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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 12604.10-2023

Replacing GB/T 12604.10-2011

Non-destructive testing - Terminology - Part 10: Magnetic memory testing

无损检测 术语 第10部分：磁记忆检测

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Table of Contents

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 10 of GB/T 12604 "Terms for Nondestructive Testing": GB/T 12604 has published the following parts:

1 Non-destructive testing term ultrasonic testing;

2 Non-destructive testing term radiographic testing;

3 Non-destructive testing term penetration testing;

4 Non-destructive testing term acoustic emission testing;

5 Non-destructive testing terminology Magnetic particle testing;

6 Non-destructive testing term eddy current testing;

7 Non-destructive testing term leak detection;

8 Non-destructive testing term neutron testing;

9 Non-destructive testing term infrared thermal imaging;

10 Non-destructive testing terminology Part 10: Magnetic memory testing;

11 Non-destructive testing term X-ray digital imaging test;

12 Non-destructive testing terminology Part 12: Industrial ray computer tomography testing;

13 Nondestructive Testing Terminology Part 13: Array Ultrasonic Testing: This document replaces GB/T 12604:10-2011 "Nondestructive Testing Terminology Magnetic Memory Test" and is consistent with GB/T 12604:10-2011 In addition to structural adjustments and editorial changes, the main technical changes are as follows:

1 Scope

Part 10 of China's non-destructive testing vocabulary, covering metal magnetic memory testing - a method that occupies an unusual position among NDT techniques and needs its

terminology fixed more than most. This document defines the terminology used for metal magnetic memory testing, and it applies to that method. Magnetic memory testing does not look for a discontinuity that already exists. It reads the residual magnetic field that a ferromagnetic component develops, in the earth's field, at the places where the stress is concentrated - and it therefore claims to find where a crack is going to form rather than where one already has. No other conventional method does that, and the difference is the reason the vocabulary matters: the quantities the method reports, the self-magnetic leakage field and its gradient, are not the quantities of magnetic particle or eddy current testing even though the words look similar, and a term borrowed loosely from another method produces a report that says something different from what its author meant. The method is also newer and less settled than radiography or ultrasonics, which means the literature contains several names for the same thing and several meanings for the same name - exactly the condition a terminology standard exists to end. The document therefore defines the physical quantities, the instruments and their parameters, the scanning and the presentation of the data, the indications and their characterisation, and the terms in which a stress concentration zone is identified and reported. It is used together with Part 1 of the series, which carries the terms common to all methods. Issued on 23 May 2023.

This document defines the terminology used for the detection of magnetic memory in metals. This document applies to metal magnetic memory testing:

2 Normative references

This document has no normative references:

3 Terms and Definitions

3:1 metal magnetic memory metalmagnetic memory; MMM The magnetic state of a ferromagnetic object after undergoing a change in the magnetic field and the accumulation of magneto-mechanical effects:

Note: For a given magnetic field (such as the earth's magnetic field), ferromagnetic objects formed during their manufacturing process or operation, due to various factors that affect the distribution of magnetic domains (3:21) Environmental factors that change its residual magnetization (for example: temperature, mechanical load or microstructural change of the material): [Source: GB/T 26641-2021, 3:1] 3:2 surface magnetic field magneticstrayfield; SF A magnetic field that leaves or enters the surface of a part and does not intentionally magnetize the part:

Note 1: A ferromagnetic material generates a magnetic field in its own volume and in the surrounding space: The field generated by the magnetization distribution of the material itself is called the surface magnetic field or the degenerate field within it: magnetic field: The demagnetization field and the surface magnetic field are geometrically related, and when

the magnetization is inhomogeneous or has a component normal to the outer or inner surface, the surface magnetization field will appear: High local variations in the surface magnetic field resemble flux leakage and are used to indicate inhomogeneity in material properties:

Note 2: Other terms used in the literature are, for example, spontaneous leakage magnetic field, residual magnetic field, surface magnetic field, leakage magnetic field, magnetic field density or surface field: When used for non-destructive testing Surface magnetic field is the recommended term for passive magnetic field measurements, while flux leakage defines the magnetic flux amplified by external magnetization before or during inspection: flux: [Source: GB/T 26641-2021, 3:2] 3:3 surface magnetic field gradient strayfieldgradient At the same probe position, the rate of change of the surface magnetic field (3:2) with the probe position and/or time: [Source: GB/T 26641-2021, 3:6] 3:4 surface magnetic field vector stryfieldvector The component of the surface magnetic field (3:2) of the object in the i direction (i=x, y,

z) measured by the passive magnetic field sensing method: [Source: GB/T 26641-2021, 3:4] 3:

5 Deviation of SF (Surface Field) caused by high mechanical stress/strain gradients: