

# JIS

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**JAPANESE INDUSTRIAL STANDARD**

**Testing Methods for Sealant  
for Automobiles**

**JIS K 6830**—1977

**Translated and Published**

**by**

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With respect to the English text of the Standard,

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## JAPANESE INDUSTRIAL STANDARD

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Testing Methods for Sealant for  
AutomobilesK 6830-1977  
(Reaffirmed: 1986)1. Scope

This Japanese Industrial Standard specifies the testing methods on general test items for sealant for automobiles, hereinafter referred to as the "the sealant".

Remark: The units and numerical values given in { } in this standard are in accordance with the International System of Units (SI), and are appended for reference.

2. Test Items

The test items specified in this standard shall be as follows:

- (1) 4. Appearance
- (2) 5. Specific gravity
- (3) 6. Nonvolatile matter
- (4) 7. Viscosity
- (5) 8. Consistency (and penetration)
- (6) 9. Storage stability
- (7) 10. Volume changeability
- (8) 11. Flash point
- (9) 12. Fixing property on oil surface
- (10) 13. Fluidity
- (11) 14. Burning durability
- (12) 15. Liquid resistance
- (13) 16. Heat resisting property
- (14) 17. Shearing adhesive strength

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Applicable Standards and Reference Standard: See page 26.

- (15) 18. Tensile adhesive strength
- (16) 19. Hardness
- (17) 20. Water absorbing percentage
- (18) 21. Humidity resisting property
- (19) 22. Water proofing property
- (20) 23. Water tightness
- (21) 24. Paint film test
- (22) 25. Thermo aging test
- (23) 26. Low temperature resistance
- (24) 27. Gasoline resisting, oil resisting property

### 3. General Conditions for Test

**3.1 Standard State of Test** The temperature shall be of Grade 2 of standard temperature humidity state in JIS Z 8703, that is a temperature of  $20 \pm 2^\circ\text{C}$ , and a relative humidity shall be  $65 \pm 10\%$ .

**3.2 Taking Method of Sample** For the sample, take necessary quantity for test from a lot recognized to be the same quality by using a proper sampler and put into a container which is tight and not to vaporize. At the time of using, it shall be mixed with stirring sufficiently to have uniform quality and then used for test.

**3.3 Preparation for Sample and Test Piece Material** After keeping the sample and test piece material in the state of 3.1, taking previously good time enough, then serve for the test.

Table 1

| Kind of test piece material | Material                                                                        | Method for surface treatment                                                                             |
|-----------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Steel plate                 | Cold rolled steel sheet of Class 1 specified in JIS G 3141, 1.0 mm in thickness | After polishing with abrasive paper No. 240 specified in JIS R 6252, rinse with solvent <sup>(1)</sup> . |
| Steel material              | Rolled steel for general structure specified in JIS G 3101                      |                                                                                                          |
| Aluminium plate             | Aluminium plate, AlP1-1/2 H specified in JIS H 4000, 20 mm in thickness         |                                                                                                          |
| Glass plate                 | Standard article specified in JIS R 3202, 5 mm polish plate glass               | Rinse with solvent <sup>(1)</sup> .                                                                      |

Note <sup>(1)</sup> In the case of rinsing with solvent, those specified in JIS K 8666, JIS K 8680, JIS K 8034 or JIS K 2201 shall be used.

**3.4 Kind of Test Piece Materials and Surface Treatments** Kind of test piece materials and surface treatment shall be as given in Table 1. However, when designated specially, it shall be in accordance with agreement between the parties concerned.

**3.5 Rounding Off of Numerical Values** The test results shall be rounded off according to JIS Z 8401 and be indicated by the number of places in Table 2.

Table 2

| Test item                             | Unit                                     | Test result                          | Number of test pieces | Number of test item |
|---------------------------------------|------------------------------------------|--------------------------------------|-----------------------|---------------------|
| Specific gravity                      |                                          | To two places of decimals            | 3 pieces              | 5                   |
| Nonvolatile matter                    | %                                        | To one place of decimal              | 2 pieces              | 6                   |
| Viscosity                             | cP {Pa·s}                                | To two places of significant figures | 3 pieces              | 7                   |
| Consistency (and penetration) at 20°C |                                          | In integer                           | 3 pieces              | 8                   |
| Volume changeability                  | %                                        | To one place of decimal              | 3 pieces              | 10                  |
| Flash point                           | °C                                       | In integer                           | 3 pieces              | 11                  |
| Fluidity                              | mm                                       | In integer                           | 3 pieces              | 13                  |
| Burning durability                    | s                                        | In integer                           | 1 piece               | 14                  |
| Shearing adhesive strength            | kgf/cm <sup>2</sup> {N/cm <sup>2</sup> } | To one place of decimal              | 3 pieces              | 17                  |
| Tensile adhesive strength             | kgf/cm <sup>2</sup> {N/cm <sup>2</sup> } | To one place of decimal              | 3 pieces              | 18                  |
| Hardness                              | °                                        | In integer                           | 1 piece               | 19                  |
| Water absorbing percentage            | %                                        | To one place of decimal              | 2 pieces              | 20                  |
| Humidity resisting property           | kgf/cm <sup>2</sup> {N/cm <sup>2</sup> } | To one place of decimal              | 3 pieces              | 21                  |
| Water proofing property               | kgf/cm <sup>2</sup> {N/cm <sup>2</sup> } | To one place of decimal              | 3 pieces              | 22                  |
| Heat aging test                       | kgf/cm <sup>2</sup> {N/cm <sup>2</sup> } | To one place of decimal              | 3 pieces              | 25                  |

#### 4. Appearance

**4.1 Object** This test shall be carried out to observe homogeneity of sealant, gelation, the presence of mixing-in of foreign matters and the colour.

#### 4.2 Test Device

- (1) Glass Plate The glass plate of the material specified in 3.4, with 200 mm × 200 mm shall be used.
- (2) Spatula The spatula of 15 to 20 mm in width, 1 to 2 mm in thickness, 200 to 250 mm in length and made of stainless steel or iron and steel shall be used.

**4.3 Test Method** After mixing the sample enough, spread 20 to 30 g on a clean glass plate uniformly and thinly with the spatula, and immediately observe the homogeneity, gelation, the presence of mixing-in of foreign matters and colour with naked eyes.

**4.4 Marking** The test results shall be indicated with the homogeneity of the sample, gelation, the presence of mixing-in of foreign matters, and the difference of colour by the agreement between the parties concerned.

#### 5. Specific Gravity

**5.1 Object** This test shall be carried out for measurement of specific gravity of the sealant.

#### 5.2 Test Devices

- (1) Even Balance Use the balance of 500 g in weighing capacity and 0.5 g in reciprocal sensibility.
- (2) Chemical Balance Use the balance of 1 mg in reciprocal sensibility.
- (3) Aluminium Plate for Measurement of Specific Gravity Use the plate with material specified in 3.4 as shown in Fig. 1.
- (4) Beaker Use the beaker with capacity of affording the size of inserting aluminium plate for the measurement of specific gravity.
- (5) Cup <sup>(2)</sup> for Specific Gravity Use the cap as shown in Fig. 2.

Fig. 1

Unit: mm

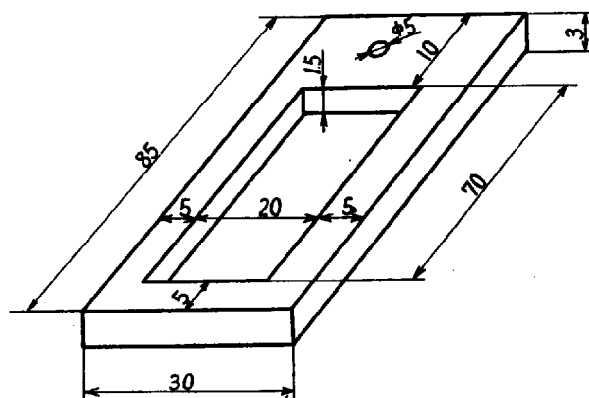
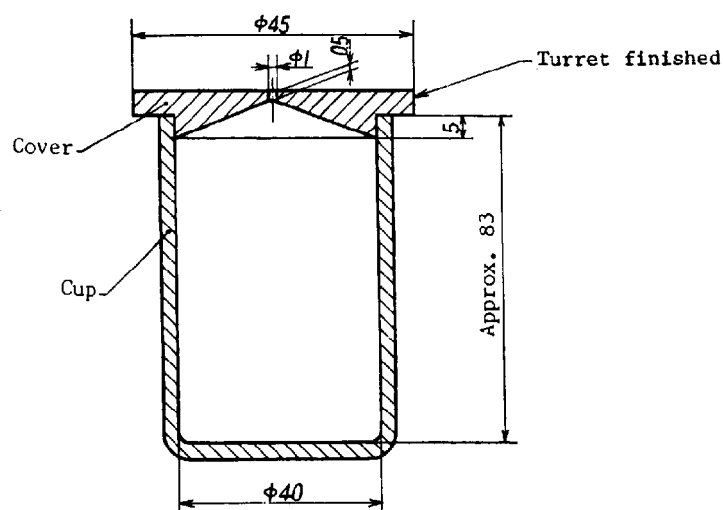


Fig. 2

Unit: mm



Note (2) The cup for specific gravity is made of brass and finished with chromium plating. The cup is strong cylinder so as not to be deformed, with cover having gentle dent in inner side, and blow hole in deep part of dent. Pour water into the cup at  $20 \pm 2^\circ\text{C}$ , after putting the cover on, wipe water blown out from the hole, and adjust the inner volume of the cup by cutting the edge of cup so that the mass of water becomes  $100 \pm 0.5$  g, when weighed. The mass of cup shall be not more than 200 g.

5.3 Test Method Specific gravity shall be measured by either one of the following methods:

- (1) After keeping the sample for about 3 h at  $20 \pm 2^\circ\text{C}$ , fill up sufficiently into the cup with care not to enter bubbles, put the cover and wipe off the excess sample flowed out from the cover hole. Put the cup for specific gravity on one side of even balance and measure the mass of sample by putting the substituted weight (3) of the same mass as the cup for specific gravity and balance weight on the other side. In this case, the specific gravity shall be the value obtained by multiplying number of mass of balance weight in g by 0.01.

Note (3) However, the substitute weight shall be adjusted so as the difference between the masses of weight and of vacant dried cup to be within 0.5 g.

- (2) Coat the sample on the groove of aluminium plate for measurement of specific gravity with care not to enter air bubbles, weigh the mass in air by the chemical balance, then immerse in methanol, take out quickly, immediately measure the mass in distilled water at  $20 \pm 2^\circ\text{C}$  and calculate the specific gravity  $D$  from the following formula:

$$D = \frac{(W_4 - W_2)}{(W_4 - W_2) - (W_3 - W_1)}$$

where  $W_1$ : mass of aluminium plate in water (g)

$W_2$ : mass of aluminium plate in air (g)

$W_3$ : mass of aluminium plate and sample in water (g)

$W_4$ : mass of aluminium plate and sample in air (g)

5.4 Marking The test result shall be obtained by measuring 3 pieces of sample, calculating the mean value to indicate in accordance with 3.5.

## 6. Nonvolatile Matter

6.1 Object This test shall be carried out for the measurement of the nonvolatile matter of the sealant.

### 6.2 Test Devices

- (1) Oven Use the oven capable of keeping the constant temperature with circulating hot wind type.
- (2) Flat Type Weighing Bottle Use the weighing bottle approx. 50 mm in inner diameter, 30 mm in depth specified in JIS R 3503.
- (3) Chemical Balance Use the balance specified in 5.2.
- (4) Desiccator Use the desiccator of not less than 150 mm specified in JIS R 3503 employed silica gel as desiccants.
- (5) Dish of Aluminium Foil Use the dish of aluminium foil formed along the inner wall of 50 mm flat type weighing bottle specified in JIS R 3503 to the sample shape.

6.3 Test Method Take approx. 1.5 g of the sample quickly into the dish of aluminium foil made along the inside of flat type weighing bottle, put on the cover, and weigh the mass. Then, take off the cover, after leaving to stand for 30 to 60 min in the room, dry for 3 h in an oven kept at  $105 \pm 2^\circ\text{C}$ , take out and cool in a desiccator and then weigh the mass with cover. Obtain the remained amount in the dish of aluminium foil and calculate nonvolatile matter  $R$  (%) according to the following formula:

$$R = \frac{A}{S} \times 100$$

where  $A$ : remained amount in the dish of aluminium foil (g)  
 $S$ : mass of the sample (g)

6.4 Marking Test results shall be obtained by measuring two pieces of the sample, obtaining the mean value to indicate in accordance with 3.5.

## 7. Viscosity

7.1 Object This test shall be carried out for the measurement of viscosity of the sealant by rotational viscosimeter.

### 7.2 Test Devices

- (1) Single Cylindrical Rotational Viscosimeter The rotational viscosimeter which rotates the rotor in the sample by synchronous motor and measures the resistance of viscosity torque by the spring balance shall be used.
- (2) Container Use the container of approx. 80 mm in inner diameter, 120 mm in depth and capable of sealing tightly.

- (3) Thermostatic Water Bath Use the bath capable of adjusting at  $20 \pm 1^\circ\text{C}$ .
- (4) Stop Watch Use the stop watch graduated not more than 0.2 sec.
- (5) Thermometer Use the 100 degrees thermometer specified in JIS B 7411.

7.3 Test Method Put a cover on the container containing approx. 500 ml of the sample, keep the sample temperature at  $20 \pm 1^\circ\text{C}$  in the thermostatic water bath, after recognizing the temperature of the sample to be uniform, stir to mix with care not to enter bubbles, immerse to the immersing mark of rotor about at the centre of container with care not to adhere bubbles to the rotor of viscosimeter and measure. For measurement, read the scale mark after 2 min from the beginning of the rotation. However, select the No. of rotor and number of revolutions to be within 15 to 85 % of the graduation of indicating pointer. Viscosity shall be calculated by multiplying the value of graduation of viscosimeter by the specified conversion factor.

7.4 Marking Test results shall be obtained by measuring 3 pieces of the sample, obtaining the mean value to indicate in accordance with 3.5. Append the used viscosimeter, No. of the rotor and number of revolutions.

## 8. Consistency (and Penetration)

8.1 Object This test shall be carried out for measurement of hardness of the sealant using penetrometer.

### 8.2 Test Devices

- (1) Penetrometer and Needle Use those specified in JIS K 2808.
- (2) Cone Use the cone specified in JIS K 2809.
- (3) Stop Watch Use the stop watch specified in 7.2.
- (4) Thermometer Use the thermometer specified in 7.2.

### 8.3 Test Methods

- (1) Consistency Fill the sample enough in an attached container of penetrometer with a spatula with care for bubbles not to enter expelling out occluded air with beating the container slightly 2 to 3 times, after wiping off the excess sample on the upper edge of the container with the spatula, put the container on the table of the penetrometer and make the tip of the cone fitted with the needle holder touch to the centre part of the surface of the sample. After recognizing the centre and the zero point of scale plate reading on the indicator, allow the cone to penetrate by the self weight for 5 sec. by pushing the retaining metal. Then make the rack for measurement of penetration touch gently to the upper side of the needle holder, read the indication <sup>(4)</sup> on the scale plate. The measurement principally shall be in the range within 0 to 360.
- (2) Penetration Fit the needle to the needle holder, measure by the same operation as (1) and read the indication on the scale plate.