

MINING

Cable bolts

TYPE KLW 15.5, KLW 18, KLW 15.5 Z, KLW 18 Z

*Certificate issued by the “INOVA” Technical Innovation Centre Ltd.
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DESCRIPTION

Cable bolts are made from cable of Ø15.5 or 18 mm in diameter and 1+6 structure. Upper end is cut by one side to perforate resin cartridges easier. Upper part cable was modified to achieve better load distribution on resin column around cable.

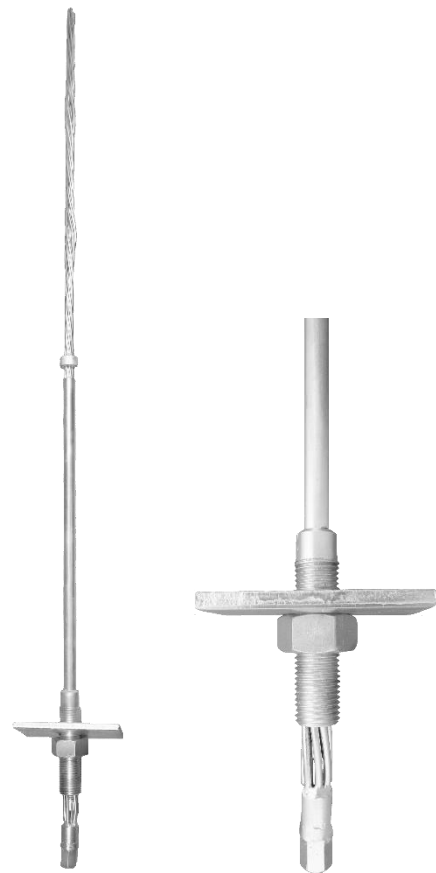
For that reason, bird cages are made in length of 100 mm and 20 to 28 mm in diameter (standard making is 22 or 24 mm). Cages diameter depends on hole diameter.

When filled up with grout or resin the cages act like stiff bulbs in relation to the cement face.

Birdcages are designed to mix resin cartridges. In the lower part there is stiffening tube and tensioning sleeve. Both items are solid jointed. Tensioning sleeve with the wedge work as clamp. Bottom is ended with hexagonal adapter to rotate the bolt. Rubber seal on the cable used only when installed with the resin of low viscosity.

APPLICATION AND USE

Resin cable bolt type KLW 15.5, KLW 18, KLW 15.5 z and KLW 18 z are designed to be used in underground workings in coal mines and non-ferrous metals mines. Bolt is designed for high horizon bolting of underground roadways, crossings and also as secondary bolting in bolted roadways where displacements occur above the bolted horizon. Height of reinforcement is higher than roadway’s height (from 3 to 10m).



ADVANTAGES

- Suitable for use with resin cartridges
- Enables pre-tension
- Facilitates the anchor bolting process

TECHNICAL DATA

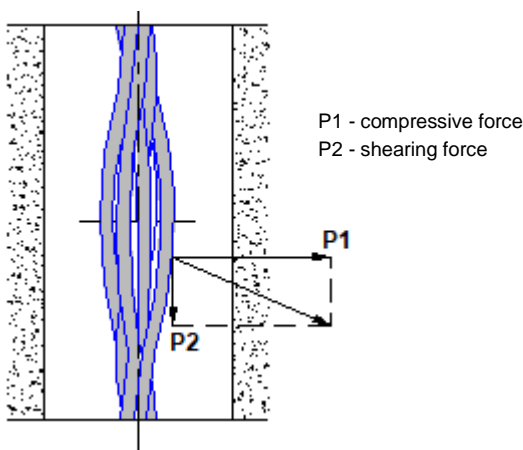
DESIGN DATA

The bulbs remain non-cracked despite considerable forces affecting the cable as radial forces occurring in the wires, which could potentially crush the cement in the bulbs, are relatively light when compared to axial forces.

The shape of the cable considerably affects force distribution around the cable caused by cable movement in the rock.

Cable bulbs release significant stresses perpendicular to the hole walls decreasing stresses parallel to the hole axis.

Load distribution around cable cage



As a result, birdcage cable bolt gives stiffer work condition between bolt and rock mass. Bolt movement against rock caused by unit load will be lower than compared to plain cable.

MECHANICAL PROPERTIES

It is intended to produce cable bolts with the following properties:

- Rm = min 1420 MPa
- Rm = min 1620 MPa
- Rm = min 1800 Mpa

BOLT DATA

Details	Value
KLW 15.5 cable diameter	∅ 15.5 mm
KLW 18 cable diameter	∅ 18 mm
Cage distance	200, 300, 400, 500, etc. (standard making 500mm)
Cage diameter	∅20 ÷ 28 mm (depends on hole diameter, standard making 22-24mm)
KLW 15.5 tension sleeve thread	M33
KLW 15.5 z tension sleeve thread	M33 x 2
KLW 18 tension sleeve thread	M36
KLW 18 z tension sleeve thread	M36 x 2
Length of stiffening tube of 15.5 cable	1500 mm (or acc. to needs)
Length of stiffening tube of 18 cable	1500 mm (or acc. to needs)
Bolt KLW 15.5 ; KLW 15.5 z adapter	Hexagonal S=22mm
Bolt KLW 18 ; KLW 18 z adapter	Hexagonal S=22mm
KLW 15.5 capacity	min. 200 kN
KLW 15.5 z capacity	min. 220 kN
KLW 18 capacity	min. 300 kN
KLW 18 z capacity	min. 300 kN

Flat square washers are made of steel of thickness 10 and 12 mm and dimensions 150 to 300 mm.

M33 and M36 nuts on the tension sleeve are to pretension cable bolt.

APPLICATION METHOD

- Prepare equipment, materials (bolts, washers, nuts, resin).
- Drill the holes according to pattern.
- Insert proper quantity of resin cartridges into the hole.
- Insert the cable into the hole.
- Rotate the bolt with the bolting machine to mix the resin.
- When resin is set mount the washer and tight the nut. Tight the nut in order to pretension the bolt not less than with 30 kN force.

Installation procedure may differ when adhesives or other equipment is used to install the bolt.

PACKAGING AND TRANSPORTATION

Bolts can be tied in 10 pcs benches and additionally packaged in bundles of 10 benches.

The plates are stapled in 10 pcs sets with wire and stacked on pallets.

The other elements are packed in containers.

Based on an agreement between the supplier and the recipient, an individual method of packaging is allowed.

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APPROVALS AND CERTIFICATES

- KLW 15.5, KLW 18, KLW 15.5 z and KLW 18 z cable bolts have Certificate of Conformity No.359/3/2018 issued by "INOVA" Technical Innovation Centre Ltd. in Lubin

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