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Technical Bulletin

ALL-NEW FP DIESEL® SERIES 60 "CROSSHEAD" PISTON

Today's Detroit Diesel engines are more powerful and more efficient than ever. They're also more demanding on their internal components. Higher combustion temperatures and compression ratios require the best in materials and design.

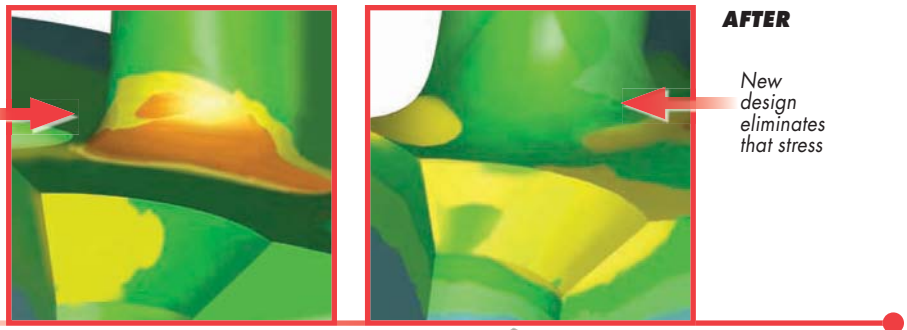
That's what you'll find in the new FP Diesel® Series 60 Crosshead replacement piston. Designed via computer-aided predictive engineering (which simulates the stress and temperatures it will need to endure) this piston incorporates advanced materials that prevent the failures common to other designs.

ADVANCED DESIGN ADDRESSES CRITICAL STRESS POINTS

In some designs, piston stress and temperature caused fatigue cracking on the underside where the struts attach the crown to the saddle (see FIG. 1). On occasion this caused the top to actually separate from the base of the crown and resulted in engine failure.

Through Finite Element Analysis, the source of the stress that led to the cracking was pinpointed. Significant changes to the rib structure were made and the strut radius design was optimized, which reduced the stress that caused those failures and eliminated the problem.

FIG. 1



IMPROVED METALLURGY-TESTED DESIGN

Enhanced metallurgy infuses the new FP Diesel Series 60 piston with 17% more tensile strength and 30% more yield strength over previous designs.

Over 5000 hours of intense dynamometer testing has proven that the new FP Diesel Series 60 Crosshead Piston crowns will stand the test of time, and renew life and performance in Series 60 engines.

IMPROVED OIL CONTROL

Oil passages and strut standup height have been optimized to increase the amount of oil trapped in the crown. This additional oil helps reduce piston temperatures for longer life. The crown profile has also been redesigned to improve under-crown cooling.

FP DIESEL®

FLEETS RETHINK REPLACEMENT

More and more fleets are rethinking their engine and equipment replacement cycles as new engines become increasingly expensive. In a challenging business environment, rebuilding a commercial engine is a smart choice – if you have the right replacement technologies.

The FP Diesel approach isn't just to return the engine to service, but to increase power and performance.

To that end, our dedicated FP Diesel engineers reviewed the closed gallery articulated piston design and developed a better, more efficient solution.

FP Diesel eliminates the oil gallery cover plates and adds an oil tray to the skirt. This design creates an open cooling gallery on the underside of the piston crown – providing cooling of the piston crown and heat transfer capabilities.

In addition, fleet operators tell us the cover plates may fall out during operation. This can lead to failure of internal engine components and, ultimately, engine failure. This problem is eliminated with the FP Diesel M11 replacement piston, since it has no cover plate.

Dynamometer test results prove the FP Diesel replacement piston design removes significant amounts of heat from the piston crown, providing improved durability without sacrificing engine performance.

All FP Diesel pistons are designed using the latest in computer-aided design (CAD) and computer-aided engineering (CAE) technology, and are thoroughly researched to ensure the proper dimensional and metallurgical requirements. When installed with FP Diesel cylinder liners and piston rings, these components develop optimum performance as part of the "power-cylinder" system.

FEDERAL MOGUL