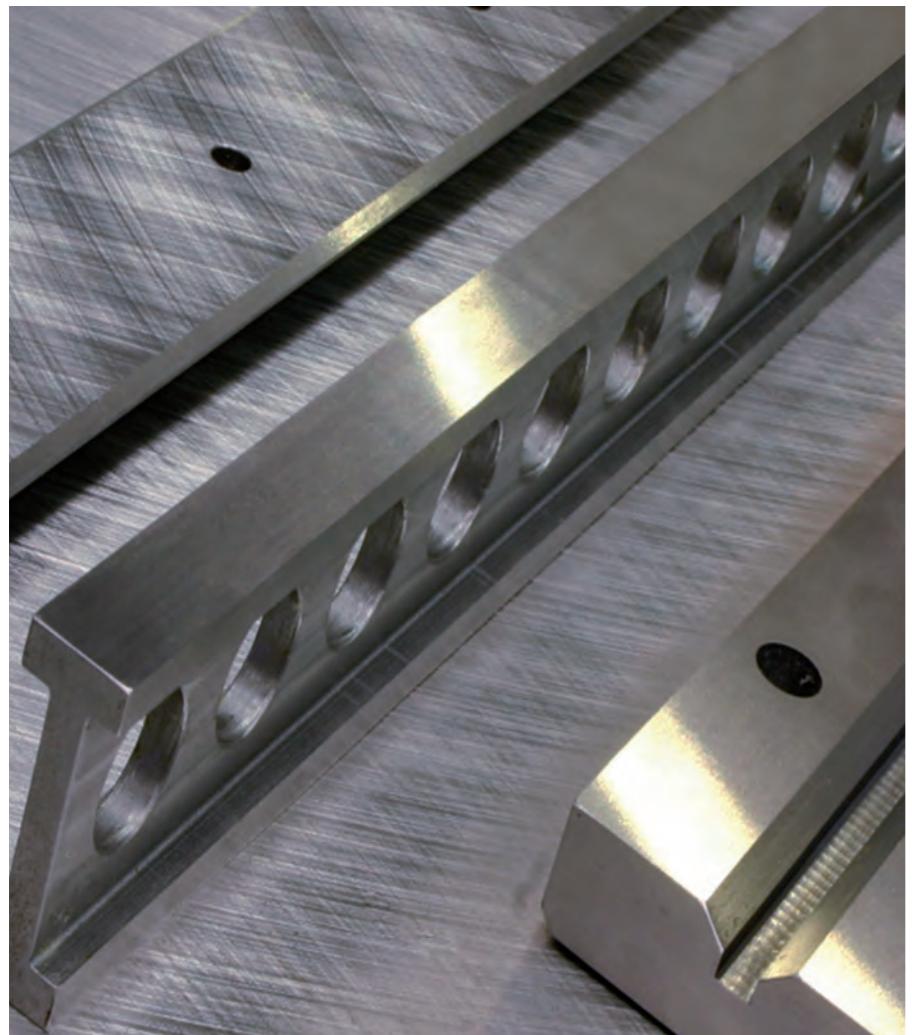


Hardened-Steel Guide Rails for Smooth Machine Motion

A supplier of precision-ground flat-stock tool steel provides custom manufacturing of guide rails for production equipment.



Präzi-Flachstahl AG supplies hardened guide rails on an individualized basis. The supplier of semifinished tool steel products designs these motion system components in exact accordance with the customer's requests and to the highest level of quality. Its quality assurance manager Heiko Schulte offers the following summary explanation of guide rail technology and of Präzi-Flachstahl's custom capabilities.

Overview

Guide rails are used for sliding guides in hydrostatic and hydrodynamic motion control units in general machine construction and machine tool construction. A second, and probably more common, use of guide rails is their employment in combination with rolling bodies, where the rolling bodies serve as rollers (bearings) and as linear roller bearings. The guide rails are custom-designed to

suit operational requirements for the particular application.

In the past, guide tracks often were integrated directly into the gray-cast-iron machine base. The cast machine stands, or the supports, were prepared such that the guide tracks were processed by subsequent milling and bevelling, and were induction-hardened. A technical designer can design guide rails freely only when separately screwed on or glued on guide tracks with a hardness up to 62 HRc are used. Depending on the application, the designer can combine various options with respect to geometry, materials, assembly method (through-bolts, screw threads or adhesive), thermal treatment and surface finish, to achieve technical or commercial purposes.

Practically combining characteristics specified by the customer results in a guide rail design perfectly fitting the need.

Geometry, Assembly

Guide rails can be variably adjusted in terms of width, thickness and length. In practice, guide rails have caught on as flat guides and inverted-V slideways. In determining the precision needed, achievable tolerances for the prepared base bodies on which the guide rails are placed have to be taken into consideration.

Precision slideways are cut to size in the event of insufficient base-body precision in the assembled state. For long slideways

exceeding 3,000 mm and assembled from multiple parts, a very tight tolerance in the absolute dimension may not be necessary. It is more important that the lengths of the slideway parts are cut uniformly, as a set, with the highest precision. Upon customer request, the guide joints can be executed as right angles or on a slant.

To mount the guide rails, the guides can be bolted together in stepped bores; the bores are sealed with a plug or glue after the bolts are in place. Guide rails can also be bolted from below with threads. Guide rails that are not very thick are often glued on to make a perfectly stable assembly.



machine, and now can fulfill a wide variety of customer requests.

By means of high-precision CNC-controlled machine tools, the company cuts guide rails with surface roughness values as fine as <1 µm Ra, the value varying with precision and surface-roughness requirements of the application.

Application Benefits

A guide rail offers advantages vis-à-vis linear guiding when high support or tool weights are a factor. Guide rails are also a common design element in large machine tools, in applications calling for heavy chip removal with interrupted sections, and in press tools.

Large-scale guide rails minimize vibrations and are important for realizing long service lifetimes for cutting tools and good surface qualities for machined workpieces. Guide rails are usually manufactured in part lengths of 2,000 to 4,000 mm, with the sections being easily assembled into long units.

Guide rails often are incorporated into pallet-changing stations

and are used in the manufacture of press tools designed for applications involving press forces exceeding 70 tonnes. Here, the tools and pallets are moved into place by means of rotary tables and swivelling tables. Such a system displays its advantages every time machine parts have to be moved from one position to another and are removed from the guide.

Practical Uses

Präzi-Flachstahl makes guide rails for numerous applications in the field of production technology. Among these are plastic-moulding machines for large parts that require a high closing force; machine tools with long travellings; machine tools designed for heavy chip removal; and grinding machines. The company's guide rails are used in heavy engineering; in automation, as a robot rail for long travelling distances; in the automotive industry, for feeding machine tools operating in production lines 3 to 100 m long and with short cycle times; and in overhauling and repairing machines and machine tools.

Conclusion

Guide rails can be used just as the user and the application require. Steadily improving technical possibilities for geometry, materials and capacity offer machine builders and production engineers generous options for constructing guide rails ideal for their needs. Präzi-Flachstahl advises them to include the guide rail manufacturer in their planning so as to arrive at the best possible solution.

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