

Freeze Plug Reinforcement on Cummins 6.7L Engine

ID: 9830

Industry: Marine

Customer Location: 8910 Glades Cut Off Road Port St. Lucie, FL 34986

Application: ENC-Engines and Casings

Application Date: May 2025

Substrate: Carbon steel

Products: Belzona 1511 (Super HT-Metal), Belzona 9111 (Cleaner Degreaser)

Problem

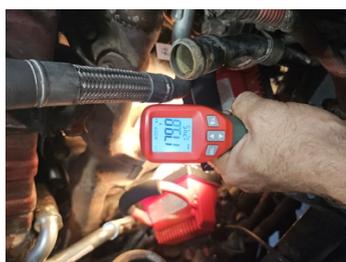
Persistent leakage at the 7 o'clock position of a freeze plug on a Cummins 6.7L engine. The plug had been previously installed twice using two different sealing compounds, but leakage continued under operational conditions (210–220°F)



Engine block area with the freeze plug removed, exposing the internal cavity before repair.



Controlled heat being applied to the engine block area using portable lamps to ensure proper curing of the repair material.



Infrared thermometer reading 179.8 °F during heat-curing process of the epoxy sealant on the engine block.



Freeze plug installed and sealed with epoxy compound after completing the engine block repair.

Application Situation

This repair was carried out to reinforce a compromised plug area using Belzona 1511, offering a cost-effective and efficient solution compared to full component replacement. By avoiding welding or mechanical interventions, the client achieved significant time savings and minimized operational downtime. The Belzona system also reduces health and safety risks associated with hot work, providing a cold-applied, durable reinforcement alternative.

Application Method

Surface preparation was performed by mechanically abrading the plug, cavity, and surrounding area to achieve optimal surface profile for adhesion. Edges were chamfered and masking tape was used to mark the rebuild zone. Belzona 1511 was mixed until homogeneous and applied using the stipple technique. The plug was inserted under pressure, ensuring product displacement around the perimeter, then excess material was used to reinforce the surrounding chamfered zone. After initial ambient curing (3 hours at ~86°F), localized heat was applied to raise the temperature to 140°F for 2–3 hours, increasing the system's heat resistance and final performance.

Belzona Facts

Belzona 1511 was selected over traditional mechanical or welded repairs due to its cold-applied nature, eliminating the need for hot work permits and reducing safety risks. The solution provided a rapid return to service, minimizing downtime and associated labor costs. Alternative methods would have required more invasive disassembly or hot work, significantly increasing lead time and cost. Belzona 1511 offers strong adhesion, long-term durability, and a high Heat Distortion Temperature when post-cured, making it

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ideal for this plug reinforcement application.

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