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# JIS K 5601-2-2 : 1999

(ISO 4625 : 1980)

## Testing methods for paint components— Part 2 : Component analysis in solvent soluble matter— Section 2 : Softening point (Ring and ball method)

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**Reference number** : JIS K 5601-2-2 : 1999 (E)

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## Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

**JIS K 5407** corresponding to this Standard will be withdrawn and replaced with this Standard in April 2002, at the time of three years passed after establishment of this Standard.

Consequently it is recommended to comply with this Standard.

**JIS K 5601** consists of the following parts.

JIS K 5601 Part 1 Section 1 to Section 2 *General rule*

JIS K 5601 Part 2 Section 1 to Section 4 *Component analysis in solvent soluble matter*

JIS K 5601 Part 3 Section 1 *Component analysis in solvent insoluble matter*

**JIS K 5601-2** consists of the following sections under the title of "*Testing methods for paint components—Part 2 : Component analysis in solvent soluble matter*".

JIS K 5601 Part 2 Section 1 *Acid value (titrimetric method)*

JIS K 5601 Part 2 Section 2 *Softening point (Ring and ball method)*

JIS K 5601 Part 2 Section 3 *Boiling range*

JIS K 5601 Part 2 Section 4 *Alkyd resin*

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**Testing methods for paint components—  
Part 2 : Component analysis in  
solvent soluble matter—  
Section 2 : Softening point  
(Ring and ball method)**

**Introduction** This Japanese Industrial Standard has been prepared based on ISO 4625 *Binders for paints and varnishes—Determination of softening point—Ring-and-ball method* issued in 1980 as the first edition without changing the technical contents.

**1 Scope** This Standard specifies a method for the determination of the softening point of resins (including rosin) and similar materials by means of the ring-and-ball apparatus.

**2 Definition** For the purpose of this Standard the following definition applies.

**softening point** The temperature at which a disk of the sample held within a horizontal ring is forced downwards a distance of 25 mm under the weight of a steel ball as the test piece is heated at a prescribed rate in a water or glycerol or paraffin oil bath.

**3 Principle** In general, with materials of this type, softening does not take place at a definite temperature. As the temperature rises, these materials gradually and imperceptibly change from brittle or exceedingly thick and slow-flowing materials to softer and less viscous liquids. For this reason, the determination of the softening point must be made by a fixed, arbitrary, and closely defined method if the results obtained are to be comparable.

#### **4 Apparatus**

**4.1 Shouldered rings**, brass, conforming to the dimensions shown in Fig. 1 b). For use in the powder method of sample preparation, the ring may be made of steel to minimize the possibility of its deformation during the compacting operation.

**4.2 Steel balls**, diameter 9.5 mm, and mass  $3.50 \pm 0.05$  g.

**4.3 Ball-centring guide**, constructed of brass and having the general shape and dimensions illustrated in Fig. 1 d); its use is optional.

**4.4 Container**, a glass vessel, capable of being heated, not less than 85 mm in diameter and not less than 125 mm in depth from the bottom of the flare (an 800 ml low-form beaker of heat-resistant glass meets this requirement).

**4.5 Thermometers** (see the specifications in the Annex A)

**4.5.1 Low-softening-point thermometer**

**4.5.2 High-softening-point thermometer**

**4.6 Support for ring and thermometer** Any convenient method for supporting the ring and thermometer may be used, provided that it meets the following requirements:

**4.6.1** The rings (4.1) shall be supported in a substantially horizontal position.

**4.6.2** The bottom of the ring shall be 25 mm above the horizontal plate below it; the bottom surface of the horizontal plate shall be 13 mm to 19 mm above the bottom of the container (4.4), and the depth of liquid in the container shall be not less than 100 mm.

**4.6.3** The thermometer (4.5.1 or 4.5.2) shall be suspended so that the bottom of the bulb is level with the bottom of the ring and within 13 mm but not touching the ring. For referee work, no more than two rings shall be used.

**4.7 Mechanical stirrer**, two-bladed, motor-driven, attached to the bottom of a true vertical shaft to ensure uniform heat distribution [see Fig. 1 e) for dimensions]. The direction of shaft rotation shall move the liquid upward. The rotational frequency shall be within the range 500 to 700 r/min.

#### **4.8 Apparatus for test piece preparation**

##### **4.8.1 For the powder method (5.1)**

**4.8.1.1 Sieves**, with 63  $\mu\text{m}$  and 315  $\mu\text{m}$  mesh openings.

**4.8.1.2 Porcelain mortar**

**4.8.1.3 Mortar and pestle**, of steel, with sleeve, knock-out button and ring support, conforming to the dimensions shown in Fig. 2.

**4.8.1.4 Hammer**, of a soft material (for example Babbitt's metal or lead-impregnated rubber), of mass about 1 kg.

**4.8.1.5 Hydraulic press**, capable of maintaining sustained pressures up to 55 kPa.

##### **4.8.2 For the moulding method (5.2)**

**4.8.2.1 Hot-plate**, 3-heat, 200 mm, 1 000 W, with variable transformer.

**4.8.2.2 Aluminium or steel plates**, 100 mm  $\times$  150 mm  $\times$  1.6 mm.

**4.8.2.3 Spatula**, 200 mm, with stiff blade.

**4.8.2.4 Tongs**

##### **4.8.3 For the pour method (5.3)**

**4.8.3.1 Container**, in which the sample can be melted.

**4.8.3.2 Knife or spatula**