Australian Standard®

# Enclosures—Temperature-controlled—Performance testing and grading

This Australian standard was prepared by Committee ET/5. It was approved on behalf of the Council of the Standards Association of Australia on 17 December 1985 and published on 3 March 1986.

---

The following interests are represented on Committee ET/5:

Confederation of Australian Industry
Department of Defence
Department of Housing and Construction
Electricity Supply Association of Australia
National Association of Testing Authorities Australia
Telecom Australia
University of New South Wales

---

***Review of Australian Standards.*** *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

*Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.*

*Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.*

---

*This standard was issued in draft form for comment as DR 84021.*

Australian Standard®

# Enclosures—Temperature-controlled—Performance testing and grading

First published . . . . . 1986

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 4069 9

## PREFACE

This standard was prepared by the Association's Committee on Environmental Testing Procedures. It is based on a draft prepared by a Working Group sponsored by the National Association of Testing Authorities (NATA) following a seminar which had demonstrated the need for such a standard. Acknowledgement is made of the assistance received from this source.

This standard describes a test procedure that establishes the temperature performance characteristics of temperature controlled enclosures for use throughout industry, and a grading system that classifies performance levels of enclosures. The procedure applies to the unloaded condition under either steady-state or dynamic modes of operation. It takes no account of other enclosure characteristics.

Standard sensors are recommended for three broad categories of usage of enclosures. Both sensors and categories of use are described in detail but for applications where such sensors are considered unsuitable an alternative sensor may be adopted provided that it can be demonstrated to have an equivalent or better response-time characteristic under the stated conditions.

## CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

# Australian Standard

# for

# ENCLOSURES—TEMPERATURE-CONTROLLED—PERFORMANCE TESTING AND GRADING

**1 SCOPE.** This standard sets out a test procedure for establishing the basic temperature performance characteristics of temperature-controlled enclosures for use throughout industry.

It applies solely to the determination of such characteristics in the unloaded condition under either steady-state or dynamic operation.

No account is taken of other enclosure characteristics, such as humidity, airflow and wall emissivity, which may also be controlled or specified. A grading system that classifies enclosure performance levels is incorporated in this standard.

The procedure is applicable to all temperature controlled enclosures, regardless of size, temperature range, mode of operation, method of construction, type or purpose.

**2 REFERENCED DOCUMENTS.** The following standards are referred to in this standard:

AS 1514 Glossary of Terms Used in Metrology
Part 1—General Terms and Definitions

AS 1965 The Measurement of Surface Roughness with Direct-reading Stylus Electronic Instruments

**3 DEFINITIONS.** For the purpose of this standard, the definitions given in AS 1514 and the following apply:

**3.1 General.**

**3.1.1** *Working space*—that part of the enclosure to which the performance characteristics apply.

**3.1.2** *Test interval*—interval of time over which the steady-state characteristics refer (see Clause 6.4.2).

**3.1.3** *Test site*—location at which a test sensor is positioned for the purpose of temperature measurement during testing of the enclosure.

(a) *Standard site*—test site used to measure the enclosure characteristics defined in Clauses 3.2 and 3.3.

(b) *Supplementary site*—any test site other than that defined in (a).

**3.1.4** *Test sensor*—temperature sensor used solely for the purpose of testing the enclosure.

(a) *Standard sensor*—sensor constructed in accordance with Clause 5.2.1.

(b) *Supplementary sensor*—any test sensor other than that defined in (a).

**3.1.5** *Test temperature*—nominal value of the enclosure temperature (see Clause 3.2.1) at which a test is required to be performed.

**3.1.6** *Measured temperature*—temperature as measured with a standard sensor located at a standard site.

**3.1.7** *Indicated temperature*—temperature as indicated by an instrument that is associated with the enclosure for the purpose of indicating and/or recording the temperature within the enclosure.

**3.1.8** *Installation sensor temperature*—temperature of any sensor associated with each indicator and/or controller when measured in accordance with Clause 5.3.3(b).

**3.1.9** *Temperature range*—difference between the maximum and minimum values of a set of temperatures.

**3.1.10** *Mid-range value*—half the sum of the maximum and minimum values of a set of temperatures.

**3.1.11** *Control setting*—value to which any adjustable control function or input, accessible to the operator, has been set and refers to all functions that affect control action such as set temperature, proportional band, reset and rate, if applicable.

**3.1.12** *Uncertainty*—estimated amount by which the observed or calculated value of a quantity may depart from the true value.

**3.1.13** *Systematic uncertainty*—upper limit placed on the difference between the actual temperature of the installation sensor and its value measured using a supplementary sensor.

**3.1.14** *Resolution*—smallest value of temperature change which can be detected (see Clause 5.1).

**3.1.15** *Grade*—integer that classifies the performance characteristics of an enclosure (see Clause 9).

**3.2 Steady-state characteristics.**

**3.2.1** *Enclosure temperature*—mid-range value of the temperatures obtained from all relevant sites within the enclosure throughout the test interval.

(a) *Measured enclosure temperature*—enclosure temperature computed from measured temperatures. It is equal to half the sum of the maximum and minimum measured temperatures.

(b) *Indicated enclosure temperature*—enclosure temperature computed from indicated temperatures. It is equal to half the sum of the maximum and minimum indicated temperatures.

**3.2.2** *Spatial variation*—difference between the mid-range of all measured temperatures obtained at one site and that at another site for those sites which give the greatest difference.

(a) *Measured spatial variation*—spatial variation computed from measured temperatures.

(b) *Indicated spatial variation*—spatial variation computed from indicated temperatures.