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Polish for automobiles

ICS 75.140

Descriptors : waxes, polishes, thermal stability, road vehicles, polishing, water-proofing materials, weather resistance, endurance testing

Reference number : JIS K 2236 : 1997 (E)

K 2236:1997

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberation at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. Consequently, **JIS K 2236:1985** was revised and replaced with **JIS K 2236:1997**. This revision is made for conformity with **JIS K 2396**, and unnecessary items were deleted.

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Polish for automobiles

Introduction When applying this Standard, normative references to this Standard shall be simultaneously referred to. Concerning the products having similar serviceability to this product, the products in **JIS K 2396** are found, however, there was case where washing method before use was different from this one because it differs in main components and durability, therefore, the unification with this Standard is impossible. The revision of the standard polish for automobile at this time was carried out after overall review, including the form of the standard, and new items such as, density, water repellency, weather resistance, influence on metals, influence on rubber, influence on plastics, are adopted, but item of glossiness water resistance was eliminated because of its ambiguity for measurement accuracy, and instead, water repellency and weather resistance have been newly adopted.

1 Scope This Japanese Industrial Standard specifies the polishing wax (hereafter referred to as "wax") which can be used for polishing coated surface of the body of automobile. This does not apply to, however, such as, wax having no water repellency, wax for repair use, and polish for coating.

Remarks: Wax is defined as the mixture of wax-like substance, silicone, and solvent, and easily covers coated surface to give glossiness and protection on the coated surface.

2 Normative references The standards listed in Annex 1 contain the provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards shall be applied.

3 Classification The wax shall be classified as shown in Table 1.

Table 1 Classification

Classification	Physical shape	Symbol
Type 1	Hard ⁽¹⁾	WH
Type 2	Soft ⁽²⁾	WS
Type 3	Liquid ⁽³⁾ ⁽⁴⁾	WL

Notes ⁽¹⁾ This is the wax whose consistency is 120 or less when measured by Annex (normative), and has no surface deformation at ordinary temperature.

⁽²⁾ This is pasty or under kneaded condition, and does not belong to Type 1 nor Type 3.

⁽³⁾ This is capable of flowing out of the Ford cup when it is subjected to the test in Annex (normative).

⁽⁴⁾ The product under aerosol or spraying condition is evaluated as corresponding to Type 3.

4 Quality The qualities of wax shall be as shown in Table 2 when tested according to 5.

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Table 2 Qualities

Items		Specified requirements			No. of test subclause
		Type 1	Type 2	Type 3	
Density g/cm ³ (20 °C)		0.70 min.			5.6
pH value (25 °C)		5.0 to 10.0			5.7
Glossiness augmentation		10 min.	15 min.		5.8
Stability	High temperature stability (50 °C±2 °C, 4 h±0.5 h) Note: For only Type 3 (50 °C±2 °C, 1 h)	No remarkable change such as the separation of solvent or constituent. When a bottle is fallen sidelong, no flowing out of the contained.	No remarkable change such as the separation of solvent or constituents.	After shaking to mix, there shall be no remarkable change such as the separation of solvent or constituents.	5.9 [5.9.2 a)]
	Low temperature stability (-12 °C±2 °C, 4 h±0.5 h)	No remarkable change such as the separation of solvent or constituents.	No remarkable change such as the separation of solvent or constituents.	After stopping shaking, its uniform condition shall be restored without remarkable change such as separation.	
Corrosiveness to metals (50 °C±2 °C, 48 h)	Appearance of test piece	No corrosion recognizable with visible test. Discoloration is permissible.			5.10
Influence on rubber (50 °C±2 °C, 120 h)	Change of hardness IRHD	±5 ±3			5.11
	Appearance of test piece	No stickiness on surface, segregation of carbon black, nor crack.			
Influence on coated film (50 °C±2 °C, 6 h)	Appearance of test piece	No peeling, wrinkle, swelling, nor discoloration on coated film.			5.12
		Aminoalkyd resin enamel-white and black			

Table 2 (concluded)

Items		Specified requirements			No. of test subclause
		Type 1	Type 2	Type 3	
Influence on plastics (50 °C±2 °C, 120 h)	Appearance of test piece	No crack, serious deformation, nor discoloration on surface.			5.13
	Polyethylene ABS resin				
Spreadability for coating g		0.2 max.	0.3 max.	0.3 max.	5.14
		10 max.	10 max.	8 max.	5.15
Informative reference	Nonvolatile content %	Report			5.16
	Water repellency	Report			5.17
	Weather resistance	Report			5.18
		Gloss retention % Percentage change of contact angle %			

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5 Test methods

5.1 General matters The general matters applicable to tests shall follow **JIS K 0050**.

Matters to be attended to when tests are carried out shall be as follows.

- a) **Wearing of protectors** In case of need, wear the protector to keep skin, eyes, or others.
- b) **Operation** Carry out the operation while confirming of safety.
- c) **Disposal of waste** Sample or the like to be discarded shall be disposed with care not to make it the source to contaminate air or water.
- d) **Observation of laws and regulations** Treat them with observation of related laws and regulations.

5.2 Standard condition of testing site The standard condition of testing site shall be ordinary temperature ($20\text{ }^{\circ}\text{C} \pm 15\text{ }^{\circ}\text{C}$) and ordinary humidity (65 ± 20) % specified in **JIS Z 8703**.

5.3 Rounding off of numerical value The rounding off of numerical value shall follow **JIS Z 8401**.

5.4 Sampling method Sampling method shall be as follows.

- a) **Number of samples to be picked** Construct one lot which is the gathering of products regarded to have the same quality and to be manufactured under the same condition, and pick up at random, by means of suitable method as random-number table, the number of samples shown in Table 3 according to the number of product containers in the lot.

Table 3 Number of sample containers to be picked

Number of containers	Number of containers to be picked
1 to 300	1
301 to 600	2
601 to 1 000	3
1 001 to 5 000	4
5 001 to 10 000	5
10 001 or more	6

Remarks: The number of containers to be picked up may be decreased depending on the efficiency of the process.

5.5 Preparation of sample

5.5.1 Case of general products

- a) **Apparatus and implements** Apparatus and implements shall be as follows.
 - 1) **Beaker** 2 000 ml beaker specified in **JIS R 3503**.

- 2) **Glass rod** Suitable one on the market.
 - 3) **Wide-mouthed bottle with ground-in stopper or polyethylene bottle** 1 l bottle on the market.
 - 4) **Spatula** Suitable one on the market.
 - 5) **Ford cup** Specified in 4.5.4 of JIS K 5400.
- b) **Preparation of Type 1 sample**
- 1) Take uniformly the sample kept in picked containers into a beaker using a spatula, and maintain it at 50 °C temperature for 2 hours with care not to allow the solvent to evaporate.
 - 2) Cool the sample down to room temperature, measure its consistency, confirm it to be 120 or less, and employ it as test sample.
- Remarks: When the consistency of the picked sample is changed, the product on the spot can be used as test sample.
- c) **Preparation of Type 2 sample** Take uniformly definite amount of the sample kept in picked containers into a beaker using a spatula, mix it well with a glass rod, keep it at room temperature for 2 hours, and employ it as test sample.
- Remarks: When the solvent has remarkable evaporative property, the product on the spot can be used as test sample.
- d) **Preparation of Type 3 sample** Take uniformly definite amount of sample from the picked product into a beaker or a wide-mouthed bottle with ground-in stopper, mix it well with a glass rod, keep it at room temperature for 2 hours, and after confirming its flowing out from a Ford cup, employ it as test sample.

5.5.2 Case of aerosol product

- a) **Apparatus and implements** Apparatus and implements shall be as follows.
- 1) **Degassing apparatus for dissolved gas**
 - 1.1) **Heater** Thermostatic water bath or mantle heater with variable resistance, which is capable of keeping at 50 °C.
 - 1.2) **Agitating device or magnetic stirrer** The apparatus on the market.
 - 1.3) **Condenser** Coiled type condenser with 380 mm in length, specified in JIS R 3503.
 - 1.4) **Erlenmeyer flask** 1 000 ml Erlenmeyer flask with ground-in stopper, specified in JIS R 3503.
 - 1.5) **Temperature measuring instrument** Thermometer No. 42 specified in JIS B 7410, or the one equivalent to this.
 - 2) **Beaker** 1 000 ml beaker specified in JIS R 3503.
 - 3) **Wide-mouthed bottle with ground-in stopper or polyethylene bottle** 1 l bottle, on the market.
- b) **Procedures** Procedures shall be as follows.
- 1) Make a hole ⁽⁵⁾ on each container picked as stated in 5.4, transfer liquid into a beaker, mix it, transfer it into a 200 ml or 300 ml Erlenmeyer flask, and construct the device for degassing dissolved gas as shown in Fig. 1.

- 2) While the liquid in the Erlenmeyer flask is being heated at about 50 °C, stir it for 30 minutes, and degas dissolved gas ⁽⁶⁾(⁷).
- 3) Allow the liquid in the Erlenmeyer flask at room temperature, make it sample, place it in a wide-mouthed bottle with ground-in stopper or polyethylene bottle, store it in the dark and cold place, and after mixing it well, it shall be submitted to tests.

When bubbles and so on are recognized, repeat the procedures in 2) and 3).

Notes ⁽⁵⁾ Case of aerosol products, it is preferable to cool them before opening it. And it is preferable to make the hole on container not too large but enough to let liquid flow out.

⁽⁶⁾ The amount of dissolved gas in wax is different depending on type of the gas used for aerosol product, but when such single gas as carbon dioxide, liquefied petroleum gas, or dimethyl ether, or their mixed gas is used, the procedure in b) may be omitted.

⁽⁷⁾ If low boiling point solvent is used as in some product on the market, the heating at about 50 °C may not be sufficient, therefore pay care with it.

Concerning the procedures from ⁽⁵⁾ to ⁽⁷⁾, carry out the procedures with confirming its sufficient safety.

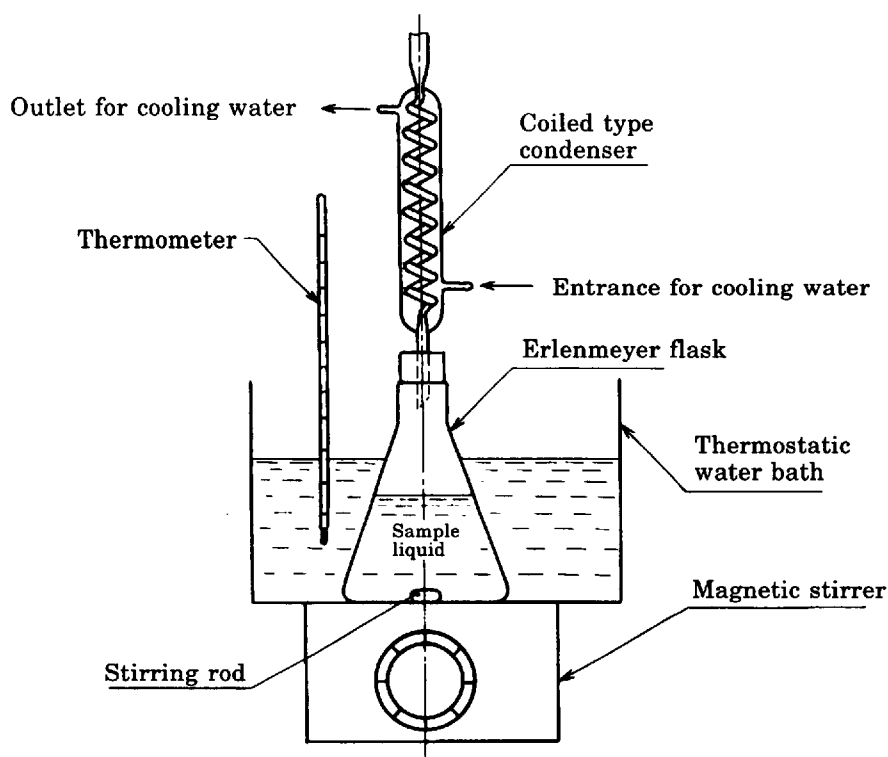


Fig. 1 Example of degassing device for dissolved gas

5.6 Density

5.6.1 Apparatus and implements Apparatus and implements shall be as follows.

- a) **Balance** Capable of weighing to the nearest 0.01 g.
- b) **Specific gravity cup** Specified in 4.6.2 of JIS K 5400, with the shape and dimensions shown in Fig. 2, and with 100 ml in capacity. It is made of brass finished with chromium plating, or of stainless steel, and weighs 200 g or under.

The hole for blowoff shall be suitable for the fluidity of liquid.

- c) **Thermostat** Capable of keeping at $20.0\text{ }^{\circ}\text{C} \pm 0.5\text{ }^{\circ}\text{C}$.

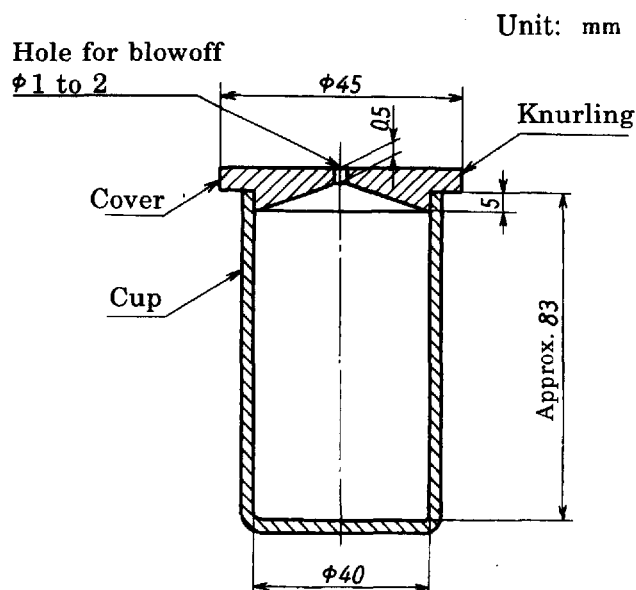


Fig. 2 Example of specific gravity cup

5.6.2 Procedures Procedures shall be as follows.

- a) **Capacity measurement of specific gravity cup**
 - 1) Wash well a specific gravity cup and its cover, dry them, and weigh respectively its mass to the nearest 0.01 g.
 - 2) Fill the specific gravity cup with water, having kept at about $20\text{ }^{\circ}\text{C}$, and put the cover lest bubbles should stay.
 - 3) Immerse it in the thermostatic water bath kept at $20\text{ }^{\circ}\text{C}$ until the water level gets its neck, and allow it to stand for about one hour.
 - 4) Wipe off overflowed water on the cover with clean cloth, draw up the specific gravity cup, wipe off attached water surrounding the cup, dry it, and immediately weigh its mass. At this time be careful not to let water overflow owing to the expansion caused by the heat of hand.
 - 5) Calculate the capacity of the specific gravity cup according to the following formula.

$$W_3 = \frac{M_2 - M_1}{d}$$

where, W_3 : capacity of specific gravity cup (cm^3)
 M_2 : mass of specific gravity cup filled with water (g)
 M_1 : mass of specific gravity cup (g)
 d : density of water at 20 °C (0.998 20 g/ cm^3)

b) In case of Type 1, density is measured as follows.

- 1) Heat and melt sample moderately enough to be able to put the sample into a specific gravity cup, and put the sample into specific gravity cup, which has been weighed, up to about 80 % to 90 % with two trials or three trials of pouring lest cavity should be produced.
- 2) Put the cover on the specific gravity cup, immerse it in the thermostatic water bath kept at 20 °C until the water level gets its neck, and allow it to stand for about one hour.
- 3) Draw up the specific gravity cup, wipe off attached water surrounding the cup, dry it, and immediately weigh its mass to the nearest 0.01 g.
- 4) Take off the cover, place water, which has been previously adjusted to 20 °C, on the sample to fill the specific gravity cup, put the cover again, and wipe off overflowed water.
- 5) Make the surface of the specific gravity cup dry naturally, and immediately weigh its mass to the nearest 0.01 g.
- 6) **Calculation** Calculate the density according to the following formula, and round it off to two decimals.

$$W_4 = \frac{W_5 - W_1}{d}$$

$$S = \frac{W_1 - W_2}{W_3 - W_4}$$

where, S : density (20 °C) (g/ cm^3)
 W_1 : mass of specific gravity cup filled with sample (g)
 W_2 : mass of specific gravity cup (g)
 W_3 : capacity of specific gravity cup (cm^3)
 W_4 : volume of water kept in specific gravity cup (cm^3)
 W_5 : mass of specific gravity cup containing water and sample (g)
 d : density of water at 20 °C (0.998 20 g/ cm^3)

c) In case of Type 2, density is measured as follows.

- 1) Weigh previously the mass of specific gravity cup at 20 °C according to a) 1).
- 2) Heat and melt sample ⁽⁸⁾ moderately enough to be able to put the sample into the specific gravity cup, and put about 100 g of the sample into the specific

gravity cup, which has been previously weighed, lest cavity should be produced, put the cover on it before the sample does not solidify, and wipe overflowed sample.

Note ⁽⁸⁾ Fill the sample so as not to make bubbles, and when bubbles are found, fill it with two or three trials of pouring, and after putting the cover, wipe off superfluous sample.

- 3) Immerse it in the thermostatic water bath kept at 20 °C until the water level gets its neck, and allow it to stand for about one hour.
- 4) Draw up the specific gravity cup, wipe off attached water surrounding the cup, dry it, and immediately weigh its mass to the nearest 0.01 g.
- 5) **Calculation** Calculate the density according to the following formula, and round it off to two decimals.

$$S = \frac{W_1 - W_2}{W_3}$$

where, S : density (20 °C) (g/cm³)

W_1 : mass of specific gravity cup filled with sample (g)

W_2 : mass of specific gravity cup (g)

W_3 : capacity of specific gravity cup (cm³), which follows
a) 5)

d) In case of Type 3, density is measured as follows.

- 1) Fill the sample ⁽⁸⁾ into a specific gravity cup, which has been previously weighed according to a) 1), lest cavity should be produced, put the cover on it, and wipe off the superfluous sample that spouted out from the hole. Provided that the sample temperature shall be 20 °C or lower.
- 2) Immerse it in the thermostatic water bath kept at 20 °C until the water level gets its neck, and allow it to stand for about one hour.
- 3) Weigh the mass of specific gravity cup to the nearest 0.01 g.
- 4) **Calculation** Calculate the density according to the formula in c) 5), and round it off to two decimals.

5.7 pH value

5.7.1 Apparatus and implements Apparatus and implements shall be as follows.

- a) **pH meter** Specified in JIS Z 8802.
- b) **Glass vessel** Conical beaker or wide-mouthed bottle with ground-in stopper, which is suitable for pH measurement.
- c) **Water bath** Suitable one for heating a glass vessel.

5.7.2 Reagents Reagents shall be as follows.

- a) **Water** Specified in 3.6 (3) of JIS K 8001.
- b) **Ethanol (95)** Specified in JIS K 8102.

- c) **Alcohol mixed solution** Mix ethanol (95) and water at volumetric ratio of 8 to 2, and control its pH to be 7.0 ± 0.1 with 0.1 mol/l sodium hydroxide solution. Never use 4 ml or more of 0.1 mol/l sodium hydroxide solution per 1 l of alcohol mixed solution.

5.7.3 Procedures Carry out either of following two procedures.

- a) In case of the sample soluble in water or emulsifiable ⁽⁹⁾, take about 2 g of sample in a glass vessel, add it into 100 ml water while agitating it, mix them for 5 minutes, adjust the solution at 25 °C, and measure its pH value using pH meter according to 7 of **JIS Z 8802**. Repeat this procedure twice.

The temperature of the solution shall not fluctuate by ± 1 °C or higher while the measurement is being carried out.

Note ⁽⁹⁾ In case of the emulsifiable, the sample of W/O type shall be treated as nonsoluble in water.

- b) In case of the sample nonsoluble in water, oily, or solid, take about 2 g of the sample and 100 ml of alcohol mixed solution into a glass vessel, mix them well, adjust its temperature at 25 °C, and measure its pH using a pH meter according to 7 of **JIS Z 8802**. Repeat this procedure twice. Solid sample, however, may be heated in a water bath.

The temperature of the solution shall not fluctuate by ± 1 °C or higher while the measurement is being carried out.

5.7.4 Calculation When the discrepancy between two measurements falls in 0.2 or less, obtain their average, and round it off to one decimal according to **JIS Z 8401**. If the discrepancy between two measurements is over 0.2, repeat the test once, and when the discrepancy between this value and either of above two measurements falls in 0.2 or less, obtain their average. If the discrepancy between this value and both of above two measurements is over 0.2, check the apparatus and vessel, and retry the test.

5.8 Glossiness augmentation

5.8.1 Reagents, apparatus, and implements Reagents, apparatus, and implements shall be as follows.

- a) **Ethanol (95)** Specified in 5.7.2 b).
- b) **Glossmeter** The measuring device for specular gloss specified in **JIS Z 8741**, and capable of measuring 60° specular gloss.
- c) **Polishing device** It consists of a fixing bed and a device by which a polishing table moves on the test plate with at least 22 cm distance toward long axis at the rate of 50 ± 15 reciprocations per one minute, and the force required by the reciprocation gives as little as possible influence on the polishing table. Place the test plate at the center of the fixing bed, and in order to fix the test plate, place two plates in series, each of which has the same thickness, the same width, and about 100 mm in length, in front and in rear at long axis direction and the same direction of movement.

The polishing table shall be prepared as follows; shape wooden plate as measuring about 15 mm thick, about 70 mm wide, and about 80 mm long, stick