

## **FA 10: Functional elements and their origin: bar steel, iron wire and steel wire**

The *wire* trade fair presents innovative solutions for the wire and cable industry.

Wire made from iron, steel, aluminium, copper and other metal-based inputs is the base material for many functional elements essential for the operation of technical systems. Measured by volume, iron wires and steel wires lead the pack.

### **Steel and iron**

Steel refers to metal alloys consisting mostly of iron and a relatively small amount of carbon. By adding alloying elements and applying thermal treatments, the technological characteristics of steel can be modified greatly and adjusted to a range of applications. The “Register of European Steels” lists more than 2,400 types of steel.

Iron wires consist of non-alloyed steel with a carbon content of less than .25%; steel wires have a carbon content of between .25% and 1.00%. Bar steel is another one of the semi-finished forms of steel offered in the marketplace. Its base material is a cast ingot or strand which is formed into billets via hot rolling. The billets are processed further – again via hot rolling – into round bar steel with a diameter of approximately 70 mm to 125 mm or into wire rods with a diameter of 70 mm. At the next rolling mill, these wire rods are rolled out into wire or bars (bright steel). Modern rolling mills can reach final rolling speeds of up to 120 m/s for wires with a diameter of 5.5 mm. This speed corresponds to 432 km/h, far exceeding even the take-off speed of a commercial aircraft. Further processing into smaller diameters takes place on drawing machines. The bars (bright steel) are finished by straightening, peeling, grinding or stripping them. Several coating processes are available as surface treatments for the wire.

## **Some 16,000 different products**

Bar and bright steel in various compositions is used to manufacture products such as chassis components; engine parts including valves, jet needles and control pistons for diesel injection systems; screws, nuts and other fasteners; ejector pins for tools; medical implants and instruments; and, last but not least, turned parts.

Rebar, used for concrete reinforcement, is also a member of the bar steel product category. Iron wire or steel wire is processed into cold-formed springs; clamps; bending parts; grids; mesh and netting; ropes and cable reinforcements; and chains, as well as needles, rollers or balls for bearings.

According to a brochure published by the Düsseldorf-based steel information centre Stahl-Informations-Zentrum, some 16,000 different products are manufactured from iron wire or steel wire. Their use is commonplace at every office, where basic equipment includes objects made from wire or containing wire products – paperclips or staples, for example. Just consider the springs in a computer keyboard, the stamps of a hole punch, the opening and closing mechanisms in lever arch files and ring binders, the spiral binding of notepads and table calendars and, not least, ballpoint pens, in which a spring and a ball are indispensable parts.

## **The *wire* 2014 trade fair**

With expectations on the rise for all kinds of products – engines, for example – the bar is correspondingly raised for functional components and their base materials. In order to efficiently produce bar steel, iron wire and steel wire as well as their derivatives, manufactures need machines that meet increasingly sophisticated requirements. Providing information on this topic as well as on manufacturing technology and trend-setting developments is the purpose of *wire*, the leading international trade fair for

the sector, held every other year concurrently with the tube and pipe trade fair *Tube*.

*wire 2014* will take place in Düsseldorf from 7 – 11 April 2014.

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