Procedure For The Ultrasonic Testing Of Castings To Def Stan 02-729 Pt.5

SAMPLE ONLY - NOT FOR PRODUCTION USE

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1. Scope

This procedure covers the ultrasonic inspection of cast products in accordance with Def Stan 02-729 Part 5.

This procedure shall only be used by people employed by or with written authorisation to work on behalf of ABM NDT Limited, Sheffield.

This procedure is only to be used for the inspection of newly manufactured castings and does not cover in-service inspection, however the procedure does cover items have been subject to initial upgrading and repair work

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

This procedure shall be carried out once all heat treatment operations have been completed (excluding post weld repair stress relief) and at least 24 hours after the final heat treatment operation has been completed.

2. References

This procedure makes reference to the following documents:-

DEF STAN 02-729 Iss. 2 Part 5 Requirements for non-destructive examination methods. Part 5 Ultrasonics.

Def Stan 02-745 Part 2 Classification, Inspection Requirements and Acceptance Standards for Castings, Part 2: Steel Castings.

Def Stan 02-863 Requirements for Classification, Dimensions, Tolerances and General Standard of Acceptance for Copper and Nickel Alloy Castings.

BS EN ISO 9712:2012 Non-destructive Testing. Qualification and certification of NDT personnel.

BS EN ISO 2400:2012 Non-Destructive testing - Ultrasonic Examination - Specification for calibration block No. 1

BS EN 12668-1:2010 Non-destructive testing - Characterization and verification of ultrasonic examination equipment - Part 1: Instruments

BS EN 12668-2:2010 Non-destructive testing - Characterization and verification of ultrasonic examination equipment - Part 2: Probes

BS EN 12668-3:2013 Non-destructive testing - Characterization and verification of ultrasonic examination equipment - Part 3: Combined equipment

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

BS EN 1330-4:2010 Non-destructive testing - Terminology - Terms used in ultrasonic testing

BS EN ISO 16811:2014 Non-destructive testing - Ultrasonic testing - Sensitivity And Range Setting

3. Definitions & Abbreviations

As well as the terms defined in BS EN 1330-1 and BS EN 1330-4 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
DAC	Distance-amplitude correction
DGS	Distance gain scale

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 to a minimum of Level 2 covering the ultrasonic testing of castings.

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

Documentation relating to ultrasonic operators employed by or working for the foundry/testing company shall be kept on file at the administration offices for review purposes.

6. Identification And Datum Points

All castings tested shall be marked (either cast on or stamped) with a unique number for identification purposes, this number shall be used as the datum point for reporting purposes.

7. Equipment

7.1 Electronic apparatus

An A-scan ultrasonic pulsed reflection type of instrument that is capable of generating, receiving and amplifying frequencies of at least 1 to 6 MHz.

The ultrasonic flaw detector shall comply with the requirements of BS EN 12668-1 and have a calibration certificate obtained within the last year.

7.2 Probes

Probe selection will depend on the geometry of the item to be examined, material type and grain size, and the area of probe contact surface. The best near surface resolution will be obtained using combined double compression wave probe and this characteristic is of value in the examination of areas subject to subsequent machining. Generally the probe test frequency will be in the range 2 – 6 MHz but a lower frequency may be necessary to overcome the effects of material large grain structure and long beam path length.

Shear wave probe techniques are to be used where specified. On bored (or hollow) items where the bore is inaccessible for examination with a compression probe an appropriate shear wave technique is to be used. Shear wave is also to be used to cover areas where the shape of the item prevents comprehensive examination by compression wave.

Other frequencies and sizes of search units may be used for evaluating and pinpointing indications.