Die-casting

INTERNATIONAL MOLD STEEL, INC.

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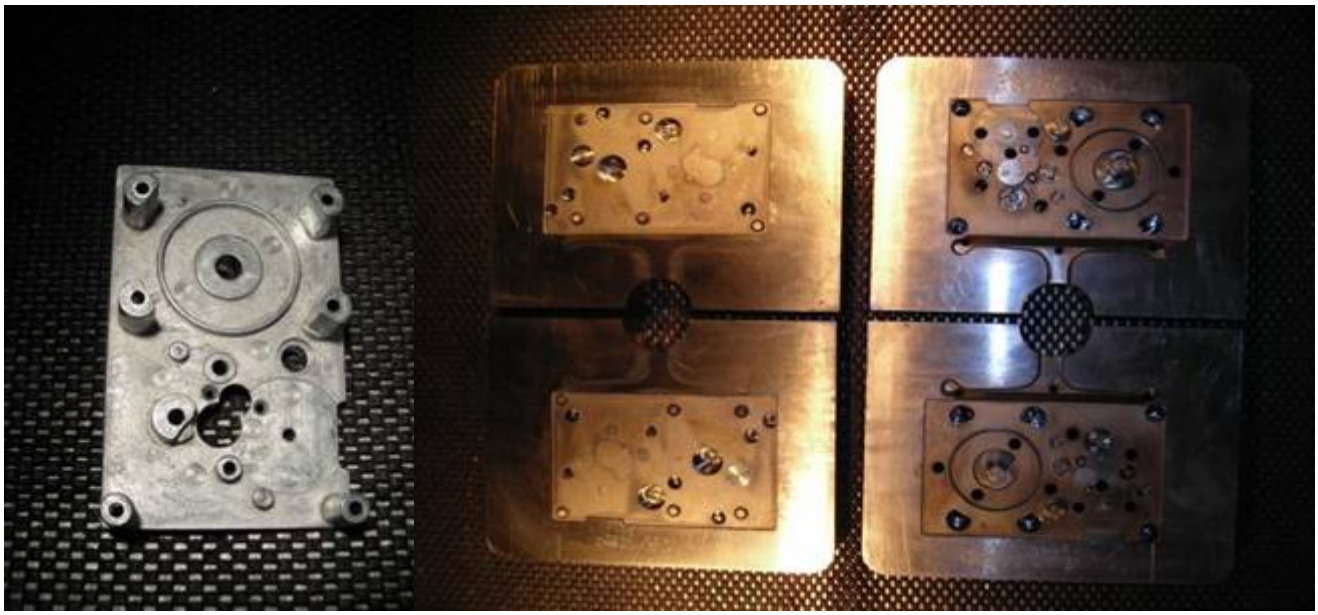
TOOLOX 44 in Zamak die casting



Function
Die casting of components in Zamak. The parts are mechanical components in electronic valve actuators. TOOLOX 44 is used for the inserts in the die casting mould.

Previous steel solution
The mould is a new design. For similar previous moulds, W.Nr. 1.2344 heat treated to 44 - 47 HRC has been used. Probably ESR-quality.

Manufacturing
The moulds are made by the Barcelona based company GARME. They say that after initial work in finding the right tooling, they don't experience such a difference in the machining as compared to working with non heat-treated W.Nr 1.2344.

They see large economical benefits with TOOLOX. Besides, giving a lower purchase cost they also see large benefits in manufacturing time. The normal time to manufacture the mould in W.Nr 1.2344 is 300 hours. Using TOOLOX 44 a reduction by 50-100 hours was achieved due to elimination of heat treatment.

Experience
The customer is a manufacturer of electronic equipment. The inserts were made in the end of 2005. Until January 2007 around 15,000 pieces have been made. The result has been at least as good as when using W.Nr 1.2344. The final series will probably be 200,000 details.

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Function
Mould for manufacturing of Zamak pieces used for a coffin decoration. For aestethic reasons, the must to have a very good surface quality.

Previous steel solution
W.Nr 1.2343 hardened and tempered.

Manufacturing
Machining went well. The necessary surface quality was obtained without any reported complications. Significant cost and time savings were obtained due to the elimination of heat treatment in mould manufacturing.

Experience
The die has been in use since the end of 2005. So far with good result.

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TOOLOX 44 in brass die casting

Function
Mould for die casting of brass components.

Material
Brass.

Previous steel solution
QRO 90 heat treated to around 48 HRC. Technically a well working, but expensive, solution.

Manufacturing
It was possible to reach better surface on TOOLOX 44 after polishing than with the previous steel. This was considered important by the customer. Machining of the mould went well.

Experience
TOOLOX 44 was used in a parallel test to QRO 90. In the mould as well as in the cores. In the cores, TOOLOX 44 was worn out faster than QRO 90. The mould itself was run to the full series of 45,000 pieces. Almost no difference could be seen between the TOOLOX 44 and the QRO 90 moulds. The only difference was slightly better surfaces on the QRO 90 part. The customer has decided to introduce TOOLOX 44 as standard for the application and also initiate a test with larger moulds.

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TOOLOX 44 in aluminium die casting of automotive engine cover

Function
Aluminium die casting mould to manufacture covers used in car engines. The moulds are made in a series of 80. To make covers in different diameters up to around 300 mm. Each mould makes two covers in one shot.

Previous solution
W.Nr 1.2343 heat treated to 46 - 48 HRC.

Manufacturing
No major complications reported during manufacturing.
Significant savings in time and cost due to that heat treatment was eliminated when using TOOLOX 44.

Experience
Initially, the customer made two moulds in TOOLOX 44 (= making four details at the time). These moulds were made in early 2005. Since then, the moulds have been in production, parallel with the moulds made in the previous steel. Two years later, the TOOLOX moulds still work well. The customer has decided to use only TOOLOX 44 for a new series of 80 moulds they plan to make, thereby leaving the previous solution. The change will represent a significant increase in the productivity at the customer.

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TOOLOX 44 for aluminium die casting

Function
Piston for a Piaggio Vespa scooter.

Previous solution
W.Nr 1.2343 ESR-quality heat treated to 46 - 48 HRC. Technically, the solution worked well at the customer.

Manufacturing
The piston is made in ten different sizes. Therefore a series of ten moulds were made. TOOLOX 44 blanks with 130 mm thickness were used in the manufacturing. Usually, a mould like this is manufactured in four weeks. Using TOOLOX 44, one week manufacturing time can be saved due to heat treatment can be eliminated. No surface engineering was made.

Experience
The mould went into production early 2006. So far it works fully satisfactorily.
The customer has also used TOOLOX 44 in a significant number of other projects.

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TOOLOX 44 in aluminium die casting

Function
The piece is used for locking moveable ladders systems.

Previous steel solution
W.Nr. 1.2343 ESR-quality heat treated to 46 - 48 HRC. Heat-checking typically appears after 6,000 cycles. Stress relieving after each 10,000 cycle interval was normally always carried out.

Manufacturing
With TOOLOX 44 no heat treatment had to be carried out and the mould manufacturing time could be halved. The total cost of the tool was reduced by 20 % as compared with the previous solution.

Experience
The die went into service in March 2005. Since then at least 80,000 production cycles have been made. The mould is still running.

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TOOLOX 44 in aluminium die casting

Function
Die casting of an aluminium fixture for furniture.

Previous steel solution
W.Nr 1.2343 ESR-quality. The manufacturing time with this solution was around 30 days. Twelve days for machining, seven days for heat treatment and another eleven days for adjustments after heat treatment.

Manufacturing
A TOOLOX 44 blank with dimensions of 90x250x330 mm was used. The blank was delivered on 20th of February 2006. The mould was finished on 10th of March 2006, and tested on the 11th. The total manufacturing time was 16 days, including four days waiting for the mould base to be delivered.

The time savings correspond to eliminate heat treatment and the following adjustment of the mould to its final shape. Very small deformations were reported during machining in TOOLOX 44.

Experience
The mould went into production in March 2006. So far production it works well.

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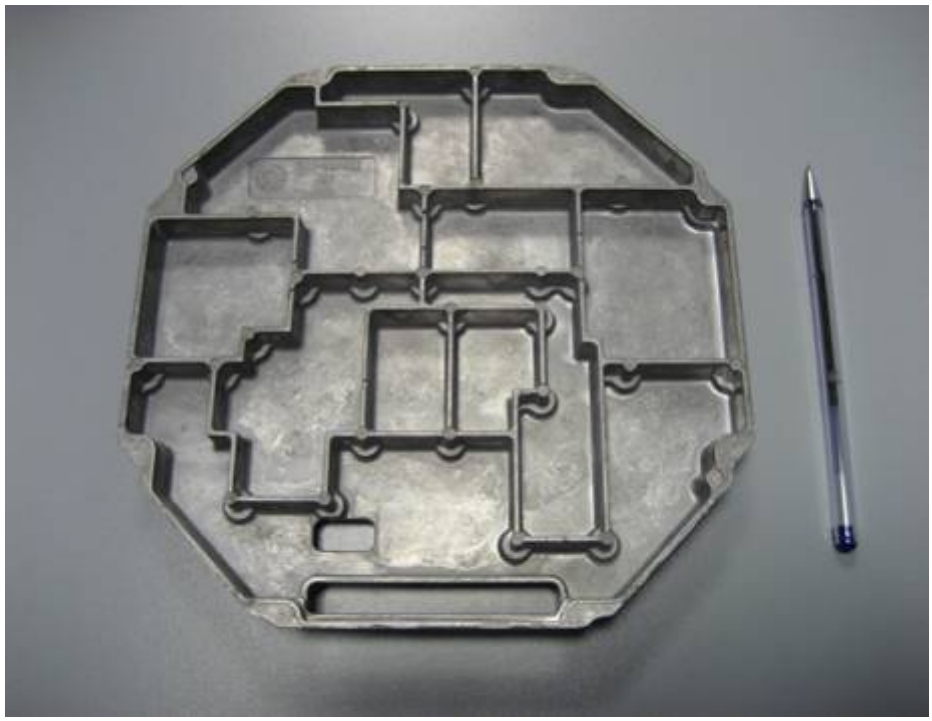

Function
Die casting of components covering the cutting blade in a lawn mover.

Previous solution
W.Nr 1.2343 hardened and tempered.

Manufacturing
No major complications reported during manufacturing.
The mould is not surface engineered.

Experience
The die went into production in 2006. An annual production of 100,000 components is estimated. So far running production works well.

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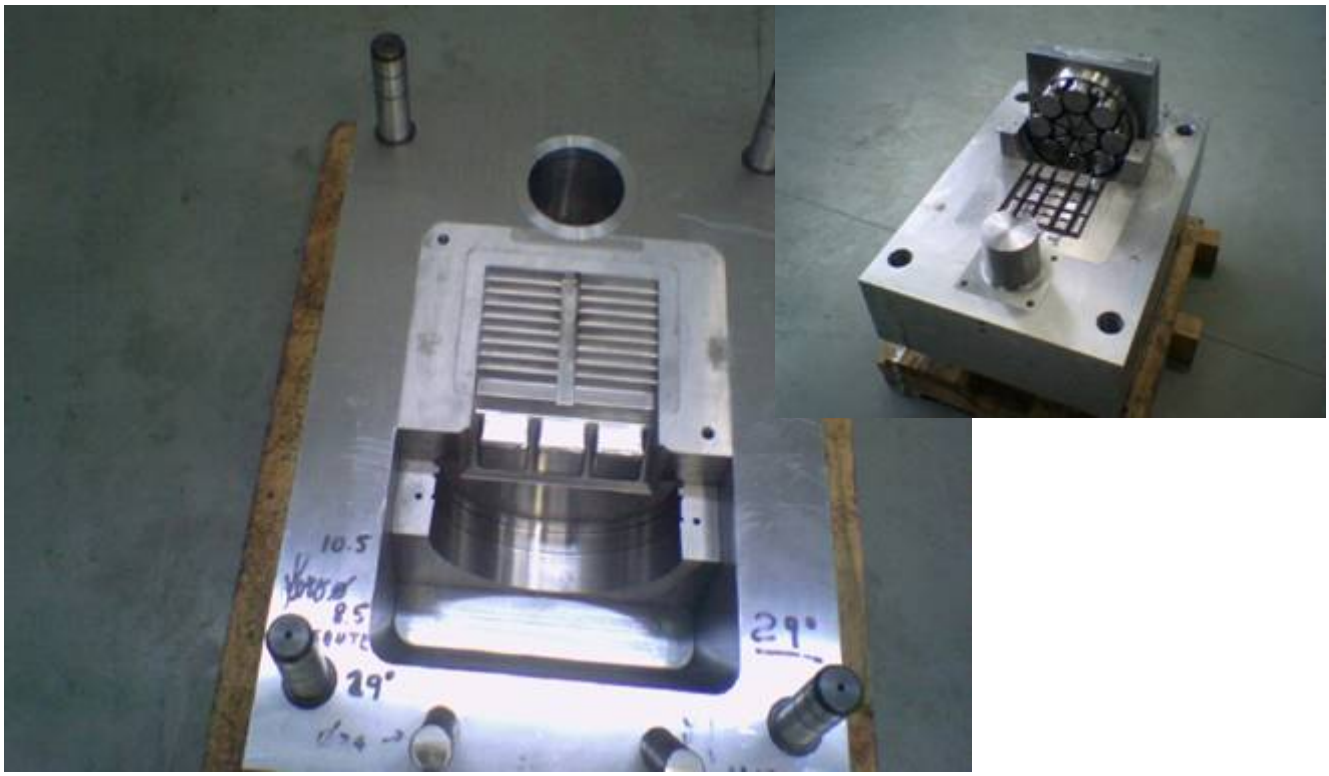

Function
Mould for die casting of aluminium component.

Previous solution
W.Nr 1.2343 ESR-quality, hardened and tempered. A well working solution.

Manufacturing
The entire mould is made in TOOLOX 44. Starting from 130 mm blanks. Each blank weight is approximately 10 kg. Besides some problems with threading, machining went well. No surface engineering was carried out.

Experience
The mould went into use in the beginning of 2005. So far no backlashes.

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TOOLOX 44 in Aluminium die casting

Function
Mould for die casting of an aluminium component.

Previous solution
W.Nr 1.2344, hardened and tempered.

Experience
Due to a corrosive attack from the liquid aluminium was noticed after approx. 10,000 shots was the die PVD-coated (CrN). After the coating were another 80,000 components produced.

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