

MACPLAS INTERNATIONAL

# MIP

THE MAGAZINE FOR THE PLASTICS AND RUBBER INDUSTRY

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■ ITALIAN MACHINERY - SPRINGING FORWARD IN THE FIRST SIX MONTHS ■ EUROPEAN  
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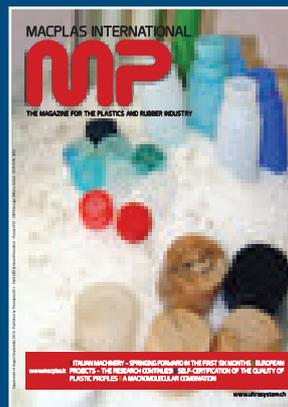
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## COVER STORY

### New purging compounds for high quality cleaning

In Friedrichshafen, at the Fakuma 2015 trade fair (stand 7120, hall A7), Ultra System is proud to introduce its brand new range of purging compounds "Qualipurge CS".

In addition to the well-known and proven products for all kind of polymers and plastic processing machines, after months of laboratory testing and tests on machines while running, new grades of purging compounds are now available: PO-CS, POE-CS (both for polyolefins), High-CS (for all transparent materials, such as polycarbonate and PMMA), PET-CS (for PET) and HT-CS (for all types of polyamide, PEEK, Apec copolycarbonates and Ultem polyetherimides).

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RICCARDO AMPOLLINI



# A (PLASTIC) ENGINE TO GET THE ECONOMY STARTED AGAIN

Let's get one thing clear, this is not a new concept. The idea of an all-plastic car engine was already circulating in the 1980s among Italian researchers at Montedison, and around a decade later the first prototypes had already been developed. What is more, the first large plastic component ever installed under a hood was apparently an air filter, which was presented in Italy, at Monza, in 1982.

Today, however, the idea has been taken up again by Solvay Specialty Polymers, which played a key role in the development of the first Polimotor, designed by the American engineer Matti Holtzberg at the start of the eighties. The new Polimotor 2 is an incredible four-cylinder double-overhead CAM engine, made entirely of plastic. It will be installed in a Norma M-20 concept car and tested during a racing event due to be held in 2016 in Lime Rock Park, Connecticut. This will make it possible to demonstrate how (in extreme cases) it is feasible to replace all the metals in car components with special polymers, namely: PEEK, PAEK, PPA, PPS, PPSU, PAI and Solvay fluoro-elastomers.

A traditional engine, made from metal, is the heaviest part of a car, weighing between 63 and 67 kg. Polimotor 2, on the other hand, weighing 41 kg, will be 40% lighter and will thus allow considerable reductions in fuel consumption and carbon dioxide emissions. Added to that there is the possibility of self-lubrication of the plastic pistons, which would eliminate the need for engine oil.

An initial prototype of a "plastic engine" was also unveiled in April at the Hannover Messe. It was presented by the Fraunhofer Institute which had created it using a glass fibre-reinforced phenolic resin-based composite developed by SBHPP (the high-performance plastics division of Sumitomo Bakelite). The researchers produced the single engine components by injection moulding, and thus in a manner compatible with their eventual mass production. (A curious fact: as long ago as 1941, Henry Ford produced a car door and other car parts – not underhood ones – using the famous thermosetting phenolic resin Bakelite).

All this is going on against the background of an automotive industry that finally seems to be giving out some positive signals. We therefore hope that innovations designed to increase the proportion of plastic materials used in vehicles might bring the sector's companies more work... thus serving as a true (plastic) engine driving the European economy!



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ITALIAN IMPORTS-EXPORTS OF PLASTICS AND RUBBER MACHINERY

# SPRINGING FORWARD IN THE FIRST SIX MONTHS

THE STATISTICAL ANALYSIS BY ASSOCOMPLAST ON FOREIGN TRADE DATA PROVIDED BY ISTAT FOR THE FIRST SIX MONTHS OF THIS YEAR, REVEALS – COMPARED TO JANUARY-JUNE 2014 – A MARKEDLY POSITIVE PERFORMANCE FOR ITALIAN EXPORTS AND IMPORTS OF PLASTICS AND RUBBER MACHINERY, EQUIPMENT AND MOULDS

The growth in exports recorded by Assocomplast members since the beginning of 2014 has continued, and actually increased, this year: in the first six months of 2015 sales outside Italy increased by 7.5% compared to the same period of 2014.

On the import side, the rise in purchases from abroad approached 17%. This provides further reassurance of economic recovery to the domestic market, although it cannot yet be described as a glittering performance. The trade balance,

consequently, showed an improvement.

“Such trend is, in fact”, remarked Alessandro Grassi, new president of Assocomplast, “in line with the results of our latest sentiment survey, reflecting the views of our members on the current state of business”. The survey revealed a climate of moderate optimism, with regard to recent results - in July, 50% of the interviewees reported an increase in orders compared to the same period in the previous year - but also in terms of outlook, with 44% of the interviewees expecting further expansion, and 45% expecting a consolidation of their turnover over the current six-month period. “These indicators also show an improvement with respect to earlier surveys”, said Grassi.

As for equipment in general, the largest volumes recorded of imported injection moulding machines, flexographic printing machines and moulds - to mention some, but not all, types of equipment making up the majority of imports - came from Germany, the country that confirms its role as main supplier of technology for Italy.

Germany, the most important destination market for Italian exports for the sector historically, reconfirms its position also from this point of view. German processors purchased Made in Italy machinery for a value of almost 200 million euro (+19% compared to the first six months of 2014).

In terms of geographical macro-areas for sales overall, there was a notable increase in business from EU countries and the NAFTA group. Amongst EU countries there was an increase of sales also in Spain and in the Czech Republic. With regard to North America, the most significant result was the 36% increase in exports to the United States, along with the by no means negligible figure of +15% in exports to Mexico. Encouraging results also came from Brazil, with a 17% increase, marking a reverse trend when considering the reductions seen over the previous four years and raising hopes for stabilisation in the area. The further decline in exports to Russia (-39%), an area still negatively affected by the problems following the Ukraine crisis, comes as no surprise. Negative figures were also recorded for India (-24%), where Italian suppliers are finding it difficult to make headway despite the undeniable market potential, and China, where marked swings in performance are noticed from year to year.

## A NEW PRESIDENT AND POSITIVE ECONOMIC SIGNALS

The annual assembly of Assocomplast, held on June 19 at the Science and Technology Museum in Milan, elected a new president for the two-year term 2015-2017: Alessandro Grassi, managing



Alessandro Grassi, managing director of Frigosystem, is the new president of Assocomplast

director of Frigosystem, who in turn named Andrea Franceschetti (international sales director of Gefran) as vice-president of the association.

The assembly of members was followed by Assocomplast public assembly, held jointly with that of Federazione Gomma Plastica, the Italian trade association representing about 800 plastic and rubber processors. Carlo Calenda, Deputy Minister of Economic Development, was the first to speak, underlining that the plastics and rubber sector plays a fundamental role in the Italian economy and that policymakers are supporting, with subsidies for the "Made-in-Italy" plan, companies in the industry and their internationalisation. Organised by Assocomplast service company, Plast 2015 trade fair is one of the 30 international trade fairs in Italy supported by the Ministry. The event took place in Milan (May 5-9) and closed with excellent results in terms of visitors (about 50,000) and foreign delegations attendance.

Another speaker was Marco Fortis, economist and vice-president of Fondazione Edison. Apart from mentioning the recent improvement in macroeconomic data, showing a growth of 0.3% in GDP in the first quarter of 2015, the weakness of the euro versus the U.S. dollar and low oil prices - and in light of the comments recorded during Plast 2015 - he declared, although with caution, that there are signs of recovery in the Italian converting market. Such signs are still faint, but hopes are that they will grow stronger in the second half of the year.

In his closing speech to the assembly of members, Assocomplast former president Giorgio

**TABLE 1 - ITALIAN IMPORTS-EXPORTS OF MACHINERY, EQUIPMENT AND MOULDS FOR PLASTICS AND RUBBER (JANUARY-JUNE 2015 - 000 EURO)**

	IMPORTS			EXPORTS		
	2014	2015	Δ% 2015/2014	2014	2015	Δ% 2015/2014
Flexographic printing machines	10,495	12,990	23.8	59,073	54,920	-7.0
Plants for mono and multifilaments	453	1,176	159.9	16,459	22,138	34.5
Injection moulding machines	37,189	53,308	43.3	50,232	51,117	1.8
Extruders	8,613	7,858	-8.8	148,718	137,694	-7.4
Blow moulding machines	5,605	2,823	-49.6	70,652	76,090	7.7
Thermoforming machines	4,812	8,328	73.1	35,693	24,390	-31.7
Presses for tyres and inner tubes	182	476	161.0	13,744	34,601	151.8
Presses	7,631	4,948	-35.2	28,369	50,422	77.7
Machinery for moulding or forming	6,046	4,674	-22.7	70,963	77,754	9.6
Machines for reactive resins	1,630	616	-62.2	21,781	22,765	4.5
Machines for foamed products	2,815	2,165	-23.1	14,133	21,634	53.1
Equipment for size reduction	1,270	1,898	49.5	8,212	9,103	10.8
Mixers	1,166	1,760	51.0	18,188	18,695	2.8
Cutting, splitting and peeling machines	892	2,193	145.9	5,582	8,095	45.0
Other machines	21,289	23,204	9.0	173,982	206,277	18.6
Parts and components	68,997	87,156	26.3	187,384	191,888	2.4
Moulds	121,870	136,124	11.7	367,032	379,164	3.3
<b>Total</b>	<b>300,955</b>	<b>351,697</b>	<b>16.9</b>	<b>1,290,197</b>	<b>1,386,747</b>	<b>7.5</b>

Colombo declared: "The result achieved last year for sales abroad, which represent over 70% of revenues in general and up to 90% for some companies, was followed by positive signals in the domestic market. Indeed, the most recent economic data provided by Assocomplast Research Center show a recovery in production levels for Italian converters and an improvement in machinery builders' order books, both in terms of consolidated data and forecasts at 3-4-months".

And it was with these optimistic words - also

echoed by Prime Minister Renzi in his positive message to Assocomplast and Federazione Gomma Plastica - that Giorgio Colombo gave the floor to the new president, Alessandro Grassi. "There are many complex challenges ahead but I am sure we will rise to the occasion thanks to the collaboration not only of the Council and the Executive Committee but also of our general members - as making them more involved in the life of the association represents one of my prime objectives", said Grassi. ■

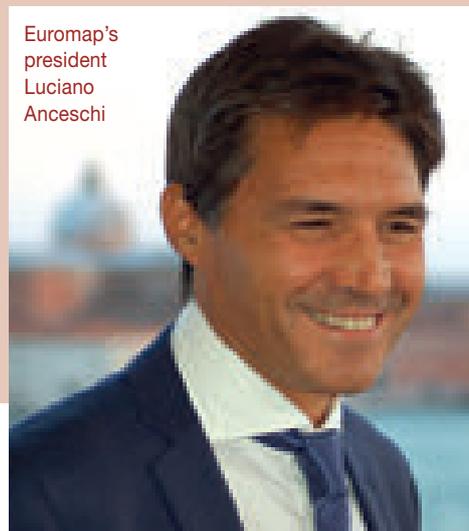
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## Euromap general assembly

# Output of European machinery manufacturers reaches 13 billion euro

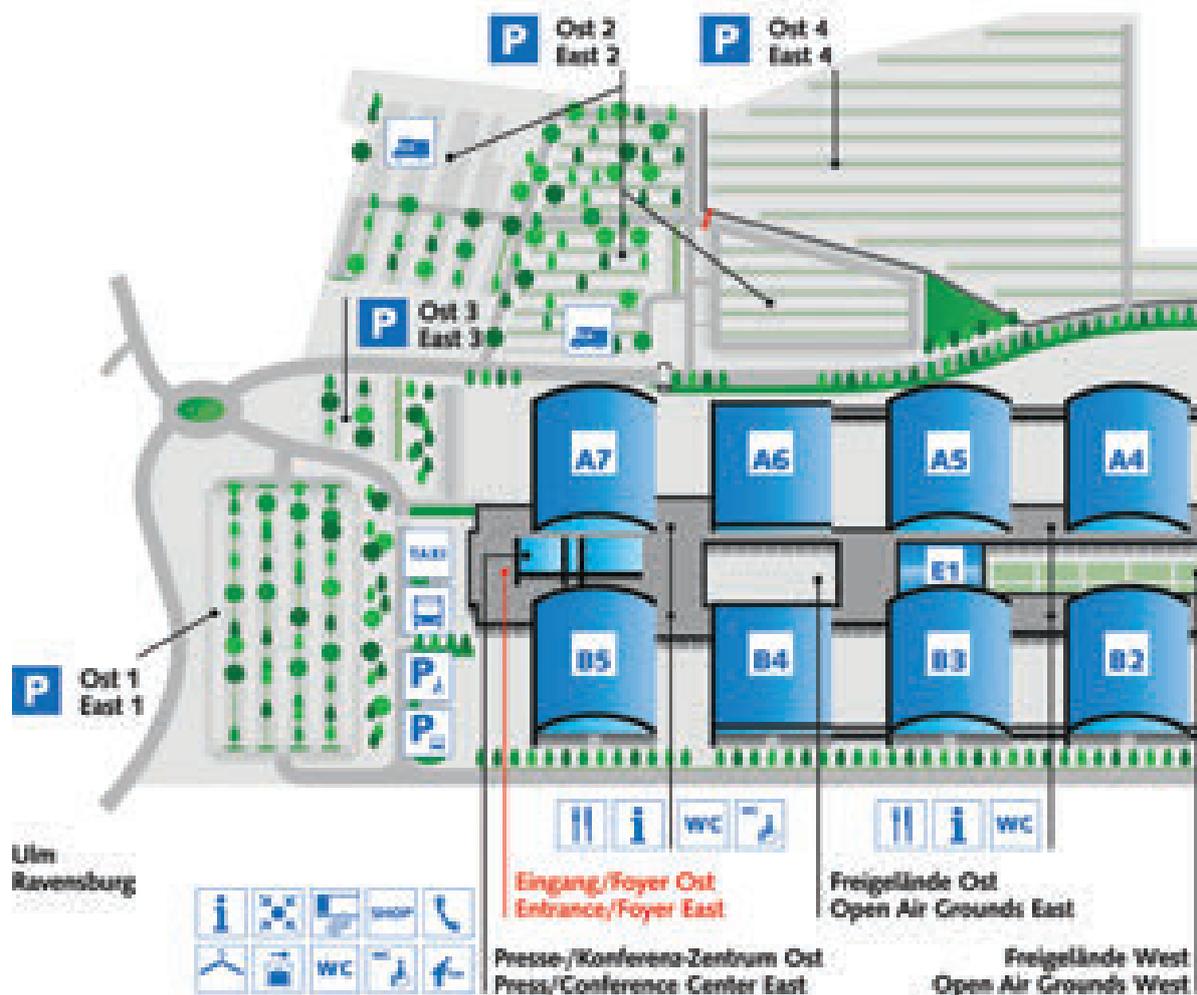
At the general assembly of Euromap, held in Venice on September 10 and 11, representatives of the member companies of the European plastics and rubber machinery federation - joined by Italian Assocomplast together with the national associations of Austria, France, Germany, Luxembourg, Spain, Switzerland, Turkey, and the United Kingdom - re-elected Luciano Anceschi of Tria as president for the period 2015-2018. Karlheinz Bourdon (KraussMaffei) has been appointed vice-president, whilst Thorsten Kühmann (VDMA Plastics and Rubber Association) will still act as secretary for Euromap. Anceschi thanked the former vice-president Helmut Heinson (Arburg) for his contribution and for clearly defining Euromap activities. The output of the nine members of Euromap amounted to 13 billion euro in 2014, a year-on-year increase of 1.9%. In the same period

global exports from "Euromap countries" rose by 1.6% to 9.7 billion euro. At Euromap's assembly, the focus was on the BRIC countries as customers for European plastics and rubber machines. "The performance of those markets did not meet our manufacturers' expectations. The shortfall main-



Euromap's president Luciano Anceschi

ly resulted from a slump in demand in Brazil and an even sharper drop in Russia. As for China, the plastics and rubber machinery industry development was uneven and needs to be closely monitored. India, on the other hand, is giving cause for optimism after a couple of years of declining exports", said Luciano Anceschi. "Overall, global output of plastics and rubber machinery reached 32.5 billion euro in 2014, with Euromap accounting for 40% of this total figure", explained Euromap former vice-president Helmut Heinson. "Despite the sharp rise in China share over the past few years, Euromap managed to hold on to its own share. The same applies to exports, with Euromap maintaining a market share of around 50% over the past five years". Euromap forecasts a 2% increase for the current year with output rising to 13.3 billion euro. ■



## ITALIAN EXHIBITORS AT FAKUMA 2015

	HALL	STAND
ABATE BASILIO C.	A7	7106
AIGLE	A7	7205
AQUATECH	A7	7201
ARCA	A5	5117
BINOVA	A6	6207
BMB	A4	4105
BMZ MOULDS	A5	5117
CAMPETELLA ROBOTIC CENTER	A7	7208
CB STAMPI	A7	7008
CELLOPLAST GD	A5	5116
CHEMORBIS	B5	5405
CMC	A5	5303
CMS	A1	1428
COIM	B5	5111
COMEC ITALIA	A1	1403
COSSA POLIMERI	B4	4315
CRIZAF	B3	3205
DEMAK	B3	3207
ELESA	A1	1221
ELIOS	A4	4012
ESSETI PLAST GD	A5	5116
EUROCHIMIND	B5	5317
EUROCOLOR	A7	7123
FB BALZANELLI	A6	6304
FIMIC	A6	6116
FI-PLAST	B4	4315
FP SERVICES	A1	1500
FRANCESCO FRANCESCHETTI ELASTOMERI	B5	5212
FRANPLAST	B1	1306
FRATELLI VIRGINIO	A7	7212

	HALL	STAND
FRIUL FILIERE	A6	6111
GEFIT	A3	3306
GEFRAN	A3	3004
GHILARDI STAMPI	A5	5117
GIASINI	A5	5117
GIMATIC	A7	7204
GIURGOLA STAMPI	A5	5117
GRIP SERVICE	A7	7405
GRUNIVERPAL	A7	7124
HBI	Foyer West	FW-45
HELIOS ITALQUARTZ	A4	4127
HEROFLON	B5	5212
HRSFLOW	A2	2217
HT	A4	4236
IHR	A2	2405
IMANPACK	B5	5117
IMI FABI	B4	4309
INPROS	A4	4129
INTERCABLE	A7	7503
INTERTECNICA	A7	7214
ISPER	A5	5121
LATI	B2	2205
LORANDI SILOS	B3	3312
LUCCHINI RS	Foyer West	FW-51
MACPLAS	Foyer West	FW-01
MB CONVEYORS	B1	1214
MEPOL	A5	5210
MILLUTENSIL	A6	6104
MO.MI.	A5	5117
MORETTO	B3	3208

# ITALIAN EXHIBITORS AT FAKUMA 2015



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MPI (MOULDS PLUS INTERNATIONAL)-ULTRAPURGE	A4	4013
NEGRI BOSSI	Foyer West	FW-04
NORD COLOR	B2	2207
NOVA FRIGO	A1	1209
NUOVA RET	A1	1511
NUOVA SITT	A1	1222
OMG	B3	3004
OMG THERMOFORMING	A7	7121
OMMP-MOULDS	Foyer West	FW-28
OREPLAST	Foyer West	FW-27
OTS	A7	7003
PANTOSTAMP	A5	5117
PENTA	A7	7201
PIAZZA ROSA	Foyer West	FW-52
PIOVAN	A7	7201
PLASTIC METAL	A7	7212
PLASTIC SYSTEMS	B3	3113
POLIBLEND	A5	5116
POLIPLASTIC	Foyer Ost	FO-04
POLIS	B4	4305
PROGIND	A1	1402
PROMIXON	Foyer Ost	FO-15
PRO.VE.R	A3	3112
RB	A7	7009
RIFRA MASTERBATCHES	B4	4314
RMP SAVOINI	A1	1402
ROMAGNANI STAMPI	A5	5117
ROSÀ PLAST	A6	6321
RUBERTI	Foyer West	FW-30-5
SABO	B2	2125

	HALL	STAND
SARA	A6	6005
SCS (SOCIETÀ COSTRUZIONE STAMPI)	A5	5301
SERISTAMPA	B3	3008
SIMATEC	Foyer West	FW-04
SIRMAX	B4	4508
SO.F.TER.	B2	2208
SPA (STAMPAGGIO PLASTICA AFFINI)	A2	2102
STAR AUTOMATION EUROPE	A7	7115
STOCCHIERO MOULD SOLUTIONS	Foyer Ost	FO-10
TARO PLAST	B5	5207
TECNOMATIC	A7	7405
TECNOSTAMPI F.LLI PELIZZARI	B5	5201
TECNOVA	A6	6207
TECNOVITI	A6	6207
TEXER DESIGN	B3	3221
THERMOPLAY	B3	3118
UCISAP	A5	5117
UNIFORM	A5	5117
UNIGASKET	Foyer Ost	FO-10-1
VAMP-TECH	A4	4004
VENETA MINERARIA	Foyer Ost	FO-07
VIBA	B2	2009
VIGNATI	B3	3009
VIPLAS	Foyer West	FW-53
VIRGINIO NASTRI	Foyer West	FW-04
ZAMBELLO RIDUTTORI	A6	6105
ZOPPAS-IRCA	A7	7317
ZRE	A5	5310

FIRST SIX MONTHS OF 2015

# EUROPEAN POLYOLEFINS MARKETS STEERED BY SUPPLY ISSUES

THE EUROPEAN POLYOLEFINS MARKETS WERE HIT BY A SIGNIFICANT NUMBER OF PRODUCTION OUTAGES STARTING FROM THE SECOND HALF OF FEBRUARY 2015. THESE PRODUCTION ISSUES MAINLY STEMMED FROM CONSTRAINTS IN FEEDSTOCK SUPPLY AND HELPED REVERSE THE BEARISH TREND WHICH HAD BEEN IN PLACE ACROSS THE POLYOLEFINS MARKETS SINCE NOVEMBER 2014

BY **BERRA BALCI**

**A**fter posting three-digit price decreases in the first month of 2015, the PP market initially extended its downward momentum into February due to persisting pressure from lower upstream costs. Spot homo-PP prices even touched below the 1000 euro/ton threshold both in Italy and West Europe briefly (see graph in **figure 1**), according to ChemOrbis Price Index.

However, the sentiment shifted by the middle of February as players started to report reduced availability for PP.

### FORCE MAJEURE ANNOUNCEMENTS

The raw material producer LyondellBasell declared force majeure on the PP output from their 185,000 tons/year plant at Ferrara (Italy) due to technical issues. Combined with rising feed-



Fig. 1 - Spot homopolymer-polypropylene prices in Italy for the past 1 year



stock costs, the intensifying tightness triggered an upward trend for PP prices as of March. Borealis also declared force majeure on the PP output from their Schwechat site in Austria in the second half of the month because of a force majeure declaration at their third-party monomer supplier.

As can be seen from **table 1**, more PP force majeure announcements were reported from European producers in the following months, especially after a fire broke out at the Naphtachimie cracker in Lavera, France on May 17. Supply constraints gradually lost their impact on the PP market during June prior to a downturn in July.

A similar case was observed for PE while the tightness was more intense compared to the PP market due to a larger number of production issues, which ended an ongoing downward trend in its fourth month. Tight supply put a cap on price decreases at the beginning of February, especially for LLDPE and HDPE and price hike targets surfaced from European producers in the following days, erasing the earlier reductions. Versalis declared force majeure on PE from Dunkirk, France in the second half of March. The company's Dunkirk site houses a 210,000 tons/year LDPE and a 140,000 tons/year LLDPE plant. Borealis also issued force majeure on PE from its Schwechat site at Austria. Both of these force majeure declarations lasted until the first half of May.

By the end March, LyondellBasell and Sabic declared force majeure on their PE supply from Germany citing technical issues. LyondellBasell has an HDPE capacity of 320,000 tons/year at Muenchsmuenster, while Sabic operates a 175,000 tons/year LLDPE/HDPE swing plant at Gelsenkirchen.

At the beginning of April, Ineos announced force majeure on HDPE from their 450,000 tons/year Lillo plant in Belgium, followed by Total's force majeure declaration on HDPE from Gonfreville, France around April 8. During May, Ineos declared force majeure on HDPE from Lavera too following the fire at Naphtachimie's cracker on May 17, followed by Sabic and Repsol's force



Fig. 2 - Spot PE prices in Italy since January 2008

majeure declarations on LDPE and HDPE from Wilton, the UK and Sines, Portugal, respectively.

### A DOWNTURN FOR PE WAS INEVITABLE

Persisting availability constraints supported sellers' three-digit price hikes for a fourth month at the beginning of June when spot PE prices in Italy hit the highest levels since 2008 on euro terms as can be seen from the graph in **figure**

**2**, created by ChemOrbis Price Wizard.

Supply levels were yet to ease fully in the June-July period as availability was still not as long as players expected it to be even after most of the producers lifted their force majeure declarations on PE. However, a downturn for PE was inevitable in August as the market came under downward pressure from the losses in feedstock costs. ■

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

TABLE 1 - FORCE MAJEURE DECLARATIONS ON EUROPEAN PP PRODUCERS IN THE APRIL-AUGUST PERIOD (2015)

Date	Company	Plant	Location	Status	Notes
April-August	Total Petrochemicals	PP	Europe	Force Majeure	Company declared force majeure on PP deliveries from Europe due to technical issues at Donges refinery in late April. The force majeure remained in place until H1 August
May	LyondellBasell	PP	Germany	Force Majeure	Company declared force majeure on certain PP grades from Wesseling and Knapsack in mid-May due to monomer supply issues
May-August	Ineos	PP	France	Force Majeure	Force majeure was announced on PP from Lavera following a fire at Naphtachimie cracker on May 17. The force majeure continued through August
June	LyondellBasell	PP	Italy	Force Majeure	Company declared force majeure on PP from Brindisi in H2 June. The plant was restarted in late June

Source: ChemOrbis Production News

NEWS

PE, PET, PP, PS, PVC, ABS

# Polymers pricing trend according to ChemOrbis

CHEMORBIS PRICE REPORTING FOR WEEK 38 (SEPTEMBER 14 - SEPTEMBER 18, 2015)							
	Italy Local Spot Market (DDP euro/ton)	Northern Europe Local Market (DDP euro/ton)	China Local Market (DDP euro/ton)	China Import (CFR euro/ton)	Southeast Asia Import (CFR euro/ton)	Egypt Import (CFR euro/ton)	Turkey Import (CFR euro/ton)
<b>PE</b>							
HDPE film	1320 - 1420	1350 - 1420	1103 - 1210	997 - 1087	995 - 1077	956 - 1139	1032 - 1103
HDPE blow moulding	1330 - 1420	1360 - 1420	1115 - 1222	969 - 1050	1059 - 1059	1000 - 1139	1103 - 1103
LDPE film	1290 - 1400	1330 - 1400	1115 - 1240	997 - 1094	1039 - 1085	956 - 1130	1024 - 1140
LLDPE C4 film	1290 - 1400	1320 - 1380	1024 - 1151	965 - 1061	1015 - 1068	1095 - 1139	1024 - 1103
<b>PET</b>							
PET bottle grades	900 - 960	880 - 930	759 - 807	-	759 - 821	807 - 829	768 - 785
<b>PP</b>							
PPBC injection moulding	1190 - 1290	1170 - 1290	932 - 1073	882 - 979	935 - 1024	1061 - 1104	971 - 1170
PPH injection moulding	1110 - 1240	1120 - 1240	920 - 1008	874 - 909	889 - 971	939 - 1026	-
PPH Raffia	-	-	889 - 1008	847 - 918	878 - 971	939 - 1026	882 - 1010
PPH RC injection moulding	-	1275 - 1275	-	-	995 - 1068	1069 - 1069	1120 - 1150
<b>PS</b>							
GPPS extrusion	1330 - 1420	1370 - 1450	996 - 1139	1015 - 1015	997 - 1032	-	-
GPPS injection moulding	1360 - 1420	-	996 - 1139	1015 - 1015	997 - 1032	1041 - 1112	1019 - 1260
HIPS extrusion	1420 - 1510	1450 - 1540	1068 - 1091	1050 - 1050	1032 - 1085	-	-
HIPS injection moulding	1450 - 1490	-	1056 - 1127	1050 - 1103	1032 - 1085	1077 - 1222	1032 - 1320
<b>PVC</b>							
SPVC K 67-68	855 - 930	880 - 900	664 - 682	688 - 706	697 - 706	681 - 698	653 - 741
SPVC K 70	860 - 960	900 - 920	682 - 682	-	729 - 838	-	768 - 768
<b>ABS</b>							
ABS extrusion natural grade	1700 - 1870	1890 - 1900	1186 - 1246	-	-	-	-
ABS injection natural grade	1700 - 1870	1850 - 1870	1163 - 1264	1143 - 1209	1112 - 1156	1200 - 1244	1249 - 1249

Source: ChemOrbis  
 VAT excluded - DDP: Delivered Duty Paid - CFR: Cost and Freight

FIG. 1 - CHEMORBIS ITALY LOCAL SPOT PRICE INDEX FOR PPH INJECTION - FD NORTH ITALY (EURO/TON)

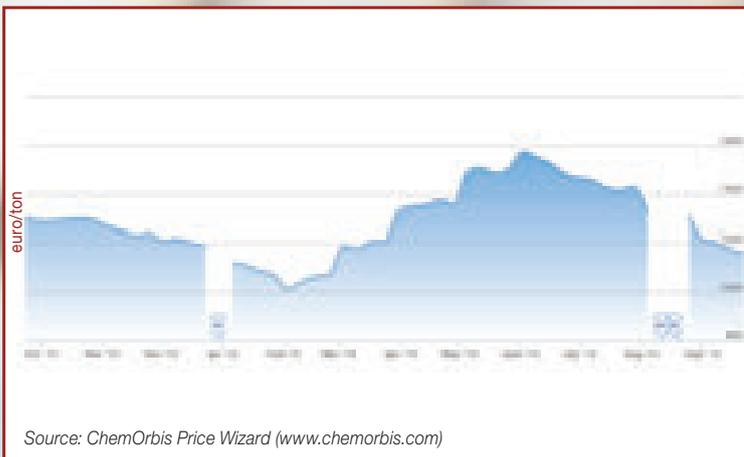


FIG. 2 - COMPARISON BETWEEN LDPE AND HDPE PRICES (FILM GRADES) - FD NORTH ITALY (EURO/TON)



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A SUMMARY OF  
THE MUCH MORE  
DETAILED ARTICLE  
BASED ON AN  
EXCLUSIVE INTERVIEW  
WITH RENATO UGO,  
ENTIRELY PUBLISHED  
IN THE ITALIAN ISSUE  
OF THE MAGAZINE  
MACPLAS

BY RICCARDO AMPOLLINI



INTERVIEW WITH RENATO UGO

# PAST, PRESENT AND FUTURE OF ITALIAN POLYMER CHEMISTRY

**B**ecause of his experience as professor of Analytical, General and Inorganic Chemistry, as member of the managing committee of Montedison, president of AIRI (Italian Association of Industrial Research) and more besides, MacPlas asked Renato Ugo his opinion on the state of the art of Italy's plastics industry.

## HOW HAS POLYMER CHEMISTRY IN ITALY CHANGED SINCE THE NINETIES?

"From the standpoint of developing new polymers and developing processing technologies, the majority of the work was done in the period between the Sixties and the Eighties. In the Nineties, a few special engineering

plastics were developed, after which, at least in Italy, no chemical companies then dedicated their efforts to developing polymers of a particular order of relevance. In Italy, I have to also say that today excellent research in the fluorinated polymer sector continues".

## IN ITALY, THEN, IS RESEARCH MORE PRACTICAL THAN THEORETICAL?

"In actual fact, we have moved on from basic research, aimed at developing new polymers, to research focussed on developing polymers with clearly determined functions. And note that this is no less noble in terms of research, it is equally challenging".

## AND HOW ARE THE ITALIANS DOING WITH THE ELASTOMER SECTOR?

"In Italy there is still a strong tradition in the field of synthetic rubber. Everything began at ENI and Montedison, with Dutral EPDM: a rubber that comes at a certain cost because of its special characteristics. Still today ENI is producing excellent synthetic rubbers, it owns rather good facilities and I believe it is also investing in this sector".

## WHAT CAN YOU TELL US, INSTEAD, ON RECOVERY AND RECYCLING POLICIES?

"The earliest techniques were purely mechanical: the material was shredded and then IR

The profile, in brief

## Renato Ugo's identity card

- Born in Palermo on June 18, 1938, Renato Ugo earned his degree cum laude in industrial chemistry from the University of Milan in 1961.
- Since 1966 fully established as professor of General and Inorganic Chemistry in the same university, awarded of the qualification prior to prescribed terms by virtue of his superior scientific merits.
- In 1965 he was post-doctoral NATO Research Fellow at Sheffield University (UK) and in 1974 Visiting Professor at Western Ontario University (Canada).
- From 1983 to 1986 he was president of the Guido Donegani Institute at Montedison. In 1988 he was awarded a degree honoris causa by Clarkson College in Posdam (NY, US) and in 1990 he became a National Member of the National Academy of the Lincei. In 2000 he was awarded Gold Medal by the President of the Italian Republic for culture and science.
- From 1986 to 1994 he was one of the founders and the first president of the Association of Italian Industries involved in Biotechnology (Assobiotec, a Federchimica association). Since 1984 he has been a member of managing committee of Federchimica (Confindustria). Since 1983 he has also been president of AIRI (Italian Association of Industrial Research). ■



selectors were able to separate anything containing carboxy groups. But with these systems it was still not possible to isolate polyethylene and polypropylene, and subsequent chemical treatments had to be devised. The sector which in Italy has invested the most in recycling technology has so far been the polyester industry (PET in particular), which for a long time was used only for materials considered seconds and never in bottles, something that today is possible thanks to certification for post-consumption PET flakes coming into contact with food".

### WHAT IS LACKING TODAY IN ITALY TO RETURN TO THE CENTRE OF GLOBAL POLYMER CHEMISTRY?

"What I am concerned about is that large research structures no longer exist. We need to bolster the few remaining good organisations - like Cesap (Centre for the development of plastic applications) and Proplast (Consortium for the promotion of the plastic culture) - concentrate them and create a national structure providing advanced technology for the study of polymers, blends, alloys and compounds. To be proactive and act in more than one sector at the same time, these structures should however be able to count on 100-150 people".

### AND WHEN IT COMES TO UNIVERSITIES, WHAT IS GOING ON?

"Some research into processing polymers is carrying on at some technical universities, Turin and Milan for example. Certainly the Uni-

versity of Naples Federico II is doing plenty of work on composites, at the unit directed by Luigi Nicolais, professor of polymer technology and science and technology of materials, but also the president of CNR. After all, Campania is home to many companies with operations in the aeronautic, automobile and nautical sectors.

To be honest, though, in Italy the CNR is virtually doing more than universities, it has facilities dedicated to polymers, like in Milan, for example. But I think that CNR has to "launch" itself into the research about new high-added value polymers, such as conductors, photochromics and so on, which are finding increasingly broad application in organic microelectronics, in optics, solar energy and various other fields".

### TO CONCLUDE, YOU ARE NOW PRESIDENT OF AIRI, WHAT DOES IT DO?

"AIRI (Italian Association of Industrial Research) represents 50% of Italian industrial research, thanks to the CNR and participation - as partners - of companies like ENI, Enel, Pirelli, Bracco, Mapei, Centro Ricerche Fiat, and Comau, among others. The main goal of AIRI is to value industrial research in Italy: this is significant, and it is just as important as university research. This is how, then, that together with our partners, we are able to prepare technical/political documents with a high application content and highlight, on a practical level, what could be the role for our national industry in the future". ■

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PCI Nylon Yellowbook 2015

# Time of flux for the polyamide industry

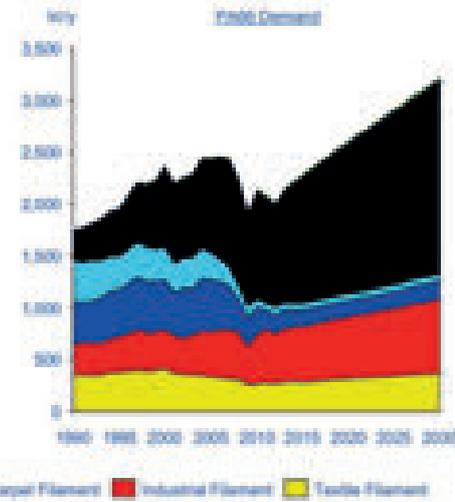
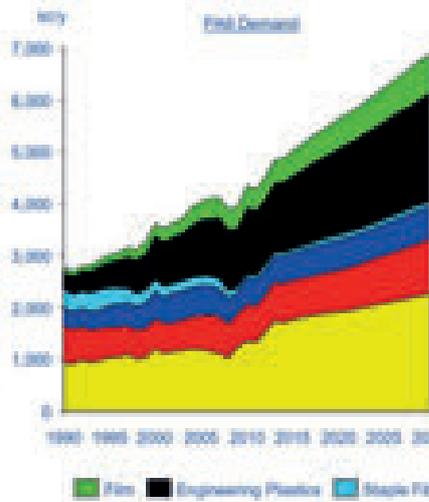


Fig. 1 - PA6 and PA66 demand is anticipated to reach 7.2 million tons in 2015, with at least some growth in all segments

The “World PA6 & PA66 Supply / Demand Report 2015”, referred to briefly as the “PCI Nylon Yellowbook” among industry experts, has just been published by the German market research and consulting company PCI Nylon. It appears at a time of flux for the PA industry. In spite of increasing margin pressure from growing over-capacity and volatile raw material prices, total PA6

and PA66 demand is anticipated to reach an all-time high of 7.2 million tons in 2015, with at least some growth in all segments in both polymer types (see graphs in figure 1). This growth in demand is occurring despite PA being a relatively expensive and mature polymer, as the industry continues to find applications and uses which justify its cost. In their latest analysis,

PCI estimates that global PA6 demand for the period 2015-2020 will increase by +2.3% (CAGR), while PA66 demand will increase by +2.7% (CAGR). In terms of geography, most of this growth is expected to come from China, where continued industrialisation is creating greater demand across the PA application spectrum. From an application perspective,

it is the global automotive industry which is the main PA demand driver, as increased numbers of vehicles and changes in the technologies used in these vehicles are together creating increasing demand for PA-based plastics (replacing metals to save weight) and PA industrial filaments (for both increasing numbers of airbags per vehicle and as reinforcement in larger and higher performance tyres).

Although PCI estimates that there is an 80% application overlap between PA6 and PA66, the markets for these two products are quite different, in terms of both application and geography. In spite of the healthy demand picture, business conditions in PA are expected to continue to be difficult for the remainder of the decade. It is predicted that China will continue its journey towards self-sufficiency in PA and this will progressively create ever-greater structural imbalances in the other regions which up until recently have been China's PA suppliers. Asset rationalisation in caprolactam (CPL, the raw material for PA6) has already begun in rest-of-Asia, with two lines in Japan, one line in South Korea and one in India all closing in the last two years. In South America, since 2009 both CPL lines have been lost and the region is now entirely reliant on imports. However, the one region which has still to respond to the looming crisis is Europe, which for more than a decade has relied on exports to balance its assets.

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

Rubber in 2014

# Global production and consumption are up

A study on world rubber industry trends in 2014, recently published by the International Rubber Study Group, shows that production exceeded 28.7 million tons, recording an overall increase of 3.7% compared with 2013. As for consumption, 2014 saw an overall increase of 7.7% compared with 2013, reaching just over 28.9 million tons: this is a volume that, for the first time since 2010, exceeded the level of production, and thus necessitated the use of stock. Production of natural rubber amounted to just over 12 million tons, a figure that represents a drop of 1.5%.

Present on the winners' podium once again were the big South East Asian suppliers, namely, in this order, Thailand (4.3 million tons; +3.7%), Indonesia (3.2 million tons; -2.6%) and Vietnam (over 950 thousand tons; +0.5%).

On the consumption side, demand stood at around 12.2 million tons (+6.8%), 4.8 million of which were absorbed by China (+13.1%), followed at some distance by India (1 million tons; +5.3%).

With regard to synthetic rubber, a sector that saw production reaching almost 16.7 million tons (+7.8%), China was once again the leading producer, with a share of 5.3 million tons (+29.9%), followed by the United States, with just over 2.3 million tons (+3.5%). Consumption of synthetic elastomers in 2014

reached 16.8 million tons (+8.3%) and here again, China, with over 6.6 million tons, corresponding to a 22.1% increase on 2013, retained its lead. Then came the United States, consuming just under 1.9 million tons (+9.2%). Overall, China consumes just under 40% of the rubber produced in the world, followed by the US (around 10%).

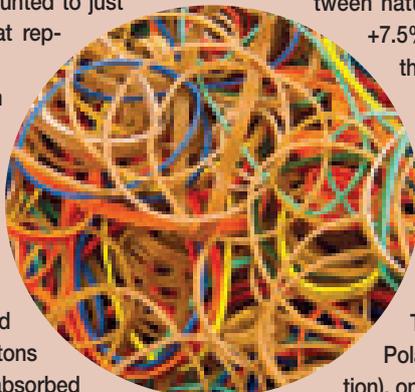
The European Union, on the other hand, recorded an approximately 2% growth in demand, shared between natural rubber (1.1 million tons, +7.5%) and synthetic rubber (more than 2.3 million tons, -0.4%).

The leading European consumers - Germany (810 thousand tons), France (374 thousand tons) and Spain (369 thousand tons) - recorded drops of between 1.9 and 1.5%.

The consumption recorded by Poland (fourth in the classification), on the other hand, increased by 14.8%, to reach the 322 thousand ton mark.

Finally, in Italy, Europe's third largest producer and fifth largest consumer, production and consumption of synthetic rubber in 2014 amounted to 193 thousand tons (+3% on 2013) and over 162 thousand tons (-5.3%), whereas consumption of natural rubber reached more than 104 thousand tons (+8.9%). ■

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



## Composites market survey

# Investment climate continues to be very friendly

Fibre-reinforced plastics/composites are considered to be materials with enormous potential development in a wide variety of applications. Since 2013 the trade association Composites Germany has been gathering indicators on current and future developments in composites, based on six-monthly member surveys conducted by AVK, CFK Valley, CCeV and VDMA.

The previous survey (second half of 2014) already showed a positive trend in ratings of the current business situation in composites. This development continued in the first half of 2015. The assessment of the business situation in all the regions under review (worldwide, Europe and Germany) is even more favourable than in the last survey. Whereas in the last survey about two thirds of all respondents viewed the business situation as "quite positive" or "very positive", this share has now increased to 90%.

For Europe as an economic region this latest trend finally shows a sustained positive tendency again. In 2015 over 80% of companies said they took an optimistic view of the business situation. The majority of respondents also believe that the coming six months will see a favourable development or the same development of the business situation.

The optimistic assessment of the general business situation and the good

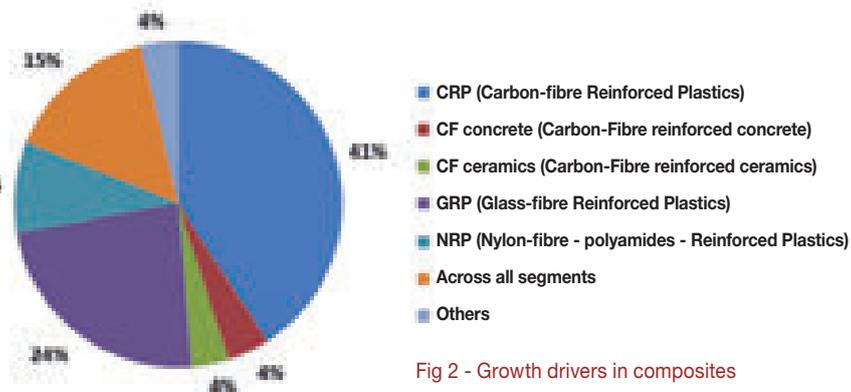


Fig 2 - Growth drivers in composites

future prospects are underpinned by several further factors. Nearly half of all respondents feel that the next half year will be marked by an increase in their staffing level. By contrast, only 6% believe that there will be a reduction.

Mainly positive replies were also received when asked about planned investments in machinery. Likewise, a strong commitment to the composites market continues to be seen as worthwhile. About half of all respondents said they wanted to envisage greater activities and composites, whereas a downturn was only assumed in isolated cases. The essential growth driver in materials continues to be seen in carbon-reinforced plastic (CRP) (see figure 2).

On the regional level, Germany and Asia are still believed to be the regions with the most vigorous development. On the application side there are expectations that major stimuli will be received from automotive engineering, aviation, infrastructure/construction and mechanical engineering. Compared with the previous survey, both the general economic situation and the companies' own business situations are seen by respondents as positive again. The next issue of the Composites Market Survey will be published in January 2016. ■

[www.composites-germany.de](http://www.composites-germany.de) - [www.avk-tv.de](http://www.avk-tv.de)



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# WITH EPRO AND COREPLA RECYCLING IS A WINNING IDEA

## COREPLA HAS AWARDED SCANDINAVIAN BUSINESS SEATING AS FOR THE BEST PRODUCT MADE OF RECYCLED PLASTIC.

On April 29<sup>th</sup> in Rome, during the IdentiPlast convention dedicated to the collection and recycling of plastics, the president of **COREPLA** (National Consortium for the Collection, Recycling and Recovery of Plastic packaging), Giorgio Quagliuolo, as a representative of **EPRO** (European Association of Plastics Recycling and Recovery Organizations), awarded the **HÅG Capisco**, made by Scandinavian Business Seating AS, the title of Best Recycled Plastic Product. This modular office chair has become a design icon, made of easily assembled recycled materials. It's a prize and another incentive to continue down the path of continuous constant commitment to promoting research, technological innovation and environmental sustainability.





AIMPLAS

EUROPEAN PROJECTS

# THE RESEARCH CONTINUES!

THE EU PROJECT INNOREX SEEKS TO DEVELOP A NEW TECHNOLOGY FOR PLA PRODUCTION THAT WILL IMPROVE ITS HOMOGENEITY AND EXCLUDE THE USE OF METALLIC CATALYSTS. THE MAIN GOAL OF THE LEGUVAL PROJECT IS THE VALORISATION OF BY-PRODUCTS THAT ARE CURRENTLY DISCARDED BY THE LEGUME PROCESSING INDUSTRY, IN ORDER TO USE THEM IN THE PLASTICS INDUSTRY. FINALLY, SEVERAL SEAL PROTOTYPES HAVE BEEN PRODUCED AND TESTED BY TDM-SEALS' PROJECT CONSORTIUM, SHOWING A SIGNIFICANT REDUCTION IN FRICTION LEVELS

**G**rowing demand for more sustainable solutions is reflected in growing production capacities for bioplastics. According to the current state of the art, metal-containing catalysts are needed to improve the polymerisation rate of lactones, posing a hazard to health and to the environment.

The Plastics Technology Centre Aimplas, along with Assocomplast and ten other enterprises and technological European centres, has launched the InnoREX project, funded by the 7<sup>th</sup> Framework Programme and coordinated by the German "Fraunhofer Institute for Chemical Technology" (ICT).

This ambitious project seeks to develop a new technology for PLA (polylactic acid) production that will use alternative energies, improve PLA homogeneity, and exclude the use of metallic catalysts, necessary until now. Furthermore, the project is expected to result in energy savings, and to allow single monolayer packaging to be obtained through polymer processing, by either

extrusion or injection moulding technology. To ensure short market entry times, commercially well-established co-rotating twin screw extruders will be used as reaction vessels. The reason commercial polymerisations are not yet carried out in twin screw extruders is the short residence time and the static energy input of the extruder, which allows no dynamic control



InnoREX Project - Leistritz twin screw extrusion line of continuous polymerisation with online control of the viscosity

of the reaction. Again, these obstacles will be overcome by InnoREX. The project will use the rapid response time of microwaves, ultrasound and laser light to achieve a precisely-controlled and efficient continuous polymerisation of high molecular weight PLA in a twin screw extruder. Additionally, significant energy savings will be achieved by combining polymerisation, compounding and shaping in one production step. And besides all this, the project includes a detailed analysis of the packaging life cycle. The prototype obtained as a result will be an exam-



Removing of residuals by Gneuss MRS extruder

ple of single thin walled monolayer packaging (of a possible thickness not exceeding one millimetre) intended for the food sector, processed through injection or extrusion, so as to obtain thermoforming and film packaging to be used when there are demands for lower thickness.

Aimplas role within the project is mainly related to the study of processability (injection and extrusion) of developed PLA grades. Mechanical, physical and thermal characterisation of packaging obtained by injection moulding, and extrusion cast-sheet and thermoforming. It will also include an extensive development of additivition strategies. The project, which started in December 2012, will run until May 2016. In addition, Aimplas will organise a workshop at their premises on October 20, addressed to suppliers of raw materials, end users, research centres and universities, and focused on the project main objectives and its developments.

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

### AN EFFECTIVE VALORISATION OF THE LEGUME BY-PRODUCTS

Public awareness of sustainability issues and the implementation of environmental regulations, especially with regard to waste disposal regulations limiting the use of petroleum-based plastics in applications where recycling is not easy, have pushed the industry to find new alternatives to such materials. According to the new market demand, bio-based plastics have found wider acceptance in the industry because they are considered more environmentally-friendly since they reduce greenhouse gas emissions and the dependence on crude oil; however, the concern regarding the use of raw materials in the production of bio-based plastics, which makes it competitive with food production, has increased. For the last one and a half years, RTD performers from Europe (CNR-IPCF of Pisa, SSICA, Tecnalia, and Polieko) have been working together with three industry associations (Consebro, PCS, Assocomplast) and five companies (Iris, Tehnos, RDX, Tuba, Lagrana) to find more sustainable, and renewable, sources for the plastics industry. In particular, the main goal of the Leguval project is the valorisation of by-products that are currently discarded by the legume processing industry, in order to use them in the preparation of materials for agriculture, packaging and automotive applications for the plas-

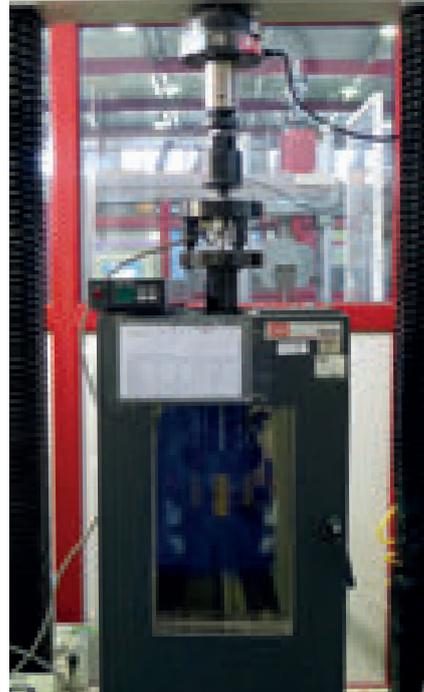
tics industry. The research leading to these results has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 315241. To this end, during the first half of the Leguval project, the researchers tested by-products from each family of legumes. Pea by-products were selected because of the simplicity of the matrix, good processability, availability, and quantitative yield as raw material. Therefore, SSICA developed and optimised an innovative method to extract proteins at pilot scale from such by-products with a purity degree close to 80%. So far, the protein rich fraction has been used, on the one hand, by Tecnalia, to produce plastics films by wet method (casting and coating) with a barrier property improvement factor of 7-10 vs PET at 50% humidity and, on the other hand, by Polieko and IPCF, who are working together on the development of plastic films by dry method (extrusion).

The researchers involved in the project have adjusted the formulation so as to produce plastic materials easy to be processed at pilot scale, with the aim of integrating such materials into current industrial facilities. Moreover, the leftover biomass is being employed as additive for the preparation of composites and evaluated as a source of energy by anaerobic digestion, which will add new value to legume by-products. Further studies will be developed during the second half of the project to validate the results at industrial scale. In general, the Leguval project is expected to have a very positive impact on the plastics industry as well as on final users since it will result in new bio-based materials, which will be renewable, compostable with improved barrier properties, and not food competitive.

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

### TDM-SEALS - FINAL RESULTS

The European industry of plastics and rubber seals has the opportunity to increase its competitiveness by producing high added-value products, such as high-performance dynamic seals able to operate with no leakage, extended lifetime, and low energy consumption levels. Friction is one of the aspects more intrinsically related to seal performance, as it generates heat, accelerates wear, and causes premature damage and leakage, shortening seal lifetime and in-



Within TDM-Seals project, a particular test rig has been developed to measure demoulding forces in a rubber cubic sample. The test rig is implemented in a Universal Testing Machine (UTM) with a climatic chamber, in order to assess the influence of different mould surfaces or coatings on the demoulding process

creasing energy consumption. It is known that surface texturing can significantly reduce the friction of lubricated seals, but its potential is hindered by the fact that the treatment is far from being suitable for real-life production processes. Assocomplast is one of the 10 partners of TDM-Seals, a project funded by the EU 7<sup>th</sup> Framework Programme, ending in October 2015. Over three years, the consortium has developed a novel design and production process for low-friction plastic and rubber seals. Amongst the main results of the project, a simulation and testing based methodology for designing the pattern that best fits the sealing application and a process for implementing the texture during the moulding process deserve special mention. Several seal prototypes have been produced and tested, showing a significant reduction in friction levels.

The demoulding process can be critical when using textured surfaces. Therefore, the consortium has also developed highly efficient coatings that significantly decrease the adhesion between the mould and the elastomer. Moreover, a test rig has been developed, providing a simple, cheap and robust way to evaluate demoulding forces on different rubber materials and mould surface characteristics (textures and coatings).

The TDMSeals Consortium partners are: Instituto Tecnológico de Aragón, Italnova (coordinator), The British Plastics Federation (UK), Plastipolis (France), Assocomplast (Italy), the Swedish Plastics Industry Association (Sweden), DMX (PVD-DLC coatings, France), Miju (rubber and plastics processor, Spain), Barbieri Rubber (rubber processor, Italy), Inspiralia (Spain) and IDS-Leibniz Universität Hannover (Germany). ■

[www.tdm-seals.eu](http://www.tdm-seals.eu)

The different steps of the Leguval project





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Disposable tableware: PP and PS have a lower environmental impact than PLA

## Acquitted on the basis of “sufficient evidence”

This is the slogan of the recent communication campaign launched by Pro.mo, and it is a message substantiated by the results of a Life Cycle Assessment (LCA) comparative scientific study of disposable tableware, published on July 9 by the Group of disposable plastic tableware manufacturers, which is part of the Italian association Unionplast (Federazione Gomma-Plastica). The research produced some surprising results: disposable tableware made from polypropylene (PP) and polystyrene (PS) has, on average, a lower environmental impact than the compostable kind made from polylactic acid (PLA) and cellulose pulp. The study, carried out in compliance with ISO 14044 and 14040, was subjected to critical review by the certification body SGS Italy and is available in the “Research” section of the website [www.pro-mo.it](http://www.pro-mo.it).

The analysis concerned two different types of disposable tableware: plates (made from PP, PS, PLA, and cellulose pulp, and reusable china ones) and cups (made from PP, PS, PLA, and PE-laminated cardboard, and reusable glass beakers), taking into account their different end-of-life scenarios.

Marco Omboni, president of Pro.mo, had this to say about the results: “Because of the originality and completeness of the analysis, the multitude of scenarios considered, the considerable care taken to verify the quality of the data, and the sensitivity and uncertainty of the results, this study carries considerable scientific “weight”: this weight has been acknowledged and judged positively by SGS, the global leader in certification services

which oversaw the process of its certification of compliance with ISO 14044”.

“In addition”, Omboni went on, “we believe that this study may offer many pointers to policy makers and those, in public service, involved in environmental issues, and could also be a starting point for further investigations and assessments, in which LCA remains the most effective tool. Indeed, the aim of the study was not only to contribute to the acquisition of knowledge that, by making it possible to minimise the environmental impact of the various products, might favour the business strategies of the Pro.mo Group companies, but also to provide a useful instrument for the various parties interested in promoting greater un-

derstanding of issues related to the life cycle and environmental impact of products”.

The study provides an illustration of just how complex the process of quantifying the environmental impact of products really is, and of how it often leads to unexpected conclusions, rarely having absolute value: seemingly low-impact products, situations, and stages in the life cycle can, in reality turn out to have an impact, and vice versa.

It also confirms that the performance of “traditional” glass and china tableware is superior; but even this statement, on a more in-depth analysis of the completed study, is seen to have some caveats. Indeed, the analysis of additional environmental impact categories showed that, in some

of these, reusable tableware performed less well than some types of disposable tableware, including the traditional plastic kind.

It is clear that the choice between “traditional” reusable tableware and disposable tableware, in the catering/outdoor sector at least, is made taking into account other variables, too, such as access to washing up facilities, practicality, cost, safety, hygiene and so on. Clearly, it is not within the scope of this study to measure and assess these variables; nevertheless, they often favour the “disposable” option and contribute absolutely to the global sustainability of the product, which is an aspect that users, consumers and all other stakeholders have to take into account. ■

[www.pro-mo.it](http://www.pro-mo.it)



“The most important conclusion of the study was that it revealed no environmental impact issues that might have indicated a need to ban some or any of the product categories studied: even disposable tableware in polypropylene and polystyrene, whose image, in terms of environmental impact, is not always as good as it might be, came out of this study with flying colours”, Marco Omboni said about the recent LCA study

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## 2015 Epro Awards

## The best recycled plastic product

The 2015 Epro Awards final, sponsored by Corepla (the Italian consortium for the collection and recycling of plastic packages) took place at IdentiPlast conference in Rome on April 29. A panel consisting of representatives of Epro, PlasticsEurope, PRE, Eupc and ACR+ from across Europe assessed the entries and prequalified three participants for Rome, where the final ranking from 1 to 3 was made by the audience. In the end, the final choice was on the "HÅG Capisco" office chair from Norway. Since its beginning in 2009, the key objective of the Epro Awards has always been to raise awareness of the value and versatility of post-consumer or post-industrial plastics, thereby promoting the opportunity to recycle end-of-life plastics and also recognising their value as a resource. Meanwhile, the competition has registered nearly 180 entries from 25

countries and witnessed an increased range of applications for recycled plastics.

The "HÅG Capisco" office chair by Scandinavian Business Seating (based in Oslo, Norway) won the first prize as the "Best Recycled Product" during this 2015 awards competition.

The railway plastics ties from the German PAV & Co. won the second prize. This new, sustainable product is made of 65-85% recycled HDPE and of 15-35% glass fibre. The Eco Potagator from UK-based ashortwalk, an ecological and neat growing pot manufactured from post-consumer packaging, was elected at the third place.

Epro's co-chairman Francis Huysman explains the idea behind the "Best Recycled Product" contest: "Plastic packaging design, improved collection schemes, advances in sorting technology together with a greater range of reprocessing opportunities and applications mean that the



In the picture, from the left: Giorgio Quagliuolo, president of Corepla (sponsor of the contest), Laura Fouillard, environmental advisor, Atle Thiis-Messel, vice president environment at Scandinavian Business Seating, and Peter Sundt, general secretary of Epro. On the left, the first prize at 2015 Epro Awards: the HÅG Capisco modular chair is made of recycled materials, and designed for easy disassembling without using specific tools

need to send many plastics to landfill is gradually decreasing. Epro believe that one of the most important ways of achieving increased recycling is to raise the awareness of the products made from recycled plastics packaging, and by doing so, promoting the use of recycled plastics".

The 22 entries of the 2015 Epro awards competition fit into a wide variety of applications ranging from different kinds of innovative packaging over neat and handy consumer goods to functional high-scale industrial products. Various plastics types were also represented. ■

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

### Petcore Europe report on recycling of post-consumer PET

## Success and challenges

The equivalent of 66 billion 1.5-litre PET bottles were collected and recycled in 2014, representing 57% of bottles and containers placed in the market. This conclusion comes from a report carried out by PCI PET Packaging Resin & Recycling for Petcore Europe from a Europe-wide survey among actors involved in the collection, sorting and recycling of PET. "PET collection and recycling continue to increase and to be a success story over the last 25 years. PET is by far the most recycled plastic material in Europe. However, we can do even better and actively contribute to the European Circular Economy, especially as PET now penetrates new applications", explains Petcore Europe executive director Patrick Peuch.

Looking at the 2014 collection rates in Europe, the report shows that with 1,8 million tons of bottles and containers, PET collection has grown by 6.8% compared to 2013. Comparing this number to an estimated 3,1 million tons demand for bottles and containers placed in the market during this period suggests a 57% collection rate. In 2014, the

growth in PET demand itself increased by 4.8%.

"Although the collection rate increased by 1.3% over the 2013 rate, it clearly illustrates the need for a two-sided approach", outlines Patrick Peuch. "On one hand, our industry has to work together to align the collection processes to deliver increased recycling objectives. On the other hand, consumers have to be more engaged. Raising consumers' awareness on the importance of collection and the value of recycling, especially in the context of the European Commission Circular Economy approach, and their own role in the process are key".

Furthermore, the collection rates vary considerably across Europe, with a number of Member States exceeding the average 57% while several others are still lagging behind, where much more can be done and should be done.

In 2014, 1,7 million tons of PET were recycled in Europe. With an installed processing capacity estimated of about 2,1 million, the recycling industry operating rate reached only 79%, lower than the 83% rate of 2013. This decrease illustrates the challenges that the PET industry had to face in 2014, in particular the pricing throughout the RPET (recycled PET) chain and pressure from low virgin PET resin prices that occurred during the last quarter of the year.

Furthermore, the processed PET volume in 2014 was also below the collection volume. According to the survey participants, this difference is due to process losses, maintenance shut downs as well as shift programmed and production schedules adjusted to available bale supplies. The latter, issues related to bale supplies, was cited as one of the main contributing factors to lower productivity in 2014. The evolution of PET resin pricing and demand for recycled PET remain uncertain for the future. ■

[www.petcore-europe.org](http://www.petcore-europe.org) - [www.pciPETpackaging.co.uk](http://www.pciPETpackaging.co.uk)



All the results of the PCI report will be presented during the Petcore Europe Conference in Brussels, on November 24

Biobased, biodegradable bags mandatory from January 2017 on

## French measures to strengthen bioplastics market

On July 22, 2015, the French parliament adopted the law on energy transition and green growth proposed by Ségolène Royal, Minister of Ecology, Sustainable Development and Energy. The association European Bioplastics (EUBP) welcomes the opportunities created by the new law to introduce biobased, compostable plastics to selected types of packaging as well as fruit and vegetable bags. "We fully support the clear commitment to plastics which are biobased and biodegradable", states François de Bie, chairman of the board of European Bioplastics.

Besides plans to reduce the share of nuclear power in the French energy mix, the law contains a wide range of legislative proposals, e.g. on renewables (40% by 2030) and CO<sub>2</sub> reduction (-40% by 2030). Bioplastic lightweight bags for fruits and vegetables, for example, will need to be biobased and compostable in home composting from the 1<sup>st</sup> of January 2017 on.

The minimum biobased content and its progressive increase will be defined in a decree of the State Council, which will also define measures for consumer information about the material composition and utilisation of such bags. Furthermore, plastic packaging for commercial mailshots will have to be biodegradable/compostable in home composting by the 1<sup>st</sup> of January 2017.

"These provisions represent an important step for the French bioplastics industry, which has invested more than 40 million euros in the last 15 years. Unfortunately, however, an important opportunity to promote single-use bags that are biobased and biodegradable at the cashier's desk was missed. They could have been a valuable tool to safely transport goods and later on to hygienically collect biowaste", states Christophe Doukhi-de Boissoudy, president of French association Club Bio-plastiques.

The French law on energy transition and green growth also clearly distinguishes between biobased, biodegradable/compostable plastics and oxo-fragmentable plastics. Compostable plastics that have been certified according to harmonised European norms support a separate biowaste collection and home-composting infrastructures. They help to keep other waste streams such as mechanical recycling efficient and clean. Oxo-fragmentable plastics are essentially durable, fossil-based plastics with artificial additives, which

cause the plastic to fragment into micro-particles. They do not meet the European norms for compostability and can potentially hinder mechanical recycling. European Bioplastics therefore welcomes the clear vote of the French institutions to prohibit the production, distribution, sale, provision and utilisation of packaging or bags made partially or completely from oxo-fragmentable plastics. ■

[www.european-bioplastics.org](http://www.european-bioplastics.org)

"France has taken a step forward to the responsible consumption of plastic materials and to treating waste as a valuable resource. Bioplastic materials will contribute their share to its environmentally responsible economic growth", declares François de Bie, chairman of the board of European Bioplastics



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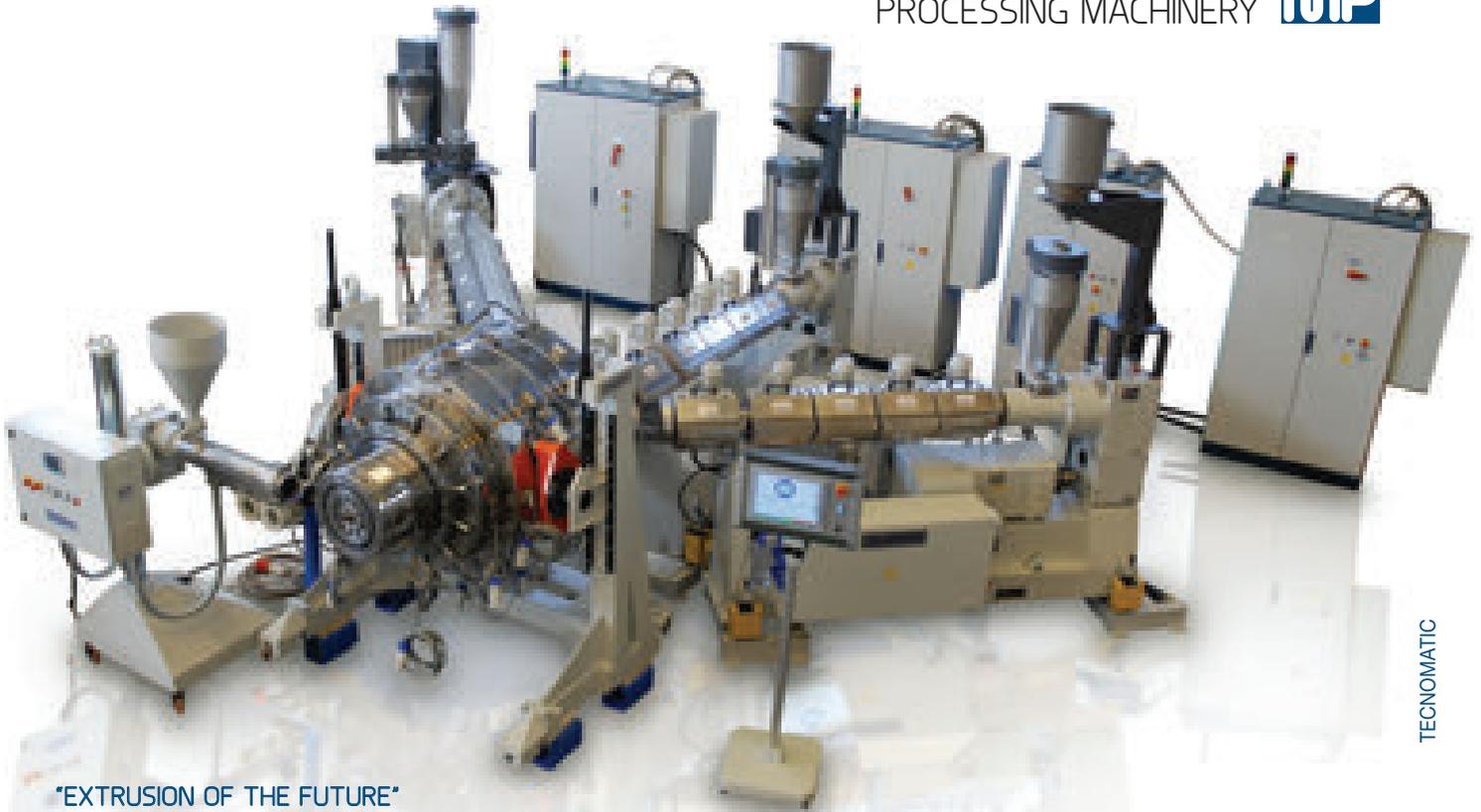
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“EXTRUSION OF THE FUTURE”

# SELF-CERTIFICATION OF THE QUALITY OF PLASTIC PROFILES

ELIMINATING UNSTABLE QUALITY IN THE EXTRUSION OF PLASTIC PROFILES THROUGH MIANI EDF (“ESTRUSIONE DEL FUTURO” OR “EXTRUSION OF THE FUTURE”). NOT JUST A THEORY, THIS IS VALID IN SCIENTIFIC TERMS AND SUPPORTED BY STUART MILL’S LOGIC

BY MARIO MIANI

Ever since plastic profiles first started to be produced using an extrusion set (extruder-die) to melt the solid raw material introduced into the screw flight, the aim has been to obtain a product (profile or injection-moulded component) guaranteeing almost absolutely constant weight, quality, surface appearance and physical-mechanical properties, from the beginning to the end of the production process. Ever since then, to produce a solid polymeric profile, the molten polymer exiting the die has been cooled and pulled towards the take-up device to obtain a manufactured product having a constant section and an indefinite length.

The production “line” for producing any profile has always been made up of an extrusion set, whose function is to push the molten polymer through the die, and a cooling system for solidifying the polymer and unload the piece at the delivery side of the line.

Therefore, profiles have always been produced through two absolutely independent processes whose only common feature is the polymer! Accordingly, the polymer is both the product of

the extrusion process, because it exits the die, but also the raw material used to produce the profile. These two processes are so independent of each other that the statement “profiles are produced by extrusion” could be considered incorrect:

- the extrusion process serves to melt the solid polymer entering the screw flight and to push the melt through the die;
- the function of the profile formation process, on the other hand, is to cool the molten polymer that is pulled and collected at the end of the line when it has become a solid that has a constant section and an indefinite length.

I indeed consider the idea that profiles are produced by extrusion an extremely inaccurate affirmation that has negatively influenced, and still negatively influences, those who work on extrusion lines and take their personal experiences as the rule – a rule that unfortunately often lead

them in the wrong direction. I must confess that I myself continued to think, quite wrongly, that profiles were produced by extrusion, until I discovered the “Miani EdF” know how (“Estrusione del Futuro” or “Extrusion of the Future”), which is the practical application of the EdF strategy.

Only when I understood that profile production involved two separate and independent processes did I work out that it was not at all logical to think that quality variations could be blamed on the extrusion process. Variations in profile section, surface appearance and physical-mechanical properties are a characteristic (not a property) of products obtained by the “traditional extrusion technique”. Only then was I able to see that the fault lay with the variable quality of the raw material, the extruded molten polymer, which is supplied by the “extrusion set” to the profile formation process.

Fortunately, albeit after many years, I realised



that the **quality of the melt exiting the die corresponded to its “viscosity” at the extrusion temperature**, a fact that is still largely ignored by the “world of traditional extrusion”. I say fortunately because I was immediately led to think that the cause of the instability of the section, surface appearance and physical-mechanical properties was the variation in the melt quality.

### NOT ONLY THEORIES

For years, ever since the first granule was extruded industrially, I think it can be said that line operators blamed raw material producers for defects occurring in profile or injection-moulded components. This happened, and still happens, because industrial operators do not know that profile defects are caused by the failure of extrusion set operators to keep the fundamental process parameters constant: the melt output and the viscosity at the extrusion temperature. Only when I discovered that profiles are produced through two processes, in sequence, did I understand why, even today, extrusion line operators are not able to produce profiles with a constant section and almost absolutely constant quality from the start to the end of the production process. Only then I was able to see that operators are unable to keep the output and the melt viscosity constant simply because nobody has ever taught them that the extrusion, process is an absolutely steady process and different therefore the pressure may be maintained constant only by eliminating the usual causes of instability. Even I, since 1988 a teacher - at Cesap in Verdellino-Zingonia (Bergamo, Italy) and in different companies - of rheology applied to extrusion, failed to teach operators (several thousand) how, in practice, output can be kept constant. I told them that output can be stabilised by changing the working conditions; I devoted a chapter of my manual to the rules on how to stabilise the output and consequently pressure, but opera-

tors still think that these ideas are “theories” and do not have the courage to eliminate fluctuations. Why? Because they are not able to predict the effect of their actions. I explain that to stabilise the cylinder temperatures all the zones, except the first one, must be off in order to know the melt temperature in each cylinder section and, at the same time, save money, but nobody follows my suggestion, probably because few understand the reason for it. Therefore, since I guarantee that an extrusion set can be stabilised using the EdF strategy, to maintain the almost absolute constancy of the section and quality of any profile from the start through to the end of the production process, I decided to teach the Miani EdF know how to all production operators not only theoretically, as I did in my manual, but also by being alongside the line and forecasting the outcomes of any suggestions made. This is the surest way to reach the target pursued by all industrial concerns, i.e. the best quality at constant output as guaranteed by “Extrusion of the Future”. More precisely I decided to offer the Miani EdF know how, as a gift, to all those attending the “EdF Course”, which shows what happens to the polymer while it is processed. Let me return to the moment when I discovered that profiles are not produced by extrusion, and tell you exactly what happened. In that instant

I had a vision of extrusion, but it was not traditional extrusion where the elimination of output instabilities is a matter of trial and error. At that moment I had, in my mind, a completely new vision of extrusion: while all the notions of applied rheology were whirling around in my head, I saw, at the same time, all that really takes place within the extrusion set and which I teach: I saw the granules falling into the flight trying to remain attached to the cylinder wall; I saw the tip of the flight scraping them off; I saw the polymer molecules becoming detached from each other and generating a quantity of heat great enough to melt the polymer; I saw the melt that, due to the thrust of the screw flight, was generating an enormous pressure at the end of the flight to win the shear stress of the polymer against the cylinder wall; I saw the molten molecules that, entering the duct towards the die, were flowing side by side at different speeds; I saw that the molecules touching the cylinder wall were almost at a standstill while the others flowed faster and faster the nearer they were to the middle of the section; then, at the cylinder exit, I saw a mass of molecules swelling, maintaining the shape of the exit section and being pulled towards the cooling zone.

This was the extrusion process that my mind saw in that moment, a process that, like all physical events, had a cause and an effect as stated by **the philosopher Stuart Mill: the cause is the sequence of conditions without which a phenomenon could not occur; the invariable result of this antecedent is the effect.**

That’s why my mind saw:

- 1) everything that happens during extrusion is due to the fact that extrusion is a process that takes place in the extrusion set when the screw is rotating inside the cylinder and a material is introduced into the extruder; a material that is subjected to an indefinite number of actions that push it, when melted, through a sequence of ducts (head and die) after exiting the screw;
- 2) the sequence of conditions under which this phenomenon occurs (cause) produces a melt that has an invariable quality (effect), which cor-





MAST

responds to its viscosity at the temperature and at the screw revolution at which the polymer is extruded.

What is the consequence of all this? That when the extrusion conditions remain the same throughout the production process, the quality of the melt does not change. At this point one can affirm that **extrusion is an absolutely steady process**. This physical law is valid for any raw material, solid or molten polymers, that enter the screw flight, as well as for flour and water doughs that behave as a non-Newtonian fluid. This is one of the laws that Galileo defined the immutable "Laws of the Created" and I hope you will always bear it in mind when reasoning about what happens in the extrusion set.

It is a law that must be remembered not for what it states (stability), but because Stuart Mill's logic leads us to affirm that if there is "instability" then there is a cause, due to the actions supported by the polymer, that can surely be eliminated. Therefore, removal of the cause results in disappearance of the effect, that is the reaction of the polymer to the actions. It is precisely this manner of reasoning that invariably allows us to guarantee that the EdF strategy (Miani EdF know how) stabilises a process that is, by definition, absolutely steady.

#### IN THE LANGUAGE OF SCIENTISTS

At this point I wish to explain why I am writing, once again, about Extrusion of the Future. Having provided a detailed description of what happens in the extrusion set, and with the support of Stuart Mill's logic, I conclude that extrusion is a really steady process, but are we sure that we have really understood each other?

Often, when a law is explained in words it can be set out in a way that may be more or less understandable (this applies to any law); generally, however, the way people understand it depends on their own knowledge and culture. For this reason, I now wish to describe the same law in the way it is taught by scientists, using their "language", that of mathematics, and thus writing a formula. The scientist Poiseuille says that the stability law of flow is:

$$P = K \cdot \eta \cdot Q$$

This tells us that the pressure "P", which indicates the force (push) exerted by the screw on

the polymer section at the cylinder exit, is equal to the product of the constant "K", i.e. the brake exerted by the walls of the duct, surrounding the melt, from the cylinder exit until the die exit section, multiplied by the output "Q" and by the viscosity "η", at the melt temperature.

This formula tells us that when the "Q" is constant (and it certainly is quasi-constant), the screw revolutions are quasi-constant (see the cause-effect principle in extrusion), and the melt temperature is quasi-constant, then the pressure "P" will certainly be constant too, because "P" is the product of the three process parameters K, Q and η, that are, let me say once more, almost constant.

This conclusion is the reason that compelled me to write this article.

In fact, by recording the pressure during the extrusion of a profile, any line operator can self-certify the constancy of the profile section; he needs only to verify that the pressure recording is a straight line.

Obviously the certification bodies as well as the profile customers must have the possibility to verify recordings to be sure that batches were produced at an almost absolutely constant output, as guaranteed by the EdF strategy.

The only small defect of this certification approach are the numerous "quasis". These are justified by the decision to consider the polymer mixture entering the screw flight a constant weight, while the screw, rotating at a constant speed, transports a constant volume per revolution. There are two reasons for this:

- the apparent specific weight of the solid mixture usually changes during the production process;
- the braking of the solid against the cylinder surface, which makes the polymer advance, changes during the production process.

With this explanation I hope I have convinced even the most sceptical that the EdF strategy, i.e. Miani EdF know how, provides a guarantee of section constancy, and thus of profile quality, that cannot be matched by the current "certifications" under which, very often, to maintain the section constancy, the screw revolutions are changed to obtain a constant output! A control system that I violently contested in an article in MacPlas International, published on the occasion of Plast 2015. To confirm the value of self-certification I wish to tell you that when I asked Modiano Brevetti for the patent of the Miani EdF know how I was told that a patent must refer to a new development, whereas the EdF strategy is guaranteed by the laws of physics and there is nothing new about those. ■

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BY ANGELO GRASSI

processors exist today to meet the specific needs of the most advanced customers: the answer is again irrefutable it is: Italy!

Fabrizio Piovaneli, the sales manager of IMG's rubber operations goes on to state: "The so

called Italian "rubber valley" has for the past thirty years been located between Brescia and Bergamo, going on to say: "Within this specialised district there are many companies which to term them mere subcontractors is

to do them an injustice, in view of their international fame and their capacity of continually evolving through time. However we are not only talking of medium/large sized companies with hundreds of employees but also SMEs employing only a few dozen people”.

## THE 'ITALIAN RUBBER VALLEY' IN ITS GLOBAL CONTEXT

Ever since the fall of Fordism, the practice of outsourcing service and production operations has been playing an increasingly important role. Although it involves all areas, this outsourcing process is particularly marked in the automotive sector, where it actually doubled during the 1990s in Europe.

“The leading automotive companies such as Mercedes, Audi and Volkswagen generate highly significant production outputs, which in terms of the outsourcing logic generate a large quantity of orders for their certified OEMs: which are usually German companies,” continues Piovanelli. “Remaining in the field of tailor-made technical elastomer processing, while the German sub-contractors continue to lead in the field (being also due to the fact that they started before the Italians), their success has seemingly lost momentum. However as the technical issues are paramount the German Original Equipment Manufacturers in the sector are well aware that Italy has a rubber district which is truly unique in the world, and that even the Chinese have a long way to go to reach the same competitive quality/price levels of our “rubber valley”. So that it may appear obvious that today about 80% of the rubber parts used to fit any vehicle circulating in Europe, have actually been produced by Italian sub-contractors”.



New press assembly and testing area inside the IMG factory premises in Capriano del Colle (near Brescia)

What is also clear is that the major automotive companies have the instruments, men and capital to undertake quality research. What emerges is that always in the logic of outsourcing - that the innovations developed by the technology of the so called parent companies are bound under the form of technical specifications, firstly to the OEM through their certificate, and then in turn by the sub-contractor certified by the OEM itself. The latter, in a partnership logic then acquaints the various machinery and/or production system constructors with which it works, with the changes underway in the automotive market: this is where the press and mould manufacturers come in.

Fabrizio Piovanelli confirms: “It is accurate to say that everything starts from carmakers. Research is expensive and they are on the necessary scale to conduct it, as well as the necessary potential to transform the results into rigorous technical specifications, which are then handed down to the companies that form part of the certified supply chain. So that the parent company, requests a specific elastomer for example that is capable of resisting under the bonnet at extremely high and/or low temperatures... after which it is up to the various sub-contractors and/or suppliers

to collaborate together to close the manufacturing cycle in an economically and technically suitable manner, for all if possible”.

Having defined in general terms what constitutes the supply chain of the automotive world, we asked the sales manager of IMG, which part of the chain is most stressed and more at risk. “It is the same Italian sub-contractor of the “rubber valley” that is most at risk”, that needs to take great care in its calculations during the feasibility studies and estimate preparation”, replies Piovanelli. “Here the nemesis of sub-contractors is scrap. In a production cycle involving thousands of pieces in each single batch, the scrap rate is the real cost, which makes the difference between an order that makes a profit and one that ends in a loss. This is also because the blends requested by the carmakers are usually expensive and difficult to process, which is something not to be underestimated and is why they have been radically changed in recent years as the result of ongoing innovation in the R&D departments of the parent companies”.

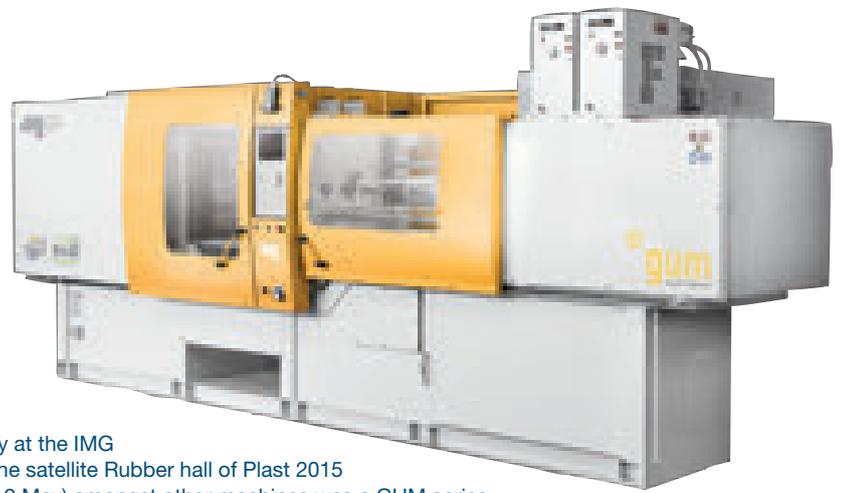
## IMG... PRESENT AND FUTURE

The meeting between MacPlas editors and the sales manager of IMG's rubber operations took place at the Milan Fair, the day before the opening of the Plast 2015 exhibition, when the two stands of the company were ready for welcoming the public. The two stands were clearly different from each other and located in different pavilions, in order to highlight the dual market targets that characterises the daily operations of IMG: plastic (with the exhibition of models by Haitian and Zhafir, for which IMG is the official Italian distributor) and rubber (with its machines GUM and GUM Fifo, of which it is the manufacturer). Fabrizio Piovanelli points out: “One of the messages that we wanted to convey at the satellite Rubber hall at Plast 2015 concerns the initial sales that we made last year to German and Spanish subcontractors, that produce their own rubber parts for the automotive sector. “Another equally important message being that as our presses offers



Fabrizio Piovanelli at the IMG stand at the Plast 2015 exhibition (satellite Rubber hall)

more value for money than foreign competitors, the key to the success being the fact that we are skilled in the production of tailor-made machines for the end user. This is not to say that the competitors mentioned above are not capable, but the fact is that in cultural structural and industrial terms they do not have the know-how to assure them an adequate level of competitiveness in the



On display at the IMG stand at the satellite Rubber hall of Plast 2015 (from 5 to 9 May) amongst other machines was a GUM series hydraulic press with clamping force of 300 tons and energy-efficient servo-assisted motor.

The GUM Fifo injection press is fitted with a FIFO (First In, First Out) type injection unit that assures fine metering control.



“tailor made” field, which is something that the advanced subcontractor whether he be Italian, German, Spanish or French is well aware”. Piovanelli also has the intellectual honesty to talk about the limits of the SMES. “Our production continues to increase, as does the related research. It has being obvious that the greater the customisation of our orders the more complex the work of our technical staff involved in R&D. Although we can rely on a double winning strategy – the experience acquired over the years and the capacity of working as a team with our clients, we are well aware that, after exceeding a certain market threshold, the motto “small is beautiful” no longer holds true. In the same

way the issue of after-sale assistance arises. Not so much in Italy (partially due to the fact that outside the so called “rubber valley” there are very few other companies) but abroad. Being aware of all this we are currently revising our future direction over the medium-short term. This is also because we do not want to have to give up on the export sector after having made such efforts to secure it. Being one of the best ways to assure wise and balanced growth, the true key being partnership with competent specialists complimentary to IMG... such as B&R and Moog for example, but not only”, concludes the sales manager. ■ [www.imgmachine.it](http://www.imgmachine.it)

## Plast 2015

# The GUM and GUM Fifo presses seen in Milan

At the Plast 2015 show in May, a 300-ton hydraulic press of the GUM range equipped with low consumption servo-assisted motor was on display, with screw plus 700-cm<sup>3</sup> piston. Confirming the partnership with B&R, the press is controlled by a new PLC by the Austrian company, equipped with a modern and convenient touch screen, as well as a VNC server, which can be interfaced with any client VNC on several platforms (PC, tablet, smartphone) in remote or local mode, protected by password.

As already mentioned in the article, the most innovative aspect of this press concerns the servo-drives: with the floating and mounting platens and central extraction all controlled by electric brushless motors. It is by virtue of this mix between the electric and hydraulic that IMG has succeeded in achieving an excellent movement overlapping, using the drive derived from a single pump, which has also made it possible to rescale the overall dimensions of the motor compartment, as well as assuring a considerable reduction in the quantity of hydraulic fluid in circulation and a greater duration of the same. The above is known as the HST (Hybrid Servo Technology) system which has several advantages, such as: production cycle precision, servo-drives totally controlled by speed loop controls (thereby assuring great cycle repeatability), as well as considerable savings in power consumption (quantified as

over 40%). Of equal importance is the “ECO - Energy Saving Process” system; an operating mode which allows the machine to operate with a high degree of energy saving, allowing it to move with further energy saving thanks to the levelling of the current peaks, which is the main cause of high electricity bills. The aim of the IMG technological staff for the future, in relation to the GUM series, is that of equipping the presses with a regenerative system capable of emitting the dispersed energy back into the mains network, in order to generate electricity from the press to the company power system.

The second injection machine representing the GUM Fifo series at the Plast 2015, as a 450-ton version. Unlike the press mentioned before which to drive the mould clamp used a classic mechanical toggle joint clamping system, the GUM Fifo is equipped with a hydroblock closure element, while the FIFO (First In, First Out) injection system also provide fine metering control. One of the most outstanding features of this press being its compact dimensions, to such an extent that in terms of total dimensions, the IMG technicians have succeeded in producing a 450-ton press with the size of a 300-ton one! Confirming the company’s commitment to floorspace optimisation. This second machine also featuring a servo-assisted motor, again with the aim of achieving energy savings, in the same way as the new PLC supplied by B&R. ■

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NEWS

Injection moulding machines

# How to save energy with optimised hydraulic fluids

At this year's Fakuma stand (4117, hall A4) Evonik showcases its Dynavis technology brand for the first time. The Dynavis team has run and evaluated comprehensive tests using different hydraulic fluids on injection moulding machines. The tests focused on the effects of hydraulic fluid on the efficiency of the injection moulding machines.

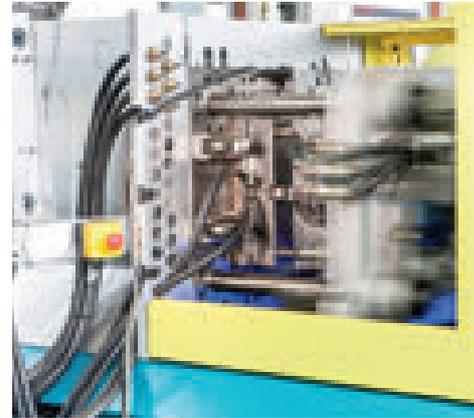
The question at hand: is energy consumption significantly reduced? The Dynavis team presents the results in Friedrichshafen between October 13 and 17.

The Dynavis technology to optimise the viscosity of hydraulic fluids is currently used by five license holders and it is indicated on the containers. Furthermore, numerous oil retailers use Dynavis technology for their best hydraulic fluids without benefiting from

the comprehensive marketing support Evonik additionally provides to its license holders free of charge.

Every type of oil (including hydraulic fluid) tends to lose viscosity at increasing temperatures. In this condition, there is usually a drop in hydraulic energy transfers because the fluid has become hot and thin, internal leaks within the hydraulic circuit increase and the efficiency in the desired flow direction is impaired. Fluids with Dynavis technology demonstrate fewer leaks and also remain efficient even at high temperatures.

On the other side of the temperature spectrum, at very low temperatures, oils tend to become more viscous and it is harder to pump them through the system. The consequence is that the hydraulic pump drive consumes



Measurable efficiency boost by changing to hydraulic fluids configured with Dynavis technology, according to tests on a Boy injection moulding machine. At stand 7101, in hall A7, Dr Boy provides information about the EconFluid used

more energy. Also in this case, fluids configured with Dynavis technology ensure the pump's energy consumption drops.

### Construction Equipment - Identical results?

The Dynavis team ran the first series of tests on construction equipment. The determined measured values were impressive: savings of up to 30% had been achieved, hydraulic systems operated more smoothly, were more agile and accurate. This all indicated that positive effects were also in the cards for injection moulding machines. But what would the extent of the effects be in the hot-tempered world of plastics production? And would there be any effects beyond that?

The Dynavis team initially carried out comprehensive measurements

on an in-house hydraulic injection moulding machine applying different pressure and temperature levels as well as using different fluids.

The results were so outstanding that the Dynavis team charged at the open doors of plastics manufacturer Boy. The management at Boy was immediately convinced as energy efficiency is a core objective at the company.

The Boy 35 E injection moulding machine provided for the test featured Econ-Plast equipment - and was hence already configured for high levels of efficiency. At the same time, replacing the hydraulic fluid increased the efficiency even further. Most fluids used in injection moulding machines are configured as per ISO 46. The ISO 32 fluid configured with Dynavis technology generated maximum output during the tests thanks to optimised viscosity. Thin oils are easier to pump and in light of the reduced friction, this resulted in double-digit energy savings.

The fluid configured with Dynavis technology consequently reduces hydraulic loss within the machine and this additionally cuts the development of heat that must be dissipated using the cooling system.

At Fakuma the Dynavis team showcases the established measured values and additional experiences made, along with a calculator (see figure 1) to illustrate the potential savings with injection moulding machines. "We invite all companies producing plastics with a desire to test the Dynavis effect on their own machines to visit us at the Evonik stand", says Rolf Fianke, aftermarket support manager at Dynavis.

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

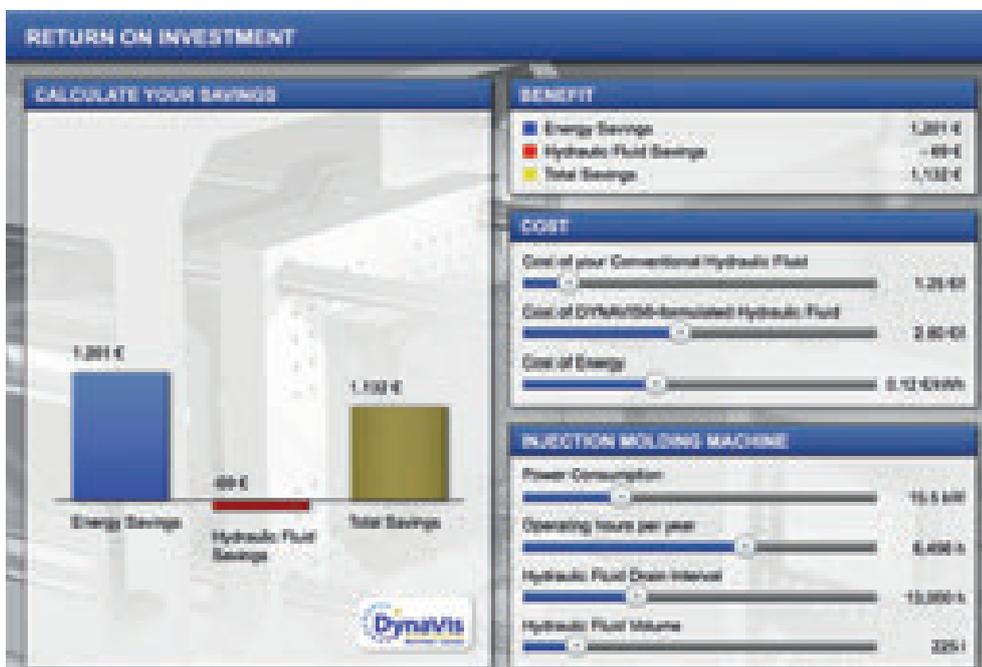


Fig. 1 - The Dynavis calculator determines potential savings within the context of injection moulding resulting from changing to a hydraulic fluid with optimised viscosity

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**VIPLAS**  
PLASTICIZING SCREWS AND BARRELS

Extrusion of profiles made of PVC and engineering polymers

## In-line shaping to reproduce traditional roof tiles

The Italian machinery manufacturer Bausano has recently provided various processors in South America with a new line for the extrusion of wavy plastic profiles for roofs (PVC tile sheet).

The new line directly extrudes PVC sheet with a protective outer layer made of UV-resistant engineering polymers. Furthermore, a system for in-line shaping reproduces the characteristics of traditional tiles.

The final product ensures remarkable performances in terms of weather resistance and dimensional stability; moreover, the PVC tile sheet has a very low thermal expansion value and is environmentally friendly,

being manufactured with 100% recyclable PVC.

The extruders used in the line, MD series Plus, thanks to their high power of dispersion of the raw materials, allow the use of highly concentrated mineral fillers, reaching higher production outputs than most lines currently present on the market.

In particular, the goal of Bausano is to suit the production requirements of those markets which require cheap and resistant products. With wavy, colonial or trapezoidal profiles, the PVC tile sheets produced by Bausano lines offer the best solution for the building sector. ■

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



The new line developed by Bausano for the extrusion of plastic wavy profiles for roofs (PVC tile sheet)

First Fakuma for Haitian International Germany

## A busy autumn season

The new two-platen Jupiter Plus Series



At Fakuma 2015 (stand 1101-1103, hall A1), Haitian International Germany presents technology to the point - high quality standard machines. This is the first official Fakuma under the new corporate name and anticipation among the company management is understandably high. "I'm really looking forward to this exhibition, which is preceded by its excellent reputation. My goal is to meet and get to know as many customers and interested people as possible", says Xiang Linfa, general manager of the German subsidiary in Ebermannsdorf.

The efficient "economy-class" variant of the best-selling Haitian Mars Series is one of the most successful servo-hydraulic injection-moulding machine in the world, with sales over 120,000 units, gaining growing popularity in Europe too. The efficiently configured equipment package is available in clamping-force categories from 600 to 5,300 kN, allowing the processor to achieve competitive production of simple standard parts while ensuring high energy-efficiency, repeatability, and precision. At Fakuma 2015, a MA11900 machine manufactures a salad cup made of PP, extracted by a Sepro Linear robot.

The lid for the cup, also made of PP, is produced by a fully-electric 1500 kN Zhafir Venus II Series in 4 seconds. The appropriate moulds for the 2+2-cavity stack mould and also for the cup were made available by the Axmann Company. Since its launch in 2007, the Venus Series has established itself worldwide as an attractively priced and high-performance alternative to hydraulic solutions. More than 5,000 Venus machines have been delivered to date.

The Jupiter II Series 4500 plus is Haitian's smallest two-platen solution so far, with its energy-saving servo-hydraulic "Mars technology drive". The JUII4500 plus has been further improved just recently to meet specific customer requirements by the European automobile industry - hence the addition "plus" to the name. The new decentralised locking system brings even more dynamics in terms of clamping and achieves significantly shorter dry-cycle times.

"We already know it's going to be a busy autumn season for us", says Xiang Linfa. "In September we broke ground for the new production hall. As from 2016, according to current plans, we will be able to assemble a considerable part of our machines for Europe". When the second plant is finally completed, Haitian International Germany will expand the production area by approximately 7,500 m<sup>2</sup>, reaching a total of more than 12,000 m<sup>2</sup>. ■

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

Magic MP is back

## Extrusion blow moulding innovators

After being out of the injection stretch blow moulding market for over 10 years, Magic MP is back with a new machine which is going to revolutionise the sector: the first single-stage 100% electric machine. A load of customer-focused technology, which brings many benefits, ranging from energy savings to equipment savings. Just think, for example, that a conventional stretch blow-moulding machine consumes, on average, approximately 25-30 kW (injector excluded), whereas the company full electric machine consumes for preform closing, mould platen closing (26-30 bar blowing) and carriage movements about 3 kW! Equipment savings means one more major plus; the costs of moulds in a single-stage machine are well known to have a significant impact on the cost of the machine and its amortisation in production. The Magic MP machine relies on the new system complete with movable mould carrier to allow the cavities of the blowing mould to be reduced by 50%. Indeed, the technology of the movable mould carrying system makes it possible to blow the preforms in two stages, thereby saving on the cost of the mould and the energy required for this move-

ment. To blow 6 preforms, traditional technology would require 6 blowing cavities, with a clamping force of approximately 30-35 tons, whereas with the 3-blowing cavity Magic MP machine the required clamping force is reduced by 40%. According to Magic's tradition, each invention is patent-covered. Here, as elsewhere, the relevant application has already been submitted.

The technical layout of the machine is such that the traditional conditioning system of the old Magic Biaxial machines is excluded for a certain number of shapes of containers. However, if in the future, any customer should require conditioning for the production, for example, of extremely flat or elliptical bottles, this can be easily added by inserting a module between the injection unit and the blowing unit.

Finally, specially designed for customers who need production in limited amounts, the Magic MP machine will allow to simultaneously blow two differently shaped bottles, with an apparently similar preform and different necks. Magic MP further proves to lead the way in flexibility and awareness of what customers really need. ■

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

A detail inside the first single-stage 100% electric machine from Magic MP



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FROM OCTOBER 13 TO 17, MORETTO IS GLAD TO ATTEND THE 24<sup>TH</sup> EDITION OF THE FAKUMA EXHIBITION. CUSTOMERS AND VISITORS ARE WELCOME TO THE STAND 3208, HALL B3, AND, WHAT'S MORE, OPERATORS FROM THE PLASTICS SECTOR CAN ENJOY AN OVERVIEW OF MORETTO TECHNOLOGY IN A FLAMING RED MOTORHOME JUST OUTSIDE THE HALL



THE CHALLENGE GOES ON..

## TWO GREAT NOVELTIES



X MAX modular dryer

The proverbial courtesy and expertise of the staff take the visitors through a journey of discovery of two great novelties: Eureka Plus, the completion of the Eureka project with its perfect drying process as the end result, and the auto-adaptive conveying system One Wire 6.

### EUREKA PLUS

The result of 13 years of passionate research and driven design, developed at the company's premises by a team of specialists, Eureka is formed today by four main systems: OTX, the Original Thermal Exchanger, where energy meets moisture; X MAX, the modular dryer offering constant performance; Flowmatik, the auto-adaptive

airflow management system to process air distribution; Moisture Meter, a system for in-line moisture measurement and control.

Such an engineered drying system ensures unequalled energy efficiency since the synergy of its components is unique and results in the following benefits for the whole moulding process: reduced cycle time, higher performance, shorter waiting time, and greater efficiency and profit.

Moisture Meter is "the" absolute novelty in the drying system market. Moretto is the only company supplying an effective device to measure the residual moisture in the plastic granule during the process. The constant communication between the moisture meter and the dryer allows to set

the process through the input of numbers, in order to dry the material perfectly and in accordance with the technical sheet recommendations. The possibility of managing the drying system by a simple numerical input provides unrivalled efficiency to the treatment, with a positive impact on the quality of the moulded products and, subsequently, a reduction in production waste; as a further consequence, it optimises energy efficiency, eliminating any energy dispersion, according to the process parameters.

Moisture Meter allows to certify production and, through the continuous measurement of the final moisture value, clears all doubts on the drying level of the polymers to be processed. Therefore, Moisture Meter stands for certified quality.

No system can be compared to Moisture Meter in terms of energy efficiency. It exploits an extremely advanced technology and, once it is set up and adjusted at the plant, it does not need to be set up again each time the material lot changes, which means certified quality over time.

The real novelty here is the opportunity to know minute by minute what the exact water quantity to be extracted is, controlling the initial and, of course, the final moisture values. "With these data we can manage the dryer using only the energy strictly required for a tailor-made treatment", says Renato Moretto, CEO of



A detail of the Moisture Meter

the company.

X MAX is an intelligent modular dryer based on zeolite technology, which allows to realise drying systems up to 20,000 m<sup>3</sup>. The uniqueness of this system is its constant performance, that is, the capability to keep the dew point steady during the process (at around -65°C), maintaining unimaginable efficiency levels. Designed in cooperation with the University of Padua (Italy), it features an absolute novelty: a turbocharger integrated in the machine, an ideal solution for drying systems, suitable also for very heavy-duty systems, such as those applications requiring PET dehumidification on a large scale.

The hopper, known as OTX (Original Thermal Exchanger), is the innovative exchanger where energy meets moisture and air is the transport medium. The OTX particular geometry and fluid dynamics guarantee a homogeneous material and air flow, an excellent process to reduce the treatment time by 40% with whatever material. Flowmatik intervenes in the interaction between X MAX and OTX to distribute the correct amount of air generated by X MAX on all active hoppers. This task is entrusted to a device based on a technology which is widely used on airliners: a perfect closed loop. Air is the transport medium for energy: a correct air utilization results in a correct energy utilisation. Flowmatik ensures the use of the correct amount of

air and only two parameters need to be set: material type and throughput. All the rest is automatic.

Each of these four solutions contributes to prevent any energy waste and obtain a perfectly controlled process. The quality of the product reflects the quality of Eureka's processes. Also, Moisture Meter allows to certify production.

### ONE WIRE 6

One Wire 6 is a conveying system which can automatically adapt to the plant status, recognising every change in it. In a conventional transport system, the operator needs to set the parameters for suction and pipe cleaning time. OW6 is a revolution in terms of system management: its automation optimises performance to the fullest. Each time a material or a feeding segment changes, OW6 automatically recognises the new situation and immediately adjusts suction and pipe cleaning time: the machines recognise the adjustments, automatically adapting and re-calculating the transport time.

The OW6 server can manage up to 80 users, such as receivers, suction units, manual and automatic manifold units. The interface is represented by a touch view colour screen and an optional 7-inch wireless palmtop with touch view colour technology is available as system supervisor. One Wire 6 can be connected to Mowis, Moretto integrated supervising system, and equipped with an Ethernet connection dedicated to remote support.

The system touch screen terminal includes



One wire 6 server

a manual as well as a configurable program for precautionary maintenance.

The conveying system at the company stand at Fakuma is equipped with a One Wire 6 management system and Kasko receivers.

The Kasko receivers, presented by Moretto as a preview and dedicated to centralised systems, stand out, in particular, for their renewed design, a clean style, and for their stainless steel construction, also suitable for the medical, pharmaceutical and food sectors. Together with OW6, the Kasko receiver shows its best feature: the Kasko series requires no setting. The Krono sensor makes them adaptive. The Kasko receiver series is available in chips, flakes, powder, talc and in the high-temperature version, representing a new philosophy in the approach to automation. The assisted opening works as a protection from accidental closing and the discharge outlet is equipped with a specific gasket. The material pipe is interchangeable and features a cyclone-effect; moreover, it is also available in an anti-wear version. The polyester filter offers a larger surface. The filter cleaning system is included on all sizes. The signal lamp is of the new-generation LED type. The vacuum pipe can be oriented in eight positions for perfect installation.

The Kasko receivers connected to the new One Wire server for an adaptive system allow to save precious time that the process

#### Kasko receivers



department manager can dedicate to the improvement of quality.

Also on display at the exhibition are some exclusive projects by Moretto, such as: some examples of Te-Ko temperature controllers, fully equipped and developed to suit the daily work of a processing machine,

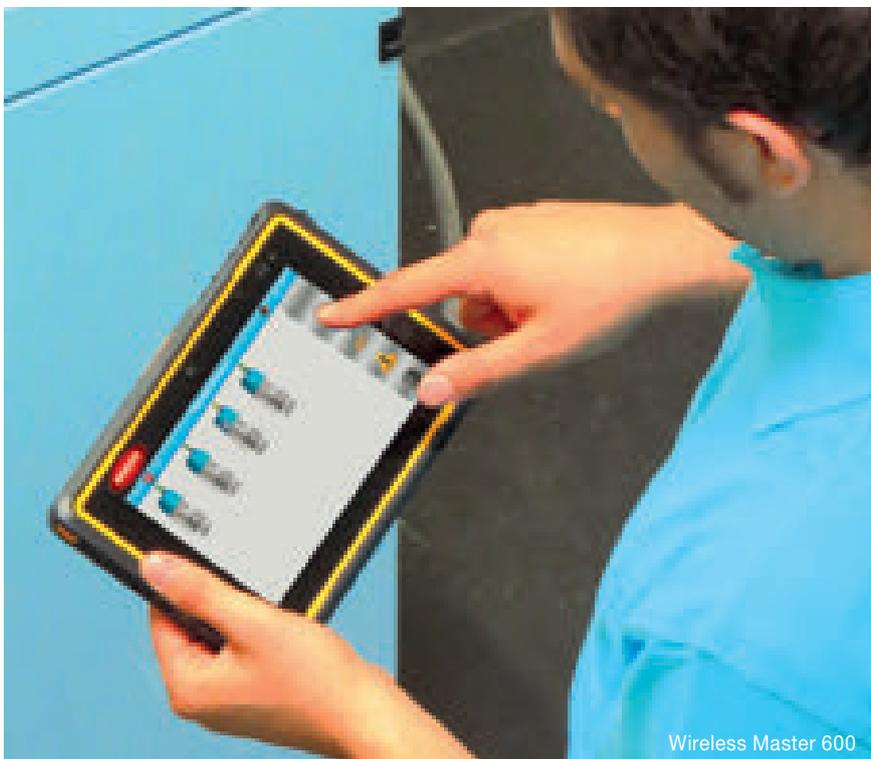
even in hard conditions; Kruse Kontrol, the only system which can automatically manage the granule speed in conveying systems by setting only two parameters and which creates the most suitable working set for each material, regardless of the distance or height of the conveying pipes. By setting the material type and the number of the machine to be fed, Kruse Kontrol guarantees a gentle granule transportation with no dust and a lower level of wear of the pipe, besides the complete elimination of the "angel hair" phenomenon.

Visitors can also find a renewed range of the Dry Air series, dedicated to the dehumidification of small quantities of material, as a proof of the great Eureka revolution in compact dimensions. The increased performance of the X drying unit together with the OTX technology represent a great combination, which leads to extraordinary energy efficiency.

Moretto exclusivities do not stop here. In the external area outside Hall B3, where the flaming red Moretto Motorhome is placed, visitors can enjoy a special exhibition of the whole product range: an 82 sqm exhibition area on 10 big wheels where visitors can touch Moretto equipment with their own hands.

The challenge goes on... ■

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YEARS OF EXPERIENCE AND CONTINUOUS RESEARCH IN THE FIELD OF PIPE SOCKETING HAVE ALLOWED IPM TO OBTAIN SIGNIFICANT RESULTS IN THE TECHNICAL IMPLEMENTATION OF BELLING MACHINES AND, ABOVE ALL, IN THE FINAL PRODUCT. THE HUGE GROWTH IN DEMAND FOR BELLING MACHINES BY PIPE MANUFACTURERS WORLDWIDE COMES AS A CONFIRMATION OF THE ABOVE STATEMENT. THE MOTTO OF THE COMPANY IS "MEET CUSTOMERS' NEEDS AND SATISFY THEIR REQUESTS BY DEVELOPING EACH PROJECT SIDE BY SIDE, TAKING CARE OF ALL THE SPECIFIC NEEDS OF EACH CUSTOMER"

MEETING PROCESSORS' NEEDS

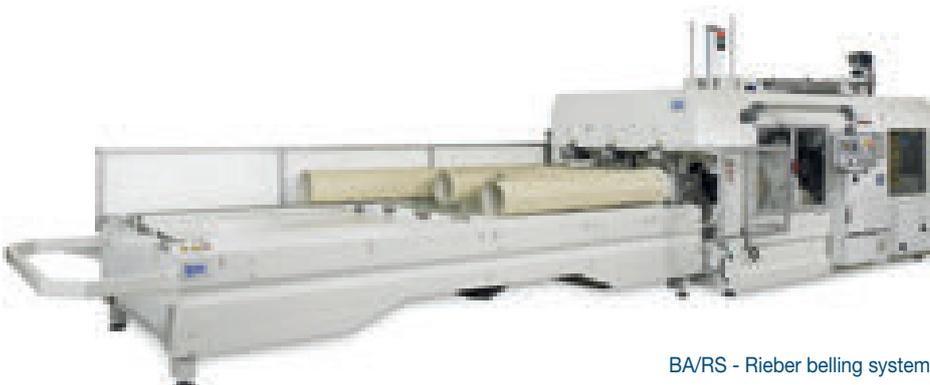
# SIDE-BY-SIDE DEVELOPMENT OF BELLING MACHINES

In fact, the range of bellling machines for PVC pipes developed by IPM is able to meet all the specific requirements of the customers. To obtain smooth or sewer o-ring sockets on pipes with diameters up to 200 mm with small wall thicknesses (thin walls), IPM produces the BA bellling machine model - a fully automatic in-line working machine with pneumatic motion. The socket is made by a smooth or blowing o-ring mandrel from inside and moulds/clamps from outside. Cooling is provided by water circulation inside the clamps/moulds and inside the mandrel. Simplicity, elegance and high output are the main features of this machine. Among BA bellling

machine models, a version for bi-extrusion lines, which can maintain very high production rates, is also available.

The BA/ME model is a bellling machine able to produce either the socket types mentioned above for the BA model or sockets produced by a mechanical mandrel with expandable sectors (both sewer and pressure o-ring sockets). This type of mandrel ensures high-precision inner diameter measurements, normally difficult to obtain, in particular with pipes with great wall thicknesses (thick walls). This is an important factor if the processor wants to obtain a sealed connection, particularly when it comes to pressure pipes. In this case, the forming takes place in the high-pressure chamber using a mechanical mandrel with expandable segments inside the pipe (i.e. inner calibration). Also the cooling occurs in the high-pressure chamber, by nebulised spraying of water containing the coolant. The hydraulic movement of the forming station allows more precise motion and gives enough strength in case of thick walls. This model covers a range of pipe diameters from 32 mm up to 1200 mm.

In order to fully respond to market needs, IPM



BA/RS - Rieber bellling system

has created BA/RS - Rieber belling system, to manufacture the same types of sockets produced by BA/ME, but which main feature is the possibility of making sockets for high-pressure pipes with a rigid seal (Forsheda type or alike). The forming and cooling occur as with BA/ME, but the main difference is the presence of a fully automated system dealing with the whole management of rigid seals (taken from storage, lubricated, brought to the forming station, and inserted on the special mandrel). This model covers a range of diameters from 32 mm up to 1600 mm.

The Italian company has also distinguished itself in the field of BIAx (belling of bi-oriented PVC pipes). The bi-oriented extrusion material ensures a level of resistance which is higher than usual with a smaller pipe wall thickness. IPM belling machines for BIAx pipes have been developed specifically for this particular kind of material. The heating process occurs within two ovens. This model covers a range of diameters from 50 mm up to 630 mm.

For those pipe producers who need semiautomatic solutions, IPM has developed semiautomatic versions of the machines described above:

- BS: the semiautomatic version of the BA model;
- BS/ME: the semiautomatic version of the BA/ME model;
- BS/RS: the semiautomatic version of the BS/RS model;
- BSR: a semiautomatic belling machine for short pipes, up to two metres long, mostly useful for the production of sleeves with smooth or sewer o-ring sockets.

IPM's significant experience in the field of heating and cooling is the pillar of the success of its belling machines, ensuring top quality and allowing pipe manufacturers to obtain high outputs.

### SOME IMPORTANT SPECIFICATIONS

Standard models have two infrared ovens (with ceramic resistances), but can be supplied with just one oven upon request (if a lower output is required). In case of very thick wall pipes, it is possible to install a shortwave oven upon request. This system exploits the principle of shaking pipe material molecules with shortwaves during irradiation, so as to shorten heating time (increasing the output as a consequence). This allows the achievement of homogeneous heating on the whole thickness of the pipe, whereas, with standard ovens, the heating time needs to be prolonged in case of thick wall pipes, which could lead to burning the pipe outer layer and, therefore, damaging its surface. During the heating process, the temperature of the part of



The BS model is BA semiautomatic version

the pipe being heated is constantly kept under control by sensors allowing the monitoring and control of the entire heating process, so that the heater is turned off when the desired temperature is reached, which means significant savings. To guarantee uniform heating in all the points, the pipe rotates around its own axis by means of specific rollers.

Before entering the oven, the pipe passes through a blowing phase that frees it from chips; this operation prevents any marks on the socket during the forming phase, which would affect its appearance, and any damage to the forming equipment. When the heating process is over, the pipe is shifted to the forming station. Forming takes place as described above: in BA, by a smooth or blowing mandrel from inside and moulds/clamps from outside; in BA/ME, BA/RS and BA/BIAx, in the high-pressure chamber by means of a mechanical mandrel with expandable segments inside the pipe and high pressure compressed air from outside. With regard to cooling, IPM has been using, and constantly improving, a water-cooling system for over 20 years. This important process occurs during the forming cycle by water spraying (with coolant) inside the high-pressure chamber. Also, the water circulates in a closed circuit, which leads to considerable savings in terms of water consumption.

Easiness of operation and maintenance are



The BSR model is a semiautomatic belling machine for short pipes up to two metres long

among the features of the IPM belling machines:

- the video terminal of the machines allows the setting and control of the parameters so that production cycles can be followed continuously; it is provided with an articulated diagnostic system that helps to solve operational problems in a simple and effective way;
- the pneumatic, hydraulic and water circuit segregation (separate blocks) allows a more comfortable use of the machine;
- internal parts are easily accessible from a front door or a side window.

A new system of automatic regulation of the cooling time, developed by IPM, can be installed upon request. The system detects the temperature of the pipe at the end of the forming cycle; then, the machine adjusts the forming and cooling times to fit the pipe temperature, based on a value set by the user. The advantages of this system are:

- correction of the "shrinkage" problem, an alteration of the size of the socket as a result of the cooling after the belling cycle, due to the different temperatures (which may vary each time at the exit of the pipe);
- greater homogeneity and repeatability of the finished product, with fewer defective pipes and, therefore, reduced waste combined with improved quality;
- reduced influence of variable environmental conditions, since the machine is able to adapt progressively to obtain the desired result;
- reduced need for operators to control the quality of the finished product;
- possibility of upgrading existing belling machines (only for machines with shortwave ovens).

In order to offer a higher level of automation for these machines, IPM developed the IG automatic seal inserter (available upon request), to withstand high production speeds and which can also integrate a quality control system (also available upon request) to ensure the correct insertion and good sealing of the gasket. ■

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

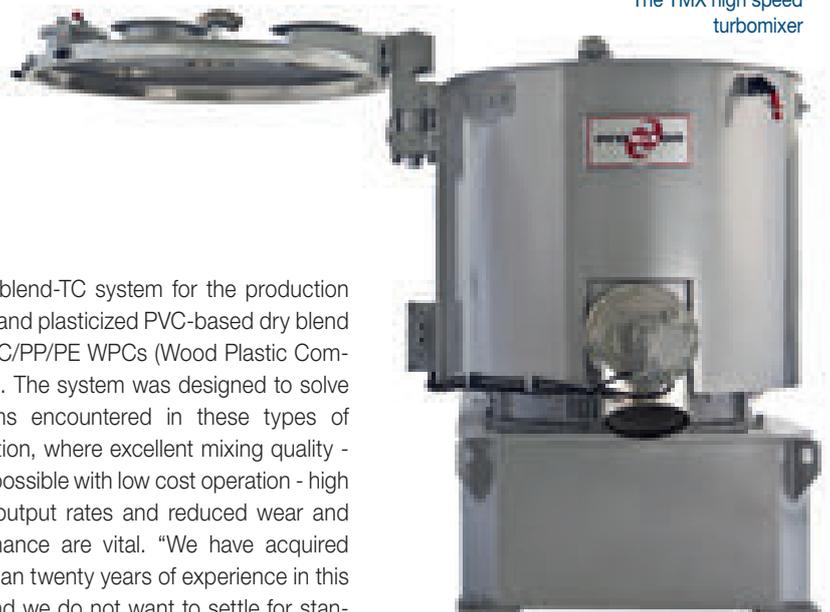
THE PROBLEND-TC IS DESIGNED FOR THE PREPARATION OF PVC DRY-BLEND WITH LOW COSTS OF OPERATION AND HIGH HOURLY PRODUCTION WITHOUT COMPROMISING THE MIXING QUALITY. IT ALSO ALLOWS OPTIMAL CLEANING THANKS TO THE ACCESSIBILITY TO THE HOPPER



PROMIXON PRESENTS PROBLEND-TC

# MORE EFFICIENT MIXING WITH THE COMBINED SYSTEM FOR PVC

The TMX high speed turbomixer



**A** specialist in the construction of plastic and powder coating mixing solutions, Promixon (Foyer Ost 15 at Fakuma 2015) counts TMX turbomixers among its lead products. These turbomixers are single or combined with the CMX high performance horizontal coolers, and the TRX high speed Containers Mixer, for fast mixing of powders, additives, colours, masterbatches, polymers and engineering plastics. The combination of TMX and CMX makes

the Problend-TC system for the production of rigid and plasticized PVC-based dry blend and PVC/PP/PE WPCs (Wood Plastic Composites). The system was designed to solve problems encountered in these types of production, where excellent mixing quality - where possible with low cost operation - high hourly output rates and reduced wear and maintenance are vital. "We have acquired more than twenty years of experience in this field, and we do not want to settle for stan-

dards in use. Instead we constantly aim to propose new technical improvements to our customers' advantage. Everything we do is for their benefit and service", the Promixon general manager, Marco Marinello, said.

**TECHNOLOGICAL INNOVATIONS**

The Problend-TC system introduces numerous technological innovations. For the TMX turbomixers, the new tank and outlet geometries, fully redesigned and now bigger, speed up the material unloading step, guaranteeing higher output and preventing deposits of material or residue at the end of the process and consequent contamination. The innovative design of the mixer tool permits greater friction and mixing intensity, while new anti-wear coating guarantees longer life.

In the CMX cooler, the new tank and mixer geometries intensify the material's contact with the exchange surface, notably improving cooling efficiency. The water distribution circuit inside the tank jacket, designed with an innovative wave configuration, has reduced cooling time by approximately 50%. The special mirror finish of the parts in con-



The innovative design of the mixer tool permits greater friction and mixing intensity, while new anti-wear coating guarantees longer life

tact with the material and adoption of some specific solutions simplify and speed cleaning and maintenance.

The control software and latest generation HMI Siemens operator panel manage and display the mixing cycle information in real time, offering features such as data saving and special graphics for process analysis and optimisation. Remote assistance directly accesses the control system to solve any problems that may arise and to modify process parameters in real time. ■

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



The inside of the CMX high efficiency horizontal cooler

# Flexibility in product customization



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Hall: B3  
Stand: 3118





www.thermoplay.com

New cover for melt filters

## FAST AUTOMATIC OPENING

The new fast automatic opening system allows easier and faster screen replacement



An Italian market leader in the production of automatic melt filters, Fimic (stand 6116, hall A6) goes on with its research to improve the products and, consequently, the quality of filtered plastic material. Thanks to the continuous efforts to fulfil customer needs, at the end of April 2015 a new cover model was finally realised and installed: a complete, fast, automatic opening system, allowing an even easier and quicker replacement of the screen, an operation that can now be carried out like never before. Fimic's products have been known for some time for permitting the replacement of screens easily and quickly, taking more or less 30 minutes. But, for those who need frequent changes, this new cover reduces the time to 5 minutes maximum.

The screen changer uses for screening a laser, or punched, perforated metal sheet, which can be used from 3 to 7 days on average, and up to 15 days maximum, depending on the contamination level of the material to process. When the maximum usage is reached, production must be stopped for 30 minutes. During this time the melt filter is opened to replace the screen. Up to now, a pneumatic screwer was needed to remove the nuts and open the melt filter. But now, thanks to a special mechanical clamp, it can be easily opened and closed in 5 minutes.

The possibility to choose among many different types of filtration, the inexpensive spare parts, and non-stop research focused on product improvement, have turned Fimic into the reliable collaborator of Italian - but not only - extruder suppliers. It's a fact that Fimic melt filter is suitable for any possible application, from film extrusion to injection moulding. The filter can be integrated in almost any type of extruder, and it adapts to all different customer needs as it is custom-built based on each single customer's requirements.

The implementation of laser perforated screens brought great performance improvements to the plastic materials obtained. Positive evaluations on Fimic products can be easily found in the recycling and compounding industry. ■

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

## NEWS

### Noise protection

## Redesigned sound insulation

The German company Herrmann Ultraschall (stand 4108, hall A4) was a pioneer in the field of occupational safety and ergonomics as early as 1973 when it put its first sound enclosure into serial production. The legendary Ultrasafe was considered an industry breakthrough at the time and irrevocably changed working conditions in ultrasonic welding. At the Fakuma 2015 trade show, the company is ready to present a modern redesigned version of this successful product.

In addition to the original sound enclosure, an open safety cell providing specific protection against third-party access is exhibited. The contact area is protected by a safety light curtain that can be configured to start automatically - making a manual start signal redundant. Both Ultrasafe variants can be set up easily on a workbench and provide options for the modular attachment of various accessories. They can also be combined with any of the ultrasonic welding machine models in the HiQ product range.

Why is sound insulation required if ultrasonic frequencies from 20 to 35 kHz are not within a person's audible range? There is an easy answer to this frequently asked question. Plastic parts being welded together, such as the external shell of an electric toothbrush or a filter housing and lid, represent a resonating body. During the welding process, ultrasonic vibration is applied only for a few milliseconds and is attenuated by the plas-

tic component itself. This process triggers resonance at a significantly lower frequency. The structure-borne sound of the vibrating plastic component is somewhat within the audible range. Humans generally perceive this as a short, unpleasant whistling sound.

The risks arising from steady exposure to this kind of noise must not be underestimated. To promote safer production environments, Herrmann Ultraschall offers several sound enclosure variants that are constantly being developed and improved. Meanwhile, specific acoustic insulation materials have been significantly improved, and behind the double-glazed safety door, more integrated functions can be added to protect operators against accidental exposure. In the past decades, like today, Herrmann Ultraschall has always considered worker safety and protection a top priority. ■

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



Rendering of one of the modern redesigned Ultrasafe model presented at Fakuma 2015 by Herrmann Ultraschall

Frigosystem presents I-RES

# Innovation and reliability in refrigeration

Amongst the different products developed through its R&D activity, Frigosystem presents the I-RES and I-RESW systems: the new range of water and air condensed fluid chillers using centrifugal compressors with magnetic levitation.

The new I-RES systems represent one of the most efficient and reliable range of solutions available in the market today, as a result of many years of experience in the application of Turbocor technology. The cooling capacity is extended up to 1,700 kW, featuring unbeatable efficiency and reduced noise levels. These units, using R134 gas as refrigerant, produce refrigerated water by means of oil-free centrifugal compressors, a system which guarantees improved performance.

The I-RES systems are able to withstand different loading conditions thanks to their accurate thermoregulation combined with the stepless variation of compressor speed. The highly innovative compressor with magnetic levitation devices and digital control of the rotor speed achieves partial load efficiency values never reached before. In particular, in the I-RESW water condensed range, the European Seasonal Energy Efficiency Ratio (ESEER) is equal to 9.52 kW (60% more efficient than traditional chillers).

The helicoidal fan technology with EC electronic switching is another innovative feature introduced in the I-RES range, with over 90% efficiency and a much lower inrush current value, which means running cost savings.

For this new series, Frigosys-

tem R&D team opted for condensation batteries with copper pipes, which make the units highly resistant to corrosion, and aluminium fins, which ensure maximum resistance in contaminated industrial environments or in case of high atmospheric pollution. These batteries are perfectly combined with high levels of gas, ensuring energy efficiency.

The shell and tube flooded evaporator construction technology, without oil in the refrigerant circuits, significantly increases the cooling capacity and optimises the compressor operational mode. The electronic valve is adapted to allow optimal operation of the evaporator in all conditions.

Furthermore, the new I-RES range extremely compact layout allows significant savings in terms of capital cost of required spaces. Also, the ultra-silent design is ideal for installation in industrial sites with strict noise limitations.

All these technical features provide additional reliability and efficiency to the new Frigosystem I-RES, amongst the best in today's market, in particular in the plastic sector, which remains the company's core business. These systems have been recently installed in an extrusion plant in Central America (where the company has a commercial and logistic subsidiary) and in the Far East, where all the I-RES innovations are gradually replacing other technologies: the forerunners among plastic processors are choosing these ultraefficient systems, also bearing in mind their rapid payback time. ■

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



The I-RESW water condensed version achieves the European Seasonal Energy Efficiency Ratio (ESEER) of 9.52 kW



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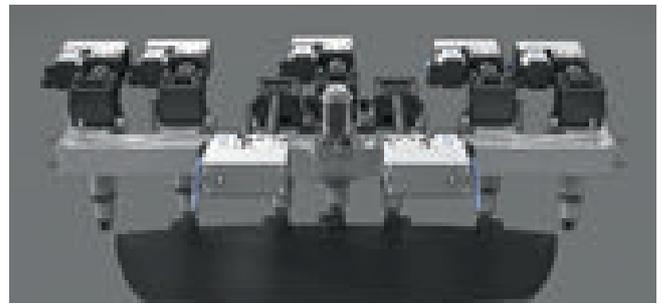
## NEWS

## Precision injection moulding

# Intelligent hot runner systems

At this year's Fakuma (stand 2217, hall A2) the Italian hot runner specialist HRSflow (a division of INglass), represented by its German sales subsidiary HRSflow, Rosstal-Buchschwabach, focuses on high-performance hot runner systems both for the cascade injection moulding of large-format parts and for multi-cavity applications. Members of the team demonstrates the mode of action of the further developed FLEXflow technology, a servo-driven, finely regulated valve gate system. One popular field of application is that of the injection moulding of complex automotive components. The latest development, which is being presented in public for the first time at Fakuma, is the integration of FLEXflow into Moldflow simulation software. The HRSflow line, Multitech - which is now independent - showcases among other things the use of the very latest technologies to shorten the cooling time in multi-cavity moulds.

A major advantage of the FLEXflow valve gate system is that it can be used to produce large-area parts with a high-quality surface. Especially with cascade injection moulding, the electrically driven needle valve nozzles allow the individual, precise and sequentially coordinated opening and shutting of the valve gates at selectable speeds. As a result, the melt flow in the individual hot runner nozzles and the volume flow in the mould cavity can be controlled with outstanding accuracy.



Cascade injection moulding with FLEXflow, the servo-driven hot runner needle valve system, produces large-format parts with a reproducible high-quality surface

This optimised filling process not only produces a better part surface than with the conventional cascade injection moulding process, it also has the advantage that, with FLEXflow, through the much wider process window, the required clamping force and even the part weight can be reduced without any loss of quality. Through the integration of this technology into Moldflow simulation software, the prediction of the course of the injection moulding process in the mould that is so important for the mould design is significantly improved.

In the Multitech line, HRSflow offers hot runner solutions for injection moulding designed for the fast cycle time and high production volume of packaging, caps and closures, and articles for medical technology, the electrical and electronics industry and automotive construction. The focus here is on high numbers of cavities, short cycle times, uniform balancing and rapid colour changes. At Fakuma, new solutions are also showcased for cooling the mould to shorten cycle times. This is attained by innovative cooling channel inserts, produced by the SLM technology (selective laser melting), similar to the technique known as 3D printing. ■

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

## Treating polymers

## Solution for new approaches

A revolutionary process for pelletising special engineering polymers is presented by Maag Automatik at Fakuma (stand 6202, hall A6). Optimised Temperature Pelletising (OTP) is a new void free approach to pelletise technical thermoplastics with Maag's Sphero

underwater pelletising system. This new system can cover the entire process from plastic melt to finished high quality pellets.

Another focal point of the booth is Maag's new generation pump. The advanced pump developed by Maag can run at higher speeds

without an increase in the temperature of the product, thanks to the tremendous improvement in volumetric efficiency. In addition, the pressure building capability is greatly improved even at lower speed increasing the minimum to maximum production rate window. The generation 6 extrex truly represents a new benchmark in the pump industry. The new generation pumps offer up to 50% higher flow rate than comparable products.

Also on show at Maag's booth is a complete system for polymer production in the mid-tier throughput range. The system consists of the extrex 90 extrusion pump, the CSC-RS 116 arched screen changer and the Sphero S 100 underwater pelletising system.

The extrex 90 extrusion pump from Maag Pump Systems is shown feeding melt to the CSC 116-RS screen changer with arched cavities and, from there, the melt is

fed to the Sphero S 100. The proven gear and bearing technology of the extrex series combines high efficiency with minimised energy consumption. Optimised flow channels, very good self-cleaning properties and a long service life are the hallmarks of the pump. The CSC 116-RS screen changer with arched cavities allows the screen surface area to be enlarged up to 4 times compared with conventional designs.

The newly-designed underwater pelletising system Sphero S 100 incorporates a variety of feature upgrades, making it ideal for masterbatch, compounding and recycling applications with throughputs between 700 and 3000 kg/h. The new pneumatic diverter valves, for example, optimise the flow channel and facilitate the cleaning of the cutting chamber, while improved access makes cleaning easier and knife changing faster. ■

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



View of Maag Automatik test lab with OTP process

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NEWS

Conveyor belts

# The next level

With its participation at Fakuma 2015 in Friedrichshafen, MB Conveyors (stand 1214, hall B1) starts looking at the conclusion of an important year - which saw the belt conveyors manufacturer as a protagonist also at NPE (Orlando) and Plast (Milan) - and celebrates 30 years of business. At Fakuma 2015, alongside a selection of some of the company's "best-selling" products, including a turntable and the classic belt conveyors, which remain MB's core business, the latest generation storage system is displayed. Such system represents an example of what is considered the "next level" in the use of conveyor belts, an area in which the Italian manufacturer is becoming increasingly specialised: complex systems

consisting of various conveyors, the combination of which allows innovative and, at the same time, surprisingly easy solutions to the most different requirements, such as storage



With Fakuma MB Conveyors ends this year's exhibition program (which began at NPE and continued at Plast) while celebrating its 30th anniversary

and optimisation of the container filling process. The horizontal filling system (CAO) with shifting flat conveyor exhibited at Fakuma is equipped with full polycarbonate covers to protect the system from contamination, and shows different solutions available in order to optimise the filling process, which can take

place: by shaking (more effective, suitable for products such as plastic caps and capsules); by vibration (more suitable for delicate pieces, such as PET preforms, as it reduces the damage); by distributed filling. The flat conveyor with double direction, thanks to the horizontal displacement, alternately fills 4 boxes, despite the reduced overall dimensions.

With this type of solutions it is possible to optimise the efficiency in the filling of the containers, reducing empty spaces to a minimum. This type of systems, highly customisable to suit different customer needs, allow to efficiently exploit the space available, always a critical issue in production sites, while considerably increasing the autonomy besides the IMM (Injection Moulding Machines). ■

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

The plastics industry represents a major market for Magnetic (stand C 32, hall 13), a company of the Ferroli group, since the first applications realised with dc motors that are still produced up to 200 kW, through their technological evolution represented by ac vectorial motors up to over 500 kW and by the most recent torque motors for direct drive use.

Through the different experiences, Magnetic has developed specific options for plastic machines, as insulated bearings to avoid eddy currents problems, water cooling, thrust bearings, hollow shaft matched with dedicated encoders. Magnetic can also provide a wide range of chillers and heat pumps for water treatment.

The Italian company has been producing electric motors for variable speed applications since 1981. The current pro-

Motors

# Solutions for positioning systems and power applications

duction program includes dc and ac motors, both for positioning systems (permanent magnet servomotors) and for power applications (dc or asynchronous vectorial motors) with a wide selection of sizes and options. Magnetic production has been appreciated during these years by both Italian and worldwide customers for high quality level, product reliability and flexible approach to tailor-made solutions.

Finally, the company's investment policy to develop a flexible and lean production, using the most advanced organisation techniques, and the collaboration with specialised

suppliers, makes it possible to satisfy the most demanding market requests in terms of lead time. Product research and development, completely made internally by the qualified staff, makes Magnetic able to propose advanced

technological solutions and to support customers while integrating products with their solutions. ■

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



Asynchronous vectorial motor model MA 160

Handling, compounding and storage of PP

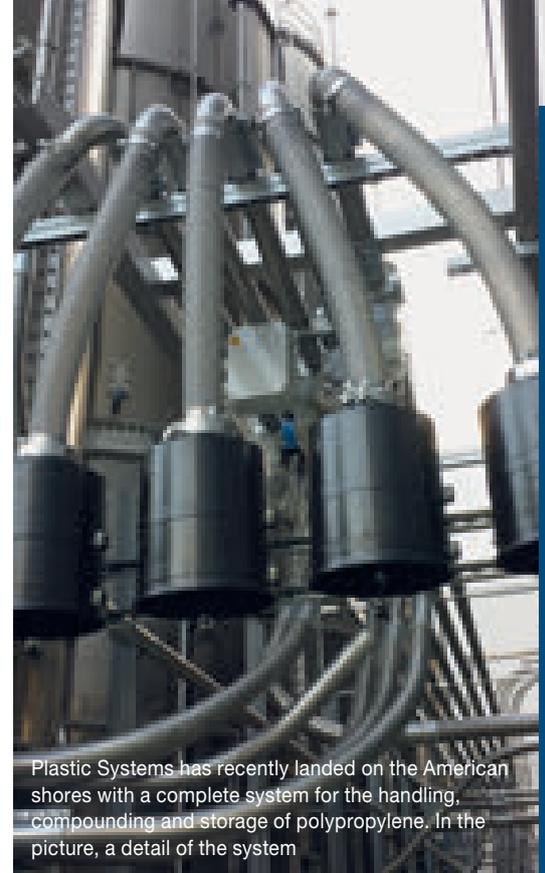
## Landing on the American shores

International leader in the design and manufacture of systems and auxiliary equipment for injection moulding, extrusion and blow moulding machines, Plastic Systems (stand 3113, hall B3, at Fakuma 2015) has recently signed an agreement to supply a complete material handling, compounding and storage system for polypropylene, offering the possibility to load/unload the polymer from/into train wagons, trucks, and big bags. The customer, who has been a leader in the distribution of polyolefin compounds and engineering polymers for 50 years, focuses its brand on the supply of custom-made innovative products for houseware, automotive and electronics. Plastic Systems has installed a complete centralised system, characterised by multiple conveying lines, designed to load the materials into 12 storage silos, with maximum flexibility in material handling. Materials stored inside the silos are conveyed to the extrusion lines through vacuum systems, dosed

according to set recipes, and fed into each extruder throat. The extruded compound is then conveyed under pressure up to a second storage area, featuring vertical mixers whose screws are designed to transfer the polymer into big bags or to a dense-phase conveying system.

Design, modularity and possibility to be extended with additional modules in the future, make the system an efficient turnkey custom-made solution, designed to respond to specific, customised production needs. The outstanding level of safety of the whole system should also be underlined: it also responds to a specific requirement by the customer, for whom safety is a top priority.

The project is completed by a supervision system to set and control all the pairings between machines and materials, trace the production lots, control raw material handling, improve constant monitoring, prevent human errors, and allow the analysis of the produc-



Plastic Systems has recently landed on the American shores with a complete system for the handling, compounding and storage of polypropylene. In the picture, a detail of the system

tion history registered. All this represents, of course, an important goal in terms of flexibility, innovation, energy saving, safety and environmental conservation, satisfying the high-level requirements of a top customer. ■

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

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New hot runner manifold

# For injection blow moulding

The Italian company Thermoplay (stand 3118, hall B3) has developed a new hot runner manifold that makes the latest innovations in hot-half design available to the injection blow moulding machines (Aoki, Nissei ASB or similar). In the most common applications the injection system is made up of an unbalanced manifold with

thread-fixed nozzles. The nozzles are often free flow and they are heated by conduction (heat transfer) from the manifold.

The new Thermoplay design is made up of a manifold with balanced flow channels and the nozzles are fitted to it only by mechanical compression (seated nozzles). This technology al-

lows the nozzles to be always centred within the cavity, reducing the wear in the coupling zone. The nozzle plate is conditioned to have the same temperature as the mould (30°C). An outer body is screwed onto each nozzle externally (so that it can easily be removed), which couples with the forming cavity. All the Ther-

moplay nozzles are provided with plastic sealing zones in order to avoid any plastics leakage and to guarantee a high-quality injection point on the preform.

Some of the main characteristics and performances of the new systems are the following: uniform distribution of the material on the product and even wall thickness; homogeneous balancing along the cavities; no strands at injection point, no colour streaks or discolouring; tighter tolerances on the bottle neck; temperature detection close to the injection point; uniform heat distribution on the whole nozzle length; nozzle bushing replaceable with nozzle drive and tightness; complete self-standing hot half, ready for installation and suitable for any press machine; direct injection systems with shut-off option; easy start up (no preheating with gas fire is required) and safe work conditions. ■

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



The new Thermoplay technology allows the nozzles to be always centred within the cavity. In the picture, an 18-cavity system

Gearbox for extruder drive

# Substantial investments in new production sites

A leading manufacturer of gearboxes for extruder drive, Zambello Riduttori (stand 6105, hall A6) has just made substantial investments in two production sites (Magnago, near Milan, and Lendinara, near Rovigo, Italy) in order to achieve very important objectives so as to consolidate its leadership worldwide. Both production sites have been expanded, with an increase of around 65% of the total covered surface, which now take up nearly 20,000 square meters of the overall 100,000 square meter area.

In order to considerably increase production capacity and to further shorten delivery time, new CNC machinery, ensuring high precision

and productivity, as well as other super efficient equipment, such as the new massive automatic warehouse system that will revolutionise order processing for customers located all

over the world, have been installed at the sites.

Over the last few years, remarkable results in terms of performance have been achieved, with the introduc-

tion of new products such as the gearboxes for twin screw extruders (both counter-rotating and corotating), now available also with torque density of the highest level.

Amongst the new products in the range are also the gearboxes for conical twin screw extruders. But the activity to widen the range, including additional sizes, is still going on. ■

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



Zambello Riduttori has recently invested in two new production facilities, in Magnago (Milan) and Lendinara (Rovigo) to consolidate the company's leadership worldwide

Technologies for caps and closures

## Providing answers to any need

To anticipate market needs and keep up with the times, Giurgola Stampi (stand 5117, hall A5) has continually worked to provide processors with innovation, expertise, flexibility, service and, of course, high quality moulds. Primary emphasis has been placed on the moulders' production requirements. Although it remains a mouldmaker, the company feels it is necessary to expand its competence from the co-design of the processor product to the complete quality control of the moulded part, through the whole testing phase and pre-production, with the aim to provide processors with an answer to any need and a solution to any problem.

The Italian company takes part in several fairs with the aim of strengthening its presence in the European and international market, from both productive and commercial points of view. It shows the latest technologies applied to moulds for closures, destined to sectors such as food and beverage, personal care,

body care, pharmaceutical and medical, all of great interest to the company.

Caps are displayed with all their possible combinations, with unscrewing thread, pull thread, seals, flip top with and without closing of the lid in the moulding machine, mono, bi and three colour, realised using rotating and tilting technologies in the mould, completely designed and manufactured by the company to meet the needs that emerged from a particularly demanding processor.

Equipment constantly updated and managed by qualified and dynamic people allows the company to expand its commercial presence in Europe and around the world, looking for continuous growth opportunities in a changing socio-economic reality. Giurgola Stampi is trying to move the boundaries in mechanics using inventiveness and imagination to create solutions and pass on to processors its capability of being a reliable partner. ■

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



A multi-cavity mould from Giurgola Stampi

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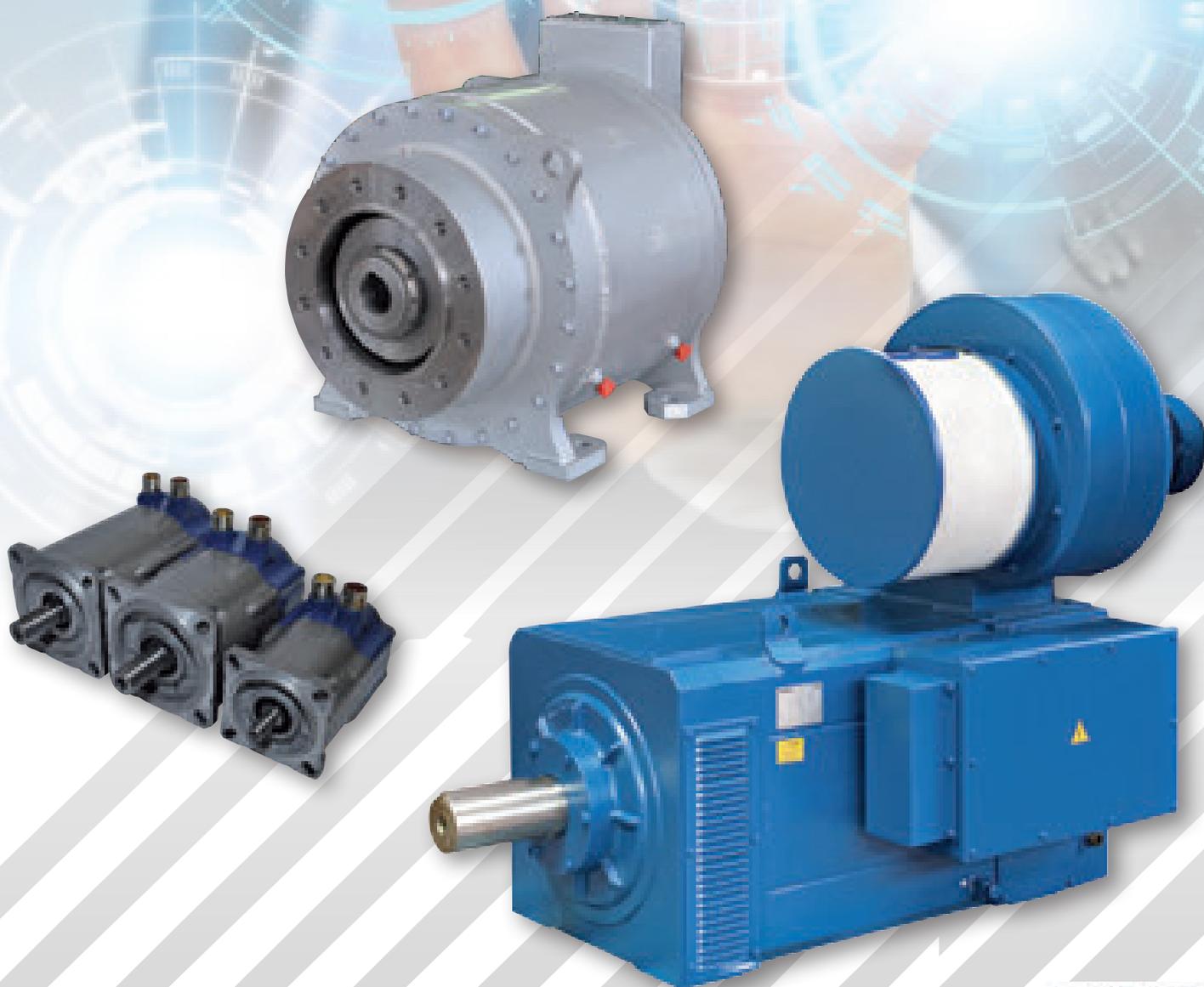


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LEONARDO CRUCIANO WORKSHOP

THANKS TO THEIR VERSATILE TALENT, PLASTICS REIGN SUPREME ON THE SETS AND BEHIND THE SCENES OF THE STUDIOS. MAKE-UP, COSTUMES, SETS, PROPS... WHEREVER THE ART OF ILLUSION IS BEING PRACTICED, THEY MAKE A PERFECT REPLACEMENT OR SUPPORT FOR MOST OTHER MATERIALS

BY PLASTICSEUROPE/PLASTICS THE MAG

FROM STAR WARS TO THE MOST RECENT EPIC AND ANIMATED FILMS

# RECORD TAKINGS FOR POLYMERS AT THE BOX OFFICE

## MAY THE PLASTIC BE WITH YOU!

George Lucas understood the potential of polymers with regard to special effects. Without plastics, no intergalactic saga! Take Chewbacca: his mask with its articulated mechanical jaws equipped with acrylic resin teeth made our favourite Wookiee a star of the screen. Under the composite shell of the faithful C-3PO (an epoxy resin and fibreglass mould), an actor is concealed. Not so with Master Yoda.

Although he may not be the Emperor's toy, he is nevertheless no more than a foam latex puppet moved by several operators. As for Jabba, he is more like a "Trojan slug" inside which, beneath a shell of composite materials covered with a foam latex skin, three technicians are wriggling around. Apart from the likeable Jar Jar, not many characters are 100% virtual. But for all that, these plastic monsters undoubtedly serve their purpose!

The spaceships designed for the films were created in the Lucas Film modelling workshops. Most of them have a wooden frame covered with plastic sheets or composite panels (made

from epoxy resin and fibre glass). Small pieces of plastic glued onto the shells of the vessels add essential details and give a touch of realism. Star Wars characters also launched fashion for collectible figurines, both movable and static, made from PVC or polyester resin.

The history of the Star Wars light sabres overlaps that of polymers. The first light sabres were simple batons for which the luminous effect was created by rotoscoping. Nothing too remarkable there, except on the screen! In Return of the Jedi, the shining blades became carbon rods. And over the years, with progress and

changes, the hilts were manufactured from resin and aluminium tubes before being replaced by carbon fibre specially developed for the film. These props were strengthened, because they frequently broke during combat scenes. But while the original light sabres were no more than plastic toys, it won't be long before the real thing is on the market.

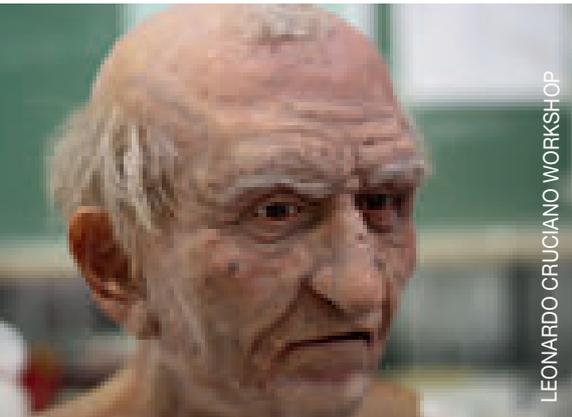
Indeed, the US company Wicked Laser, specialist laser manufacturers, has produced a light sabre with a polycarbonate hilt and blade, just like those in Star Wars. Georges Lucas was a visionary. Thanks to plastics, his ideas have become reality!



MUSÉE DES ARTS DÉCORATIFS PARIS

## PLASTICS STEAL THE SHOWDOWN WITH MASKS!

As demonstrated by the movie Avatar, motion capture has some good times in store. But the computer does not do everything. Make-up is still indispensable, but today make-up uses more polymers than foundation. Indeed, they allow the actor to identify with his or her character in any situation throughout the charac-



ter's life. This is evidenced by *La Vie en Rose*, in which Marion Cotillard so closely resembles Édith Piaf, behind her make-up. The same goes for Brad Pitt, totally believable in the skin of an 80-year-old Benjamin Button. In order to achieve this, make-up artists use foam latex masks. Specially designed to adapt themselves to the physiognomy of the actor, they are created using a resin mould of the actor's face, into which latex is poured. If you don't believe this, take a look at Tom Cruise in *Mission Impossible III*, as he effectively swapped heads in no time at all and Robin Williams, who used his facial prosthetic to become Mrs Doubtfire, winning the film an Oscar for Best Make-up in the process!

### THE STUFF OF SUPERHEROES

The era is over when Christopher Reeves pranced around in his Spandex tights, relying on polyurethane-based elastane fibre for its elasticity. Costume designers have since moved on with the help of polymers, ushering in a new age for superheroes.

Today's costumes are no longer simple items of clothing. They are more like prostheses that are perfectly adapted to the actor's body to leave the muscles visible, muscles that are often highlighted by a polyurethane resin shell.

On the whole, traditional materials like imitation leather, elastane and foam latexes are still used, but in specific combinations. Elastane, which is more resilient than latex, is now used for the interior of the costume to provide the actor with greater mobility.

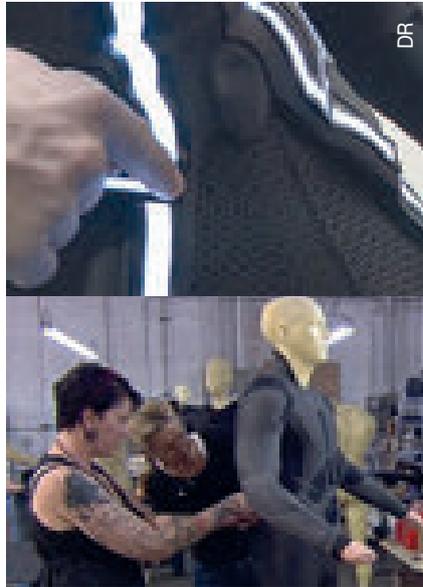
To see Peter Parker knocking up his Spiderman costume one night in his bedroom is quite touching, but scarcely credible. Costumes now represent a fundamental element of the major productions, involving considerable investment in design and technology.

For the film *Tron Legacy*, the production team spent almost 13 million dollars on the luminous costumes similar to those in the previous film.

Borrowed from a Japanese firm, the process

consisted of covering the material with a dozen layers of a flexible polymer, sprinkling the layers with conductive metal particles then a fluorescent powder reacting like cinematic gelatine.

The costumes of the Sirens were created by spraying rubber onto elastane to make them look super-smooth. These spectacularly skin-tight and delicate costumes had to be handled with care, particularly when filming action scenes!



### POLYMERS USED IN STUNTS

Action films are always sensational, but although stunt men and women still manage to please us, much of that is due to the expandable materials they use. Leaping and falling in films are activities that require technique and special effects skills, but also good materials. Stunt men and women need protection in order to be able to keep getting back up after their falls.

There is nothing better for this purpose than polymers. The back protectors used for dangerous physical stunts are made from a polypropylene layer for strength, while the shock-absorbing element is often made of expanded polyurethane for maximum comfort and safety. But these stunt artists do not only fall; sometimes they have to jump more than 10 metres high, which often requires a well-cushioned landing. These professional airbags are usually made from a film of stratified polymer material, most often in polyamide to provide the stunt artist with the safest possible landing.

The days of unrealistic wounds in the cinema are over. Fake injuries now look more genuine than real ones. Silicon is often used in this field. It can be applied as a polymer film to become a second skin, in the form of a wound, a burn or a scar that can be coloured with a silicone-based colouring.

The Art and Creative Material Institute, the ac-

knowledgeed authority for creative materials, has given its seal of approval to this process. It can also be used as standard silicon to create in advance wounds that can be attached later, such as those seen in horror films.

In addition, its flexibility allows it to match the movement of the skin and to remain fixed in difficult areas like joints. For less serious injuries like bruises, liquid latex provides a more interesting result. To put it succinctly, if silicone is a gore-fest, latex is more like playground scrap.

### A WHOLE WORLD OF PLASTICS

Rather than making some parts of sets life-sized, some directors prefer to build small-scale models. Such was the case with the *Star Wars* saga, in which most of the different planets were models made from polystyrene using an injection moulding process or from resin by thermoforming.

They often include elements made from other materials such as rubber, used for certain tricky details and then reproduced in moulded plastic. For example, the planet Utapau, where the Jedi Order was said to have been founded, is in reality an enormous mock-up with a diameter of 10 metres. For filming purposes, it was cut in two to accommodate two teams of technicians working simultaneously.

The team also made thousands of litres of artificial lava using a natural polymer with a polysaccharide base, used in the preparation of milkshakes.

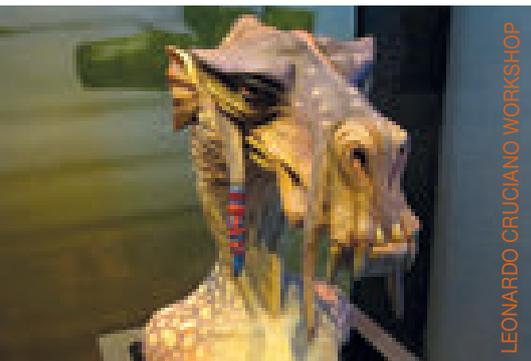


### PLASTICS, MONSTERS & CO.

Animatronics pioneer Carlo Rambaldi, The father of E.T., made his debut at Cinecittà Studios on pasteboard sets, to which he introduced plastic materials.

In 1957, he saved the day for the director of *White Knight*, a B-movie inspired by the legend of Siegfried, by creating, in two weeks, a 14-metre mechanised wooden dragon covered in material and foam latex.

After numerous historical epics and other "Z" movies, his genius took him to Hollywood to create, in 1979, the horrific *Alien* of Ridley Scott,



then the delightful E.T. of Spielberg, using metal frames covered with polyurethane skin.

In 1991, Rambaldi, like his American colleagues Rick Baker and Robin Bottin, the creator of the first Robocop in fibre glass and foam rubber, must have imagined that the fully digital Terminator 2 sang the swan song for his profession - until Spielberg decided, two years later, hesitating between animatronics and synthetic imaging, to combine the two approaches for the T-Rex in Jurassic Park.

Number Five, the robot of Short Circuit made largely of polymers, is another imaginary character worthy of a mention. Apart from the skeleton and the metal motors, a large part of the external components have been made using moulded shock-proof plastics of a metallic grey colour. Polystyrene and fibreglass have made the robot much lighter (137 kg) than it would have been in real life.

Returning to the present day, one of the most interesting facts concerning the production of The Hobbit, in which Peter Jackson has again ventured into the magical and turbulent world of Tolkien, concerns the amount of silicones used in order to give many of the actors an out-of-this-world look (or rather a "Middle-earth look"): non less than 4 tons of material having been used to create the Hobbit-like foreheads, noses and feet, to such an extent that it has been suggested that the filming area (the county of the hobbits) should more appropriately be termed "Silicone Valley".

### THROUGH A GLASS SHARPLY - FROM PASTEBOARD TO POLYMER PLASTER

Bruce Willis, walking barefoot over broken glass to escape the clutches of the odious Gruber's goons. Does that remind you of something? Die Hard, the film in which more glass gets broken than at a Cossack banquet. And what were the costs in terms of the destruction and injuries caused by these perilous scenes? Only that of the polyurethane resin used. No need for a miracle-worker to shoot these scenes; with some fake blood on his feet, Bruce does just fine!

Designed to break on impact, this resin is essential for stunts and special effects and has become established as the perfect material for a wide range of objects destined to get smashed: fake windows, bottles, glasses etc. Transparent or coloured, it is sometimes used in vast quantities on sets. First prize goes to 007, as entered in the Guinness Book of Records, for breaking, in the Ice Palace in Die Another Day, six and a half tons of polyurethane resin.

Cardboard sets or studio filming, the Maciste era is now over. What has changed? The materials! Since the 1950s, film set construction techniques have evolved rapidly due to progress in the chemical industry. Set constructors use chipboard, plastics and new fast-drying paints. Since the 70s, materials like expanded polystyrene and thermoforming resins have permanently replaced the plasterboard sets of the historical epics. Sets are now often made from gypsum- and latex-based polymer plaster. This material allows sets and props to be created to look like stone, but are much more lightweight. It means that sets look much more realistic than in days gone by. On top of this, they are fire- and water-resistant, and that means scenes can be shot outside of the studio, even when it's raining!



### UNDEADLY WEAPONS

With the new style of historical epics, swash-bucklers or heroic fantasy, weapons experts and props designers have a wide range of opportunities to display their talents, in line with the unwritten rules of cinema warfare: realism, comfort and safety. Hence the frequent use of anachronistic materials.

In Gladiator, for example, Commodus and Maximus fight with a breast-plate covered in leather. But one is made of rubber and the other of foam latex. A number of originals were made and there were several versions - clean, muddy, blood-spattered. For Luc Besson's Joan of Arc, winner of the César 2000 for best costume, the company Mediev'art, specialists in organic matrix composite materials, created a wide range of helmets and



armor from fibreglass and metallised polyester resin.

Providing the armor for many Hollywood blockbusters, the New Zealand workshop Weta has made more than 15,000 bladed weapons. It was therefore able to provide each combatant in Narnia several models specifically adapted to suit his/her body shape. Swords, as heavy as the medieval weapons, made from forged steel, with engraved blades and pommels made from precious wood for those special scenes in which the actors must strike realistic poses. Less dangerous copies made from aluminium with urethane pommels were used to shoot several scenes as long shots without tiring the actors. Not to forget the swords, crossbows and assorted other weapons made from flexible urethane so that the stunt artists could let fly without risk.

### POLYMERS - COME RAIN OR SHINE

It is not easy filming out of doors - except on those occasions when bad weather conditions fit in with the story line. So how can this problem be avoided? Put your money on polymers! To recreate gloomy weather, a stormy sky or even a full-on hurricane, all you need is an aquarium. A little salt water, fresh water, add a latex mixture diluted with paint and Bob's your uncle!

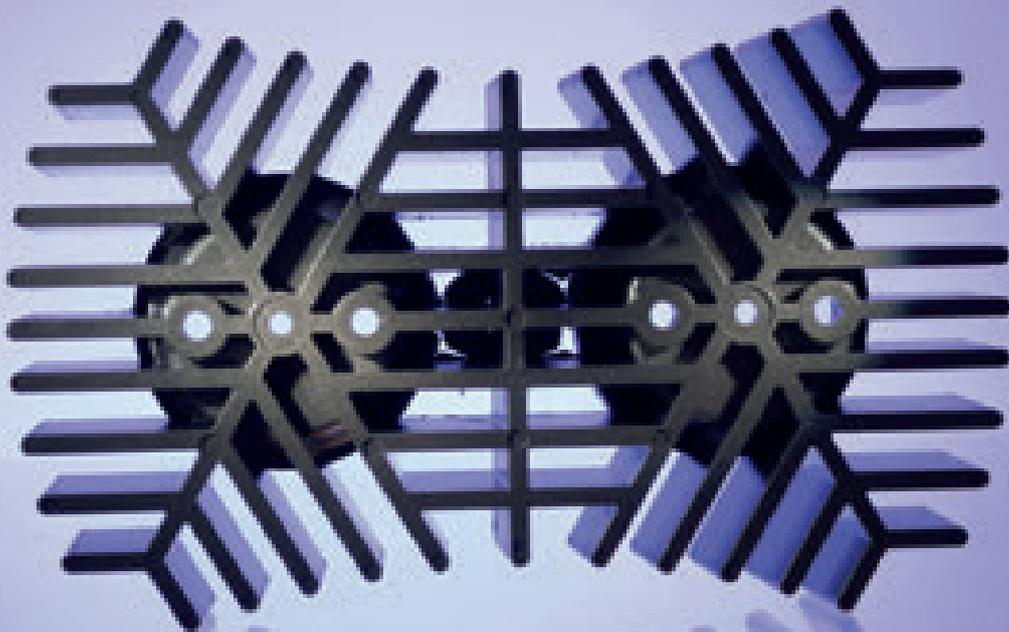
Because of the different densities, you get the different shades of cloud you were looking for. All that remains is to film them!

Along the same lines, it is no longer necessary to spend two hours shooting 35 takes in the cold near the Arctic Circle just to film one scene in the snow. Most of the snowflakes drifting across our screen are made from polyethylene. The effect is sometimes not very realistic, as in Edward Scissorhands!

That is why a super-absorbent polymer based process (SAP) is generally used, identical to those used in nappies. Osmotic pressure causes the grain of the polymers to swell and form a translucent gel that looks exactly like snow. ■

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



One area of focus for Covestro is the thermally conductive polycarbonate Makrolon TC8030

FROM SEPTEMBER 1 BAYER MATERIALSCIENCE IS OPERATING UNDER THE COVESTRO NAME. THE COMPANY IS NOW LEGALLY AND ECONOMICALLY INDEPENDENT, BUT IT WILL REMAIN A 100 PERCENT SUBSIDIARY OF BAYER AG. THE LATTER WANTS TO FLOAT COVESTRO ON THE STOCK MARKET BY MID-2016 AT THE LATEST, IN ORDER TO CONCENTRATE EXCLUSIVELY ON THE LIFE SCIENCE BUSINESSES

FIRST APPEARANCE OF BAYER MATERIALSCIENCE AT FAKUMA UNDER THE NEW NAME COVESTRO

# VERSATILE PRODUCTS FOR KEY INDUSTRIES

For the first time at Fakuma 2015 (stand 4206, hall B4) Bayer MaterialScience will step onto the stage of a major international trade show under the name Covestro. The name is a portmanteau of terms embodying the identity of the new company. Whereas the first syllable stands for “collaboration” with a variety of partners, “vest” refers to investments in modern, large-scale production facilities, which are a key prerequisite of the company’s competitiveness. Finally, “stro” is derived from the English word “strong,” and stands for strength – in innovation, in the markets and with a strong team.

Closely associated with the new name Covestro are the values “curious,” “courageous” and “colourful”, which represent the company’s curiosity, courage and diversity. “Curiosity will drive us to listen to customers and respond with creative and also unexpected solutions”, explains Rainer Rettig, head of Commercial Operations for Polycarbonates in Europe,



Covestro has joined the UN Global Compact, a voluntary initiative by companies to adopt sustainable and responsible business practices. It is the world’s largest corporate responsibility initiative with over 8,000 business and non-business participants in 135 countries. “The concept of sustainability is the foundation for everything Covestro does, so our own initiatives to help protect people and the planet are perfectly in line with those of the Global Compact”, CEO Patrick Thomas said

Middle East, Africa and Latin America. “Curiosity and openness are the prerequisites for being able to recognise early on the direction in which the markets are developing. This enables us to jump on the right trends and offer tailored developments that enhance the competitiveness of our customers”.

FROM RADIANT TO FUNCTIONAL COLOURS

Colourfulness and diversity are important values for the future company Covestro. Colouration also plays a central role in polycarbonates, one of the company’s key product groups, if they are to be used for the production of competitive, functional articles. Not just a wide range of shades, but fluorescence effects and even transparently and translucently coloured products are possible today. Rounding out the portfolio are UV-resistant, lightfast and tailored infrared-absorbing grades. The comprehensive expertise required here – including interactions with UV- and near-infrared

radiation as well as visible light – is pooled at the Covestro Colour Competence & Design Centres of the company.

Another factor for the outward appearance is the surface. The latest internal developments at the company enable increasingly precise surface formation. One way to achieve this is with sophisticated, dynamic tempering during the injection moulding process. The wall of the mould is heated prior to injection; cooling does not begin until after the cavity has been filled. This enables the targeted production of smooth and structured surfaces as desired – from Class A to grained.

### FIRST STEPS INTO THE PRODUCTION OF POLYCARBONATE COMPOSITES

Another topic is composite materials for lightweight, yet robust structures. After polyurethane systems, the company is now planning to enter into the production of composites with the high-performance plastic polycarbonate, primarily for the automotive, transport and IT industries. However, there is also strong demand in the consumer goods sector for thermoplastic materials reinforced with continuous fibres.

“The new materials are particularly thin and lightweight, and the solutions produced so far offer properties superior to those of existing solutions based on aluminium, for example”, says Olaf Zöllner, technical manager of the composite business. “Furthermore, they are robust, freely formable, easy to process and can be recycled multiple times”. Just recently, the company strengthened its position in this key future market with the acquisition of the German company Thermoplast Composite (TCG).

Rounding out the Covestro portfolio at Fakuma are further new developments for applications in the automotive and transport field, including electric mobility. Besides poly-

carbonates, other focal points of the Covestro stand (4206, in hall B4) are polyurethane systems, thermoplastic polyurethanes and the use of polycarbonate films.

### FACTS AND DISCUSSION ABOUT BPA

Bisphenol A (BPA) is one of the most thoroughly studied chemical substances and for decades has been used for the production of the high-performance plastic polycarbonate, among other things. Nevertheless, public opinion regarding its use as a raw material remains divided. Covestro welcomes this debate and invites Fakuma 2015 visitors to its stand for discussions.

“We would like to provide customers and visitors the desired information about BPA and to answer their questions”, said Sven Gestermann, Global Product steward Polycarbonates at Covestro and chairman of the Polycarbonate-BPA Product Group at PlasticsEurope.

### LATEST MATERIAL SOLUTIONS FOR HEAT MANAGEMENT OF LED LAMPS

Developing innovative and sustainable solutions for global challenges is a core task of Covestro. This also applies to lighting, which presently accounts for around 15 percent of the world’s energy consumption and five percent of greenhouse gas emissions. According to estimates by the UNEP Global Efficient Lighting Forum, switching to energy-efficient lighting could reduce this worldwide energy requirement by more than one thousand terawatt hours (TWh) each year, thus reducing the associated CO<sub>2</sub> emissions by roughly 530 million tons.

Therefore, Covestro is committed to modern and energy-efficient lighting technologies such as LED and has established a wide and diverse range of products for this field. Despite some improvement with respect to the efficiency of LEDs, the lamps have still not yet reached the level of efficiency theoretically possible because a portion of the energy is given off in the form of heat. This heat must be dissipated via cooling elements in order to ensure a high light yield and long service life of the lamps.

For this application, Covestro has launched the special, thermally conductive polycarbonate Makrolon TC8030 (TC stands for “Thermally Conductive”). “Compared with the aluminium typically used, the plastic stands out for its combination of good thermal conductivity and

The Magnum Future mobile spotlight from Lena Lighting is fitted with energy-efficient LEDs as a light source. A diffuser made from Makrolon 2405 ensures optimal dispersion of the LED light



In heat sinks of Filix Lighting, Makrolon TC8030 is already being used

greater design freedom”, says Klaus Reinartz, Covestro marketing manager for LED Lighting in the Europe, Middle East, Africa and Latin America region. “The easy and efficient production via injection moulding enables a whole new generation of cooling elements”.

The plastic has good thermal conductivity behaviour similar to that of aluminium, but weighs less and is therefore well-suited for lightweight LED lighting solutions.

### MOBILE LED WORK LAMPS FOR NUMEROUS APPLICATIONS

Workplace lamps have to illuminate the place where they are in use perfectly, while at the same time being robust and working reliably despite a variety of environmental factors. Covestro offers various grades of its Makrolon polycarbonate that are ideally suited as construction materials for lamp components and easily satisfy these different requirements. This is demonstrated in the Magnum Future mobile spotlight from Polish lamp manufacturer Lena Lighting.

This lightweight lamp is fitted with energy-efficient LEDs as a light source. A diffuser made from Makrolon 2405 ensures optimal dispersion of the LED light. Dyed white, the translucent polycarbonate is tailor-made for use in light and lamp technology applications. Its high level of translucency and outstanding light-diffusing properties ensure that the diffuser disperses and homogenises the spots of light from the LEDs with little loss. Thanks to the high impact resistance of the material, the diffuser is well protected against impacts and vibrations such as those that can occur during the assembly or transport of the lamps.

Another advantage of the thermoplastic material is the low level of shrinkage and very limited tendency to warpage. Combined with low water absorption, these two characteristics provide a high level of dimensional stability in the diffuser and contribute to the tightness of the whole lamp construction. LED lamps with Makrolon 2405 thus fulfill the IP54 (International Protection) class; their inner workings are safely protected from splashing and dust. Thanks to its good flow properties, the product is particularly well suited for components with large flow path / wall thickness ratios. The low melt viscosity enables the material to fill the mould quickly and completely, and the finished parts are easily demoulded. ■

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





## THERMOPLASTIC ELASTOMERS

# A MACROMOLECULAR COMBINATION

**F**ounded in 1998 by a pool of entrepreneurs active in Northern Italy, Sipol is a private company whose core business consists in the polymerisation of specialty copolyesters and copolyamides which are tailor-made for the adhesives and engineering plastics sector.

The company currently sells 25 million euro of specialty polymers developed and manufactured at its plant in Mortara (about 40 km west of Milan). Its main activities are the development and manufacturing of thermoplastic ether-ester elastomers (TPC-ET), specialty hot-melt adhesives (copolyester and copolyamide based), and biodegradable polymers (copolyester based).

Sipol's business policy is based on marketing its superior competence in polymer chain modification. Depending on application needs, the R&D department creates new copolymers by inserting different blocks (comonomers) into the polymer chain; this produces tailor-made materials designed to match application requirements with the level of business flexibility that only a medium-sized company is able to offer.

THE SIPOLPRENE ENGINEERING POLYMERS ARE MADE THROUGH THE MACROMOLECULAR COMBINATION OF RIGID POLYESTER BLOCKS (CRYSTALLINE SEGMENTS) AND FLEXIBLE LONG-CHAIN POLYETHER BLOCKS (AMORPHOUS SEGMENTS)

### A NEW RANGE OF TPEs IS BORN

With regard to engineering polymers, in 2002 the company introduced Sipolprene as trade brand for its thermoplastic ether ester elastomer range (TPC-ET), to then gain, in over 10 years of activity, an excellent reputation in a niche market, in a field where the number of companies with proprietary chemical know-how is extremely limited worldwide.

These engineering polymers are made through the macromolecular combination of rigid polyester blocks (crystalline segments) and flexible long-chain polyether blocks (amorphous segments).

This combination grants the polymer a unique behaviour as the rigid part of the molecule develops intermolecular associations with the other

rigid segments, providing the dimensional stability and the mechanical properties of a semicrystalline polymer, while the flexible part, with its relatively low glass transition temperature, imparts elastomeric properties to the material.

Sipol's polymerisation know-how in regard to hot melt adhesives and its familiarity with the building of a polymer chain using different comonomers like in toy blocks, enabled the company to develop several Sipolprene grades through the variation of the macromolecular composition.

From the analysis of the structure shown in **figure 1**, it is possible to modify the rheological, physical or chemical polymer behaviour acting on both the length of monomer components and their combination. In order to have a general understanding of the possible molecular

modifications achievable, it should be observed that what is shown as "Rigid part" is practically a PBT chain, while the "Flexible part" is mainly a polyether. It is quite obvious that the higher number "n" is, the softer the polymer obtained is, as the weight of the flexible part increases. On the contrary, bringing n=0 the polymer becomes a simple PBT. It is therefore evident that the ratio between rigid and flexible segments is the first and simplest way to drive the polymer hardness.

## CHEMICAL AND PHYSICAL CHARACTERISTICS

The Sipolprene standard portfolio of products covers a range in hardness levels going from ShD 25 up to ShD 72 with melting temperatures between 170°C and 220°C, where all grades share a common "polyester" backbone which provides superior chemical and thermal resistance.

In addition to the traditional Sipolprene range, Sipol has been continuously adding specialty grades providing a unique performance, like Sipolprene 35150 (TPC-ET low melting point suitable for PVC modification), Sipolprene 55211 (TPC-ET with improved rate of hardening for ultra-high-speed injection moulding) and the Sipolprene B series, showing a moisture absorption value greater than 15% (breathable products). Therefore, the Sipolprene family offers a good balance of characteristics, which can be briefly summarised as follows:

- performances over a temperature range from -40°C to +120°C;
- excellent flexibility with high-impact strength even at low temperatures;
- high mechanical strength;
- good resilience;
- excellent wear resistance;
- high resistance to chemicals (e.g. organic solvents, gasoline, naphtha, light acids, sea water, and zinc chloride solution);
- excellent surface gloss and good paintability;
- easy welding with several techniques (e.g. spin, ultrasonic, and hot-plate);
- printable using sublimation inks, pad printing and silk screening;
- laser markable with the most conventional

techniques;

- suitable for sterilisation with gamma radiations, ethylene oxide and steam autoclave (harder types);
- availability of stabilised versions providing an increased resistance to heat, UV, hydrolysis, NOx and copper contact;
- almost all Sipolprene grades are suitable for food contact according to FDA and EN 10/2011 regulations.

The entire Sipolprene range provides a combination of sharp melting points typical of every single product with an excellent melt stability; this combination allows easy and reliable product processing in various injection moulding techniques, pipe extrusion, film extrusion, monofilament extrusion and rotomoulding (powder).

In injection moulding, which is the most common technology used to process Sipolprene, the rheological behaviour of the polymer shows curves of viscosity vs. nearly flat shear rate (non Newtonian), allowing the stable flow of molten polymer through mould restrictions found in complex moulds and in multi-cavity moulds without the over-heating, and consequent degradation, of the polymer. The products can be injection moulded by means of conventional runners as well as runnerless moulds. When using conventional runners, the use of regrind mixed with the virgin polymer even at high percentages is permitted without a significant loss of performance on the moulded parts.

The soft nature of Sipolprene and its chemical structure, which allows the development of good compatibility with several rigid engineering plastic products, has made Sipolprene commonly used in 2K moulding applications where a "soft touch" is needed and where other thermoplastic elastomers do not provide sufficient adhesion.

## INDUSTRIAL AND CONSUMER APPLICATIONS

Besides the easy and economical processing, there are several benefits to choosing Sipolprene in demanding applications where other TPEs cannot be used because of the high me-



One of the production plants for Sipol's engineering polymers

chanical performance required or because of the working temperature of the parts.

Sipolprene is used in several market fields for industrial applications as well as for consumer goods. Considering its excellent mechanical properties, together with its good thermal and chemical resistance, the automotive segment represents one of the most important areas of application for Sipolprene, which is used to make gaskets, door latch covers, special connectors, clips, vibration absorbers, thermoplastic hoses, trim rods, monofilaments for seats support and many other types of products. Another important area of application is the industrial segment where Sipolprene is utilised for making low noise gears, covers, pulleys, distribution valve bodies, and cable jacketing.

Its suitability for food contact and the absence of any plasticiser make it an excellent polymer for various applications in the consumer goods markets where Sipolprene is used to make kitchen tools, toy components, valves for packaging, body-care equipment, and in many other specialised applications.

As for hot-melt adhesives, Sipol operates with special copolyesters and copolyamides (dimeric acid based) specifically designed for many industrial sectors, like the footwear industry, where the company is a worldwide leader with regard to the production of long-lasting products, and automotive filters, where Sipol is one of the best known worldwide players.

All the hot-melt adhesives specifically designed for textile lamination are marketed under the trade name Sipoltex, while all the other grades are under the trade name Technipol. ■

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



Fig. 1 - The macromolecular structure of Sipolprene thermoplastic ether ester elastomers (TPC-ET)

Drinking water series for hose applications

# TPEs for the world's most valuable resource

Especially in sanitary facilities and household appliances the components and functional elements come into direct or indirect contact with drinking water. Thermoplastic elastomers, due to their elastic properties and the economical processing methods of injection moulding or extrusion, open up diverse possibilities for manufacturers of drinking water applications - at the same time, the materials must pass stringent controls, due to the extreme requirements of this market for quality and safety.

Especially for drinking water applications Kraiburg TPE (stand 5303, hall B5, at Fakuma 2015) has developed TPEs with different grades of hardness that contain no softeners and comply with the European standards in Great Britain (WRAS), France (ACS) and Germany (KTW and W270). Within the scope of the German guidelines for plastics in drinking water issued by the Federal Environmental Agency the new compounds are approved for drinking water applications. Approvals

according ACS and WRAS are in progress and will be confirmed shortly. The formulation of the new drinking water compliant series had been optimised according to the increasing requirements of the market: the economical thermoplastic extrusion process allow use of the material for the manufacture of supply hoses for showers or dishwashers, for example.

After all, drinking water is considered a foodstuff and must be of high quality to prevent damage to health through its consumption or use. Therefore, the requirements of the European drinking water standards are mandatory for TPE manufacturers such as Kraiburg TPE in the development of new compound series.

Thermoplastic elastomers are manufactured for the most part on the basis of styrene block copolymers, which also form the raw material basis for developing compounds for use with drinking water. The market-oriented portfolio



Grommet application made of Thermolast V

of Kraiburg TPE includes three series that are specially adapted to the requirements of the drinking water market. The secret of drinking water compliant TPEs is the special formulation of the compounds. The growth of microorganisms is prevented without the addition of biocides. However, the special materials not only fulfil the requirements for drinking water compatibility, but also feature the special advantages of a high-quality TPE: due to a hardness spectrum between 50 and 90 Shore A and the capability for

precise colouring, which has no effect on the drinking water certifications, they can be used in numerous applications.

At Fakuma 2015, Kraiburg TPE presents also new products that in accordance with the company's philosophy were not developed only in labs, but rather with a clear market and customer orientation.

For consumer applications the company developed a new compound series with an especially convincing cost-effectiveness ratio: these TPEs feature improved adhesion to engineering thermoplastics such as PC and ABS at an attractive price.

Innovations in the materials for "slit valves" - valves made of food-compliant TPE - are also presented at the trade fair: Kraiburg TPE offers new compounds with the FDA and EC 10/2011 food certifications. Advantages include efficient processing in 2-component injection moulding processes, excellent resilience and reliable adhesion to hard components.

Also in time for Fakuma the Thermolast V compound series goes into production. More and more customers are using Thermolast V for seals in demanding applications such as under the hood. The new series features high temperature resistance, an improved compression set and good adhesion to polyamides. Kraiburg TPE holds a presentation on the subject of adhesion technologies on October 15, 2015 from 13:20 to 14:00 in the East Foyer. The presentation sheds light on factors that affect the adhesion of TPE to hard components, for example, in addition to discussing potentials for further improving the material properties in the future. ■

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



At Fakuma 2015, Kraiburg TPE presents drinking water compliant TPEs developed especially for hose applications. The material of the new DW series has passed the KTW as well as W270 approval; due to an optimised processing method it can be used e.g. for hoses in showers, dishwashers and similar applications



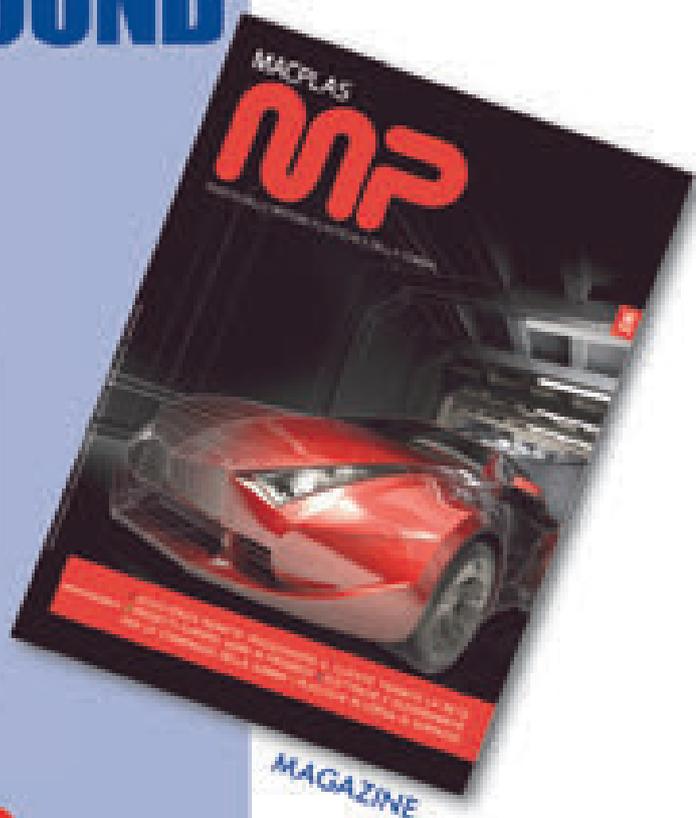
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NEWS

Sandwich structure for automotive

# Honeycomb on the car roof

With the polyurethane foam system Elastoflex E from Basf (stand 4306, hall B4, at Fakuma 2015) it is possible for the first time to mass-produce an exterior car part featuring a honeycomb sandwich structure with a class-A film.

The roof module in the standard model of the new smart fortwo consists of a paper honeycomb and two surrounding glass fibre mats. These are sprayed in an impregnation process with the low-density, thermally activable Elastoflex E 3532 and pressed together with a solid-coloured class-A film. A single operation thus produces a roof module which is around 30 percent lighter than the standard roof on the previous model - but retains the same strength and flexural rigidity. The

lightweight roof was developed by Fehrer Composite Components, which manufactures it in its factory in Großlangheim, Germany.

The honeycomb technology has previously been used in the car interior, for example for loading floors, roof linings, and rear shelves. For use in exterior components, Basf has adjusted the viscosity and reactivity of Elastoflex E (semi-rigid polyurethane system), which was developed for the honeycomb technology, so that it can be optimally processed in each manufacturing step and shows good adhesion properties: it guarantees uniform, thin wetting of the glass fibre mats and does not drip. Once the semi-finished product has been impregnated, it is pressed into shape in a heat-

ed mould together with the class-A film. This causes the PU system to

foam up slightly at the edge of the sandwich and creates a solid material composite between film, reinforcing mats and paper honeycomb core.

The reactivity of Elastoflex E has been adjusted so that long spray times of up to 120 seconds are possible for large-scale parts, along with short demoulding times of up to 60 seconds. Moreover, decorative materials and films can be directly bonded or back-foamed in the mould as Elastoflex E shows good adhesion to films. The roof module of the smart fortwo is fitted on the outside with a film having a class-A surface. A



New type of PU foamed, lightweight roof on the smart fortwo (photo: Daimler/Basf 2015)

textile covering is attached on the inside.

“In contrast to conventional composite parts, in this roof module the individual layers are not glued together in a multi-stage process, but are instead produced in a single manufacturing step. This is much more efficient - also thanks to the clean process with the polyurethane foam and the customised technical support from Basf”, says Gao Kwintmeyer, global purchasing Fehrer. ■

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

Thermoplastic polyurethanes

## Lighter and sustainable

Laripur -18 and -18B series are plasticised thermoplastic polyurethanes (TPU) developed by Coim (stand 5111, hall B5, at Fakuma 2015) to supply the footwear industry with technically and aesthetically high quality materials. These TPUs contain plasticisers, which have not been classified as harmful and which lead to no migration in the final product. More

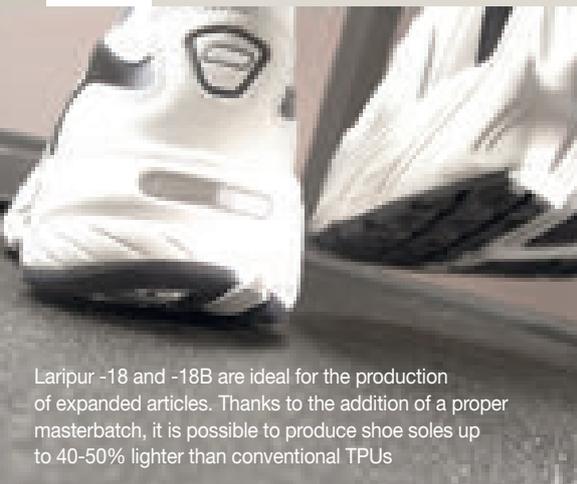
precisely, the plasticisers used in the -18B series do not contain any phthalate. The items produced using these TPUs show a remarkable natural glossiness, but it's also possible to obtain mat surfaces through satin finishing of the mould; moreover, being basically migration-free, the surface appearance is maintained over the time. The perfect replication of the smallest details of the inner mould surface is ensured by the optimal flowability during processing.

The Laripur -18 and -18B series stand out from classic TPUs because, besides exhibiting the well-known properties of polyurethanes (as very good abrasion and tear propagation resistance and the high flexibility in a wide temperature range), they are also stabilised against hydrolysis and against UV and thermal-yellowing. This ensures long lasting aesthetical appearance and technical performances. The optimal bonding with the 2-component polyurethane systems (both com-

pact and expanded) and in moulding with other TPUs allows the production of a wide range of items: sport shoes, single density and dual density army and safety shoes, fashion shoes and boots. Furthermore, through the addition of a special master available upon request, it's also possible to produce high-antistatic shoe soles, suitable for ESD safety shoes.

The Laripur -18 and -18B products are also designed for the production of expanded articles: for instance, with the addition of a proper master available upon request, it is possible to produce shoe soles up to 40-50% lighter than conventional TPUs, while maintaining at the same time the typical aesthetical features processing performances of TPU. Lastly, an important advantage of these products is their extreme versatility, which enables their usage with the same machineries traditionally used for plasticised PVC. ■

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



Laripur -18 and -18B are ideal for the production of expanded articles. Thanks to the addition of a proper masterbatch, it is possible to produce shoe soles up to 40-50% lighter than conventional TPUs



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From the polyurethane sector to blow moulding and injection

## OVER 25 YEARS OF EXPERIENCE



Blow moulding process at Fisem

The Italian company Fisem has worked for over 25 years in the polyurethane moulding sector, both integral and flexible, and in the blow moulding industry, acquiring skills and competence and gaining the trust of the most prestigious international companies in various sectors, including, but not limited to, motorcycle, automotive, heating and hot water, furniture. Over the last few years, in order to widen its offer and on the basis

of the skills acquired, Fisem has also become an injection moulding specialist.

Thanks to the tools, equipment and technologies, the company is able to cooperate with its customers from the design phase throughout the entire production process. All departments are equipped with modern facilities: presses, a hot plate plastic welding machine and a water and air leak testing machine for blowing tanks; polyurethane moulding machines, high frequency welding machines and a continuous vacuum forming machine for leather in industrial upholstery. As a support to these facilities, a modern standard room ensures compliance with customers' specifications. Flexibility and optimisation are both at the base of all internal processes, contributing to ensuring their efficiency and effectiveness.

Throughout its history, Fisem has achieved important goals in terms of quality of the product. The company has put its know-how into action, at the service of a project of constant growth through continuous improvement, always searching for new applications and market areas for its products and developing new perspectives in order to adapt the process to the needs of a changing market. ■

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



Assembly line for motorcycle saddles

## NEWS

### DuPont at Fakuma

# Shaping the polymers industry since 1935

Throughout the entire process, from "art to part", DuPont's design and engineering team share data and analysis with their collaboration partners using commercially available CAE software suites in a non-proprietary, transparent environment



The DuPont exhibit at Fakuma 2015 demonstrates how DuPont has shaped the polymers industry since it invented nylon in 1935 and modified it to become the world's first true engineering-grade polymer several years later.

Over the years DuPont Zytel nylon has shaped not only the engineering polymers market, but helped shape the consumer market. Whether used to replace metal in automotive components or to lower cost and simplify manufacturing in consumer electronics and other diversified industries, product designers quickly embraced the versatility of Zytel to make expensive and heavy products affordable and accessible.

The DuPont stand 4201, in hall B4, reflects how this advanced material, coupled with DuPont's broad material portfolio and application development support in the form of Computer Aided Engineering (CAE), process simulation, can continue to create new growth opportunities in a wide range of industries, including automotive, electrical & electronics, food and healthcare. Highlights of where DuPont materials can support market growth include:

- lightweight, high-temperature resistant polymer solutions for automotive;
- flame retardant and halogen-free grades for electrical & electronics markets;
- "Special Control" (SC) and "Premium Control" (PC) grades with a greater de-

gree of testing, manufacturing control and regulatory support for medical and healthcare applications;

- polymers such as PBT Crastin SF (Super Fast) series for reducing processing cycle time and enabling thinner parts in automotive and large connector applications.

At the company, the advent of high-powered computing combined with state-of-the-art materials and highly qualified design experts has taken computer-aided simulation engineering to a new level for their value-chain partners.

"DuPont works with customers throughout the product development cycle, continually advancing materials, supporting design and optimising for processing and is helping customers predict how our materials will perform from art-to-part", said Michel Renaud, head of design for Europe, Middle East and Africa (EMEA), at DuPont.

And Patrick Cazuc, global automotive manager, added: "The automotive industry ceaselessly seeks materials that will help them reduce vehicle production time, total system costs and environmental impact. To meet these critical targets, automakers and first tier suppliers collaborate with DuPont for expertise in materials, design and processing technologies from the earliest stages of development until the finished vehicle rolls off the manufacturer's assembly line". ■

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

## New options for gear solutions

# Facilitating progress with PAEK-based solutions

On the Victrex stand 4106, hall A4, at the Fakuma trade fair, the focus is on striving to help customers reach the top of their game by differentiation and exploiting new market opportunities faster. The company, in particular, is presenting solutions for the automotive industry. Associated benefits include greater fuel efficiency and driving comfort, and an extended service life, all achieved through refinements such as a reduced moment of inertia, less complex parts, new design approaches, and greater functional integration. In addition, the Victrex PAEK materials are produced economically on conventional thermoplastic machines with high-temperature capabilities. Importantly, this makes it possible to use the injection-moulding process to mass produce complex and elaborate high-performance components, without subsequent tempering or machining.

To address specific market challenges, Victrex is working with its customers and improving future performance through innovation in polyaryletherketone (PAEK) materials. These include the PEEK family as well as downstream areas such as Aptiv films, Victrex Pipes and tapes and medical technology components, or advanced options in the case of gears.

The acquisition of Kleiss Gears, a US gear specialist with over 20 years' experience, is also intended to assist in achieving this goal. The move unites Kleiss Gears' combination of plastic optimised, innovative gear design and testing, and its manufacturing capability, with Victrex's material know-how, innovation-focused technical expertise and global footprint. The main benefits of solutions based on Victrex's high-performance plastics are a reduction in noise vibration harshness (NVH) of up to 50% and a significant reduction

The acquisition of Kleiss Gears, a US specialist in thermoplastic gears, and the PAEK capacity expansion are just two recent examples of the Victrex's focus on extending capabilities to help accelerate product introductions in important markets of automotive, aerospace, electronics, energy and medical



tion in energy consumption and weight compared to metal gears. Victrex also continues to be involved in pioneering technologies and their application in the aerospace sector. A major theme at Fakuma is achieving greater production efficiency - including parts consolidation - in processes such as:

- The advanced hybrid-moulding process - This allows engineers to combine the strength of continuous fibre-reinforced Victrex PAEK composites with the design flexibility of PEEK injection-moulding solutions. Hybrid moulding enables the more cost-efficient production of a component in minutes, whereas the process for metal or thermosetting solutions can take hours.
- The fusible-core technology of the Dutch injection-moulding specialist Egmond Plastic, which can achieve cost savings of over 30% in the manufacture of complex pump housings, combined with top-class performance and a weight savings of up to 50% compared with conventionally machined metal components.
- The British precision injection-moulding specialist Denroy Plastics has joined forces with Victrex and Bombardier to develop an optimised bracket technology, and small to medium-size brackets previously cut from aluminium and titanium can now be replaced with Victrex PEEK-based units. These will last the lifetime of the aircraft, whilst radically reducing weight and costs. ■ [www.victrex.com](http://www.victrex.com)

## PP compounds

# Flame-retardant new developments

The Grafe Group of Blankenhain (Thuringia, in the heart of Germany) presents two new product developments at Fakuma 2015 (stand 5306, hall B5). Alongside other products, the company is introducing an electrically conductive and halogen-free, flame-retardant PP compound at the international plastics trade fair in Friedrichshafen. "It was our goal to develop a material with good mechanical features and flow properties in addition to being conductive and flame-retardant. And we have succeeded", says Martin Günther, development engineer. The specific volume resistivity or surface resistivity of the new product is adjustable to suit the customers' applications. Settings below 100 Ohm will also be possible.

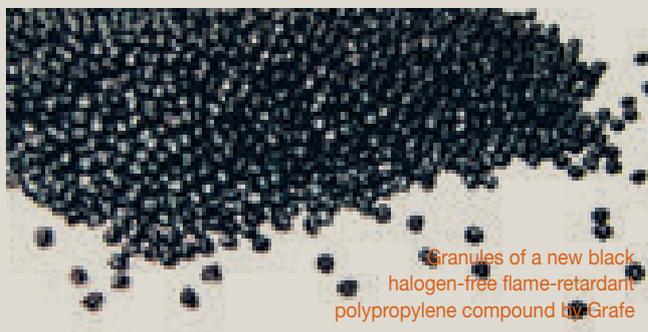
"This PP compound meets the requirements of flammability rating UL94 V-0 for wall thicknesses of up to 1.6 millimetres", explains Günther. "This opens up the door to numerous applications where fire and explosion protection play an important role and where, in the past, it was necessary to use brominated flame retardants".

Some examples of use include containers for the transportation of

highly inflammable process media as well as conveyor belts and storage containers in explosion and fire protection areas.

The second new development of the Grafe Group involves halogen-free flame-retardant polypropylene compounds which are available for customers in any desired colour.

"This is about endowing a material with effective flame-retardant properties to meet the requirements of flammability rating UL94 V-0 even for very thin walls - here we are talking about 0.8 millimetres", according to the development engineer. "With this development, we were also able to minimise any loss of mechanical properties that flame retardants might cause. It is especially important that we could avoid an embrittlement of the plastic. The material also displays good flow properties and is thus suitable for the manufacture of thin-walled parts". ■ [www.grafe.com](http://www.grafe.com)



Granules of a new black halogen-free flame-retardant polypropylene compound by Grafe

CHINAPLAS 2016

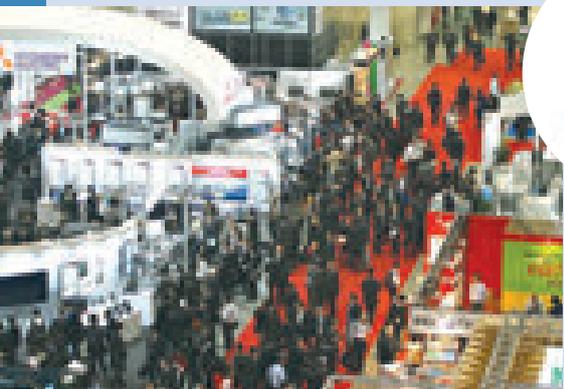
## THE CHINESE TRADE SHOW REACHES ITS 30<sup>TH</sup> EDITION

The next Chinaplas will be held in 2016, from April 25 to 28, at the Shanghai New International Expo Centre, with an exhibition area over 240,000 sqm. More than 3,200 exhibitors are expected. Chinaplas is recognised as Asia's first and world's second plastics and rubber trade fair by the industry. Looking back, when Chinaplas was held for the first time in Beijing in 1983, the exhibition area was only 2,000 sqm, and 90% of the exhibitors were from overseas. In the past three decades, the trade show has been moving forward together with the China market, and has developed into a platform for the showcase of both overseas technologies and Chinese machineries for export. Its international nature attracts overseas visitors from more than 150 countries and regions, which accounts for nearly 30% of the show's visitors.

Like other manufacturing industries in China, plastics and rubber industries are facing transformation to meet the new era of smart production. The world's leading manufacturing countries have launched national strategic plans to meet the challenges in the new era and to strengthen their industrial competitiveness. Examples include German "Industry 4.0", US "Advanced Manufacturing Partnership", and Japanese "New Robot Strategy". China also launched recently the "Made in China 2025" strategic plan to boost its industrial growth, with the aim to comprehensively upgrade Chinese manufacturing industries. It is not hard to find that intelligent manufacturing plays a vital part in all of these national plans in adapting to new market environment.

The new edition of the show theme "Greenovation for a Smart Future" signifies that the show content next year will focus on green and innovative technologies, as well as intelligent manufacturing solutions in response to the development of the industry. With more new and high-end technology on display, the show can better support enterprises to explore business opportunities. The fair is supported by a number of country and region pavilions, including Austrian, German, Italian, Japanese, Korean, Swiss, Taiwanese, and US pavilions. With broader range of exhibits, the number of theme zones will rise to sixteen, among which the Automation Technology Zone, Composite & High Performance Materials Zone and Recycling Technology Zone are all new to the coming show in Shanghai. Smart production lines and systems, industrial robots, high performance materials, composite materials, the latest recycling solutions as well as other plastics and rubber technology breakthroughs will be showcased under one roof. ■

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



Adsale Exhibition Services - the organiser of Chinaplas 2016 - created a new logo to celebrate the 30<sup>th</sup> edition of this trade fair

## EXHIBITIONS & TRADE FAIRS

### 2015

- October 13-17 - Fakuma (Friedrichshafen, Germany)
- October 14-16 - Ciri Expo (Qingdao, China)
- October 20-22 - Plastex Uzbekistan (Tashkent, Uzbekistan)
- October 20-22 - JEC Asia (Singapore)
- October 21-22 - Made from Plastic (Valencia, Spain)
- November 3-6 - Ecomondo (Rimini, Italy)
- November 4-6 - Fullplast (Santiago, Chile)
- November 4-6 - Expo Plasticos (Guadalajara, Mexico)
- November 9-12 - Adipece (Abu Dhabi, United Arab Emirates)
- November 11-13 - Rubbertech (Shanghai, China)
- November 11-13 - Reifen China (Shanghai, China)
- November 17-19 - Filtration (Chicago, United States)
- November 17-20 - Formnext (Frankfurt, Germany)
- November 17-20 - Iplas (Guayaquil, Ecuador)
- November 18-21 - Plastics & Rubber Indonesia (Jakarta, Indonesia)
- November 19-21 - Rubber Tec (Bombay, India)
- November 25-26 - Plastics Recycling Show (Bruxelles, Belgium)
- November 25-27 - Central Asia Plast World (Almaty, Kazakhstan)
- November 27-30 - Indplas (Kolkata, India)
- December 2-5 - Nile Plast (Khartoum, Sudan)
- December 3-6 - Plast Eurasia (Istanbul, Turkey)
- December 4-7 - Plast Show Vapi (Gujarat, India)

### 2016

- January 5-7 - Oman Plast (Muscat, Oman)
- January 7-11 - Plexpoinidia (Gujarat, India)
- January 14-17 - Plastex (Cairo, Egypt)
- January 18-21 - Saudi Plastics & Petrochem (Riyadh, Saudi Arabia)
- January 26-29 - Interplastica (Moscow, Russia)
- February 1-3 - GPPS, Gulf Packaging & Polymers Show (Abu Dhabi, United Arab Emirates)
- February 19-21 - Plastware Expo (Mumbai, India)
- February 19-21 - India Rubber Show (Ahmedabad, India)
- February 22-25 - Plastivision Arabia (Sharja, Saudi Arabia)
- March 1-3 - Plastics & Rubber Vietnam (Ho Chi Minh City, Vietnam)
- March 8-10 - Tyrexpo Africa (Johannesburg, South Africa)
- March 8-11 - Plastimagen (Mexico City, Mexico)
- March 9-11 - Global Rubber, Latex & Tire Expo (Bangkok, Thailand)
- April 5-7 - Plast Alger (Algiers, Algeria)
- April 5-7 - P4 Expo (New Delhi, India)
- April 6-8 - Plastic Japan (Tokyo, Japan)
- April 13-17 - Iranplast (Tehran, Iran)
- April 19-22 - PaintExpo (Karlsruhe, Germany)
- April 25-28 - Chinaplas (Shanghai, China)
- May 4-7 - Plastech (Izmir, Turkey)
- May 17-20 - Plastpol (Kielce, Poland)
- May 24-27 - Rubbertech Europe (Essen, Germany)
- May 31-June 2 - parts2clean (Stuttgart, Germany)
- June 8-10 - Kenya Plast (Nairobi, Kenya)
- June 13-16 - Argenplas (Buenos Aires, Argentina)
- June 14-16 - Rapid.Tech (Erfurt, Germany)
- July 7-10 - InterPlas Thailand (Bangkok, Thailand)
- August 12-16 - Taipeiplas (Taipei, Taiwan)
- August 16-19 - Interplast-Euromold Brasil (Joinville, Brazil)
- September 26-30 - Colombiaplast (Bogotá, Colombia)
- October 19-26 - K 2016 (Düsseldorf, Germany)
- November 6-8 - CPPIA (Guangzhou, China)
- December 1-3 - PPP Expo Tanzania (Dar Es Salaam, Tanzania)

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## MEETINGS & CONGRESSES

### ■ Belgium

**December 8-9** - Bruxelles: Cyclitech (First International Conference on Bicycle Technology) - JEC Group ([www.jeccomposites.com](http://www.jeccomposites.com)) and SPE ([www.4spe.org](http://www.4spe.org))

### ■ Brazil

**October 19-23** - São Paulo: Sampe Brazil Advanced Composites Week - Sampe ([www.sampe.com.br](http://www.sampe.com.br))

### ■ Germany

**October 21-22** - Dresden: Carbon Dioxide Utilisation Summit - ACI ([www.acius.net](http://www.acius.net))  
**November 2-4** - Cologne: Polymer Foam - AMI ([www.amiplastics-na.com](http://www.amiplastics-na.com))  
**November 5-6** - Berlin: European Bioplastics Conference ([www.european-bioplastics.org](http://www.european-bioplastics.org)) - <http://en.european-bioplastics.org/conference>  
**November 9-12** - Nuremberg: PET Passion Week - PETnology ([www.petpassionweek.com](http://www.petpassionweek.com))  
**November 17-19** - Bonn: Waterproof Membranes - AMI ([www.amiplastics-na.com](http://www.amiplastics-na.com))  
**November 23-24** - Cologne: Microplastic in the environment - sources, impacts & solutions - Nova Institut

(<http://microplastic-conference.eu>)

**December 1-3** - Cologne: Thin Wall Packaging - AMI ([www.amiplastics-na.com](http://www.amiplastics-na.com))

**December 16-17** - Cologne: WPC Conference - Nova Institut ([www.nova-institut.eu](http://www.nova-institut.eu))

### ■ Italy

**November 16-20** - Rome: Europe Rubber Processing Education Week - HJG Consulting, TechnoBiz Group ([www.technobiz-group.com](http://www.technobiz-group.com))

### ■ Mexico

**November 6** - Cancun: Petrochemical Seminar - Polyolefins Consulting ([www.polyolefinsconsulting.com](http://www.polyolefinsconsulting.com))

### ■ Netherlands

**November 26** - Amsterdam: Petrochemical Conference - ChemOrbis (<http://europe.chemorbisevents.com>)

### ■ Spain

**December 9-10** - Barcelona: Thermoplastic Elastomers - Smithers Rapra ([www.smithersrapra.com](http://www.smithersrapra.com))

### ■ United Arab Emirates

**December 7-9** - Dubai: Flexible Packaging Middle East - AMI ([www.amiplastics-na.com](http://www.amiplastics-na.com))

### ■ United Kingdom

**October 26-28** - Manchester: GoCarbonFibre Europe - Smithers Rapra ([www.smithersrapra.com](http://www.smithersrapra.com))  
**December 8-10** - London: Oil & Gas Non-Metallics - AMI ([www.amiplastics-na.com](http://www.amiplastics-na.com))  
**December 9-10** - London: European Biopolymer Summit - ACI ([www.acius.net](http://www.acius.net))

### ■ United States

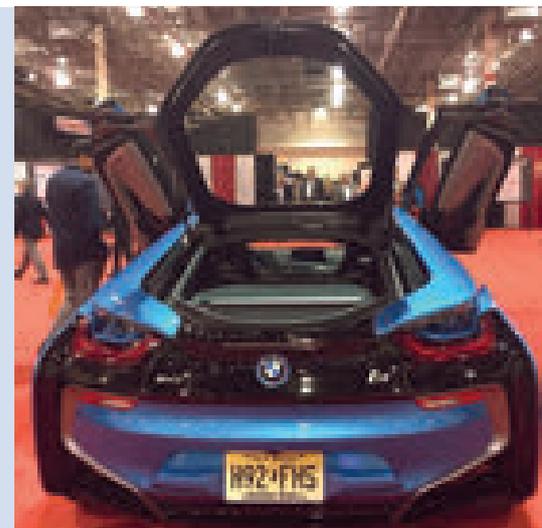
**October 28-30** - Chicago: GPS 2015 - The Global Plastics Summit - IHS ([www.ihs.com](http://www.ihs.com))  
**November 17-18** - Stretch & Shrink Film - AMI ([www.amiplastics-na.com](http://www.amiplastics-na.com))  
**November 17-19** - Chicago: Filtration International Conference and Training Courses - Inda (<http://www.inda.org/events/filt15>)  
**December 1-3** - Dearborn (University of Michigan): Automotive Plastic Part Design - ETS (<http://ets-corp.com/automotive.htm>)  
**December 8-9** - Philadelphia: Compounding World Forum - AMI ([www.amiplastics-na.com](http://www.amiplastics-na.com))

### ACCE conference and exhibition

## A leading event devoted to the automotive industry

The Society of Plastics Engineers (SPE) Composites Division organised the 15<sup>th</sup> edition of the Automotive Composites Conference and Exhibition (ACCE), and as in every year, it was the largest event so far. It took place on September 9-11, at the Diamond Banquet & Conference Center at the Suburban Collection Showplace, Novi, Michigan (United States). After a welcome by Brosius and co-chair Fred Deans, chief marketing officer at Allied Composite Technologies (Rochester Hills, MI, US), that included best paper awards and student scholarship winners, Russ Broome, managing director for SPE US, accepted 20,000 dollars from SPE's automotive division and composites division (10,000 dollars each) for the Jackie Rehkopf scholarship, administered by the SPE Foundation. Broome noted that his goal is to begin providing scholarships at the high school level: "We need to get kids interested in plastics and composites earlier, so that they're prepared to enter polymer programs when they're ready for university". Three simultaneous tracks

over three days provided conference-goers with a wealth of technical learning opportunities, with an emphasis on ways to improve parts and production speeds while reducing costs. A three-part nanocomposites track included several papers on nanocellulose, available as cellulose nanofibrils (CNFs) and cellulose nanocrystals (CNCs) and ways to use them in biocomposites. The event's big panel discussion, moderated by Jan-Anders Månson, a composites entrepreneur and a professor at Ecole Polytechnique Fédérale de Lausanne (EPFL), was as always insightful. Panelists included Paul Krajewski, director of GM's Vehicle Systems Research Laboratory; Glade Gunther of Cytec Industrial Material's (Heanor, Derbyshire, UK) automotive sector; Rainer Kossak of Novelis, an aluminium supplier to Detroit OEMs; Peter Ulintz of the Precision Metal-forming Association (PMA, Independence, OH, US); Paul Thom of Schuler (Canton, MI, US); and Hannes Fuchs of Multimatic (Markham, Ontario, Canada), a well-known Tier 1 supplier of both metals and com-



The carbon fibre-intensive BMW i8 at SPE ACCE in Novi, Michigan

posites. The final keynote was delivered by long-time auto composites expert Antony Dodworth, managing director of Bright Light Structures (Peterborough, UK). He described Zenos E10 sports car that his company is involved with, focusing on the chassis tub. ■ [www.4spe.org](http://www.4spe.org)



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