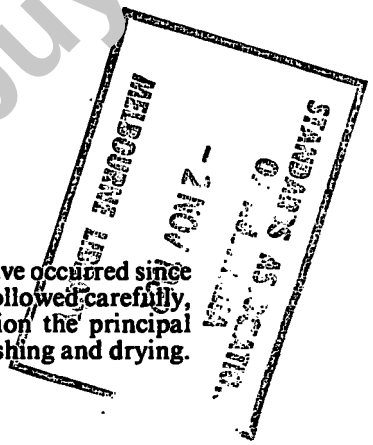
STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

TEXTILES—METHODS OF TEST FOR COMBUSTION PROPERTIES

AS 1176.3
THE DETERMINATION OF SURFACE BURNING PROPERTIES OF CERTAIN TEXTILE MATERIALS



PREFACE

This edition of this standard takes account of developments which have occurred since the 1976 edition was published, and provides that the procedure is followed carefully, good correlation of the test results may be obtained. In this edition the principal change made is that the specimens being tested are brushed after washing and drying.

CONTENTS

ISBN 0 7262 2707 2

METHOD

1 SCOPE. This standard sets out a method for determining the time required for the pile or nap of a fabric to burn a defined distance. It also sets out a method for determining whether flame propagation can occur on the surface of a fabric.

2 APPLICATION. The method is applicable to fabrics which have a surface nap or pile.

3 DEFINITIONS. For the purpose of this standard, the following definitions apply:

3.1 Fabric—a woven, knitted or non-woven textile material in the form of single or multicomponent (coated, quilted and multilayered sandwich construction including foam laminated fabrics, and similar combinations) materials.

NOTE: The words 'textile material' and 'fabric' are synonymous.

3.2 Surface burning time—the time required for the pile or nap of a fabric to burn a defined distance when tested by the method described herein. It is expressed as the minimum time of a number of determinations made during the testing of the fabric.

3.3 Pile—a surface effect on a fabric formed by tufts or loops of yarn introduced into the fabric for the purpose, that stand up from the body of the cloth.

3.4 Nap—a fibrous surface produced on a fabric (or felt) in which part of the fibre is raised from the base structure.

4 PRINCIPLE. A washed and dried specimen of the fabric is supported on a vertical plate and its raised surface is ignited near the top in a standard manner.

5 APPARATUS. The following apparatus is required:

(a) *Specimen holder.* The specimen holder shall be a stainless steel plate approximately 250 mm long, 75 mm wide and 3 mm thick (see Fig. 1). The specimen shall be framed by stainless steel 3 mm thick so that an area of 225 mm × 50 mm of fabric surface is exposed for testing. The frame shall have a reference mark which shall be 75 mm below the ignition point of the test specimen. The frame shall be attached to a holder so that it may be mounted centrally in the draught shield described in AS 1176.2.

(b) *Burner.* A gas burner to the detail shown in Figs 2 and 3. The burner shall be mounted on the side of the draught shield approximately 900 mm from the base of the cabinet. The burner shall be placed so that its tip is 50 mm from, and in line with, the vertical centreline of the test holder when mounted in the correct position in the draught shield. The burner orifice shall be made of 2 mm OD hypodermic tubing. The igniting flame shall impinge on the fabric 75 mm above the reference mark on the frame.

(c) *Hydrogen source.* A source of dry hydrogen at a pressure of approximately 40 mm water gauge. To give it a luminous flame, the hydrogen shall be passed over approximately 100 mL of toluene in a 500 mL flask. The inlet tube for the hydrogen shall be directed at the surface of the toluene and end approximately 10 mm above the surface.

NOTE: Care should be taken in handling hydrogen because of the wide explosive limits of air/hydrogen mixtures. Advice should be sought from the local Statutory Authority (see Appendix A).

(d) *Valve and manometer.* A fine control pressure-reducing valve for hydrogen and a manometer capable of measuring pressures up to 100 mm of water.

(e) *Gas piping system.* A gas piping system with controls as shown in Appendix A, Fig. A1 consisting of the following:

(i) 3 mm OD copper tubing.

(ii) An electric solenoid valve, having a minimum orifice diameter of 3 mm.

NOTE: A suitable valve is designated 'bubble tight raised seat, brass body, normally closed, 240 V'.

(iii) A timing device capable of operating the solenoid valve for approximately 0.5 s.

(iv) A press-button switch which when depressed will open the solenoid valve, for the prescribed period.

(v) A bypass valve for adjusting the pilot gas flow when the solenoid valve is shut.

(f) *Washing and drying apparatus.* As described in Appendix B.

(g) *Circulating air oven.* A circulating air oven capable of drying the test specimens at 105±2°C.

(h) *Dry airtight container* (for holding the test specimens).

(j) *Brushing device* for raising the surface fibres of the fabric test specimen (see Appendix C).

(k) *Stopwatch.* A stopwatch or other timing device accurate to 0.2 s.

6 TEST SPECIMENS.

6.1 Selection of Test Specimens from Fabrics.

(a) Test specimens shall be cut representative of the fabric under examination. Unless otherwise required, both surfaces shall be tested.

(b) Test specimens shall be cut so that their length is parallel to the length and to the width of the piece (see Clause 6.4). As far as possible, specimens shall not contain the same warp threads or wales or the same weft threads or courses.

(c) The test specimens (or the sample from which they are to be taken) shall not be cut within 2 m of the lead end or the tail end of the piece under examination or closer to the selvedge than one-tenth of the width where the width is more than 100 mm.

(d) Test specimens shall be free from creases and faults.

NOTE: In the selection of test specimens, it should be recognized that differences in combustion characteristics can result from variations in processing, particularly in dyeing and finishing.

6.2 Selection of Specimens from Garments.

(a) Test specimens shall be cut representative of the garment(s) under examination. Unless otherwise required, both surfaces shall be tested.