



Duraband®NC is 100% crack free, so casing protection is consistent.

## Interesting FACT

Casing Wear testing provides important information for hardbanding product qualifications. However, there are variables that need to be evaluated when reviewing test results especially when comparing the casing wear results between two products

Casing Wear testing Variables:

- Type of casing (N80, T95, etc.)
- Sideload pressure during testing (3,000 lbs, 7,000 lbs, etc.)
- Water or synthetic based mud
- Duration of test (8 hours is typical)
- Etc.

## What is Casing Friendly

Hardbanding has been used to protect the Tool Joints on drill pipe for years. Hardbanding using a matrix wire with Tungsten Carbide was quite common in open hole and vertical well drilling. Once directional drilling through casing became popular, the use of Tungsten Carbide became much less popular because of the damage caused to the inside of the casing. Casing wear became an important issue regarding hardbanding products and procedures. Operating companies began insisting on hardbanding wire that was “casing friendly”.

Various tests were developed to determine and measure casing friendliness. Some of the tests were done by manufacturers and others by 3<sup>rd</sup> party companies. These new tests were, and are, done with new hardbanding that had only been applied one time, and that had no cracking or spalling, and were generally clean. Generally considered ideal conditions. The problem is that these tests, carried out in ideal conditions, do not replicate what actually occurs downhole. In actual practice some hardbanding welds crack, while others spall and delaminate. Downhole these cracks and spalling areas harbor sand, cuttings, drilling mud, and any other debris in the well. These cracks and spalling areas collect debris creating a very hostile environment for the inside of the casing. Sand, cuttings, and debris inside of these cracks essentially create a grinding tool. Even more damaging could be spalled pieces of hard material circulating between the drill string and the casing. Hardbanding with cracks certainly change the casing wear factor, and certainly cause additional wear to the inside of the casing. Duraband®NC does not crack, even after several reapplications, and so it does not create a place for abrasive material to collect. The hardbanding continues to be as effective as it was in the lab testing. With drilling conditions getting more severe, including increased side-loading, it's important to reconsider the use of hardband materials that crack and eventually spall.

Unfortunately, it's difficult to simulate these conditions in a lab test. It's not difficult, however, to visualize what these conditions create downhole, and how they compromise the casing integrity. Casing friendliness in a lab is not necessarily casing friendliness once the hardbanding starts to crack and spall.



Sharp edges, trapped sand, or other imbedded debris affect the “casing friendliness” of cracked or spalling hardbands



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