



# Smart shimming

Need to eliminate play? Now you can peel that shim down to size.

Unfortunately it doesn't exist – a design made up of components without any tolerances at all. You can either accept this with a shrug or develop a nifty product that at least makes it easier to work within industrial realities. This is the idea: if a spacer is too thick, you simply peel off a thin layer so the rest fits exactly in the joint to be closed. Searching for a scrap of sheet metal just the right thickness? That's a thing of the past.

The Georg Martin GmbH, located in the German state of Hesse, has now perfected this idea. Day-to-day work in entire sectors of business is hardly conceivable today without the laminated sheet metal produced for use as intermediate layers or spacers in Dietzenbach, near Frankfurt. No matter whether it's Airbus, Liebherr, Rolls-Royce, TRUMPF or Voith – they all rely on the M-Tech brand when it comes to compensating for tolerances. “The term ‘M-Tech’ even appears on the parts lists in component drawings, where otherwise only numbers and material specifications are found,” says Christoph Martin, head of Marketing and Technical Sales. His father, Herbert, is the company's general manager.

When son Christoph talks about the products made by the family enterprise, it all sounds very technical: “Our standard sheets measure between 0.5 and 3.2 millimeters in thickness. Each individual layer is 50 or 75 micrometers thick.” The 3.2 millimeter version, for example, consists of up to 64 laminated metal foils. Customers can choose among five materials: aluminum, wrought aluminum alloy, brass, low-alloy steel and stainless steel. The client can select the geometry at will since Georg Martin GmbH produces according to drawings and punches or laser-cuts the contours using a Trumpf TC 2000R punching machine or a TruMatic 6000 L punching and laser cutting machine.

At the end of the 1950s the company acquired a license for a bonding process in the USA and has further developed that in a fully automated production process. “The key is to work with the suppliers of the rolled product so as to develop the right feedstock foils, since not all foils are suitable for bonding,” says Martin. The chemical pretreatment of the high-precision foils in the rolling mill may cause undesired bubbles to form on the surface during lamination.

### The “tear-sheet calendar” for technicians

The company in Dietzenbach cuts the metal foils to into sheets measuring 600 by 1200 millimeters before heat-laminating them in stacks. “The adhesive layer is so thin that no residues remain when a layer of metal foil is peeled off later,” explains Martin. Although the adhesive layers in the finished product are only a few micrometers thick, the individual layers are bonded so tightly to each other that the 0.2 per cent compression limit for the laminated sheet differs by only 20 per cent from a solid, hard-rolled product. This has been confirmed in tests conducted by the State Materials Testing Institute in Darmstadt.

Georg Martin GmbH produces not only laminated sheet metal under its M-Tech brand. It also makes up individual

high-precision sheets and sheets bonded at one edge only. Service technicians make use of these “tear-off calendars” in maintenance, for example, enabling them to quickly compensate for component tolerances. Over 80 per cent of the M-Tech business involves customer-specific solutions, while products such as ball bearing spacer rings and sheet cut to size for industrial needs account for the rest.

The family enterprise makes more than half of its sales with M-Tech. “In Germany, as a manufacturer of peel-off M-Tech laminated sheets and special solutions, we have no competitors in this niche,” states Martin. Company figures show that exports make up around 30 per cent of production, but Martin – who holds degrees in both business administration and engineering – estimates that three-quarters of the M-Tech sheets are ultimately used abroad, “since German companies export the majority of their machines and equipment.” For the company in Dietzenbach this means big business with small tolerances. □

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The layers of metal foil, just micrometers thick, can be removed without leaving any residues.

### Shims for tolerance compensation

- Who:** Georg Martin GmbH, Dietzenbach, Germany. Established in 1945, approx. 100 employees, sales of 11 million euros, of that approx. 6 million euros with layered shims. [www.georg-martin.de](http://www.georg-martin.de)
- What:** Metallic layered shims, primarily for customers in the printing press and custom engineering sectors as well as the aerospace industry
- How:** TruMatic 6000, TRUMATIC 2000 ROTATION