AS/NZS 60695.11.20:2001
(Incorporating Amendment 1)

Australian/New Zealand Standard™

Fire hazard testing –

Part 11.20: Test flames – 500 W flame test methods
(IEC 60695-11-20:1999, IDT)

STANDARDS AUSTRALIA

STANDARDS NEW ZEALAND
Paerewa Aotearoa

This Joint Australian/New Zealand Standard was prepared by Joint Technical EL-002- Safety of Household and Similar Electrical Appliances and Small Power Transformers. It was approved on behalf of the Council of Standards Australia on 21 May 2001 and on behalf of the Council of Standards New Zealand on 12 May 2001. It was published on 11 June 2001.

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PREFACE

This standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-002- Safety of Household and Similar Electrical Appliances and Small Power Transformers, to supersede the LF test methods contained in AS/NZS 4695.707, two years from publication.

A1 This Standard incorporates Amendment No. 1 (May 2004). The changes introduced by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide a small-scale laboratory screening procedure that allows manufacturers and designers to pre-select materials based on the relative burning behaviour of specimens made from non-metallic materials using a flame ignition source of 500 W nominal power.

This Standard forms the first edition of AS/NZS 60695.11.20, *Fire hazard testing* - Part 11.20: *Test flames – 500 W flame test methods*.

A1 This Standard is identical to and is reproduced from IEC 60695-11-20:1999, *Fire hazard testing* - Part 11-20: *Test flames - 500 W flame test methods*, including its Corrigendum 1 (2000-02) and amendment 1 (2003-06).

Annex A is for information only.

Clause 2 has been reformatted to indicate the Australia/New Zealand standard that is equivalent to the IEC standard or ISO standard to which normative reference is made.

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a) Its number does not appear on each page of text and its identity is shown on the cover and title page only.

b) In the source text "IEC 60695" should read "AS/NZS 60695".

c) A full point substitutes for a comma when referring to a decimal marker.

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INTRODUCTION

When considering the use of the tests in this International Standard, it is important to distinguish the term “end-product test”, meaning a fire hazard assessment test on a completed product, piece part, component or subassembly, from the term “pre-selection test”, meaning a combustion characteristic test made on a material (piece part, component or subassembly).

Pre-selection tests on materials normally use test pieces that have standardised shapes, such as a rectangular bar or sheet, and are frequently prepared using standardised moulding procedures.

It is emphasized that data using the pre-selection tests given in this standard need careful consideration to ensure their relevance to the intended application and to avoid misuse and erroneous interpretation. The actual fire performance of a part or product is affected by its surroundings, design variables such as shape and size, fabrication techniques, heat transfer effects, the type of potential ignition source and the length of exposure to it. It is important to bear in mind that these properties may also be affected by foreseeable use, abuse and environmental exposure.

The advantages of a pre-selection procedure are listed below.

a) A material, which reacts more favourably than another when tested as a standard test specimen, will usually also react more favourably when used as a finished part in the product, provided that possible synergistic effects are avoided.

b) Data concerning relevant combustion characteristics can aid the selection of materials, components and subassemblies during the design stage.

c) The precision of pre-selection tests is usually higher, and their sensitivity may be superior when compared with end-product tests.

d) Pre-selection tests may be used in a decision-making process directed to minimize fire hazards. Where applicable for the purpose of fire hazard assessment, they may lead to a reduction in the number of end-product tests, with a consequent reduction in the total testing effort.

e) When fire hazard requirements need to be upgraded quickly, it may be possible to do this by upgrading the requirements of a pre-selection test before modifying the end-product test.

f) The grading and classification obtained from the pre-selection test results may be used to specify a basic minimum performance of materials used in product specifications.

It should be noted that, when pre-selection testing is used to replace some of the end-product testing, it is necessary to fix an increased margin of safety in an attempt to ensure satisfactory performance of the end-product. End-product testing may avoid restrictions in innovative design and in economic material selection imposed by a pre-selection procedure. Consequently, following a pre-selection procedure, it may be necessary to implement a value analysis on the end-product, in order not to overspecify the product beyond what is strictly needed.

For electrotechnical products, IEC 60695-1-1 indicates that the risk of fire is present in any electrical circuit which is energized. With regard to this risk, the objective of component circuit and equipment design, and of the choice of materials is to reduce the likelihood of fire, even in the event of foreseeable abnormal use, malfunction or failure. The practical aim is to prevent ignition due to the electrically energized part but, if ignition and fire occur, to control the fire, preferably within the bounds of the enclosure of the electrotechnical product.

The best method for testing electrotechnical products with regard to fire hazards is to duplicate exactly the conditions occurring in practice. In most instances this is not possible. Accordingly, for practical reasons, the testing of electrotechnical products with regard to fire

hazard is best conducted by simulating as closely as possible the actual effects occurring in practice.

IEC 60695-1-3 provides that pre-selection may be made on the basis of specified tests and by the use of specifications of the necessary resistance to fire and related combustion characteristics. It also outlines guidance that is intended to relate the specific function of the electrotechnical product, its subassemblies and its parts to the tested properties of materials, and to demonstrate the significance and the limitations of such a pre-selection procedure.

ISO/TR 10840 summarises specific problems associated with the fire testing of plastics, which should be taken into account when assessing and interpreting test results.

AUSTRALIAN/NEW ZEALAND STANDARD

FIRE HAZARD TESTING –

Part 11-20: Test flames – 500 W flame test methods

1 Scope

This part of IEC 60695 specifies a small-scale laboratory screening procedure for comparing the relative burning behaviour of specimens made from plastics and other non-metallic materials, as well as their resistance to burn-through when exposed to a flame ignition source of 500 W nominal power. This method is applicable to both solid materials and cellular plastic materials having an apparent density of 250 kg/m^3 or greater when determined in accordance with ISO 845. It does not apply to thin materials that shrink away from the applied flame without igniting, for which ISO 9773 should be used.

The test method described is intended to characterize material performance, for example for quality-control purposes, and is not intended to assess the behaviour to fire of building materials or furnishings. It may be used for the pre-selection of a material, provided that positive results are obtained at a thickness which equals the smallest thickness used in the application. The results obtained provide some information about the behaviour of plastic materials in service, but can never by themselves assure safe performance in service.

NOTE – Test results are influenced by material components, e.g. pigments, fillers, and fire retardants, and properties such as the direction of anisotropy and the molecular mass.

This test method provides a classification system (see 8.4) which may be used for quality assurance or the pre-selection of component materials of products.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60695. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60695 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC or ISO standard	Year	Title	AU/NZ standard	Year
IEC 60695-2-2	1991	*Test methods – Section 2: Needle-flame test*	AS/NZS 4695.2.2	1996
IEC 60695-11-3	2000	*Fire hazard testing – Part 11-3: Test flames – 500 W flames: Apparatus and confirmational test methods*		
IEC 60695-11-10	1999	*Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*	AS/NZS 60695.11.10	2001