APPLICATION NOTES

Automated Testing of Cylinder Bores with the Eddy Current Method

Coated cylinder bores and cylinder linings in engines perform an important function. They ensure that the piston runs optimally. If the material surface is damaged by surface flaws such as cracks, this can also affect other engine components and lead to engine damage. Therefore, non-destructive and automated testing is common practice to continuously monitor and ensure product quality.

For testing cylinder bores/linings, FOERSTER offers the STATOGRAPH eddy current test instrument. In conjunction with a rotating, longitudinally guided eddy current sensor, the inner surface is scanned (see Figure 1).

This makes it possible to detect open cracks and pores as well as imperfections located just beneath the surface of the material. Test throughput amounts to approximately 120 bores per hour.

Figure 1: STATOGRAPH CM with STATOVISION CM and eddy current sensor

The cylinder bores in the engine blocks are automatically tested for imperfections using handling systems customized for the testing function. Thanks to its excellent resolution, the eddy current test with special rotary eddy current sensor also reveals imperfections in the aluminium block which are hidden below the material surface in addition to those which are unconcealed on the surface. Immediately after testing, an automatic classification of the test results in „OK“ and „NOK“ takes place.

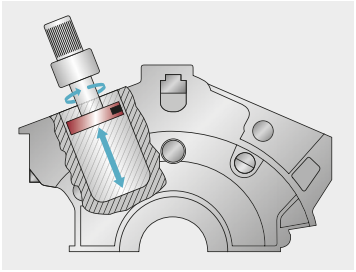

Figure 2: Testing principle

Nikasil® cylinder linings can also be inspected for cracks, pores and binding defects with the rotating eddy current sensor. In Nicasil cylinder linings, it must be checked whether the 60 to 80 µm thick coating applied to the cylinder surface has sufficient adhesion to the basic material.

Documentation of the test results is done with an evaluation software especially optimized for the specific testing job. Figure 3 shows the mapping of a scanned cylinder lining with multiple discontinuities varying in characteristic and position. The different test signals are shown in color.

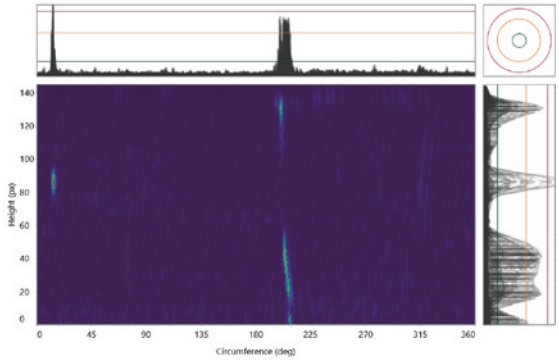

Figure 3: Mapping of scanned cylinder lining

For the testing of cylinder bores/linings, we recommend the STATOGRAPH test instrument with eddy current sensor in order to detect material defects at an early stage and to ensure quality. Further information can be found on our homepage: foerstergroup.de