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Interchangeable spherical ground
glass joints

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Interchangeable spherical ground glass joints

Introduction This Standard is Japanese Industrial Standard made on the basis of ISO 641, *Laboratory glassware — Interchangeable spherical ground joints* published as the first edition in 1975. In the body of this Standard, the content specified in the former Standard is described, and in Annexes, the corresponding technical content of the International Standard is specified without any technical modification.

1 Scope This Japanese Industrial Standard specifies interchangeable spherical ground joints of glass apparatus for chemical analysis (hereafter, referred to as “interchangeable spherical ground joints”).

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

- | | |
|------------|---|
| JIS B 0601 | <i>Surface roughness — Definitions and designation</i> |
| JIS B 0651 | <i>Surface texture — Instruments for the assessment of surface texture — Profile method</i> |
| JIS B 1501 | <i>Steel balls for ball bearings</i> |
| JIS B 7502 | <i>Micrometer callipers</i> |
| JIS B 7507 | <i>Vernier, dial and digital callipers</i> |
| JIS R 3503 | <i>Glass apparatus for chemical analysis</i> |
- 2 The corresponding International Standard to this Standard is as follows.
- ISO 641:1975 *Laboratory glassware — Interchangeable spherical ground joints*

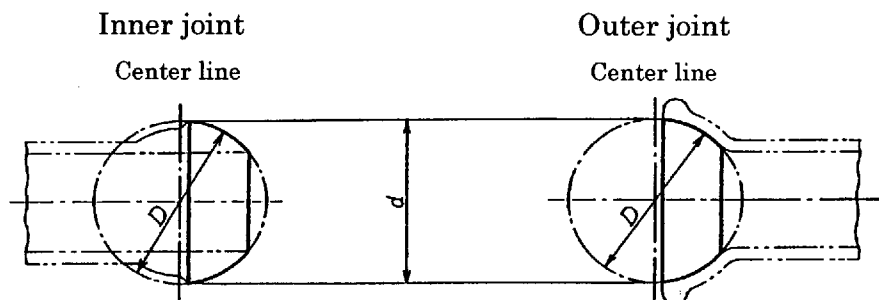
2 Quality The quality of interchangeable spherical ground joints shall be as specified in JIS R 3503.

3 Airtightness For the airtightness of interchangeable spherical ground joints, when subjected to the test of 6.4, increase in pressure due to leakage shall not exceed the following numerical value in one min.

S7 to S13 0.93 kPa, that of S19 or higher 1.99 kPa

4 Surface roughness The surface roughness of the spherical part of interchangeable spherical ground joints shall not exceed $1\text{ }\mu\text{m}$ as arithmetic average roughness (R_a) determined in 2(1) of JIS B 0601 and should preferably be under $0.5\text{ }\mu\text{m}$.

5 Symbol, shape and dimensions The symbol, shape and dimensions of interchangeable spherical ground joints shall be as given in Table 1.

Table 1 Symbol, shape and dimensions of interchangeable spherical ground joints

Unit : mm

Symbol of inter-changeable spherical ground joints		S7	S13	S19	S29	S35	S41	S51	S64	S76	S102
Spherical dimensions of inter-changeable spherical ground joints	Diameter D	7.144	12.700	19.050	28.575	34.925	41.275	50.800	63.500	76.200	101.600
	Tolerance of diameter	Inner joint	0 -0.025	0 -0.025	0 -0.025	0 -0.025	0 -0.025	0 -0.025	0 -0.035	0 -0.040	0 -0.050
		Outer joint	+0.025 0	+0.025 0	+0.025 0	+0.025 0	+0.025 0	+0.025 0	+0.035 0	+0.040 0	+0.050 0
	Major diameter of ground zone d	6.9	12.5	18.7	28.0	34.3	40.5	50.0	62.5	75.0	100.0

Remarks 1 The diameter of the spherical surface of interchangeable spherical ground joints is corresponding to **JIS B 1501**.

2 Dimensions without tolerance in the Table indicate standard dimensions.

6 Tests

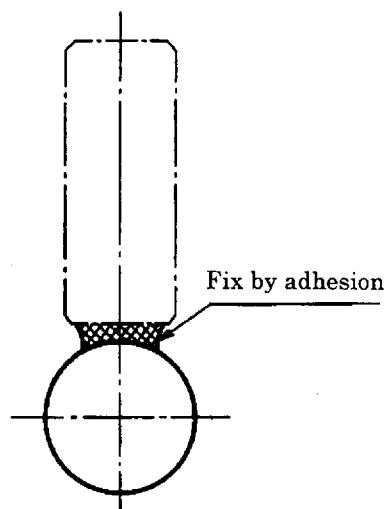
6.1 Measurement of dimensions The dimensions of interchangeable spherical ground joints shall be measured by using the micrometer callipers specified in **JIS B 7502**, the vernier calliper specified in **JIS B 7507** or measuring instruments equivalent in performance thereto.

6.2 Spherical surface test A spherical surface test shall be carried out as follows.

- (1) For a spherical surface test of outer joint, use the master gauge given in **Table 2**, fit it to the outer joint of an interchangeable spherical ground joint, and examine the presence of play.
- (2) For a spherical surface test of inner joint, use the outer joint which has conformed to the test of (1) as a gauge, fit it to the inner joint of the interchangeable spherical ground joint, and examine the presence of play.

Table 2 Shape and dimensions of master gauge

Unit : mm



Remarks : The master gauge shall be made of steel which is little in abrasion and distortion, or material equivalent in quality thereto.

Nominal	Symbol	Diameter of spherical surface D	Sphericity (Max.)
$\frac{9}{32}$	S7	7.143 8	0.000 4
$\frac{1}{2}$	S13	12.700 0	
$\frac{3}{4}$	S19	19.050 0	
$1\frac{1}{8}$	S29	28.575 0	0.000 5
$1\frac{3}{8}$	S35	34.925 0	
$1\frac{5}{8}$	S41	41.275 0	0.001 1
2	S51	50.800 0	
$2\frac{1}{2}$	S64	63.500 0	0.001 5
3	S76	76.200 0	
4	S102	101.600 0	0.002 5

Remarks : The nominals of Table 2 are as specified in JIS B 1501.

6.3 Linear expansion coefficient and alkali elution amount The tests for linear expansion coefficient and alkali elution amount shall be as specified in JIS R 3503.

6.4 Airtightness test An airtightness test shall be carried out as follows.

- (1) **Apparatus** The apparatus shall be assembled as given in Fig. 1, and joint parts excepting the cock and the test product shall be coated with grease.
- (2) **Procedure** Prior to the test, carry out the airtightness test of the apparatus itself. For the airtightness test of the apparatus, firstly put 400 g to 500 g mercury of reagent into a mercury tank ⑰. Connect airtightly an exhaust pipe ⑪ to a vacuum pump by a vacuum rubber tube. Close a switch cock ⑨ and an exhaust cock ⑩, and open a cock ⑬. After starting the pump, open the exhaust cock ⑩. Reduce pressure in the apparatus gradually, make a vacuum state, and raise mercury in a mercury tank ⑰ to a manometer ⑫. When a height of the mercury column reaches about 760 mm, close the exhaust cock ⑩, and stop functioning of the pump. Allow it to stand for about 10 min. When there is no drop of the mercury column, regard the airtightness test as excellent. After end of the test, open slightly the switch cock ⑨, and make the inside of the apparatus atmospheric pressure.

For a spherical ground joint test, at first wipe the spherical part of an interchangeable spherical ground joint of a test product with a cloth soaked in a suitable solvent (for example, cyclohexane). Thereafter, dip it into the solvent, and dry.

Remove a particle stuck to the surface by using a soft brush. Then, detach a test product setting joint (inner joint) ⑤ from the apparatus, assemble a spherical