

## Introduction

Butt welds are one of the simplest types of welded joint, and one of the most suitable welds for phased array ultrasonic (PAUT) inspection. Made by joining the ends of two materials on the same plane on plate to plate or Pipe to Pipe for example, this method of welding is suitable for high thickness ranges and for joining dissimilar metals.

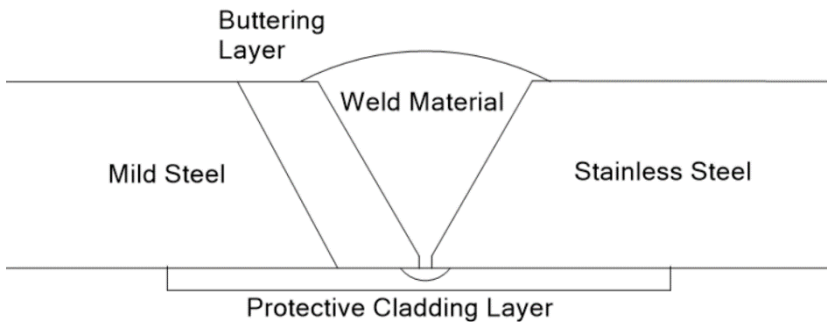


Figure 1 – Example of a dissimilar butt weld plan

PAUT can be used in lieu of conventional UT (Ultrasound Testing) in most cases and is increasingly replacing radiography due to its advantages in safety, faster inspection speed and result delivery, and that PAUT can be carried out without the need to evacuate the inspection area meaning surrounding work does not to be stopped for the inspection.

The Sonatest VEO3 provides a robust, portable, easy to use PAUT unit capable of inspecting large lengths of weld quickly and efficiently.



Figure 2 – VEO3 in use on a double V shop butt weld

## VEO3 Butt weld Setup Steps

Over the next few pages, we will briefly detail the steps for creating and gathering data for a PAUT weld inspection, along with useful tools and video links.

### Industries

- Aerospace Aeronautical Inspection
- Aerospace Astronautical Inspection
- Chemical & Petrochemical Sector
- Oil & Gas Sector
- Nuclear Energy Sector
- Wind Power Renewables Sector
- Military Sector
- Maritime Shipping Industries
- Mining Sector
- Construction and Infrastructure
- NDT Service Providers

### Application

- Weld Inspection
- Plastics Inspection
- Storage Vessel Inspection
- Material Bonding Inspection
- Asset Integrity
- Flaw Detection and Evaluation

### Typical Parts

- Pipeline Circumferential and seam welds
- Storage vessel shell, floor, and roof welds
- Infrastructure welds
- Plastic pipe welds

### Inspection Techniques

- Phased Array S-Scan

### Features and Benefits

- Scanning of long weld lengths in a single shift
- VEO3 high speed data acquisition with dual side weld inspection: Acquiring the entire weld integrity region in a single file.
- Phased array data files saved and used for data review and repeatability of inspections.
- Visual data representation views give high levels of information compared to conventional ultrasound techniques.

## Scan Setup

Creating setups for phased array scans is easy on the VEO3, full setup wizards with step-by-step guidance and help boxes make the process of creating delay laws that have the correct coverage and focal settings. Probe and wedge selection is easy using the onboard library The Veo3 can also import delay laws created on ES Beamtool and CIVA.

Multiple group and probe setups are easy to setup with the VEO3 capable of up to 8 PA (Phased Array) groups in a single scan setup and can be run with PA, TOFD, TFM (Time of Flight Measurement) and TFMi scans simultaneously.



Figure 3 – Setup Wizard on the VEO3

## Calibrations

The VEO3 has made the calibration process simple, with easy to perform step by step guides to help get that calibration set first time and get through all the calibrations quicker than ever before.

The PA calibrations and checks available on the VEO3 are as follows:

- Wedge angle check
- Element activation Wizard (dead element check)
- Velocity and Zero
- Wedge Delay
- Sensitivity
- TCG (Automated, Manual, and constant dB options)
- Encoder Calibration

A full list of 'how to' videos are available on the [Sonatest YouTube page](#)

## Scanning

Scanning with the VEO3 can be performed with an encoded scanner, or via timed free hand scanning. The VEO3 can gather data at a high speed with its Linux based operating system. The technician also has control over the PRF settings that can be set to increase scanning speeds if needed.

Scanning layout options can be chosen or created to be customised to the technicians' preferred views when scanning. Each window is fully customisable with cursors, colour pallets and window size being controllable.

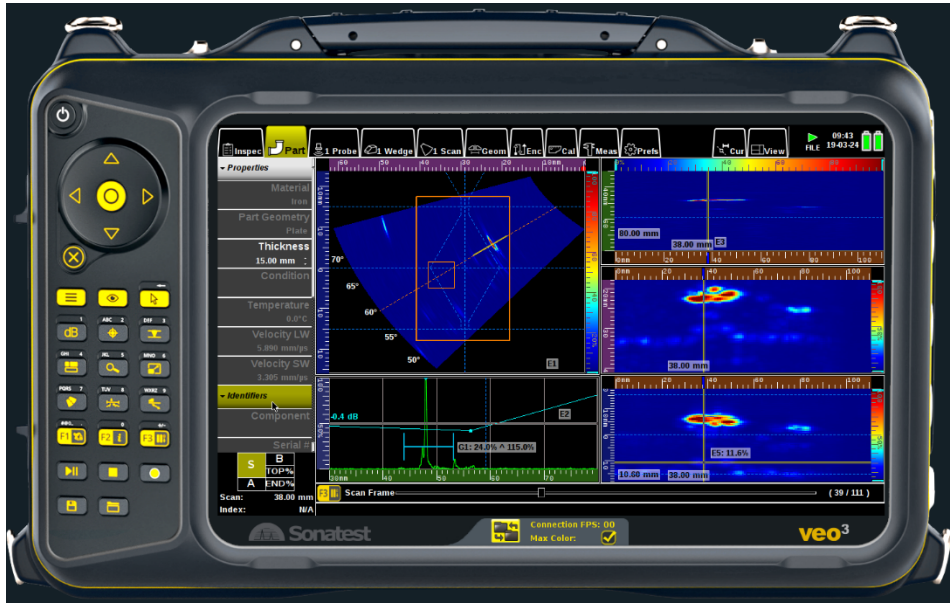


Figure 4 – Data acquisition performed on the VEO3.

## Data Review and Reporting

Once acquired, scanning data can be reviewed on the VEO3 itself and a PDF report can be generated for immediate onsite results.

The UTStudio+ PC software comes with advanced data review tools to help locate and automatically size defects within your scan data, this can then generate a full report providing the scan setup parameters, calibration details and defect measurements for submission to the clients.

Sonatest PA data is also compatible with CIVA review software for live data review and defect plotting using complex geometry weld profiles.

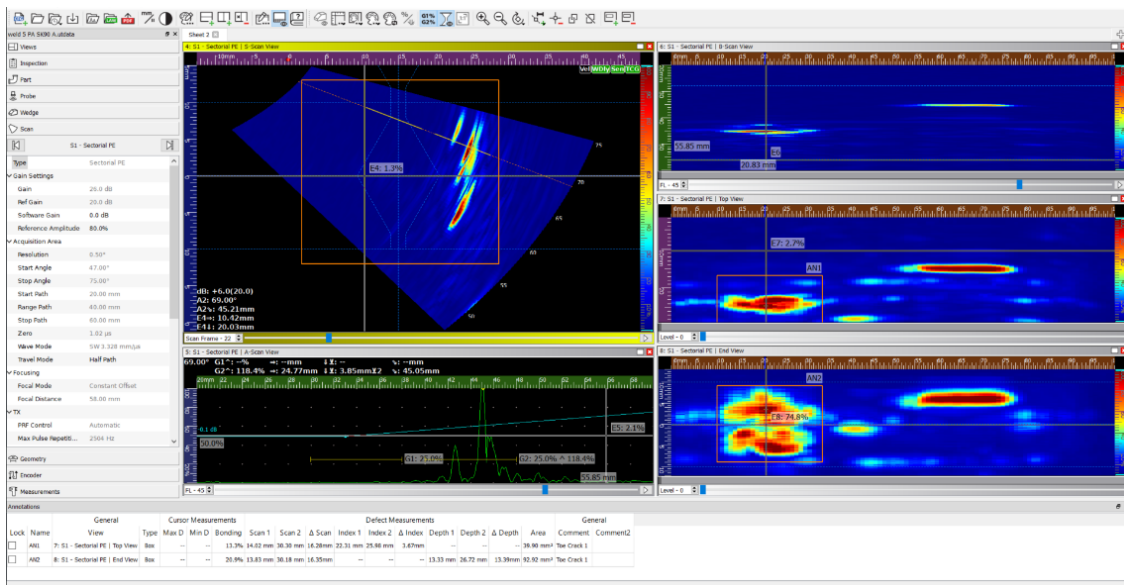


Figure 5 – Data review on UTStudio+ PC Software

## Conclusion

The VEO3 PA data acquisition unit is designed for fast, efficient portable PAUT inspections and is a perfect solution for butt weld inspection carried out under any regional standard. Technicians can be confident in their results, speed up setup times and scanning speeds with a world leading PA units and data review software.

For further information or support, please contact the Sonatest Applications Team: [applications@sonatest.com](mailto:applications@sonatest.com)

---

## Recommended Tool Package

Category	Links to our website
Acquisition Unit	The VEO3 PAUT Flaw Detector details can be found here. <a href="https://sonatest.com/products/flaw-detectors-phased-array/veo3">https://sonatest.com/products/flaw-detectors-phased-array/veo3</a>
Transducer	Our PAUT transducer and wedges list and catalogue can be found here <a href="https://sonatest.com/products/phased-array">https://sonatest.com/products/phased-array</a>
Calibration Block	Our calibration block list can be found here <a href="https://sonatest.com/products/calibration-blocks">https://sonatest.com/products/calibration-blocks</a>

---

**Get in touch with your local Sonatest expert, available in more than 50 countries over 5 continents!**



Sonatest (Head Office)  
Dickens Road, Old  
Wolverton Milton Keynes,  
MK12 5QQ  
t: +44 (0)1908 316345 e:  
[sales@sonatest.com](mailto:sales@sonatest.com)

Sonatest (North America)  
12775 Cogburn, San Antonio Texas,  
78249  
t: +1 (210) 697-0335 e:  
[sales@sonatestinc.com](mailto:sales@sonatestinc.com)