

Alternating Current Field Measurement (ACEM)

The alternating current field measurement (ACFM) technique is an electromagnetic technique capable of both detecting and sizing (length and depth) surface-breaking cracks in metals. The basis of the technique is that an alternating constant current in a tangential solenoid, remote from the test surface, induces electric currents in the sample surface which are uni-directional and of uniform strength over a localised area under the solenoid. When no defects are present in this area, these electric currents will be undisturbed. If a crack is present, the uniform current is disturbed and the current flows around the ends and down the face of the crack. A standard PC is used to control the equipment and display results. ACFM is unique in the way data is displayed.



Target customers

Alternating current field measurement can be carried out anywhere magnetic particle inspection (MPI) is currently used, such as in:

- Oil and gas production (refineries and pipelines)
- Structural steel fabrication
- Aerospace manufacturing and maintenance
- Metal fluid-storage tanks (oil, gas and water)
- All welding industries
- Power-generation plants (nuclear and fossil fuel)

Key customer benefits

The ACFM technique is a detection and sizing technique for surface-breaking cracks.

The technology offers several advantages over conventional MPI inspection for both topside and subsea inspection:

- ACFM requires less surface preparation. It can be used on coated or rusted surfaces without coating removal or cleaning to bright metal. In most cases, light brushing is sufficient. ACFM can be used on non-conducting coatings, in good condition, up to 5mm thick
- ACFM can be deployed in most sea conditions and, unlike MPI, is not limited by currents, swell or poor visibility
- ACFM can be used in any light level and can therefore be used in 24-hour operations
- ACFM provides information on defect length and depth
- ACFM is faster to deploy
- ACFM provides electronic records of all inspection data, which is available for subsequent review or audit
- Use of a two-man team means the probe can be deployed by a diver or abseiler who is not a skilled ACFM operator. Data analysis is conducted by a skilled operator who is not required to dive or climb.