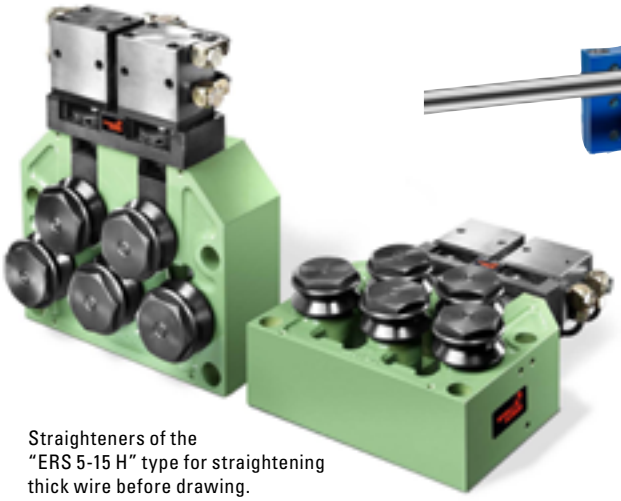
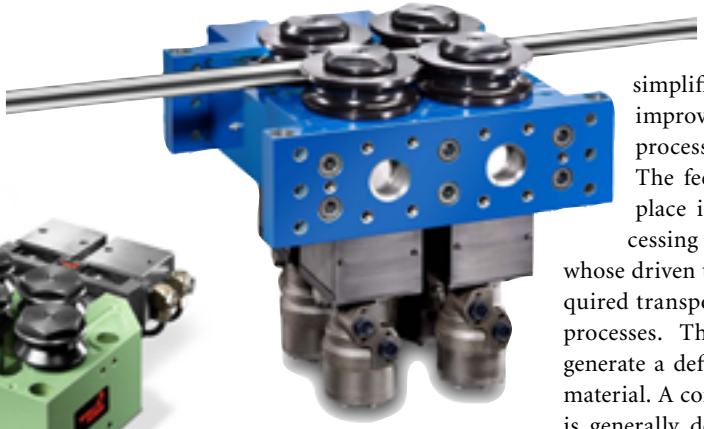
Peripheral components

According to the DIN 8593 standard, drawing is defined as joining by forming a process in which metals primarily undergo plastic deformation into another cross-sectional shape. As the forming process involves the simultaneous application of tensile and compressive loads, each operating in a different direction, the process is classified according to DIN 8584.



Straighteners of the "ERS 5-15 H" type for straightening thick wire before drawing.



"NADH 160" drive unit for feeding wire diameters greater than 25mm.

Wire drawing is performed on wet drawing machines for diameters smaller than 0.6mm and on dry drawing machines for larger diameters. Dry drawing uses straight-line wire drawing machines and single bull blocks. Forming by drawing is based on the operating principle of the wedge, which is achieved by drawing the material through at least one drawing die or at least one drawing hole. The shear force required for forming is generated by the impression of the external drawing force. Due to the gradient of the drawing hole wall and the friction between the surface of the process material and the drawing hole under a certain angle to the normal direction on the contact surface, it attacks the process material/drawing hole. The translation of the wedge produced by the drawing angle and friction angle means that the normal force is four to seven times higher than the drawing force. Forming then takes place during the drawing process more as a result of the radial and tangential compressive stresses created in the material by the normal force and less as a result of the axial tensile stresses created by the drawing force.

Process-related longitudinal internal stresses inevitably occur in the wire. Tensile stresses usually occur in the core, whereas compressive stresses are revealed at the edge. This leads to a reduction in the fatigue strength of the wire. Sub-processes such as guiding, transportation and straightening are upstream and downstream of a drawing process. Peripheral components such as roller guides, straighteners and drive units are used. Guides and drive units support and enable the transportation of the process material. Straighteners affect the shape and the mechanical properties of the material. Straighteners are upstream of the drawing process so that straightened material is produced. This simplifies the drawing process and improves the quality of the drawn process material.

The feeding to the bull block takes place in particular during the processing of thick wire using drive units whose driven transport rolls provide the required transport force for the straightening processes. The downstream straighteners generate a defined curvature of the process material. A constant curvature on one plane is generally desired, which can be defined and constantly influenced by subsequent processes or ensures process stability. Furthermore, straighteners redistribute the internal stresses that have appeared during the drawing process. The change of internal stress that results from straightening is often connected with an increase in the fatigue strength of the process material.

Straightening boosts fatigue strength

Guides, straighteners and drive units are adapted to the harsh conditions of drawing processes. Typical features include straightening rolls optimized to high speeds or high straightening forces, adjusted roll diameters and roll pitches, straightening rolls made of wear-resistant materials that can be relubricated, roll coatings, robust roll and shaft bearings and rigid constructions. The ease of operation and maintenance of the components is also important. Easily accessible adjustment mechanisms, systems for quick-opening and closing that require little force, elements for the defined and reproducible tool configuration and a straightening roll changing system that requires no tools are just a few examples.

Designed for the harsh conditions in the drawing process: precision straighteners of the "RS" series. Photos: Witels-Albert

Witels-Albert GmbH
Malteserstrasse 151-159
12277 Berlin, Germany
Phone: +49 30 723988-0
e-mail: info@witels-albert.com
www.witels-albert.com