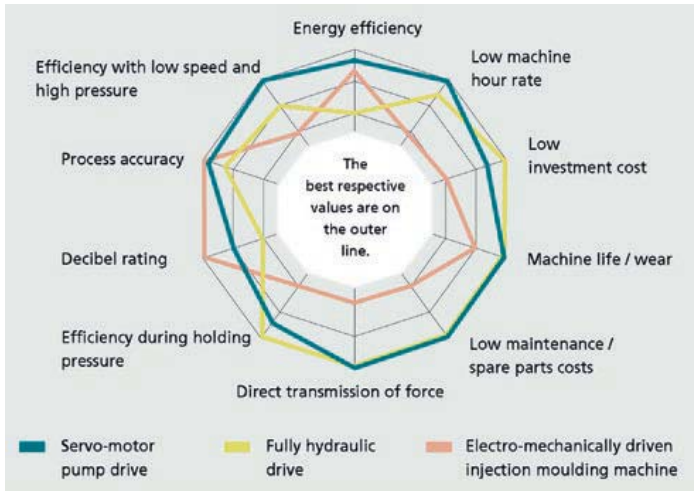




A step by step design to more efficiency

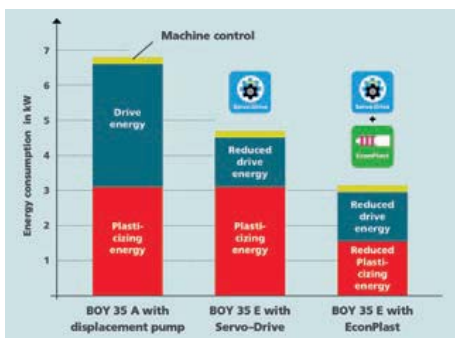
Energy costs during injection moulding can be reduced using different modern technologies



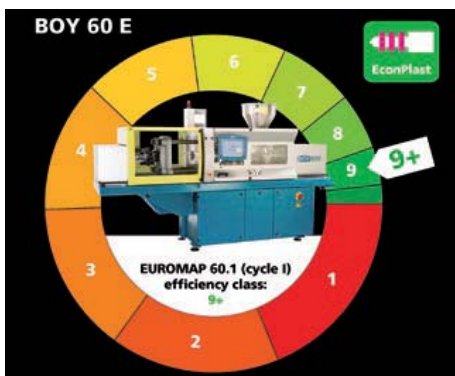
Servo drive advantages: here is a comparison with fully hydraulic and electro-mechanical driven injection moulding machines Photos and Illustrations: Boy



BOY introduced the new EconPlast plasticizing technology last year at K



Using the EconPlast technology, the heating power is reduced from 3.1 kW to 1.55 kW. The total energy consumption of a BOY 35 E with EconPlast unit with this application is only 3.15 kW – an energy savings of about 54 % compared with the former BOY 35 A.



Equipped with servo drive and EconPlast, the new BOY 60 E and BOY 100 E both achieve the Euromap 9+ classification

Injection moulding With the drive and plasticizing technologies used today, plastic parts can be produced more precisely, more cost-efficiently and material-friendlier than just a few years ago. Energy savings of 50 % and more are possible due to the use of a servo-motor pump drive and the newly developed and patent pending EconPlast heating technology. Comparative tests show how the efficiency has improved when compared to previously designed injection moulding machines.

Considering the period 20 years ago, the use of electronically controlled variable displacement pumps (DFE pumps) had achieved an energy savings of about 15% compared with previous drive technologies. In the course of increasingly strong competition and due to ever-rising energy costs, the demand for more energy-saving machines became apparent.

In 2008, BOY became the first European injection moulding machine manufacturer to use servo-motor pump drives. With this drive technology and depending on the application, a 70% reduction in energy was possible when compared to DFE pumps. The main consumer became the "saving miracle" through the servo drive. The result was a lower energy input without the striking disadvantages the electro-mechanical machine design caused – including high initial costs, higher connected loads and more complex mechanics.

Faster, more dynamic and quieter

The servo drive technology does not only set standards in terms of energy saving, but also provides further advantages: faster and more dynamic method of operation with speed-regulated conveying rate, about a 20% noise emission reduction and

motor warming so that less cooling energy is required. With the servo drive, the driving side is no longer the main consumer of energy, but rather the plasticizing and dosing of the plastics. Therefore it was important for BOY to also optimize this process. This was done in 2013 with the development and introduction of the new EconPlast plasticizing technology at K 2013.

After many years with hardly any further developments in the melting of plastics, BOY has now made the plasticizing process significantly more efficient with the EconPlast technology. For example, the electrical heating power (-40 %) and energy losses during dosing (about 60 % less) for a BOY 35 E can be significantly minimized.

Additional advantages are a faster and more direct temperature control and as a result, shorter starting-up and heating-up periods. The reject rate is also reduced due to the material-friendly and low-friction material processing. Compared with the high wear-resistant plasticizing units, the EconPlast unit achieves longer working lives. Further benefits are the improved feeding zone cooling and the improvement of the material melting with optimized homogeneity. Also, the energy losses to the environment and to the cooling water are clearly reduced. The high wear-resistant EconPlast plasticizing units are optionally available for all BOY injection moulding machines from a screw diameter of 24 mm.

Technologies can be combined

For optimal energy reduction, the combination of both technologies is recommended. An earlier BOY 35 A with a DFE pump and with conventional heaterbands has a total energy consumption of 6,8 kW. With the servo-motor pump drive on the BOY 35 E, the required drive energy is reduced by 2,1 kW to only 1,4 kW. Using the EconPlast technology, the heating power is reduced from 3,1 kW to 1,55 kW. The total energy consumption of a BOY 35 E with EconPlast unit is with this application is only 3,15 kW – an energy savings of about 54% when compared to the earlier BOY 35 A. The sum of these further developments in the field of drive and plasticizing technologies provide substantial benefits. According to Euromap 60.1, BOY injection moulding machines achieved top grades in their respective clamping force range. The scaling, which was created in the last year, provides the user well comparable classification numbers (from 1 to maximum 10) for grading the efficiency of injection moulding machines. Equipped with servo drive and

EconPlast, the new BOY 60 E and BOY 100 E both achieve the 9+ classification.

This must be considered: The smaller the injection moulding machine and screw diameter and the lower the material throughput per hour, the more difficult it is to achieve the highest classifications. For purely physical reasons, the top grade 10 is therefore almost not achievable for smaller machines.

With increasing energy costs and the commitment to continuous sustainability, energy, material and cooling water should be used as little as possible. A first move to save material is to use spruelless part production. When this is technically possible and reasonable, much energy and material can be saved during the production of sprues.

THOMAS BREIDEN, BOY www.dr-boy.de



Production of ICE model railway housings on a BOY 100 E.

The total energy consumption for the production of the 29 cm long and 38,5 g heavy housings was only 2,70 kWh.

Energieverbrauch	kWh
Pumpenantrieb	1.65
Heizzone	0.77
Heizkanäle	0.27
Σ	2.70



Servo-Drive



EconPlast



Technology



Abhängig von der jeweiligen Maschinenausstattung ist die aufgeführte Effizienzklasse erreichbar.

According to Euro-map 60.1, through the combination of servo drive and EconPlast, energy classifications of up to 9+ are achievable.

Although the new energy label does not cover all applications, it provides conclusions about the machine efficiency.

BOY will soon mark all machines with the new energy label prior to delivery.