Australian Standard®

Methods for fire tests on building materials, components and structures

Part 1: Combustibility test for materials

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Australian Assembly of Fire Authorities
Australian-British Chamber of Commerce
Australian Chamber of Commerce and Industry
Australian Fire Protection Association
Australian Institute of Building
Australian Uniform Building Regulations Coordinating Council
Australian Wool Testing Authority
Building Research Association of New Zealand
Bureau of Steel Manufacturers of Australia
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Australian Standard®

Methods for fire tests on building materials, components and structures

Part 1: Combustibility test for materials

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PREFACE

This edition of the Standard was prepared by the Standards Australia Committee on Fire Tests on Building Materials, Components and Structures, to supersede AS 1530.1—1984. This edition aligns the test method more closely with ISO 1182:1990, but specifies the combustibility criteria necessary for regulatory purposes.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard

Methods for fire tests on building materials, components and structures

Part 1: Combustibility test for materials

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies a test method for the determination of the combustibility of a building material within the criteria given in Clause 3.4.

WARNING: SO THAT SUITABLE PRECAUTIONS ARE TAKEN TO SAFEGUARD HEALTH, THE ATTENTION OF ALL PERSONS CONCERNED IN FIRE TESTS IS DRAWN TO THE POSSIBILITY THAT HARMFUL GASES MAY BE EVOLVED DURING THE COMBUSTION OF TEST SPECIMENS.

1.2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS
2484 Fire—Glossary of terms
2484.1 Part 1: Fire tests

BS
4937 International thermocouple reference tables

ISO
1182 Fire tests—Building materials—Non-combustibility test

1.3 DEFINITIONS For the purpose of this Standard, the definitions given in AS 2484.1 shall apply.

1.4 APPLICATION TO FIRE HAZARD ASSESSMENT The test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test, and are not intended to be the sole criteria for assessing the potential fire hazard of the material in use.

The test method is not applicable to products which are coated, faced or laminated. In such cases, tests may be carried out separately on the individual materials from which the product is formed and this shall be clearly stated in the test report.

NOTE: The performance of coated, faced or laminated products may be determined by other reaction to fire tests (see Paragraph A1 of Appendix A).

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SECTION 2 TEST PROCEDURE

2.1 SAMPLING The sample shall be selected to be representative of the average properties of the material. Where applicable, sampling shall be in accordance with the procedures specified in the appropriate Australian Standard.

2.2 TEST SPECIMENS

2.2.1 Quantity Five specimens of the material shall be tested.

2.2.2 Construction The specimens shall be cylindrical and each shall have—

(a) a diameter of 45, +0, –2 mm;

(b) a height of 50 ±3 mm; and

(c) a volume of 80 ±5 cm^3.

2.2.3 Preparation If the thickness of the material is less than the required height, specimens of the height specified in Clause 2.2.2 shall be made by using a sufficient number of layers of the material and by adjustment of the material thickness if required. The layers shall occupy a horizontal position in the specimen holder and shall be held together firmly, without significant compression, by means of two fine steel wires (see Note) of maximum diameter 0.5 mm, to prevent air gaps between layers, prior to testing. The layers shall be arranged so that the measuring (hot) junction of the specimen centre thermocouple does not lie at an interface between layers of material.

NOTE: Nickel-chromium thermocouple wires have also been shown to be suitable.

2.2.4 Hole for centre thermocouple A 2 mm diameter hole shall be made axially from the top of the specimen to locate the measuring junction at the geometric centre of the specimen.

2.2.5 Conditioning The specimen shall be conditioned in a ventilated oven maintained at 60 ±5°C for between 20 h and 24 h, and cooled to ambient temperature in a desiccator prior to testing. The mass of each specimen shall be determined to an accuracy of 0.1 g prior to test in the furnace.

NOTE: These conditioning requirements assume that the test specimens are already at a normal equilibrium moisture content. Dense materials with very high moisture contents may not be adequately dried by this procedure.

2.3 TEST APPARATUS

2.3.1 General Unless tolerances are specified, all dimensions given in the following description of the test apparatus are nominal values.

NOTE: These nominal dimensions are recommended values and should be followed as closely as possible to ensure reproducibility between tests at different laboratories.

The apparatus shall consist of a furnace comprising essentially a refractory tube surrounded by a heating coil and enclosed in an insulated surround. A cone-shaped airflow stabilizer shall be attached to the base of the furnace and a draft shield to its top. The furnace shall be mounted on a stand and shall be equipped with a specimen holder and a device for inserting the specimen holder into the furnace tube. Thermocouples shall be provided for measuring the furnace temperature, the temperature at the centre of the specimen and the temperature on the surface of the specimen. A typical arrangement for the apparatus is shown in Figure 1.

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2.3.2 Furnace, stand and draft shield The following requirements shall apply:

(a) The furnace tube shall be made of an alumina refractory material as specified in Table 1, of a density of 2800 ±300 kg/m^3 and shall be 150 ±1 mm high with an internal diameter of 75 ±1 mm and a wall thickness of 10 ±1 mm. The overall wall thickness, including the refractory cement applied to retain the electrical winding, shall not exceed 15 mm.

TABLE 1

COMPOSITION OF FURNACE TUBE REFRACTORY MATERIAL

Material	Composition % (m/m)
Alumina (Al_2O_3)	>89
Silica and alumina ($SiO_2.Al_2O_3$)	>98
Iron (III) oxide (Fe_2O_3)	<0.45
Titanium dioxide (TiO_2)	<0.25
Manganese oxide (Mn_3O_4)	<0.1
Other trace oxides (sodium, calcium, potassium and magnesium)	balance

NOTE: Mn_3O_4 is a mixture of MnO and MnO_2.

(b) The furnace shall be provided with a single winding of 80/20 nickel/chromium resistance tape 3 mm wide and 0.2 mm thick, which shall be wound as shown in Figure 2.

(c) The furnace tube shall be fitted in the centre of a 200 mm external diameter surround made of insulating material, 150 mm in height and of approximately 10 mm wall thickness, and fitted with top and bottom plates recessed internally to locate the ends of the furnace tube. The annular space between the tubes shall be filled with magnesium oxide powder of bulk density 1400 ±200 kg/m^3.

(d) To the underside of the furnace shall be attached an open-ended, cone-shaped airflow stabilizer 500 mm in length, and reducing uniformly from 75 ±1 mm internal diameter at the top to 10 ±0.5 mm at the bottom. The stabilizer shall be manufactured from 1 mm thick sheet steel and finished smooth on the inside. The joint between the stabilizer and the furnace shall be a close, airtight fit and finished smooth internally. The upper half of the stabilizer shall be insulated externally with a 25 mm thick layer of mineral fibre insulating material having a thermal conductivity of 0.04 ±0.01 W/mK at a mean temperature of 20°C.

(e) A draught shield made of the same material as the stabilizer cone shall be provided at the top of the furnace. It shall be 50 mm high and have an internal diameter of 75 ±1 mm. The draught shield and its joint with the top of the furnace shall be finished smooth internally, and the exterior shall be insulated with a 25 mm layer of mineral fibre insulation having a thermal conductivity of 0.04 ±0.01 W/mK at a mean temperature of 20°C.

(f) The assembly of the furnace, stabilizer cone and draught shield shall be mounted on a firm stand which shall be provided with a base and draught screen attached to the stand to reduce draughts around the bottom of the stabilizer cone. The draught screen shall be approximately 550 mm high and the bottom of the stabilizer cone shall be approximately 250 mm above the base plate.

NOTE: A door 150 mm square near the base of the draught screen facilitates access to the base of the conical airflow stabilizer and enables collection of specimen residue that may have fallen from the specimen holder during the test.

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2.3.3 Specimen holder and insertion device The specimen holder shall be as specified in Figure 3, and shall be made of nickel/chromium or heat-resisting steel wire. A fine metal gauze tray of heat-resisting steel shall be placed in the bottom of the holder. The mass of the holder, including the gauze, shall be 15 ±2 g. The specimen holder shall be capable of being suspended from the lower end of a tube of stainless steel having an outside diameter of 6 mm and a bore of 4 mm.

A suitable insertion device shall be provided for lowering the specimen holder precisely down the axis of the furnace tube without shock, so that the specimen is located rigidly at the centre of the furnace during the test. The insertion device shall comprise two metallic rods, one sliding within a vertical guide and the other through a locating hole mounted on opposite sides of the furnace, connected by a bridge from which is hung the vertical stainless steel tube. This arrangement is shown in Figure 1.

2.3.4 Thermocouples

2.3.4.1 *General* Mineral insulated stainless steel sheathed thermocouples shall be used, having an external diameter of 1.5 mm, with nickel/chromium v nickel/aluminium (Type K)[1] elements of 0.3 mm nominal diameter. The measuring junction shall be of the insulated type. All new thermocouples shall be artificially aged before use to reduce reflectivity.[2]

NOTES:

1 Types R, S or N thermocouples to BS 4937 may also be used.

2 A suitable method of ageing new thermocouples is to employ the thermocouple as a specimen centre thermocouple and to carry out the test procedure detailed in Clauses 2.5.1(a) to 2.5.1(h) using a specimen of resin-bonded glass fibre material.

2.3.4.2 *Furnace thermocouple* The furnace thermocouple shall be located with its measuring junction 10 ±0.5 mm from the tube wall and at a height corresponding to the mid-point of the furnace tube. The position of the thermocouple may be set using the locating guide illustrated in Figure 4 and the correct position shall be maintained with the help of a guide attached to the draught shield.

2.3.4.3 *Specimen centre thermocouple* The specimen centre thermocouple shall be positioned so that its measuring junction is located at the geometric centre of the specimen (refer Clause 2.2.4).

2.3.4.4 *Specimen surface thermocouple* The specimen surface thermocouple shall be positioned so that its measuring junction is in contact with the specimen at its mid-height at the start of the test and shall be located diametrically opposite the furnace thermocouple (see Figure 5).

2.3.5 Test environment The apparatus shall not be exposed to strong direct sunlight nor any form of artificial illumination which would adversely affect the observation of flaming inside the furnace. During the course of a test, the environmental conditions shall be kept substantially constant and air movement in the vicinity of the apparatus shall not exceed 1 m/s.

NOTE: To facilitate observation of sustained flaming and for the safety of the operators, it is advisable to provide a mirror above the apparatus positioned so that it will not interfere with the test. A mirror 300 mm square, at an angle of 30 degrees to the horizontal, 1 m above the furnace has been found suitable.

2.3.6 Additional equipment

2.3.6.1 *Voltage stabilizer* A voltage stabilizer of the single-phase automatic type with a nominal rating of not less than 1.5 kVA shall be used. It shall be capable of maintaining the accuracy of the output voltage within ±1 percent of the rated value from zero to full load.

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2.3.6.2 *Variable transformer* A variable transformer, capable of handling a maximum of 1.5 kVA and of regulating the voltage output from zero to a maximum value equal to that of the input voltage, shall be used. The voltage shall vary linearly over this range.

2.3.6.3 *Electrical input monitor* An ammeter, voltmeter or wattmeter shall be provided to enable rapid setting of the furnace to approximately the operating temperature. Any of these instruments shall be capable of measuring the levels of electrical power required to meet the requirements of Clause 2.4.5.

2.3.6.4 *Power controller* If a power controller is used as an alternative to the equipment specified in Clauses 2.3.6.1, 2.3.6.2 and 2.3.6.3, it shall be of the type which incorporates phase-angle firing and shall be linked to a thyristor unit capable of supplying 1.5 kVA. The maximum voltage output shall not be greater than 100 V and the current limit shall be adjusted to give '100 percent power' equivalent to the maximum rating of the heating coil. The stability of the power controller shall be approximately 1 percent and the setpoint repeatability shall be ±1 percent. The power output shall be linear over the setpoint range.

2.3.6.5 *Temperature recorder* The temperature recorder shall be a zero current device capable of continuously measuring the output from the thermocouples to the nearest 1°C or the millivolt equivalent. It shall be capable of assimilating the incoming data and producing a permanent record of this at intervals of not more than 5 s. A suitable instrument is either a digital device or a multichannel chart recorder with provision for operation with a suppressed zero signal, which includes an operating range of 10 mV full scale deflection with a 'zero' of approximately 700°C.

2.3.6.6 *Timing device* The timing device used shall be capable of recording elapsed time to the nearest second and shall be accurate to within 1 s in 1 h.

2.3.6.7 *Desiccators* Two desiccators are required and their capacities shall be as follows—

(a) suitable for storing conditioned specimens for at least one working day (e.g. at least 10 specimens); and

(b) suitable for cooling specimens after testing (e.g. at least 3 specimens).

2.4 SETTING UP

2.4.1 Siting of apparatus Site the apparatus so as to meet the requirements of Clause 2.3.5.

2.4.2 Specimen holder Remove the specimen holder and its support from the furnace.

2.4.3 Furnace thermocouple Position the furnace thermocouple as specified in Clause 2.3.4.2 and connect it to the temperature recorder.

2.4.4 Electricity supply Connect the heating element of the furnace to the appropriate power control equipment (refer Clauses 2.3.6.1, 2.3.6.2 and 2.3.6.3 or Clause 2.3.6.4) as shown in Figure 6. Automatic thermostatic control of the furnace shall not be used during testing.

NOTE: The heating element should draw a current of between 9 A and 10 A at approximately 80 V under steady state conditions. In order not to overload the winding, it is recommended that the maximum current does not exceed 11 A. A new furnace tube should be subjected to slow heating initially. A suitable procedure is to increase the furnace temperature in steps of approximately 100°C, allowing 2 h at each temperature.

2.4.5 Furnace stabilization With the specimen and the insertion device holder removed from the furnace, adjust the power input to the furnace so that the average furnace temperature, as indicated by the furnace thermocouple, is stabilized for at least 10 min at 750 ±5°C with a drift of not more than 2°C in 10 min, and take a continuous record.

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2.4.6 Furnace wall temperature When the furnace temperature is stabilized as given in Clause 2.4.5, carry out the following procedures:

(a) Measure the temperature of the furnace wall using a contact thermocouple of the type specified in Clause 2.3.4.1 and the temperature recorder specified in Clause 2.3.6.5.

(b) Make measurements on three vertical axes of the furnace wall such that the distances separating each of the axes are the same.

(c) Record the temperatures on each axis at a position corresponding to the mid-point height of the furnace tube and at positions both 30 mm above and 30 mm below the mid-point height.

NOTE: This procedure may be conveniently achieved using a thermocouple scanning device of the type shown in Figure 7.

(d) Pay particular attention to the contact between the thermocouple and the furnace wall which, if poor, will lead to low temperature readings.

(e) At each measurement point, the temperature recorded by the thermocouple shall be stable for at least 5 min before a temperature reading is taken.

(f) Calculate and record the arithmetic mean of the temperature readings recorded in Step (c) above as the average furnace wall temperature. This shall be 835 ±10°C and shall be maintained in this range prior to the start of the test.

The procedure given above shall be carried out for a new furnace and whenever the furnace tube, winding, insulation or power supply is replaced. (Refer Paragraph A5 of Appendix A.)

2.5 TEST METHOD

2.5.1 Procedure The following test procedure shall be followed:

(a) The apparatus shall be as specified in Clause 2.3.

(b) Stabilize the furnace in accordance with Clause 2.4.5 and record the initial furnace thermocouple temperature (T_{fi}).

(c) Before starting the test, ascertain that all the equipment is in good working order, e.g. the stabilizer is clean, the insertion device is working smoothly and the specimen holder exactly occupies the required position in the furnace.

(d) Insert one specimen, prepared and conditioned as specified in Clause 2.2, into the specimen holder suspended on its support and ensure that the thermocouples as specified in Clauses 2.3.4.3 and 2.3.4.4 are correctly positioned.

(e) Place the specimen holder in the furnace in the position specified in Clause 2.3.3 taking not more than 5 s for this operation and immediately start the timing device.

(f) The temperatures measured by the furnace and both specimen thermocouples shall be recorded using the device specified in Clause 2.3.6.5.

(g) Temperature equilibrium shall be observed. This shall be deemed to be achieved when the temperature change as measured by a thermocouple does not exceed 2°C over a period of 10 min. In accepting the equilibrium criteria, the specimen centre thermocouple reading shall be less than that of the furnace thermocouple.

(h) While making the observations given in Clause 2.5.2, continue the test for a period of 30 min. If at 30 min, temperature equilibrium has been reached on all three thermocouples, then stop the test. If equilibrium has not been achieved on one or more thermocouples, then continue the test, checking for equilibrium at intervals of 5 min. Stop the test once equilibrium is reached on all three thermocouples.

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(i) Note the duration of the test. The end of the test is at the end of the last 5 min interval.

(j) Remove the specimen from the furnace, recover any char, ashes or other debris that has broken off the specimen, and include this as part of the unconsumed specimen.

(k) Cool the specimen to ambient temperature in a desiccator.

(l) Clear any obstructions to the air flow and remove any loose particles which would interfere with the next test.

(m) Repeat Steps (b) to (l) on the other four specimens.

2.5.2 Observations during the test

(a) Record the mass before and after test for each specimen and note any observations relating to the behaviour of the specimen during the test.

(b) Record the occurrence and duration of any flames caused by the specimen.

(c) Record the following temperatures as measured by the appropriate thermocouples, taking the final temperature as being that at the end of the test period (refer Clause 2.5.1(h)):

(i) Initial furnace temperature . . . . . T_{fi}

(ii) Maximum furnace temperature . . . . . T_{fm}

(iii) Final furnace temperature . . . . . T_{ff}

(iv) Maximum specimen centre temperature . . . . . T_{cm}

(v) Final specimen centre temperature . . . . . T_{cf}

(vi) Maximum specimen surface temperature . . . . . T_{sm}

(vii) Final specimen surface temperature . . . . . T_{sf}

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SECTION 3 CALCULATIONS AND REPORTING OF RESULTS

3.1 TEMPERATURE RISES

3.1.1 Individual values For each specimen, the temperature rise of each thermocouple shall be calculated and recorded:

(a) Furnace thermocouple temperature rise

$$\Delta T_f = T_{fm} - T_{ff}.$$

(b) Specimen centre thermocouple temperature rise

$$\Delta T_c = T_{cm} - T_{cf}.$$

(c) Specimen surface thermocouple temperature rise

$$\Delta T_s = T_{sm} - T_{sf}.$$

3.1.2 Arithmetic means Calculate and record the arithmetic mean for the five specimens for each temperature rise specified in Clause 3.1.1.

NOTE: The form given in Appendix B may facilitate the calculation and recording of these results.

3.2 SUSTAINED FLAMING Calculate and record the mean duration of sustained flaming which is obtained by summing all the individual durations of flaming for 5 s or longer and dividing by five.

3.3 MASS LOSS Calculate and record the following mass losses:

(a) The mass loss of each individual specimen in each test, expressed as a percentage of the initial mass of the specimen.

(b) The arithmetic mean of the mass losses of the five specimens in each series of tests, expressed as a percentage.

NOTE: When calculating the mass loss, the mass of any metal tie wires shall not be included.

3.4 CRITERIA OF COMBUSTIBILITY A material shall be deemed to be combustible under any of the following circumstances:

(a) The mean duration of sustained flaming, as determined in accordance with Clause 3.2, is other than zero.

(b) The mean furnace thermocouple temperature rise, as determined in accordance with Clause 3.1, exceeds 50°C.

(c) The mean specimen surface thermocouple temperature rise, as determined in accordance with Clause 3.1, exceeds 50°C.

3.5 TEST REPORT The test report shall be as comprehensive as possible and shall quote the individual results as required by Clause 2.5.2 for each specimen tested together with calculated results as specified in Clauses 3.1, 3.2 and 3.3. Any observations made during the test and comments on any difficulties experienced during the test shall also be given, together with the following:

(a) Name and address of the testing laboratory.

(b) Name and address of the sponsor.

(c) Date of the test.

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(d) Sample identification including trade name if applicable.

(e) A general description of the material tested together with the form of construction.

(f) The following statement:

‘These test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test and they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.’

(g) Reference to this test method, AS 1530.1.

(h) A statement indicating whether or not the material was deemed combustible according to the test criteria specified in Clause 3.4.

A suggested layout for a test report is shown in Appendix B.

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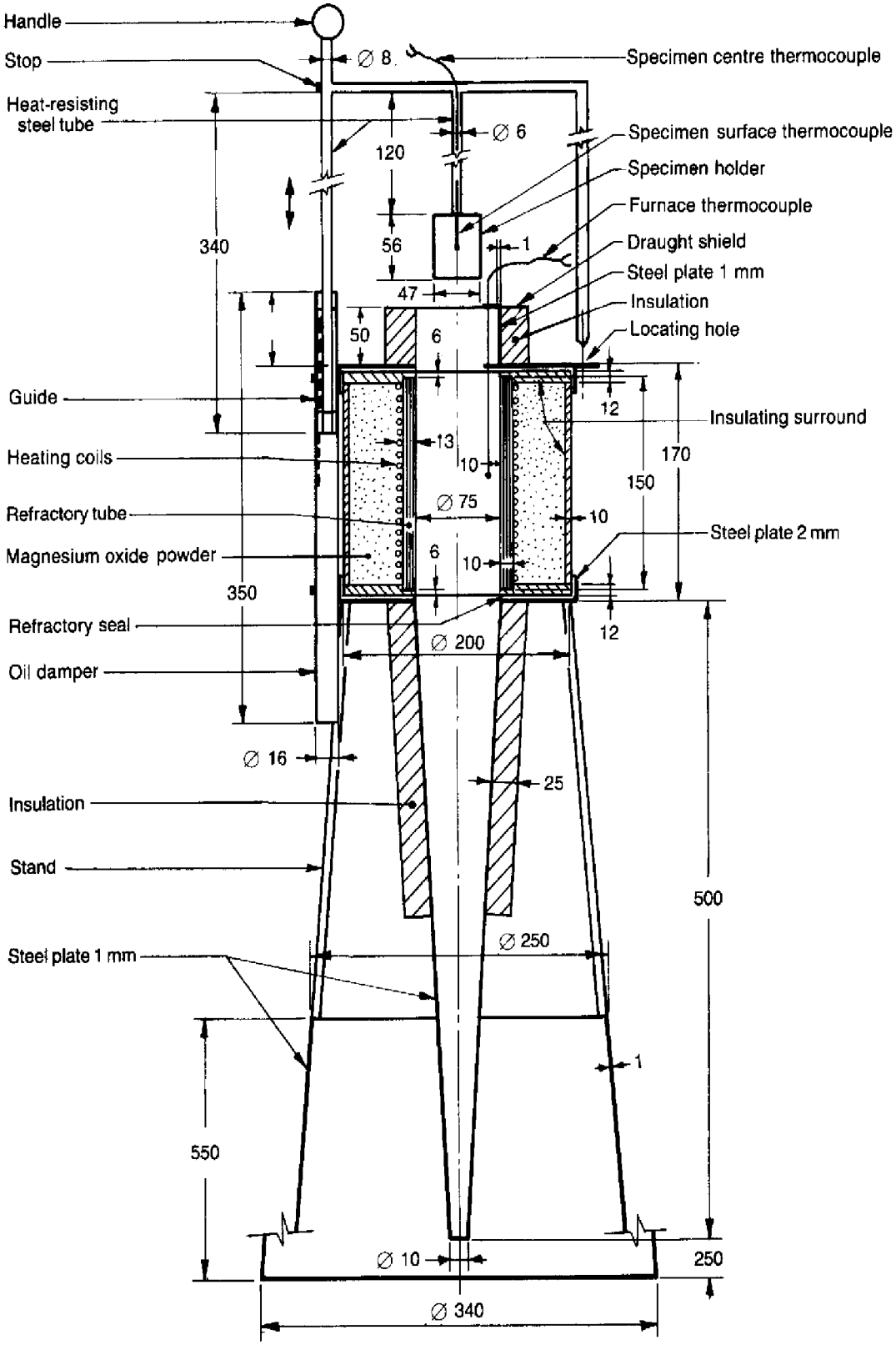

NOTE: Tolerances for critical dimensions are given in the text. All other dimensions are recommended values and should be followed as closely as possible.

DIMENSIONS IN MILLIMETRES

FIGURE 1 GENERAL ARRANGEMENT: COMBUSTIBILITY APPARATUS

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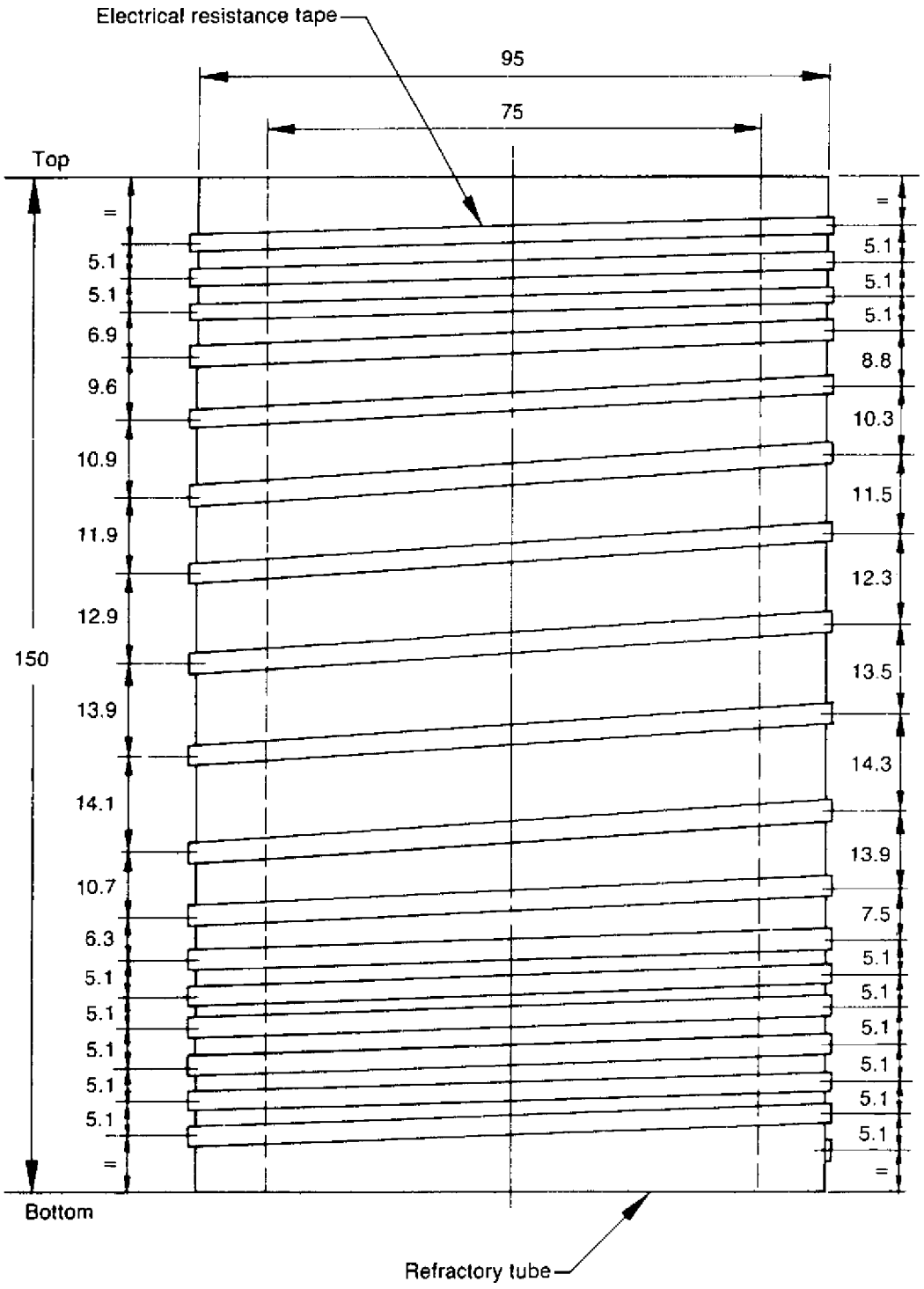

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DIMENSIONS IN MILLIMETRES

FIGURE 2 FURNACE WINDINGS

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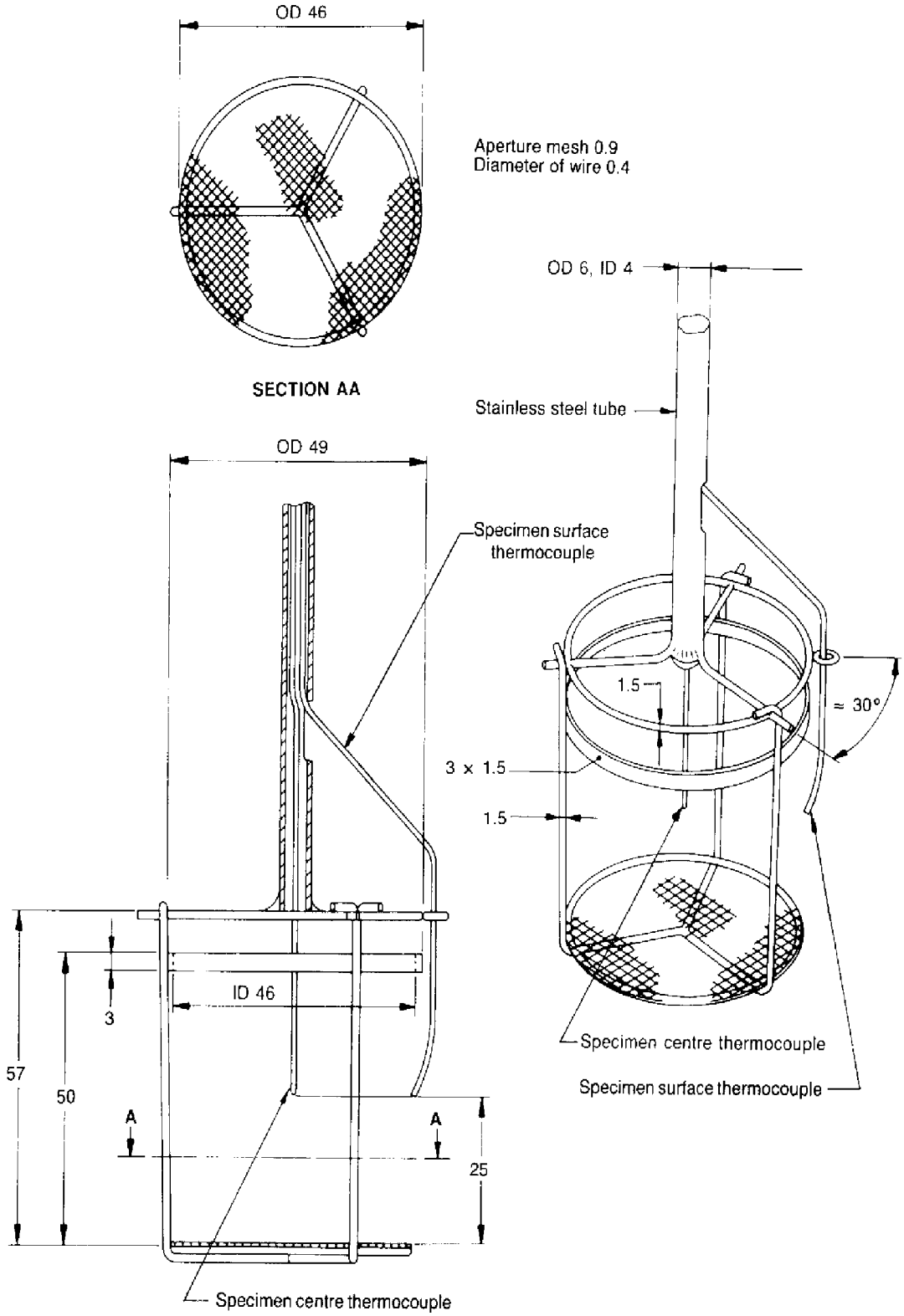

NOTE: Tolerances for critical dimensions are given in the text. All other dimensions are recommended values and should be followed as closely as possible.

DIMENSIONS IN MILLIMETRES

FIGURE 3 SPECIMEN HOLDER

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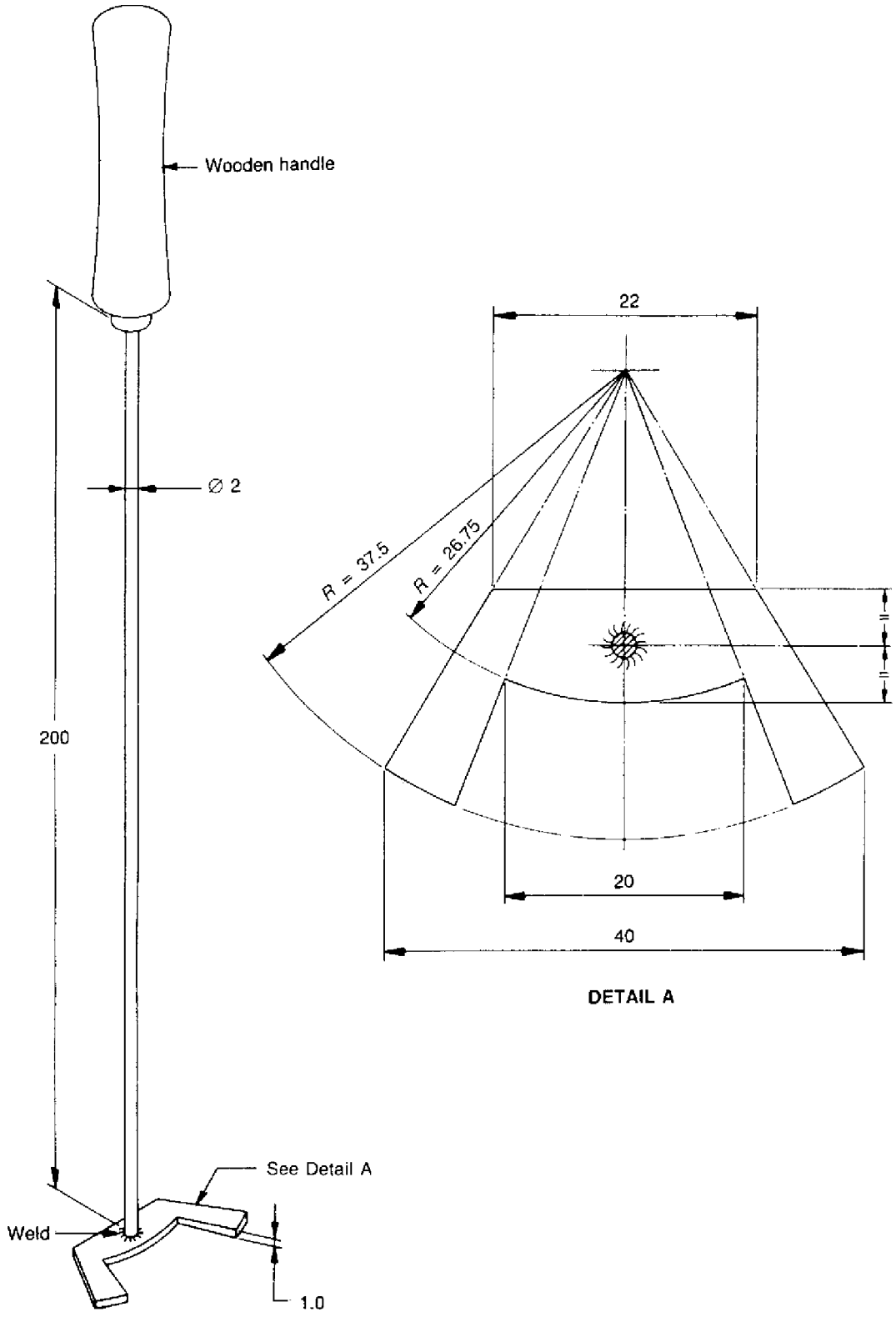

NOTE: Tolerances for critical dimensions are given in the text. All other dimensions are recommended values and should be followed as closely as possible.

DIMENSIONS IN MILLIMETRES

FIGURE 4 LOCATING GUIDE

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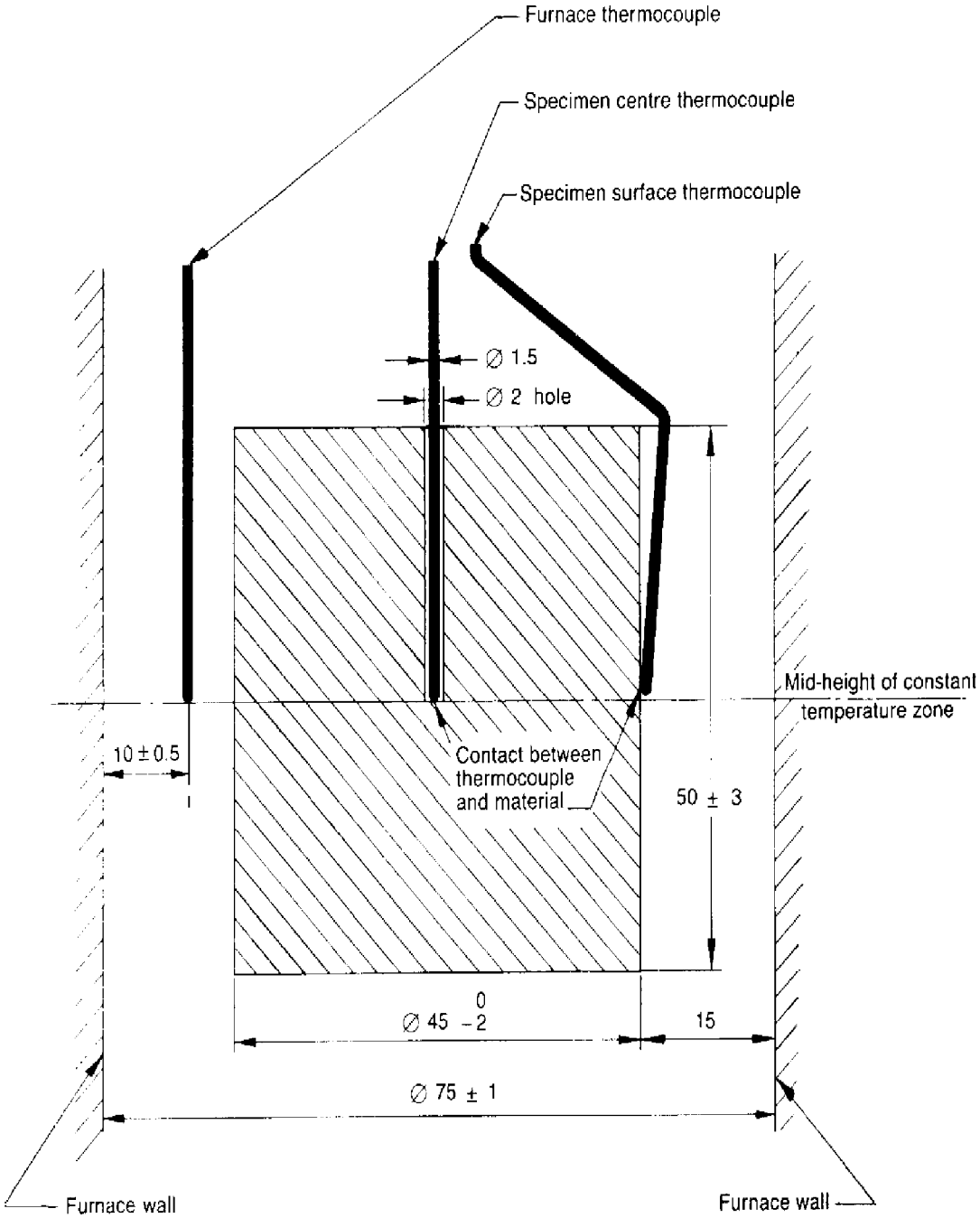

NOTE: Tolerances for critical dimensions are given in the text. All other dimensions are recommended values and should be followed as closely as possible.

DIMENSIONS IN MILLIMETRES

FIGURE 5 RELATIVE POSITION OF FURNACE, SPECIMEN AND THERMOCOUPLES

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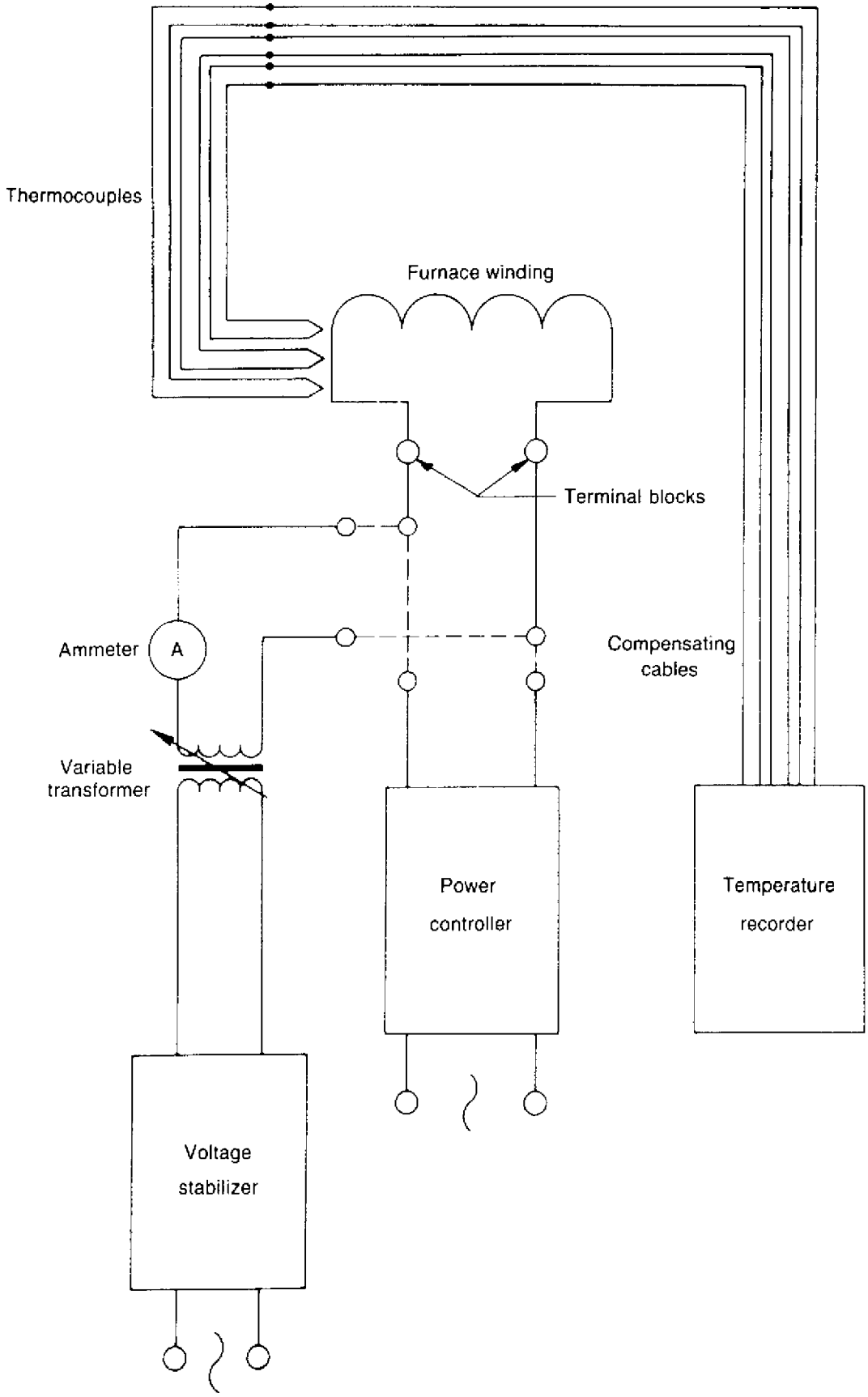

FIGURE 6 LAYOUT OF APPARATUS AND ADDITIONAL EQUIPMENT

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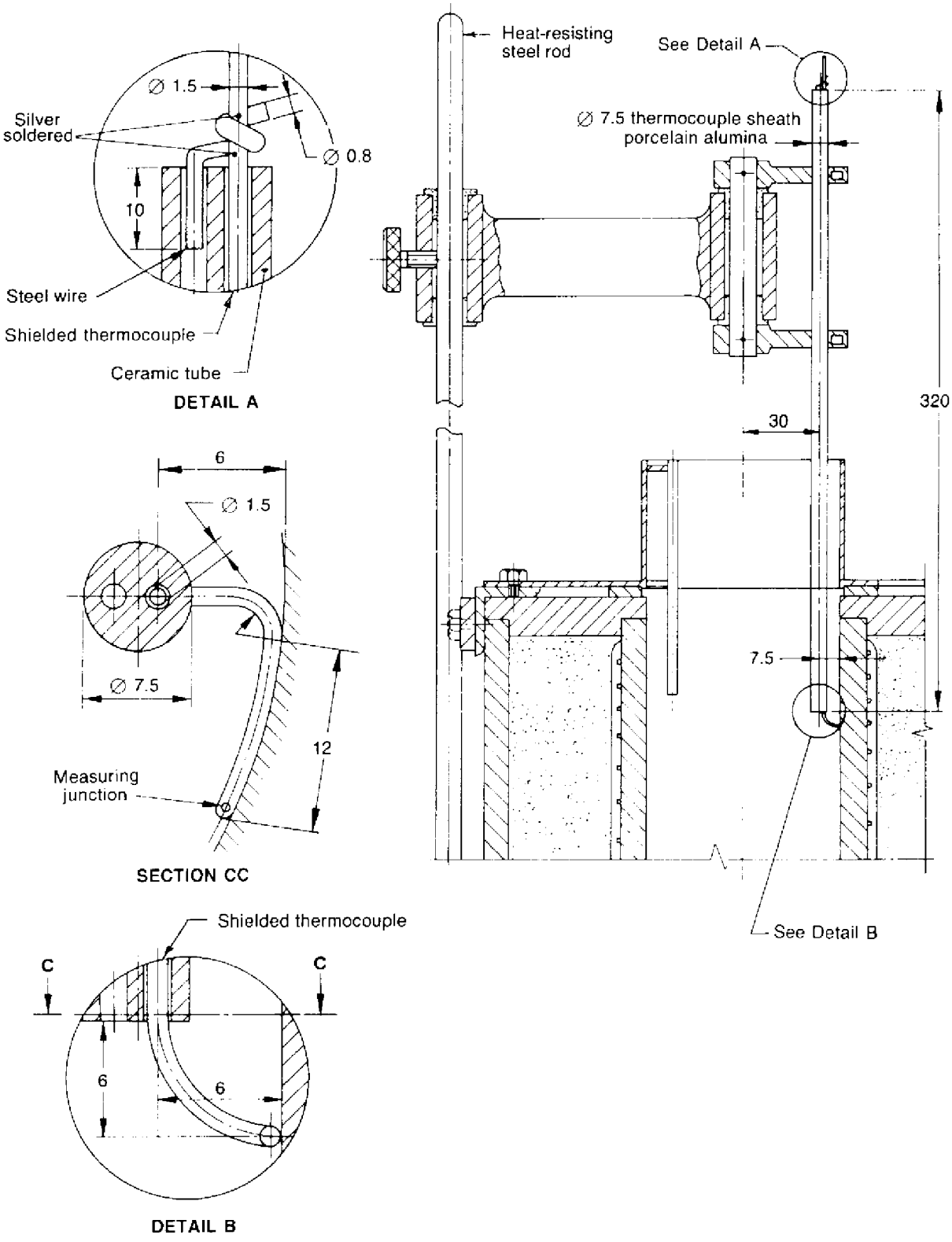

NOTE: Tolerances for critical dimensions are given in the text. All other dimensions are recommended values and should be followed as closely as possible.

DIMENSIONS IN MILLIMETRES

FIGURE 7 THERMOCOUPLE SCANNING DEVICE

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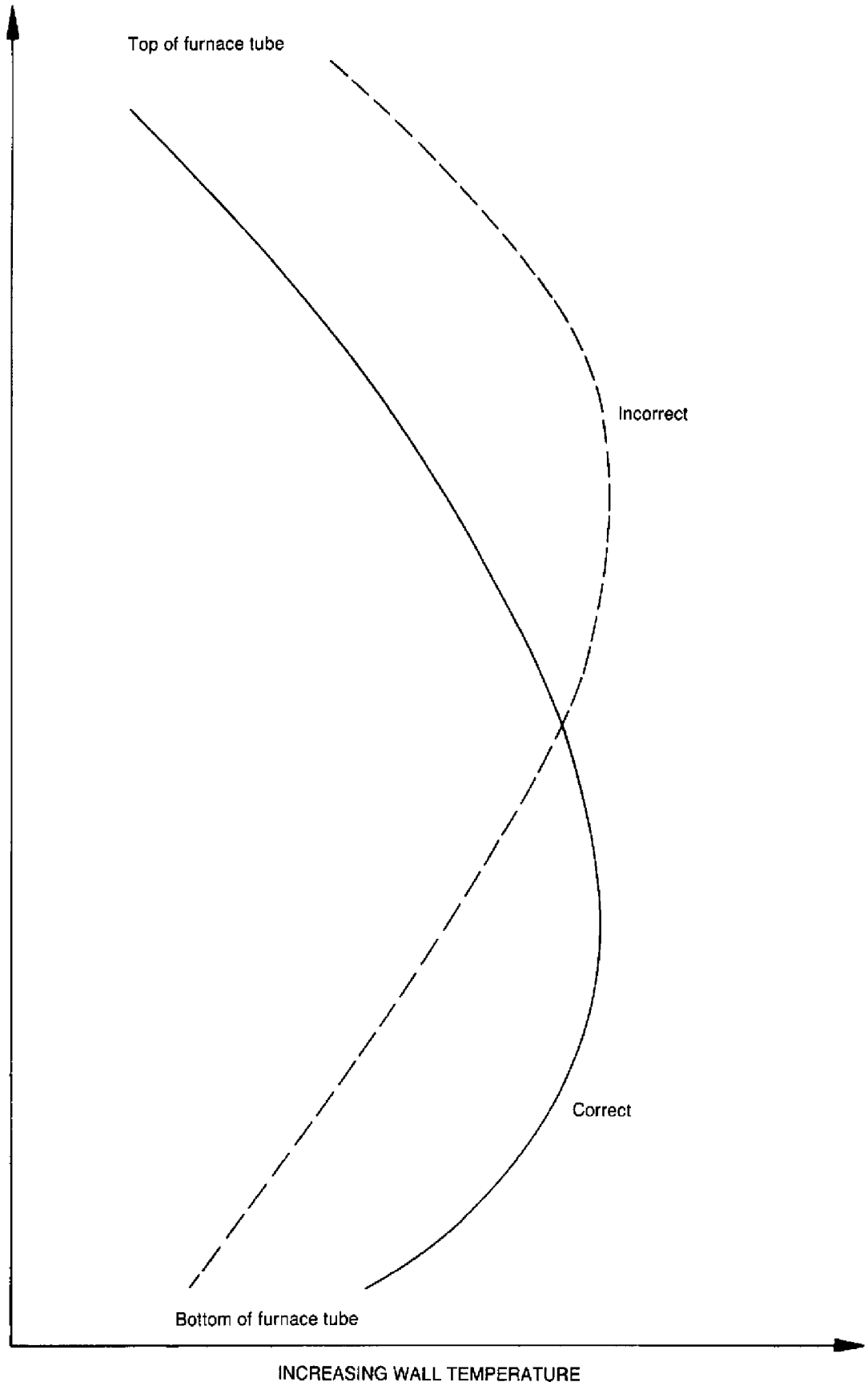

FIGURE 8 FURNACE WALL TEMPERATURE PROFILE

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APPENDIX A
COMMENTARY
(Informative)

A1 BACKGROUND TO THE DEVELOPMENT OF THE TEST This fire test has been developed for use by those responsible for selection of construction materials which, although not completely inert, produce only a limited amount of heat and flame when exposed to temperatures of approximately 750°C. It is expected that it will be applied mainly in connection with building and shipbuilding work.

Limiting the test to other than coated, faced or laminated products was introduced in Clause 1.4 because of problems in defining specifications for these specimens. The design of the specimens of coated, faced or laminated products strongly influences the test results. The position of combustible layers in respect to the furnace thermocouples also influences the results.

To achieve comparable and sufficiently reproducible results with coated, faced or laminated products, a detailed specification for the sampling and preparation of the specimens would be necessary.

A2 APPLICATION OF QUALIFIED MATERIAL Materials which are not deemed combustible using the criteria defined in Clause 3.4 are expected not to burn appreciably even when exposed to severe fire conditions. The assumed application conditions involve use of the materials in slab or other forms up to approximately a few tenths of a metre in thickness.

A3 SELF-HEATING NOT COVERED The test does not rule out the possibility of self-heating and ignition of improperly cured or other sensitive materials when stored in bulk at elevated temperatures in piles several metres in height. A self-heating test would be required to provide assurance that materials are safe with regard to this type of hazard.

A4 THERMALLY UNSTABLE MATERIALS The criteria used for evaluating materials (see Clause 3.4) will be used for qualifying materials which may be thermally unstable, i.e. materials that melt or shrink at the test temperatures. In these cases, the information recorded by the specimen thermocouples may not be relevant and regulating authorities may choose not to use the information. In these cases, one or both thermocouples need not be included.

Glass fibre and rock or slag fibre insulating materials with similar densities and calorific values and which should be quantified similarly by this test, have been demonstrated to give different results because of the above phenomena.

A5 ORIENTATION OF FURNACE TUBE It is possible to install the furnace tube upside down. If there is a possibility that this has occurred, it will be necessary to check that the tube orientation complies with Figure 2. This can be achieved by measuring the furnace wall temperature at 10 mm intervals up a single axis of the tube using the thermocouple scanning device. The resulting temperature distribution should be of the general shape given by the solid curve in Figure 8. If the tube is incorrectly installed, the distribution will appear as shown by the broken curve.

A6 MASS LOSS The inclusion of a performance criterion based on a limited mass loss requirement would avoid the possibility of qualifying low density materials or materials which might be highly flammable. Certain materials of this type are known to release their limited heat content so rapidly that the test results would be very favourable in the absence of a mass loss result. Materials which show a high mass loss only, should not in consequence automatically be considered to be combustible.

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It was also recognized that, as with many other tests, certain anomalies were possible. For instance, an ice cube would melt, drip and evaporate. In a similar manner, metals which melt at a temperature below 750°C would also show excessive mass loss.

It was the majority opinion of those responsible for developing the test that these and other similar anomalies could readily be recognized as such by the testing laboratory performing the test.

A7 TEST PROCEDURE Flaming is sometimes difficult to identify. Some specimens exhibit only a continuous glow (corona); this should not be timed but should, nevertheless, be noted under ‘Observations during test’ (see Clauses 2.5.2, 3.2 and 3.4).

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APPENDIX B
TYPICAL TEST SUMMARY AND REPORT
(Informative)

B1 TYPICAL FORM FOR SUMMARY OF OBSERVATIONS AND CALCULATIONS

Parameter	Symbol or expression	Unit symbol	Results					Arithmetic mean $= \frac{\Sigma \text{ results}}{5}$
			1	2	3	4	5	
Initial specimen mass	m_{si}	g						
Final specimen mass	m_{sf}	g						
Mass loss	$\Delta m = \frac{m_{si} - m_{sf}}{m_{si}} \times 100$	percentage						
Total duration of sustained flaming	Cumulative total of duration of flaming*	s						
Initial furnace thermocouple temperature	T_{fi}	°C						
Maximum furnace thermocouple temperature	T_{fm}	°C						
Final furnace thermocouple temperature	T_{ff}	°C						
Furnace thermocouple temperature rise	$\Delta T_f = T_{fm} - T_{ff}$	°C						
Maximum specimen centre thermocouple temperature	T_{cm}	°C						
Final specimen centre thermocouple temperature	T_{cf}	°C						
Specimen centre thermocouple temperature rise	$\Delta T_c = T_{cm} - T_{cf}$	°C						
Maximum specimen surface thermocouple temperature	T_{sm}	°C						
Final specimen surface thermocouple temperature	T_{sf}	°C						
Specimen surface thermocouple temperature rise	$\Delta T_s = T_{sm} - T_{sf}$	°C						
Test duration	—	min						

* Disregard any individual duration of flaming less than 5 s.

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B2 TYPICAL FORM FOR TEST REPORT

Name of laboratory: . . . . . .
Laboratory reference No: . . . . . .
Address: . . . . . .
Phone: . . . . . .
Facsimile: . . . . . .
Date of test: . . . . . .

REPORT OF TEST TO AS 1530.1, COMBUSTIBILITY TEST FOR MATERIALS

Sponsor: . . . . . .
Address: . . . . . .

Sample identification: . . . . . .
Trade name or reference: . . . . . .
Description of material: . . . . . .
. . . . . .

Construction of test specimen: . . . . . .

Observations

Test results

Mean furnace thermocouple temperature rise ΔT_f: . . . . . °C
Mean specimen centre thermocouple temperature rise ΔT_c: . . . . . °C
Mean specimen surface thermocouple temperature rise ΔT_s: . . . . . °C
Mean duration of sustained flaming: . . . . . s
Mean mass loss: . . . . . percent

Combustibility: Cross out the words not required:

DEEMED COMBUSTIBLE

NOT DEEMED COMBUSTIBLE

These test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test, and they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.

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