

# Impulse-Based Calibration of Ultrasonic Flaw Detectors



## What Is Impulse-Based Calibration of Ultrasonic Flaw Detectors?

**Impulse-based ultrasonic flaw detectors calibration** is an evaluation method that uses ultrasonic waves to verify the internal integrity of materials. Testing is essential for detecting internal defects such as cracks, voids or inclusions in industrial components without compromising the tested part. Thanks to the high frequency of ultrasonic waves, calibration allows accurate and detailed results to be obtained in real time, which is vital in sectors where reliability and safety are critical, such as [automotive](#), [aeronautics](#) and [construction](#).

## What Are Impulse-Based Ultrasonic Flaw Detectors?

Ultrasonic flaw detectors are advanced devices that emit ultrasonic signals to locate cracks, voids and other internal defects in materials.

### Detector Characteristics

- **High sensitivity** for small internal defects.
- **Real-time display** of echoes reflected from defects.
- **Portable and automated equipment** for inspection in industrial environments.

## How Are Impulse-Based Ultrasonic Flaw Detectors Calibrated by Impulse?

Applus+ Laboratories carries out the periodic calibration of ultrasonic pulse ultrasonic error detectors, in compliance with the Standards UNE-EN ISO 22232-1 and UNE-EN 12668-1:2010, to guarantee the reliability and precision of the equipment and components evaluated.

- **UNE-EN ISO 22232-1**  
The Standard UNE-EN ISO 22232-1 regulates the requirements for equipment used in the calibration of ultrasonic error detectors. This Standard ensures that the equipment is accurate and that the measurements taken in the field are reliable, which is essential to guarantee the safety of the components evaluated.
- **UNE-EN 12668-1:2010**  
UNE-EN 12668-1:2010 describes the technical specifications for ultrasonic equipment used in non-destructive evaluation. This Standard establishes the key operating parameters and ensures the conformity of the equipment with international best practices, guaranteeing consistent and accurate results in each evaluation.

## Emission Pulse Parameters

- **Pulse voltage V**
- **Rise time Tr**
- **Pulse duration Td**
- **Reverberation voltage**, evaluated according to Standard UNE-EN 12668-1:2010

## Receiver Parameters

- **Frequency response:** We cover a wide frequency range, from 10 kHz to 25 MHz, with an uncertainty of  $\pm 30$  kHz at the -3 dB point.
- **Noise level:** The noise level is verified to meet the manufacturer's specifications.
- **Gain linearity:** The gain linearity of the ultrasonic equipment is verified.
- **Linearity of the vertical representation:** The vertical linearity ensures that the measurements are not distorted on the vertical axis of the equipment.

## Stability Parameters (UNE-EN 12668-1:2010)

- **Vertical amplitude:** Evaluated with an uncertainty of  $\pm 0,58$  % on the display, this parameter ensures the consistency of the measurements.
- **Horizontal position:** Measured with an uncertainty of  $\pm 0,020$  % on the screen, this parameter ensures accuracy in the positioning and display of detected defects.
- **Time base linearity:** Evaluated with an uncertainty of  $\pm 0.20$  %, this parameter is essential for temporal accuracy in measurements, especially on components requiring strict control.

## Benefits of Impulse-Based Calibration of Ultrasonic Flaw Detectors

Calibration of impulse-based ultrasonic flaw detectors offers many advantages for material evaluation:

- **Non-destructive:** Allows inspection without damaging the material.
- **High accuracy:** Detects internal defects with high accuracy.
- **Immediate results:** Enables quick decisions to be made based on the results.
- **Versatile applications:** Suitable for a wide range of materials such as metals, composites and plastics.
- **Safety:** No radiation is required, minimising risk to operators.

## Why Choose Applus+ Laboratories for Impulse-Based Calibration of Ultrasonic Flaw Detectors?

Applus+ Laboratories is a leader in the execution of impulse-based ultrasonic flaw detector calibrations, with years of experience in the industry and international accreditations that guarantee the quality of our services.

- **Verification accredited** in the UNE-EN ISO 22232-1 and UNE-EN 12668-1:2010 standards.
- **Highly qualified personnel:** Specialised technicians who guarantee reliable and accurate results.

**Customised solutions: We adapt our calibrations to the specific needs of each client.**