



Case Study – Piston Flaw Testing

Customer Problem

Major automotive piston manufacturers were finding minute cracks and oxide inclusions in the combustion bowl of their cast aluminum pistons. The manufacturers had been using visual inspection and sample testing to find these flawed pistons, but were inadvertently passing flawed parts resulting in premature failures and warranty costs. They needed an automated system that would inspect 100% of their pistons.

The Solution

The manufacturers decided to utilize eddy current test systems to inspect their pistons. Custom eddy current probes were designed to fit precisely within the unique bowls of many pistons. (See Figure 1). The eddy current sensors were protected by a ceramic material seen as a white dot on the probe in Figure 2. The adjustable probe modules were spring loaded to allow the coils to access the critical test zone under the upper bowl radius for very precise positioning.

A multi-channel [InSite CT](#) was used by the piston manufacturers for the evaluation. The InSite CT was able to drive all 4 winding pairs at once. It also ran the test at multiple frequencies using a higher frequency to look for surface cracks, while a lower test frequency was set to look for subsurface oxide inclusions.

A custom inspection fixture (shown in Figure 3) was used to spin the eddy current coil fixture to ensure 100% inspection of the piston head. The eddy current instrument was able to clearly identify the flaws the piston manufacturer was looking for.

“This technology has given us an advantage in detecting surface and subsurface flaws. We found eddy current testing to be the ultimate test solution.”

- Plant Manager

For more information visit our website at www.criterionndt.com or call Criterion NDT at 253-929-8800.

Equipment: [InSite CT](#),
Custom Probes, Fixtures

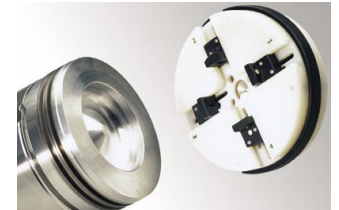


Figure 1 - Piston and Eddy Current Probe

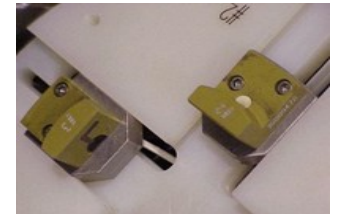


Figure 2 – Eddy Current Probe Details



Figure 3— Manual Test Fixture

