

ULTRASONIC INSPECTION SYSTEM FOR AL-FIN INSERT DIESEL PISTONS



The purpose of this equipment is the ultrasonic inspection of the bond quality of Al-Fin insert to aluminium body in diesel pistons. See the reverse of this brochure.

Piston diameter range 60mm to 310mm.

Up to 8 channels are supported.

**Pulse echo, through transmission or a
combination of the two techniques.**

Horizontal or vertical piston orientation.

Fully automatic or manual operation.



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The Al-Fin bond is a bond between an aluminum alloy and a ferrous metal. In diesel engine pistons for the automotive industry, this Al-fin process is used to bond an iron insert in the position where the top piston ring groove will be machined. This is necessary because of the high compression ratio of a diesel engine when compared to gasoline engine and therefore the stress on the top ring groove is that much greater. It is the bond that will be inspected using ultrasound. The bond area is an alloy of iron and aluminum that has an intermediate chemical composition, of approximately $FeAl_3$.

An un-bonded Al-Fin insert which has been removed from the piston is shown below.

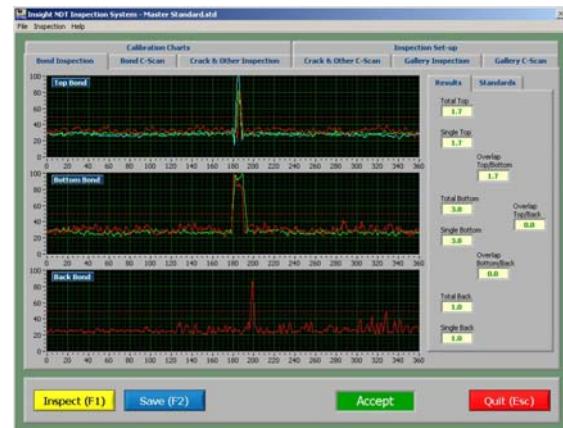


Piston Inspection Software

The piston inspection software is designed to perform several functions critical to the integrity of the overall inspection system. These functions are:

- To provide a user-friendly menu-driven user interface for communication with the piston testing system.
- To process and analyse ultrasonic inspection data supplied to the computer by the Ultrasonic Instrument.
- To store sets of user definable acceptance standards.
- To associate a unique ultrasonic set-up file to each set of user definable acceptance parameters.
- To save the raw inspection data, for future analysis.
- To display the inspection results, either after an inspection or when re-loading a saved inspection data file.
- To print the results to a printer or as a bitmap file.

The piston inspection software collates data provided by the ultrasonic instrument concerning the flaw detection of pistons. This data is stored analysed and displayed following each piston test, and furthermore, the software will compare the test results with the user definable acceptance standards, and make an accept/reject decision. Finalised test results are displayed following each test and can be saved for future reference.



The Main Screen of the piston inspection software is shown above, allows the use of up to 8 Ultrasonic channels, to test different features associated with Diesel engine pistons, which have an Al-Fin insert and/or oil-cooling gallery

Mechanical Handling Systems

A range of piston inspection systems are available for different product diameter ranges.

The following systems are available with:

- Traditional Wellworthy Roller drive system. Using Pulse Echo Only.
- Crown Down system, which can use Pulse Echo, Through Transmission or a combination of the two techniques.
- A Fully Automatic system which is designed to fit in a manufacturing line and is capable of 650 parts and hour through put rate.

In addition to these systems we offer a custom design solution to meet our customer's exact requirement.