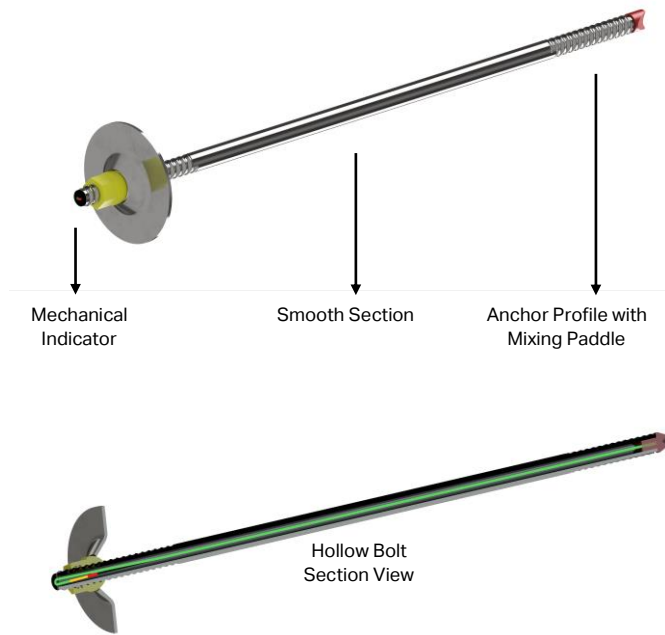


DESCRIPTION



Normet HD-Bolt is an engineered hollow deformable bolt designed for use with resin capsules in areas where significant rock mass deformation is expected. Its unique features include a mechanical indicator that provides real-time feedback on the deformation experienced by the bolt, a mixing paddle for effective resin installation, and a larger diameter that minimizes resin consumption while providing superior properties for dynamic conditions.

FUNCTIONALITY & INSTALLATION

The HD-Bolt adopts the design principles of the SDDB®, featuring a smooth hollow bar with anchoring profiles at both ends. The anchoring profiles bond rigidly with the resin, while the smooth section remains de-bonded, allowing it to deform without constraints and absorb dilation energy by leveraging the plastic deformation characteristics of the bolt steel. This design enables the bolt to provide a stiff initial response, followed by consistent yielding and energy absorption capacity post-yield.

The hollow center houses a mechanical indicator, positioned at a fixed length from one end of the bolt and protruding from the other end by a specific length. As the bolt deforms, the length of the protruding section decreases, visually indicating the amount of elongation. This feature provides timely feedback when the deformation reaches the bolt's elongation capacity.



Bolt after installation

Bolt undergoing elongation

Bolt reaching peak elongation capacity

The installation process for the bolt is similar to that of conventional bolts and typically utilizes a two-speed resin to establish a chemical anchor point. Its larger diameter reduces resin consumption, enhancing overall installation efficiency.

KEY BENEFITS

- › Superior dynamic reinforcement
- › Bolt elongation indicator
- › Can be mixed with existing rock reinforcement systems for support system quality monitoring
- › Ease of installation and transportation
- › 50% less resin required. Reduced resin storage, consumption, wastage and footprint

TYPICAL APPLICATIONS

- › Deep Mines with high in-situ stresses
- › Installation of dynamic reinforcement with resin capsules
- › Problematic underground areas affected by stress redistribution or abutment
- › Seismically active fault zones
- › Monitoring of dynamic activities

TECHNICAL DATA

HD-Bolts are available in 28 mm and 32 mm diameter bolts in three strength classes.

Specifications	R28	Group A	Group B	Group C
Typical UTS (kN)	250	250	270	290
Typical Yield Load (kN)	180	170	190	200
Min. Energy Absorption (kJ)	****60	*30	**35	***70
Outer Diameter (mm)	28	32	32	32
Inner Diameter (mm)	~17	~24.9	~23.3	~20.5
Cross Sectional Area (mm²)	390	350	382	433
Typical Elongation	26%	23%	23%	23%
Weight (kg/m)	3.05	2.75	3.0	3.5

* Based on 2.4m length samples, Group A – 1.2m free length 32.4 kJ input energy, single drop.
 ** Based on 2.4m length samples, Group B – 1.2m free length 34.6 kJ input energy single drop.

*** Based on 2.4m length samples, Group C – 1.55m free length.

**** Based on 2.4 m length samples, R28 – 1.5 m free length split tube tests with urea silicate resin
 Energy Absorption capacity based on multiple drops