APPLICATION NOTES

Monitoring the Autofrettage Process of Injection Systems

In the common rail injection system of combustion engines, extremely high pressures prevail. In order for the high pressure tube to withstand this extreme load, it is treated in the autofrettage process. During this process, to tube is filled with liquid, and then the pressure inside the tube is increased above operating pressure up to 15,000 bar. As a result, the pipe's inner wall undergoes a considerable increase in strength, which clearly counteracts possible cracking.

With the MAGNATEST D testing instrument from FOERSTER, the injection systems can be tested after the autofrettage process. This will determine if the autofrettage process has been performed correctly.

Fig. 1: MAGNATEST D and test coil

To test for this material treatment, the high-pressure pipe is positioned in a test coil (see Fig. 2). The sensor detects the measurement signal resulting from the magnetic and electrical properties of the test piece. The signal is displayed graphically as a measuring point. As part of the calibration, the statistical evaluation of several measured values automatically creates a sorting limit.

In the series testing, all other measuring points are compared with the specified tolerance limits. The automatic sorting of the workpieces into good and bad parts takes place according to the respective test result.

Fig. 2: Coil with test piece

As can be seen in Figure 3, the MAGNATEST D in combination with the test coil makes it possible to achieve a clear separation of the specimens.

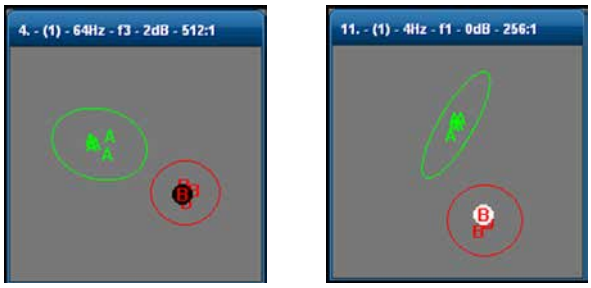

Fig. 3: Graphical presentation of the test results

For monitoring the autofrettage process, we recommend the MAGNATEST D test instrument in conjunction with an encircling test coil for determining the material properties of the test piece. This application solution enables continuous quality monitoring of the production process or an incoming gooods inspection. Further information about our products and industry solutions can be found on our homepage at: foerstergroup.com