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JANUARY 2010

iPf PLASTICS INDIA

AN OFFICIAL ORGAN OF INDIAN PLASTICS FEDERATION

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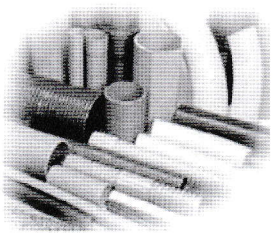

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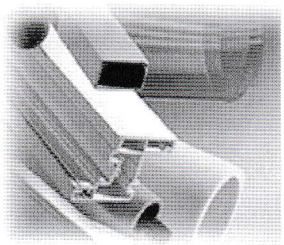
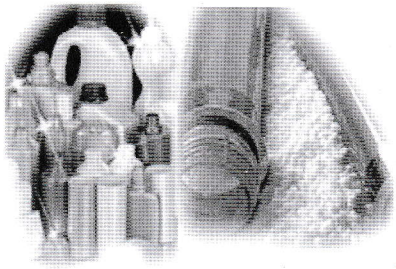
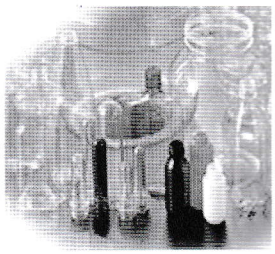






PRESIDENTIAL ADDRESS

Dear Members,

This is my first message to you after taking over as President of this Federation. I would like to take this opportunity of conveying my sincere gratitude to you for reposing your faith in me.

The coming of the New Year has been welcomed with much optimism, since 2009 did not disappoint us as perceived earlier. Due to various measures in the form of stimulus by the governments the world over, the much feared recession was prevented from setting in and the process of recovery started. The New Year has thus started on a much improved vision and optimism.

The polymer markets remained buoyant and stable through the year with intermittent phases of correction. On close analysis we find that feedstock prices have increased by 70% to 90% as compared to March whereas downstream PP and PE prices have increased by only 30% as compared to March prices. The PP producers have been experiencing negative margin for past several weeks with PE producers also not being in comfortable position.

The crude prices have almost doubled in one year and are ready for upward movement as the global recovery takes place. The demand for crude is bound to increase as the two major Asian economies – India and China move back into higher growth trajectory followed by recovery in U.S. and European economies. From this we can conclude that polymer prices are expected to maintain their steady uptrend with time to time corrections and hiccups but with rising graph.

Thus the polymer markets are poised for a big upmove not only in Asia but also in Europe and U. S. Purchases in the Asian region are expected to gain momentum as the Free Trade Agreement among 6 countries becomes operational and the import duties are further slashed. The much awaited restart of HPL with expanded capacity is expected in the middle of January. It has a naptha cracking capacity of 520 Kt/annum with HDPE and PP plant capacity of 300 Kt/annum each and an LL plant of 260 Kt/annum. After the completion of its super max expansion plant, its capacity will increase by 30%. The plant of IOC is also expected to enter commercial production this year. With improved domestic supplies the intensity of imports will gradually come down in the latter half of the calendar year. With increased supply of polymers, the year 2010 will most likely augur well for the processing industry.

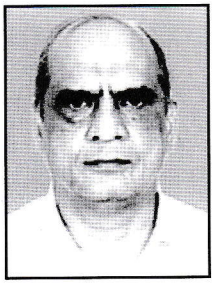
Wishing you all and members of your family a very HAPPY NEW YEAR 2010.

Thanking you,

Sourabh Khemani
President

From the Desk of

The Hony. Secretary



Dear Members,

I take this opportunity of conveying my heartfelt thanks to you electing me as your Secretary for the term 2009 – 10. I give below a brief of some of the major activities of the Federation in the previous one month.

The Curtain's Down Golden Jubilee Year Celebration programme was held at the Fort William, Kolkata with a grand show performed by a profession group DHWANI. We took this as an opportunity to felicitate the sponsors of this programme and also our Chief Guest Lt. Gen. V. K. Singh GOC-in-C Eastern Command. Nearly five hundred persons enjoyed the cultural programme and cocktail and dinner.

At the invitation of Reliance Industries Ltd. 25 customers of Reliance Polymers who are also our members visited their Jamnagar plant. They were taken around the plant by Reliance officials and a presentation was also made to them.

IPF has been offered a complimentary stall at PLEXPO India, an exhibition organised by GSPMA, Ahmedabad. An IPF team visited PLEXPO. Arrangements were made for sale of Plastics India AGM Spl Issue & AIPD 2009 CD-ROM. Membership application forms and other leaflets were also distributed from the IPF stall.

An IPF team met the MD and ED of WBIDC to know the status of our application for allotment of additional land in the Poly Park at Sankrail. Their attitude was positive towards our request, but this the terms and conditions of allotment may be more strict than those who were offered land earlier. We have informed the applicants of land of this and even offered them refund of the earnest money paid by them in case they want to withdraw their application.

Bidhannagar Municipality has expressed its eagerness in development of a 1.5 Km road in their municipality using plastic waste. IPF has taken up this matter in right earnest and we expect that a road using plastic waste will soon be developed in Bidhannagar. Once successful completed the demand for waste plastics and construction of new recycling plants will greatly increase.

Wishing all members and their families a HAPPY NEW YEAR 2010.

Thanking you

Poddar

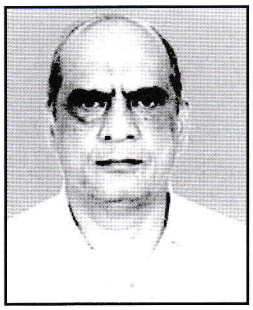
Ramawatar Poddar
Hony. Secretary

LIST OF OFFICE-BEARERS & MEMBERS OF THE EXECUTIVE COMMITTEE OF THE FEDERATION FOR THE YEAR 2009-2010

OFFICE BEARERS

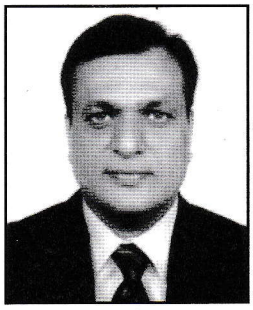
SOURABH KHEMANI
President

RAJESH MOHTA
Vice - President



RAMAWATAR PODDAR
Hony. Secretary

RAMESH KR. RATERIA
Hony. Jt. Secretary



ASHOK JAJODIA
Hony. Treasurer

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Shri Alok Tibrewala	:	M/s Swastik Polymers Pvt. Ltd.
Shri Pawan Kumar Newar	:	M/s Prabhu Polycolor Pvt. Ltd.
Shri Ajit Bagade	:	M/s Reliance Industries Ltd.

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Associate Members

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Shri Anil Damani	:	M/s Plastic Concern

Dealer Members

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Shri Prabhat Agarwala	:	M/s Ritik International
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Shri Mahesh Singhania	:	M/s Triveni Chemicals

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Shri S. K. Damani	:	M/S Plastic Concern
Shri Alok Ghosh	:	M/S Conhyde India Pvt. Ltd.
Shri M. L. Lahoti	:	M/S Lahoti Plastic Moulders Pvt. Ltd.
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Shri R. K. Kasera	:	M/S Extrusions
Shri N. K. Tibrewala	:	M/s. Swastik Polymers Pvt. Ltd.
Shri R. A. Lohia	:	M/S Neha Impex Pvt. Ltd.
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Shri K. M. Tibrewala	:	M/S Tib Creations Pvt. Ltd.
Shri K. K. Seksaria	:	M/S Uma Plastics Ltd.

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Shri G. S. Agarwal	:	M/s Ashay Marketing Pvt. Ltd.
Shri Pawan Kr. Agarwal	:	M/s PBS Packaging Pvt. Ltd.
Shri N. K. Surana	:	M/s Kalpana Industries Ltd.
Shri K. K. Agarwal	:	M/s Oriplast Ltd.
Shri Pradip Goel	:	M/s Goel Airshrink (India) Ltd.
Shri Abhishek Goel	:	M/s SL Polypack Pvt. Ltd.
Shri Sushil Bahety	:	M/s Smitabh Intercon Ltd.
Shri Shankar K. Tekriwal	:	M/s Puja Poly Plastics Pvt. Ltd.
Shri Jatish Seth	:	M/s Rajda Sales (Cal) Pvt. Ltd.
Shri Rohit Anchalia	:	M/s Poly Udyog
Shri Sandip Agarwal	:	M/s Sangeeta Industries
Shri Manoj Agarwal	:	M/s Shiva Polymers Pvt. Ltd.
Shri T. K. Banerji	:	M/s East Land Machines & Tools Pvt. Ltd.
Shri Raj Jain	:	M/s Ratnajeet Polycorp Pvt. Ltd.
Shri Vinay Surana	:	M/s Everbright Plastics Pvt. Ltd.
Shri D. K. Chatterjee	:	M/s Haldia Petrochemicals Ltd.
Shri S. K. Chakraborty	:	M/s Haldia Petrochemicals Ltd.
Shri S. K. Debnath	:	M/s Haldia Petrochemicals Ltd.
Shri Subrata Sarker	:	M/s Reliance Industries Ltd.
Shri Partha S Mukherjee	:	M/s Reliance Industries Ltd.
Shri K. D. Chattoraj	:	M/s GAIL India Limited
Shri P. Poomalai	:	M/s Central Institute of Plastics Engineering & Technology
Shri M. Karuppasamy	:	M/s Central Tool Room & Training Centre
Shri N. N. Debnath	:	M/s Micro, Small, & Medium Enterprises
Shri K. K. Sharma	:	M/s The National Small Industries Corporation Ltd.
Shri Alok Ray	:	M/s MSME (RTC-ER)
Shri Nilotpal Biswas	:	M/s The Plastics Export Promotion Council
Shri T. R. Ghosh	:	M/s South Asian Petrochemicals Ltd.
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Shri R. K. Bihani	:	Convenor (North Bengal & Sikkim Chapter)
Shri Sunil Marda	:	Convenor (Chattisgarh Chapter)
Shri L. K. Thakuria	:	Convenor (Assam & North East Chapter)
Shri Prakash Kr. Khemani	:	Convenor (Jharkhand Chapter)
Shri Gopal Agarwal	:	Convenor (Orissa Chapter)
Dr. S. K. Verma	:	M/s Kalpana Industries Ltd.
Shri Prakash Kandoi	:	M/s Royal Touch Fablon Pvt. Ltd.
Shri Devendra Surana	:	M/s Magnitude Poly Films
Shri Vikas Agarwal	:	M/s Sunrise Plastic Industries
Shri Debabrata Khastagir	:	M/s Indian Oil Corp. Ltd.
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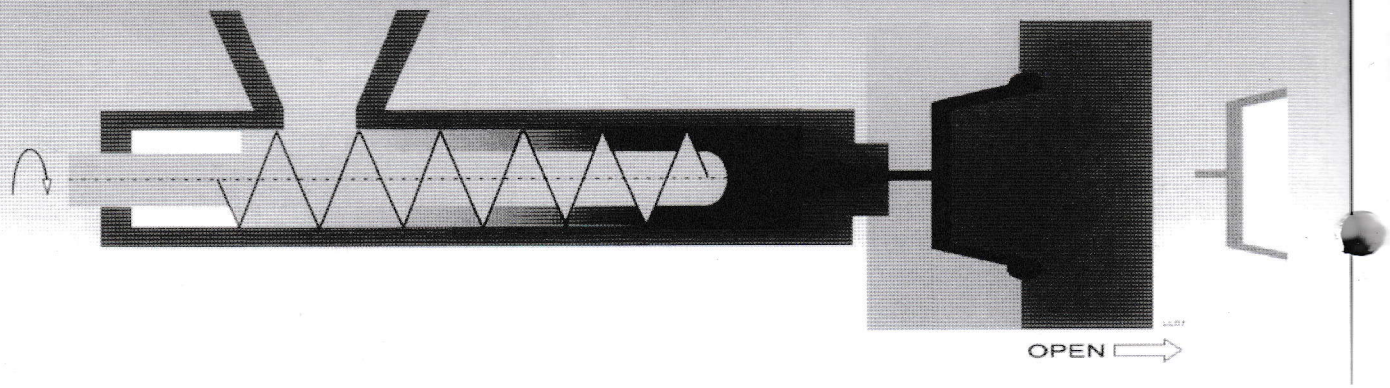
Shri Hemant Kr. Goenka	:	M/s Polyplastics & Industries
Shri P. K.Guha	:	M/s Hi-Care Plastics Pvt. Ltd.

Energy – Efficient Injection Moulding

Eduard Stueckle
Arburg GmbH & Co +KG



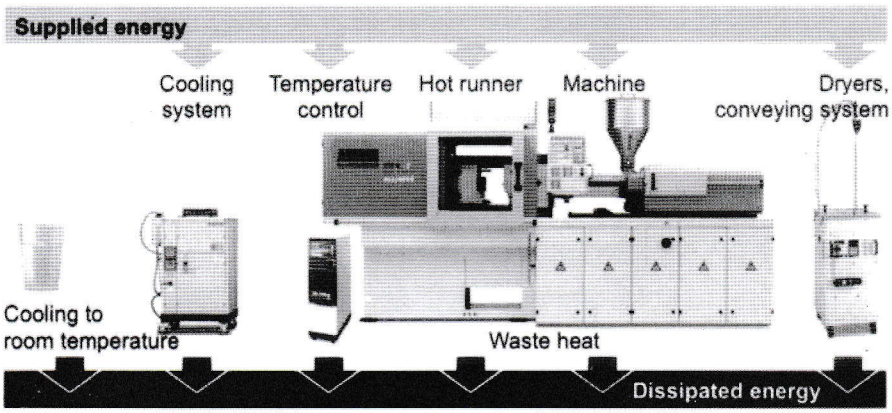
Energy consumption has recently become a highly-political, global issue. Economical use of resources is also being increasingly focused on in the plastics processing industry. In addition to productivity increases, automation and process expertise, energy efficiency has now become another important factor for maintaining a successful profitable company.

The cost of energy has increased significantly recently, but ARBURG has been trying to conserve energy for much longer than that, as far as its own products and production are concerned. For many years, the company has exploited all the available innovative opportunities in order to produce with greater energy efficiency and safeguard the environment. Moreover, by providing energy-efficient products, ARBURG contributes towards reducing its customers' energy consumption. All these measures are brought together with the "Energy Efficiency All round" initiative.

Due to rising energy costs, the production of plastic parts by means of injection moulding is increasingly being discussed and analysed with respect to energy consumption and energy efficiency. The choice of production resources and production plants has a large effect on the efficiency of the injection moulding production system which can subsequently be achieved. An integrated approach to the injection moulding process is therefore vital. During the injection moulding process, the plastic undergoes multiple energy conversions on its journey from the granulate to the finished moulded part. Energy is absorbed, transported and released again throughout the whole process – from conditioning the granulate, through plasticising and shaping to the cooling process. In addition to the injection moulding machine itself, many more energy consumers are involved in the production of moulded parts and depending on the application, these sometimes contribute significantly to the overall energy consumption.

Fundamentals

The production process : a holistic view



The energy balance of an injection moulding production system is a comparison of the supplied energy, which is primarily electric, and the dissipated energy, which is mainly in the form of heat. The overall injection moulding process can be divided into several definable spheres of activity and responsibilities–injection moulding machine, mould and peripherals.

A closer look at the dissipated energy from an injection moulding production system reveals that it can be divided into two types. Part of it is dissipated into the environment as heat. This includes radiation and convection from the plasticising cylinder, from the machine base (oil tank and control cabinet) and from the mould (if it is a heated mould), as well as from the finished moulded part, which cools down to room temperature.

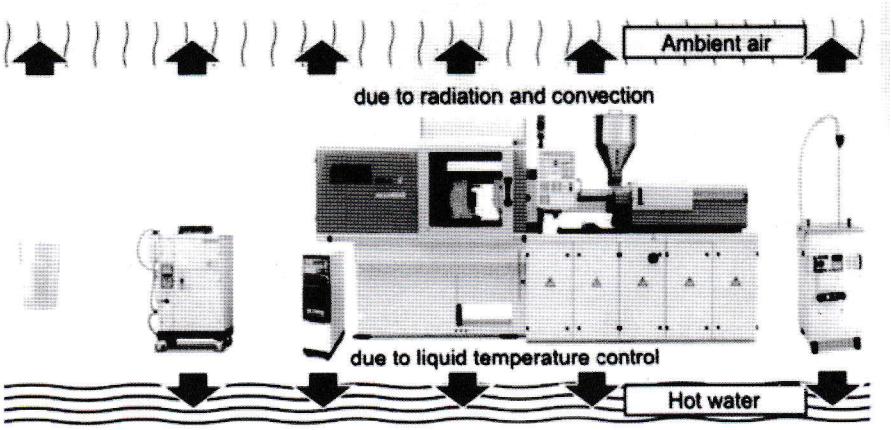
The second part is dissipated via the cooling water. This includes the oil cooling system, liquid temperature control on the control cabinet radiator as well as mould temperature control, either in the form of cooling units or temperature control units.

Dividing the dissipated energy into ambient and cooling water heating is important for an integrated analysis of the energy efficiency of an injection moulding production system. Whereas heat dissipated into the ambient air by means of air conditioning or ventilation systems usually has to be "disposed of" at high cost, the energy in the cooling water can be "recycled" by feeding it into other processes in a targeted manner, i.e. reusing it.

The decisive factor for the energy consumption of an injection moulding process is ultimately the efficient conversion of primary electric energy into operating power or heat energy. In order to compare various injection moulding processes and – if you extend the energy balance scope – various injection moulding production systems, the energy requirement of the plastic can be used; this is known as the enthalpy. The enthalpy is material-specific and

Fundamentals

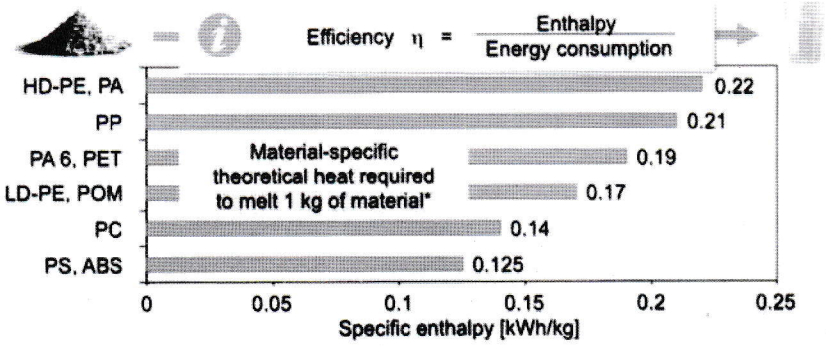
Differentiation by type of heat



Fundamentals

Determination of energy efficiency

Compared with theoretical energy requirement

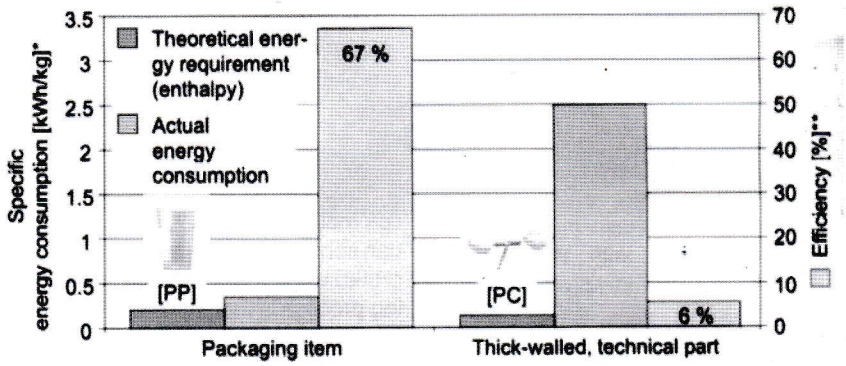


• Corresponds to the theoretocal energy consumption of the plastic

Fundamentals

Determination of energy efficiency

Process specific - energy consumption of an injection moulding machine



• Power consumption (kw)/ material throughput (kg/h)
• Proportion of the total energy consumption of the injection moulding machine that is incorporated in the plastic

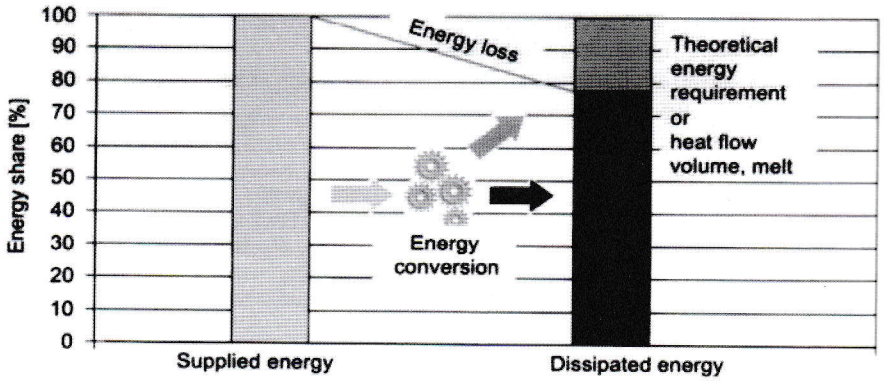
describes the theoretical amount of heat needed to melt 1 kg of material. This theoretical energy requirement for converting plastic granulate into molten plastic can be used to calculate efficiency in relation to the actual energy consumption needed in order to determine the overall efficiency. The enthalpies of typical plastics are shown in the diagram above as examples.

As well as machine factors, the energy consumption of an injection moulding machine is largely dependent upon the type of process. If we only examine the energy consumption of injection moulding machines, various process settings and sequences are not taken into consideration. Therefore, it often makes more sense to use the specific energy consumption as a comparative quantity. This quantity incorporates the shot weight and cycle time, enabling us to ascertain energy savings in direct relation to the application. In terms of the energy efficiency of injection moulding machines, only specific energy consumption permits a realistic comparison. The process-dependency of the absolute energy consumption and therefore the efficiency is illustrated on the basis of the two examples, a packaging item in a highspeed application and a thick-walled, technical component with a correspondingly long cycle. Optimal utilisation of the energy employed therefore requires knowledge of the most energy efficient operating points of an injection moulding production system and therefore working points with optimum efficiency.

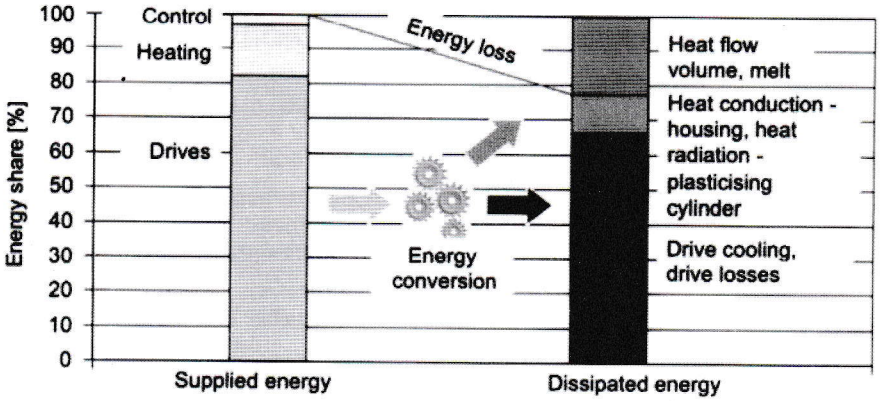
	4-cavity tub	Optical part
Machine	520A2000-800	520C200080advance
Cycle	5.64 s	2.55 s
Shot weight	101 g	233.6 g
Throughput	64.4 kg/h	3.3 kg/h
Average power	22.9 kW (without hot runners)	8kW

Energy which is supplied must be dissipated again. If the theoretical energy requirement of a plastic (enthalpy) is chosen as a point of reference and is put in proportion to the energy actually supplied, the efficiency of an injection moulding production system or of a machine can be calculated, i.e. the proportion of the total energy which is fed into the plastic is shown.

Fundamentals
Determination efficiency in detail



Energy considerations injection moulding machine
Energy - saving potential



After this brief introduction we will now focus on the injection moulding machine. If you view the volume of heat in the melt as utilised energy, the difference from the supplied energy is lost energy. To increase energy efficiency, this energy loss therefore has to be minimised. The lion's share of the energy supplied and dissipated by an injection moulding machine results from the drive system. Therefore the key to making an injection moulding machine energy efficient is the choice and dimensions of the drive system.

To summaries, the various approaches to saving energy on injection moulding machines are listed again and they will dealt with in more detail later. Energy which is not supplied also does not need to be dissipated again. Therefore the first step in becoming more energy efficient is to consume less energy. In addition to improved insulation and the use of drive systems with lower energy consumption, one must also use drive systems with a high degree of efficiency. Since energy losses usually have to be dissipated in the form of heat, this also reduces the energy consumption due to lower machine cooling consumption. If you also extend the balance scope again, energy can also be saved by the use of liquid cooled drive systems, by "recycling" the dissipated energy. As a result of fluctuating energy requirements in the

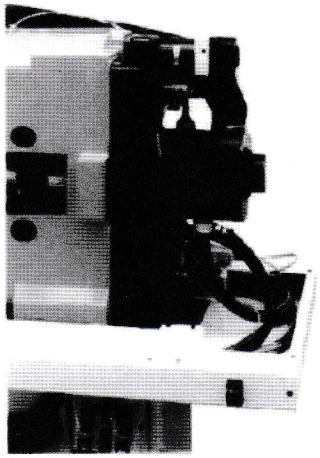
individual phases of an injection moulding cycle, an energy-efficient drive must be capable of providing the energy required at any one time in a demand-oriented manner. Electro-mechanical direct drives have advantages in this respect, as they are only switched on when they are being used, and consume considerably less power in power-down mode. In the cooling phase, above all, energy is saved due to lower no-load losses. The efficiency of electro-mechanical direct drives also contributes to lower energy consumption. Ultimately, the configuration of an injection moulding machine determines the dimensions of the drive technology and therefore its basic energy consumption as well as its performance.

The simplest way of reducing radiated heat from one of the most significant consumers, the plasticising unit, is by means of appropriate insulation measures. The ARBURG cylinder modules are still state-of-the-art in this respect. When designing the insulation of cylinder modules one must remember that insulation which is too effective has a negative influence on the controllability of the temperature. Despite all considerations with regard to efficiency, a controlled, reproducible process must be the priority.

A standard injection moulding machine has at least five movement axes: the movements mould, ejector, dosage, injection and nozzle. In *hydraulically powered machines,* these movement axes are all supplied by a central hydraulic drive with electric motor and regulating pump. Depending on the power requirement of the individual movements in the injection moulding process, the feed volume needed is provided via the control circuit in line with requirements. The pump motor is operated at a constant speed. A disadvantage of this is that a hydraulic drive such as this has a poorer level of efficiency in the event of small feed volumes. This is where the ARBURG energy-saving system (AES) comes into play - with this system the drive power of

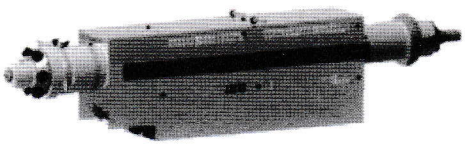
Energy considerations injection moulding machine
Energy - saving potential in detail

- Insulation of the Plasticising unit
- Drive technilogy
  - Drive systems with lower no-load losses
  - Drive systems with higher efficiency
  - Energy recycling through drive systems with liquid cooling
- Energy efficient configuration of an injection moulding machine and therefore drive technology dimensioning

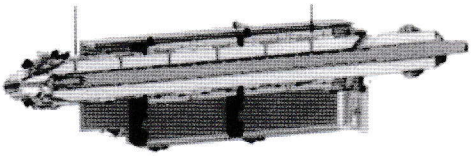


Energy considerations injection moulding machine
Insulation of the plasticising unit

- Insulation of the ARBURG cylinder module id state-of the-art
- Optimum temprature controllability is decisive factor when designing the insulation
- This ensures controllable reproducible processes

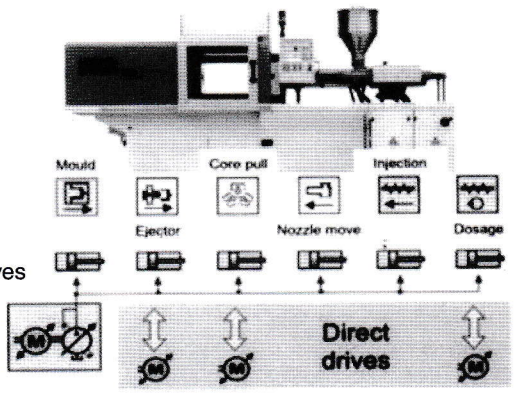


Heater band Insulation



Energy considerations injection moulding machine
Drive technology : Hydraulic ALLROUNDER S

- Central hydraulic drive for all movement axes
- Energy - saving control pump with p/Q control
- Drive options for energy optimisation
  - Energy saving system (AES)
  - Electro-mechanical direct drives



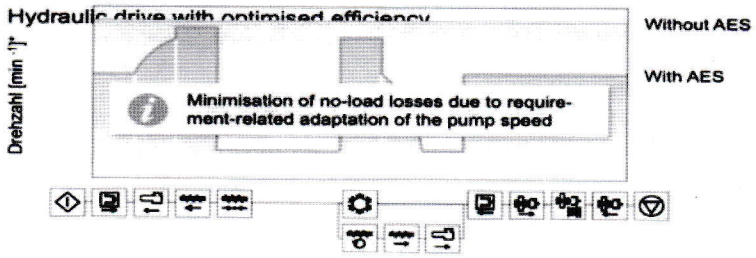
the pump motor is adapted to the actual power requirement of the machine as well as the feed volume. Furthermore, the modularity of the hydraulic ALLROUNDER S machine series also allows individual movement axes to be equipped with decentral, electro-mechanical direct drives to optimise energy consumption. Special attention should be focussed on the dosage axis.

The basic idea behind the AES is extreme simple: For applications with long cycle times, the drive power of the pump motor is adapted in line with the lower energy requirement of the machine during the injection moulding cycle phases in which no hydraulic movement axes are active. Instead of continually working at the nominal speed and a low level of efficiency, the speed and therefore the power of the pump motor is adjusted to the actual power requirement during long cooling times, for example. If full drive power is required again after this "resting period" the speed of the pump motor is increased again to the nominal speed and consequently to the nominal power. A frequency converter sets the speed of the electric motor continuously to the actual power required. The motor therefore operates at optimum efficiency and with correspondingly low energy consumption, even with low levels of utilisation. No-load losses are effectively minimised by varying the pump speed in line with the cycle. Energy-savings of up to 30 percent in relation to the overall cycle are possible. A positive side-effect is reduced machine noise emissions at low speeds. Drives with optimised levels of efficiency also minimise wear and produce less heat loss, resulting in energy also being saved when the cooling system is in operation.

As we have already mentioned, the overall efficiency of a drive system must be improved to optimise energy consumption. The overall efficiency results from multiplying the degrees of efficiency of the energy converters in the sequence. Therefore, the higher the number of components involved in a

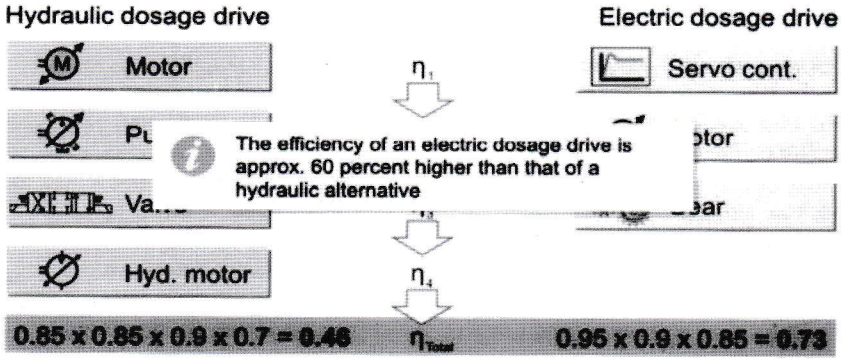
Energy considerations injection moulding machine

Drive technology: Energy-saving system (AES)



Energy considerations injection moulding machine

Drive technology: Electric dosage (AED)



drive system, the poorer the efficiency and the higher the energy consumption will be. This becomes particularly clear when we look at the example of the rotating electric dosage movement, the efficiency of which is 60 % higher than its hydraulic alternative. Energy-savings of up to 20 percent in relation to the overall cycle are possible. A positive side effect is the dosage movement's independence from the hydraulic drive. Simultaneous dosage with other machine movements ensures that the cycle time of sequences determined by the cycle time can be significantly reduced in some cases. Furthermore, the melt is processed more carefully as a lower screw speed can be used. Electric dosage drives produce less heat loss, resulting in energy also being saved when the cooling system is in operation.

The advance equipment package has purposely combined the energy-saving potential of hydraulically driven injection moulding machines. The advance models provide the significant advantages of a modern, energy-optimised machine coupled with a high degree of reproducibility at an attractive price/ performance ratio. Energy-savings of up to 30 percent in relation to the overall cycle are possible.

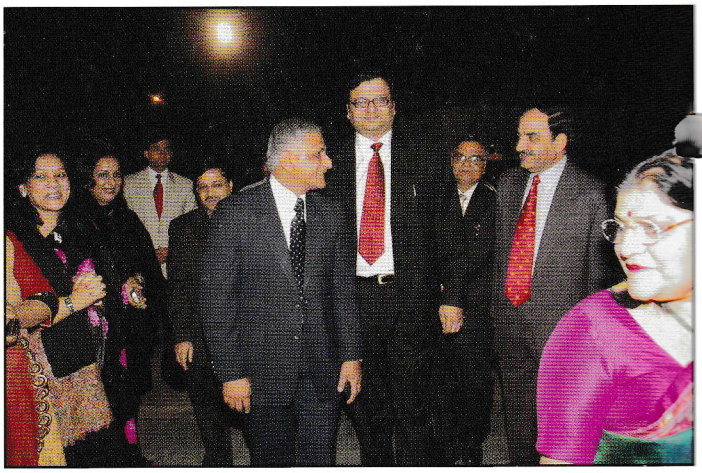
The high levels of efficiency of the servo electric dosage drive and the toggle -type clamping unit ensure that ALLROUNDER H machines are

Contd. to Page - 19

GLIMPSES

GOLDEN JUBILEE YEAR CELEBRATION NITE AT SANGAM COMPLEX, FORT WILLIAM, KOLKATA

A view of the dais of Golen Jubilee year Celebration Nite at Fort William, Kolkata.



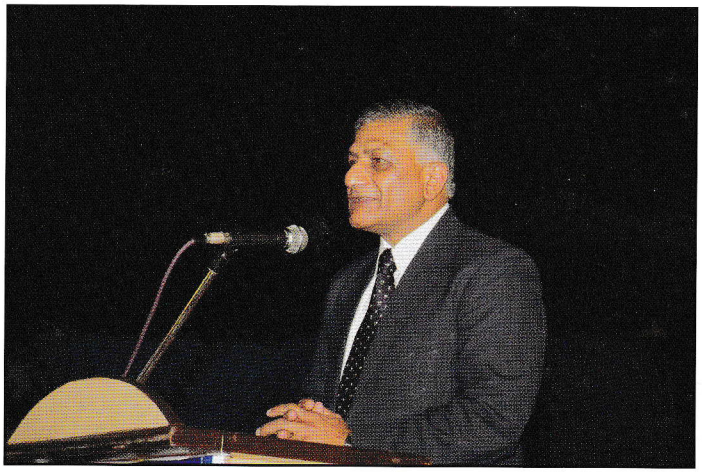
Sri Sourabh Khemani, President, IPF with Lt. Gen. V. K. Singh and others on the way to dais.

Lt. Gen. V. K. Singh is lighting the lamp at inaugural function.

From (L to R) : Sri Amar Seth, Executive Committee Member, IPF, Sri Rajesh Mohta, Vice-President, IPF, Lt. Gen. V. K. Singh, Sri Sourabh Khemani, President IPF, Sri R. A. Poddar, Hony. Secretary, IPF and Sri K. K. Saksena, Immediate Past President, IPF are on the dias.

GLIMPSES

Mrs. Joshita Khemani giving a flower bouquet to Mrs. Bharti Singh.



Lt. Gen. V. K. Singh giving his speech at the function.

A gathering with Lt. Gen. V. K. Singh with IPF Office Bearers and members of the federation in front of the gate of the venue.

The Cultural Show by the "Dhani" Group

extremely energy efficient. The energy recovery of the servo motors during braking also has a beneficial effect on the machines' overall energy-efficient consumption. Furthermore, the hydraulic drive features a performance-adapted pump and an electric motor to meet efficiency class EFF1. Together, these factors combine to reduce energy consumption by up to 40 %.

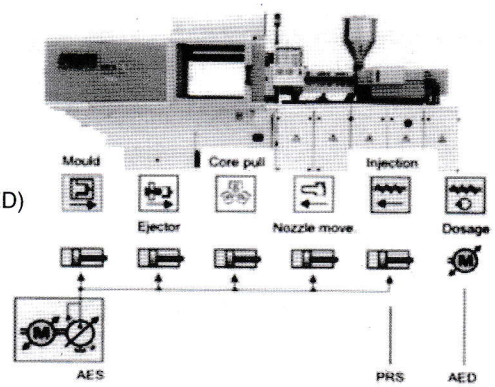
Electric machines are equipped with mutually independent electro-mechanical direct drives, with an electric motor for each movement axis. In comparison to hydraulic drives, electro-mechanical drives feature a significantly higher level of efficiency. This greater efficiency is due to the fact that the motor needed for the drive is only switched on and in operation when a movement is required and it hardly produces any no-load losses in the subsequent resting phase. Furthermore, in comparison to hydraulic drives, electro mechanical drives often have one energy converter less and therefore the hydraulic drive usually comes out worse when the individual efficiency levels are multiplied. This has already been illustrated using the example of the dosage drive. And after all, electro mechanical energy converters usually have a higher level of efficiency than hydraulic ones anyway. In relation to the overall cycle, energy savings of up to 50 percent are possible with electric machines and in some cases even up to 75 percent. A positive side-effect is the reduced machine noise emissions generated by an electric machine. The use of water-cooled motors also reduces heat dissipation to the ambient air.

Electric, direct drive injection moulding machines feature more advantages than just those concerning energy and noise reduction - they also have characteristic advantages with respect to important process requirements which extend the field of application of these machines. These characteristics mainly concern the highly dynamic and precise machine movements. In turn, they result

Energy considerations injection moulding machine

Drive technology : advance equipment package

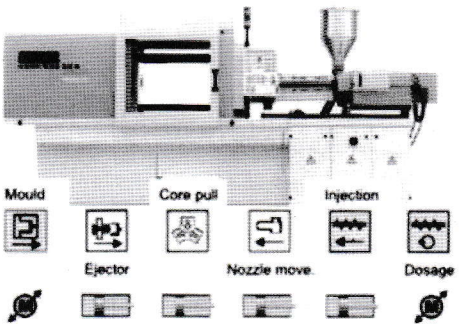
- Energy-optimised hydraulic machine for especially high moulded part quality
- Modules
  - Energy saving systems (AES)
  - Electro-machanical dossage (AED)
  - Position-regulated screw (PRS)



Energy considerations injection moulding machine

Drive technology : hybrid ALLROUNDER H

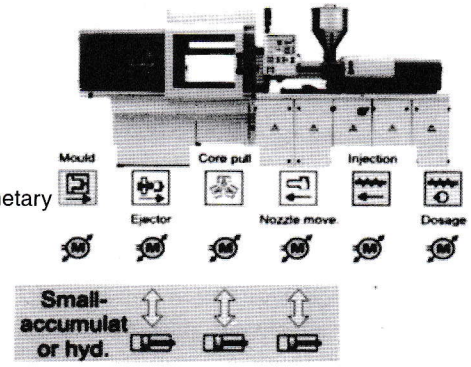
- Perfect combination of the benefits of electric and hydraulic drive technology
- Low energy consumption thanks to
  - Dosage with servo-electric direct drive
  - Toggle-type clamping unit with servo-electric direct drive
  - Energy recovery of servo motor braking energy to the network
  - Hydraulic drive with performance-adapted pump and electric motor of efficiency class EFF1



Energy considerations injection moulding machine

Drive technology : Electric ALLROUNDER A

- Particularly energy efficient due to
  - Independent electro-machanical direct drives without no-load losses for all movement axes
  - Liquid-cooded servo motors
  - Play-free power transmission with planetary roller drives or gears
  - Energy recovery to utilise the braking energy of the servo motors
- Optional energy-optimised small-sccumulator hydraulics



in better process stability and reproducibility as well as shorter cycle times.

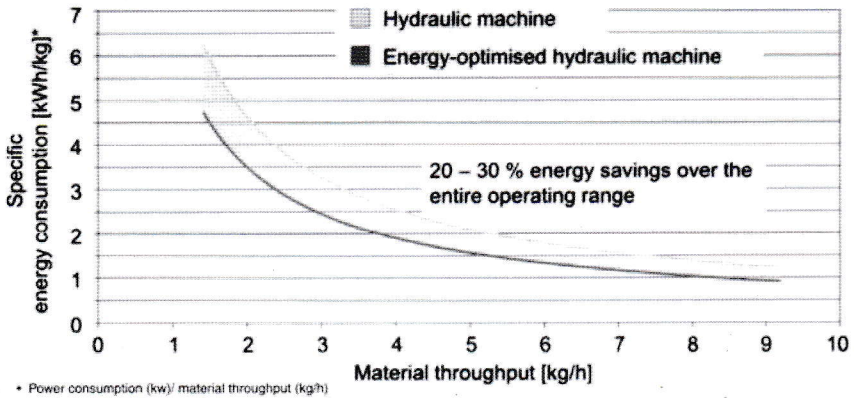
The graph above shows the specific energy consumption of various injection moulding machine technologies in relation to material throughput for one machine size each. In principle, this graph can be translated to other machine sizes and it will show similar interrelationships.

On the graph you can see that, with the same material throughput, electric machines work in a significantly more energy-efficient manner than hydraulic machines. The graph also shows that the specific energy consumption reduces as the material throughput increases and the injection unit is utilised more fully. Therefore, the larger the difference between the installed power and the actual consumption is, the higher the losses will be. Thus, the design of an injection moulding machine is a decisive factor in the efficient use of energy. We will investigate this issue in more detail later and also demonstrate the advantages of modular machine technology.

Another important result shown on the graph is that the difference in energy consumption between the various drive technologies remains practically constant across the entire operating range. The energy-saving potential of an energy-optimised hydraulic machine amounts to between 20 and 30 percent. Potential energy savings of electric machines amount to 25 to 50 percent and even up to 75 percent in individual cases. However, increasing the energy efficiency by improving processes or using other process variants with the same material throughput [kg/h] is only possible to a limited extent.

The injection unit is at the heart of an injection moulding machine. The main task of this unit is optimum melt preparation under a wide variety of process settings. Therefore the highest energy consumption usually occurs at the injection unit. Consequently, the size of the injection unit frequently determines the

Energy considerations injection moulding machine
Comparison of specific energy consumption



* Power consumption (kw)/ material throughput (kg/h)

extent of the installed power of an injection moulding machine and therefore also the extent of the no-load losses of the drive. This particularly applies to hydraulic injection moulding machines with a central hydraulic drive.

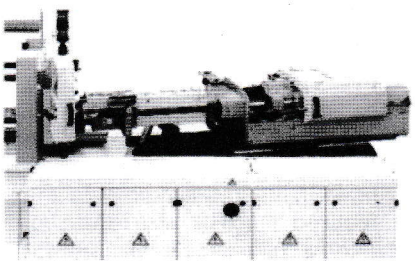
The choice of injection unit size therefore has a considerable influence not only on moulded part quality, but also on energy consumption. The highest possible utilisation of the injection unit in relation to its maximum material throughput is decisive for a high degree of efficiency and energy conservation.

The maximum material throughput provides information on the melting capability of an injection unit up to which optimum melt preparation is ensured. The screw pitch volume and the material-specific dwell time are, in turn, determining factors for the melting capability. Dwell time can be understood as the time that passes from when a grain of granulate enters the plasticising cylinder to when it exits through the nozzle. The dwell time specific to plastic ranges from approx. 30 to 600 seconds for standard plastics and 60 to 600 seconds for technical plastics. This defines the limit values for maximum possible and minimum necessary melting capability of an injection unit. However, it is recommended not to use the full extent of the melting capability range of an injection unit, but rather to utilise the optimum working range between 20 and 80 per cent of the total capacity.

Based on material throughput, it is therefore very easy to determine the

Energy considerations injection moulding machine
Energy-efficient design

- Most energy consumption usually occurs on the injection unit
- So injection unit size often decisive for
  - Extent of installed power of an injection moulding machine
  - Level of no=load losses of the drive
- So choice of injection unit size is decisive factor for energy consumption



injection unit sizes suitable for selection (top diagram). The material throughput of a specific application is dependent on the shot weight and cycle time of the injection process.

As illustrated by the graph above indicating specific energy consumption, efficiency can be improved by a factor of four or more by observing the aforementioned recommendations. The higher the utilisation of an injection unit is, the greater its efficiency and the lower the specific energy consumption will be. High utilisation of the injection unit is helped by short cycle times (example: packaging item). However, applications with long cycle times necessarily result in higher specific energy consumption (example: thick-walled technical part).

The choice of the suitable injection moulding machine size - in relation to the parts to be produced and the manufacturing process - determines and allows for optimisation of energy efficiency irrespective of the drive technology.

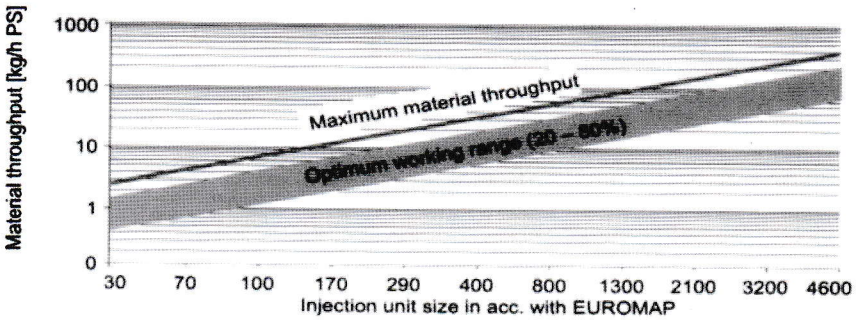
In order to ensure the greatest possible flexibility when adapting the machine size to the injection process, ARBURG offers a comprehensive range of modular machine solutions and technologies. Of particular interest here are also the varied options for combining clamping units (clamping forces and distances between tie bars) with injection units and drive technologies. This means that even under very unfavourable conditions, an ideal combination in terms of energy can be implemented. This flexibility is particularly useful where the required machine size does not allow for a fully-electric and consequently energy-optimised drive.

The modularity of the machine range extends from "fully-hydraulic" with a central hydraulic drive for all movement axes, to "fully-electric" with electromechanical direct drives on all movement axes.

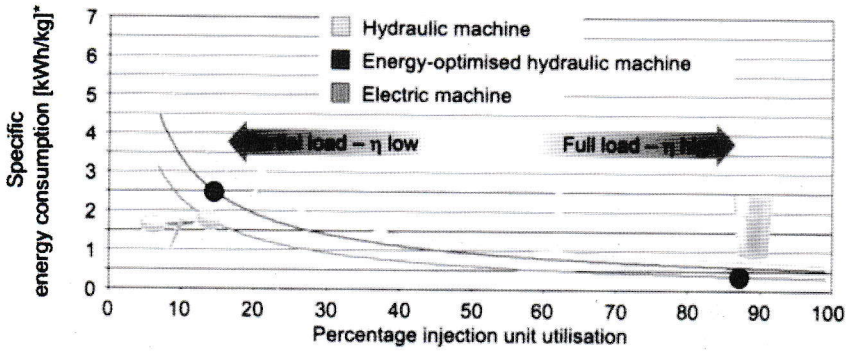
The processes in the mould are also extremely important factors when assessing the energy efficiency of the overall injection moulding process, as most energy is used when the moulded

Energy considerations injection moulding machine
Energy-efficient design

Criterion: Injection unit utilisation



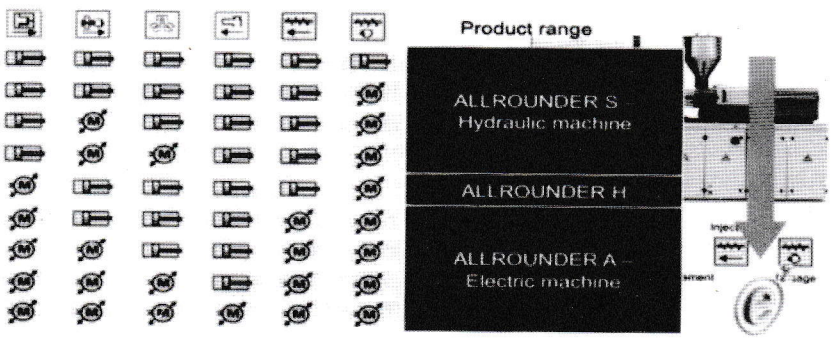
Energy considerations injection moulding machine
Energy-efficient design
Criterion : Injection unit utilisation



• Power consumption (kw)/ material throughput (kg/h)

part is formed. The energy in the melt has to be dissipated again in the mould after injection. The extent to which the dissipated heat can be used again is decisive. The physical enthalpy share after the melt inlet until the moulded part is demoulded must be dissipated. In order to ensure constant product qual-

Energy considerations injection moulding machine
Energy-efficiency through modularity

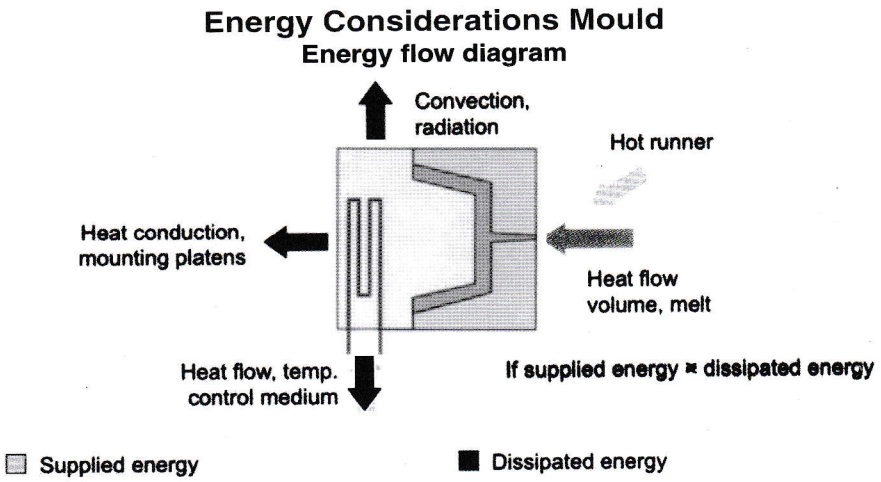


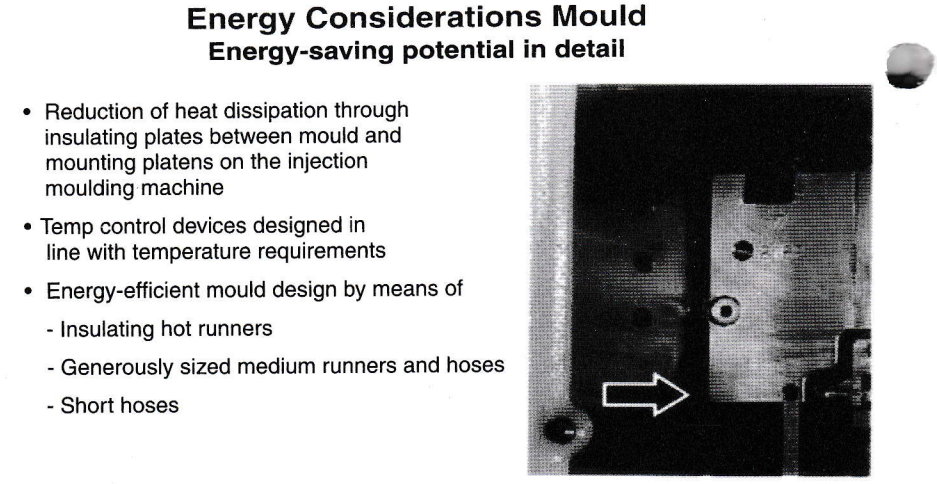
ity, the conditions in the mould must also remain the same. Therefore the losses must be evened out in order to generate constant conditions. The diagram above illustrates the heat transmission operations in the mould. Depending upon the type of process, e.g. whether the mould has to be cooled or heated up, various different measures are recommended to achieve efficient operation.

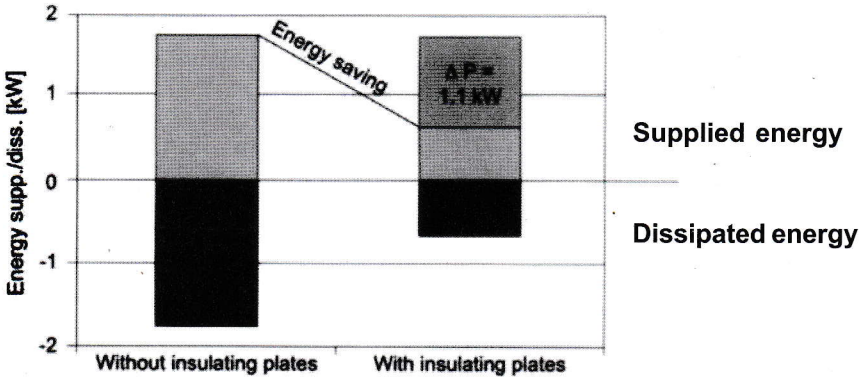
Besides the injection moulding machine, moulds and temperature control devices also exert considerable influence on the energy consumption of an injection moulding process. For example, when moulds have temperature control, it is extremely important to provide appropriate insulation for the mould. Otherwise, as with a poorly insulated house, large quantities of heat will simply be wasted, unutilised, soaking into around the injection moulding machine or into the environment. Insulation measures on hot runners also help to save energy. Another important point is that temperature control devices must be designed for the moulds' specific temperature requirements. To achieve improved efficiency, the mould temperature control system should be equipped with generously sized medium runners and hoses which are as short as possible, so that smaller temperature differences and larger amounts of medium can be used.

The diagram above indicates the energy-saving potential which can be achieved with temperature controlled moulds - e.g. when processing polycarbonate at 90 degrees. Energy savings of more than 60 percent were achieved in the example shown by providing suitable insulation between the mould and the machine and on the mould itself. If measures such as these are not implemented, considerable amounts of heat can be dissipated, unused, into the environment due to radiation from the mould and the machine.

Example, optical lens
Machine 520 C 2000-800
Material PC







Shot volume 220 cm³
Cycle time 255 s
Mould temperature 90 °C
Demould temperature 95 °C
Melt temperature 290 °C
Ambient temperature 25 °C
Mould dimensions 486 x 400 x 400 mm

As already discussed, the energy-

related balance of an injection moulding production system is a comparison of the supplied energy, primarily electric, and the dissipated energy flows which mainly involve heating the environment and cooling water. In the previous balances and comparisons between the packaging item process and that of a thick-walled technical component, the machine's consumption was the primary focus. However, the two diagrams which follow show the overall balance of these production processes.]

With the packaging item, electric energy is supplied to the injection moulding machine, the mould hot runners and the cooling unit. Part of the supplied energy is dissipated into the environment as heat by means of radiation (machine, cylinder module and moulded part). A total of 25 percent of the volume of energy invested. The remaining energy is dissipated in the cooling water and can therefore be reused. The efficiency of the entire system in relation to the enthalpy of the plastic is 26 percent, compared with 67 percent if only the machine is taken into consideration.

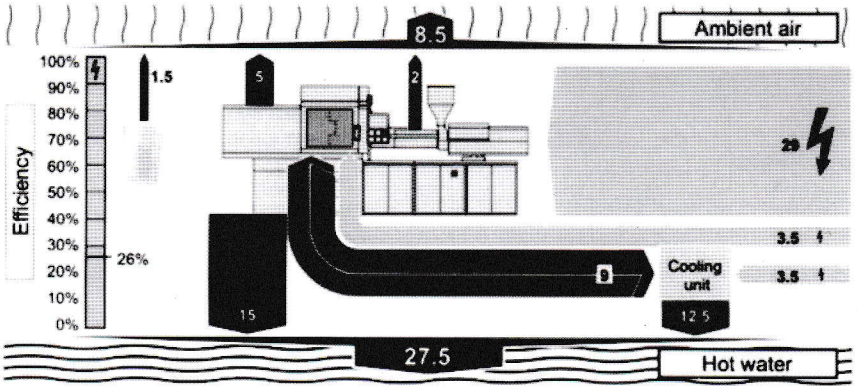
Now as a comparison we will look at the thick-walled, technical component. The mould is not cooled, it is heated. In this example, an optical component is produced which needs a high mould temperature for dimensional stability as well as to reduce internal tension. Four temperature control units are used, which have, in total, the same energy requirement as the injection moulding machine. Furthermore, a hot runner system also needs energy as well. Heat dissipation from the mould to the environment is extremely significant in this case. In total, more energy is dissipated into the environment than in the cooling water (75 percent to 25 percent). This example shows that, as well as the injection moulding machine, the mould can play an important part in the overall energy balance. This comparison illustrates that with technical components, more of the supplied energy is transmitted to the peripherals and therefore the injection moulding machine consumption reduces proportionately. The share of energy dissipated into the ambient air increases significantly due to higher process temperatures and additional peripherals.

With injection moulding production systems in air conditioned rooms in particular, it is important to aim for as high a possible proportion of the generated heat to be dissipated in the cooling water as this heat is comparatively easy to transport and reuse.

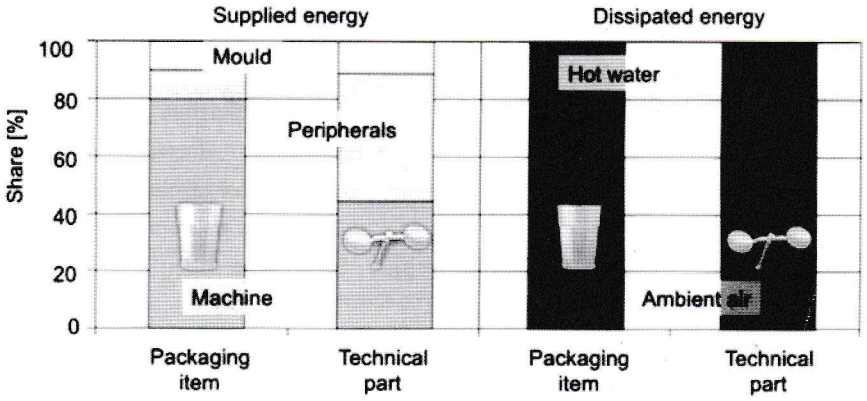
The aforementioned high energy consumption for processing technical materials and for the production of technical parts is reflected in poorer production efficiency.

In addition to the injection moulding machine itself, many more energy consumers are involved in the production of moulded parts and depending on the application, these sometimes contribute significantly to the overall energy consumption. This includes dryers, temperature control units, cooling devices, vacuum and compressed air generators and importantly, hot runners in the mould. If these peripherals are included in the calculation of the specific energy consumption, one can see a significant increase in the specific, overall energy consumption. This effect is particularly pronounced with technical items, as

Energy considerations overall process
Power balance - packaging item



Energy considerations overall process
Representative applications in comparison

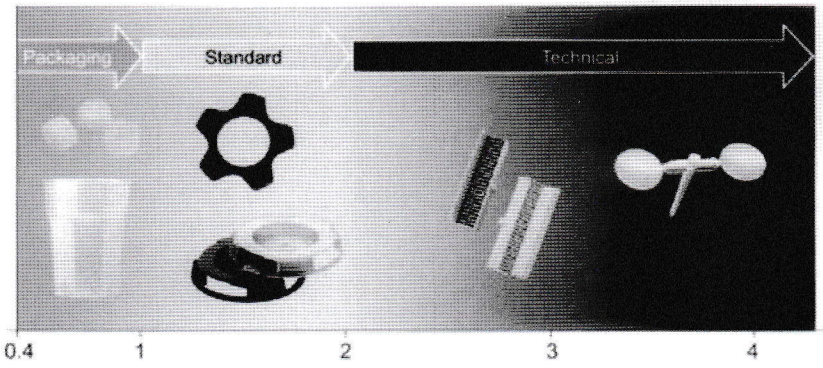


processing technical plastics at high melt temperatures often means pre-drying and usually one or more perature control units have to be used as the mould has to be heated. The specific energy consumption required by a packaging item is usually significantly less than 1 kWh/kg, whereas technical items, especially thick-walled components or micro-components, can have specific energy consumptions of considerably more than 5 kWh/kg.

Machine down times can also be reduced by means of preventative maintenance. Preventative maintenance is the only way to maintain the reproducibility of an injection moulding machine, which in turn is a requirement for other quality assurance measures. After all, quality assurance measures can reduce production reject rates and therefore save energy. Even reject parts have used energy to be produced, in addition to the raw material costs. Both aspects are recorded on the losses side on the overall balance sheet.

To reduce the reject rate it is necessary to create a qualified process evaluation in order to find out about the process stability and it is also necessary to monitor and document the production process.

Energy considerations overall process
Energy consumers for various applications

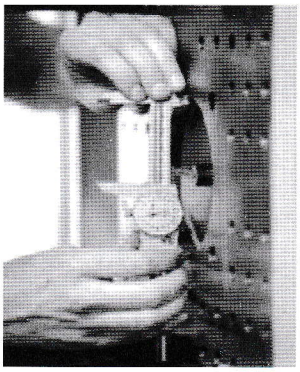


Specific energy consumption [kWh/kg]*

* Power consumption (kw)/ material throughput (kg/h)

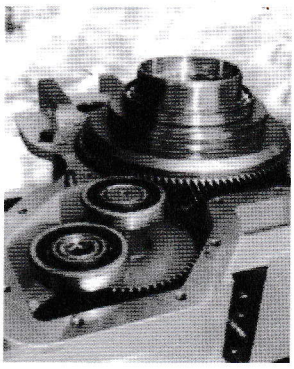
Energy - efficient production organisation
Quality assurance

- Preventive maintenance for
  - fewer unplanned machine downtimes
  - more planning certainly in production
  - maintaining the reproducibility of the machine
- Regular machine re-calibration possible via ARBURG inspection contract
- Reduction of reject rate by means of quality assurance measures
- Comprehensive quality assurance possible with ARBURG AQS quality assurance system



Summary and conclusions
Energy efficiency consultation field

- Key to making a machine energy efficient is the choice and dimensions of the drive system
- Optimum drive technology mainly depends on the specific requirements
- Modularity of the machine range helps energy-efficient design and use



Source : IPI Journal

Its all for Green Recycling

With 'Recycling' and 'Green' being the mantra two major companies takes the trend forward. While the Minas Basin will put plastics to use as fuel, AWS Eco Plastics claims to recycle more than 2 billion bottles per year....

Following the recent trend of recycling, Minas Basin paper and Power Company has stepped in renewable traditions and is investing in a plastics-to-fuel venture.

According to a report Minas Basin Pulp and Power Co. Ltd. of Hantsport, Nova Scotia, is leading a project that aims to turn 8.8 million pounds per year of plastic scrap into more than a million gallons of diesel fuel or fuel oil. Minas Basin President and Chief Operating Officer Scott Travers said, "It's completely complementary to what we do".

Minas Basin owns Scotia Recycling Ltd., a Dartmouth-based company that collects household recyclables at curbside in Atlantic Canada. Scotia Recycling separates paper for use in Minas Basin's own mill and soon will have a valued-added use for mixed plastics, after PET and high-density polyethylene are sorted out.

Minas Basin already has a good environmental track record. It produces renewable hydroelectric power. It makes paperboard from 100 percent recycled material, diverting 105 million pounds per year of waste paper away from Nova Scotia's landfills. As well, it is constructing a tidal power demonstration plant in the Bay of Fundy to explore that potential source of renewable electrical power.

In an interview to a magazine Travers said that things would in places very soon and perhaps the project might pick up around mid 2009. The company plans to use a pyrolysis type rather than one based on catalysts.

Minas Basin will convert a mixture of PVC, low density PE, polypropylene, polystyrene and mixed plastics to fuel. It is expected to create significant operational savings and increase the supply of renewable energy for Nova Scotia.

Further sources say Minas Basin will contribute C$27 million (US$28.9 million) of its own funds toward the project whereas Nova Scotia's Department of Economic Development will fetch C$20.7 million (US$22.1 million) and other grants total C$5 million (US$5.4 million), including C$2 million (US$2.1 million) would come from the federal Ecotrust program for reducing greenhouse gases and air pollution.

Angus MacIsaac, Nova Scotia's minister of economic development, said "The company's innovative business model emphasizes recycling, waste elimination and energy reduction."

While the Minas is very keen on the new venture UK-based AWS Eco Plastics has been focusing on the plastic bottle recycling the company claims its plastic bottle recycling facility is the largest in Europe, following £14m worth of expansion work. The company's Hemswell, Lincolnshire, plant is now fully operational and has quadrupled its capacity. It can process 15 tonnes of plastic every hour – 100,000tpa – and has the scope to handle 2bn plastic bottles and containers each year.

The upgraded facility can now segregate and process a wider range of plastics including polypropylene, polystyrene, coloured HDPE and coloured PET. These were previously baled and sent abroad for reprocessing or alternatively sent to landfill sites.

Most bottles are de-labelled, granulated and washed at the plant. The resulting flakes are then sent on for use in new plastic products including fleece jackets, piping and packaging.

The investment follows this year's successful £6m fundraising from the Sustainable Technology Fund. The fund focuses on providing investment for UK companies developing clean and efficient industrial processes, and international asset manager Robeco through its Clean Tech private equity fund.

AWS chief executive, Jonathan Short, said that Britain lagged behind Europe in the recycling of plastic, which he described as historically treated to a "very basic degree in the UK and then transported overseas to the Far East for reprocessing." Commenting on to the facility he added, "Our new plant with its considerable extra capacity can take plastic waste from local councils, supermarkets and other users of plastic and recycle it into flakes of the highest quality for use in general manufacturing and plastic bags."

AWS also plans to install a new processing line next year, which will enable it to sort and process recycled plastics to the standard required by the food industry.

Source : Plastics News

Surface appearance, Take One: Piano-black PC/ABS parts with no painting

By Matt Defosse

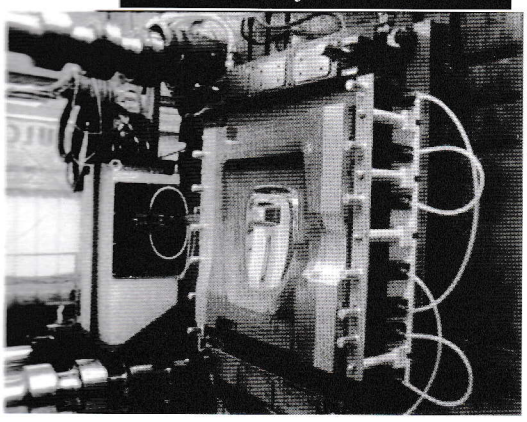
MPW caught up with French company RocTool at December's Euromold trade show in Frankfurt, where the company came to draw attention to the new trick—injection molding—it has taught its inductive heating system.

RocTool emerged almost a decade ago at the JEC composites show in France, and until recently its technology for rapidly heating a mold's surface to high temperatures using an inductive heating method patented by the firm has seen use only in some composite plastics processing.

But Matt Boulanger, the company's business development manager, told MPW at Euromold that the company has optimized its technology for the injection molding market, where it sees great potential and in which interest already is high. Indeed, the week after Euromold, Boulanger started a multicity tour of the U.S., visiting potential customers interested specifically in what the technology could mean for injection molding. (For more on the firm, a good start is our June 2004 issue, p. 48, or search our website for more mentions.)

What it could bring to molders, said Boulanger, is the ability to process very high-quality parts of very high-temperature materials with very thin walls, with very tight control of temperatures, so that in many cases there is no need for painting or coating parts after molding. The key is that the Cage System, as RocTool's mold heating technology is known, only heats the surface of a mold, but does that very rapidly. Because only the surface of the mold is heated, cooling also can be done rapidly. The combination of the two helps prevent warpage and makes for better surface appearance. "We've molded PEI (polyetherimide, a very viscous thermoplastic) parts at just 1-mm thickness but with good surface appearance," he said. No mold preheating is necessary, and molding machine pressure typically can be reduced by up to 30%, he added.

A Cage System is shown attached to the rear of an injection mold



At the firm's Euromold stand he showed MPW two automotive interior parts, molded on the same mold but with one heated/cooled via RocTool's Cage and the other using standard technology. Both parts were molded with a single gate. The part formed on a Cage-heated mold more accurately reflected the mold's surface, with the part matte where it was supposed to be and glossy where it was intended. The other part's matte-like appearance wasn't very matte at all. "Tier Ones and OEMs see the chance for better surface quality," Boulanger said.

"The tool design has to be optimized" to work with the Cage system, Boulanger notes, especially with regard to where cooling lines need to be placed and what sort of steel should be used. The method of attaching a Cage system to an injection mold, so that the mold is inductively heated, also is part of RocTool's intellectual property. So far there appears to be about a 10-second cycle-time penalty when switching from an established mold to one heated via RocTool's Cage, so clearly the technology will not see use in swift-cycling packaging applications. Current licensees of the technology include two French molders, Group Dedienne Plasturgie (Dedienne) and Plastivaloire (PVL), Europe's largest molder of television frames. Automotive parts processor Visteon was the first to show interest in the injection molding technology and had an exclusive license for a short time, as did Didienne, but the exclusivity of both has expired.

Last October RocTool displayed the process on a Billion injection molding machine at Pôle Européen de la Plasturgie (PEP), a French technology center in Oyonnax, the center of the country's processing industry. Boulanger showed MPW video of the event, attended by 250; presenters included experts from Dow Chemical, DuPont, and PVL. PVL showed attendees large, glossy, 'piano-black' PC/ABS frames it molded, and did not need to paint, which met customers'

RocTool bets its mold heating technology will attract processors of parts requiring a great surface finish.

requirements. He said Dow, DuPont, and other resin suppliers already have shown interest in developing materials specifically for the process. Boulanger added that RocTool is keen this year to find a similar technology center in the U.S. where its technology can be demonstrated, but where its IP is guaranteed protection. The firm also has contacted the Society of the Plastics Industry, asking after space at the association's NPE 2009 exhibition in Chicago in June. The firm currently is recruiting a sales manager for North America.

On the business end, RocTool can sell a test license to a processor and help it make a prototype/pre-series mold equipped with the Cage heating system. Once the mold and process are optimized, the processor then can acquire a full production license. "We want to license to good processors," Boulanger stated.

Enhancing polyolefins

A line of specialty elastomers is being added to polyolefins to create rigid thermoplastic olefins (TPO), soft thermoplastic elastomers (TPE), and transparent compounds or polymer blends for applications that require improved toughness, impact strength, flexibility, elasticity, clarity, reduced stress whitening, or weight reductions. ExxonMobil Chemical's Vistamaxx is being applied as a minority blend partner by compounders and dry-blending converters to create materials seeing use in flexible hoses/tubing, adhesives, containers, and semi-rigid/rigid food-contact packages. The company positions the compounds as an alternative to polyvinyl chloride (PVC). Vistamaxx was initially focused on applications in nonwoven films, but the company is now anticipating broader markets, including blowmolded and injection molded goods.

Vistamaxx reportedly exhibits excellent compatibility with polyethylene (PE) and polypropylene (PP), acting in some cases as a partial substitute for a variety of polymers, including styrene block copolymers and polyisobutylene, leading to reduced costs and improved performance.

The material's elastic properties, which result from a predominantly amorphous ethylene propylene matrix with a network of fine, well-dispersed isostatic PP crystallites, allow for compounds with flexibility and impact resistance, while remaining clear in PP random copolymer and homopolymer blends.

ExxonMobil says compounds become more flexible as Vistamaxx levels increase, while tensile strength drops steeply with the addition of the elastomer due to a reduction in the blend's crystallinity. If elastomer content exceeds 30%, elongation at break increases steeply with the creation of a co-continuous phase. Low Vistamaxx concentrations have little effect on initial PP hardness.

Adding Vistamaxx to random copolymer or homopolymer PPs can improve impact strength down to -20°C (-4°F). In terms of thermal properties at concentrations below 30%, compounds will act like PPs, while in compounds with elastomer levels above 30%, stickiness is observed in materials aged above 100°C (212°F). As elastomer levels increase, the Vicat softening point goes lower. Low haze-level compounds can be produced when Vistamaxx is added to random copolymers, although ExxonMobil notes that thorough mixing of dry blends during processing or melt blending is needed to optimize transparency. Tests have shown that when mixed in above 30%, Vistamaxx can reduce or eliminate stress whitening in homopolymers. In styrene ethylbutylene styrene (SEBS), Vistamaxx elastomers can increase tensile and tear strength by up to 45%.

ExxonMobil Chemical Co., Houston, TX, U.S.A.; +1 281-870-6607; www.exxonmobil.com

RESINS/COMPOUNDS

Barrier keeps PET's properties stable

Is your customer's beverage losing its fizz in polyester (PET) containers? The SP434 grade ethylene vinyl alcohol (EVOH) from this manufacturer is said to enhance the existing barrier properties of PET without adversely affecting clarity. The resin helps keep oxygen out of the container but also ensures that the CO_2 contained in the bottle remains there and does not escape through PET container walls, even when downsizing is an issue. The SP grade can be used to process co-injected barrier performs as well as stretch blowmolded bottles.

EVAL Europe NV, Zwijndrecht, Belgium; +32 2-509745; www.eval.be

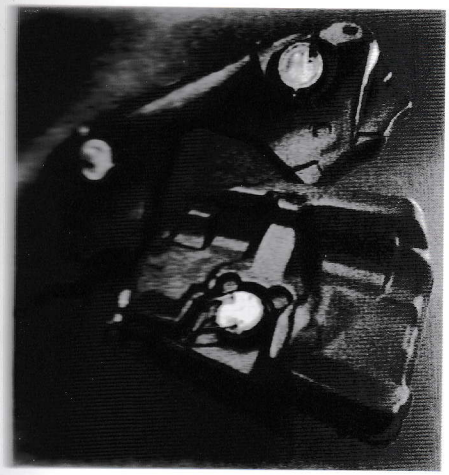
Typical properties of EVAL SP434 EVOH for PET barrier

Property	Value
Ethylene content, mol%	32
Density, g/cc (D1505)a	1.19
Melt index, g/10 min (D1238)	
at 190°C	4.6
at 210°C	10
Melting point, °C (DSC)	183
Haze in monolayer cast film/20 µm, % (D1003)	1.4
OTR, cc.20 µm/m2.24hr.atm	
20°C 65%RH	0.5
20°C 85%RH	1.9
CO_2TR, cc.20 µm/m2.24hr.atm	
20°C 65%RH	1.5
20°C 85%RH	10

ASTM test method unless noted
Source: EVAL Europe

Biodiesel no problem for this HDPE

A new family of Lupolen high-density polyethylene (HDPE) resins offers improved resistance to biodiesel, and therefore is a new candidate for blowmolded and injection molded automotive fuel tanks. Grade 4261AGBD is designated for blowmolding, while 4261A IMBD is suitable for injection molding of vehicle fuel tanks. After 1500 hours of contact with 100% biodiesel fuel, the



LyondellBasell's **Lupolen 4261AGBD** and 4261A IMBD HDPE grades offer good resistance properties to biodiesel when molded into fuel tanks.

grades changed their intrinsic viscosity by only 1.7%. This corresponds to a nearly 30-fold improvement in resistance compared to standard HDPE grades previously used for fuel tank applications.

LyondellBasell, Rotterdam, Netherlands;
+49 69-305-85459; www.lyondellbasell.com

Compostable resin takes the deep freeze

A polylactic acid-based polymer (PLA), CP-ENJ-13, offers biodegradability during composting of what is claimed to be the first-ever such bioresin that is freeze-tolerant. The material is said to retain structural rigidity in freezing temperatures as low as –35°C for frozen food applications such as injection molded ice cream containers. The producer says it features good flexibility compared to other PLA-based products, tensile elongation that is about 10-times greater than conventional PLA grades, and a notched IZOD impact measurement of 2.5 lb-ft/in. "The new addition to our product lineup is a direct result of customer demand for freeze-capable bioplastics products," says William Kelly, the company's Sr. VP, technology. It is certified as biodegradable and compostable in both the U.S. and Europe according to Biodegradable Products Institute, ASTM, and European Bioplastics (EN) standards.

Cereplast Inc., Hawthorne, CA, U.S.A.;
+1 310-676-5000; www.cereplast.com

TPE

Nature gets a boost from plastics sector

Compounder Horst Müller Kunststoffe (Lichtenfels, Germany) says it is helping product manufacturers take advantage of renewable raw materials in their applications by adding performance and processing benefits of styrenic block copolymer (SBC) thermoplastic elastomer (TPE) from this manufacturer. Horst Müller's Lifocork is a range of cork-based products where the SBC enhances cork's natural non-slip, comfort, durability, and moisture absorption performance while reducing production time and increasing cost-effectiveness. Containing a high proportion of natural cork, Lifocork provides comfort and tear-resistance due to the softness and strength via the inclusion of SBC. It has UV-light resistance, will absorb perspiration, and can be colored to improve aesthetic appeal. The degree of stiffness and elasticity can be tailored to the final application. Lifocork can be combined with polyolefins through 2K injection molding. The material is suitable for orthopedic footwear and supports.

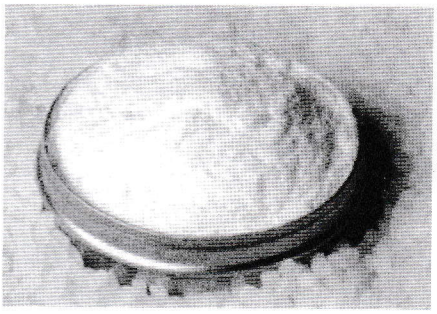
Kraton Polymers US LLC, Houston, TX, U.S.A.;
+1 281-504-4700; www.kraton.com

MASTERBATCHES

Alternative offered for use of silver

Biosafe antimicrobial masterbatch based on silane rather than silver is said to provide good protection in extruded or injection molded applications. Jean Sirois, general manager at the producer, says the silane-based technology renders plastics inherently antimicrobial at a more cost-effective and faster-acting rate than competitive silver-based additives. Additionally, the masterbatches do not discolor, tarnish, or yellow applications, which Sirois says can be a problem with antimicrobials based on silver or triclosan. "The active ingredient in these antimicrobial masterbatches only needs to be at a 0.25-0.5% loading in the final product to be effective," says Sirois. "These masterbatches work by physically puncturing and rupturing the cell wall to inhibit microbial growth." Conventional antimicrobials kill by leaching into the cell, where they are metabolized and interfere with critical life processes. He claims this can cause microorganisms to mutate and adapt, thereby becoming resistant to the antimicrobial. This masterbatch is FDA-listed as a modifier to medical devices. It is available for use in polyurethane, polyester, acetal, polycarbonate, nylon, vinyl, thermoplastic elastomers, and polybutylene terephthalate. In certain cases it may be suitable for inclusion in ABS, polypropylene, or polyethylene.

RTP Co., Winona, MN, U.S.A.;
+1 507-454-6900; www.rtpcompany.com



RTP's Biosafe antimicrobial masterbatches offer low toxicity of the active biocide, which will not leach or off-gas into the environment.

PROCESSING AIDS

Rheology-modifying wax adds more value

Aquatix 8421 is a rheology-modifying wax emulsion to improve orientation of effect pigments in water-borne systems. It reduces cloudiness/mottling and provides anti-settling properties during storage and application. Compared to clays and acrylic thickeners, it is easier to handle and incorporate. It is less sensitive to co-solvents than polyurethane-based thickeners. It can improve the brilliance of effect pigment slurries that are co-solvent free. The material is an emulsion of a modified ethylene-vinyl-acetate (EVA) copolymer wax. Predilution with water is not required when processing. Due to its acidic nature, it reduces the pH-value.

BYK-Chemie GmbH, Wesel, Germany;
+49 281-670-0; www.byk.com/additives

Source : Modern Plastics Worldwide

PET Perform Expertise

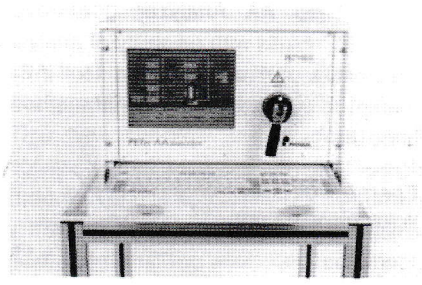
Piovan, the Italian leading Company in the production of auxiliary equipment for plastic material processing, strengthens its direct presence in India through its subsidiary located in Mumbai.

The Piovan presence in the territory follows the Group strategy, totally focused on the customer and his product.Piovan is present all over the world with 15 direct service & sales structures, three production sites (Italy, Brazil and China), and more than 50 Distributors and Agents.

Piovan India Pvt Ltd was incorporated in October 2003 and officially started trading on the 1st of April 2004. In April 2008 the branch moved in to new offices in Saki Naka – Mumbai, increasing its workforce to 8 people.

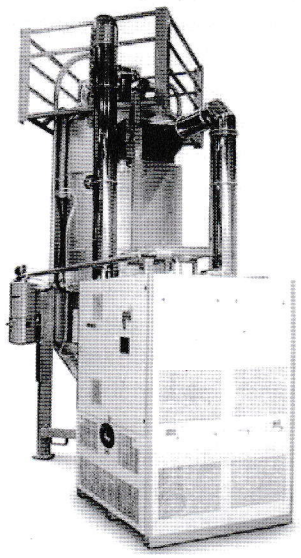
Although Piovan India has provided its customers with an efficient service in the past, this new office and additional staff in India will result in customer's enquiries being dealt with promptly by experienced sales and service personnel based in the South, the Centre and the North of the country. Customers will benefit from having local Piovan contacts that can provide reliable support and service as required.

Piovan India provides attentive service, prompt support and solutions that contribute to effectively improve the value of the finished plastic products, key factors to win customer confidence in the territory. Moreover, visits to customers are done on a regular basis to carry out service work and plant audits. These regular visits help customers identify spare parts requirements, fine tune the equipment, train any new operators and maintenance engineers to ensure their equipment is running at its optimum. One of the major factors of merit for Piovan is represented by the capabilities and skills of competent and qualified personnel, that knows markets, application processes, customer needs and respective product specifications. Piovan's entire range of ancillary equipment includes raw material storage systems, handling equipment, dryers, dosing and blending units, mould temperature controllers, water chillers and granulators. Software and engineering capabilities complete the offer.



Piovan is active in the sectors of Injection & Blow Moulding, Extrusion, and PET Preform, and, with reference to the latter, the company will be present at the next DrinkTech show of Mumbai (Stand 42).
In the latest 15 years Piovan has supplied some 3000 systems to the PET perform sector. The company today holds a solid position of leadership worldwide.All the equipment that are part of a complete PET system, are driven by the basic aspects of the production process, like:
- energy utilisation
- infrastructures
- maintenance and spare parts
- process automation One PET system of the latest generation, composed of dryer, chiller, circulation pumps for the cooling water, resin feeding system and mould dehumidification unit, can guarantee energy utilisation optimisation as high as 50%, or more, if compared to the average consumption of the systems currently in operation in the field.

The innovation of the new PET systems of Piovan is expressed in many other characteristics, like design, components and controls.



The ultimate and innovative design, that combines compactness and high capacity, presents one neat advantage to overcome the very common limitations imposed by an ordinary PET solution, thus allowing the user to make use of conventional/standard infrastructures, eliminating the need for high head room and mezzanine floors, typical requisites of today's preform production lines.

The new components and the accurate selection of those contribute to the containment of the overall running costs of a PET system, cutting the activities of ordinary maintenance to almost zero.
Production constancy is above all ensured with the new control. All new drying systems allow set-up and automatic memorisation of all operation parameters, such as: start-up, shut-down, hopper fill-up, material change, temperature and time for the drying process. All of this allows any operator to easily interact with the system preserving all process parameters. An additional example of how Piovan expertise can improve the quality of the finished product, is represented by the PETes AA Analyzer.

PET Perform Expertise

PETes is a method of analysis to determine the content of acetaldehyde in PET preforms. The instrument was first launched in the market in year 2003.
Proved and concrete benefits are:
optimum repeatability
reliable output values
reduction of analysis complexity and of all correlated potential errors improvement of the quantity of analysis with decrease of work load for the operator flexibility and simplicity of use cost reduction of the analysis PETes is a method of analysis that allows to measure the acetaldehyde contained in PET preforms in a simple, rapid, reliable, repetitive and repeatable manner.

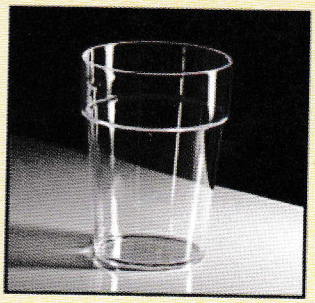
The whole preform is analysed, keeping the principle of the gaschromatography technology. The result is accuracy, stability and repeatability, as the analysis is not anymore subject to any preventative preparation of the sample.

One more advantageous characteristic of the PETes AA Analyzer is its compactness. In one single desktop type cabinet, the unit incorporates one de-adsorption cell, one gaschromatograph, one microprocessor control and one colour LCD interface to the operator.
Two versions for the PETes AA Analyser are available: Lab, for use in a laboratory environment and Turret for industrial usage (production floor).
The PETes AA Analyser also features automatic procedure for the gaschromatograph calibration, to be performed with either acetaldehyde solution or ethanol.

The PETes AA Analyzer guarantees excellent results with reliability of analysis greater than 99% and positions itself in the market to oust the conventional methods once used.

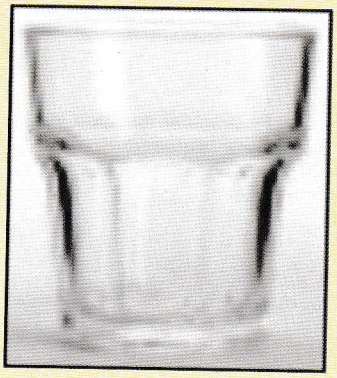
For more details:
www.piovan.com

Source : Modern Plastics India Magazine



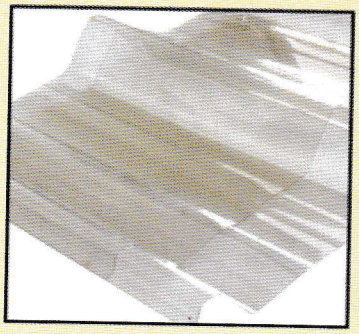
JoshPAC

Disposable PET Glasses



National Moulding Company Ltd.

3C, Camac Street, Kolkata - 700 016
T/F : 0 33 2229 4125 / 4435 | M: 0 98318 48103
E: nmc@joshgroup.com | W: www.joshgroup.com



JoshBLIS

Thermoformable PET Sheets

Technology for Productivity

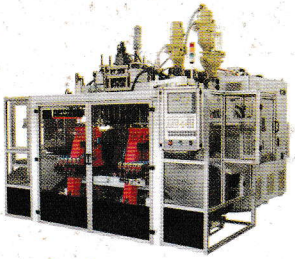
Ferromatik Milacron India offers wide range of Injection & Blow Moulding Machines for a variety of plastic processing applications. Please contact us for your specific needs & we shall provide you a technologically superior solution.

MAGNA-T
Toggle Injection Moulding Machines
30 to 500 MT

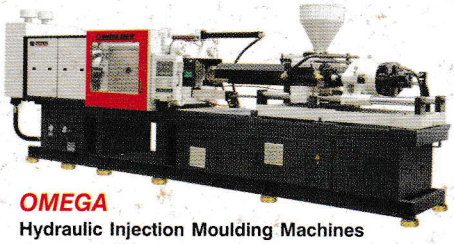
ELEKTRON
All Electric Technology
50 to 155 MT

PET SERIES
PET Preform Production Systems

PVC LINE
Hydraulic Injection Moulding Machines
100 to 910 MT

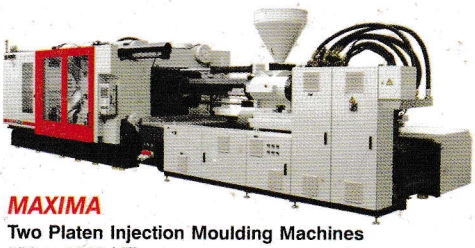


UMS - Shuttle Series
Extrusion Blow Moulding Machines



OMEGA
Hydraulic Injection Moulding Machines
80 to 910 MT

HYDRON
Hydraulic Injection Moulding Machines
100 to 450 MT



MAXIMA
Two Platen Injection Moulding Machines
500 to 3000 MT

FERROMATIK MILACRON *India*

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