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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 43413-2023

**Non-destructive testing - Infrared thermographic testing -
General principles for thermoelastic stress measuring method**

无损检测 红外热成像检测 热弹性应力测量方法通则

(English Translation)

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Foreword

This document is in accordance with GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting:

This document is equivalent to ISO 22290:2020 "General Principles of Thermoelastic Stress Measurement Methods for Non-destructive Testing and Infrared Thermal Imaging Testing":

Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents:

Introduction

The thermoelastic stress measurement method uses the thermoelastic effect of materials to measure the surface stress distribution of materials and structures: It is a "comprehensive Field "non-contact" measurement technology: Unlike traditional technologies such as the strain gauge method, the unique advantage of this method is that it can easily measure the entire specimen the surface stress distribution ($\Delta(\sigma_1 - \sigma_2)$) is imaged (see ISO 10878):

With the development of thermal imaging technology, the industrial application of thermoelastic stress measurement methods is becoming more and more widespread: Application of thermoelastic stress measurement method the effectiveness depends on the correct use of the method: This document has been developed to establish the general principles of thermoelastic stress measurement methods to facilitate this method is

correctly and effectively applied to non-destructive testing in various industrial fields such as automobiles, aerospace, electronic instruments, medical equipment, and industrial materials:

Nondestructive testing infrared thermography to detect thermoelastic stress General rules for measurement methods

1 Scope

This document establishes the general principles for thermoelastic stress measurement methods in infrared thermal imaging testing in the field of industrial non-destructive testing:

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, the dated quotations for undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document:

ISO 9712 Non-destructive testing Qualification and certification of non-destructive testing personnel (Non-destructive testing-Qualification and Note: GB/T 9445-2015 Qualification and certification of non-destructive testing personnel (ISO 9712:2012, IDT) Vocabulary) Note: GB/T 12604.9-2021 Non-destructive testing terminology infrared thermography (ISO 10878:2013, MOD) testing-General principles) Note: GB/Z 43414-2023 Non-destructive testing Non-destructive testing training outline (ISO/T S25107:2019, IDT)

3 Terms and definitions

The terms and definitions defined in ISO 10878 apply to this document:

4 Infrared thermal imaging inspection personnel

Personnel performing infrared thermography testing (TT) including thermoelastic stress measurements should comply with the following requirements:

- a) TT personnel should have sufficient inspection knowledge, including thermal imaging inspection and testing in accordance with ISO 9712 and ISO/T S25107 Basic knowledge of heat transfer engineering;
- b) The vision and color discrimination ability of TT personnel should comply with the requirements of ISO 9712:

5 Detection environment

5.1

Testing equipment environment Conduct inspections in an environment where the temperature, humidity and air pressure are suitable for the operation of inspection equipment (including thermal imaging cameras that comply with ISO 10880):

Measurement: Avoid condensation on the surface of the object being measured:

In order to avoid image blur due to field of view jitter, try to avoid vibration of the infrared thermal imaging camera: When the vibration period of the infrared thermal imaging camera is different from the measured when the object's loading cycle is synchronized, the impact can be reduced through position correction technology: