

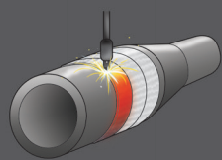


Welding
Alloys
Group

DRILL-GUARD Nb
DRILL-GUARD CC
DRILL-GUARD Non Mag



ACTING GLOBAL
WELDING LOCAL



DRILL-GUARD®

PREMIUM HARBANDING CORED WIRES

DRILL-GUARD: the ultimate protection

DRILL-GUARD Nb



Best in class: welding operator appeal

Excellent wear performance

Hardness: 58 to 61 Rockwell "C" Scale

Niobium, vanadium, and titanium carbides

API ® Standard 7CW Casing Wear Tests

- Casing Wear Factor: 0.91×10^{-10} psi-1
- Frictional Factor: 0.33 dimensionless
- Hardband OD Loss: 0.002 in
- Tool Joint Weight Loss: 0.010 lbs

DRILL-GUARD CC



Best in class: compatibility

Very Good wear performance

Hardness: 55 to 57 Rockwell "C" Scale

Multi-carbides

API ® Standard 7CW Casing Wear Tests

- Casing Wear Factor: 0.94×10^{-10} psi-1
- Frictional Factor: 0.36 dimensionless
- Hardband OD Loss: 0.009 in
- Tool Joint Weight Loss: 0.070 lbs

Can also be applied with tungsten carbide for the enhanced protection of BHA components

DRILL-GUARD Non Mag



Best in class: crack resistant and welding operator appeal

Non Magnetic Austenitic Deposit

Corrosion Resistant

Metal Cored = Increased Productivity

Buildup and / or Hardbanding

Permeability ≤ 1.005 (less than half of the allowable by API)

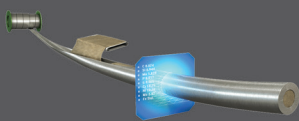
No post heat treatment or shot peening

tion for your drill string and casing

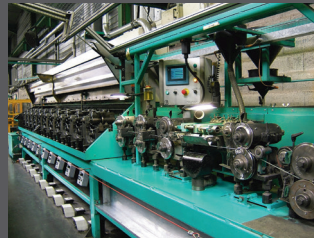
Each of the DRILL-GUARD premium hardbanding wires are designed and manufactured in-house utilizing our own technology from extensive Oil & Gas industry knowledge. We are confident in the superiority of our hardbanding wires because we have control of the entire process as outlined below.

- Formulation / Chemistry of each wire which is specifically designed for the Oil & Gas Industry
 - **Crack-Free** → **Wear-Resistance**
 - **Non-Spalling** → **Re-Applicable**
 - **Casing Friendly** → **Compatibility**
- Sourcing of the high grade raw materials with QC verification
- Optimal mixing times for the alloyed metallic powder cores
- In-house manufacturing with our proprietary mills
- Heat treatment
- Exceptional quality control
- Precision spooling and packaging
- Warehousing and inventory control prior to shipment
- Training and support to the drill pipe and BHA manufacturers as well as hardband service applicators
- Education and support to drilling contractors, Oil & Gas operators, and rental fleet companies

DRILL-GUARD Nb | DRILL-GUARD CC



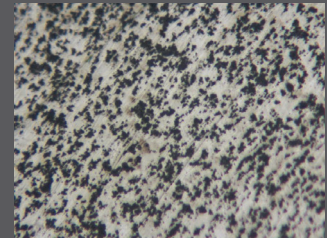
Highest grade metallic powders and strip.



In-house proprietary mills manufacturing hardbanding wire.



Every DRILL-GUARD batch has a six layer welded test and a spectrometer verifies that chemistry meets the stringent specifications.



Microstructure of DRILL-GUARD magnification x200.

API ® Standard 7CW Casing Wear Tests

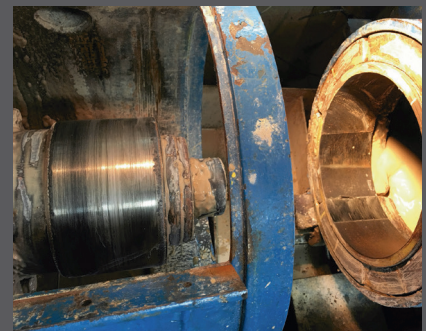
- T-95 casing
- 3000 lb / ft side load
- 155 rpm
- 74,400 revolutions



Wet mag particle testing performed on DRILL-GUARD Nb at Accu-Test labs in Houston, TX.

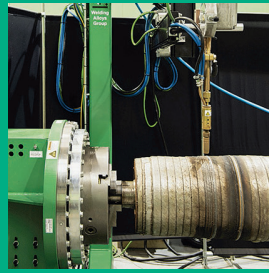


DRILL-GUARD sustained 26,647 lbs (12,086 kg) of force on a 1" (2.5 cm) Ring Test prior to yielding without any spalling, flaking, or delamination. The testing was performed at Accu-Test labs in Houston, TX.



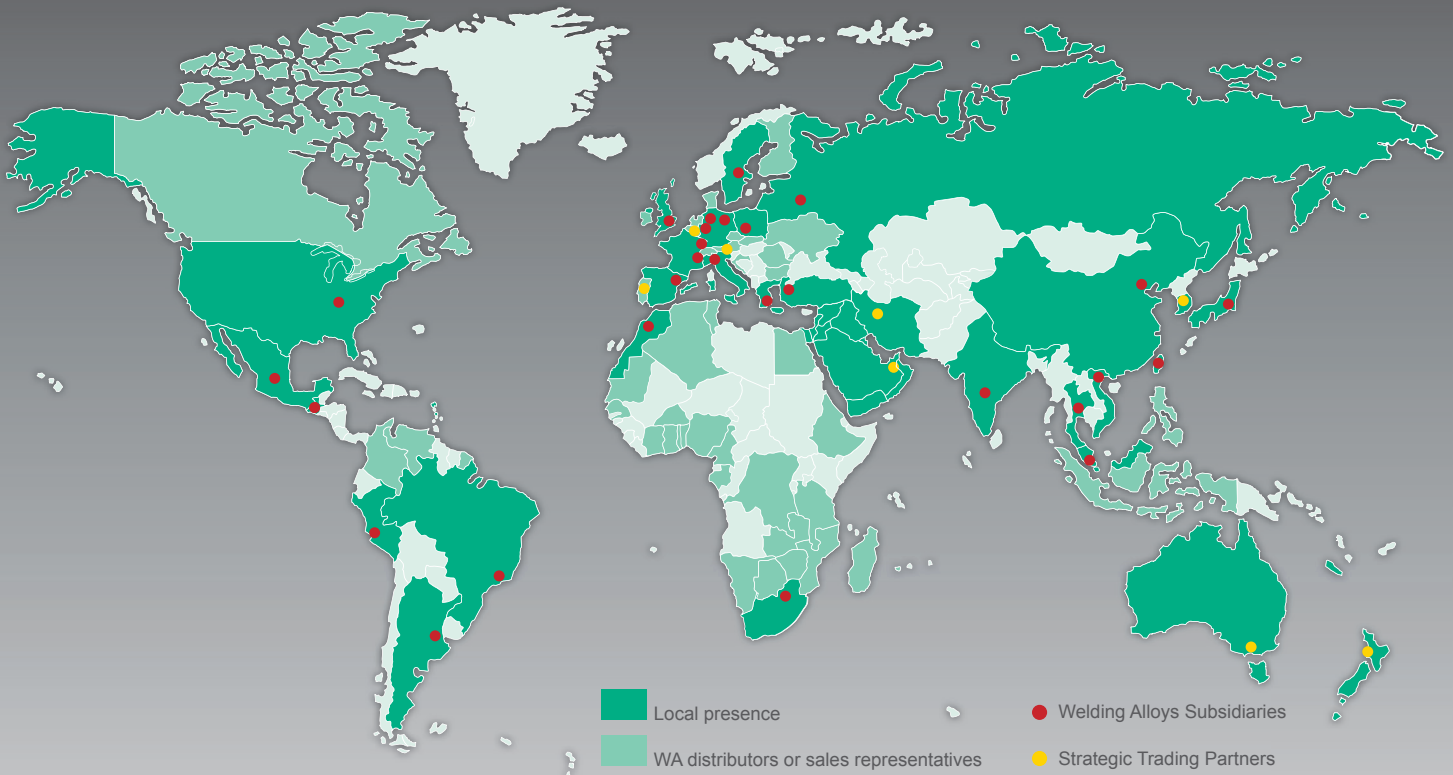
DRILL-GUARD Nb API Standard 7CW Casing (T-95) Wear Testing after successfully completing the Open Hole Testing. The testing was performed at Stress Engineering in Houston, TX.

Our Technical 'Spark' Solves Your Industrial Challenges



Founded in 1966, Welding Alloys Group is the global specialist in alloyed cored welding wires. Each of our DRILL-GUARD hardbanding wires is specifically formulated and manufactured in-house to provide superior protection to the drill string while preserving the integrity of the casing.

A worldwide presence



For technical expertise, please contact: sales@drill-guard.com
www.drill-guard.com



www.welding-alloys.com