

■ Gasket Forming: Verification of Metal Foil Inserts in Gasket Forming Process

**Highlights:**

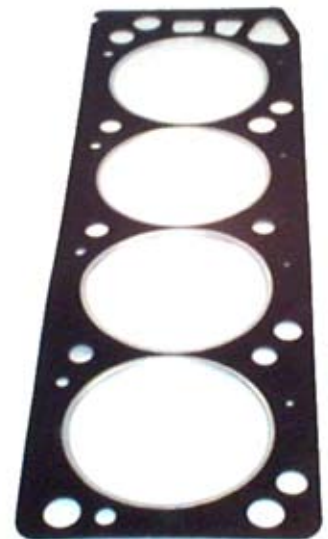
- Force versus time analysis detects missing or double foils
- Defective foil application is detected during forming
- Defective gaskets are easily identified
- System is easily re-programmable

Metal foil inserts are used to give extra strength to the edges of engine gaskets. They also provide the advantage that dimensional tolerances can be taken up during assembly. The detection of missing or extra foils during the gasket manufacturing process is a problem since either can result in incorrect engine performance. One would expect that there would be marked differences in the peak force that occurs when one, two or no gaskets are present, but in practice, the differences are too small to reliably detect these defects.

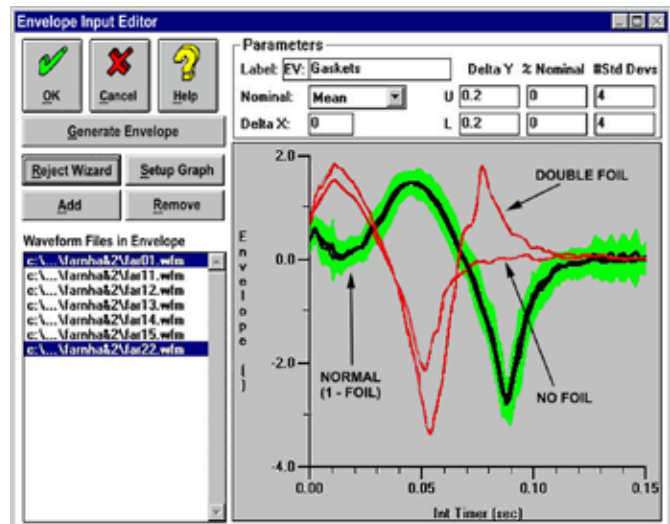
Using Sciometric's SigMETER® and Signature Analysis technology, Sciometric is able to measure the force required to form the foil around the edge of the gasket during the forming operation. Since the forming time is fixed, variations in force profile at the forming tool indicate missing or extra foils.

The screen shot shows the signature of a normal, single foil, and also the signatures obtained with a missing foil and a double foil. The green zone around the waveform for a single foil indicates the normal variation for good parts. Notice that although the peaks and valleys are of comparable magnitude in all cases, which renders simple peak detection unreliable, the valley occurs earlier for the defective parts, and there is an extra, delayed peak for a double foil. When you see the entire force signature, like that displayed below, the defects stand out very clearly.

The Sciometric approach goes beyond the detection of extra or missing foils and makes it possible by using Signature Analysis to ensure the quality of the process.



Close up of gasket showing metal foil insert



SigMETER® Screen showing the Signature Waveforms Produced during the Gasket Forming Process.

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