

PAUT & TOFD WELD INSPECTION

SEE INSIDE THE WELD. NO RADIATION.

Phased array and time-of-flight diffraction for plate, pipe and rail welds. Every weld is scanned from both sides, encoded along its length and kept as a permanent digital record. No exclusion zones, so other crews keep working.

PLATE & PIPE WELDS | TOFD HEIGHT SIZING | TANK WELDS | RAIL WELDS | ASME V | API 650 ANNEX U | LEVEL 3 SCAN PLANS

WHY PAUT & TOFD

INSIDE THE WELD, WITHOUT CLEARING THE SITE.

Radiography needs a barricaded exclusion zone, often out of hours, to keep people clear of the beam. Phased array and ToFD use sound, not radiation, so welds are scanned while everyone else keeps working, and every flaw is sized through the wall, not just seen from above.

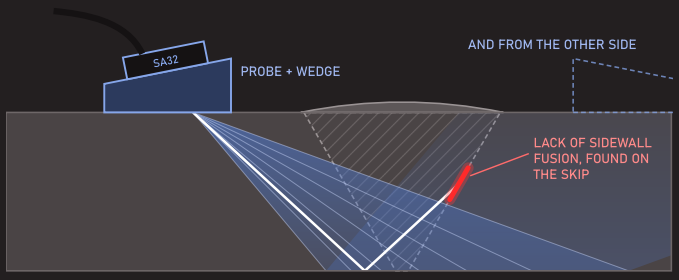
	RADIOGRAPHY	PAUT + TOFD
SAFETY	Exclusion zone and barricades. Work stops nearby while shots are taken.	No radiation. Crews keep working around us.
FLAW HEIGHT	Not measured. The film is a flat picture of the weld.	Through-wall height measured from the ToFD tip signals.
PLANAR FLAWS	Lack of fusion and cracks can be missed if they don't line up with the beam.	Angled beams from both sides aimed at the fusion faces.
ACCESS	Source on one side, film or plate on the other.	One surface only.
RECORD	Film or a CR image.	Encoded data file of the whole weld, re-analysed any time.

We do both. Radiography still suits thin welds, small bore and some joint types, and we'll tell you which suits the job.

HOW IT WORKS

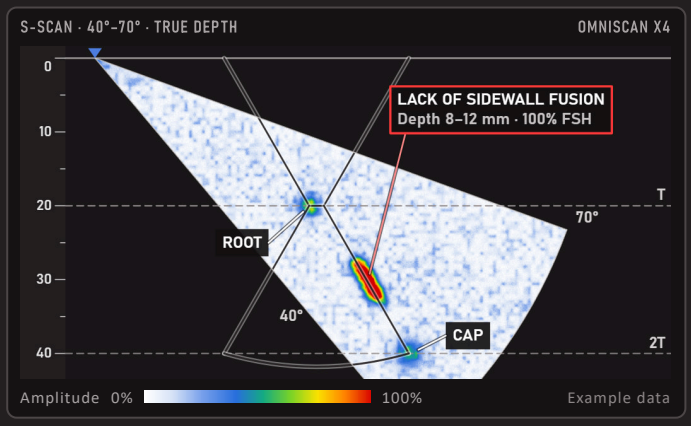
SECTORIAL SCANS FROM BOTH SIDES. ENCODED ALONG THE WELD.

THE SET-UP



SECTORIAL SCAN 40°–70°, ENCODED ALONG THE WELD

WHAT THE X4 SHOWS: THE WELD IN CROSS-SECTION



Sectorial scans from both sides of the weld, encoded along its length, give full volumetric coverage in one pass and a permanent digital record of every weld.

- NATA accredited (No. 12303) for PAUT weld inspection: steel, stainless and aluminium
- Scan plans reviewed by a Level 3, to ASME V, API 650 Annex U or your ITP

PLATE & PIPE WELDS

New build, repairs and in-service welds, with indications sized for length, height and depth.

TANK WELDS

Shell welds on new tanks, where API 650 Annex U allows ultrasonic examination in place of radiography.

RAIL WELDS

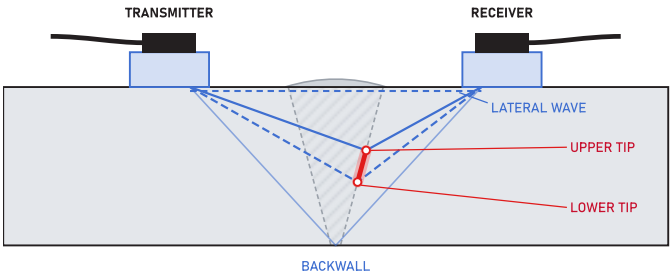
Low-frequency 2.25 MHz arrays get through the coarse grain of rail welds. Every weld recorded.

TIME-OF-FLIGHT DIFFRACTION · TOFD

TOFD MEASURES THE HEIGHT OF THE FLAW.

A transmitter and a receiver straddle the weld. Sound diffracts off the top and bottom tips of a flaw, and the time between those two signals gives its through-wall height. We run ToFD with PAUT in the same encoded pass on the X4.

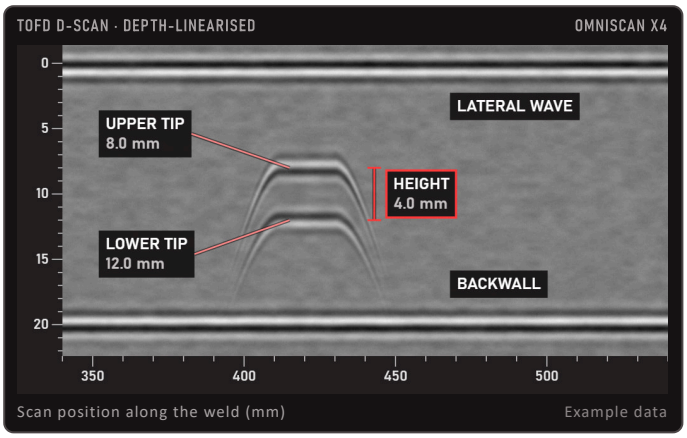
THE SET-UP



HEIGHT = DEPTH OF LOWER TIP − DEPTH OF UPPER TIP

Illustration. The tip signals arrive in phase order: upper tip, then lower tip, between the lateral wave and the backwall.

WHAT THE X4 SHOWS: TOFD ALONG THE WELD



TIP TO TIP

Height comes from the time between the signals off the top and bottom of the flaw, not from how loud the echo is.

ALONG THE WELD

The probe pair straddles the weld and travels along it, so the weld volume is covered as it goes.

PAUT COVERS THE GAPS

ToFD can't see just under the scan surface or right at the backwall. The PAUT sectorial scans cover both.

HOW A WELD JOB RUNS

PLANNED, SCANNED, SIZED AND CALLED.

01 SCAN PLAN
Probes, wedges, angles and positions set for the joint, and reviewed by a Level 3.

02 SET-UP
Sensitivity and depth set on a reference block before scanning, and checked again after.

03 SCAN
Encoded scans from both sides of the weld, with PAUT and ToFD in the same pass.

04 ANALYSE
Every indication located along the weld and sized for length, depth and height.

05 REPORT
Accept or reject against the code you nominate, with the images and data behind each call.

Scanned to **ASME V** **API 650 ANNEX U** **YOUR ITP** and accepted against the construction code you nominate.

WHAT WE NEED FROM YOU

- Joint details: thickness, bevel and weld process, from the WPS
- A weld map or drawing with weld numbers
- The code and acceptance criteria that apply
- Access along both sides of the weld, with spatter and loose scale removed

BOTH SIDES

Every weld scanned from both sides

ONE PASS

PAUT and ToFD encoded together

NO RADIATION

No barricades, no clearing the area

WHAT YOU GET

EVERY INDICATION, LOCATED AND SIZED.

Each weld comes back with an indication table, the S-scan and ToFD images behind every call, and the encoded data file. Re-open the data any time to check a call, or compare at the next inspection.

WELD W-014 · 20 MM PLATE BUTT WELD · PAUT + TOFD

Example data

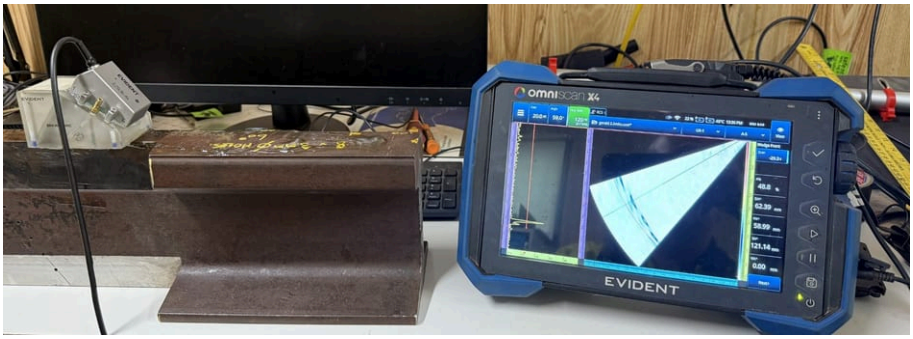


No.	Start from datum	Length	Depth	Height	Type	Result
1	412 mm	18 mm	8.0 mm	4.0 mm	Lack of sidewall fusion	Reject
2	655 mm	6 mm	15.5 mm	1.0 mm	Slag inclusion	Accept
3	1,020 mm	3 mm	11.0 mm	< 1 mm	Porosity	Accept

Indication 1 is the same flaw as the S-scan on page 2 and the ToFD D-scan on page 3. Results shown against an example acceptance standard.

THE KIT

EVIDENT (OLYMPUS) PHASED ARRAY, RUN IN-HOUSE



SET-UP CHECK

ON THE REFERENCE BLOCK FIRST

An Evident 2.25L16 array on a 55° wedge, set up on a rail reference block with 3 mm side-drilled holes. The X4 shows the sectorial scan from the block before any weld is scanned.

INSTRUMENT

OMNISCAN X4

Phased array flaw detector. PA, UT and ToFD with every scan encoded and recorded.

PROBES

MULTIPLE WELD PROBES

Linear arrays, wedges and ToFD pairs, from 2.25 MHz for rail welds up to 7.5 MHz.

PLANNING

LEVEL 3 SCAN PLANS

Every scan plan reviewed by a Level 3 before the job starts.

ACCREDITATION

NATA 12303

PAUT weld inspection of steel, stainless and aluminium.

WELDS TO INSPECT? KEEP THE SITE RUNNING.

Swift reporting, round the clock.

NATA 12303 | ISO 9001 | AINDT | PCN

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