

# EnForce™ NON-MAGNETIC DRILL COLLARS

**EnForce™ Non-Magnetic Drill Collars are made from 15-15LC® a modified stainless steel, which is an austenitic, nitrogen strengthened stainless steel.** With a lower carbon content, carbides do not tend to readily precipitate in the material's grain boundaries, providing an improved resistance to intergranular stress-corrosion cracking. The portions of nickel, chromium, nitrogen, manganese and molybdenum are carefully blended to further enhance the material's resistance to cracking.

This material was selected based on the combination of stress-corrosion-cracking resistance, high strength and low magnetic permeability. Magnetic permeability of the warm worked material is less than 1.01 based on the Severn gauge. Laboratory and field evaluations have shown it's superiority over the conventionally used Cr-Mn compositions typically used for this application.

All EnForce Non-Magnetic Drill collars used to house the MWD tools also have their I.D.s increased to lower flow velocities around the pressure barrels. This also has the added effect of lowering the pressure drop across the MWD tools.

In addition, specialized low permeability hard banding has been selectively applied on the exterior of the drill collars to provide protection against external abrasion, increasing the longevity of the drill collars.

Additional material specifications may be provided on request.



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