

**INNOVATION.
NOT DUPLICATION.™**



ENGINE SOLUTIONS

3500 SERIES ENGINE HEAD BOLTS

H-E PARTS INTERNATIONAL (H-E PARTS) SPECIALIZES IN IMPROVING ENGINE PERFORMANCE FOR OUR CUSTOMERS IN THE COMMODITY AND ENERGY MARKETS. UTILIZING OUR STATERRA POWER™ ENGINE TECHNOLOGY AND STATE-OF-THE-ART REMANUFACTURING FACILITIES, WE PROVIDE OUR CUSTOMERS TAILORED SOLUTIONS AND SUPERIOR, LONGER LASTING ENGINES.

In line with H-E Parts commitment to provide innovative solutions that improve mine and industrial maintenance, we are able to offer cryogenically treated head bolts for Caterpillar 3500 series engines. Cryogenic treatment is a process that involves temperatures below -300° F (-190° C) and goes beyond conversion of retained austenite to martensite. This reduces inherent residual stresses, but also allows micro-voids in the steel to be filled through precipitation of micro-fine eta-carbides, thus ensuring our customers benefit from improved corrosive resistance and tensile strength.

H-E Parts offers a more durable and stronger head bolt as an innovation to improve cylinder head to block joint sealing. Enhanced bolts will reduce cylinder head micro-movements that contribute to mid-life engine interventions such as coolant leaks, bolt failures (breakages) and cylinder block deck wear and erosion. Further benefits of using cryogenically treated head bolts include:

- Improved mechanical grip (diminished bolt creep or plastic deformation of load, over time and heat cycles)
- Increased fatigue strength - provides less failures due to fatigue cracking
- Stress relieving from original manufacturing processing
- Metallurgical enhancements to the bolt grain structure and properties

Cryogenically treated parts have improved durability with increased strength of 30 to 50 percent.

H-E Parts International replacement parts are compatible with the makes and/or models of the third-party equipment described. H-E Parts International is not an authorized repair facility of these third parties and it does not have an affiliation with any manufacturers of these third-party products. All brands, original equipment manufacturer (OEM) part numbers or references are owned by the respective OEM entities or their affiliates. These terms are used by H-E Parts International for identification and cross reference purposes only and are not intended to indicate affiliation with, or approval by the OEM, of H-E Parts International or its products.



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HEPI18JAN2021

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