

JIS

JAPANESE INDUSTRIAL STANDARD

Aluminium pigments for paints

JIS K 5906—1991

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Aluminium pigments for paints

K 5906-1991

1. Scope

This Japanese Industrial Standard specifies aluminium pigments for paints (hereafter referred to as the "aluminium pigments").

Remarks 1. Applicable Standards to this Standard are shown in Attached Table 1.

2. Corresponding International Standards to this Standard are shown in Attached Table 2.

2. Definitions

For the purposes of this Standard main definitions are in accordance with JIS K 5500, and in addition the following definitions apply:

- (1) aluminium pigment By making the foil pieces or grain powders or the like of aluminium as raw material, those made the scale state grains by using such lubricant as stearic acid, oleic acid, or the like and according to mechanical grinding working.
- (2) leafing The phenomenon where the aluminium pigment grains are floated to be arranged on the paint film, when preparing the paint film by making the aluminium pigment as coating by using vehicle,
- (3) nonleafing The phenomenon where opposite of leafing the aluminium pigment grains do'nt float to be arranged on the surface of paint film.
- (4) water-covering capacity The area occupied by dry aluminium pigment grains per unit mass when, by utilizing the leafing phenomenon the dry aluminium pigment grains diffuse uniformly on water surface and, covered so as open space is absent.

3. Types and classes

Aluminium pigments shall, according to the property and condition, be divided into the following four types.

Further, the classes of aluminium pigments shall, according to residue on sieve and water-covering capacity, be as given in Table 1.

- (1) Type 1 The aluminium pigment of grain state having leafing property.
- (2) Type 2 The aluminium pigment of paste state having leafing property.
- (3) Type 3 The aluminium pigment of grain state having non-leafing property.
- (4) Type 4 The aluminium pigment of paste state having non-leafing property.

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Table 1. Class

Type	Class	Residue on sieve %				Water-covering capacity m ² /g
		Nominal dimensions of standard sieve				
		45 μm	150 μm	180 μm	250 μm	
Type 1	A	20.0 max.	0.5 max.	—	0.1 max.	0.8 or under
	B	20.0 max.	0.5 max.	—	0.1 max.	Over 0.8 up to and incl. 1.5
	C	1.5 max.	—	—	0.1 max.	Over 1.5 up to and incl. 2.2
	D	0.1 max.	—	—	0.1 max.	Over 2.2
Type 2	A	15.0 max.	0.5 max.	0.1 max.	—	1.7 or under
	B	1.0 max.	—	0.1 max.	—	Over 1.7 up to and incl. 2.4
	C	0.1 max.	—	0.1 max.	—	Over 2.4
Type 3	A	20.0 max.	0.5 max.	—	0.1 max.	—
	B	6.0 max.	—	—	0.1 max.	—
	C	1.5 max.	—	—	0.1 max.	—
Type 4	A	11.0 max.	0.5 max.	0.1 max.	—	—
	B	1.0 max.	—	0.1 max.	—	—
	C	0.1 max.	—	0.1 max.	—	—

4. Quality

The quality of aluminium pigment, when subjected to the test according to 8., shall be as given in Table 2.

Table 2. Quality

Item	Class			
	Type 1	Type 2	Type 3	Type 4
Condition in container	To be free from rigid lump and be uniform.			
Heat residue %	99.0 min.	65.0 min.	99.0 min.	65.0 min.
Acetone soluble content %	6.0 max.	4.0 max.	1.5 max.	6.0 max.
Appearance of paint film	To be small in difference in comparing with the evaluation sample.			
Residue on sieve %	To be in the range shown in Table 1.			
Water- covering capacity m^2/g	To be in the range shown in Table 1.		—	
Leafing power %	65 min.		To be not confirmed.	
Water content %	0.20 max.	0.15 max.	0.20 max.	0.15 max.
Other metals in dry pigment	Copper + iron + lead + silicon + zinc %	1.0 max.		
	Lead %	0.03 max.		

5. Evaluation sample

The evaluation sample shall be that to be used for evaluation of product quality, preliminarily agreed between the parties concerned or that preliminarily determined for the purpose of quality control of product by the manufacturer.

6. Sampling method

6.1 Summary Select the product container for each lot of aluminium pigment, and after sampling from respective product containers by using sampler, mix thoroughly by stirring to carry out the reduction.

6.2 Forming of lot Form the lot by the aluminium pigment of the quantity to be considered to be the same quality of those manufactured under the same conditions.

6.3 Apparatuses and container Apparatuses and container shall be as follows:

- (1) Sampler The sampler suitable in shape and dimensions. The example is shown in Fig. 1 and Fig. 2.
- (2) Reducer A suitable reducer. The example is shown in Fig. 3.
- (3) Sample container A tin plate can capable of preventing light and humidity and of closing, having a suitable volume.

Fig. 1. An example of sampler
(A scoop for sampling)

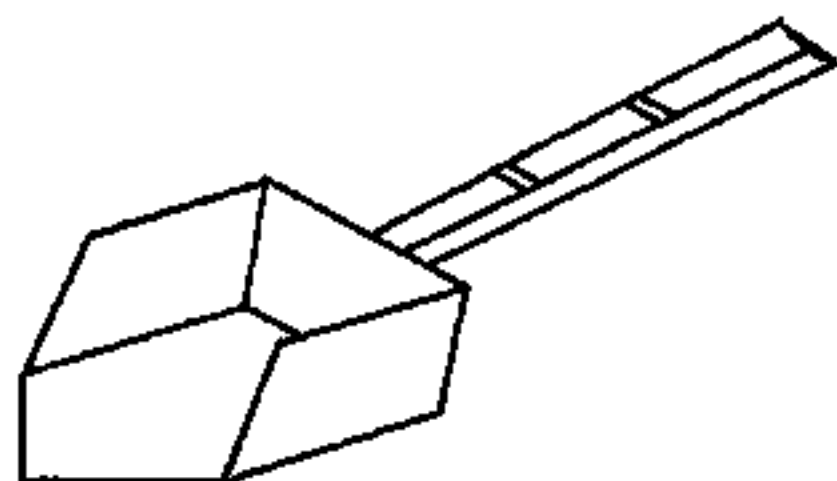


Fig. 3. An example of reducer
(Increment reduction apparatus)

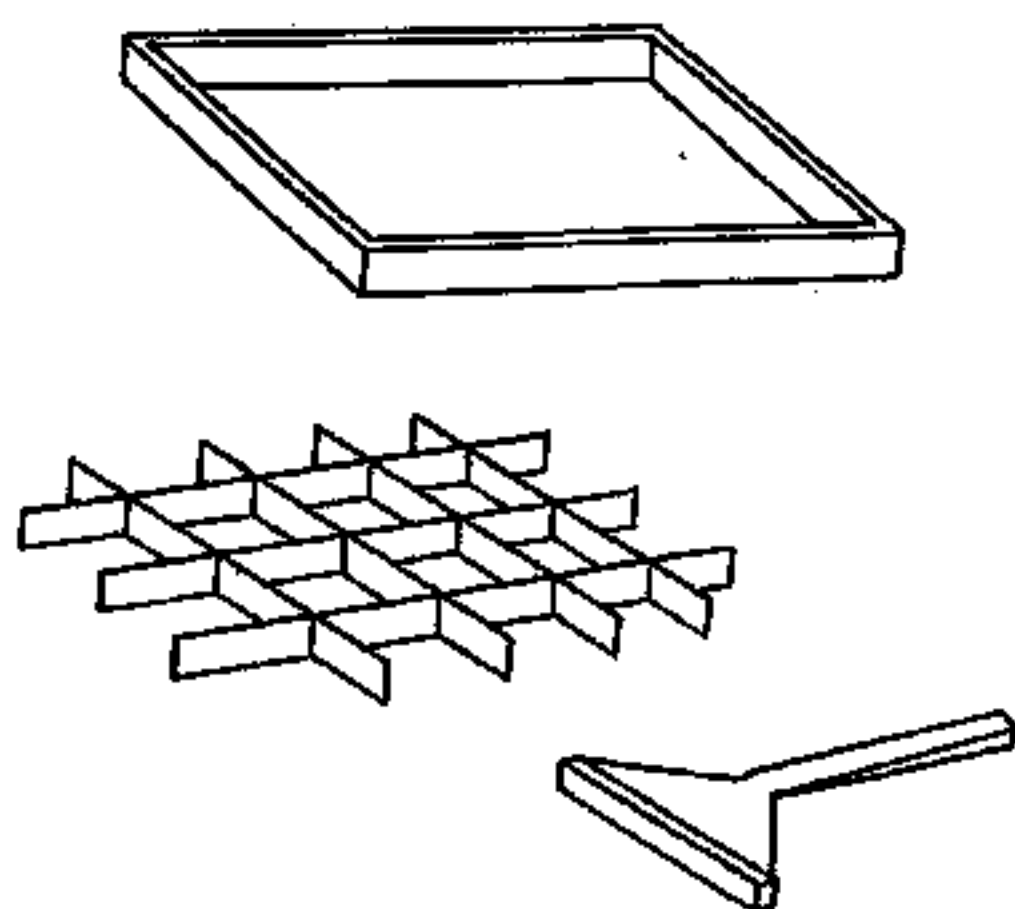
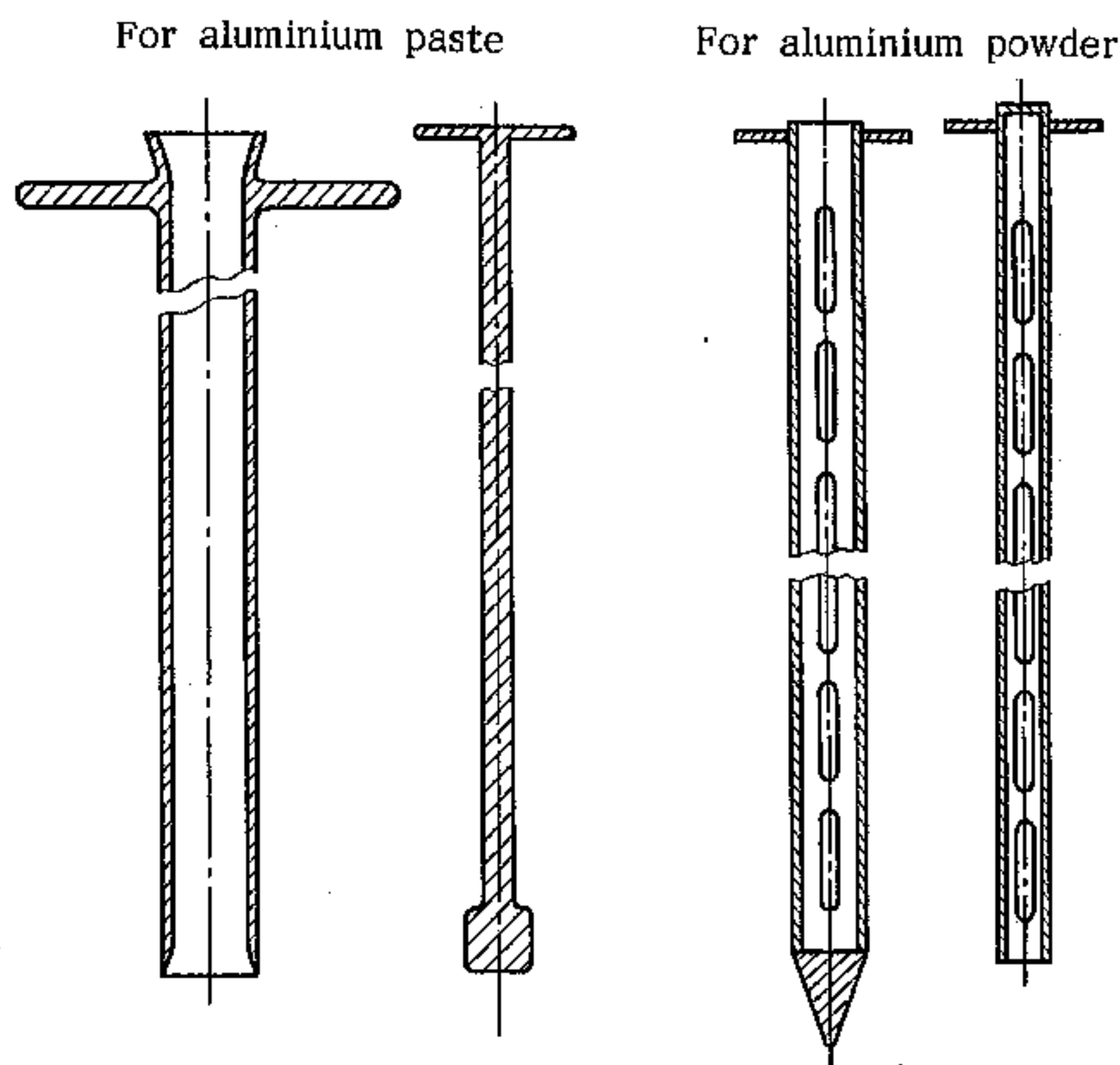


Fig. 2. An example of sampler
(A tube for sampling)



6.4 Operation The operation shall be carried out as follows:

- (a) For each lot, select at random two (¹) or more pieces of product container.
- (b) In the case where the quantity of content in the product container is small and capable of mixing by stirring easily, mix thoroughly by stirring the aluminium pigment, and sample approximately 500 g from the central part of product container as far as possible from respective product containers sides and bottom by using the scoop for sampling.

Further, in case where the quantity of content in the product container is large and the mixing by stirring is impossible, insert a tube for sampling from the middle part of product surface in the product container, and take aluminium pigment sample uniformly from the upper, medium, and lower parts of product container. Make the sampling quantity from each product container approximately 500 g.

- (c) Mix thoroughly by stirring the taken sample, carry out the reduction to approximately 250 g (¹) according to the increment reducer or the like, and put into a sample container.
- (d) On the sample container, describe the product name, date of sampling, number of manufacture or lot number, and other required matters.

Note (1) The number of pieces of sampling product container, storing quantity and storing period of sample may be determined according to agreement between the parties concerned.

7. General

Items in common to all tests shall be in accordance with JIS K 5101 and JIS K 5400.

8. Testing methods

8.1 Places for testing Conditions of places for testing shall be as follows:

- (1) Places for testing given in 8.5 and 8.8 shall be as specified in 3.1 (1) (Standard condition) of JIS K 5400.
- (2) Places for testing relating to other test items shall be as specified in 3.1 (2) (General condition) of JIS K 5400.

8.2 Condition in container

8.2.1 Summary Examine whether the aluminium pigment in the sample container is under the condition suitable for using or not according to the contacting sense when mixing by stirring with a knife or bar.

8.2.2 Operation After leaving the sample container as it is in a room for not less than 24 h, open the mouth of the sample container, quickly insert the knife or bar into the aluminium pigment and mix the contents by stirring.

8.2.3 Judgement When the content is soft, not in rigid lumps, and approximately uniform, consider it to be "free from rigid lumps and uniform".

8.3 Heating residue

8.3.1 Summary Obtain the heating residue of aluminium pigment at the temperature of 105°C.

8.3.2 Apparatuses Apparatuses shall be as follows:

- (1) Oven An oven capable of keeping at a temperature of $105 \pm 2^\circ\text{C}$.
- (2) Chemical balance The chemical balance capable of measuring to the nearest 1 mg.
- (3) Desiccator The desiccator specified in JIS R 3503, and use silica gel as the desiccating agent.
- (4) Flat type weighing bottle The flat type weighing bottle specified in JIS R 3503 of nominal size of 40 mm x 20 mm.
- (5) Glass bar The glass bar of approximately 3 mm in diameter and approximately 60 mm in length, which is such size that it is able to be entered into a flat type weighing bottle by bending with folding approximately at the middle part to L shape.

8.3.3 Operation The operation shall be carried out as follows:

- (a) With the plug of flat type weighing bottle detached as it is, heat in an oven kept at $105 \pm 2^\circ\text{C}$ in temperature for approximately 2 h together with the plug and glass bar.
- (b) Leave cool in a desiccator to room temperature, apply the plug to the flat type weighing bottle, and measure the mass together with the glass bar to the nearest 1 mg.
- (c) Quickly take approximately 2 g of sample, put into a flat type weighing bottle, apply the plug and weigh the mass together with the glass bar to the nearest 1 mg.
- (d) By using a glass bar, spread the sample to as uniform a thickness as possible on the bottom of flat type weighing bottle.
- (e) With the plug of flat type weighing bottle detached as it is, heat together with the plug and glass bar in an oven kept at a temperature of $105 \pm 2^\circ\text{C}$ for 3 h.
- (f) Put the flat type weighing bottle into a desiccator, after letting cool to room temperature, apply the plug and weigh together with the glass bar to the nearest 1 mg.
- (g) Repeat the operations of (a) to (f).

8.3.4 Calculation Calculate the heating residue according to the following formula, average the measured values twice and round off to one place of decimal.

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

where, A : heating residue (%)

S : mass of sample (g)

B : residual quantity in the flat type weighing bottle (g)

8.4 Acetone soluble content For measuring method of acetone soluble content, there is the acetone extraction method and hydrochloric acid dissolution method.

8.4.1 Acetone extraction method The acetone extraction method applies to aluminium pigments of all types.

8.4.1.1 Summary Obtain the quantity of acetone soluble matters excepting the evaporating solvents in aluminium pigment.

8.4.1.2 Reagent Acetone specified in JIS K 8034.

8.4.1.3 Apparatuses Apparatuses shall be as follows:

- (1) **Oven** The oven capable of keeping temperature at $105 \pm 2^\circ\text{C}$.

- (2) Chemical balance A chemical balance capable of measuring to the nearest 1 mg.
- (3) Water bath The water bath capable of keeping the temperature at 50 to 60°C.
- (4) Suction apparatus The suction apparatus having the suction force required for filtration.
- (5) Desiccator The desiccator specified in JIS R 3503, using silica gel as desiccating agent.
- (6) Pot type sintered-glass filter 1G4 specified in JIS R 3503.
- (7) Erlenmeyer flask The Erlenmeyer flask of 300 ml in capacity specified in JIS R 3503.
- (8) Beaker Beakers of nominal capacities of 100 ml, 200 ml and 300 ml specified in JIS R 3503.

8.4.1.4 Operation The operation shall be carried out as follows:

- (a) Weigh out approximately 2 g of sample into a beaker 200 ml to the nearest 1 mg.
- (b) Add approximately 20 ml of acetone to the beaker, mix the contents by stirring, after dispersing sufficiently the sample, further add approximately 10 ml of acetone and mix by stirring.
- (c) After leaving as it is for 1 h, settle the aluminium pigment.
- (d) Pour the liquid of upper layer into a pot type sintered-glass filter, and put the sucked-in filtrate into an Erlenmeyer flask 300 ml.
- (e) After filtration of all filtrates, further add approximately 30 ml of acetone to the residue in the beaker 200 ml, again disperse the aluminium pigment, transfer to a pot type sintered-glass filter and filter.
- (f) Wash the beaker 200 ml with approximately 50 ml of acetone, and filter through a pot type sintered-glass filter.
- (g) Transfer the filtrate from the Erlenmeyer flask 300 ml to a beaker 300 ml, further wash the Erlenmeyer flask with approximately 50 ml of acetone and transfer the washings to a beaker of 300 ml.
- (h) Heat the beaker 300 ml in the water bath kept at a temperature of 50 to 60°C, and concentrate until the volume becomes approximately 50 ml.
- (i) Transfer the concentrated filtrate in the beaker 300 ml to a beaker 100 ml preliminarily weighed in mass to the nearest 1 mg.