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Gypsum plasters

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Gypsum plasters

Introduction This Japanese Industrial Standard has been prepared on the basis of the corresponding parts (standard test condition, test on fineness of grinding and determination of bulk density) of the following International Standards without changing the technical content but adding the provisions mentioned below which are not included in the corresponding International Standards, as the provisions of the Japanese Industrial Standard.

Number, year of publication and title of the International Standards

ISO 3048 : 1974 *Gypsum plasters – General test conditions*

ISO 3049 : 1974 *Gypsum plasters – Determination of physical properties of powder*

ISO 3052 : 1974 *Gypsum plasters – Determination of water of crystallization content*

Provisions added as Japanese Industrial Standard Definitions, classification, quality, bending strength test, compressive strength test, hardness test, inspection, marking, clicined gypsum content and setting time.

1 Scope This Japanese Industrial Standard specifies the gypsum plasters used for plaster work of buildings in building site or manufacturing factory by proportioning with aggregate and mixing with water.

Remarks 1 The normative references to this Standard are as follows:

JIS R 5201 *Physical testing methods for cement*

JIS R 9101 *Methods for chemical analysis of gypsum*

JIS Z 8801 *Test sieves*

2 The units and numerical values given in { } in this Standard are based on the traditional units and appended for reference.

2 Definitions For the purpose of this Standard, the following definitions apply:

- (1) **gypsum plaster** Powdery wall coating material consisting mainly of clicined gypsum and mixed, when necessary, with admixtures, thickeners, setting retarders, etc.
- (2) **plaster proportioned at work site** Plaster used by proportioning with aggregate and mixing with water in building site.
- (3) **preproportioned plaster** Plaster in which aggregate, admixture, etc. are mixed in advance and usable only by mixing with water in building site.
- (4) **first coating** Process of coating wall for making bedding on which finish coating applies.
- (5) **finish coating** Process of coating base or bedding thinly as finishing as it is.
- (6) **clicined gypsum** Material obtained by baking gypsum and consisting mainly of semi-hydrate gypsum, and symbolized as $\text{CaSO}_4 \cdot 1/2 \text{H}_2\text{O}$.

Informative reference: For the aggregate of preproportioned plaster, river sand, quartz sand, crushed sand, vermiculite, pearlite, calcium carbonate, etc. are used.

2

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3 Classification The classification of gypsum plasters shall be as shown in Table 1.

Table 1 Classification

Class	Use
Plasters proportioned at work site	For first coating
Preproportioned plasters	For first coating
	For finish coating

4 Quality The quality of gypsum plasters shall be as follows:

(1) The quality of gypsum plasters shall conform to the requirements in Table 2.

Table 2 Quality

Item		Classification		
		Plaster proportioned at work site	Preproportioned plaster	
		For first coating	For first coating	For finish coating
Fineness of grinding %	850 μm remainder	10 max.	20 max.	10 max.
	106 μm remainder ⁽¹⁾	70 max.	60 max.	60 max.
Bending strength	N/mm ² {kgf/mm ² }	1.0 {0.10} min.	0.7 {0.07} min.	0.5 {0.05} min.
Compressive strength	N/mm ² {kgf/mm ² }	3.0 {0.31} min.	1.8 {0.18} min.	1.5 {0.15} min.
Hardness	N/mm ² {kgf/mm ² }	—	—	8.0 {0.82} min.
Water of crystallization content	%	4.0 min.	—	—

Note ⁽¹⁾ Powder passing through 850 μm sieve and remaining on 106 μm sieve.

(2) The following quality shall be specified when necessary.

- (a) Clinked gypsum content The clinked gypsum content shall be as shown in Annex 1.
- (b) Setting time The setting time shall be as shown in Annex 2.
- (c) Bulk density The bulk density which depends on the agreement between the interested parties shall be determined in accordance with the method specified in Annex 3.

5 Test

5.1 Test portion The test portion shall be sampled in accordance with the reasonable method and put in a glass bottle or other container so as to conserve without absorbing humidity and carbon dioxide.

5.2 Proportioning and setting of test sample The preparation and setting of test portion shall be carried out in accordance with the following procedure:

- (1) Take the test portion in a container of 1 l at the proportion given in Table 3, mix up sufficiently, add an appropriate amount of water and stir up for about three minutes. In

stirring, use a wooden or plastic rod of some 20 mm in diameter and with semispherical end and conduct uniformly at a speed of some 120 times per minute. Fill the container with the stirred test portion, flatten the surface, down calmly the rod for measuring consistency (of hollow aluminium weighing 50 g) of Vicat needle apparatus specified in **JIS R 5201** and shown in Attached Fig. 1 on approximately middle place and measure the depth of the penetration of needle. Take the depth of penetration of needle coming to the values given in Table 3 as the standard consistency and take the ratio of the mass of water to the gypsum plaster at that time as the standard mixing water ratio.

- (2) Put the test portion of standard consistency in a measuring container, flatten the surface, down calmly the standard needle for initial setting of Vicat needle apparatus specified in **JIS R 5201** and make the time when the tip of the needle stops at the point about 3 mm distant from the bottom of container the initial setting.

After passing an appropriate time since the initial setting, down calmly the needle again and make the time when the tip of the needle stops at the point about 3 mm deep from the surface of test portion the final setting.

Table 3 Proportioning and standard consistency

Classification		Proportion g		Total mass of downing portion g	Standard consistency (depth of penetration of needle mm)
		Plaster	Sand ⁽²⁾		
Plaster proportioned at work site	For first coating	100	200	150 ⁽³⁾	10 ± 1
Preproportioned plaster	For first coating	300	—		
	For finish coating	300	—	50	

Notes ⁽²⁾ Sand to be used shall be the standard sand specified in **JIS R 5201**.

⁽³⁾ Put a weight of 100 g on the rod for measuring consistency (50 g).

5.3 Standard condition The standard condition of the test room shall be the temperature: 20 °C ± 2 °C, relative humidity: (65 ± 5) % and atmospheric pressure: 86 kPa to 106 kPa.

5.4 Conversion of numerical values When converting the values measured by meters or measuring machines of the indication based on the traditional units to the numerical values based on the International System of units (SI) shall be in accordance with the following equation:

$$1 \text{ kgf} = 9.80 \text{ N}$$

5.5 Test on fineness of grinding The fineness of grinding shall be determined by the following procedure using the sieves of nominal dimensions of 850 µm and 106 µm specified in **JIS Z 8801**.

- (1) Dry the test portion of some 210 g at 40 °C ± 4 °C until coming to constant mass ⁽⁴⁾ and cool in a desiccator. Weigh two sets of test portion of some 100 g from it to the nearest 0.1 g and screen each of them using a sieve of 850 µm in accordance with the following procedure:

Hold the sieve in one hand, slightly tilted, and shake it at a rate of some 120 times per minute. Shake it, allowing it to strike the other hand on each movement so that the

plaster always spreads out evenly. Approximately every 30 movements turn the sieve through 90°, give a few sharp taps against the side and recommence the shaking.

Consider the sieving is finished when, between two weighings carried out at intervals of 1 min, the mass of plaster passing does not exceed 0.4 g, and weigh the residue on the 850 µm sieve in each case of two sets of test portion to the nearest 0.1 g and express their arithmetical mean as a rate to the weight of test portion.

- (2) Next sieve two sets of the test portion which have already passed the 850 µm sieve on the 106 µm sieve, proceeding as in (1).

During the sieving, the sieve may, from time to time, be tapped against a solid base and the sieve blocked may be brushed to free holes.

Consider the sieving is finished when, between two weighings carried out at an interval of 1 min, the mass of plaster passing does not exceed 0.1 g, weigh the residue on the 106 µm sieve in each case of two sets of test portion to the nearest 0.1 g ⁽⁵⁾ and express their arithmetical mean as a rate to the weight of test portion.

Notes ⁽⁴⁾ The mass is regarded as constant when the difference between the result of two successive weighings, separated by 1 h of drying, does not exceed 0.2 g.

⁽⁵⁾ The difference between this value and the value obtained by subtracting the residue on the 850 µm sieve and the amount passing the 106 µm sieve from the initial weight of test portion shall not exceed 1 %.

Remarks 1 In sieving, mechanical sieve may be used, but the final sieving shall be carried out by manual sieving.

- 2 Clause 4 of Annex 3 may apply in place of (1) to (2). In this case, in place of Note ⁽¹⁾ in 4 (1), the sum total of each mean value of the residues on the sieves of 400 µm, 200 µm and 100 µm obtained in 4.2 of Annex 3 shall be expressed with the rate to the initial mass of the test portion (100 g).

5.6 Bending strength test The bending strength test shall be carried out in accordance with the following procedure :

- (1) The test sample measuring 40 mm × 40 mm × 160 mm shall be used. The test portion shall be stirred up at the rate of portioning in 5.2 and poured in the die for forming mortar specimen specified in JIS R 5201. In this case, the test portion shall be formed by suitably tamping so as to prevent arising of so many cavities on the test sample. Three test samples shall be prepared.

The test samples shall be allowed to stand calmly in the room for three hours or more after the setting shown in 5.2, dried at 40 °C ± 4 °C in a desiccator and tested when the mass variation of each test sample does not exceed 0.2 g in six hours, recognizing as being in the constant weight dry condition.

- (2) Testing machine shall, as shown in Attached Fig. 2, consist of two supporting rollers of 10 mm in diameter put at interval of 100 mm ± 1 mm, a load applying roller of 10 mm in diameter ⁽⁶⁾ and a load cell to which these rollers are attachable and capable of measuring the load with precision of 1 % in a scale range of $\frac{4}{5}$ from the maximum value of the scale.