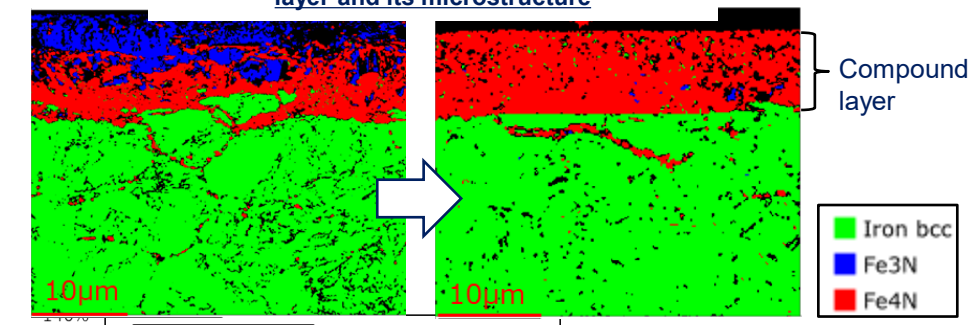
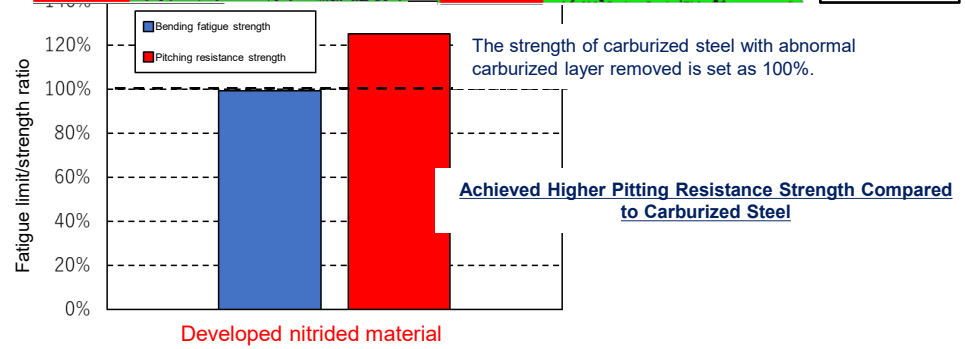
Nitriding as an Alternative Heat-Treatment Process to Carburizing

Technology Research Center

- Carburizing with hydrocarbon gas for surface hardening is commonly used for gears, gear reducers, and other components that require both high strength and good machinability. However, this process produces significant CO2 emissions, contributing to environmental concerns. As a result, there is increasing interest in shifting to processes like nitriding and induction hardening, which have lower CO2 emissions.
- Conventional nitrided parts have lower strength compared to carburized parts, making conventional nitriding unsuitable as an alternative process.
- With our next-generation nitriding process and controlled microstructure, we have achieved strength levels that match or exceed those of carburized components.
- Applying the nitriding process can also reduce heat treatment deformation, thereby minimizing the burden on the finishing process
- We are optimizing heat treatment conditions to enhance strength and utilize nitriding technology into our products.

Optimizing the thickness of the compound layer and its microstructure





The strength of carburized steel with abnormal carburized layer removed is set as 100%.

Achieved Higher Pitting Resistance Strength Compared to Carburized Steel

Carbon Neutral Contribution points

- ✓ **Reducing CO2 emissions during the heat treatment process.**
- ✓ **Minimizing heat treatment deformation, thereby reducing the burden on subsequent finishing processes**

Copyright © Sumitomo Heavy Industries, Ltd. All Rights Reserved.