

Procedure For The Ultrasonic Testing Of Solid Steel Bars To BS EN 10308:2002

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1. Scope

This procedure covers the ultrasonic inspection of round, square and rectangular steel bar products using the longitudinal wave manual pulse-echo technique.

This procedure follows practices laid down in BS EN 10308:2002.

This procedure is only to be used for the inspection of newly manufactured wrought bar products and does not cover in-service inspection or items which have been subject to any repair work.

This procedure covers the testing of martensitic, ferritic, austenitic and austenoferritic type wrought/forged steel and stainless steel materials.

This procedure does not cover any bar stock which has been extensively machined (i.e. into components) except where proof machining/turning has taken place to improve surface condition.

This procedure only covers solid bar products and is not applicable to bar which is either hollow or has been bored.

This procedure shall be carried out once all heat treatment operations have been completed and at least 48 hours after the final heat treatment operation has been completed.

This procedure covers the ultrasonic testing of round, square and rectangular bar stock of diameter or cross-sectional thickness up to and including 400mm.

2. References

This procedure makes reference to the following documents:-

BS EN 10308:2002 Non-destructive testing. Ultrasonic testing of steel bars

BS EN ISO 9712:2022 Non-destructive testing. Qualification and certification of NDT personnel.

BS EN ISO 5577:2025 Non-destructive testing. Ultrasonic testing. Vocabulary.

BS EN ISO 22232-1:2020 Non-destructive testing. Characterization and verification of ultrasonic test equipment. Part 1: Instruments

BS EN ISO 22232-2:2020 Non-destructive testing. Characterization and verification of ultrasonic test equipment. Part 2: Probes

BS EN ISO 22232-3:2020 Non-destructive testing. Characterization and verification of ultrasonic test equipment. Part 3: Combined equipment

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BS EN ISO 2400:2025 Non-destructive testing. Ultrasonic testing. Specification for standard block No. 1

BS EN ISO 7963:2022 Non-destructive testing. Ultrasonic testing. Specification for calibration block No. 2

BS EN ISO 16810:2024 Non-destructive testing. Ultrasonic testing. General principles

BS EN ISO 16811:2025 Non-destructive testing. Ultrasonic testing. Sensitivity and range setting

3. Definitions & Abbreviations

As well as the terms defined in BS EN ISO 5577 this procedure uses the following definitions:

PCN	Personnel certification in Non-destructive testing
COSHH	Control of substances hazardous to health
PPE	Personal protective equipment
FBH	Flat-bottom hole
FSH	Full screen height
DAC	Distance-amplitude correction

4. Safety

All consumables used shall have accompanying COSHH data sheets and shall be disposed of in a way that is non-injurious to site personnel or to the environment.

Personnel working to this procedure shall at all times wear mandatory PPE; overalls, safety boots, hard hat, high visibility clothing, safety eyewear.

5. Personnel Qualifications

All personnel following this procedure must be currently certified by PCN (or BS EN ISO 9712 equivalent body) to a minimum of Level 2 covering the ultrasonic testing of forgings and wrought products.

All personnel shall also hold a valid eyesight certificate (meeting the requirements of BS EN ISO 9712 Section 7.4) obtained within the last 12 months.

Documentation relating to ultrasonic operators working on-site for the steel supplier/end user shall be kept on file at the administration offices for review purposes.

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6. Identification And Datum Points

All bars tested shall be permanently stamped/engraved at one end with an identifying cast number and where more than one bar from the same cast is to be tested, each bar shall be uniquely numbered with indelible ink at the same end for identification purposes.

The end of the bar marked with the cast number shall be used as the datum point for reporting purposes (See appendix A).

7. Surface Preparation

The surface condition shall be such that satisfactory coupling conditions can be maintained at all times.

All surfaces to be examined shall be clean and free from paint, non-adhering scale, dry couplant, surface irregularities or any other substance that could reduce coupling efficiency, hinder the free movement of the probe or cause errors in interpretation.

Where bars have been milled the surface condition shall be such that a regular smooth surface is achieved so that spurious indications do not affect the sensitivity of the test.

If a bar is found to have a surface condition which means that a complete satisfactory ultrasonic examination cannot take place, then company management and/or the responsible Level 3 shall be informed so that corrective action can be taken before the bar is subject to ultrasonic testing.

8. Extent Of Inspection

All bars tested in accordance with this procedure shall be examined using the longitudinal wave manual pulse-echo technique on:

- In the case of square/rectangular bars: 100% of two perpendicular faces parallel to the direction of rolling.
- In the case of round bars: At least 180° of the cylindrical surface of the bar along full length.

This procedure does not cover the examination of the bar in the longitudinal direction nor does this procedure cover the examination of the bar using angle (shear wave) probes.

This procedure only covers solid round, square and rectangular bar stock and is not applicable to bar stock which has been bored.

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