

## Challenge

A major manufacturer of diesel engines was having a problem testing for correct piston cooling nozzle assembly. Blocked, missing or obstructed cooling nozzles were only being detected after engine assembly at cold test or not at all, leading to severe engine damage and costly tear downs and warranty repairs. The manufacturer urgently required a way to successfully detect piston cooling nozzle defects early.

## Solution

A Sciometric monitoring system was added at the nozzle insertion station on the piston cooling nozzle assembly line for real-time quality verification. The test applies low pressure airflow to the nozzle oil galleries inside the engine, measuring the back pressure with a standard pressure transducer. Blocked or obstructed nozzles are detected when the test results in back pressure that is much greater than the expected pressure (detectable levels of obstruction vary from part to part). A lack of back pressure or the mean value(s) being lower than expected are indications of missing or problem nozzles.

Sciometric's signature analysis system analyzes the data from the pressure transducer and converts it to a time/pressure signature, which it then compares with an envelope and mean value developed from known good parts. It then transmits a 'PASS' or 'FAIL' to the operator. Programs can be saved, edited and reloaded as required, which extends the versatility of the system and minimizes the time needed to integrate into the production process

## PISTON COOLING NOZZLE ASSEMBLY TEST KEY FEATURES

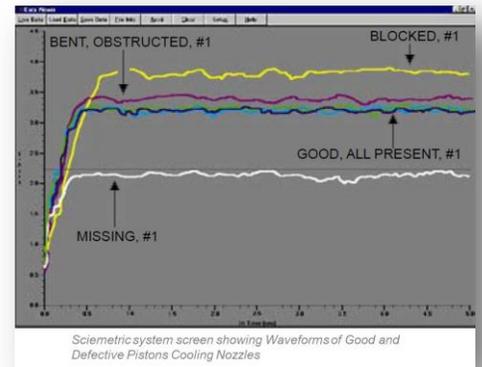
- Detects all missing, blocked and restricted nozzles
- Uses signature analysis for most accurate verification
- Automatic PASS/FAIL analysis display
- Provides detailed graphical displays and numerical results to test engineers and operators
- Decreased repair costs
- Minimal time required to integrate with production process



the science  
of quality

## Results

Incorporating Sciometric's signature analysis monitoring system into the piston cooling nozzle assembly line immediately resulted in advanced defect detection, a drastic decrease in end-of-line repair costs and customer warranty claims.



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