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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 19799.3-2025

Non-destructive testing - Ultrasonic testing blocks - Part 3: Calibration blocks for curved surfaces

无损检测 超声检测试块 第3部分：曲面检测标准试块

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1.Structure and drafting rules for standardization documents" Drafting. This document is part 3 of GB/T 19799 "Non-destructive testing ultrasonic test blocks". GB/T 19799 has published the following part.

---GB/T 19799.1 Non-destructive testing - Ultrasonic testing - Calibration test block No. 1

---GB/T 19799.2 Non-destructive testing - Ultrasonic test blocks - Part

2.Standard test blocks No. 2.

---GB/T 19799.3 Non-destructive testing - Ultrasonic test blocks - Part

3.Standard test blocks for curved surface testing. This document is proposed and coordinated by the National Technical Committee for Standardization of Nondestructive Testing (SAC/TC56). This document was drafted by: Nanjing Diwell High-end Manufacturing Co., Ltd., Shanghai Materials Research Institute Co., Ltd., Shandong Ruixiang Mould Co., Ltd. Ltd., Changzhou Ultrasonic Electronics Co., Ltd., Wujiang Hongda Flaw Detection Equipment Co., Ltd., Beijing Xinliantie Group Co., Ltd., Ainti Nake Technology (Shanghai) Co., Ltd., Gangyan Nake Testing Technology Co., Ltd., and Aerospace Intelligent Manufacturing (Shanghai) Technology Co., Ltd. The main drafters of this document are. Chen Changhua, Ding Jie, Zhang Li, Jiang Jiansheng, Zhang Wencheng, Ha Yao, Xu Zhengmao, Chen Qingyong, Wei Yulong, Wan Haitao, Xiao Xiao, Zhang Jianwei, Shen Mingkui, Tan Ying, Zhang Rui, Xu Lei, Han Lina, Zhong Dehuang, Shen Yaocheng, Xu Guozhen.

Ultrasonic test blocks are divided into standard test blocks, comparison test blocks and test test blocks. GB/T 19799 "Non-destructive testing ultrasonic test blocks" aims to standardize

ultrasonic testing standard test blocks. GB/T 19799 is intended to consist of three parts constitute.

1.Standard test block No.

1.The purpose is to specify the size, material and production requirements of standard test block No. 1.

2.No. 2 standard test block. The purpose is to specify the size, material, manufacturing requirements of No. 2 standard test block, and the use of test blocks Methods for setting up and verifying ultrasonic testing equipment.

3.Standard test blocks for curved surface inspection. The purpose is to specify the size, material, production requirements of standard test blocks for curved surface inspection, and A method of verifying curved probe performance and material sound velocity using a test block. This document is part 3 of GB/T 19799.The standard test blocks for curved surface testing are divided into convex curved surface test blocks and concave curved surface test blocks. The surface inspection standard test block not only ensures the accurate positioning of the curved probe on the detected defects, but can also be used to test the performance and calibration of the instrument. Sensitivity, improve the level of curved surface ultrasonic testing, effectively solve the measurement of curved surface detection angle probe incident point, refraction angle, zero point and material sound velocity question. The issuing organization of this document calls attention to the fact that when declaring compliance with this document, Figure 4, Figure 5, Table 1, Table 2, Table 3 and "One The use of related patents for "a heel test block", "a heel test block", "a cup-shaped test block" and "a bellyband test block". The issuing organization of this document takes no position on the authenticity, validity and scope of this patent. The patent holder has promised to the issuing agency of this document that it is willing to cooperate with any applicant under reasonable and non-discriminatory terms and conditions, free of charge. The patent holder's statement has been issued by the issuing agency of this document. Related information can be obtained through the following contact information. Name of patent holder. Nanjing Diwell High-end Manufacturing Co., Ltd. Company address. No. 8, Dixi Road, Zhongshan Science and Technology Park, Yanjiang Industrial Development Zone, Liuhe District, Nanjing City, Jiangsu Province. Please note that in addition to the above patents, some of the contents of this document may still involve patents. The issuing agency of this document does not assume the responsibility for identifying patents. responsibility. Non-destructive testing ultrasonic test blocks Part

1 Scope

China's national standard for the ultrasonic calibration blocks used when the surface being tested is curved. It is Part 3 of GB/T 19799 and specifies the dimensions, the material and the manufacturing requirements of calibration blocks for curved surface testing, describing their use with the probe, with informative annexes on the method of use for convex and for

concave surfaces. It applies to standard blocks for curved surface testing, and other curved blocks for metal materials may refer to it. Ultrasonic testing is a comparative technique: the instrument is set up on a block containing known reflectors at known depths, and everything found afterwards in the component is judged against that setting. Which means the block has to represent the component, and where the surface is curved the flat blocks of Parts 1 and 2 no longer do. Curvature changes two things at once. It changes the coupling, because a flat probe on a convex surface touches along a line rather than over an area and on a concave surface rocks, so the energy entering the material is different. And it refracts the beam: a curved entry surface acts as a lens, spreading the beam on a convex surface and focusing it on a concave one, which shifts both the sensitivity and the apparent position of a reflector. Setting a pipe or a vessel examination on a flat block therefore produces a calibration that is wrong by an amount depending on the diameter. This part provides blocks with the matching curvature so that sensitivity, range and beam index can be established under the geometry that will actually be used, and it specifies the block material and its acoustic properties, the reflector geometry, the manufacturing tolerances and the marking and declaration of conformity that make one laboratory's block equivalent to another's. Issued and in force since 24 January 2025.

This document specifies the size, material, and Manufacturing requirements, describing the use of the probe operating test block. This document is applicable to standard test blocks for curved surface testing, and other types of curved test blocks for metal materials can also be used for reference.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 12604.1 Nondestructive testing terminology Ultrasonic testing

GB/T 20737 General terms and definitions for non-destructive testing

GB/T 41114-2021 Non-destructive testing ultrasonic testing phased array ultrasonic testing standard test block specification

3 Terms and definitions

The terms and definitions defined in GB/T 12604.1 and GB/T 20737 apply to this document.

4 Production

4.1 Materials The test block should be made of steel with the same or equivalent steel grade as the test piece. The steel used to make the test block should meet the following requirements.

--- The acoustic performance of the test block is similar to that of the test piece;

---The heat treatment process of the test block is the same as that of the test piece.

4.2 Rough machining and heat treatment

4.2.1 Rough machining The standard test blocks for curved surface testing are divided into convex curved surface testing standard test blocks and concave curved surface testing standard test blocks. See Figure 1, and the outline of the concave surface test standard block is shown in Figure

2.Before heat treatment, the rough processing size of the surface test standard block should be kept not less than 15mm machining allowance. Rough machining to near final shape before heat treatment.