



Equipment for wall thickness measurements of
motor block cylinders

EMATEST-WTM

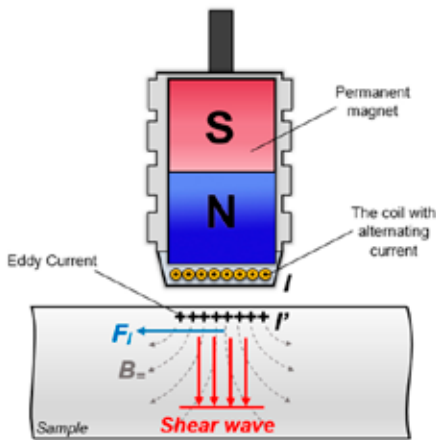




Principle of Electromagnetic Acoustic Transformation

EMAT is the abbreviation for Electromagnetic Acoustic Transducer. An EMAT is a non-destructive ultrasonic testing device which has overcome many of the issues faced by the more conventional piezo probe.

An EMAT transducer consists of a case with a socket, an induction coil, a protective cover, a magnetic flux concentrator and a permanent magnet. Alternate current feeds the induction coil, causing electromagnetic oscillations which, in turn, induce eddy currents on the surface of the test object.



The principle of EMA transformation

Eddy current interferes with the permanent magnetic field, creating ultrasonic waves directly on the surface of the test object. These waves propagate in the test object, reflecting and deflecting from the walls back to the EMAT coil. The picture created by the ultrasonic activity shows up flaws and defects within the test object.

One of the key advantages of the EMAT is that the ultrasonic waves are generated into material and received from it without direct contact between the UT-probe and the material, without a couplant.

The second important advantage of the EMAT is that ultrasound is generated always normal to the material surface so that the direction of ultrasonic waves transmitting is always perpendicular to the surface: the EMAT does it automatically regardless the probe inclination or test object geometry change.

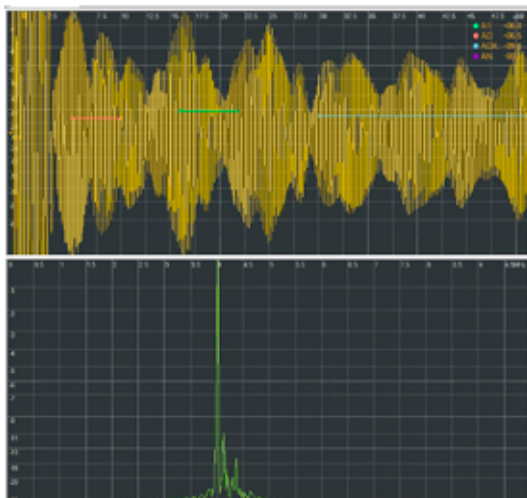
The third key advantage of the EMAT is the type of ultrasonic waves transmitted normal to the surface – shear waves, allowing one to get the best accuracy and resolution of measurement.

EMAT is the most effective instrument to transmit and receive shear waves, allowing one to get the best detectability and resolution. This factor assumes one more advantage of the EMAT-technology.

Resonance method

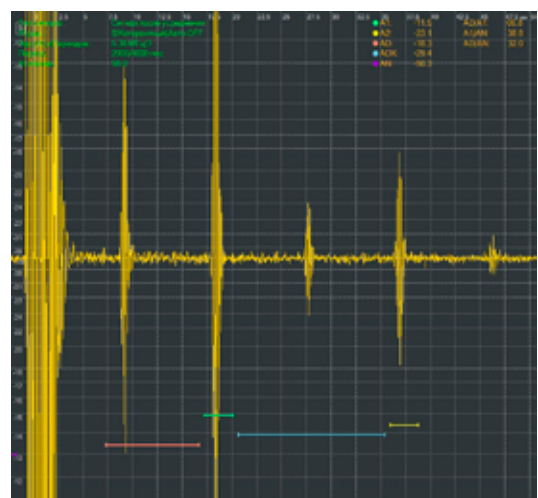
In the method of measuring the resonance frequencies, waves produced by a short stress pulse and interfering in the specimen are analysed referring to their frequency spectrum. In ultrasonic testing, it's a method of measuring the thickness of a metal by varying the frequency of the beam transmitted to excite a maximum amplitude of vibration.

The method is capable of determining the thickness of these structures nondestructively and with sufficient precision.



Echo method

Impact-echo is a method for nondestructive testing is based on the use of impact-generated stress (sound) waves that propagate through specimen and are reflected by internal flaws and external surfaces. Impact-echo can be used to determine the location and extent of flaws and the specimen thickness measurement.



EMATEST-WTM

Precise thickness measurement is an important application domain for contactless NDT (non-destructive testing) of materials. It is responsible for a secured measurement of geometry parameter of test objects.

Our new product - EMATEST - WTM is a device for ultrasonic testing, which can measure a wall thickness of combustion engine parts with different metal alloy during the serial production.

Main field of appliance for EMATEST - WTM is measuring of remaining wall thickness of cylinder sleeves which are built in engine block for enhancement. Thereby, measuring heads of barrel gauges equipped with EMAT – sensors will be contactless inserted in hollow space of frame in order to undertake a precise measurement according to pre-set parameters.

The wall thickness measurement can be processed during each stage of manufacturing for other construction elements in spite of cylinder sleeves:

- as intermediate examination before subsequent treatment;
- as for finishing quality conformance test after processing;
- by test measurement at experimental laboratory;
- for monitoring of material wearing on construction elements of test objects;
- etc...

The standard configuration includes 12 channels for simultaneously wall thickness measurement at 4 measuring points in all 3 cylinders of engine block. Measuring can be successively applied at several different levels. This configuration can be adapted for technical requirements of customer and in accordance to the characteristics of test object.

Two basic methods can be applied for processing of measurement:

- resonance method (0,5 – 5,0 mm);
- echo method (5,0 – 50,0 mm).

The thickness measurement range is within the frame of 0,5 – 5,0 mm. Appliance of contactless measurements will be realized on the inside of cylinder sleeves built in engine block or on other construction elements.



Main view of equipment



Main window of system user interface

Basic parameters of EMATEST-WTM

Thickness range (resonance method):	0,5 – 5 mm
Thickness range (echo method):	5,0 – 50,0 mm
EMAT - Channels:	up to 16 (for each EB)
Sensor type:	EMAT
Output rate at manual mode:	up to 30 pc/hr
Measurement accuracy:	up to 0,005 mm
Frequency range (electronic cycle):	0,5 – 7,0 MHz

For more information please contact us or send us the description of your technical requirements, in order to define relevant parameters.

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Plate testing equipment EMATEST-PL / EMASCAN-PL

Pipe testing equipment EMATEST-PI

Bar & billet testing equipment EMATEST-BB

EMATEST – BB Wire

Tube testing equipment EMATEST-TU

Portable EMAT thickness gauge NKD-019E Ultrasonic

SonaFlex

We are sure, we'll find the best way for
quality improvement of your engines!

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