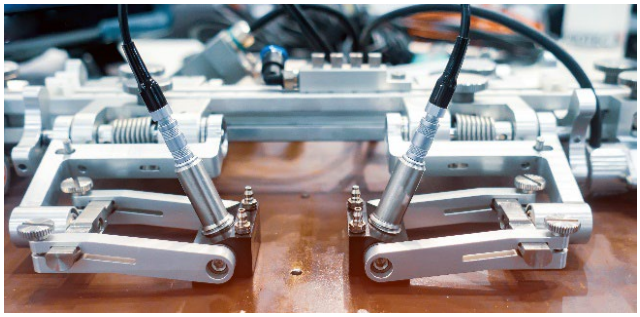
Time of Flight Diffraction (ToFD)

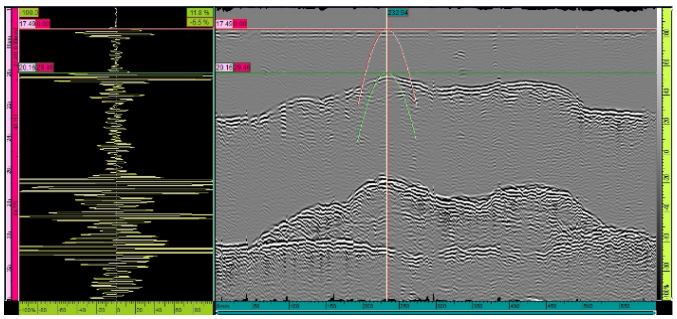
ToFD capitalizes on tip diffracted signals generated when a discontinuity within a weld receives ultrasonic mechanical energy. Tip diffracted signals are omni-directional wave fronts emitted from the very tips of discontinuities. This results in detection that is less sensitive to defect orientation and more accurate for through wall sizing when compared with amplitude reliant ultrasonic methods. Given crack geometry can be erratic, ToFD is an excellent tool for detection and sizing

Advantages

- Through wall measurements based on arrival times, therefore more accurate than amplitude techniques
- 100% coverage, permanent record, instant analysis, reproducible fingerprinting for condition monitoring
- Reduced sensitivity to defect orientation, particularly applicable to cracks
- Capable of inspecting complex geometry including weld joints, such as bend to flange joints
- High Temperature equipment can be used for temperatures up to 200°C
- General Accuracy +/- 0.5mm - Monitoring Accuracy +/- 0.3mm



Standard ToFD scanner setup



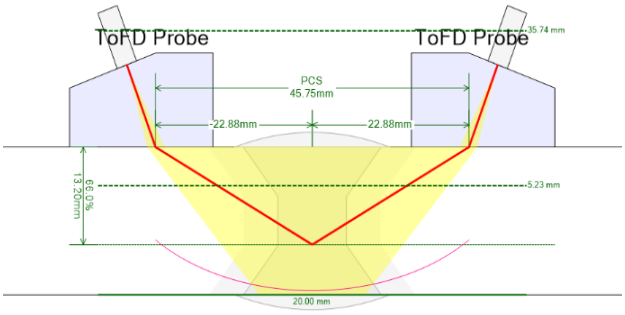
Data collected from weld root erosion (WRE)

The system provides fully-encoded data collection ensuring 100% weld coverage, significantly increasing the probability of detection (POD) of weld flaws and in-service cracking, enabling engineers to determine the optimum repair strategy and improve Risk Life Assessment (RLA) and Risk Based Inspection (RBI) maintenance programs.

ToFD data in A-Scan/ D-Scan format, enabling the operator to analyse data in real time and immediately detect and size areas of cracking, erosion, and corrosion.

Raw data is easily transferred and can be transmitted globally for Level 3- and third-party analysis, auditing, or storage.

To ensure accurate and consistent probe/wedge placement for weld scanning, a chain link scanner may be used with an incorporated encoder and a water supply system (to ensure consistent ultrasonic coupling).



ToFD scan plan of a standard focus weld inspection.