
MITSUBISHI MATERIALS & BAUM ZERSPANUNGSTECHNIK

FACE MILLING WITH WSX445



In cooperation with

MMC Hartmetall GmbH

A Group Company of  MITSUBISHI MATERIALS CORPORATION





Problem solved: The WSX445 face milling cutter from Mitsubishi Materials was used to mill a large, unstable fabrication made from St52 steel in a process which was both extremely efficient and easy on the machine tool.

Face milling an unstable fabrication

When Baum Zerspanungstechnik had difficulty milling a large and unstable fabrication, they turned to MMC Hartmetall, the European headquarters of Mitsubishi Materials Corporation cutting tools division. Due to the tight time-frame, Mitsubishi brought their new multi-purpose WSX445 face milling cutter to Marl and managed to quickly solve the problem.

Baum Zerspanungstechnik is a manufacturing company based in the German county of North Rhine-Westphalia and specialises in making prototypes, one-off items and small-scale batches. "As a service provider to the engineering industry, we specialise in making challenging turned and milled parts," explains Managing Director Melanie Baum. "At the present time, we have about 150 active customers from sectors as diverse as the food and drinks processing industry, general mechanical engineering companies through to conveyor systems suppliers and the textile industry as well as manufacturers of drive-trains, plumbing fittings and pump manufacturers." The most commonly machined material, as typified in the drive-train and mechanical engineering sectors, is St52-3 mild steel, but we also mill high-strength materials such as 42CrMo4 alloy steel for transmission system components, as well as stainless steels, 1.4301 and 1.4057 for the food industry. At times, we are also required to work with more exotic materials, such as super-duplex steel.

"With this wide range, we prefer to machine parts that are too heavy to be moved by hand and this means workpieces weighing up to 16 tonnes," continues Baum. "Our lathes can handle parts up to 1600 mm in diameter and up to 6 m in length, and we can mill workpieces of up to 6.5 m in length."

Unstable, large workpiece

It was a sizeable component with a diameter of 2.5 m that recently caused Baum problems when it came to face milling: The tool that was being used was prone to vibration, making a lot of noise and putting a heavy load on the machine. Why? The St52 steel fabrication, which was being rough machined without coolant on a Kao Ming KMC milling machine, was very unstable. In parts, it was also uneven, meaning that different thickness's of



stock material had to be removed from the surfaces, which led to some intermittent cutting.

To add to the challenge, not only was the parallel tolerance have to be guaranteed to a tenth, there was also extreme time pressure due to the impending delivery date. Due to these factors, Production Manager Marco Seidel turned to Mitsubishi's tool specialists who he had already cooperated with successfully on turning projects. When Uwe Schreiber (Sales and Technical Support) and Johannes Hinzen (Application Engineer) came to Marl, they brought with them a brand new face mill from Mitsubishi. "We set up the cutter and ran it in," says Schreiber. "It worked perfectly from the outcome with very little adjustments in the feed and speed. The tool did not vibrate and there was little or no more background noise."

Highly efficient cutting tool

The solution used was the new WSX445 face milling cutter with positive double-sided Z-geometry inserts which give an extremely sharp cut with very low cutting resistance. In this case up to six millimetres of material had to be removed but the machine tool was powerful enough to cope. Baum used a 200mm diameter cutter with a fine pitch – fitted with twelve inserts of the new grade MP6120 with JM chip-breaker geometry designed for medium milling. "The parameters we used with this tool were excellent right from the start," says Seidel. "In fact, the WSX worked so well that we were able to increase the standard feed after the first run, even then the tool was still



The WSX445 easily fulfilled the quality requirements defined for face milling the fabrication. (2nd photo from left): **Johannes Hinzen** (Applications Engineer, MMC Hartmetall), **Marco Seidel** (Production Manager, Baum Zerspanungstechnik), **Uwe Schreiber** (Sales, MMC Hartmetall), **Melanie Baum** (Managing Director, Baum Zerspanungstechnik), **Stephan Sülzner** (Machining Engineer, Baum Zerspanungstechnik).

very quiet.” Originally, Schreiber and Hinzen had intended to remove the required six millimetres in three passes. “With the new tool, it only took us two,” says Seidel. “This enabled us to reduce throughput time by a third. What’s more, we obtained the specified dimensional quality immediately.”

The right insert for every application



Due to their low cutting resistance, the new WSX face milling cutters from Mitsubishi Materials are also suitable for less powerful machines. This is thanks to the double-Z inserts that have a positive angle of 26°. In order to clamp these inserts securely, the tool body must be equipped with conical insert seats and an AFI (Anti Fly Insert) mechanism. “Because of the double-sided geometry of the inserts, the seat is not simply a conventional image of the insert. Rather, it is clamped at the outer contact surfaces whilst the base of the insert sits on a conical section where it is held in place” explains Hinzen. “As a result, no chips can

penetrate behind the insert and damage its seating.”

“However, the really special feature of the new face mill is the double-sided inserts with eight cutting edges,” Hinzen reiterates. “With its double-Z geometry, the insert is designed to cut much more freely than other double-sided inserts.” What’s more, the chips removed at depths of cut up to 5 mm are safely discharged away from the cutter. This eliminates the risk of abrasive damage to the unused corners. For all applications, such as steel, stainless steel, cast iron and non-ferrous alloys there is an extensive range of precision sintered and precision ground inserts with chip-breakers for a variety of depths of cut and feeds. In addition, the PVD-coated inserts powered by Miracle Sigma technology give excellent stability at high temperatures and are extremely hard wearing.

Today, every machine has a WSX cutter

After successfully using the WSX face mill on the fabrication, Baum found many other uses for the tool. At the company’s production facility in Marl, all milling machines are now fitted with WSX cutters for both roughing and finishing and the majority of applications run with a fine pitch type cutter. “For carbon steel and alloy steel, we use a P20 or P30 grade depending on the application, whereas the somewhat tougher P30 has proved to be suitable for unstable workpieces. We have also achieved outstanding results when milling stainless steel with the MP7130

grade and the corresponding chip-breakers,” says Seidel. “In fact, these four grades and the choice of chip-breakers enable us to cater for all applications, whether the workpiece is stable or not. This is tremendously important for us.” The tools have an impressively tool life and with eight cutting edges they are extremely cost-effective.

The fact that Baum can call on support from MMC in relation to a wide range of products means that the cooperation goes beyond just milling and turning. Good results have also been achieved when testing drills. The next step in the cooperation will probably be to change all tools over to Mitsubishi Materials.





About Hans-Peter Baum Zerspanungstechnik e. K.

Baum Zerspanungstechnik is a manufacturing company with 32 years experience as a specialist manufacturer of prototypes, one-off items and small-scale series of items weighing up to 16 t. In addition to turning and milling, the company offers drilling, superfinishing, grooving, broaching and slotting of components, as well as the assembly of complex parts. Together with qualified partners, Baum also provides a range of additional services in the areas of surface finishing, heat treatment and coating.

State-of-the-art equipment and excellent production workflows backed by a dedicated and committed workforce guarantee top quality and reliable performance. Professionalism, flexibility and a spirit of cooperation are the core values of this family-run company. Baum Zerspanungstechnik is not only a certified specialist manufacturer but has also received a number of industrial and business awards.

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About MMC Hartmetall GmbH

MMC Hartmetall GmbH, located in Meerbusch near Düsseldorf, is the European headquarters of the cutting tool division of the Japanese Mitsubishi Materials Corporation. The company was founded in 1983 and has been supplying precision cutting tools and integrated solutions for the automotive and aerospace industries, for the medical device sector, for tool and die making and for general mechanical engineering for over 30 years. The company's product portfolio includes a wide range turning, milling and drilling tools. The European headquarters represents the Mitsubishi Materials Corporation in Europe. Additionally, five sister companies in the United Kingdom, Italy, France, Poland and Russia, together with a newly established branch in Turkey and a wide network of distributors, provide a comprehensive service throughout Europe. In addition, the parent company has a subsidiary in Spain, which operates not only as a local sales office but also as a production plant.

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ABOUT WSX445

Diameter range	Ø40 mm - Ø200 mm
Pitch	regular, fine, super fine
Geometries	L, M, R, H
Grades for	steels, stainless steels, cast irons, heat- resistant super alloys
Types	arbor and shank