



## NDT -TOFD / -PA

(advanced ultrasonic testing techniques)

### What's included with the service?

**UT TOFD (Time of Flight Diffraction)** and **PAUT (Phased Array Ultrasonic Testing)** are advanced ultrasonic testing techniques used to detect internal discontinuities in materials and assess the quality of welded joints without damaging or interfering with the tested structure.

For weld inspection, PAUT and TOFD are often used together. PAUT provides reliable detection, location and evaluation of internal defects, while TOFD enables accurate measurement of their through-wall height.

Ultrasonic testing can be used to assess the quality of components during manufacturing, installation and operation. These methods are increasingly replacing radiographic testing (NDT RT).

Advantages of NDT UT/PA over RT testing:

1. Testing can be conducted during normal plant operation – no ionizing radiation.

PAUT and TOFD methods use ultrasonic waves, which are harmless and do not require the test zone to be closed off, as is necessary with X-ray radiation, allowing for parallel production, assembly, and maintenance work. In practice, this can reduce downtime and organizational costs associated with quality control.

2. Results are available immediately after scanning, without the need to develop films or perform additional processing of radiographic images. Examination data can be archived digitally, along with information on the probe's position. This allows indications to be reviewed again, results from subsequent inspections to be compared, and the development of discontinuities to be monitored over time.

These methods are used to inspect thick-walled components, steel structures, pipelines, pressure vessels, and components of industrial machinery and equipment.

As part of our service, we provide:

- Inspection of welded joints and base materials to detect internal discontinuities and assess workmanship.
  - Detection of internal defects such as cracks, lack of fusion, adhesion, porosity, non-metallic inclusions, delamination, and other material inconsistencies.
  - Testing of structural components, including sheets, forgings, castings, shafts, axles, and components operating under high pressure and load.
  - Assessment of compliance with applicable standards, technical documentation, and customer-specified acceptance criteria.
  - A detailed test report containing a description of the inspection, measurement results, location of detected inconsistencies, and, if necessary, photographic documentation or visualization of the results.
  - Recommendations for further action, including repair, additional NDT testing, or approval of the component for further use.
  - Tests performed by certified personnel in accordance with applicable standards procedures, customer requirements, and technical inspection regulations.
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