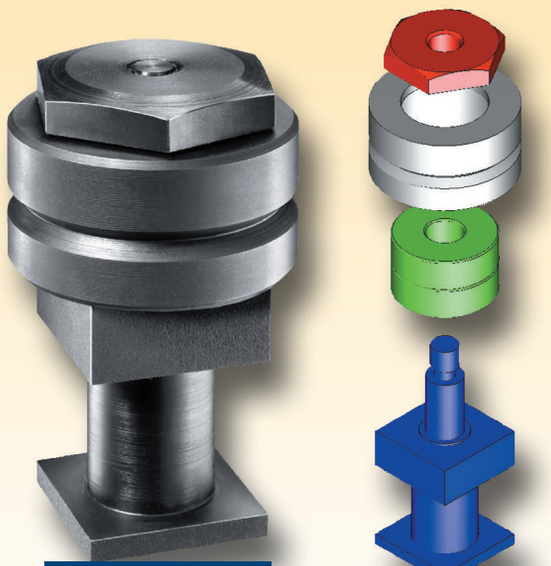
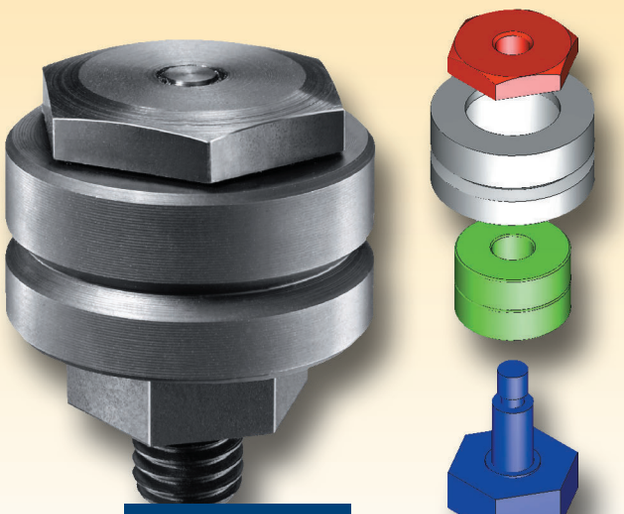


Straightening roll WR 31 HS N



Straightening roll WR 31 HS G

A new generation of straightening rolls

In response to the ever-higher speeds of process materials in the wire industry and to the trend toward higher strength values Witels-Albert is introducing two new series of straightening rolls.

Roll-type straightening units are in widespread use for changing the curvature of single or multiple wire-shaped process materials with the most diverse cross sectional dimensions. This particular method of straightening is based on the alternating elasto-plastic deformation of the process material by straightening rolls that are arranged in two off-set rows. But even when a straightening unit is truly optimised in terms of the deformation process, the straightening rolls in direct contact with the process material still have to satisfy a variety of requirements. Above all the rolls are expected to be long lasting.

Working life of straightening rolls

Parameters with an impact on a straightening roll's useful life are, in particular, its speed of rotation n and the straightening force F_R. While the speed of rotation n results from the velocity v of the process material (equation **1**), the straightening force F_R is mainly dependent on the geometrical boundary conditions of the straightening unit (the diameter D of the straightening roll and the roll pitch T) and on the characteristics of the process material.

$$n = \frac{60 \cdot v}{\pi \cdot D} \qquad \text{(Eq. 1)}$$

The straightening force F_R acting on a straightening roll can be roughly calculated with equation **2**. The equation also indicates the influence of the most important characteristics of the process material, namely its yield point R_p and diameter d, on the

A new generation of straightening rolls

Outer diameter [mm]	Type	Recommended max. straightening force [N]	Recommended max. velocity [m/s]
17	WR 17 HS N/G	1320	35
	WR 17 HL N/G	6200	20
23	WR 23 HS N/G	3460	60
	WR 23 HL N/G	6200	22
31	WR 31 HS N/G	6600	70
	WR 31 HL N/G	10400	25

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Reprint from WIRE 1/2002, Meisenbach Verlag, D-96011 Bamberg/Germany

straightening force. With a constant roll pitch T, larger diameters d and higher yield points R_p will result in higher straightening forces F_R.

$$F_R \approx \frac{\pi \cdot d^3 \cdot R_p}{4 \cdot T} \qquad \text{(Eq. 2)}$$

For specific diameters of process materials the trend at the moment is toward high speeds and advanced yield points. This goes hand in hand with accordingly higher speeds of rotation and straightening forces at the straightening rolls, which in turn means that the active straightening rolls suffer wear all the sooner.

Optimised for crucial parameters

A new generation of straightening rolls counters this premature wear by having the rolls optimised in relation to the crucial parameters, i.e. speed of rotation or force. In other words, a particular type of roll is used to suit the specific case of application. For example, type HS rolls are used where high speeds of rotation are preferred, and type HL rolls where high straightening forces are more important. For cases where the requirements overlap, i.e. a high speed of rotation n is desirable along with a high straightening force F_R, the use of a type HS roll is recommend.

Thanks to their modular design, all the straightening roll types can be used as adjustable rolls (suffix N in the type code) or as permanently applied rolls (suffix G in the type code).

Basically it is possible for the various elements of a roll to be customized. It makes sense, for example, to use a wear-proof material for the roll element that is in direct contact with the process material, or to use a soft material to minimize the likelihood of residual stress in the process material on the one hand while reducing the surface pressure between the roll and the process material on the other.

Straightening rolls of the new generation are available for Witels-Albert straightening units that are equipped as standard with the conventional straightening rolls WR 17, WR 23 und WR 31. They are also compatible with units equipped with Wicas® rolls type NC and GC. ■