accounting for 40% of demand in 2015.

The construction market will post the strongest gains through 2015, benefiting

from an acceleration in global construction spending. The consumer/institutional product market will also post solid gains, reflecting rising standards of living. The packaging market will post respectable gains due to rising manufacturing output and consumer demand for packaged products. In addition, plastic will continue to gain market share from other materials in applications such as bottles.

| WORLD DEMAND FOR PLASTICS PROCESSING MACHINERY (million dollars) | 2005   | 2010   | 2015   |
|--|--------|--------|--------|
| NORTH AMERICA  | 3,150  | 2,640  | 3,430  |
| WESTERN EUROPE   | 4,040  | 3,830  | 4,560  |
| ASIA-PACIFIC   | 8,130  | 11,510 | 16,150 |
| CENTRAL & SOUTH AMERICA  | 580    | 880    | 1,160  |
| EASTERN EUROPE   | 1,200  | 1,470  | 1,980  |
| AFRICA & MIDEAST   | 960    | 1,270  | 1,620  |
| TOTAL  | 18,060 | 21,600 | 28,900 |

[www.freedoniagroup.com](http://www.freedoniagroup.com)



## Better than expected

Generally speaking, 2011 was a greatly satisfying year for the Italian manufacturing industry of plastics & rubber processing machinery, equipment and moulds: after the deep crisis of 2009 (which actually erupted in late 2008 with the world financial crisis) and the slow recovery in 2010, heartening figures were finally witnessed again this past year. Awaiting the consolidated figures, estimates developed by Assocomplast (the national association representing the above industry) show revenues in the sector of over 4 billion euro, an increase of 11% over 2010, with exports especially providing encouragement at +19% for sales worth an overall 2.4 billion euro. Although we are not quite at pre-crisis levels (2007, the best year ever, recorded pro-

duction valued at 4.25 billion and exports at 2.75 billion), only a minimal amount of ground still remains to be regained. As is clear from the above figures, production is driven mainly by sales abroad and certainly not by the domestic market which, with all due exceptions, continues to suffer a slump that seems endless (and the prospects for 2012 are anything but rosy...). Without delving into mere statistical analysis, it must be said that certain foreign markets (Brazil above all) seem not to have felt any impact from the difficulties in the global economy. And while they have witnessed a slight slowdown, China and India continue to grow at rates that are unimaginable in a mature market like Europe. Russia too - as is well known by the companies that exhibited at the Interplastica show in Moscow last January - has resumed its pace. While not comparable to China or India, it is nevertheless very attractive to Italian manufacturers. Continuing with this brief overview, Turkey also deserves some mention. It is alluring not only for its domestic market (in spite of the massive presence of Chinese manufacturers) but also as a bridge between Europe and the Near East.

| MARKET FOR ITALIAN PLASTICS AND RUBBER MACHINERY & EQUIPMENT (million euro) | 2009  | 2010  | 2011  |
|---|-------|-------|-------|
| Production  | 3,300 | 3,600 | 4,000 |
| Export  | 1,833 | 2,010 | 2,430 |
| Import  | 484   | 570   | 605   |
| Domestic market   | 1,951 | 2,160 | 2,180 |
| Trade balance   | 1,349 | 1,440 | 1,825 |

Regarding forecasts for 2012, little can be said with certainty except perhaps that it will be impossible to repeat the performance recorded in 2011. There is a certain pessimism in the air among Italian businesses in the sector rooted in economic conditions that are objectively anything but bright but also nurtured by negative moods and rumours propagated in the media. Actually, as also revealed by Assocomplast's survey of its member companies, most of them had enough orders on the books at the end of 2011 to cover at least the first half of the current year. Of course, there is still the second half to worry about, but looking at the situation with a certain optimism, once you're halfway, you're almost there... Depending on how things develop, it is reasonable to expect slight oscillations in the market - perhaps up, most likely down - with respect to 2011, without however there being any particularly worrisome negative dips.

[www.assocomplast.org](http://www.assocomplast.org)



## Extensive growth for WPC

With nearly 300 participants from 21 countries and 30 exhibitors, the WPC Congress organised by Nova-Institut in Cologne on December 13-14 once more lived up to its reputation as a leading European event with current topics, developments and trends related to WPCs (Wood-Plastic Composites). An extended advisory committee including representatives of manufacturers, the scientific community and the press selected the presentations to ensure adequate coverage of topics of concern to the industry. The result was a programme that packed 26 lectures into two days. The European market for WPCs (Wood-Plastic Composites) has been growing at an average annual rate of 35% since 2005. Given the current levels of investment in expanding production and growing interest from both trade and consumers, the industry is optimistic about the future and expects continued two-figure growth over the next few years.

In 2010 roughly 220,000 tons of WPCs were produced in Europe: 50,000 were used in the automobile industry (mainly compression moulding) and 167,000 in the area of terrace flooring, fencing and cladding (mainly extrusion). More and more WPC materials are being used for furniture and office and home utensils, along with small technical parts and casings. Further substantial growth is expected in every sector in the coming years. WPCs are predominantly used in applications that emphasise product characteristics such as great rigidity and low shrinkage (compared to pure plastics) and better durability and malleability (than pure wood products). However, as prices for plastics rise, it is only a matter of a few years before WPC pellets are cheaper than pure plastic pellets (they are presently 20-30% more expensive) and can then conquer mass markets.. The WPC sector has matured in recent years to a point where, from a technical

perspective, there are no longer any obstacles to its servicing a mass market. Made up of 20-80% bio-based material, wood plastic composites represent the largest group of new biomaterials by volume, significantly outstripping bio-based plastics. This advantage becomes even clearer considering the international figures. The US are currently in pole position with a production volume of approximately 1.5 million tons of WPCs. One particularly dynamic market is China, where 700,000 tons of WPCs were produced in 2010 - and this volume is projected to rise to 5 million tons by 2015, which would make the country the largest WPC producer in the world. Entire houses are made from extruded WPC panels and even the doors are fully extruded.

[www.nova-institute.eu](http://www.nova-institute.eu)



## Energy efficiency & productivity

**A**ccording to a recent study of Euromap (Europe's association for plastics and rubber machinery manufacturers), there are close links between energy efficiency and productivity of processing machinery. Investing for greater productivity generally also means investing in energy efficiency. The study looks at the main plastics and rubber processing technologies, i.e. injection moulding, extrusion, blow moulding and thermoforming, which account for around 90% of the total volume processed.

The production efficiency of injection moulding machines has more or less doubled in the last 20 years. Machines are now capable of a manufacturing output that would once have required twice as many machines of similar size. Developments in manufacturing technology have provided a significant performance boost. The demands made on hydraulic systems have resulted in greater efficiency and cut the energy consumption of injection moulding machines by around 40%.

The throughput capacity of extrusion machines has also doubled over the same period. Machine-related energy consumption has been reduced by around 20%. The same is true in compounding: twice the amount of material is being processed with machine-related energy consumption down by 20% at the same time.

Increasing use has been made of servo-drives in cyclic processes such as injection moulding, blow moulding and vacuum forming technologies for a number of years now. These allow the energy required for motion to be cut by half. Plants with a conventional, central power source and system-related line and control losses are increasingly being replaced.

Servo-engineering has long since made the breakthrough in such high-performance areas as packaging and medical engineering. Servo-systems now also offer simple solutions for energy recuperation. In injection moulding, for example, during rapid motion of the closing units, the drives are used as generators to produce energy when braking. The same principle is also used with fast-working closing units of blow moulding machines and in thermoforming machines.

\*\*\*

Looking to the future, there is no doubt that the use of energy-saving and highly dynamic components will provide a significant boost in terms of improving energy efficiency further in the next ten years. Greater use of all-electric drives and servo-hydraulic designs instead of conventional technology will pave the way for further efficiency gains - in some



cases as much as 50%. The most important part in improving machinery is played by developments in process engineering: advances in screw technology have brought a significant increase in throughput rates while at the same time improving the melt quality. This has allowed extruders and the injection units of injection moulding machines to become smaller and better while maintaining performance. Radiant heater systems show great potential in thermoforming machines. There is also a great deal of potential for combining several processes: this is of particular interest if residual heat from one stage in a process can be used in the

following stage with a view to eliminating reheating altogether.

In conclusion: if increasing productivity continues to drive European plastics converters' investment decisions in the future, energy efficiency will benefit. Major savings can also be achieved if converters fine-tune processes to minimise energy consumption.

Monitoring the flow of energy in machines, installations and in the plant also produces results. It makes the energy requirement transparent, which in turn contributes to tailoring energy consumption to need.

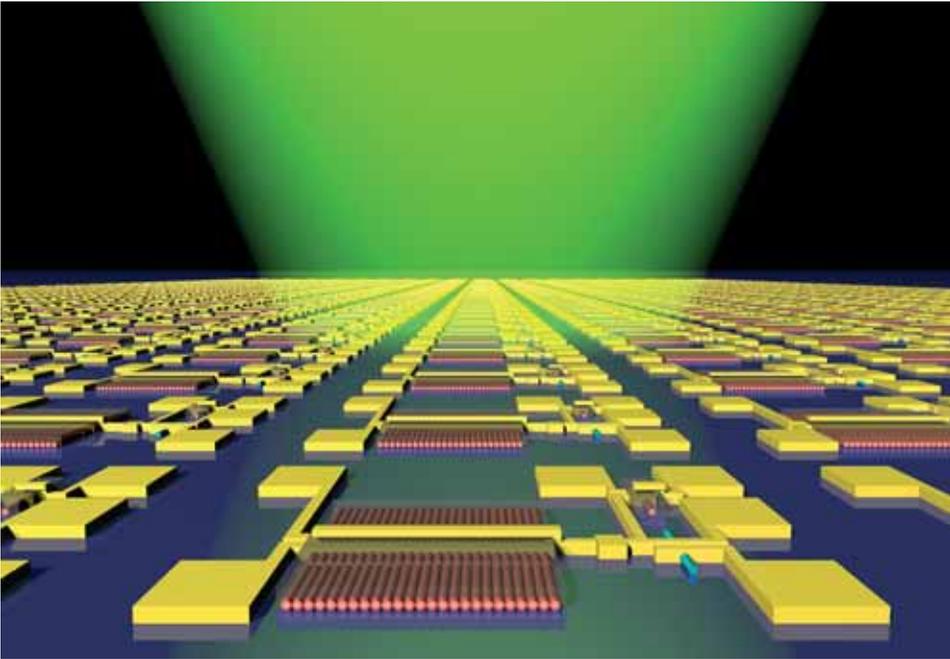
[www.euromap.org](http://www.euromap.org)

## Electronic equipment

**A**ccording to a new market report from BCC Research, the global volume for plastics in electronic components is expected to reach 1.58 million tons in 2012 and increase to 2 million in 2017, at an annual growth rate of 4.7%. This market can be separated into two segments: thermoplastic and thermoset. In 2012, thermoplastics are expected to total 1.13 million tons and in 2017 the volume should reach 1.4 million (+4.9% per year). The thermoset segment is projected to reach nearly 500,000 tons in 2012 and 590,000 tons by 2017 (+4.3% per year).

Resin consumption in electronic components is made up of a selected group of engineering thermoplastics led by polyamides and thermoplastic polyesters in volume. Based on value, however, higher performance resins such as PPS, polyimides, polyketones and LCP have become more significant factors in the market. Engineering thermoplastics dominate the moulded component segment, of which connectors are the most important.

The advantages of using plastics parts for electronic components must be weighed against their disadvantages. To decrease



already small component sizes, melts used in moulding components must possess excellent flow and precise moulding, thermal endurance, and dimensional stability due to tight space constraints and relatively high operational temperatures. While mechanical performance of plastics can be enhanced through reinforcements and filler loadings, higher amounts

of these additives often impair processability in the molten state. A better resolution of this dilemma is still an ongoing issue.

\*\*\*

In another market study from BCC Research, the global production of plastics in electronic enclosures is projected to be

nearly 3.35 million tons in 2012 and to reach 4.5 million in 2017, increasing at an annual growth rate of 6.1%. Electronic enclosures are cabinets designed to protect electronic equipment and to prevent electrical shock to users. In addition, these enclosures are developed to be visually attractive to users.

The global market for plastics used in electronic enclosures can be broken down into two segments - stationary and mobile enclosures. The stationary segment is expected to amount to 3.26 million tons in 2012, and should be at 4.3 million by the end of 2017 (+5.9% per year). The mobile segment is projected to amount to 91,000 tons in 2012 and should reach 165,000 tons in 2017 (+12.6% per year).

The surge of new electronic products has resulted in significant changes in resin selection for enclosures. Downsizing and thin walling have necessitated a re-evaluation of resins because of more demanding physical-property requirements and moulding challenges. In addition, a re-evaluation is also necessary for resins used in the stationary portion of the market, which includes enclosures for desktop computers and flat-panel displays.

[www.bccresearch.com](http://www.bccresearch.com)



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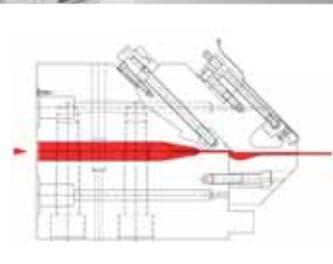
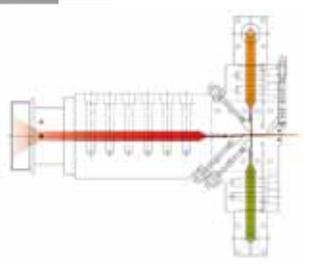


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# POLYMER MARKETPLACE

## World polyolefins

An annual global market study released by CMAI (Chemical Market Associates Inc) covers historical developments and future projections for supply the global market of polyolefins (polyethylene and polypropylene) in the period 2006-2016. Polyolefins represent almost two-thirds of the major commodity thermoplastics used worldwide. Their global market is changing dramatically in response to the quickly advancing industrialization process in emerging countries, as well as improvements in global communications and trade liberalization.

Investments in polyolefin production capacity are increasingly concentrated in regions with affordable supplies of feedstocks or high-demand growth areas, such as the Middle East and the Asia-Pacific region. The same trend, particularly in Western Europe, is driving industry consolidation, operations optimization, and a shift toward the production of higher-value, higher-performance products. In North America, low-cost feedstock from shale gas is revitalizing the polyethylene business, making its exports highly competitive globally. In response, several producers have announced new capital projects that are currently scheduled to come on-stream in the second half of the decade. One of the most challenging issues facing the polyolefin industry during the last decade has been the loss of its pricing power. Wedged between the demands of upstream oil and gas corporations and major retail chains on the downstream side, the production chain has been caught in the middle. While energy and raw material prices increased in response to tighter global market conditions, prices for finished goods remained at the same level or even declined, as imports from low labour cost countries flooded the market. As a result, profits in the polyolefin industry had all but disappeared. Although the recession of 2008-2009 only exacerbated the already unfavourable market conditions for polyolefins, producers are making strategic moves to protect against further margin erosion. Instead of engaging in competition for market shares, they have been controlling production



and inventories to keep the market balance tight. The development of "green" sources for the production of plastics is advancing steadily and is generating the first tangible results.

[www.cmaiglobal.com](http://www.cmaiglobal.com)

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The annual market study released by EATP (European Association for Textile Polyolefins) offers an analysis of the situation and evolution of polyolefin fibres and textiles in Europe. The main trends and conclusions of the 2010 report are summarized below.

The leading share of polyolefins - polypropylene and polyethylene - in the total European textiles market has further recovered from the dramatic fall in 2008 and 2009 and is still increasing. In 2010 they accounted for 44% of all man-made materials used for textiles. Consumption of polyolefin textiles was almost 2.5 million tons. Spunbond & meltblown nonwovens are the largest sector product and continue to grow strongly (up by 6% in 2010), followed closely by tapes and slit film, staple fibres and filament yarn. The largest end-use market is technical textiles, consuming 900.000 tons of polyolefins, in articles such as agro & geo

textiles, strapping, packaging, construction and a wide range of other technical applications. Carpet markets, one of the large end-uses, recovered slightly in 2010, with PP usage rising by 1.4% to 516.000 tons. Hygiene and medical applications grew by 6.9%, reaching almost 600.000 tonnes. Polyethylene usage grew, particularly in artificial grass, but is less than 10% of the total market of polyolefin textiles.

Western Europe still accounts for most production of polyolefin textiles production, but the combined share of

Turkey and Central Europe has risen to 32%. Total production of man-made fibres in Europe reached 5,580 ktons in 2010 with the following shares: polyolefins 42,8%, polyester 21,6%, acrylic 12,4%, polyamide 10,5%, cellulosic 10,3%, other 3,7%. Total consumption of PP textile intermediate products in Europe reached 2.268 ktons in 2010, subdivided as follows: spunbond & meltblown 707 (31,2%), tapes & slit film 495 (21,8%), staple fibres 469 (20,7%), multifilaments 433 (19,1%), strapping 105 (4,6%), monofilaments 46 (2%), others 13 (0,6%).

[www.eatp.org](http://www.eatp.org)

## Rubber consumption

Based on figures through the first nine months of 2011, the IRSG (International Rubber Study Group) expects total rubber consumption to total 25.9 million tons in 2011, and 27.2 in 2012. Synthetic rubber (SR) demand is forecast to grow by 5.5% to 14.9 million tons in 2011, and by a further 5.5% to 15.7 million this year; natural rubber (NR) demand is forecast to rise by 2% to 11 million tons in 2011, and by a further 4.6% to 11.5 in 2012. Global NR production is forecast to rise by 4.4% to 10.9 million tons in 2011, and this year the output should expand at a higher rate of 5.1% to 11.4 million. IRSG reports that total global rubber consumption continued to increase in the third quarter of 2011, rising to 25.8 million tons on a MAT (moving annual total) basis in September 2011, up from 25.4 million in June. The rate of expansion has continued to decelerate, slowing down from 7.1 to 6%, respectively, over the same period. Global NR consumption





totalled 10.9 million tons on a MAT basis in September 2011, continuing to grow at a decelerating rate. Global SR consumption data were revised downwards in September 2011. Here, the rate of growth accelerated in the third quarter of 2011 as compared to the second quarter.

Global total NR exports expanded to 7.48 million tons in September 2011, 6.5% higher than exports at the same point in 2010. World total SR exports continued to expand during the third quarter of 2011, increasing to 8.6 million tons on a MAT basis in September 2011, rising from 8.5 million in June.

On aggregate, the trend of volume of exports of selected latex general rubber goods from the five leading countries appears to be continuing to decrease in the third quarter of 2011. It is still centered on the other gloves sector, and is driven by the weakened state of the global economy. Global NR latex consumption dropped by 3% in September to 1.3 million tons, and appears to be driven by NR-SR substitution in downstream latex industries as well as concern over slowing global NR demand in general rubber products.

[www.rubberstudy.com](http://www.rubberstudy.com)

### Polycarbonate demand

After demonstrating phenomenal growth during the 1990s due to its use in the production of CDs and DVDs, polycarbonate saw its demand fall in 2009 and rebound in 2010, but diversification to other uses, such as electronics, drove global growth for the polymer by around 3% in 2011, according to a new global market study from IHS.

Electrical and electronic applications are the largest end-use for polycarbonates, accounting for around 20% of global demand at around 720,000 tons in 2011. The key driver for this market will be the increased use of consumer electronics, such as tablet devices, flat screen televisions, mobile phones and office equipment, including printers. The sheet and film segment, which primarily serves the construction industry, represents 18% as well as optical media (CD/DVD); appliances and automotive (non-window usage) are at 12%. Other uses include auto glazing, medical equipment and instruments, sports, safety and recreational equipment, and packaging. As the trend toward larger TVs continues, polycarbonate is increasingly preferred over acrylic sheet for backlight diffusers, since greater dimensional stability is required, which cannot be offered by acrylic sheet, especially at the high temperatures generated in the backlight unit. These new applications for the polymer are an important factor for an



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industry that can no longer rely on optical media for the long-term growth of the business. Increasingly, optical media applications are being superseded by other technologies, as higher internet bandwidth allows consumers to download music and movies rather than buying the physical polycarbonate disc. According to the study, global demand for polycarbonate is expected to grow at an average annual rate of around 5% during the next five years, reaching around 4.5 million tons by the end of 2016. The fastest growth will be in the automotive glazing sector, albeit from a very low base. Polycarbonate has almost entirely replaced glass for headlights and taillights in automobiles and is making inroads into sun and moon roof manufacture, but if the automotive industry transitions to using this polymer to replace window glass, then it would be a game-changer for the polycarbonate industry as the demand growth would be phenomenal.

[www.ihs.com](http://www.ihs.com)

### Raw materials in Italy

In January, Federchimica (the Italian federation for the chemical industry) published the results of its six-monthly survey, which analyses in depth the economic and market situation of the chemical industry, and issues some forecasts for the various sectors. As usual, the results of this analysis pertaining to the sector of plastic materials and synthetic resins are summarised below.

Also according to data from Plastic Consult, the performance of the plastics market in Italy during the first 9 months of 2011 is disappointing. Demand for polymers on the part of processors was just above 4.6 million tons, that is to say down 2% compared with the same period in 2010, which had itself been very unsatisfactory. This negative trend was determined chiefly by polyolefins (-3.4%), which

account for 56% of plastics consumed in Italy. More specifically, there was a 4.2% drop for LDPE/LLDPE, principally attributable to film extrusion, which has felt the continuing crisis of stretch wrap and the collapse of shoppers (a prohibition on polyethylene bags came into force on January 2011); HDPE declined 5.5% as a result of the downturn in film and pipe sectors; PP fell by 1.8%, following the slowdown of film and fibre, which have long been suffering.

For what concerns the other plastic materials, the decline of polyamides (-2.4%) is noticeable, hurt by the crisis of the automotive industry, and of polyurethane foam (-1.6%), whose main destination markets, with the exception of bedding, are in notable decline. The only polymers which grew, though by a modest amount, are EPS (+1.5%), thanks to the increase in sheet thickness, followed by plasticised PVC (+0.9%) and PET (+0.3%).

In effect, all the factors responsible for depressing demand in last year continue to exist: stagnation in the building industry, uncertainty surrounding the recovery of industrial production, contraction in household consumption due to low purchasing power, now further eroded by the return of inflation, cuts to public spending and to investments in infrastructure. Added to this is the previously mentioned ban on PE shopping bags, which has caused a loss of significant product volumes.

Based on the results posted for the first nine months of the year, and the still-negative fourth quarter estimates (-3.6% compared to the same period of 2010), the year 2011 is expected to close with a disappointing overall trend for demand for plastic materials. The forecasts in fact point to a 2.5% decline relative to 2010.

[www.federchimica.it](http://www.federchimica.it)





## Exhibitions & fairs

April 2-5 - **NPE** (Orlando, United States)  
 April 10-13 - **Plastshow** (São Paulo, Brazil)  
 April 11-13 - **Plastic Japan** (Tokyo, Japan)  
 April 11-14 - **Indoplas** (Jakarta, Indonesia)  
 April 17-20 - **Tires & Rubber** (Moscow, Russia)  
 April 17-19 - **Utech Europe** (Maastricht, Netherlands)  
 April 18-21 - **Intermold** (Osaka, Japan)  
 April 18-21 - **Chinaplas** (Shanghai, China)  
 May 2-3 - **Plastec South** (Charlotte, United States)  
 May 8-12 - **PLAST 2012** (Milano, Italy)  
 May 10-13 - **Plas Tech** (Izmir, Turkey)  
 May 14-17 - **Plastivision Arabia** (Sharja, Saudi Arabia)  
 May 16-18 - **Plastex Caspian** (Baku, Azerbaijan)  
 May 16-18 - **Plastex Uzbekistan** (Tashkent, Uzbekistan)  
 May 16-18 - **N Plas** (Tokyo, Japan)  
 May 20-22 - **PPP Expo Africa** (Dar Es Salaam, Tanzania)  
 May 23-26 - **Expoplast** (Lima, Peru)  
 May 29-30 - **Plastics Design & Moulding** (London, United Kingdom)  
 May 29-June 1 - **Plastpol** (Kielce, Poland)  
 June 5-8 - **Vietnam Plas** (Hanoi, Vietnam)  
 June 18-22 - **Argenplas** (Buenos Aires, Argentina)  
 June 18-21 - **Rosplast** (Moscow, Russia)

June 19-21 - **Vietnam Plastics Fair** (HoChiMinh City, Vietnam)  
 June 21-24 - **Interplas Thailand** (Bangkok, Thailand)  
 July 18-20 - **High Performance Film Expo** (Shanghai, China)  
 July 19-22 - **M'sia-Plas** (Kuala Lumpur, Malaysia)  
 August 6-9 - **PMEE - Pyongyang Machinery & Equipment Exhibition** (Pyongyang, North Korea)  
 August 10-12 - **Sri Lanka Plast** (Colombo, Sri Lanka)  
 August 17-20 - **Camboplas** (Phnom Penh, Cambodia)  
 August 20-24 - **Euromold Brasil** (Joinville, Brazil)  
 August 20-24 - **Interplast** (Joinville, Brazil)  
 September - **Iranplast** (Tehran, Iran)  
 September 4-6 - **Plasti&Pack Pakistan** (Karachi, Pakistan)  
 September 6-9 - **Plastex** (Cairo, Egypt)  
 September 10-14 - **Plastex** (Brno, Czech Republic)  
 September 12-14 - **Expo Plasticos** (Guadalajara, Mexico)  
 September 13-16 - **Rubber Fair** (Istanbul, Turkey)  
 September 17-19 - **Kenya Plast** (Kenyatta, Kenya)  
 September 19-22 - **Sistep Midest** (Casablanca, Morocco)  
 September 20-22 - **China Injection Moulding** (Tianjin, China)  
 September 21-25 - **Taipeiplas** (Taipei, Taiwan)  
 September 24-27 - **Plast Alger** (Alger,

Algeria)  
 September 25-26 - **Mediplas** (Birmingham, United Kingdom)  
 October 1-5 - **Colombiaplast** (Santa Fè De Bogotà, Colombia)  
 October 3-6 - **Expoplast** (Bucarest, Romania)  
 October 5-8 - **Indiplas** (Kolkata, India)  
 October 10-13 - **Plastics & Rubber Indonesia** (Jakarta, Indonesia)  
 October 16-20 - **Fakuma** (Friedrichshafen, Germany)  
 October 16-18 - **Plasto Ispack** (Tel Aviv, Israel)  
 October 23-26 - **Plastics Industry Show** (Moscow, Russia)  
 October 24-27 - **Vietnam Plas** (HoChiMinh City, Vietnam)  
 November 2-October 31 - **Plastex Ukraine** (Kiev, Ukraine)  
 November - **Feiplar Composites** (São Paulo, Brazil)  
 November 7-9 - **Jec Americas** (Boston, United States)  
 October 9-11 - **Brityrex** (Manchester, United Kingdom)  
 November 14-15 - **Expoplast** (Montreal, Canada)  
 November 14-16 - **Rubbertech** (Shanghai, China)  
 November 27-30 - **Euromold** (Frankfurt, Germany)  
 November 28-December 2 - **Saurashtra Plast** (Rajkot, India)  
 November 29-December 2 - **Plast Eurasia** (Istanbul, Turkey)  
 December 13-16 - **Bakumach** (Baku, Azerbaijan)

## Future zone in Shanghai

Undoubtedly, industrial plastics can fit well into the advance development of the automotive industry, to pursue with the emphasis of energy saving, environmental friendliness and enhance safety. Plastics usage in the making of automotive is under rapid growth and such trend is expected to continue in the coming years. The use of plastics in this industry in developed countries accounts for 7% of total plastics consumption and is expected to reach 10-11% soon. Based on this upward trend, it is believed that the ideal scenario of producing the 100% plastics-made automobile will turn into reality in near future. Staging its 26th edition, Chinaplas 2012 (Shanghai, April 18-21) has reached an exhibition area of 200,000 sqm occupying all 17 exhibition halls. More than 2,600 exhibitors from 35 countries and regions and over 100,000 visitors from 140 countries are getting together in this vast professional event. The organizer, Adsale Exhibition Services, strives to contribute to the plastics and rub-



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ber industries, to ride on its effective communication platform to promote sustainable properties of plastics and rubber in different applications, and to cultivate, develop and promote the forward-looking "green" concept. Through the collaboration between students of university, experts from the automotive and the plastics/rubber industries, a concurrent event named Future Zone is being held during the show period. The concurrent event is composed of two parts: the first (Nurturing Our Future) combines plastics & rubber applications, technology and innovation that lead to a brand new design of a future car; the second (Premium Design Gallery) showcases a series of new, unique design of various plastic-made end products. This program is to promote cooperation between the

commercial and academic field in terms of three aspects: application, technology, innovation-theory.

Supporting partners and co-organizing units for the event include East China University of Science and Technology, Shanghai Society of Plastics Industry, Shanghai Automotive Trade Association, and Asso-comaplast (the Italian plastics & rubber processing machinery and moulds manufacturers' association).

The winning entry of Future Car - which is made as a model for display at the Future Zone of Chinaplas 2012 - is being selected by a judging panel comprising experts in the plastics and automotive industry, the representatives of university and the organizer. The major selection criteria stresses on the degree of eco-friendliness, the

extent on improving our future living with high level of creativity.

In addition, the Premium Design Gallery is showcasing the stunning local and overseas new products at the exhibition onsite. Exhibitors invited their clients to display products which are brand new to the market, with major parts made of plastics/rubber that are environmental friendly and can better the quality of our living. The display items have to fall into categories of future transportation vehicle, appliances, architecture and packaging, with written description putting next to the product to elaborate its special features and outstanding application concept to the visitors.

[www.ChinaplasOnline.com](http://www.ChinaplasOnline.com)

## Meetings & congresses

### Australia

October 7-10 - **Cairns**: "International Symposium on Biopolymers"

### Austria

April 24-26 - **Wien**: "Stretch & Shrink Film"

### Belgium

April 19-20 - **Bruxelles**: "Polymer Rheology and Extrusion"

May 9-10 - **Bruxelles**: "Food Contact Plastics"

### Brazil

November 9 - **Rio de Janeiro**: "Advances in Technologies for Production of Basic Petrochemicals, Polymers and their Products"

### Germany

April 24-26 - **Köln**: "Polymers in Photovoltaics"

May 14-16 - **Hamburg**: "Polymer Sourcing"

June 19-20 - **Fellbach**: "Global WPC and Natural Fibre Congress"

June 20-21 - **Düsseldorf**: "World Symposium on Performance Films"

July 2-5 - **Nürnberg**: "German Rubber Conference (DKT)"

October 8-9 - **Düsseldorf**: "Composite and Reinforced plastics"

October 16-18 - **Köln**: "Multilayer Packaging Films"

October 23-25 - **Köln**: "Polyolefin Additives"

November 6-7 - **Berlin**: "European Bioplastics"

### Italy

April 19-20 - **Parma**: "Congress on Biodegradable Polymer Packaging"

April 26-27 - **Venezia**: "European Thermoforming Conference (SPE)"

May 7 - **Assago**: "Polymer Insights"

May 9 - **Milano**: "Earth, Water, Air. Impacts and Sustainability of PVC"

May 9 - **Milano**: "Italian Research on

### Active Packaging"

May 9-10 - **Milano**:

"SPE Italian Technical Meeting (I-tec)

May 10 - **Milano**: "EPS between Energy and Environment"

May 10 - **Milano**: "Quality Marks as Tool to Increase Organizations Competitive Development"

May 10-11 - **Milano**: "Biodegradable Polymer Packaging (Biopolpack)"

May 11 - **Milano**: "Thermally Conductive Polymer Nanocomposites"

May 11 - **Milano**: "Smart Plastics for a High Quality Supply Chain in Agriculture"

May 11 - **Milano**: "Plastic Materials Coating Innovations (Verplast)"

May 21-25 - **Gargnano**: "Polymer Synthesis (AIM)"

May 29-31 - **Torino**: "Assocompositi Italian congress"

June 3-7 - **Gargnano**: "Porous Polymer-Based Systems (Eupoc)"

June 10-14 - **Ischia**: "Times of Polymers and Composites (TOP)"

June 24-28 - **Venezia**: "European Conference on Composite Materials (ECCM)"

July 3-6 - **Ustica**:

"Italian Congress on Rheology"

October 15-19 - **Riccione**: "ISO TC 45 Congress - Rubber and Rubber Products"

### Netherlands

April 17-19 - **Maastricht**:

"Urethanes Technology (Utech)"

May 20-23 - **Kerkrade**: "Sustainability in Polymer Materials"

### Norway

May 14-16 - **Oslo**: "Advanced Rubber Technology for Demanding Applications in the Oil and Energy Industry (Rubber-Con)"

### Singapore

May 23-24 - **Singapore**:

"World Rubber Summit"

June 26-28 - **Singapore**: "Innovative Composites Summit (JEC Asia)"

### South Korea

May 21-24 - **Jeju**:

"International Rubber Conference (IRC)"

### United Arab Emirates

April 3-5 - **Dubai**:

"GPCA Plastics Summit"

May 15-16 - **Dubai**:

"Middle East Plastic Pipes"

### United Kingdom

May 29-30 - **London**: "Plastics Design and Moulding Summit"

July 4-5 - **Bristol**:

"Composites Innovation"

October 23-25 - **London**:

"Oilfield Engineering with Polymers"

### United States

April 2-4 - **Orlando**: "SPE Annual Technical Conference (Antec)"

April 18-19 - **Miami**: "Polymers in Cables"

May 8-9 - **Miami**:

"Bioplastics Compounding & Processing"

June 19-20 - **Chicago**:

"Thin Wall Packaging"

June 26-27 - **Chicago**:

"Multilayer Packaging Films"

August 25-26 - **Minneapolis**:

"Durable Bioplastics"

August 26-29 - **Columbus**:

"Global Polymer Innovation"

September 11-13 - **Troy**: "Automotive Composites Conference"

September 24-26 - **Atlanta**:

"Polyurethanes Technical Conference"

October 9-10 - **Newark**:

"Polymer Foams"

November 6-7 - **Philadelphia**:

"Stretch & Shrink Film"

November 7-9 - **Boston**:

"Summit on Innovative Composites

(JEC Americas)"



## Composites on the lagoon

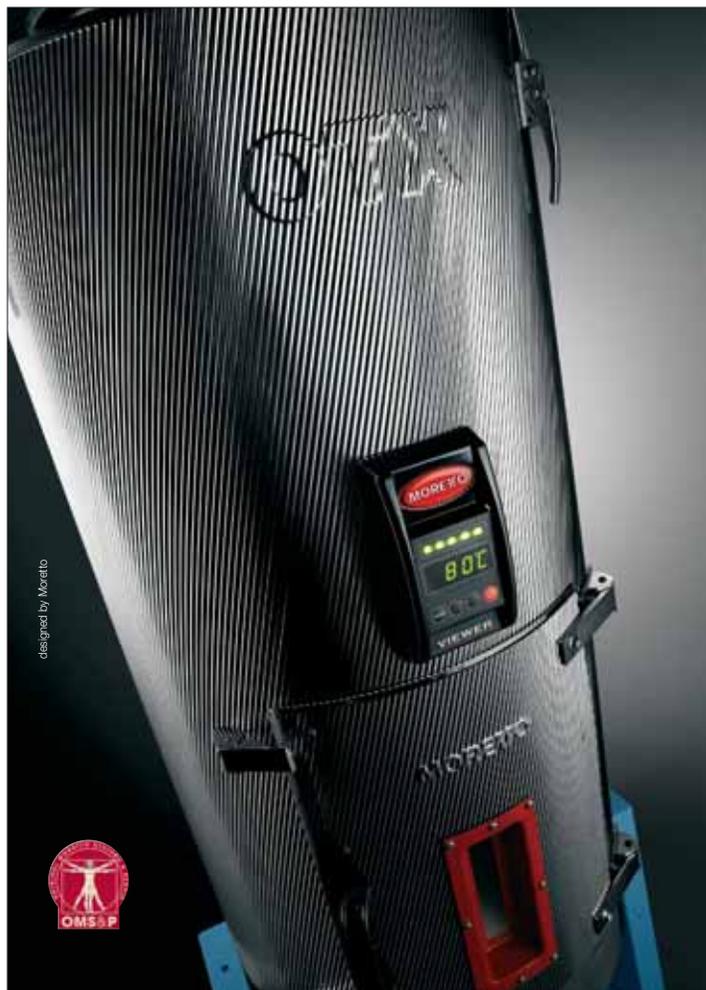
The 15th edition of ECCM (European Conference on Composite Materials) - to be held in Venice (Italy) on June 24-28 - is organized by the University of Padua (Department of Management and Engineering) in cooperation with two regional districts for nanotechnology (Veneto) and composite materials (Campania), respectively. The overall results of abstract submission is outstanding: more than 2,000 contributions collected and more than 2,400 registrations from 90 countries worldwide, an attendance that goes well beyond the European borders.

The conference already shows all the conditions necessary to become the most important scientific event in the world history of composite materials, covering all the areas related to the development of components made of these materials: from the formulation and production of innovative materials to the designing of components for conventional and advanced applications.

Besides usual topics of the conference, such as strength and fracture toughness, computation methodologies and manufacturing technologies, special attention will be paid also to natural composites, "green" and recyclable, made with natural fibers and biodegradable matrices. There is also a huge number of contributions in the field of nanocomposites and nanotechnology applied to polymers and composites. Finally, materials for renewable energy are another increasingly important subject.

The conference is aimed at enhancing the cultural exchange and the interaction between academic research and the industrial world, stimulating and supporting the innovation on composite materials, especially considering the difficult moment for the industry and the world economy. In this perspective the organizing committee has planned more than 50 thematic sessions, organized by world experts, and several roundtables on topics of industrial interest.

[www.eccm15.org](http://www.eccm15.org)



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## Porous polymers

The series of annual Europolymer Conferences (EUPOC) - organised by EPF (European Polymer federation) on topics of recent scientific and industrial interest - is a prestigious activity of AIM (Italian association of macromolecule science and technology), sponsored by the University of Milan. The 2012 edition - to be held on June 3-7 in Gargnano (Brescia) - is focused on the theme of porous polymer-based systems from design to application. Chairmen of the scientific committee are M.S. Silverstein (Technion - Israel Institute of Technology) and D. Grande (CNRS - Université Paris-Est), while the managing responsibility and competence have been committed to the EPF president, G. Galli (University of Pisa).

There is a recent confluence of fundamental R&D work being conducted on porous polymeric systems by a variety of different research communities. A large number of innovative routes to these has been explored, generating new materials with wide-ranging technological applicability. As the need for porous polymers with more complex structures and functions has increased, so has the ability to synthesize such systems with tuneable mechanical properties, well-defined pore sizes, pore wall functionalities, and controlled pore size distribution and interconnectivity. Moreover, such polymers can be generated with inherent microporosity (subnanometer-scale pores) or with templated macroporosity (micrometer-scale pores). The recent advances extend beyond the ability to synthesize novel porous polymers. These new materials challenged the capabilities of standard characterization methodologies. In response, innovative characterization methodologies were developed to provide insight into the porous structures and their effects on material properties.

[www.dcci.unipi.it/eupoc2012](http://www.dcci.unipi.it/eupoc2012)

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# ETHICAL AND AESTHETIC RECYCLING

**U**pcycling - or the art of giving a second life to objects - was born in developing countries, where access to consumer goods is limited and systems for waste collection and processing are often non-existent, and it has now spread to the developed countries, which find it a major source of inspiration. All this is evidenced and widely documented in a serial article (which is summarized below) appeared in *Plastics The Mag* magazine published by *PlasticsEurope*.

Upcycling means recycling from the bottom up. A new generation of designers are no longer content with recovering materials and objects in order to give them a second life; they are enhancing these materials so that the result is more attractive than the initial product: an aesthetic and ethical approach, with a strong emphasis on the notion of creation.

Upcycling is reusing, but not just in any old way: the object is appropriated and modified to make it original and useful. It is often removed completely from its regular use and given a new purpose. Upcycling is not "turning old things into new things," it is avoiding throwing away things which could still be useful when they are transformed with a little imagination. Few or no new resources are used in creating such an object, thus minimising the impact on the environment as far as possible.

In both upcycling and recycling, an object at the end of its life is recovered to make another one. But whereas recycling involves chemical processing, upcycling does not change materials chemically. It can also be said that a recycled product will often be of quality equal to that of the original material. With upcycling, an attempt is made to add value to the product, often in an artistic manner.

Whatever the case may be, it can be considered that upcycling is a form of recycling. We should add that recycling can be carried out on a large scale whilst upcycling remains something of a private affair. A little like the difference between industry and crafts.

From time immemorial, artists in the developing countries, Africa in particular, have been skilled in giving new life to the most banal of objects. Recovering things that are no longer of any use, adding value to handmade objects, recycling or reprocessing materials from waste. There are many examples of artists, associations and communities which have incorporated upcycling into their everyday lives and have brought their local and traditional know-how to the fore.

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Accra, Ghana, the streets are littered with small plastic bags, like everywhere in Africa. These bags, sold in shops or peddled in the street, are used as containers for drinking water. Very cheap and practical, they are thrown away as soon as they are used. An English entrepreneur, Stuart Gold, had the idea of founding an NGO with the view of clearing these bags from the streets, trees and waterways and at the same time creating jobs for the population. This was how *Trashy Bags* came to be, today manufacturing 350 models of handbags, purses, raincoats etc., produced from the 20 million or so bags collected. *Trashy Bags* encourage citizens to bring in used bags, which are washed, dried, flattened, cut up and finally assembled by some sixty workers to turn them into the final product: trendy, unique and colourful fashion accessories. Florie Salnot, winner of the *Coca Cola* sustainable design competition in 2010,



SARAH TURNER

has been working for two years on a promising technique, collecting plastic bottles and using hot sand and simple techniques with a human and social vocation in order to produce jewels, handbags and carpets. For her project to see the light of day, Florie set off for the Algerian desert to make use of materials available on the spot: old plastic bottles and hot sand. There, groups of Sahrawi women weave fine strips of plastic, cut from the bottles, to produce all sorts of geometrical shapes. They are then plunged into burning sand where the plastic melts and then sets. The jewel is then virtually ready to be worn. The objective has been attained: creating value and reviving the craft traditions of a forgotten people in an extremely arid part of the world.

The *Gafreh* association in Burkina Faso is an eco-responsible initiative which combines the fine leatherwork know-how of Yves Saint Laurent with the craft skills of the women in the association. They have developed a unique technique allowing a textile to be produced from old plastic bags and woven cotton. From this happy marriage of two universes far apart, a beautiful bag has been born, the *Muse Two Artisanal Recycled* bag. Produced in a limited run of 60, it will only be available to a fortunate few.

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In the West, a growing environmental awareness and the economic slowdown have precipitated upcycling. Local initiatives, exhibitions and happenings have multiplied and companies such as *Terracycle*, *Upcycle Living* or *Enviroglas*





have rapidly developed. All over Europe, new shops have been opened. And a few companies realised, several years ago, that this concept had some promising days ahead for itself. In 2006, Jean-Marc and Marie Imberton launched Reversible, which has quickly become a reference in fashion bags and accessories made of reused sheeting. For this, they have organised the collection and recovery of, among other things, old PVC advertising posters put up by large companies and are trying to give a second life to these materials. They have thought up a whole series of products ranging from bags to iPad cases, poufs and lamps. Today, Reversible accessories are sold all over the world. The company's charm lies in its joyful designs, its constant search for materials (recently, vinyl floor coverings, i.e. lino) and also its care in recycling its own products. Marie and Jean-Marc Imberton want Reversible to be seen not only as a brand of articles made from recycled materials but also as a leading-edge eco-design company. In 1993, brothers and graphic designers Markus and Daniel Freitag were looking for a messenger bag. In fact, real Zurich people get around on bikes. And they often find themselves out in the rain. For their designs, the Freitag brothers wanted a solid, functional and watertight bag. Inspired by the colourful stream of heavy goods vehicles passing outside their apartment and on the roads of Zurich, they cut out a messenger bag from an old lorry tarpaulin. For the strap they used an old car safety belt and for the stitching an old bicycle inner tube. Today, Freitag products are on sale worldwide, however they are still made in Switzerland, close to the roads that inspired them. Because they come from original sheeting materials and in different colours, cuts and patterns, all Freitag products are unique. In the UK, E&KO (Elvis & Kresse Organisation) is offering a new range of accessories in PVC (handbags, belts, schoolbags etc.) made from old fire hoses salvaged from fire stations. The insides of the bags are lined with old parachute silk. Each bag is handmade, unique and, of course, strong. As a mark of gratitude to British firefighters, 50% of the profit from sales goes to a Fire Fighting Charity. These trusty old fire hoses, enjoying a second life after 25 years of loyal service saving lives and property, are not the only materials to be reclaimed by E&KO: pieces of sailcloth, old sunglasses, their cases, pallets etc., are also recovered and turned into deco- and fashion accessories with very contemporary looks. Products fired with imagination.

[www.plastics-themag.com](http://www.plastics-themag.com)



## Recycling in Italy

The results of the annual survey on recycling in Italy - commissioned by FISE Unire (the Italian association representing waste recovery contractors) - reveal that in 2010 plastic packaging recycling volumes rose 1.3% compared to 2009, with 711,000 tons of waste - corresponding to 34.3% of the consumption volume - sent for recycling. A total of 743,000 tons of packaging were consigned to energy recovery (+7.2%), accounting for 35.8% of the consumption volume. Overall, 614,000 tons of plastics were collected, equivalent to 10.4 kg per capita, with an increase of just 4% in the separate collection of packaging over the previous year, due to various factors: the financial crisis, a decline in consumption, and failure of collection to expand in certain regions, some of which densely populated. In Italy, the material recovered from the separate collection of municipal waste is marketed by Corepla (the national consortium for the collection, recycling and recovery of plastic packaging waste) primarily through electronic auctions, and is reserved exclusively for Italian or EU recyclers which undertake to carry out the recycling within the European Union. For this material stream, Italy is prevalently an importer from other European countries, especially France, Germany, Belgium and Austria, and an exporter toward the rest of the world. France is once again the top source country, supplying more than 53,000 tons of recovered plastics to the Italian mar-

ket. Italian exports, meanwhile, are mainly directed towards China (165,657 tons) and the US (15,476 tons). The forecasts for the three-year period 2011-2013 indicate an average annual growth rate of around 3.5% in the volume packaging waste sent for recycling, to reach 813,000 tons by 2013. There is an increasing diversity in the plastics used for the original production of packaging, and in the manner in which they are combined and processed: packaging is becoming ever more complex and high-performing with respect to its original function, but this can entail greater difficulties when it comes to recycling. It is necessary to develop ever more sophisticated technologies for processing miscellaneous plastics, possibly in combination with virgin materials, to enable the manufacture of ever more advanced products with higher added value.

[www.fise.org](http://www.fise.org)





# Booming bioplastics

**A**ccording to a new market report from BCC Research, the global market for bioplastics totalled more than 850,000 tons in 2011 and is expected to increase to more than 3.7 million in 2016, at an annual growth rate of 34.3%.

The European region amounted to nearly 307,000 tons in 2011 and is expected to increase at 32.1% per year to exceed 1.2 million in 2016. The Americas have nearly identical: in 2011 the market segment totalled more than 307,000 tons, and in 2016 that volume should approach 1.3 million (+32.9% per year). A smaller market, Asia held nearly 195,000 tons in 2011 and in 2016 that volume should reach nearly 1.1 million (+41.1%). The rest of the world totalled more than 44,000 tons that should become 132,000 by 2016 (+24.5%).

Global economic weakness slowed growth of bioplastics demand from 2009 to 2011, but support from powerful companies is spurring real growth of the renewably sourced plastics business. Another important factor is the Chinese government's growing support for agricultural development in areas such as bioplastics as a way to prop up the standard of living in the country's rural regions. Major indigenous producers of starch plastics and other types of bioplastics are rapidly emerging, changing the shape of the marketplace. Brazil and Thailand also are emerging as bioplastics-producing powerhouses.

[www.bccresearch.com](http://www.bccresearch.com)

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The global bioplastics market is expected to reach revenues of more than 2.8 billion dollar in 2018 - corresponding to an average annual growth rate of 17.8%, according to the latest study published by Ceresana Research. With a roughly 48% share of global demand, Europe was the largest outlet for bioplastics in 2010, followed by North America and Asia-Pacific.

Over the next eight years, shares in demand of the individual world regions will shift significantly. Two regions will considerably influence the bioplastics market: Asia-Pacific and South America.

Demand trends of the individual bioplastic grades show significant regional differences. While PLA demand in North America is projected to rise by 12% per year by 2018, it will soar by almost 17% per year in Asia-Pacific. In 2010, most demand was accounted for by starch-based plastics, followed by polylactic acid (PLA). Other bio-based plastics (PHA/PHB, cellulose, PBS) as well as fossil-based biodegradable plastics accounted for just less than 17% of global demand. Accordingly, biodegradable plastics are currently dominating the bioplastics market with a roughly 92% share. Non-biodegradable plastics based on renewable resources are forecasted to increase their market share



NOVAMONT

from 8% in 2010 to more than 47% in 2018.

[www.ceresana.com](http://www.ceresana.com)

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Global demand for biodegradable and bio-based plastics will more than triple from 300,000 tons (2010) to over one million tons in 2015, valued at \$2.9 billion - according to another study from Freedonia Group. Gains will be fuelled by a number of factors but ultimately, however, price considerations will be the primary determinant of bioplastic market success.

Biodegradable plastics accounted for 90% of the world bioplastics market in 2010. Excellent growth is forecast for the two leading biodegradable materials, starch-based resins and polylactic acid (PLA), both of which will more than double in demand

through 2015.

Despite the strong advances for biodegradable, non-biodegradable bio-based resins will be the primary driver of bioplastics demand through 2015 and beyond. Gains will be fuelled by the availability of commercial quantities of bio-based polyethylene from Braskem's 200,000-tons-per-year plant in Brazil, which opened in late 2010. Two other bio-based polyethylene plants - as well as a bio-based polypropylene facility - are also in the planning stages and are expected to open around 2015. Additionally, industrial production of fully bio-based PET is forecast to become a reality by the end of the decade. As a result, demand for non-biodegradable bioplastics will rise from 30,000 tons in 2010 to 1.3 million tons in 2020.

[www.freedoniagroup.com](http://www.freedoniagroup.com)

## Crumb rubber for asphalt

**E**very year in Italy, some 25 million tires are discarded (in Europe the total is over 250 million), amounting to some 400,000 tons in weight, of which around 45% are consigned to energy recovery (in Italy and abroad), just under 25% are granulated, and 30% still end up in landfills.

The use of granulate, or crumb rubber from discarded tires, as an additive for road surfaces, is an interesting application, also in volume terms, for the recycling of tires at end of life. The "wet" technology has been successfully implemented with the development of suitable standards for the design and laying of special asphalt compounds, termed "gap-graded" or "open-graded", depending on their functional and structural characteristics.

Recent studies conducted by Turin Province and Politecnico di Torino have examined the use of gap-graded compounds as road paving materials. The goal of the project is to develop and deploy in-

novative technologies capable of extending the use of crumb rubber from scrap tires in road paving, with a particular emphasis on solutions that offer an optimal balance between satisfying technical, economic and environmental requirements. Starting in 2008, the Province administration commissioned Politecnico di Torino to conduct a comprehensive R&D project, which last autumn resulted in the surfacing of approximately 1600 metres of the Borgaro-Venaria ring road with asphalt concrete containing crumb rubber additive from scrap tires.

The Tyrec4life project, which has a duration of 36 months and an overall cost of approximately 3.5 million euro, co-financed by the European Union, proposes to validate alternative compounds with the aim of improving the performance of asphalt mixes in terms of drainage, skid resistance and traffic noise reduction.

[www.provincia.torino.it](http://www.provincia.torino.it)



# Natural bottles

Last December Coca-Cola announced multi-million dollar partnership agreements with three leading biotechnology companies (Virent, Gevo and Avantium) to accelerate development of the first commercial solutions for next-generation PlantBottle packaging made 100% from plant-based materials.

This packaging is the only fully recyclable PET bottle made with up to 30% plant-based material available today. It is made up of two components: MEG (mono-ethylene glycol), which makes up 30% of the PET, and is already made from plant materials, and PTA (purified terephthalic acid), which makes up the other 70%. In this next step, PTA will be replaced with plant-based materials, too.

Since introduced in 2009, more than 10 billion PlantBottle packages have been already distributed in 20 countries worldwide. It is estimated the use of this packaging in the first two years alone has helped save the equivalent annual emissions of more than 100,000 tons of carbon dioxide.

Virent's technology features catalytic chemistry to convert plant-based sugars into a full range of products identical to those made from petroleum, including bio-based paraxylene - a key component needed to deliver 100% plant-based PET

packaging. PET made from bio-based paraxylene features the same high quality and recyclability as materials used today, with the added benefit of being made from a wide range of renewable materials.

Gevo is converting existing ethanol plants into biorefineries to make renewable building block products for the chemical and fuel industries.

The company plans to convert renewable raw materials into isobutanol and renewable hydrocarbons that can be directly integrated on a "drop in" basis into existing chemical and fuel products to deliver environmental and economic benefits. Avantium has developed the YXY technology to produce 100% bio-based PEF bottles. PEF (polyethylene furanate) can be derived from any biomass feedstock containing carbohydrates, such as sugarcane, agricultural residues, plants and grains. Using YXY as a fast and efficient chemical-catalytic technology, these carbohydrates can be converted into bioplastics.

Current estimates indicate that PEF will be a viable alternative to petroleum-based PET. It is 100% biobased and when commercialized will be fully recyclable. Early in December, Avantium officially opened its pilot plant in the Netherlands, to start



up its YXY process at scale. The pilot plant, with a capacity of 40 tons per year, produces PEF material for application development. The collaboration with The Coca-Cola Company is key to secure a smooth transition into the mass production phase of PEF bottles

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## Agricultural waste

**D**uring their lifetime, plastic-based products such as films, bale nets, yarns, irrigation hoses and packaging act as versatile and highly valuable aids to the agricultural economy. Yet, at the end of their useful service life, they turn into awkward waste requiring disposal. Into the container and off to landfill - that is the most frequently-chosen and, at the same time, worst route.



There is a lot of good will to do things better amongst those involved. But there is still a lack of sustainable and practical disposal concepts in the majority of European countries. A recently-formed working group by EPRO (European Association of Plastics Recycling and Recovery Organisations) is now working on the development of new, forward-thinking solutions to address this issue.

The total amount of plastics used in agriculture is considerable. Almost half is processed for use in films. Approximately 1.2 million tons of agricultural plastics require disposal each year, yet only 22% of this amount is recycled. Over half, more than 600,000 tons, ends up in landfill. Around 26% is used for energy recovery. There is enormous room for improvement in these figures. To date it is only a handful of European countries that have efficient systems. They are either the result of legal requirements, such as in Ireland or Iceland, or of voluntary industrial, trade and agricultural initiatives (for instance in Germany, France, Norway, Sweden and Spain).

In the majority of European countries - par-

ticularly in Eastern Europe - there is still no controlled recovery system. Pan-European legislation relating to the recovery of non-packaging plastics used in agriculture does not exist.

At the start of March 2011, EPRO initiated a new, cross-border work group entitled Agricultural-Plastics, which currently has 14 members from France, Norway, Sweden, Iceland, Germany, Ireland, Switzerland, United Kingdom, Spain, Belgium and Romania. The majority of its members are representatives of national, established or emerging recovery schemes.

The group's overriding intentions are the exchange of information on existing disposal solutions, the ecological and economical enhancement of existing recovery systems and the provision of support for new systems in countries where, to date, no activities in this regard have been undertaken. A further objective is the initiation of intensive discussions with external partners from industry, trade and agriculture.

[www.epro-plasticsrecycling.org](http://www.epro-plasticsrecycling.org)

## Recycled on the bridge

**T**he completion of Europe's first recycled plastic bridge has been announced last December by Axion International. The materials for the bridge consist of innovative RSC (Recycled Structural Composite, which is designed from 100% recycled plastic. The bridge, which was prefabricated in the US and transported to Scotland via container ship, now spans the river Tweed near Edinburgh.

The bridge, which consists of three spans, is approximately 3.5-m wide and 27-m long and was used to replace an old steel beam and timber deck road bridge. The entire construction project (including dismantling of the old bridge) was completed in under two weeks. Being made from plastic, the bridge will not rot, rust or corrode, and requires no painting or regular maintenance. In addition, it is 100% recyclable at the end of its useful life.

The remarkably fast erection time of only 4 days is a major benefit of the composite material, as it substantially reduces the complexity and cost of construction, and is good for the environment as well. Moreover the project was able to save 50 tons of plastic waste from going into landfill or being shipped to Asia.



AXION

[www.axionintl.com](http://www.axionintl.com)

## Youth Parliament

**A** Bulgarian student, Svetoslav Kostov, has won the European final of the third edition of PlasticsEurope's Youth Parliament Debate which took place in Rome on March 16. The young winner was the best at providing a well-rounded speech on sustainability and the role of plastics in this regard, with strong rhetorics and robust arguments.

He was elected by an international jury composed of politicians, experts and journalists who judged a debating competition between 50 students from across Europe. An Italian student, Carla Biondo, and another Bulgarian, Georgi Kotov, won the second and third prize respectively.

The Youth Parliament debate was thrown open by Francesco Ferrante, member of Environment Commission of the Italian Senate. He talked about the positive economic and environmental impact of the plastics industry, as well as the responsibility of plastics producers in helping secure a sustainable future where the legacy of Nobel Prize Giulio Natta would be perpetuated. Plastics pros and cons were then introduced by Onno Gross, president of Deep Wave, and Giuseppe Lo Faso, plant manager at Polimeri Europa.

The European final was the result of a long process that led to 50 students being selected out of 500 participants. PlasticsEurope wanted to raise the interest of young people over important issues such as climate change, the identification of new technologies for energy supply and the fundamental role of plastics in society. This pan-European debate is an effective way to educate students to a deeper and critical reading of these issues.

Many interesting points, either for or against plastics, were raised during the event. In their arguments against plastics, students mentioned bad littering habits and poor waste management practices, as well as the need for research on new raw materials that would either be easier to recycle or biodegradable. Another concern was the risk of plastics waste entering the food chain.

The main arguments in favor of plastics, on the other hand, were the idea that consumer behaviour plays a key role in minimising the impact of plastics on the environment, as well as its crucial role for innovation and in green applications such as insulation, wind turbines or environment-friendly cars.

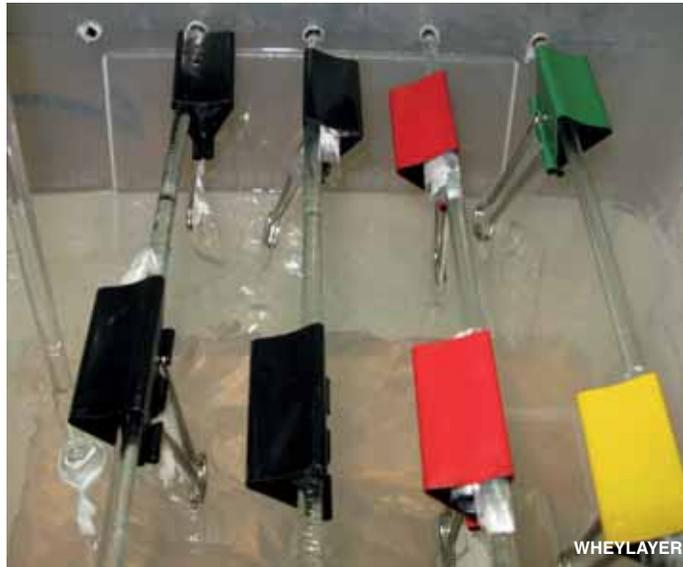
[www.plasticseurope.org](http://www.plasticseurope.org)



## EUROPEAN PROJECTS

### Barrier whey-coating

The EC-funded Wheylayer project successfully finished in October 2011 after developing a whey protein-coating for plastic films to replace currently used oxygen-barrier layers in packaging and allow the recyclability of multilayer films. The coating achieved superior oxygen and humidity barrier properties compared to most other bioplastics and approaching those of synthetic materials such as EVOH. In addition, Wheylayer-based laminates comply with the requisites of the packaging industry in terms of thermo-mechanical properties, food contact and processability. They are expected to be used mainly for the packaging of sensitive food as well as cosmetics or pharmaceutical products. Earlier in the project, suitable formulations were developed at Fraunhofer Institute (Germany) showing that the process controls the structure of proteins and the resulting properties of the coating which led to a patent filing. More recently, the lab-scale and pilot process was upscaled by Iris (Spain) to test in semi-industrial configuration: production speed was increased by a factor 10 and energy consumption was reduced while still maintaining good material properties. The project mainly focused on producing films and derived laminates but the whey-coating is expected to be used for different types of packaging. Preliminary feasibility tests were also done for the production of blisters by Serviplast (Spain), specialized in thermoforming. The research center TTZ Bremerhaven (Germany) has also recently demonstrated the possibility of substituting standard multilayer films with laminates including Wheylayer while preserving food quality and shelf life as a conclusion of storage tests of food products such as cheese. In parallel the environmental impact of the material has been evaluated by the University of Pisa (Italy) showing the significant advantages in terms of Human health, ecosystem quality and resources. They also showed that using an enzymatic cleaning compatible with current plastic recycling operations, the whey-coating can be removed to allow recycling multilayer packaging. The cheese maker Mlang (Germany) and the members of the dairy cooperative Llet (Spain) are also keen in developing their



capabilities of protein isolation to supply the whey for the coating application and to pack their cheese with a material obtained from their by-product. Highly successful industry-focused demonstration events were held by the consortium (in Spain, Slovenia, Italy and Hungary) at the end of the project for presenting the new packaging material and its process prototype. Overall, the potential for using whey-coating in packaging is high due to number of ecological advantages it presents compared to barrier polymers that are available today while keeping required technical performance. In terms of environmental advantages, the holistic "cradle-to-grave" approach followed throughout the material and process development provided a new solution with increased sustainability to packaging producers and consumers. Indeed as

opposed to price increasing depleting fossil resources currently used, the developed low carbon footprint bio-sourced coatings valorize a by-product from the agro-food industry that can be highly polluted due to its high organic content if not handled correctly.

[www.wheylayer.eu](http://www.wheylayer.eu)

### Natural fibres for composites

In recent years there has been much interest in developing natural fibre-reinforced polymers for a sustainable substitution of synthetic materials, and also to develop markets for the European non-food crop industry sector. As natural fibre crops cannot be easily separated into fibres of consistent quality, new research was undertaken to reduce processing costs and improve fibre quality, consistency, and efficiency. Partly funded by the European Commission under its FP7 (Framework 7) programme, the UltraFibre project brought together 11 partners including industrial companies, trade associations and research partners - coordinated by Assocomplast (the Italian association for manufacturers of plastics and rubber machinery & equipment) with the support of Smithers Rapra. Started in December 2010, the project aims to develop a hydro-acoustic radial cell decortication process for the clean, continuous, high volume production of high quality natural fibres and an atmospheric plasma treatment system for improved adhesion between polymeric materials and the natural fibres





A flow through ultrasonic processor unit was developed. The treatment removes surface contaminants: consequently it reduces fibre bundles to elemental fibres with clean surfaces for enhanced adhesion prior to plasma treatment. Sonicating the fibres in conjunction with a caustic pre-treatment increases elemental fibre content from 40 to 80%. This affords a greater and cleaner surface area for plasma treatment and therefore a better adhesion to the polymer matrix is expected, thus increasing the mechanical properties of the composite.

[www.ultrafibre.org](http://www.ultrafibre.org)

### Recycling for food contact

The European Commission granted a financial contribution for research under the Seventh Framework Programme to develop processes and quality procedures for the valorisation of recycled plastics for food contact applications. The 3-year SupercleanQ project, started on November 2011, consists of a 12-partner (from United Kingdom, Italy, Belgium, Netherlands and Germany) consortium that has secured more than 1.9 million euro of EU funding to develop quality assurance tools and procedures for plastics recycling processes targeted at food contact applications.

The tools will be applied to a new process for the recycling of coloured and layered PET into food contact applications that cannot be processed by current PET recycling facilities. The project results will accelerate the development of new recycling processes for the wider food contact materials market and provide quality assurance for converters and end-users of recycled products applications for food contact thereby overcoming barriers and

expanding this high value recycling market. The advancements over the current state of the art are expected to be: a post-market challenge test for validation of recycled food contact materials with 100% reliability; a post-process validation quality protocol for assuring the efficacy of plastics recycling processes for food contact applications with 100% reliability; development of a process to recycle the 700,000 tons per year of currently unrecyclable coloured and layered PET that cannot be processed by existing recycling facilities for food contact PET

packaging; in-line monitoring for process quality control to identify contaminants from oxo-degradable additives, biodegradable plastics, bisphenol A and non-food contact compliant levels of chemical contamination.

[www.supercleanq.eu](http://www.supercleanq.eu)

### Rubber accelerators

Thiourea based accelerators, of which ETU is the most common, have been used for more than 80 years in the vulcanization of polychloroprene rubber as they facilitate the rubber cure system by speeding up the creation of molecular crosslinks, decreasing process duration and increasing physical properties. However ETU is classed toxic to reproduction, therefore its use could be forbidden or drastically reduced at some time in the future under the REACH regulations.

Since June 2010 the SafeRubber project - funded by the European Community's Seventh Framework Programme managed by REA (Research Executive Agency) - has been working on a suitable and safer alternative to ETU. The research consortium includes 12 partners (associations, universities, private companies) from Italy, Belgium, United Kingdom, Spain, Latvia and Norway. The initial work concentrated on research into the chemical mechanism of the vulcanization of polychloroprene using ETU, a mechanism which has never been fully understood or proven. This enabled the consortium to design and synthesize several alternative molecules which it is hoped will be safer than ETU. These molecules are now being optimized in polychloroprene compounds before being scaled up to an industrial process.

[www.saferubber.eu](http://www.saferubber.eu)

## Endless

Opened last December, the exhibition "Endless - Twelve tables for one chair", produced by Fondazione Plart of Naples (Italy), features the works of a collective of designers, artists and architects, as well as a writer, a photographer and a musician.

Conceived as a single, spatially extended work, the exhibit maps out a route through the main hall of the foundation building. The arrangement of the tables geometrically - but also metaphorically - follows the curve of a hyperbola: starting from ground level, where the first ones seem to "sink" into the floor, with a heavy and massive appearance, and finally taking flight with the last tables, suspended in mid-air.

The object evoked at the top of the hyperbola loses weight and material substance, ascending to an ideal form, that virtually represents all the chairs of the world. We thus find the conventional ratio is inverted: no longer 12 chairs around one table, as the recent Christmas festivities might suggest, but instead 12 tables for just one chair, like 12 apostles or, more prosaically, 12 men competing for the most alluring woman. Each table leads the visitor to discover one of the most experimental projects of the international contemporary design scene. Endless by Dirk Vander Koji. The Dutch designer has recovered an industrial robot decommissioned by a Chinese factory, equipping it with new software and reusing it as a machine for making interior decoration products. Paradoxically, the robot becomes a tool for hand-crafted production, creating the Endless collection starting from a single continuous band of melted recycled plastic. Meanwhile, the production process itself also becomes endless: each chair or table produced in fact makes it possible to perfect the process for making the next one, just like in the old days, one piece at a time.

[www.plart.it](http://www.plart.it)





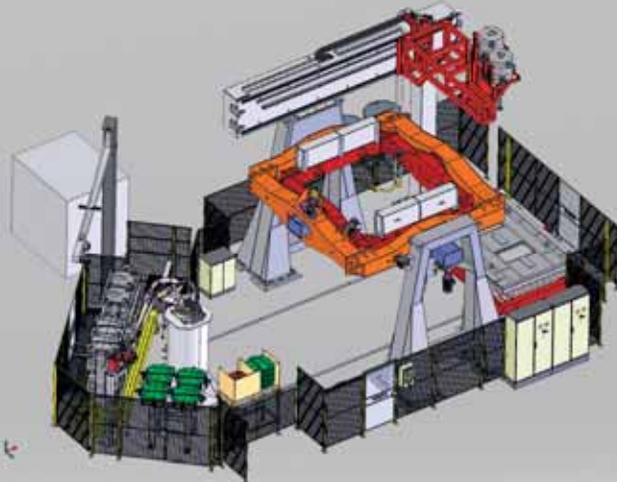
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Persico production unit in Nembro, Bergamo, Italy, has recently supplied a Leonardo rotational moulding machine to a highly environmentally conscious Finnish manufacturer. This particular model is a first, in that it is fully electric. When operating at full capacity, the Finnish plant will manufacture 30,000 units/year of organic waste composters and dry toilets (toilets that do not need to be connected to a sewer system). The Leonardo line of rotational moulding machines has been patented and developed since 2000; it has been specifically designed to allow customers to mass-produce parts of great geometrical complexity in shorter time and with savings in energy and production costs.

*"On the latest Leonardo model", said Sergio Zilioli, sales manager at Persico, "we got rid of the diathermic oil mould heating and cooling systems. This means that there will be no need for a diathermic oil change every two years - by itself a great contribution towards reducing the environmental footprint of the production process. The innovative heating system on the new machine consists of a series of resistors applied directly on the mould surface".*



Our customer is going to install a wind tower next to its plant to generate enough power to run the Leonardo machine and the plant's lighting system. Thus their production site will have zero environmental impact.



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# EXTRUSION LINES & EQUIPMENT

## Ultralight profiles

The international showcase of Plast 2012 provides **Friul Filiere (13 - C21/D18)** the occasion for a live presentation of its world-patented FFC (Foam Fiber Composite) technology through the display of the new Omega Evolution extrusion line. During the demonstrations, the new FFC ultralight composite is extruded as a skirting profile, which is the best compromise between the need to show the full characteristics and potentials of this new material and the constraints imposed by an exhibition setting.

The line exhibited at the fair is equipped with an Omega single-screw extruder, which processes a dryblend consisting of a mixture of thermoplastic materials, natural fibres and various additives which is fed into the hopper and extruded directly, cutting out the pelletizing stage.

The true innovative potential of FFC is the ability to recycle not only the natural fibre waste (jute, hemp, sugar cane, rice husk etc.) but also, and most importantly, thermoset scrap, which is classified as a special waste (rubber, urea, melamine, phenolic, MDF, coatings etc.). During the demonstration the skirting profile, designed in-house, is extruded using a dryblend containing recycled coating scrap to show the high physical, mechanical and aesthetic quality of the extrudate.

In recent months, there has been special interest on the market in the new FFC decking profile, especially after Friul Filiere delivered a major order to a South American customer, including various complete lines for extruding this kind of decking profile. Currently, WPC (Wood-Plastic Composite) decking profiles are widely used and their benefits and drawbacks are well known. This could be the reason why customers are so enthusiastic about the innovative FFC decking profile with its improved physical and mechanical performance characteristics.

Visitors to the stand find decking profile samples to illustrating the different sorts of finishes that can be applied in-line: mono-material, coextruded in FFC or PVC, embossed, printed, brushed etc. There are also many other samples of different types of profiles already made of FFC: door frames, window profiles, wall panels, fences and more. Naturally, traditional



MACCHI

products are also on display manufactured using the company's most successful turnkey projects: edge band profiles, EPS picture frames, special coextruded gaskets for the automotive industry etc.

[www.friulfiliere.it](http://www.friulfiliere.it)

## Evolution of stretch film

To meet the demands of constant growth and development in the market for stretch film, **Macchi (15 - B33/C32)** has designed and developed a cast line able to produce coreless reels. This solution allows considerable savings, including those resulting from the inline production of pre-stretched film. Elimination of the cardboard core reduces the per-kilogram cost of film by 5%, while the possibility of producing pre-stretched film in-line enables higher production speed (over 10,000 m/min) of thinner film with enhanced mechanical properties, without the additional costs of secondary machining processes.

These results were obtained thanks to technology involving the use of a specific winder (for which Macchi holds exclusive European rights), developed in collaboration with NoEI, that enables the creation of coreless reels for manual or automatic use. Film in thickness from 7 to 23 microns can thus be produced to provide practical responses to a wide range of issues, from a need for lightweight film for pallets to reduced costs for transport, storage, and cardboard disposal.

Macchi cast technology enables production of all these films without changing system configuration. Moreover it is possible to reduce film thickness without affecting machine productivity: the film exits the chill roll with a thickness of 23 microns and is then further reduced to 12 microns by increasing the line speed without fully pre-stretching the film.

The new line was presented at a recent open house in a demo version based on 5 extruders (65-100-100-100-65 mm)

and a 2600-mm extrusion head. It permits the production of film in thickness from 12 to 50 microns at a speed of 600 m/min with an output of 1,000 kg/h (23-micron film). The cooling unit is composed of a main chill roll (diameter 1350 mm) and two stabilization chill rolls, one of which features adjustable positioning.

During Plast 2012, Macchi is showing a 9-layer blown film coextrusion line in operation. The configuration again comprises three integrated



FRIUL FILIERE



platforms equipped with Plastex Barrier 55 extruders and Siemens Torque motorization feeding a COEXflex IBC head with all melt conveying channels at the same level. The inner design is based on the dual distribution concept, first at binary partition and then with conventional spirals, to feed a 500-mm die with automatic profile control. Multiple layers bring various benefits, from a better barrier effect for the same total thickness of PA and EVOH layers to improved physical-mechanical properties, including thermofomability.

[www.macchi.it](http://www.macchi.it)

### Thirty-year partnership for compounding

Three new compounding lines for the production of engineering plastics, supplied by **Icma San Giorgio (13 - C29/D26)**, will add 30,000 tons to the total annual production capacity of the Softer Group. The lines are intended for installation in the Forli and Ferrara (Italy) and Silao (Mexico) plants and will enable the Italian group to strengthen its presence in the automotive and household appliance sectors and also to consolidate its role as a global supplier. The machines are three co-rotating twin-screw extruders capable of processing different materials, such as polypropylene and polyamide filled or reinforced up to 50% with glass fibre, at high flow rates. The extruder is made of wear-resistant steel alloys and features a modular design which makes it possible to optimize maintenance costs. The significant results achieved by Softer, one of the largest independent compounders globally, were made possible partially thanks to its 30-year partnership with Icma, which over the years has supplied high performance machines backed by world class customer service. Moreover, the relaunch of the Ferrara plant (former P-Group), acquired in 2011, allows the machinery maker to participate as a supplier in a very positive initiative that



ICMA

helps keep a centre of technological excellence in Italy. In addition to contributing to the recovery plan of the Ferrara technological centre, the new investment confirms the intention of Softer to maintain Italy as a privileged production platform for the European markets. On the other hand, with its strategic location and efficient logistic structures, Mexico is becoming the basis for expansion towards the NAFTA countries: it will be easy to supply companies located in the US or Canada from there as well as to collaborate with corporations that have relocated their production to Mexico and are looking for local partners boasting European technological and quality. The range of Softer products includes thermoplastic elastomers, thermoplastic vulcanizates and engineering plastics. Thanks to its technological know-how, the group can offer innovative solutions with a strong specialization in the automotive, appliance, electrical-electronic, construction, footwear and sports sectors. The group has two manufacturing plants in Italy, two further units in Latin America (Mexico, Brazil) and a sales subsidiary in Germany.

[www.icmasg.it](http://www.icmasg.it)

### Giant corrugator

The increasing demand for double-wall PP corrugated pipes as an alternative to concrete or PVC pipes for sewerage networks or drainage of rainwater has prompted **Itib Machinery (13 - C25)** to invest greater resources in developing suitable production technology. After producing the F700SH9 shuttle corrugator, of which an exemplar was recently put into operation at the facilities of the Slovak



ITIB

processor **Plastika**, the company is developing its successor, F1200SH10, for pipes with inner and outer diameter, respectively, up to 1,000 and 1,200 mm, depending on applicable standards. The corrugator is composed of 10 pairs of mould halves, 6 of which are in the forming position while 1 pair is in the closing phase, 1 pair is in the opening phase, and 2 pairs are on the return path. In this model, as in the previous smaller one, the mould halves are not moved using chain conveyors but instead by means of a shuttle technology, i.e., a sliding mould-holder trolley. This solution is more suitable for a machine of such large size, reducing the necessary number of pairs of mould halves, the machine footprint and investment costs.

Each mould half is equipped with a circuit for cooling water, which is applied under pressure from an independent inlet-outlet point. Pipe forming is carried out under vacuum assisted by a low-pressure blown air. In emergency situations or in the event of a power cut-off, the F1200SH10 corrugators can be moved backwards in order to allow free access to the head, extrusion die, and the cooling mandrel of the inner layer of the pipe thereby allowing any residual material to be removed.

The corrugator can achieve hourly outputs up to 1000 kg. Moulds of different sizes can be fitted by lifting or lowering the upper structure where part of the cooling and suction systems is installed thereby affording easy access for mould assembly.

[www.itib-machinery.com](http://www.itib-machinery.com)

### Extrusion & thermoforming

For thermoforming applications, **Amut (13 - B39/C38)** introduces the evolution of the FFG high-speed automatic machines with steel rule die cutting: the FFG820 ADV model is in operation with air pressure and/or vacuum forming. The toggle system for platen stroke, with planetary roller screws, ensures resistance and duration of cutting efficiency for the toughest



AMUT

vegetable fibres. Thanks to the low revolution speeds and high torque of the screws, it is possible to extrude at high pressure and reduced shear keeping the melt temperature low so as to prevent the degradation of vegetable components. Another machine on display is an EA 75 single-screw extruder for the production of small pipes in special

high-quality components and software fully developed and manufactured by the company. The line also includes a hot runner injection mould for drippers (up to 96 cavities). Production of this new line has enabled the company to achieve very high output and quality standards. Another line was developed at the same time for irrigation pipes with round drippers having the following technical specifications: pipe diameter 16 and 20 mm, insertion capability of up to 400 drippers per minute, production speed 80-100 m/min.

[www.profiledies.com](http://www.profiledies.com)

### Socketing & packaging

Precisely on the occasion of Plast 2012, **IPM (13 - C37/D34)** celebrates its 25<sup>th</sup> year of activity, previewing the innovative BA 200 PP belling machine for polypropylene pipes, operating in connection with a fully automated packaging system for pipes up to 500-mm long. Considering the high production capacity of these belling

materials at high speeds, both in the forming and in the cutting stations, with an installed force of 60 tons. Great attention has been given to flexibility and user-friendliness, as seen in the quick mould change system in all the stations, direct connections to the utilities on the mould-holding platens of the forming station, and the electric hoist.

A machine from this range has recently been installed on a complete line for extrusion-thermoforming of PP sheet for high speed production of pots (depth 200 mm) for the flower-nursery market. On this occasion an additional hole-punching station was included to make holes in the bottom of the flowerpots, while the finished items are automatically stacked by a 3-axis handling robot.

Also on display is a BA 130 twin-screw extruder for the production of WPC profiles. The Easy Wood system developed for this application is provided as complete lines (from 300 to over 1,000 kg/h) for direct extrusion, without pre-mixing of materials and additives, with up to 80% vegetable fibres in a polyolefin base (HDPE-PP) and around 50% for PVC. The extrusion line is equipped with a single-screw extruder and a counter-rotating twin screw extruder. The latter is considered the ideal machine for processing highly viscous compounds, such as WPC, with high percentages of

materials for medical and automotive applications. Depending on screw geometry and barrel configuration, hourly outputs up to 750 kg can be achieved. The pipes produced on these lines must comply with very strict dimensional and ovalization parameters. For this reason, the lines are equipped with very accurate measuring and control systems for diameter and thickness, which ensure constant, oscillation-free production.

[www.amut.it](http://www.amut.it)

### Irrigation pipes

Specialized in the construction of extrusion lines for the production of drip irrigation pipes, **Profile Dies (13 - C05)** has recently developed a new fast extrusion line for pipes with flat drippers having the following technical specifications: minimum pipe thickness 0.15 mm, mechanical line speed 150 m/min, production speed up to 130 m/min, insertion of 800 drippers per minute.

The line is composed of the following components: automatic inserting unit for drippers, gravimetric dosing units, extruder with 65- or 80-mm screw, coextruder with 20-mm screw, special head-die, calibration and cooling tanks, haul-offs, mechanical drilling unit, automatic winder, control panel with



PROFILE DIES



[www.baruffaldi.eu](http://www.baruffaldi.eu)

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Pav.13 Stand B43

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[www.primac.it](http://www.primac.it)





machines (up to 924 sockets per hour for 50-mm diameter x 1.8 mm), end-of-line management (collection, automatic packaging and conveyance to storage of a huge amount of pipes) is increasingly necessary. Moreover, an automated quality control (checking the correct position of the automatically inserted gasket) and socket tightness check system is also displayed, demonstrating that only the pipes that pass inspection are conveyed to the automatic packaging unit.

The company offers its European customers customized automated solutions for pipe packaging involving the use of robots for pipe handling and packaging into suitable supports, with automatic forming of pallets pre-arranged to be picked up by forklifts and stocked, or for packing shorter pipes into cardboard boxes provided for the purpose. There are many requests from other regions for automatic packaging systems for pipe bundles by means of multiple straps and optional packing into sacks (or wrapping up by film) as well as subsequent palletization of the produced bundles in special cases.

These are fully automatic systems operating in-line with extrusion (sometimes consisting of more than one of the above-mentioned technologies combined together) which are able to pack up to 1,500 pipes per hour with length of 150 to 3,000 mm. Furthermore, it is also possible to handle, sort and pack separately (with socketed ends having opposite position) pipes having different lengths but manufactured in sequence by the same extrusion line.

Another piece of equipment on display during the fair is the new version of the BA 200 RS (Rieber System) socketing machine, which can attain very high output rates thanks to the use of ovens equipped with short-wave lamps. In addition to their very high efficiency and excellent energy performance, these ovens ensure better penetration as well as direct and dynamic temperature control of the material undergoing processing. The direct effect is a reduction of heating times and therefore of power consumption, particularly when

the machine is not working at maximum potential. Moreover, these ovens do not need to be brought to temperature before the extrusion line is started, because they are instantly operative. Lastly, on May 5, the eve of Plast 2012, IPM is organizing an open house at its headquarters to celebrate its 25 years in the business as well as to introduce the new (patented) INJ range for belling of double-wall PP and PE corrugated pipes. The model being demonstrated (BA 1200 INJ) is the largest of the range and cannot be displayed at the fair due to its size. Together with the cutting unit, this machine completes an extrusion line made by Unicor and having its final destination in the Arabian countries. It is able to socket pipes in-line having outer diameter from 315 to 1,200 mm, ensuring the dimensional stability of the socket, even if exposed to highly variable environmental temperatures

[www.ipm-italy.it](http://www.ipm-italy.it)

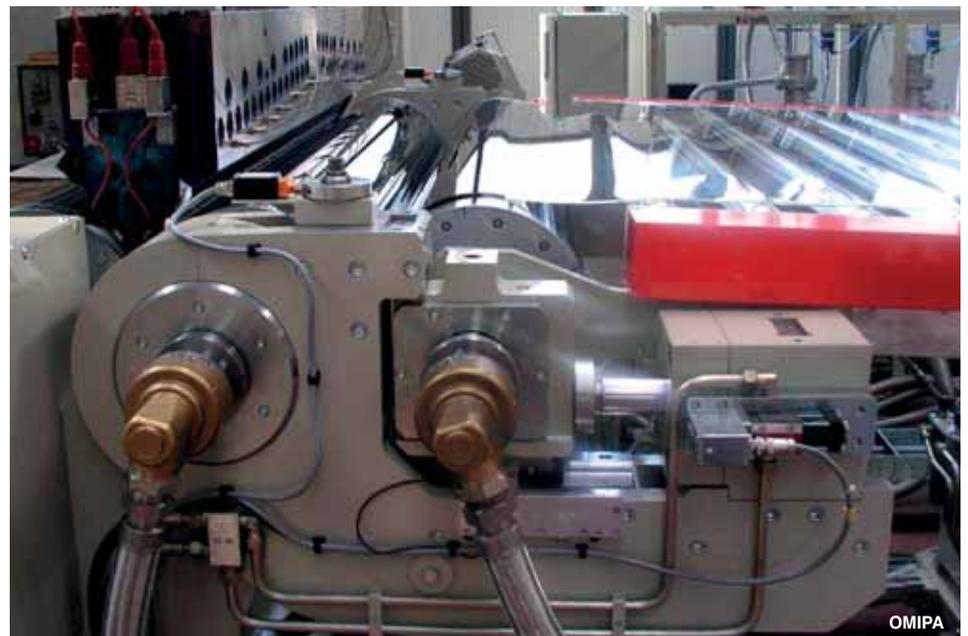
#### Optical quality

With more than 45 years of experience, development, and in-house production and over 95% of its products exported,

**Omipa (13 - C30)** is a leader in the construction of complete extrusion lines for various thermoplastic materials. The company is already an established presence in the market for extrusion lines for high optical quality sheets and foils in PMMA-PC-PS-MS with thickness from 0.3 to 10 mm. These products are destined for the continually growing market of LCD, LED and 3D screens, and also for touch-screen technology and advertising applications. For the automotive industry, sanitary applications, food packaging, and appliances the company offers high performance lines for the production of sheets in PE-PP-ABS-PET with coextrusion in up to 7 layers.

In recent years, Omipa has been working with its clients to design and develop hollow polycarbonate profiles with increasingly innovative architectural geometries for application in public and private construction, major projects such as stadium roofing for Olympic and other sports events, stations, shopping malls, and greenhouses.

High line speed is the main feature of extrusion lines for hollow PP profiles in thickness varying from 1.8 to 20 mm for use in industrial and agricultural packaging applications (e.g., fruit boxes, containers, folders etc.) with developments also in the fields of heavy-duty packaging and advertising. In hollow polypropylene profile segment, the company is developing the new Foam System, which makes it possible to reduce final product weight without altering mechanical resistance properties. Fluctuating raw materials prices and the need to improve existing applications have led the company to develop a production system for hollow PP-foam profiles, especially designed for medium-high weights, which makes it possible to reduce raw material





BARUFFALDI

Moreover, the company has recently extended its product range to cover machines for processing PVC and polypropylene pipes by acquiring the Primac brand and technology.

[www.baruffaldi.eu](http://www.baruffaldi.eu)

consumption by 20-30%, producing economic savings and environmental benefits without compromising the physical and mechanical characteristics of the finished product.

An absolute novelty for the market is the new range of machines, presently in the development and testing phase, for the production of low shrinkage EVA for encapsulation of silicon cells for photovoltaic panels. The idea is to build and deliver a turn-key plant, including blend formulation. Lastly, Omipa has successfully carried out tests for the production of hollow profiles in ABS, a material which has not previously been used for these applications. Besides making it possible to replace the products commonly used for heavy packaging, it guarantees excellent performance even when subjected to very low ambient temperatures.

[www.omipa.it](http://www.omipa.it)

### High speed for roller shutters

Specialized in the development of advanced technology for high-output extrusion tooling of roller shutters, in which it boasts world leadership with speeds of up to 12 m/min in double outlet, **Baruffaldi Plastic Technology**

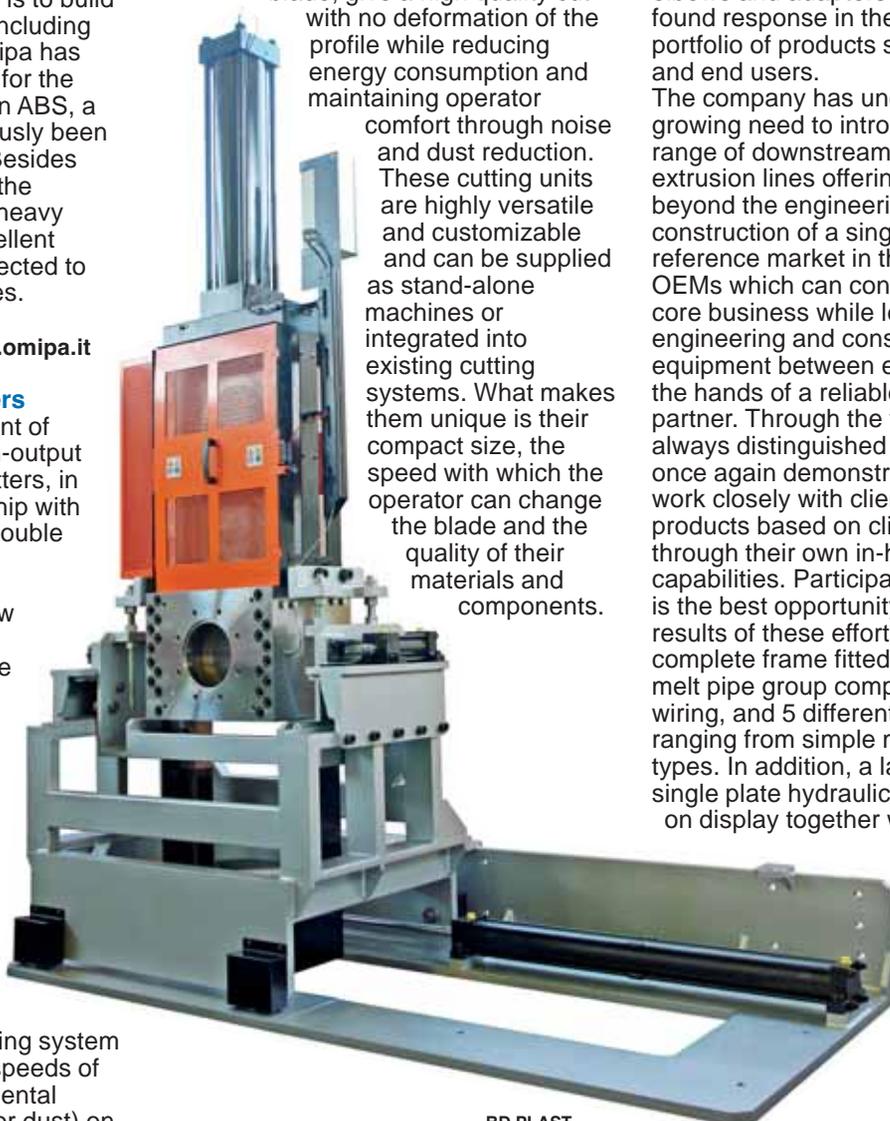
**(13 - B43)** is introducing a new generation of Combiroll and Combipack, in-line and off-line automatic and semi-automatic machines for assembling and packaging roller shutter profiles of all sorts and sizes up to 12 m, in single or dual outlet. These machines stand out for sturdiness, high production rates, versatility and ease of use.

When it comes to punching profiles, even the largest and thickest ones, an innovative punching and striking system has been designed to reach speeds of up to 15 m/min with no detrimental effects (such as burrs, swarf or dust) on

the quality of the finished products while keeping noise levels and environmental impact to a minimum. The new rotary punching machine, which can handle all sorts of technical profiles including angular ones, can run at 30 m/min, is extremely versatile and can be used in-line and off-line. Simple to operate, it comes with height adjustment and quick changeover tooling.

The patented horizontal guillotine cutting systems, available with either hot or cold blade, give a high quality cut with no deformation of the profile while reducing energy consumption and maintaining operator

comfort through noise and dust reduction. These cutting units are highly versatile and customizable and can be supplied as stand-alone machines or integrated into existing cutting systems. What makes them unique is their compact size, the speed with which the operator can change the blade and the quality of their materials and components.



BD PLAST

### Advanced screenchangers

The capability of a company to express its philosophy through R&D of innovative products represents a fundamental factor in its growth and development. Finding new market opportunities through expertise gained over decades of effort requires readiness and flexibility. Following this idea, **BD Plast (15 - B23)** has continuously improved its range of screenchangers, addressing growing demand in a very challenging market and introducing new lines of products strictly embodying its traditions.

For many years the need for melt pipes, elbows and adapters for extrusion has found response in the company's portfolio of products supplied to OEMs and end users.

The company has understood the growing need to introduce a complete range of downstream equipment for extrusion lines offering services that go beyond the engineering and construction of a single component. The reference market in this regard are OEMs which can concentrate on their core business while leaving the engineering and construction of ancillary equipment between extruder and die in the hands of a reliable and qualified partner. Through the flexibility that has always distinguished it, BD Plast has once again demonstrated the ability to work closely with clients, producing products based on client's designs or through their own in-house engineering capabilities. Participation in Plast 2012 is the best opportunity to display the results of these efforts. These include a complete frame fitted with a 5-layer cast melt pipe group complete with heaters, wiring, and 5 different screenchangers, ranging from simple manual to hydraulic types. In addition, a large filtration area single plate hydraulic screenchanger is on display together with a continuous

flow double plate screenchanger with a new sealing systems and protective guard layout.

[www.bdplast.com](http://www.bdplast.com)



# Technology, Quality, Innovation



## **E** EXTRUSION

- Single screw extruders for PVC, PE, ABS, PS, PET, PP, screw diameter from 20 mm to 180 mm, L/D up to 40.
- Twin screw extruders for PVC, screw diameter from 55 mm to 170 mm, L/D up to 36.
- Complete pelletizing lines for PVC and PO processing.
- PVC and PE pipe lines up to 1.200 mm diameter, PPr and PEx pipes up to 5 layers.
- PVC and PO profile lines, including co-extruded profiles, up to 600 Kg/h output.
- Foil and sheet lines, including co-extrusion up to 9 layers.
- Complete plants for co-extrusion of PVC-TPE-TPO geo-membranes.
- Custom-made lines for special applications.

## **T** THERMOFORMING

The range of plants developed for thermoforming processing is quite wide and includes:

- machines based on the so called "forming & separate steel die rule cutting" technology (three or four stations featured with press for production of holes containers);
- "forming & in-mould rule die cutting simultaneously" machines;
- "forming & in-mould punching" machines (featured with lower mould holding platen available in tilting version or by vertical handling);
- "forming & punching separately" machines;
- accessory machines such as rimming machines, lifting devices, automatic stackers also available in robotized version.

Moreover, it is possible to have complete plants featured with extrusion groups to be combined with thermoforming machines for the in-line production and special high-output machines for articles of wide consumption.



## **R** RECYCLING

- Complete PET bottles washing lines consisting of: high-friction hot or cold prewashing of bottles, automatic selection of polluting polymers, wet or dry grinding, pre-floatation, intensive and high-friction hot washing of flakes, final rinsing, drying and storing. Outputs from 500 to 4.000 Kg/h of cleaned flakes for fiber production, for packaging foil production, for foil destined to thermoforming production till reaching the "Bottle to bottle" quality.
- Complete washing lines for HDPE containers and LDPE film consisting of: dry grinding, pre-floatation, intensive and high-friction hot or cold washing, final rinsing, drying and storing. Outputs from 500 to 2.000 Kg/h of cleaned material.



MILANO, ITALY, MAY 8/12, 2012  
HALL 13 - STAND B/C 39/38



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# INJECTION MOULDING MACHINES

## Low tonnage with 2 platens

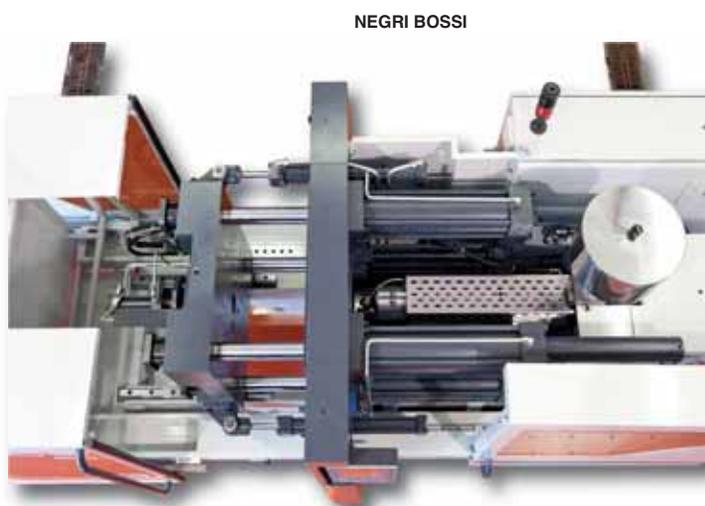
The introduction of the innovative EOS range represents for **Negri Bossi (24 - C64/D62)** not just an occasion to showcase a new low-tonnage injection machine range - which completely revolutionizes customary approaches to design, providing customers with a new concept in presses of this size - but also an opportunity to offer a solution that combines efficiency, cleanliness, energy savings and enormous versatility at a decidedly attractive quality-price ratio. The impressive features of this innovative series - silent operation, precision, and energy consumption levels comparable to those achieved on electric machines - are all on display to the benefit of visitors.

The new range is proposed with a 2-platen solution clamping unit and extremely wide tiebar spacing while also offering the lowest floor space requirements in its category. The need to meet the challenges of the low-tonnage press segment in an innovative fashion has led the company to focus strongly on product engineering and containment of overall dimensions without compromising ergonomics, performance, efficiency, and moulding quality.

EOS presses are equipped with a new compact twin-cylinder injection unit featuring a practical and fast plasticizing-unit changeover system that provides easy and comprehensive access for tooling and maintenance tasks. The clamping unit adopts a 2-platen solution with the moving platen sliding on prismatic guides while hydraulic oil is circulated through channels in the fixed platen. In addition to streamlining plant engineering, this solution also allows clamping and release to take place at high pressure using a reduced amount of fluid, thereby reducing energy consumption.

Fast low pressure movement during opening and clamping is achieved by two piston-corepullers with reduced cross-section, which ensure outstanding sensitivity during the mould securing phase, thereby minimising mould damage and wear. This new design, together with the decision to support and guide the moving platen on prismatic guides, makes this range ideal for the medical or food sector, or for the production of any items where it is important to ensure that no lubricating oils enter the mould area.

The most important achievement, however, has been made in energy consumption. After years of experimentation and practical application with servo-motors, inverters, vector inverters, and regenerative systems (for all-electric and hybrid presses), the engineers decided to take development of the inverter-controlled



with a tiebar clearance of 600 x 600 mm, as well as the movable platen equipped with synchronized central and side ejectors with a 100-mm and 350-mm stroke, respectively. The mould approaching stroke is 600 mm and the maximum distance between the platens is 750 mm.

The injection unit of the twin-screw cylinder model with stationary carriage unit and electrically-driven screw revolution by motor-gearbox and frequency inverter is a 1,000-cm<sup>3</sup>

variable displacement pump even further. This involved studying and mapping variable-displacement pump efficiency curves and actuator curves to develop a press software that ensures the best combination of motor rotation speed and pump capacity for each phase of the moulding cycle.

[www.negribossi.com](http://www.negribossi.com)

## Non-standard technology

A leading manufacturer of special injection moulding machines, **Presma (22 - B09)** is displaying two new machines, both upholding the "non-standard technology" slogan. One of them provides a particularly clear expression of the company's aim to attract visitor attention to the new range of fully Italian-made presses for rubber and silicone elastomers.

In this application segment the spotlight is on the PRO 400/100, a 400-ton horizontal press with 4-tiebar direct-piston clamping unit. Its main features are the heated steel mould-holding platens (700 x 700 mm),

FIFO system, with 2,000-bar specific pressure. The unit is also equipped with double thermo-regulated circuit for the plasticizing barrel and for the injection barrel + nozzle, with the possibility to remove the injection punch for cleaning. Injection stroke control involves the use of a linear transducer. The machine is set up for the assembly of feeding systems for rolled rubber bands and silicone blocks. Tool cleaning is accomplished by an adjustable electrically driven brush. The second machine on display is Presmall, a 6-ton all-electric mini-press with electric coaxial drive for clamping and ejection and three independent drives for the injection unit. The machine, equipped with touch-screen interface and dedicated software, offers quick cycle time, high precision and very low energy consumption. This model is particularly suitable for micro-moulding even in clean rooms and can be equipped with a feeding unit for rubber or both solid and liquid silicone.

[www.presma.it](http://www.presma.it)



PRESMA



# BLOW MOULDING MACHINES

## Zero energy

After the success achieved with the presentation of the all-electric UMA 12 SeCo EZ blow moulding machine in sequential coextrusion for technical parts, **Uniloy Milacron (22 - A11/B14)** continues the development of new models to enrich its Energia Zero (Zero Energy) range, the brand that distinguishes all the company's technologies without hydraulic drives. The UMS 200 shuttle extrusion-blow moulding machine on display during the fair follows this direction: it is an intermediate model with 200-kN closing force and horizontal 710-mm carriage stroke that has already gained a high level of acceptance among customers. Fit to accommodate up to 12-cavity moulds with 55-mm centre distance, the machine is already prearranged for coextrusion configurations of up to 7 layers. Engineered to easily install the IML system on both sides of the bottle (also available for double-station version), it finds its ideal application in the food, detergent, and personal care packaging industries. The application of the most advanced electrical and electronic technologies, the use of latest-generation servomotors and multiple drives with energy recovery during the deceleration phase of all movements (as it happens in Formula 1 or on hybrid cars) provide exceptionally low power consumption.

The absolute precision of all electric movements of UMS 200 EnergiaZero, not depending on the processing temperature, makes it possible to maintain a constant level of quality of the blow moulded product within narrow tolerances. The possibility of using the innovative parison cutting device with direct electric movement in multi-cavity productions - typical of the food industry - makes greater precision in the cutting phase possible than can be achieved with traditional systems and therefore greater process stability with production scrap reduction.

In addition to the particularly silent operation, the absence of the hydraulic pump and the hydraulic circuit eliminates the risk of fluid spillage caused by leakage or breakages, while the absence of ball screws and bearings for linear movements removes the risk of contamination from lubricants and the need for periodic maintenance, making



UNILOY

the machine suitable for production in clean rooms. Like other Uniloy Milacron's machines, UMS 200 EnergiaZero is equipped with a special bottle take-out system (two-axis movement, fully electric servomotor driven). Bottles are dropped on a linear conveyor system and then released to one side of the machine also in the double-carriage version. The elimination of the traditional bottle conveyors allows a dramatic reduction of footprint and better accessibility to the machine for a quick mould change.

[www.uniloy.com](http://www.uniloy.com)

## All-electric blow

The absolute innovation introduced by **Meccanoplastica (22 - A19/B22)** is Mipet-1P, an all-electric single-cavity machine for in-line 2-step stretch-blow moulding of PET preforms.

Manufactured at the Spanish branch in Barcelona, during the exhibition the machine is equipped with a mould to produce 750-ml bottles starting from model 28/410 preforms (weight 38 g). Designed for using both standard and special preforms to produce PET bottles of up to 2.5 litres, the machine can reach a tightness strength (at 10 bar) of 450 kg with a 140-mm max opening stroke. Its peculiar innovative feature is the high speed of the production cycle, thanks to the prompt responses of the all-electric drive.

Another all-electric machine is HL 350 for 2-

station continuous extrusion-blow moulding, designed to produce containers having a volume of up to 3 litres. The machine can reach 6 tons of mould clamping force with a carriage stroke in the two versions of 350 and 400 mm, respectively. Its innovative feature is the hydrostatic-pneumatic system used for the clamping phase, actuated by a brushless electric motor. During the fair the machine is running equipped with triple-parison extrusion head (120-mm centre distance) to produce 350-ml HDPE oval-shaped cosmetic bottles (weight 30 g).

Finally, JET55/L, an all-electric 3-station injection-blow moulding machine, has been designed to produce small containers up to a 250-ml volume and

can achieve 55 tons of total clamping force (50 for injection and 5 for blowing). During



MECCANOPLASTICA



TECHNE (GRAHAM PACKAGING)

the exhibition the machine is equipped with a set of 18-cavity moulds to produce 10-ml HDPE bottles (weight 5 g). This is currently the only all-electric injection-blow moulding machine in operation anywhere in the world. The absence of pollutant or noise emissions makes it particularly suitable for pharmaceutical applications, where there is a critical need for clean room work with very strict tolerances.

[www.meccanoplastica.com](http://www.meccanoplastica.com)

#### Advanced generation

In the new Advance generation of extrusion-blow moulding machines, developed by **Techne (Graham Packaging Company Italia)**, the "fully-electric" concept has been pushed beyond normal limits thanks to innovative features such as kinetic energy recovery during machine slowdown cycles. During each step of the production cycle, kinetic energy is stored and then fed back into the network in the subsequent step, producing energy savings. The final result offers a range of machines with an overall energy consumption of 0.31 kWh per 1 kg of extruded material, with a 37% saving in real terms if compared to conventional machines. The flexibility concept was then developed, bearing in mind that nowadays the market requires machines capable of handling different kinds of production processes. In order to manage this important issue, the mould clamping system accommodates a range of containers starting from small single-serving capacity up to 20-litre industrial tanks. The same concept has been

applied to the handling device for calibration nozzles, with the aim to precisely and constantly cut large diameter necks, and conventional ones from multi-cavity moulds. The project is completed by the energy saving extrusion section with high quality raw material plasticizing, heating and stabilization time, and fine adjustment of parison thickness. The extrusion platform includes a wide range of models and sizes in order to cover the most suitable production choice in terms of both hourly output and extruded material. Of course the multilayer and multi-cavity platforms (up to 6 layers and 80 cavities through the neck-to-neck technology) are available as well as the option for production of aseptic containers. Modularity is a unique special feature of the Advance range: machines are built with configuration capacity of up to 4 shuttles, with high output volumes in limited floor-space, making use of conventional units. For limited production output, machines can run with 2 shuttles only or be reconfigured with different cavity platforms. The production cycle has been drastically reduced thanks to solutions which offer 15% increases in productivity for small containers, and over 25% for industrial tanks. The picture is completed by the IML feature, with just one label application robot serving two shuttles, which allows quick application time and high-precision label placement.

[www.technespa.com](http://www.technespa.com)



## Electric Evolution



### EnergiaZero™

All-electric Blow Molding Technology

**Energy Saving  
Consistent Quality  
Clean Operation**



Milan, 8 - 12 May  
Hall 22 - Stand A11/B14

#### UNILOY MILACRON S.r.l.

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MEGROPLASTICA IBERICA

# MIPET 1P NEW PET PREFORMS STRETCH-BLOW MOULDING MACHINE (SBM) UP TO 2,5 LIT.

The new "all electric" MIPET range of machinery assures highly accurate movements and very fast cycle time. The above showed MIPET-1P single cavity SBM machinery id designed to use both standard and special PET preforms.

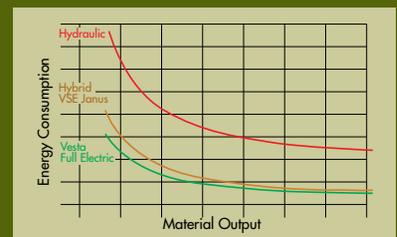
Its production capacity reaches MAX 2,5 Litres volume.  
Air tight force 450 KG (at 10 bar) - Opening stroke MAX 140 mm.



# Nature has already made her choice.



In a future where sustainability will be an ever-more important company asset, having machines that provide both high performance and environmental friendliness will, quite simply, be priceless. No-one knows this more than Negri Bossi, which produces the most eco-sustainable machines with compete, flexible solutions offering full electric, hydraulic or hybrid operation. Energy savings range from 20 to 75%. Not to mention the oil savings. Nature knows what's best for it: after all, she didn't just fall in love with the great Italian design.



# NEGRI BOSSI

The SACMI Injection Moulding Company

For full information on Negri Bossi technology go to [www.negribossi.com](http://www.negribossi.com)

## OTHER MACHINERY

### Thirty years of pad printing

Precisely in concurrence with Plast 2012, **Tosh (22 - B25)** celebrates thirty years of activity in the field of pad printing. This is a unique opportunity to thank customers, suppliers, representatives and all those who have believed in the company and its products. In addition, the exhibition provides an occasion to learn more about possible goals for the future, thanks to the company's expertise and professionalism. Founded in May 1982, the company quickly established a leadership role in pad printing not only in Italy but also in the international marketplace. Passion, solution-based motivation, and design ingenuity made the name Tosh well known among the most satisfied and successful users of pad printing technology worldwide. Gaining leverage from the economic boom of the Eighties, the Logica Series was designed and developed. This line of pad printing machines introduced the clearly innovative technological component of an all-electric operating cycle with digital control of all axes of motion. The choice not to design the systems around the traditional pneumatic drive proved to be a winning one. This is attested by thousands of machines sold to date in a dynamic and expanding market. Parallel to the advancements in the area of machine design, the company worked to develop a complete line of consumables specifically developed for pad printing. Here, a second winning choice was made with the decision to produce, in addition to pads of any shape and hardness, printing inks, clichés and accessories, thus acquiring the capability to provide customers with products that truly meet their requirements. Continuing along the same path and encouraged by satisfied customers, the Nineties saw the company expand outside of Italy and Europe to other countries around the world. New countries brought new opportunities, leading to the development of more sophisticated, application-specific, highly automated pad printing machines. These years were also characterized by the proliferation of hermetically sealed systems that have all but eliminated the old open inkwell systems of the past making pad printing increasingly production-friendly. The first decade of the new millennium reaffirmed pad printing as an essential technique for decoration of a seemingly



infinite number of products. Niche markets developed as companies sought to differentiate their products. At the turn of the century, Tosh was routinely providing customers with solutions that were inconceivable only a few years earlier. During this decade the company recognized the need to divide its Logica range into two distinct lines - High Speed and Flexible - to meet the specific needs of those customers seeking to make

investments in technology that ensures concrete advantages in an increasingly challenging economic environment. In these last two years the range of machines has continued to grow via the advent of Logica Platform and Logica Cartesio. Both of these solutions come "sized to fit" and will serve the customers well as they continue to expand the horizons of the pad printing process. Last but not least, in contrast to most competitors, when Tosh says "made in Italy", it means using 100% Italian design and components, in the full Italian style.

[www.tosh.it](http://www.tosh.it)

### Alternative rotomoulding

Some materials currently available on the market have not yet found their best use in rotational moulding because of a lack of adequate automation and process control in the conventional process. Recent experiments carried out by **Persico (22 - A23)** have been focused precisely in this direction.

One of these experiments regards the production of PA6 components starting from caprolactam chips which are polymerized through anionic addition. The company has designed a material preparation plant for this application in which the raw materials (caprolactam+activator, and caprolactam+catalyst) are melted in two separate tanks where specially designed stirrers uniformly blend the additives. The material in liquid state is mixed in an antechamber and pumped into rotating moulds heated at the proper temperature





for polymerization. Material solidification occurs through a chemical reaction and not by cooling inside the mould. This being a chemical process, it is vital to control and monitor the processing temperature inside the mould. On Leonardo, the first fully-automated rotomoulding machine, the heating elements consist of a series of resistors applied directly to the mould surface. This feature allows for uniform heat transmission and precise, instantaneous control of process temperature, which is required for effective completion of the chemical reaction inside the mould. The second experiment was focused on transparent polycarbonate processing, in which a newly developed version of the Leonardo machine with electric heating uses a vacuum technique. This process also requires precise mould temperature control in addition to rotation speeds higher than in conventional rotomoulding. As is well known, one of the problems of polycarbonate moulding is the presence of tiny air bubbles trapped on the outside and inside surface of the moulded part during sintering. If the bubbles are not eliminated, they negatively affect the mechanical properties of the material as well as its aesthetic appearance. The classic approach to removing the bubbles is to process the material at a much higher temperature and for a longer time than is theoretically necessary to melt the polymer. The higher temperature increases melt fluidity and, by keeping the material in this state for a sufficiently long time, the bubbles can be "reabsorbed" by the polymer.

To overcome this technological limitation, Persico carried out some tests comparing the results of different samples moulded under the same processing conditions but with a different internal mould pressure. Thanks to the Leonardo machine, besides controlling the mould temperature directly and precisely, it is easy to monitor internal temperature and even pressurize and depressurize the cavity of the rotating mould.

Testing revealed that a vacuum technique leads to the complete removal of the bubbles both on the outside surface and

inside the wall. In addition, the mould surface was subjected to a special treatment, and some adjustments in design and construction have produced a significant improvement in moulded part quality.

[www.persico.com](http://www.persico.com)

### Wood-imitation embossing in register

The market shows great interest in laminated materials and coverings for production of wood-grain flooring, composed of a substrate encapsulating several PVC film layers filled with high percentages of calcium carbonate and possibly reinforced with glass fibre, laminated to a printed film, which can be reinforced or non-reinforced (extensible) and perfectly imitates wood. Progress in printing techniques, including digital printing, makes it possible to obtain very high quality imitations of any kind of natural material. For example, prints can be produced that perfectly reproduce colours, shades, and grains of any kind of wood. But this is not sufficient to give an acceptable appearance to the product, as its surface is glossy and smooth to the touch, which is absolutely unnatural and far from the real appearance of a natural material.

Currently, this problem is addressed by subjecting the material, after the base layer and printed sheet have been laminated together, to an embossing process that imprints relief into the surface, creating tactile irregularities that make the product more similar to its natural counterpart. However, such techniques do not provide satisfactory results since the engraved roll creates relief that does not correspond to the printed pattern. Thus, grain, knots, and other printed features of the wood have no corresponding features in the embossed relief.

This drawback can only be overcome by performing embossing in register discontinuously, thus making it a slow process. Furthermore, the embossing press, working offline, is expensive and cumbersome. Since laminates are, by nature, economical products, the process needs to be simplified and as cheap as possible. It is thus necessary to carry out embossing in a continuous process, i.e., directly on laminated film instead of on pre-cut panels, something hitherto considered infeasible.

Specific patent-pending systems have been invented and are presented at the fair by **Rodolfo Comerio (11 - C42)**. The aim is to offer an effective, fast, and



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economical technology for embossing in register (or synchronized embossing) of single-layer or laminated sheet composed as described above.

[www.comerio.it](http://www.comerio.it)

### Insulating panels

Early in 2011, **Saip (11 - A73)** and Dow Chemical established a new company in Spain, CeDePa (Centro de Desarrollo del Panel en Continuo), located in Tudela (Navarre). It is a new, one-of-a-kind, state-of-the-art industrial-scale development centre for thermal insulation polyurethane panels produced with continuous lamination process. Dedicated technical resources and a complete network of experts in equipment, chemical systems, process engineering, and applications assist teams from different companies to confidentially develop, prototype, and test innovative and most effective solutions. CeDePa builds on years of experience in this industry of the two partners, who have decided to jointly invest in this initiative as they both believe that the combination of their respective expertise in chemical and mechanical production processes and technology is a decisive factor for rapid innovation and the enduring success for customers and the industry as a whole. The new company is also open to external R&D and technology centres, universities, quality certification organizations, and other external players interested in innovation and sustainability in this industry. A state-of-the-art industrial-scale line has been installed at

CeDePa and is fully devoted to testing and prototyping. It has been conceived to allow Saip and Dow customers, and the construction industry as a whole, to accelerate the development of novel solutions for the manufacturing of polyurethane panels for thermal insulation and to accelerate the discovery and availability across the industry of novel solutions to help increase energy efficiency through enhanced thermal insulation of buildings while also simplifying and accelerating their construction, durability and safety including fire performance, and final user comfort.

The line, with a length of 135 m, includes the whole range of production equipment from the steel uncoiling section to the wrapping section: roll forming section for corrugated and flat steel facing profiles with a quick profile changeover system; primer equipment for steel facing treatment; flexible facing, EPS and mineral wool processing equipment; multi-stream, high-pressure foam dispensing machine (9 components); double press conveyor with operating temperature up to 70°C (panel thickness processing range up to 240 mm); handling section complete with cooling equipment, stacking and panel bundle wrapping; state-of-the-art line process control and supervision system (over 100 parameters constantly monitored); up to 16 cameras monitoring and recording the production and trial process.

[www.saipequipment.it](http://www.saipequipment.it)



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### Shuttle rotomoulding

As a supplier of solutions for all rotational moulding needs, **Rotomachinery Group (22 - C10)** is introducing a new shuttle machine with 3 stations, where each carriage enters the oven independently. The client demanded maximum flexibility for the production of huge tanks (capacity up to 40,000 litres) requiring long cycle times for handling the moulds and moulded parts. The presence of the additional carriage has brilliantly resolved these problems, allowing optimization of resource use (operators and equipment): each arm (with a mould or group of moulds) can be put into operation totally independent of the others, either sporadically or continuously. The insulation system for the walls of the cooking chamber allows high efficiency even with low production volumes. The synergy between Rotomachinery Group's Italian and Canadian research teams has led to noticeable progress in the efficiency of hot air circulation inside the moulding chamber. And the results can be applied to any type of plant in the range (independent arm machines, shuttle machines, and rock-and-roll machines).

Tests carried out on a new type of hot air blower and a better performing directional air handling system have proven a significant reduction in cycle times and lower energy consumption thanks to increased heat exchange in the oven. The goal of reduced consumption is constantly pursued with tests of new insulating materials and auto-adaptive cycle management thanks to software that automatically determines optimal cooking and cooling times and verifies the best



ROTOMACHINERY GROUP

combination of the moulds based on the specific programmed recipe.

[www.rotomachinerygroup.com](http://www.rotomachinerygroup.com)

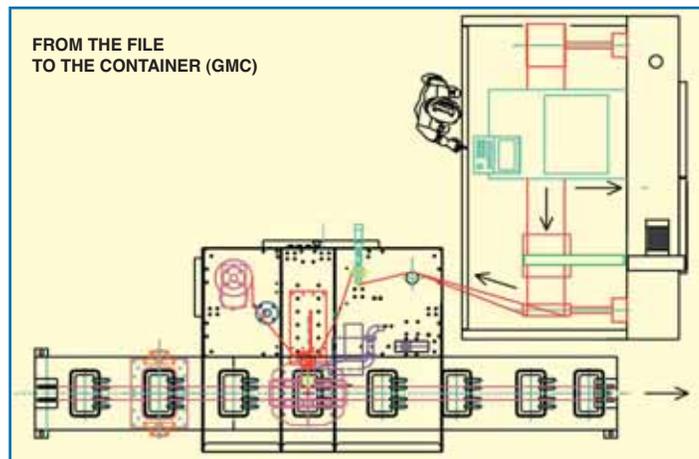
### Digital decoration

In 2012 **GMC** is introducing the innovative D-HDT system for direct printing of digital images on plastic containers. The special feature of the system is the ability to print digital images using dry thermoplastic toner, applying them subsequently to the moulding process. The system permits the decoration of plastic pails or jars with different geometries: truncated-cones, cylinders, and objects with oval, round or

square bases with or without handles. The new system was developed in response to specific demand in the printing market for reduced production times with respect to the traditional thermal transfer. This is achieved thanks to the immediate decoration of the object and simultaneous check of the final result, reducing labour costs because the entire process can be managed by a single operator.

Based on mechanical and software innovation, D-HDT makes it possible to set up a single line to print digital images and apply them to containers, simplifying process management, improving cycle time (warm-up time 5 min; print launch time 30 sec) and increasing productivity. Rolls of variable length (from 1,600 up to 7,000 m) can be used to decorate as many as 450 seventeen-litre pails or 650 three-litre pails per hour. Thanks to the innovative technology of the print controller and process electronics, the printing process offers excellent performance in terms of consistently accurate colour reproduction, simplicity of use, and operational economy.

The new system conserves all the characteristics of the traditional system, such as maximum printing area (1,200 x 300 mm), resolution (1,800 x 600 dpi equivalent) with pantone colour calibration, a commercial print engine model that is widely distributed and serviced all over the world to ensure clients full freedom and autonomy in acquiring and managing consumables. The new system is characterized by a quick size changeover, absence of mandrels, reduced maintenance, and easy management.



[www.gmcprinting.com](http://www.gmcprinting.com)

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# ANCILLARY EQUIPMENT & COMPONENTS

## Innovative approach to drying

The Eureka project has been developed by **Moretto (22 - A33/B34)** to significantly reduce energy consumption and improve performance in drying systems. It includes three exclusive technologies: the new X MAX modular dryers, the Flowmatik control device and the OTX hoppers.

The modularity of X MAX dryers makes it possible to create large drying systems with capacity of up to 20,000 m<sup>3</sup>/h. The units can be configured from a minimum of 3 to a maximum of 10 with up to 32 drying hoppers, with no need for air pressure or cooling water. The result is a faster, consistent and gentle dehumidification of hygroscopic materials, ensuring a significant reduction in energy consumption.

The main feature of this multi-bed system is the capability of maintaining a consistent and uniform dew point during the process. High efficiency levels can thus be achieved with total operating flexibility. The individual units are rotated for regeneration: while one dryer is being regenerated, the other units are in operation, guaranteeing constant performance. The variable airflow adjusts automatically depending on process requirements, thus preventing thermal stresses and viscosity variations in the polymer.

Flowmatic is an automatic integrated system for process air distribution in multi-hopper systems. It supplies the correct quantity of air needed by the hoppers. This technology manages the system by adjusting the individual hoppers and process variables. The machine uses only the process air needed, which is calculated on the basis of the quantity and type of polymer to be handled. This produces excellent results in terms of minimizing consumption. The proprietary OTX hopper has an innovative geometry which resolves the problem of non-uniform material falling flows and results in more efficient management of the drying phase, keeping the process inside the hopper under control. The particular hopper configuration provides homogeneous airflow and temperature, thus ensuring optimal treatment of the granule with a considerable reduction in energy costs in comparison with conventional hoppers. The high impact Spyro finish, besides providing this new hopper with its distinctive look, also makes it more



resistant than those using standard linings.

[www.moretto.com](http://www.moretto.com)

## Cooling & thermoregulation

The new range of Raca Plus Energy chillers is now complete with the innovations to be introduced by **Frigosystem (15 - B30, 24 - D40)** during the fair. This series boasts successful worldwide installations: many customers have already attained the benefits of the ecological R410 gas, saving an average of 35% energy compared to the traditional R407. These chillers are also appreciated for their highly reliable technology and the flexibility of application.



However, the company continues to enlarge and enrich its range of products to better address the needs of its customers. In its quest to stay ahead of competitors, the new series will include models from 50 to 1,200 kW of nominal cooling power, all with multi-circuit and multi-compressor systems. The max ambient temperature range will move from 43 to 45°C without options. The free-cooling system, integrated or not, has been optimized too, and will consequently reduce the energy consumption in the most favourable climatic conditions. i-Remote is the name of the newly introduced control system, a local and remote supervision system, applicable also to the most complex cooling plants.

Innovations are also announced on Kite air and water chillers, purpose-built and engineered for blown film extrusion and already valued by German, Italian and North American customers. The technical focus remains on energy savings, R410 efficiency and flow variations, with constant and precise control of process temperature. The range now offers units with 1-2-3 cold air outlets and heat regulated water connections for extruder utilities.

On the temperature controllers, the company is presenting the new i-Heating units, with a new-generation control system. In 2011 Frigosystem was named number one Italian manufacturer of temperature control units, with more than 150 models in its catalogue and 2,800 produced units: water or diathermic oil, simple solutions or sophisticated technologies, but always and totally "made in Italy" with an excellent quality-price ratio.

[www.frigosystem.it](http://www.frigosystem.it)

## Band granulators

Band granulators from **Sagitta (11 - C06)** are suitable for dicing non vulcanized rubber compounds of any type, natural or synthetic, as well as thermoplastics, linoleum, cellulose, and silicone.

Feeding extruders and moulding machines with granules instead of



strips offers several advantages, such as the ability to blend different compounds thus obtaining better product quality, less pulsation in extruder screws, energy savings, and automatic operation. Many solvent manufacturers take advantage of band granulators because the dissolving times can be reduced considerably by means of granules (5x5 or 3x3 mm). The use of the GR 450 S2 model is recommended for processors who often have changes of compounds or colours. On this machine the cutting unit moves forward for easy cleaning.

Sagitta delivers machines with working width of 135-235-430-620-830 mm for granules of 3x3, 5x5, 8x8, 10x10 and 15x15 mm. Toothed feeding disc-cylinders are available for very hard materials in order to prevent slippage. Hardened metal knives can be supplied for granulating very abrasive compounds. The hourly output capacity ranges from 300 to 10,000 kg according to the machine model and granule size. Machines with or without automatic powdering equipment are available. Furthermore, the delivery program includes pneumatic conveyance of granules and de-powdering systems as well as de-packing powder feeding equipment.

Sagitta also produces other rubber processing machines: horizontal splitting machine to divide elastomer sheets (max width 550 mm, max thickness 60 mm, minimum thickness 0.2 mm); automatic machine for trimming and cutting elastomer gaskets placed on rotating spindle and trimmed with extreme precision by lance tooling; automatic machine to cut elastomer sleeves on rotating spindles into rings by means of special knives; automatic machine to cut extruded elastomer profiles and hoses by electronically-controlled revolving circular knives.

[www.sagitta.it](http://www.sagitta.it)

#### In-line recovery

Among the innovative proposals introduced by **Tripla (15 - C26, 24 - C55/D50)**, a special emphasis is put on the evolution of JM grinders, devoted to in-line recovery of injection moulding scrap. Following sales of more than 4,000 units, the company decided to sum up in these machines the Blue Line design philosophy that it has developed in recent years.

This vision has led to thoroughgoing research into performance while maintaining flexibility of use, compliance



with standards and legislation, advanced ergonomic solutions, and management economy combined with constructive quality to ensure a medium-term return on investment.

The aims which have served as guidelines in renewing the JM range may be summarized as follows: low noise level (below 80 dBA) for in-line grinding; low energy consumption (max 700 W) with motor power reduced by 20% while ensuring the same performance; ergonomic design and reliability with simplified access to the hopper and funnel, and a 27% reduction in footprint. Similar design standards and solutions have also been applied to other widely used machine ranges, Series 30 and 42,



which are proposed in updated versions.

As for large-sized machines, a revamped version of the Series 80 (rotor diameter 620 mm) is on display for grinding in-line (thermoforming and film scrap) and off-line (extrusion and recycle). A new counter-knife securing system has been designed for the watertight grinding chamber; moreover it is possible to fit stationary or rotary discs and three different shafts, including a forged one for wet grinding or extrusion spurges.

A further innovation on display is the CR K high speed forced loader for film fluff, designed in cooperation with major manufacturers of cast film lines. Equipped with visual warnings and video cam for internal monitoring, its special design allows it to integrate with any type of extruder.

[www.trioplastics.com](http://www.trioplastics.com)

#### Sprue-pickers & driers

The sprue-picker manipulators in the AVP range, suitable for on-board use with injection moulding machines, have been designed by **Dega (24 - D14)** to pick-up sprues or parts (with grip device and vacuum generator) from the mould area. Amortized pneumatic cylinders and large solenoid valves permit a considerable reduction of the extraction cycle times. Thanks to the programming software designed by the sister company Dega Automation, the manual control allows constant and accurate monitoring of all cycle times, with visualization of each movement on the display. The selection of standard programs is easy and fast: there are 4 pre-set programs in the memory which can be called up and modified at any time. Moreover, it is possible to create new programs and store them in memory. The operating functions, such as vacuum circuit, part grip verification, and part pick-up from the moveable and fixed platen, are easily selected by a key on the hand-held control.

For small batch dehumidification with a stable process quality, Dega is introducing the latest version of its DD60-R, a small dehumidifier with a 60-m<sup>3</sup>/h rotor which is positioned in a container that rotates, divided into 3 different compartments, each specialized in a different function: processing, regeneration and cooling. With this system, the processed air exits the rotor always at the highest level of dew point, eliminating the rippling effect observed in conventional systems.

When it is dried, industrial compressed air (6-15 bar) has a dew point of 3-5°C. When it expands to atmospheric pressure, the dew point falls naturally



to -20 or -28°C. With the Series AC micro-dehumidifier it is possible to reach an average and constant dew point of even -18°C. Hence, for small batches it becomes convenient to adopt this solution because similar results are achieved, per unit of energy consumed, as with traditional dehumidifiers, with the advantages of small space requirements, temperature control managed by specific software, micrometric control of the air flow at low pressure, insulated hopper with rolling cover, and air diffuser positioned in the socket adapter.

[www.dega-plastics.com](http://www.dega-plastics.com)

### Quality first

The latest innovative solutions introduced by **Doss Visual Solutions (11 - A31)** in the field of artificial vision systems and industrial automation include Migl II, which makes it possible to sort complex and irregular parts with length up to 600 mm and width up to 200 mm. Linear cameras and laser measurement systems collect all the data necessary for repeatable quality control. The point-to-point laser acquires the real part thickness and the cameras carry out both surface (on two sides) and dimensional checks.

The machine can be equipped with loading and unloading robots. A turnover system has been developed specifically for 180° flipping of any type of part or material. All sorting data are saved to a database that can easily be accessed by the operator and statistics can be arranged in tables that can be exported whenever needed.

Designed for the sorting of large gaskets up to 200-400 mm (in two versions), the Duet machine is composed of a first robot, guided by a camera, which picks up the parts directly from a bin: 2 different cameras frame the scene from two different viewpoints and send back to the PC all the information about the XYZ position of the part to be picked up. The robot then places the part on a back-lit plate for dimensional check; a

second robot rotates the part and passes it in front of a camera for inspection of the entire external surface. The software detects

stains, rings, scratches, tears, flash or missing material. Depending on the outcome, the robotized arm places the part into the bin for good parts or the scrap bin.

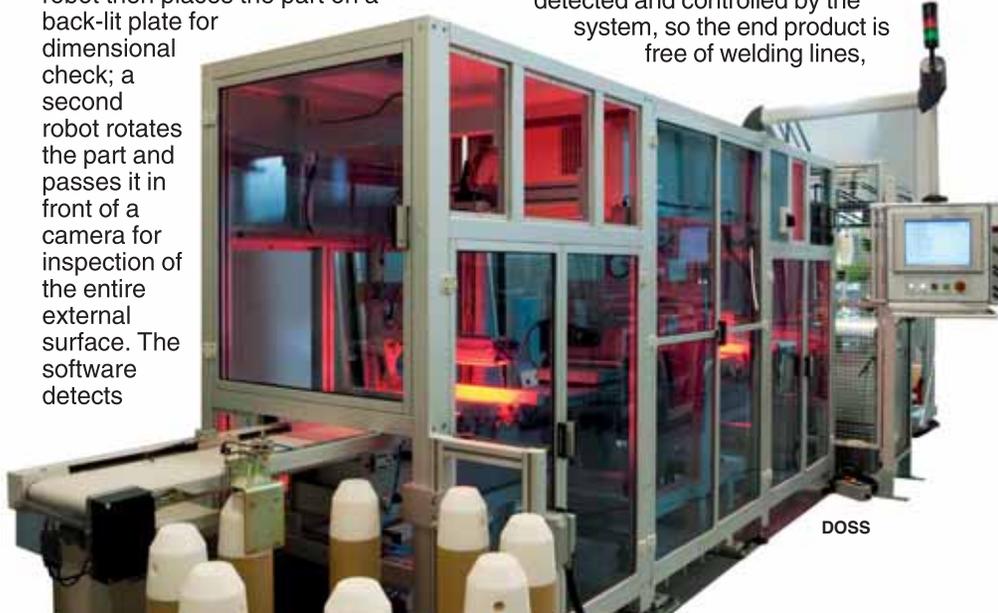
[www.doss.it](http://www.doss.it)

### Nozzles & controllers

Innovations introduced by **Thermoplay (24 - D34)** for injection systems include a new nozzle for multi-cavity moulds used for manufacturing tubular-shaped parts, which contributes to the elimination of traditional "tunnel" sprues normally used in these applications. Injection is direct in the annular cavity wall. The nozzle structure allows easy machining of the injection system housing in the mould. In addition the nozzle is provided with a double sealing ring preventing material leakage. The thermal profile of the nozzle body and the isolation of the tip from the forming matrix make it possible to use process parameters aligned with those suggested by plastics manufacturers. The extraction operation helps create a defect-free injection point thanks to the lateral injection.

Another innovative injection system envisages that the nozzle, with or without the shut-off group, can be mounted at different inclinations and assembled to the manifold ensuring perfect perpendicularity to the injection platen. An innovative system of joints that distributes expansion inside the manifold enables the use of nozzles without minimum length constraints depending on distance from the centring element. The system is supplied prewired in various configurations based on specific needs and equipped with conditioning and electrical circuit, and pneumatic/hydraulic system, simplifying handling and installation of the system in the mould.

Thermoplay also introduces a new sequential controller designed to optimize the molding process in critical applications. Each shut-off valve is detected and controlled by the system, so the end product is free of welding lines,



DOSS

# ROBOTS



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24-D14



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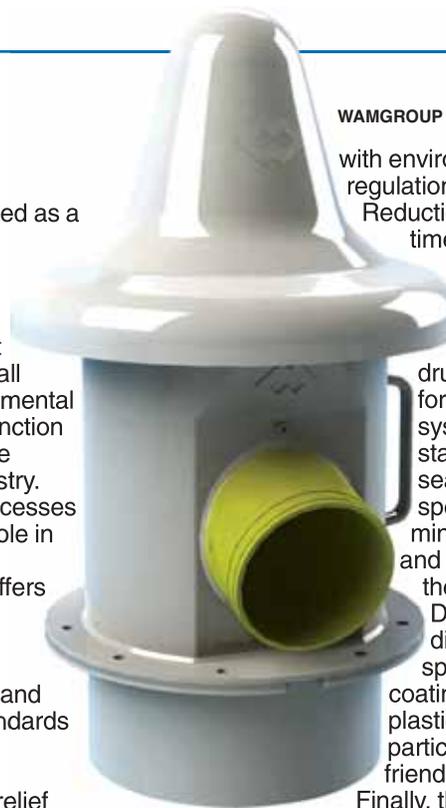
thus meeting the most strict quality standards. Technical characteristics include: sequential control of pneumatic and hydraulic shut-off valve systems, automatic and manual test operation for function testing of each valve, maximum configuration 16 valves, mobile high-resolution touch-screen unit and shockproof case, temperature control of conditioning circuits.

[www.thermoplay.com](http://www.thermoplay.com)



### Strategic maintenance

Today more than ever, maintenance is recognized as a strategic asset for any company. An accurate maintenance strategy, together with the use of system components that enable reduction in overall operating costs, is fundamental in optimizing machine function and plant operation in the plastics processing industry. Even though service processes often play a secondary role in the production system, **Wamgroup (11 - B92)** offers new specialized components aiming at optimizing processes, improving performance, and ensuring high safety standards for both personnel and equipment. The new VHS pressure relief valve, manufactured from engineering polymers, relieves any excess pressure occurring during silos filling or generated by physical or chemical reactions that may take place inside containers. The valve conveys dust emissions to a collections point to ensure constant safety in the work area. Reliability in operation coupled with easy maintenance make the VHS valve a one-of-a-kind component fully compliant



WAMGROUP

with environmental protection regulations.

Reduction in maintenance time and costs also plays a key role for Torex, another Wamgroup company, which has developed VAR, a drum-type diverter valve for pneumatic conveying systems. This valve, with standard inflatable seals, has been specifically designed to minimize maintenance and considerably extend the product life cycle.

Distinctive features of diverter valves are specific anti-abrasive coatings designed for the plastics industry and a particularly maintenance-friendly design.

Finally, the GT pipe couplings, developed to join plain pipe ends of pneumatic conveying lines in a safe, quick and rigid way, help reduce installation costs as compared to welded junctions, at the same time ensuring greater flexibility of use, work safety and no pressure drop along the pneumatic line.

[www.wamgroup.com](http://www.wamgroup.com)

HALL 13 - STAND C05

## HOLLOW LINE

Linee di estrusione per lastre e profili alveolari.  
Extrusion lines for the production of hollow sheets and profiles.

Studio Caporaso Venese - [www.caporaso.it](http://www.caporaso.it)

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Extrusion line for the production of hollow sheets and profiles.

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# AGRICULTURE & POLYMERS

## High performance films

The increasing importance of plastics in the area of agriculture and horticulture has been highlighted by AMI (Applied Market Information) with a new report on agricultural films in Europe, a 2-billion euro market which accounts for over 500,000 tons of polymer-based films every year. The latest trends of this market were also the focus of an international conference that was organised last November by AMI in Barcelona, bringing together agricultural and horticultural cover specifiers, researchers, manufacturers and the supply chain to the industry.

Plastic films for silage, mulch and greenhouse applications have made a substantial contribution to the development of agriculture over the past 60 years. Their use has been notable in the horticultural industry, as well as the beef and dairy sector, contributing to continuously increasing yields. These films have also enabled the extension of cultivation in terms of the growing season and the location for a variety of plants through their use in protective mulching and greenhouses.

While plastic films can undoubtedly contribute to improved efficiency and output, growing concerns about their waste and disposal is leading to growing interest in the use of biodegradable materials. Reductions in dairy herds may lead to a decline in silage films in one area; growth in biomass crops may create opportunities in another. Climate change may extend the opportunity for plastic greenhouses further north, while at the same time existing users will want more durable, longer lasting films to cut costs.

Currently the overall impact of these various trends is a market which in volume terms is showing very little growth but which will still present opportunities for film producers to develop better performing films in areas such as barrier performance, thermal, visual and photo-selective properties.

The market is mainly in the Mediterranean region with Italy and Spain taking the lead particularly in consumption of greenhouse and mulch films. In the long term, however, demand for agricultural films is expected to grow more strongly in countries in Northern Europe where climate change will contribute to more favourable conditions for agriculture and ongoing push for higher yields will drive demand for agricultural films.

Silage film is the largest



segment accounting for almost a half of the European market, split fairly evenly between clamp silage and stretch silage with a small share accounted for by silo bags/tubes. Consumption of greenhouse film represents around 30% of the market consisting of film for classic greenhouse structures, macro tunnels/walking tunnels and low tunnels and floating/direct covers. Mulch film represents the remaining 25% of the agricultural film demand in Europe and is expected to show a small overall decline mainly due to replacement by biodegradable types and where feasible further downgauging.

The ten largest agricultural film producers account for more than a half of the films produced in Europe. While the Mediterranean producers account for the majority of the greenhouse film output, the Nordic and North-West European producers offer primarily silage film and to a lesser extent mulch film.

[www.amiplastics.com](http://www.amiplastics.com)

## Drip irrigation

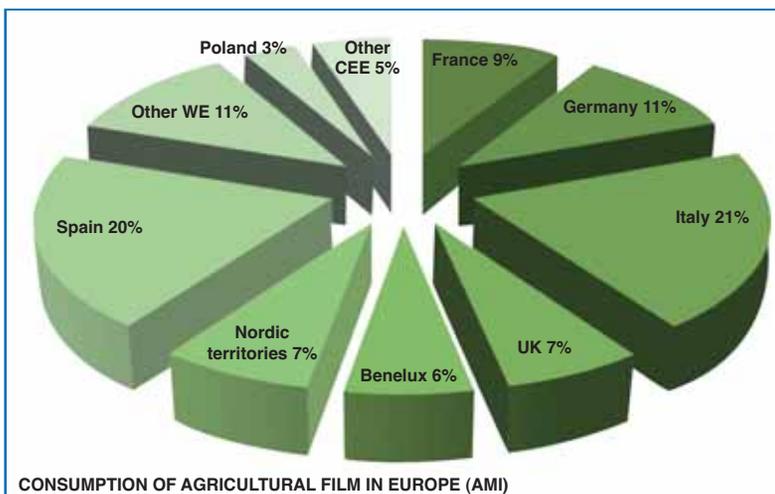
Fresh water usage for irrigation, from surface or underground sources, accounts for approximately 70% of the total worldwide. Also at a global level,

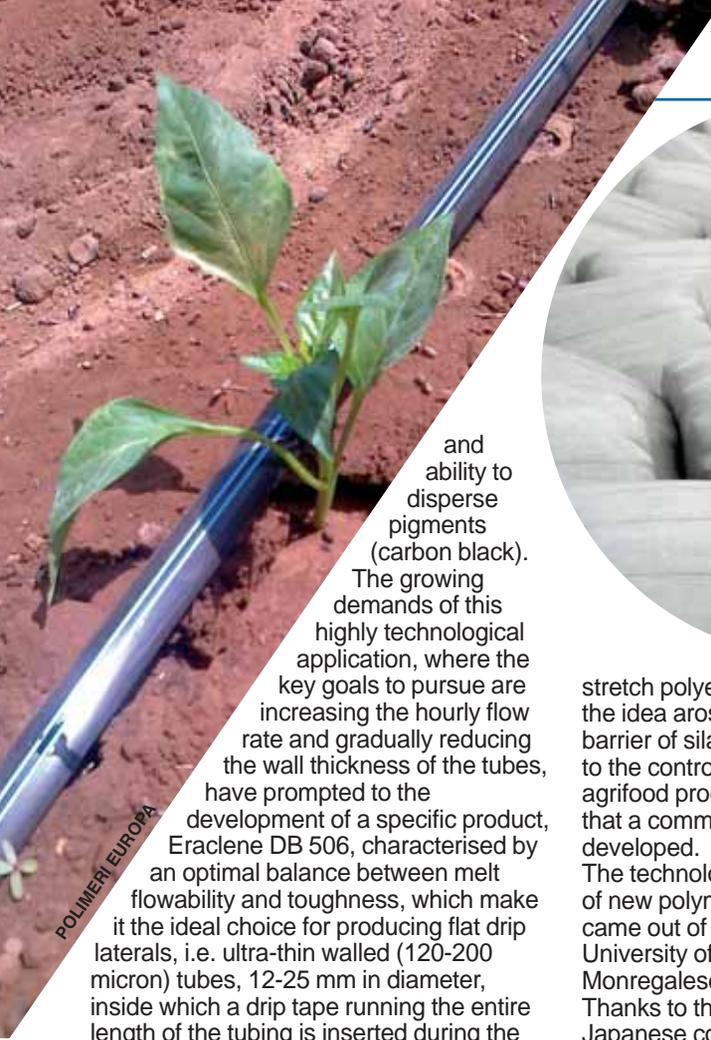
approximately 60% of water drawn for irrigation is lost in the transport networks and during delivery to the crop. The challenge we face, at the start of the third millennium, is to protect the fundamental role of water in supporting the ecosystem, by encouraging sustainable use of this resource and water conservation during irrigation.

Management of irrigation water is still far from matching the ever escalating demands of crop production, however there have been some new technologies developed able to significantly reduce water waste. The most well-known and efficient of these, adopted in developing countries, is micro-irrigation or drip irrigation, which by delivering small amounts of water directly to the roots of plants, is able to reduce water consumption by around 60% and improves the quality and yields of agricultural crops.

In low-pressure localised irrigation, the efficiency of water delivery is generally high because evaporation losses are negligible, as also are losses due to surface runoff. In order to achieve good uniformity of delivery, the system needs to be sized taking care to select the diameter of the tubes as a function of their length, as well as of the flow rate and the spacing between emitters.

The introduction of plastics has made possible countless advances in this sector, and polyethylene is the preferred material for its processability and mechanical properties. Suitably formulated, it is employed for the production of tubes, hoses and drippers. For this application, Polimeri Europa offers a vast range of products that can be used either alone, or in blends. The product traditionally employed for this application is Eraclene FB506, whose success is due to key factors such as versatility, ease of extrusion at low thickness





and ability to disperse pigments (carbon black).

The growing demands of this highly technological application, where the key goals to pursue are increasing the hourly flow rate and gradually reducing the wall thickness of the tubes, have prompted to the development of a specific product, Eraclene DB 506, characterised by an optimal balance between melt flowability and toughness, which make it the ideal choice for producing flat drip laterals, i.e. ultra-thin walled (120-200 micron) tubes, 12-25 mm in diameter, inside which a drip tape running the entire length of the tubing is inserted during the extrusion phase.

This product is used in dripper line systems for irrigating annual crops, and is made entirely from a single resin. This characteristic allows it to be completely recycled at end of life, making this an ecologically sustainable application in terms of both water resource management and the safeguard and protection of the environment.

[www.polimerieuropa.com](http://www.polimerieuropa.com)

### Barrier for silage

Global consumption of plastics in agriculture has grown significantly in recent years, to reach nearly 3 million tons, of which 20% is used in Europe and is employed chiefly for three applications: 40% for greenhouse covers, 20% for mulching fruit and vegetable crops, and 40% for covering silage in livestock farms. The use of plastics for ensilage involves two different technologies: wrapping round bales using 25-micron thick stretch film, and covering silage in trenches or stacks using 110-200-micron thick film. The technique of preserving livestock feed by means of ensilage relies on lactic fermentation in an anaerobic environment. Therefore the quality of the wrap, and its ability to completely isolate the silage from oxygen, are crucial to the success of this method.

Historically, film for ensilage was made from polyethylene. In 1985, a technique was developed for preserving ensilaged forage by wrapping round bales, made possible by the first commercial bale wrapping machine and the availability of



stretch polyethylene film. In the Nineties, the idea arose of improving the oxygen barrier of silage sheets, in a manner similar to the controlled-atmosphere packaging of agrifood products, but it was not until 2005 that a commercial application was developed.

The technological development of film and of new polymers with high oxygen barrier came out of a collaboration between the University of Turin, IPM (Industria Plastica Monregalese) and Nippon Gohsei Europe. Thanks to the far-sightedness of this Japanese company, which believes that development of high oxygen barrier film will be the future of ensilage, in 2007 a new grade of EVOH was developed for this application (SoarnoL SG611).

This polymer retains the extremely high oxygen barrier typical of EVOH, coupled with mechanical properties essential for this type of application, such as elasticity and resistance to puncture and tearing, which make it suitable for producing stretch wrap for round bales.

During the Agricultural Films international conference, held in Barcelona last November, Giorgio Borreani (University of Turin) presented the first experimental results of the application of these films to ensilage on a farm scale.

The findings show a marked improvement in the efficiency of silage storage quality, with a reduction in the losses of ensilaged product and improved healthfulness of the resultant fodder. Improving the quality of silage for livestock farming is one of the most ambitious goals which the scientific and international community has set itself for the near future, because modern livestock farms rely on silage for over 50% of their animals' feed. Availability of healthful and high-quality silage is therefore of the essence, and the new films developed for this application open up

very promising future prospects for this preservation method.

[www.unito.it](http://www.unito.it)

### Olive harvesting

Recently the Italian moulder Saroplast was tasked with the design of new gears for a tool designed for the commercial harvesting of fruit, mainly olives. The original tool had both ergonomic and practical problems. It was heavy and therefore tiring for the user who has to carry it normally all day long. The weight also had a negative effect on mechanical functioning, with the device kept in constant operation for hours at a time.

So the company evaluated the possibility of replacing some metal components with polymers, in order to achieve a more lightweight and easy to handle tool, while enhancing the lifetime of the device. The designers focused on the toothed gear wheel that drives the tool via a connecting rod.

The first tests were carried out with a PPS-based material, which failed after only 3 minutes because of excessive wear. Any new material would have to be able to survive heavy use. It had to be lightweight and offer excellent resistance to wear, fatigue and high operating temperatures. It would also need to support manufacturing to tight tolerances.

A modification was made to a metal ring, also adding a roller bearing that controls the movement of the rod. The key was to use the PEEK 450CA30 grade from Victrex Polymer Solutions, in the first instance to overprint the component, in the second to mould it directly.

The design was tested successfully. PEEK provides a lightweight solution that enables ease of use throughout an entire day. The high thermal resistance of the polymer allows the tool to operate continuously without incurring excessive wear. The new tool also runs more quietly and reduces energy consumption significantly. The new design weighs 10 times less than the original model, improves the acoustic index and reduces power consumption.

[www.victrex.com](http://www.victrex.com)



VICTREX



# Moulding temperature

**T**hermoplastic polymers are injection moulded at temperature and pressure conditions that depend, obviously on the type of mould and its geometry (dimensions, gate location and conditioning are some of the factors to consider), but also on the type of material used.

With respect to this last-mentioned aspect, the essential consideration which determines the choice of moulding conditions is that the polymer must be able to very rapidly fill the mould. This to prevent the melt from cooling inside the mould before it has been entirely filled, which would result in an incomplete part.

It follows that moulding of thermoplastic polymers requires sufficient flowability, both to fulfil the above requirement, and also to ensure a faster moulding cycle, and so higher throughputs.

Given these premises, it is important to remember that the moulding temperature is determined differently for the two main types of thermoplastics, i.e. semi-crystalline and amorphous polymers.

Moreover, we have to consider that semi-crystalline polymers (which include polypropylene, polyethylene, polyamides, acetal resins and polyesters) have a partially ordered arrangement of macromolecules within the polymer matrix, whereas amorphous polymers (such as polystyrene, polycarbonate, PMMA and ABS) have a completely random and disordered arrangement of macromolecules (generally described as a tangle of chains).

Due to these structural differences, the manner in which amorphous and semi-crystalline polymers pass from the solid to the fluid state differ, as do the temperatures at which these transitions take place: for semi-crystalline polymers, this change of phase occurs at the melting temperature, and for amorphous polymers at the glass transition temperature.

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In practical terms, these two different polymer structures entail a difference in behaviour, due to the fact that, immediately after completing the phase transition, a semi-crystalline material is significantly more fluid than an amorphous one. Evidently, this in turn influences the choice of moulding temperature for a polymer, given that, as noted above, it must achieve a certain degree of flowability, and the fluidity of a material in the molten state increases with increasing temperature.

This means that for semi-crystalline polymers, which as we have seen already have a higher flowability to start with, the requisite temperature for moulding is reached at only slight above (a few tens of degrees) the melting temperature.

In the case of amorphous polymers, instead, since even after exceeding the glass transition temperature, and therefore

passing to the molten state, they nevertheless continue to be highly viscous, achieving the fluidity needed for moulding requires increasing the temperature by a much greater amount, at least 100°C above the glass transition temperature.

To illustrate the above points, let us compare the behaviour of a semi-crystalline polymer (PA 6) and an amorphous polymer (PC) as they change state. Polyamide has a melting point of 220°C, while PC has a glass transition temperature of 150°C. Yet, even though PA 6 melts at a much higher temperature than that at which PC begins to soften, it is in practice moulded at a lower temperature than PC (240-250°C for PA 6, approximately 300°C for PC).

In fact, PA 6 is already so fluid at its melting point that only a slight increase in temperature (20-30°C) is needed to achieve the requisite flowability for moulding, whereas polycarbonate, after reaching its glass transition temperature, is still far from fluid enough, and requires its temperature to be raised by a further 150°C approximately.

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*This article was contributed by the experts of Cesap, the Italian centre for training and application support to processors and users of plastic materials.*

[www.cesap.com](http://www.cesap.com)



## Infusion for UV protection

**A**s UV light attacks polycarbonate at the surface, UV protection is most effective when concentrated there. Yet, with traditional compounding of additives it is not possible to concentrate protection at the surface. This limits UV absorber effectiveness in outdoor applications, such as lenses and covers for lighting fixtures, where protection from sunlight is essential to durability and clarity.

A cost-effective and environmentally responsible way to improve the UV protection of injection moulded or extruded polycarbonate parts is offered by Aura infusion technology, developed by Bayer MaterialScience and licensed exclusively to Radco Infusion Technologies for worldwide use. The infusion of UV additives utilizes the same process used to add custom colorants. In this new twist, finished plastic parts are immersed in a mostly aqueous solution containing UV additives. The parts are removed from the solution after a short period of time, rinsed with water to remove excess solu-

tion from the surface and then dried to produce a market-ready product.

The infusion process allows for the use of heat-sensitive additives that break down at extrusion/moulding temperatures, but remain viable at the lower temperatures associated with infusion technology.

Aura technology works in a water-based medium with a minimum of organic additives.

The liquid, constantly recycled and reused, does not add to the waste stream. Processing solvents are reclaimed and reused within the system, and the process produces no hazardous waste. This technology is opening a way to the fundamental redesign of LED light engines and fixtures for outdoor applications. The heat-resistive properties of polycarbonate combined with long-term UV protection through Aura makes possible simple, elegant and cost-effective LED solutions.

[www.materialscience.bayer.com](http://www.materialscience.bayer.com)



## Glass in the shell

The successful overmoulding of a glass perfume bottle using Surlyn ionomer resin is the result of collaboration between Bormioli Luigi, DuPont and the Italian injection moulding specialist Pibiplast. This was made possible thanks to a new glass formulation as well as to Surlyn 3D technology. The bottle concept has been designed by French luxury design specialist QSLD.

The twisted shape of the glass inner bottle is accentuated in perfect transparency by the thick walls of the resin cube that encases it. Further emphasis on the contrasts shapes is made possible by the overmoulding technology in

its choice of colours. The charcoal grey for the outer resin layer is an obvious option for the mood and type of design, and gold is the best colour to enhance this smoky effect. One of the amazing possibilities of Surlyn 3D technology is the ability to create two contrasting shapes, each of them decorated differently. The spectacular end result is a bottle that is almost limitless in terms of the colours and shapes adopted for both materials and also the finish of both the internal and external surfaces.

Bormioli's patented Sparkx glass formulation provides high resistance to chemicals and alcohol and a luxurious sense of weight, whilst the resin shell can be used to magnify, enhance and durably protect the visual effect of the bottle, as well as rendering it far less susceptible to breakage or damage.

At the same time, the material's favourable tactile properties make the bottle both smooth and pleasant to the touch.



DUPONT

[www.dupont.com](http://www.dupont.com)

## Ventilation system

Zeus ventilation system has been designed by NDA (Nuove Dimensioni Ambientali, Italy) to provide thermal insulation and sound absorption in building air vents. The inside is lined throughout with light gray Basotect G, the open-cell melamine resin foam from Basf which is used in a thickness of 20 mm for this application. The foam ensures that the 54-dB rated system meets the strict noise control requirements that apply to residential buildings in Italy, with a minimum requirement of 40 dB.

The ventilation system (45 x 34 x 18 cm) has a 15-cm wide air inlet, it is easy to integrate into the façade and is compatible with all standard mortars and rough-casts. This type of system is specified for Italian kitchens for safety reasons, as gas is the primary cooking fuel. As well as sound absorption, such ventilating systems also place a lot of emphasis on thermal insulation, as they create thermal bridges in the wall.

In addition to offering very good sound absorbing and thermal properties, the foam fits the contours of the ventilating system precisely, so that it can be cut to size and glued in place. The material is very flexible and can easily be adapted to various shapes. It is also free of mineral fibers.

[www.basf.com](http://www.basf.com)

## Inflatable car

Among the many new products previewed at the 2011 Motor Show - held last December in Bologna (Italy) - there was the revolutionary BlowCar, a micro-car developed by former Fiat designer Dario Di Camillo, which draws its inspiration from the technology of the pneumatic structures of airplane evacuation slides and the large airbags for space probes.

Parts of the external bodywork and the rigid plastic interiors of the car are replaced with inflatable rubber components, in order to make the vehicle more lightweight and thereby also reduce its fuel consumption compared to an equivalent vehicle with traditional bodywork. The two-ply panels, inflated to 2 atm (like normal tyres) and made from an aerospace-inspired fire-resistant compound of rubber and textile, allow the overall structure to weigh just 350 kg.

Developed starting in 2008, between Pescara and Turin, the project is now in the full implementation stage, so that as early as next December it should be possible to purchase - for a price close to 12,000 euro - this micro-car just 3 m in length, capable of carrying up to 4 people, equipped with an electric, hybrid or diesel engine, that will be produced by the newly created company likewise named Blow Car.

In addition to better safety in case of impact, and all the advantages connected with a lower overall vehicle weight, it is



also possible to envisage in future an entirely customisable car, with colours and lines that are no longer pre-established, but open to the inventiveness of clients, who will be able to renew the appearance of their vehicle whenever they like. Car makers will be able to offer vehicles that are always stylish, while at the same time cutting down production costs.

[www.concept-inn.eu](http://www.concept-inn.eu)

## F Flying robots

From December 2 through February 19 the FRAC centre in Orléans, France hosted for the first time a very special exhibition, Flight Assembled Architecture, which was built entirely by flying robots. It is a tower (height 6 m, diameter 3.5 m) made up of 1,500 prefabricated EPS modules which has been developed by Swiss architect Gramazio & Kohler and Italian robot designer Raffaello D'Andrea, to inspire new methods of thinking about architecture as a "physical process of dynamic formation". The installation involved a fleet of quadcopters that were programmed to interact, lift, transport and assemble the final tower, all the time receiving commands wirelessly from a local control room. The tower was constructed within a 10 x 10 x 10-m airspace, in which up to 50 vehicles could be tracked simultaneously at a rate of 370 frames per second. Each quadcopter was fitted with custom electronics and onboard sensors to allow for precision vehicle control, whilst also providing the opportunity for pre-programmed flight paths, avoiding possible collisions by taking over when the flying robots get too close to each other.



FRAC

## R Reshapeable like glass

Replacing metals by lighter but just as efficient materials is a necessity for numerous industries. Due to their exceptional mechanical strength and thermal and chemical resistance, composite materials based on thermosets are currently the most suitable. However, such resins must be cured in situ, using from the outset the definitive shape of the part to be produced. In fact, once these resins have hardened, welding and repair become impossible. In addition, even when hot, it is impossible to reshape parts in the manner of a blacksmith or glassmaker. This is because glass, once heated, changes from a solid to

a liquid state in a very progressive manner (glass transition), which means it can be shaped as required without using moulds. Conceiving highly resistant materials that can be repaired and are infinitely malleable, like glass, is a real challenge both in economic and ecological terms. It requires a material that is capable of flowing when hot, while being insoluble and neither as brittle nor as "heavy" as glass.

From ingredients that are currently available and used in industry (epoxy resins, hardeners, catalysts, etc.), researchers from the Laboratoire Matière Molle et Chimie (CNRS/ESPCI ParisTech), supported by Arkema, developed a

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novel organic material made of a molecular network with original properties: under the action of heat, this network is capable of reorganizing itself without altering the number of cross-links between its atoms. This novel material goes from the liquid to the solid state or vice versa, just like glass. Until now, only silica and some inorganic compounds were known to show this type of behaviour.

The material thus acts like purely organic silica. It is insoluble even



CNRS

when heated above its glass transition temperature. Remarkably, at room temperature, it resembles either hard or soft elastic solids, depending on the chosen composition. In both cases, it has the same characteristics as thermosetting resins and rubbers currently used in industry, namely lightness, resistance and insolubility. Most importantly, it is reshapeable at will and can be repaired and recycled under the action of heat.

[www.cnrs.fr](http://www.cnrs.fr)

## Insect cuticle

Researchers at the Wyss Institute for Biologically Inspired Engineering at Harvard University have developed a new material that replicates the exceptional strength, toughness, and versatility of one of nature's more extraordinary substances - insect cuticle. The latter is uniquely suited to the challenge of providing protection without adding weight or bulk. As such, it can deflect external chemical and physical strains without damaging the insect's internal components, while providing structure for the muscles and wings. It is so light that it does not inhibit flight and so thin that it allows flexibility. Also remarkable is its ability to vary its properties, from rigid along the body segments and wings to elastic along its limb joints.

Insect cuticle is a composite material consisting of layers of chitin, a polysaccharide polymer, and protein organized in a laminar, plywood-like structure. By studying the complex mechanical and chemical interactions between these materials and recreating this unique chemistry and laminar design in the lab, the researchers

were able to engineer a thin, clear film that has the same composition and structure as insect cuticle.

The material is called Shrilk because it is composed of fibroin protein from silk and from chitin, which is commonly extracted from discarded shrimp shells. It is similar in strength and toughness to an aluminium alloy, but it is only half the weight. It is biodegradable and can be produced at a very low cost, since chitin is readily available as a shrimp waste product. It is also easily moulded into complex shapes, such as tubes.

By controlling the water content in the fabrication process, the researchers were even able to reproduce the wide variations in stiffness, from elasticity to rigidity. The material could be used to make trash bags, packaging, and diapers that degrade quickly. As an exceptionally strong, biocompatible material, it could be used to suture wounds that bear high loads, such as in hernia repair, or as a scaffold for tissue regeneration.

[www.wyss.harvard.edu](http://www.wyss.harvard.edu)



EVONIK

## Acrylic towers

Last June, one week before the opening of the 54<sup>th</sup> Biennale exhibition, the "unsurfaced roads" of Venice posed a logistical challenge, when a boat moored at the quay of Arsenale Novissimo carrying two cylinders (height 7.8 m, diameter 3 m, weight 3 tons) made of Plexiglas PMMA from Evonik that Russian artist Alexander Ponomarev wanted to use for his Formula installation.

For this challenge Ponomarev placed his trust in the German company Heinz Fritz, which used a special thermoforming process to turn 4 PMMA blocks into four 6-mm thick half-tubes, then into two cylinders without visible joints. The acrylic material is particularly suitable for this purpose because it is easy to form. That would be impossible with glass.

Once the base plates had been bonded with adhesive, the sanded and polished cylinders were sent off on their journey to the world's oldest art festival, firstly by semi-trailer, then by pontoon boat once they reached Venice. Upon their arrival, two cranes installed the tubes at the historical hall. This called for precision work, because the tubes that were later to serve as water pillars had to stand absolutely straight. Steel foundations were made for this purpose, since the original clay floor would not have borne the weight of 3 tons of PMMA plus 15 tons of water.

When the exhibition opened, the high transparency and light transmission of Plexiglas made it barely visible. To viewers, it looked as if two pillars of water

were standing in the historical shipyard. Inside them are submersibles that appear from nowhere and break through the roof of the former shipyard building. They rise and fall, setting the pace for a phase transition, a state that expresses creativity by means of the antique concept of "techne", making no distinction between art and technology.

[www.evonik.com](http://www.evonik.com)



## Beverage holder

**A** portable holder for plates, glasses, bottles or cans, made by CP Multi Trading (Belgium), received the golden innovation award at the 2011 International Exhibition of Inventions in Geneva, Switzerland. Identified as Stick-iT, this piece is made of a grade of

Terblend N, an ABS+PA blend produced by Styrolution. In spite of its glass fibre content, this material can be used without being coated. The pre-dried granules come in a wide range of colours, thus saving time and cutting costs.

Designed especially for aesthetically pleasing applications, this Terblend N grade has relatively low glass fibre content (8%) and provides an excellent balance between enhanced stiffness and durability. Moreover, the material stands out for its high surface quality and pleasant surface feel. In addition, mould textures can be replicated very precisely, giving a matt surface that is easy to grip during use.

The excellent flow of the blend allows the creation of geometrically complex injection-moulded parts, such as the filigree details of the beverage holder. It also offers the requisite dimensional stability under heat as well as chemical and UV resistance, making the holder very stable and robust. It can easily withstand exposure to sun, rain and other liquids, thus lending itself well to outdoor use in the backyard, at the campground or on the beach.



STYROLUTION

[www.styrolution.com](http://www.styrolution.com)

## Logo plates

**T**he logo plate is virtually the “figure-head” on the engine block. It carries the brand of the car manufacturer and should be clearly and permanently visible. TPE-bearings on the logo plate are important for being able to put it on the engine cover and remove it again. In cooperation with Kraiburg TPE, Mues Products & Moulds has developed a method to produce the logo plate including the TPE-component in just one manufacturing process and to improve the properties of this part at the same time. This was made possible through the application of the high-performance Hipex compounds, which are extremely temperature and media resistant as well as suitable for thermoplastic processing, but which still retain their elastic properties with a hardness of 70 Shore A. A special challenge during the development of the logo plate is the construction of the anchorage of TPE on the hard component (polyamide), in which a ring has been provided with slots and tooth which are completely overmoulded and penetrated by the TPE compounds. Thereby the TPE become anchored with the hard component mechanically and furthermore they are formed by means of an elaborate undercut construction. The cavity has been designed more voluminous in the lower area and therefore the rubber bearing builds a narrower part in the upper area, which allows to put on the logo plate on the engine cover similar to a press stud. Despite the undercut, demoulding does not cause difficulties thanks to the firm mechanical anchoring of the TPE-component and the high flexibility of the material.

Up to now, rubber bearings have been fitted on the hard component manually in a second work step, which required much more time and held the risk of failure.

[www.kraiburg-tpe.com](http://www.kraiburg-tpe.com)

## Logistic revolution

**P**lans to phase out the use of wooden pallets across global operations and to transition instead to alternative plastic pallets have been announced by Ikea. Though the change required a complete overhaul of supply chain operations and routines, the company still found that it was the best business decision, based on the overwhelming advantages associated with plastic pallets. Designed and produced by OptiLedge, a new US company totally controlled by the Swedish group, the new pallets will be supplied also to other interested customers. Produced by injection moulding from strong polypropylene copolymer, the less than 500-g shipping pallet is extremely durable, 100% recyclable, helps keep the air clean by reducing overall wood consumption and reduces overall fuel emissions.

The OptiLedge platform presents the opportunity for dramatic savings to other supply chains, as well, by decreasing the costs associated with labour, fuel, packaging and product damage. It has many advantages over paper platforms as well.

For instance, it is less susceptible to moisture, maintains stiffness with flexible loads and is more durable.

[www.optiledge.com](http://www.optiledge.com)



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# NEWS

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RODOLFO COMERIO, leader in manufacturing calendering lines for plastics films, offers a complete line for production of wood-grain floorings, from base layer filled and reinforced with fibre glass, to printed film protected by clear wear layer.



RODOLFO COMERIO, leader in designing and manufacturing laminating machines for plastics films, presents its latest patent pending systems for the embossing in register exactly respecting the printing pattern, both on extensible sheets used for furniture coverings and on unextensible laminated sheets to manufacture panels perfectly reproducing finish flooring.



# WOOD LINE

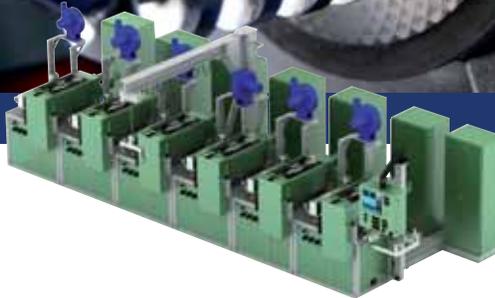
Linee di estrusione profili per l'industria dell'arredamento.  
Extrusion line for the production of edge profiles for furniture industry.

HALL 13 - STAND C05



Studio Caporaso Varese - www.caporaso.it

- Impianti speciali di tubo per irrigazione a goccia
- Impianti per lastre piano mono e multi strato
- Impianti per cast film multistrato
- Impianti per lastre alveolari
- Teste piane ed attrezzature per profili speciali
- Impianti speciali per polimeri fluorurati
- Impianti per profili di illuminazione
- Impianti speciali a richiesta

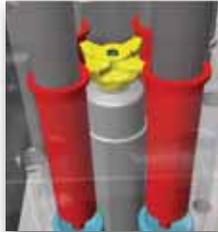


Macchina da stampa a 6 stazioni imitazione legno.  
UV color printing machine 6 stations wood imitation.

- DROP LINE**
- WOOD LINE**
- HOLLOW LINE**
- FLAT LINE**

- Special plants for the production of drop irrigation pipes
- Plants for mono and multi-layered flat sheets
- Plants for multi-layered cast film
- Plants for hollow sheets
- Flat dies and equipments for special profiles
- Special plants for fluoro-polymers
- Plants for lighting profiles
- Special plants on request

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## Hot Runner Special Solutions

Side injection nozzle  
2 or 4 drops

Medical parts moulding  
with special shapes

Direct injection in the circular cavity wall

Double plastic sealing on the nozzle

Uniform wall thickness

Process parameters optimization

Nozzle tip insulation from the matrix

Very small injection point

Easy maintenance on machine board



Milan, Italy  
from 8 to May 12  
Hall 24 Booth D34



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# Together, the challenge goes on...



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*25*  
years

Giving shape to ideas, discovering new horizons, marking out new innovative routes with the usual quality and reliability, are our entrepreneurial challenges. Twenty-five years of steady growth, thousands of machines produced and sold all over the world are the tangible evidences of the passion, diligence and serenity with which we want to face the future... **together.**

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