



MALAYSIAN STANDARD

MS 1787-14:2022

**Wood-based panels – Part 14:
Determination of formaldehyde content by
perforator method
(First revision)**

ICS: 79.060

Descriptors: wood-based panels, determination, formaldehyde, content, perforator

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Committee representation

The National Standards Committee on Timber, Timber Products and Timber Structures (NSC 22) under whose authority this Malaysian Standard was adopted, comprises representatives from the following organisations:

Construction Industry Development Board Malaysia
Department of Standards Malaysia (Secretariat)
Forest Research Institute Malaysia
Jabatan Kerajaan Tempatan
Jabatan Kerja Raya Malaysia
Malaysian MDF Manufacturers Association
Malaysian Panel-Products Manufacturers' Association
Malaysian Timber Council
Malaysian Timber Industry Board
Malaysian Wood Industries Association
Malaysian Wood Moulding & Joinery Council
Malaysian Wood Preserving Association
Sabah Timber Industries Association
Sarawak Timber Association
Sarawak Timber Industry Development Corporation
Timber Exporters' Association of Malaysia
Universiti Putra Malaysia
Universiti Teknologi MARA

The Technical Committee on Wood-based Panels (NSC 22/TC 3) which supervised the development of this Malaysian Standard consists of representatives from the following organisations:

Besgrade Products Sdn Bhd
Construction Industry Development Board Malaysia
Department of Standards Malaysia (Secretariat)
Dongwha Malaysia Sdn Bhd
Forest Research Institute Malaysia
HeveaBoard Berhad
Jabatan Kerja Raya Malaysia
Jowat Manufacturing (SEA) Sdn Bhd
Malaysian MDF Manufacturers Association
Malaysian Panel-Products Manufacturers' Association
Malaysian Timber Council
Malaysian Timber Industry Board
Perceptive Profile Sdn Bhd
Profina Plywood Sdn Bhd
Robin Resources (Malaysia) Sdn Bhd
Sarawak Timber Industry Development Corporation
Universiti Putra Malaysia
Universiti Sains Malaysia
Universiti Teknologi MARA

The Working Group on Formaldehyde Content (MS 1787-14&15) (NSC 22/TC 3/WG 5) which developed this Malaysian Standard consists of representatives from the following organisations:

Department of Standards Malaysia (Secretariat)
Forest Research Institute Malaysia
Malaysian Timber Industry Board
Universiti Putra Malaysia
Universiti Teknologi MARA

Foreword

This Malaysian Standard was developed by the Working Group on Formaldehyde Content (NSC 22/TC 3/WG 5) under the authority of the National Standards Committee on Timber, Timber Products and Timber Structures (NSC 22).

This first revision of MS 1787-14:2022 cancels and replaces MS 1787: Part 14:2005, *Wood-based panels - Determination of formaldehyde content by perforator method*.

The changes in this revision are as follows:

- a) normative reference has been updated;
- b) item (i) in 4.4 has been added;
- c) 6.1, 7.1, 7.5.2 and 7.5.2.1 have been revised;
- d) 8.1 has been added; and
- e) annex has been added.

MS 1787 consists of the following parts, under the general title *Wood-based panels*:

- Part 1: *Determination of dimensions of panels*
- Part 2: *Sampling and cutting of test pieces*
- Part 3: *Determination of dimensions of test pieces*
- Part 4: *Determination of moisture content*
- Part 5: *Determination of density*
- Part 6: *Determination of swelling in thickness after immersion in water*
- Part 7: *Determination of dimensional changes associated with changes in relative humidity*
- Part 8: *Determination of moisture resistance under cyclic test conditions*
- Part 9: *Determination of surface soundness*
- Part 10: *Determination of modulus of elasticity in bending and of bending strength*
- Part 11: *Determination of tensile strength perpendicular to the plane of the panel*
- Part 12: *Determination of wet bending strength*
- Part 13: *Determination of screw holding ability*
- Part 14: *Determination of formaldehyde content by perforator method*
- Part 15: *Determination of formaldehyde emission by desiccator method*

This Malaysian Standard will be used in reference to fibreboard, particleboard and oriented strand board, but does not include plywood.

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations.

**Wood-based panels – Part 14:
Determination of formaldehyde content by perforator method
(First revision)**

1 Scope

This Malaysian Standard specifies a method for determining the extractable formaldehyde of non-laminated and uncoated wood-based panels.

2 Normative reference

The following normative reference is indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the normative reference (including any amendments) applies.

MS 1787-4, *Wood-based panels - Part 4: Determination of moisture content*

ISO 2227, *Formaldehyde solutions for industrial use - Determination of formaldehyde content*

ISO 12460-3, *Wood-based panels - Determination of formaldehyde release - Part 3: Gas analysis method*

ISO 12460-4, *Wood-based panels - Determination of formaldehyde release - Part 4: Desiccator method*

ISO 14184-1, *Textiles - Determination of formaldehyde - Part 1: Free and hydrolysed formaldehyde (water extraction method)*

3 Terms and definitions

No terms and definitions are listed in this document.

4 Principle

The formaldehyde is extracted from the pieces by means of boiling toluene and then transferred into distilled or deionised water. The formaldehyde content of this aqueous solution is determined photometrically by the acetylacetone method.

5 Apparatus

5.1 Precision balance, scale interval 0.01g.

5.2 Well ventilated drying oven, capable of maintaining a temperature of (103 ± 2) °C.

5.3 Spectrophotometer, capable of measuring absorbance of wavelength 410 nm to 415 nm.

A cell of 50mm pathlength is recommended especially for low emitting samples.

5.4 Extraction apparatus (refer Figure 1)

The apparatus consists of:

- a) **spiral condenser**, total length approximately 400 mm, cone 45/40, socket 29/32 (item reference 2);
- b) **conical adaptor**, socket 45/40, cone 71/51 (item reference 3);
- c) **filter insert**, porosity P 160 (100 μm to 160 μm), bowl and filter diameter 60 mm (item reference 4);
- d) **perforator attachment**, 1 000 ml with stopcock (4 mm bore), socket 71/51, cone 29/32 (item reference 5);
- e) **conical adaptor**, socket 29/32, cone 45/40 (item reference 8);
- f) 1 000 ml **round-bottom flask**, socket 45/40 (item reference 9);
- g) **double bulb tube**, cone 29/32 (length approximately 380 mm), external diameter approximately 10 mm, bulb diameter approximately 50 mm, distance between bulb and bottom end of tube approximately 200 mm (distance between the bulbs approximately 50 mm) (item reference 6);
- h) **absorption bulb** e.g., conical flask 250 ml (item reference 7); and
- i) **heating mantle** (item reference 10).

Permanent PTFE seals should be used rather than paraffin or silicone grease sealants.

NOTE. The item references are given in Figure 1.

5.5 Laboratory equipment

- a) **volumetric flask**, 2 000 ml calibrated at 20 °C;
- b) **conical flask**, 250 ml;
- c) **precision burette**, 50 ml, calibrated at 20 °C;
- d) **watch glass**, with diameter of about 120 mm;
- e) two **volumetric flasks**, 1 000 ml, calibrated at 20 °C;
- f) six **volumetric flasks**, 100 ml, calibrated at 20 °C;
- g) **bulb pipette**, 100 ml, calibrated at 20 °C;
- h) **bulb pipette**, 25 ml, calibrated at 20 °C;