Procedure For The Ultrasonic Testing And Thickness Measurement Of Steel Plate to DEF STAN 02-729 Part 5

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Authored By: Mr A Sample PCN Level 3	**Authorised For Use By:**
Signed: Mr A Sample	**Signed:**
Date:	**Date:**

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1. Scope

This procedure covers the manual ultrasonic testing of steel plate, 6 mm up to and including 200 mm thick, using the compression (longitudinal) wave pulse-echo contact technique and, where specified or required, the shear wave technique, in accordance with DEF STAN 02-729 Part 5 Issue 4 clause 8. It also covers the ultrasonic measurement of plate thickness in accordance with clause 9. It is for on-site and in-house use.

This procedure covers plate in carbon and low alloy steels only (e.g. Q1(N) to DEF STAN 02-736 Part 1 and HY100(UK) to DEF STAN 02-880 Part 1). It does not cover austenitic stainless steel or non-ferrous plate.

Where DEF STAN 02-729 Part 5 is referenced from a material specification (e.g. DEF STAN 02-736 Part 1 or 02-880 Part 1), the material specification has precedence over this procedure (clause 1.5).

The effective application of ultrasonic examination may be restricted in materials with inherently high or variable attenuation, or which produce severe scattering of the ultrasonic beam (clause 1.2).

This procedure is to be used for the inspection of newly manufactured products and, where suitable, can be used for in-service inspection or items which have been subject to repair work.

Unless otherwise specified in the Contract Documents, testing shall be performed on the plate in the final surface condition and the final heat-treatment condition (clause 6 b)).

2. References

This procedure makes reference to the following documents:-

DEF STAN 02-729 Part 5 Issue 4 Requirements for Non-Destructive Examination Methods. Part 5: Ultrasonic

DEF STAN 02-736 Part 1 Issue 5 Requirements for Q1 (Navy) Quality Steel. Part 01: Plates

DEF STAN 02-880 Part 1 Issue 1 Requirements for HY 100 (United Kingdom) Steel. Part 01: Plates

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

BS EN ISO 18490:2026 Non-destructive testing. Evaluation of vision acuity of NDT personnel

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

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

BS EN 1330-1:2014 Non-destructive testing. Terminology. List of general terms

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

BS EN ISO 16827:2025 Non-destructive testing. Ultrasonic testing. Characterization and sizing of discontinuities

BS EN ISO 16831:2025 Non-destructive testing. Ultrasonic testing. Characterization and verification of ultrasonic equipment for the determination of thickness

3. Definitions & Abbreviations

As well as the terms defined in BS EN 1330-1 and 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
SDH	Side drilled hole
FSH	Full screen height
BWE	Back wall echo
DEF STAN	Defence Standard
DAC	Distance-amplitude correction

Contract Documents: The purchase order, drawings, material specification and any other documents that specify the requirements for the item.

Design Authority: The authority responsible for the design of the item, as identified in the Contract Documents.

Approval Authority: The authority responsible for approving the examining authority, its procedures and personnel, as identified in the Contract Documents.

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Material specification: The DEF STAN or other specification to which the material is supplied, e.g. DEF STAN 02-736 Part 1 or 02-880 Part 1.

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 operating to this procedure shall hold a minimum of Level 2 certification in accordance with BS EN ISO 9712 in the ultrasonic testing of wrought products (e.g. plate), e.g. PCN Level 2.

All personnel shall meet the vision requirements of BS EN ISO 9712 and provide documentary evidence (DEF STAN 02-729 Part 5 clause 7.1 a)): near vision acuity shall permit reading a minimum of Jaeger number 1 or Times Roman N 4.5 or equivalent letters (1.6 mm high) at not less than 30 cm, with one or both eyes, corrected or uncorrected; colour vision shall be sufficient to distinguish and differentiate between the colours or shades of grey used in the method. Vision shall be tested annually. Information on vision testing is given in BS EN ISO 18490.

Personnel shall be able to demonstrate their ability to meet the requirements of this procedure (clause 7.1 b)). A register of approved personnel shall be kept (clause 7.1 h)).

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

6. Identification And Datum Points

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

One corner of the plate, at the end marked with the cast number, shall be marked as the datum corner and used as the datum point for reporting purposes (see Appendix A).

7. Surface Finish

The surface of the plate shall be clean and free from dirt, loose scale, paint or other foreign matter to ensure effective acoustic coupling (DEF STAN 02-729 Part 5 clause 7.8). Ideal surfaces are smooth and clean to bright metal.

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