FA 5 Wire products for the “Micro-World”

Wire and the resulting products, such as springs, screws and cables, are necessary for the functioning of technical systems. However, products made by the wire and wire-processing industry also play a major role in everyday life. We just need to remind ourselves of paperclips, ballpoint pen springs, key rings and of course power cables. Progress in areas such as transport and power engineering are closely related to ongoing developments in the wire and wire-processing industry, and the increasing miniaturisation, which can be observed in so many areas of technology, is only possible with the help of suitable wire products. These are based on wire which is made from a variety of metals and has a diameter between 0.5 and 2.5 mm.

The prefix “micro” is applied to anything below 1 mm in all three dimensions. While the dimensions of micro-components are getting smaller and smaller, we can see a steady increase in requirements on technical properties and thus also on the relevant production equipment and its components. Some typical components are micro-screws with a nominal diameter of 1 mm or less, used in sensors, mobile phones, printed circuit boards, digital cameras, hearing aids and small parts in medical devices. One cost-effective manufacturing method is cold forging, i.e. the shaping of material at room temperature. However, at the micro-level, the physical phenomena that must be taken into account are not the same as in the macro-range. For instance, the structure of such a small workpiece has a far greater effect on the processing method, and friction, too, works differently between the part and the tool compared with the forming of larger parts. Moreover, adhesive forces behave differently than in the macro-range. Similar to a hair, micro-parts may, for instance, stick to the wall of the tool or to one another during transportation. Micro-forming technology still has considerable room for development. Special metal forming centres are already in use for industrial purposes, using wire with diameters between 0.5 and 2.6 mm. Within a single operation they can produce ready-to-use micro-screws with dimensions between M0.6 and M3, and indeed at a speed of 400 screws per minute.

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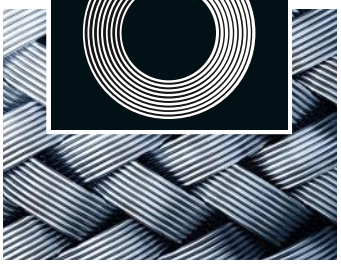

Wire, Cable, Fibre Optic, Wire Products and Machinery
Spring Making
Fastener Technology
Mesh Welding Machinery

International Wire and Cable Trade Fair
Internationale Fachmesse Draht und Kabel

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Another important group of wire products is technical springs. As there has long been a need for such products in typical applications such as precision engineering and watchmaking, the manufacturing of micro-springs started much earlier than the production of micro-screws. Made from ultra-fine wire with a diameter of 0.05 mm, the resulting micro-springs have a diameter below 1 mm and are almost invisible to the naked eye. Another amazing fact should be the yield of a single gram of wire, as it can be used for up to 20,000 such springs. Some typical applications are mechanical and electro-mechanical watches, measuring and control devices, office equipment, small motors, power tools, consumer electronics, optical instruments and of course components for motor vehicles, such as anti-lock braking systems.

The wire 2016 Trade Fair

Manufacturers of wire products in the micro-range require special techniques, machines and tools. Up-to-date information on these and other, more general developments in the wire and wire-processing industry can be obtained at the international industry trade fair “wire” in Düsseldorf from 4 to 8 April 2016.

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