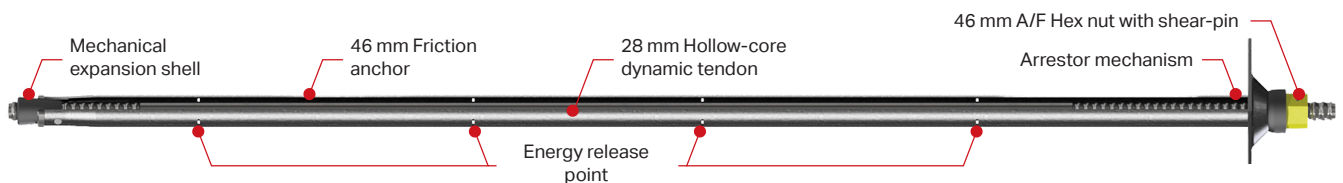


ROCK REINFORCEMENT

HX-Bolt

Hollow hybrid dynamic bolt



HX-Bolt is a dynamic rock bolt combining the benefits of mechanical and bonded anchorage to offer a robust support system suitable for a broad range of ground conditions. Initial anchorage is achieved mechanically through a combination of expansion shell and frictional anchorage, providing full dynamic capacity immediately after installation. The bolt can then be encapsulated with injectable resin or grout to further enhance anchorage and to protect the bolt from corrosion, providing robust long-term support and anchorage in very weak ground. HX-Bolts integrates primary and secondary support, enabling rapid installation while maintaining long-term performance reliability.

WORKING PRINCIPLE

HX-Bolt combines multiple anchorage mechanisms to deliver robust, adaptable reinforcement:

- > Mechanical expansion shell provides immediate end anchorage
- > Friction unit ensures continuous radial confinement and anchorage along with the full bolt length. During encapsulation, it also helps contain resin or grout within the borehole, reducing material losses into fractures and voids.
- > Yielding hollow bar allows resin or grout to be injected into the installed bolt to encapsulate the anchor and enhance anchorage. The yielding hollow bar absorbs rock displacement and dynamic energy while maintaining load-bearing capacity.
- > Energy release points along the frictional anchor ensure load transfer to the yielding bar once the anchor is encapsulated, ensuring the bolt can control deformation while sustaining confinement

BENEFITS

- > Instant, full-capacity dynamic support without need of grout or resin
- > Resin or grout encapsulation further enhances anchorage and protects from corrosion long-term.
- > High-performance in weak, fractured, and competent rock
- > Combines primary and secondary support
- > Rapid installation using bolters or jumbos
- > Full-column anchorage with mechanical and friction system

- > Residual capacity indicator (optional) for visual monitoring of bolt elongation
- > Improved resistance to shear loading and installation buckling with a large cross-section
- > Energy release design directs loads onto a yielding tendon

RANGE AND SPECIFICATIONS

Description of Parameter	HX-Bolt
Typical UTS	706 MPa
Typical Ultimate Load	250 kN
Typical Yield Strength	252 MPa
Typical Yield Load	180 kN
Energy Absorption ***	Typical 60 kJ (2.4 m)
Bar Diameter	28 x 17 mm
Friction Unit Diameter	47 x 3.2 mm
Total Cross-sectional Area	707 mm ²
Typical Elongation (A200 mm %) **	19%*
Installation Hole Size Range	Ø44 – Ø46 mm
Maximum Expansion Shell Diameter	Ø55 mm
Typical Weight (2.4 m Black)	13.5 kg
Bolt Finish	Black or Galvanized ISO 1461:2022
Nut Size	45 x 46 mm A/F

* 2.4 m Sample – DTS-20250601 Normet HX Bolt Dynamic testing

** A 200 mm

*** Based on 2.4 m length samples, R28 – 1.5 m free length split tube tests with urea silicate resin



HX-Bolt Groutable



HX-Bolt with Residual Capacity Indicator

DEFINING THE FUTURE
UNDERGROUND

