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

*Essais non destructifs — Examen par thermographie infrarouge
— Principes généraux de la méthode de mesure des contraintes
thermoélastiques*



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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 8, *Thermographic testing*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Thermoelastic stress measuring method, which utilizes the thermoelastic properties of materials, is a “full-field”, “noncontact” technique for surface stress mapping of materials and structures. Unlike the conventional technique such as strain gauge method, the unique advantage of the method is its ability to image whole-surface stress ($\Delta(\sigma_1 + \sigma_2)$) distribution in specimens easily (ISO 10878).

Industrial applications of thermoelastic stress measuring method are getting wider along with remarkable improvement of thermographic technologies. The effectiveness of any application of thermoelastic stress measuring depends upon proper and correct usage of the method. The purpose of this document is to provide general principles for the thermoelastic stress measuring method to promote correct and effective application to various industrial non-destructive testing, such as automobiles, aerospace products, electronic instruments, medical devices, industrial materials and so on.

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

1 Scope

This document provides general principles for thermoelastic stress measuring method of infrared thermographic testing in the field of industrial non-destructive testing (NDT).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10878, *Non-destructive testing — Infrared thermography — Vocabulary*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO/TS 25107, *Non-destructive testing — NDT training syllabuses*

ISO 10880, *Non-destructive testing — Infrared thermographic testing — General principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10878 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Infrared thermographic testing personnel

Personnel who are responsible for conducting infrared thermographic testing (TT) including thermoelastic stress measuring shall meet the following criteria.

- a) TT personnel shall have an adequate knowledge of the testing including the basics of infrared measurement and heat-transfer engineering as required by ISO 9712 and ISO/TS 25107.
- b) TT personnel's visual acuity and colour vision shall meet the requirements of ISO 9712.

5 Test Environment

5.1 Installation environment for the test equipment

Conduct the test in an environment where the temperature, humidity, and atmosphere are appropriate for the test equipment, including the infrared camera as required by ISO 10880. Be sure to avoid condensation on the surface of the test object.