
Z-FORM & MITSUBISHI MATERIALS

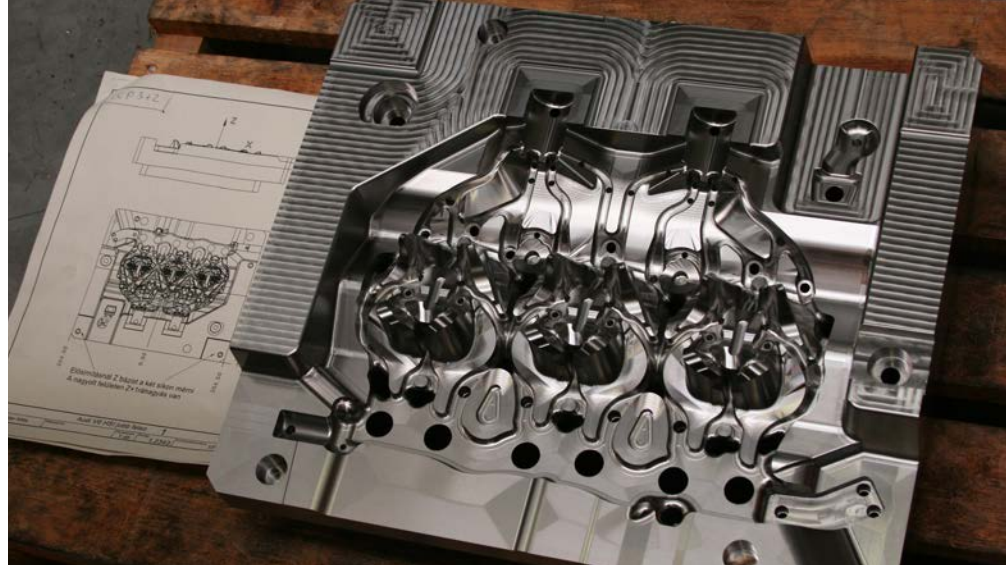
SUCCESS STORY MOULD & DIE



MACHINING EXCELLENCE
FOR MOULD AND DIE APPLICATIONS



Z-Form workshop



Materials ranging from tool steels through to hardened steels up to 62HRC, plus aluminium and copper are machined at Z-Form. A complete service is provided for customers that includes conception, design, planning, machining and testing of moulds.

Machining excellence for mould and die applications

About MS Plus

Profile Solid carbide end mill series for general machining

Range

- Ball nose end mills: DC Ø 0.2 – 12 mm
- Corner radius end mills: DC Ø 0.2 – 20 mm
- Corner radii RE: 0.05 – 0.5 mm
- Various neck lengths: 2.5xDC – 12xDC
- Square corner end mills: DC Ø 0.2 – 20 mm

Features

- Versatile end mills for universal machining
- Irregular helix flutes to reduce vibration
- Long tool life on materials up to 55 HRC



MS Plus end mill series



Tool reliability and versatility are essential for the mould and die industry, especially when it comes to the machining of prototypes or small lot production of complex shapes. For Z-Form, the Hungarian industry manufacturer of rubber and plastic moulds, utilizing universal tools that permit unmanned operation and maintain high quality standards while keeping operating costs down is part of the business strategy. Since 2012, the company has implemented Mitsubishi Materials tooling solutions to meet the special requirements of the different moulds required across different industries.

Succeeding Taurus Hungarian Rubber Works (1969), and taking over their technology and know-how, Z-Form was founded as an individual company in Budapest in 1993. The company has been producing rubber moulds for over 40 years and has gradually expanded its product portfolio through a diversified range of moulds for plastic, die casting tools and other unique metal components. The exponential growth and forecasted development as well as the increased demand for sophisticated machining solutions for the automotive industry in Hungary have led Z-Form to focus on this industry. Today more than 80% of the company's orders are from the automotive industry and 20% from the consumer electronics and home appliances industries. A broad partner network enables Z-form to serve

international customers across Europe, identify specific market needs and develop tailor-made solutions. The company is constantly increasing production capacity by expanding its workshop with new state-of-the-art machines. With 16 3- and 5-axis machining centres, a number of CNC lathes, die-sinking and wire erosion machines, Z-Form is processing a wide range of materials such as aluminium and copper, plus pre-hardened and hardened steels up to 62 HRC. "Our primary focus is to offer our customers a complete service for diverse mould and die applications, from consulting and conception to planning and designing and ultimately to machining and testing. To maximise efficiency in our value chain and increase



Roland Nagy, Cad/Cam programmer Z-Form

productivity in the daily operations we only work with reliable partners such as Mitsubishi Materials that can provide us with first-class tooling solutions and guaranteed quality", says Sándor Gál, managing director of Z-Form.



(From left to right): Csenge Igali (technical manager Z-Form), Zoltán Bálint (tooling manager Lovász), Bence Szabó (machine operator Z-Form), Attila Polgár (application engineer Lovász), Tibor Horvath (Mitsubishi Materials representative).



Sándor Gál (managing director Z-Form) and the machine operator checking the application parameters.

Versatility and reliability are the key to efficiency

Z-Form's expertise in offering customised solutions is based on a high degree of engineering competence along with a careful material and cutting tool selection. This is made possible with the support of Mitsubishi Materials experts and the engineers of the company Lovász* that consult and plan closely together with Z-Form on every new project. Commenting upon this cooperation, Csenge Igali, Z-Form's technical manager, says: "We strive to implement an agile project management process to optimise our daily business. For all new projects, we choose the cutting tools primarily because of their general characteristics and quality based on previous, reliable machining results rather than due to absolute high performance. In weekly meetings, we discuss with our partner company Lovász the upcoming projects and rely on their advice regarding the most suitable Mitsubishi tooling solutions. The machining results we have experienced the last 5 years give us great confidence in the technologies of Mitsubishi Materials."

Depending on the workpiece complexity, machining cycles can stretch over many hours therefore a high level of automation is required to increase speed and cost efficiency of production. "The versatility of Mitsubishi's tools is outstanding. For example, the AJX indexable insert cutter with VP15TF grade inserts used

on roughing operations and the coated range of end mills are applicable over a huge range of applications. This versatility applies whether the materials are normal or hardened, and enables automatization and long machining cycles without changing the tool", Zoltán Bálint, tooling manager at Lovász confirms. "The product ranges of Mitsubishi are so broad that we can cover the customer's needs from the standard portfolio. In some rare occasions we also offer slightly modified standards" Zoltán continues.

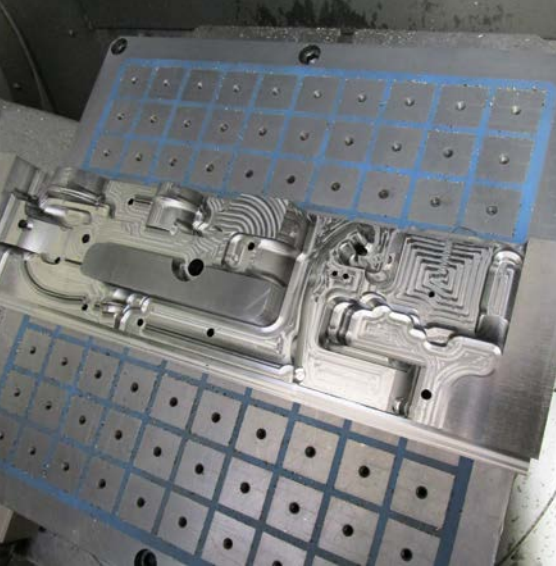
It was for the finishing of a prototype of a car headlight lens mould (steel 1.2343, with a hardness of 48 HRC) that Z-Form consulted with Mitsubishi Materials experts about a suitable tool. The ball nose end mill from the MS-Plus family was recommended due to its high all-round versatility and ability for reliable, continuous cutting and the outstanding component surface finish quality it can produce. The ball nose, Ø12 MP2SB used for this finishing operation was used at 260 m/min speed at a feed rate of 1500 mm/min. This enabled an emphasis on absolute reliability and surface finish quality rather than out and out speed. "Sometimes absolute high speed and performance can be risky on expensive one off components where one tool change can soon negate the gains of higher speeds," stated Tibor Horvath, tooling expert of Mitsubishi Materials in Hungary. "The customer requested us

About AJX

Application	High feed milling die & mould machining
Range	Arbor type, screw in type, shank type. Insert sizes 06, 08, 09, 12, 14
Grades	Steel up to 55 HRC, stainless steel, cast iron, HRSA, titanium alloys
Features	For roughing. Multifunctional for face milling, ramping, copying, pocketing and helical milling. ap up to 2 mm. Feed rates up to 3.5 mm/tooth.



AJX high feed milling cutters



Machined workpiece with MS Plus ball nose end mill



The machining of complex shapes requires careful planning.

ABOUT Z-FORM

Established by Taurus Hungarian Rubber Works in 1969, Z-form Ltd. has more than 40 years of experience in producing rubber moulds and nearly 20 years of experience in manufacturing injection moulds for the plastic industry. The company has been privately owned since 1993. Z-form produces around 100-120 new mould and die sets each year - for parts with both visible and technical surfaces. These are mainly for components for customers based in Hungary, across central Europe, Germany and Austria and are used in the automotive and electronics industry, household appliances as well as for pipes and seals with complex geometry. Z-form employs an experienced team of tool designers and CAM engineers. In addition to the design and production of new tools, Z-form also deals with the maintenance, modification and reparation of existing moulds as well as manufacturing mountings and spare parts such as form inserts, slides and other complex tool components.

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ABOUT MITSUBISHI MATERIALS & LOVÁSZ FORGÁCSOLÓ KFT.

Mitsubishi Materials Corporation is a leading Japanese company, specialising amongst others, in the production of cutting materials, coatings and precision tools for the metal working industry. Mitsubishi Materials Corporation operates Head Offices in Europe, India, Brazil, China, USA, Japan and Thailand, a modern Research and Development Centre in Japan and several production facilities throughout the world. The Corporation employs over 23,000 people in more than 77 countries.

Lovász Forgácsoló Kft. is an authorized distributor of Mitsubishi Materials in Hungary.

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to supply them with tools he can absolutely rely upon for machining of these costly one off projects.”

Due to these excellent results, Z-Form has recently changed its machining strategy and now utilizes Mitsubishi's tools in similar applications across the whole factory. The AJX high feed milling cutter with indexable inserts is used for roughing operations and the MS-Plus or various end mills of the Mitsubishi Miracle series for the pre-finishing and finishing operations. Roland Nagy, CAD/CAM programmer at Z-Form says: “With this tool combination the power consumption is considerably lower and the machine runs smoothly, even when the tools are performing at or near their maximum level. The high feed rates of AJX allow us to reduce machining time and the MS-Plus range guarantees a competitively priced tool that provides high quality surfaces, which is a critical parameter in the mould and die industry”. For the small parts machining Z-Form utilizes Mitsubishi drills from 2.2 mm diameter and end mills from 0.5 mm diameter. “Especially the MS-Plus ball nose and corner radius cutters in such a small diameters through to larger diameters offer an easy choice of tool across a very wide spectrum of applications. This helps with the selection of the tool during programming and a reduction in tooling inventory costs”, added Csenge Iglai.

Z-Form has evolved to a consignment stock customer with a complete range of solid carbide end mills, indexable

insert end mills, face mills and drills available. Attila Polgár, application engineer at Lovász, is very pleased with this development. He remembers the first tool trial with a DC diamond coated cutter for a graphite application. “This very first trial was the start of our cooperation with Z-Form. Our advantage is that Mitsubishi Materials has advanced solutions for a wide variety of applications so that Z-Form currently invests over 70% of their tooling budget in Mitsubishi cutting tools. We remain close to our customers, watching the market and issuing tool performance benchmarks to offer targeted solutions for each application”. Tibor Horvath adds: “At Mitsubishi we place great value on high standards of quality in all our service areas, especially on personal contact and prompt customer responses. We offer high quality solutions in competitive prices to meet the customers' needs”.

With the recent product portfolio expansion of Z-Form to die casting tools and other general components, Z-Form's demand for advanced tooling solutions is increasing. “We count on having our partners Lovász and Mitsubishi Materials on our side for all future projects. This will help us remain competitive and relevant in this demanding market place”, Sándor Gál concludes.

*Lovász Forgácsoló Kft. is an authorized distributor of Mitsubishi Materials in Hungary.