

TR 119:2024
(ICS 91.040.01; 91.060.10)

TECHNICAL REFERENCE

Qualitative inspection of building facade using infrared thermography (IRT)



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ISBN 978-981-5237-83-2

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Foreword

This Technical Reference (TR) was prepared by the Working Group on Qualitative Inspection of Building Facade Inspection Using Infrared Thermography (IRT) set up by the Technical Committee on Building Maintenance and Management under the purview of the Building and Construction Standards Committee.

As buildings age, their facades experience wear and tear. Facade inspection is important to have early detection of tell-tale signs of deteriorating facade materials and its connections, and allow the building owner to carry out repairs before it fails. However, there is a lack of specifications on how the IRT should be carried out and how the data is to be interpreted. This TR aims to establish the building inspection and diagnostic fundamentals for our local built environment.

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

It is presupposed that in the course of their work, users will comply with all relevant regulatory and statutory requirements. Some examples of relevant regulations and acts are listed in the Bibliography. The Singapore Standards Council and Enterprise Singapore shall not be responsible for identifying all of such legal obligations.

In preparing this TR, reference was made to the following publications:

1. ASTM C 1060-11a (2015) Standard practice for thermographic inspection of insulations in envelope cavities of frame buildings
2. BCA Guidelines on Periodic Facade Inspection
3. Building Control (Periodic Inspection of Buildings and Building Facades) Regulations 2021
4. BS EN 13187-1999 Thermal performance of buildings – Qualitative detection of thermal irregularities in building envelopes – Infrared methods
5. JAIRA Building Facade Inspection Method, Japan Infrared Ray Association
6. Standard for Infrared Inspection of Building Envelopes 2016 Edition – Infrasppection Institute

Permission has also been sought from the following organisations for the reproduction of materials from their publications into this standard:

1. International Organization for Standardization – ISO 6781-1:2023 Performance of buildings – Detection of heat, air and moisture irregularities in buildings by infrared methods – Part 1: General procedures. ISO standards can be purchased from Enterprise Singapore.
2. Andes Consultants Pte Ltd for the figures used in Annex A, and the figure of thermal anomalies at gable end wall in Annex D.
3. ALX Pte Ltd for Figure 3.
4. Agency for Science, Technology and Research for the figures used in Annex C.
5. Housing & Development Board for examples of residential site layouts in Annex D.

Figures are included as examples in this Technical Reference for the sole purpose of illustration. It does not connote any endorsement whatsoever of any product, service and/or design concept by the Working Group and Enterprise Singapore.

Acknowledgement is made for the use of information from the above publications.

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1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "mature standards". Mature standards will not be subject to further review unless there are requests to review such standards.*
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Qualitative inspection of building facade using infrared thermography (IRT)

1 Scope

This TR provides procedures for a thermography inspection in detecting defects on the facade for the safety of buildings:

- Description of a qualitative approach that employs a thermographic assessment to identify thermal anomalies in a building's exterior.
- Outcomes derived from this approach are evaluated and understood by thermographers with specialised training to interpret them.

This TR does not cover the following:

- Structural integrity of any particular material or system of a building facade; and
- Deep-seated defects that are not affected by the transient state of the heat transfer between facade finishes and/or underlying substrates.

2 Normative references

The following referenced documents are indispensable for the application 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.

ASNT CP-105	ASNT Standard topical outlines for qualification of nondestructive testing personnel
ASNT CP-189	ASNT Standard for qualification and certification of nondestructive testing personnel
ISO 9712	Non-destructive testing – Qualification and certification of NDT personnel
ISO 18436-7	Condition monitoring and diagnostics of machines – Requirements for qualification and assessment of personnel – Part 7: Thermography