SLOVENSKI STANDARD
SIST ISO 641:1995

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Laboratorijska steklovina - Medsebojno zamenljivi kroglasto brušeni spoji

Laboratory glassware -- Interchangeable spherical ground joints

Verrerie de laboratoire -- Assemblages sphériques rodés interchangeables

Ta slovenski standard je istoveten z: **ISO 641:1975**

ICS:

71.040.20	Laboratorijska posoda in aparati	Laboratory ware and related apparatus

SIST ISO 641:1995 **en**

INTERNATIONAL STANDARD 641

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Laboratory glassware — Interchangeable spherical ground joints

Verrerie de laboratoire — Assemblages sphériques rodés interchangeables

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 48 has reviewed ISO Recommendation R 641 and found it technically suitable for transformation. International Standard ISO 641 therefore replaces ISO Recommendation R 641-1968 to which it is technically identical.

ISO Recommendation R 641 was approved by the Member Bodies of the following countries :

Australia	Greece	Poland
Austria	Hungary	South Africa, Rep. of
Belgium	India	Spain
Brazil	Ireland	Switzerland
Canada	Israel	Turkey
Chile	Italy	United Kingdom
Colombia	Japan	U.S.A.
Czechoslovakia	Netherlands	U.S.S.R.
Egypt, Arab Rep. of	New Zealand	Yugoslavia

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

France*

No Member Body disapproved the transformation of ISO/R 641 into an International Standard.

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* Subsequently, this Member Body approved the Recommendation.

Printed in Switzerland

Laboratory glassware — Interchangeable spherical ground joints

0 INTRODUCTION

The purpose of this International Standard is to ensure interchangeability between spherical ground glass joints, irrespective of where they are manufactured.

Limiting dimensions for the ground glass zone and the external diameter of adjacent tubing, which will ensure interchangeability, are given in table 1. The finish of the ground surface is also specified, and this is similar to the finish specified in ISO/R 383, *Interchangeable conical ground glass joints.*

A conventional designation is adopted, which consists of the code letter "S" in conjunction with the approximate spherical diameter of the joint in millimetres. The bore diameter which may be employed with each size of joint is controlled, for the purposes of this International Standard, only by the maximum diameter at the narrow end of the ground zone.

A convenient leakage test, to be carried out on ungreased joints, is described in annex A, but this does not form an integral part of this International Standard. In annex B are listed, for convenience, the size designations of the joints specified in the British and U.S.A. standards which correspond to, or are interchangeable with, the joints listed in this International Standard.

While reference is made in this International Standard only to glass joints, these having come into general use, it is not thereby intended to exclude the development of joints made of other materials, which should be manufactured to the same dimensions.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the essential geometric requirements for interchangeability in relation to a series of ground glass joints for laboratory use.

2 NOMINAL SPHERICAL GROUND JOINT DIAMETER

The diameter of the ground spherical zone shall be in accordance with the dimensions specified in table 1, columns 2, 3 and 4. These tolerances ensure that the diameter of the inner component (or ball member) is not greater than the nominal diameter and that the diameter of the outer component (or cup member) is not less than the nominal diameter.

3 DIMENSIONS

The diameter at the wide end of the ground zone shall not be less than the corresponding dimension given in table 1, column 5, and the diameter at the narrow end of the ground zone shall not be greater than the corresponding dimension given in table 1, column 6. The relationship of the dimensions is illustrated in figure 1.

4 DIAMETER OF TUBING

The external diameter of tubing adjacent to the joint shall not exceed the dimensions given in table 1, column 7.

NOTE — It is important to limit the external diameter of the tubing in order to facilitate interchangeability of clamps.

5 SURFACE FINISH

The R_a value[1] of the ground surface shall not exceed 1 μm and should preferably be less than 0,5 μm.

6 TESTING OF INNER AND OUTER COMPONENTS (BALL AND CUP) OF SPHERICAL JOINTS

For checking for compliance with the dimensional tolerances, normal engineering techniques (including pneumatic or radius gauges) shall be used.

The degree of cleanliness of the ground surfaces is a vital factor affecting the rate of leakage. First rub the components with a cloth soaked in a suitable solvent, for example cyclohexane, then dip in the solvent and allow to dry. Remove any particles adhering to the surfaces, using a camel's-hair brush. Then place the components in turn in a vertical position in the apparatus and evacuate the system. No pressure, other than that exerted by the atmosphere, shall be applied to the joint.

When the mercury gauge reading is above a value preselected by the operator, close the stopcock and note the scale reading. After a further 1 min or more, note the scale reading again.

1) See ISO/R 468, *Surface roughness.*

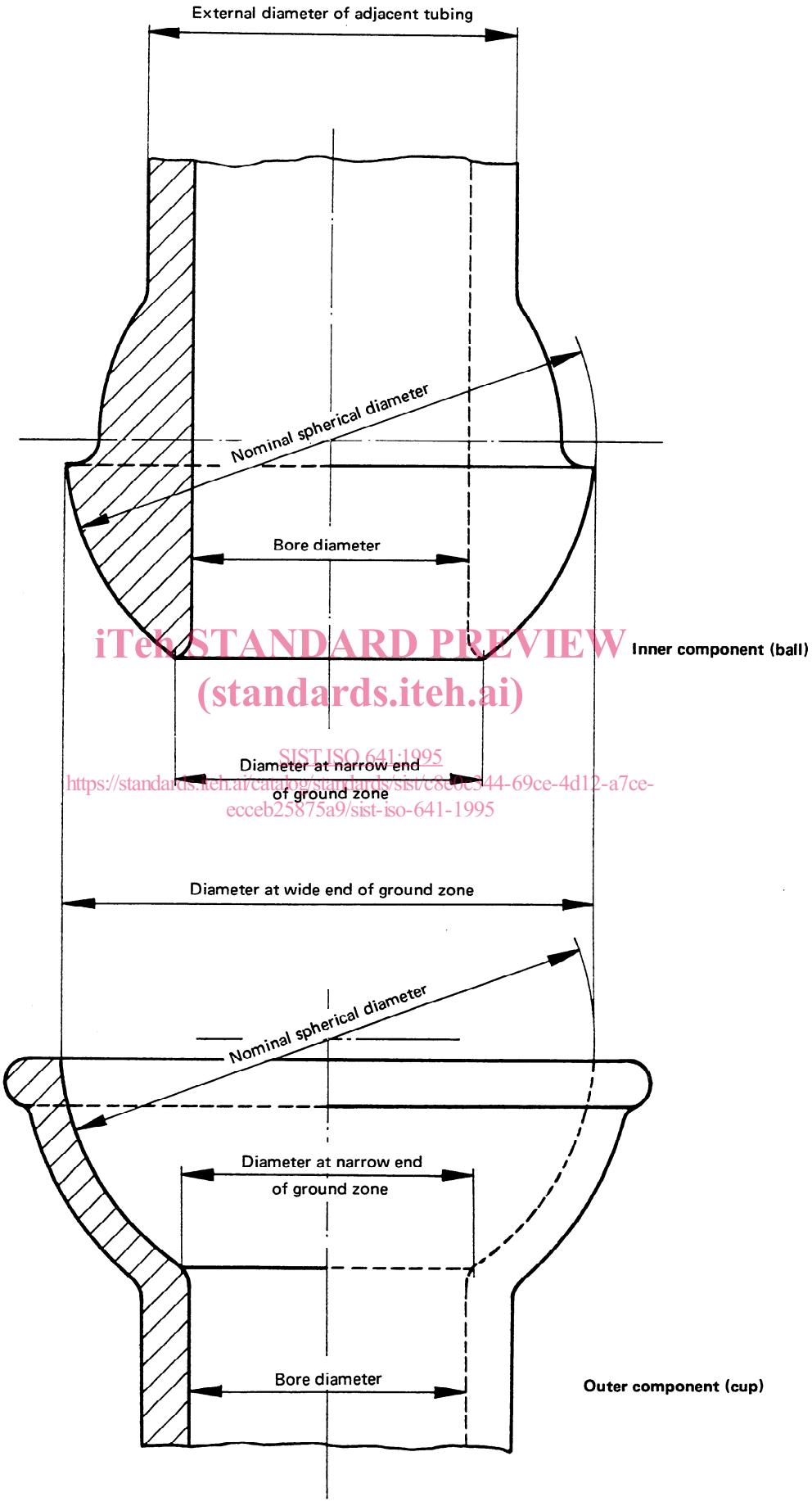

FIGURE 1 — **Dimensions of spherical joints**

TABLE 1 — **Dimensions and tolerances of spherical ground joints**

Dimensions in millimetres

1	2	3	4	5	6	7
Size designation	Spherical diameter			Minimum diameter at wide end of ground zone	Maximum diameter at narrow end of ground zone	Maximum external diameter of adjacent tubing
	Nominal dimension	Tolerance on inner component (ball)	Tolerance on outer component (cup)			
S7	7,144	$^{0}_{-0,025}$	$^{+0,025}_{0}$	6,9	2,0	4,5
S13	12,700	$^{0}_{-0,025}$	$^{+0,025}_{0}$	12,5	7,0	9
S19	19,050	$^{0}_{-0,025}$	$^{+0,025}_{0}$	18,7	12,5	14
S29	28,575	$^{0}_{-0,025}$	$^{+0,025}_{0}$	28,0	19,0	22
S35	34,925	$^{0}_{-0,025}$	$^{+0,025}_{0}$	34,3	27,5	30
S41	41,275	$^{0}_{-0,025}$	$^{+0,025}_{0}$	40,5	30,0	34
S51	50,800	$^{0}_{-0,025}$	$^{+0,025}_{0}$	50,0	36,0	43
S64	63,500	$^{0}_{-0,035}$	$^{+0,035}_{0}$	62,5	47,0	53
S76	76,200	$^{0}_{-0,040}$	$^{+0,040}_{0}$	75,0	58,0	64
S102	101,600	$^{0}_{-0,050}$	$^{+0,050}_{0}$	100,0	84,0	85

Having equalized the pressures inside and outside the system, turn the component on its axis through 90° and then repeat the test.

Express the results as the increase in pressure in the system in pascals per minute, averaged over the time interval between the two readings.

For routine production testing, it is satisfactory to take the first reading immediately after closing the stopcock and the second testing 1 min later. For comparative laboratory tests, take the first reading 30 s after closing the stopcock and the second reading after a further interval of 2 min.

Cup members may conveniently be tested by this method in conjunction with gauging balls (for example of steel) of the dimensions shown in table 2.

Ball members may also be tested by this method, using a two-stage procedure in which the cup members are first tested against steel balls and then the ball members are tested against cup members known to be satisfactory.

For joints complying with the tolerances in table 1, practical experience shows that the following figures for leakage should not be exceeded :

— for sizes S13 and smaller : an increase in pressure of 930 Pa per minute;

— for sizes S19 and larger : an increase in pressure of 2 kPa per minute.

TABLE 2 — **Diameters of gauging balls for testing cups**

Size designation of cup	Spherical diameter of steel ball	
	nominal dimension	tolerance
	mm	mm
S7	7,144	$^{+0,003}_{0}$
S13	12,700	$^{+0,005}_{0}$
S19	19,050	$^{+0,005}_{0}$
S29	28,575	$^{+0,008}_{0}$
S35	34,925	$^{+0,008}_{0}$
S41	41,275	$^{+0,008}_{0}$
S51	50,800	$^{+0,008}_{0}$
S64	63,500	$^{+0,010}_{0}$
S76	76,200	$^{+0,013}_{0}$
S102	101,600	$^{+0,015}_{0}$

ANNEX A

LEAKAGE TEST FOR SPHERICAL JOINTS

The leakage test is carried out on dry joints by observing the rate of increase in pressure in a previously evacuated system in communication with the atmosphere via the leaking joint. A suitable apparatus is illustrated in figure 2, the details not being essential provided that the total capacity of the system is approximately 1,5 l. It is essential to render all joints in the testing apparatus leak-proof and to check the apparatus before coupling in the joint to be tested. Any leakage found during checking must be negligible in comparison with the leakage measured during the test.

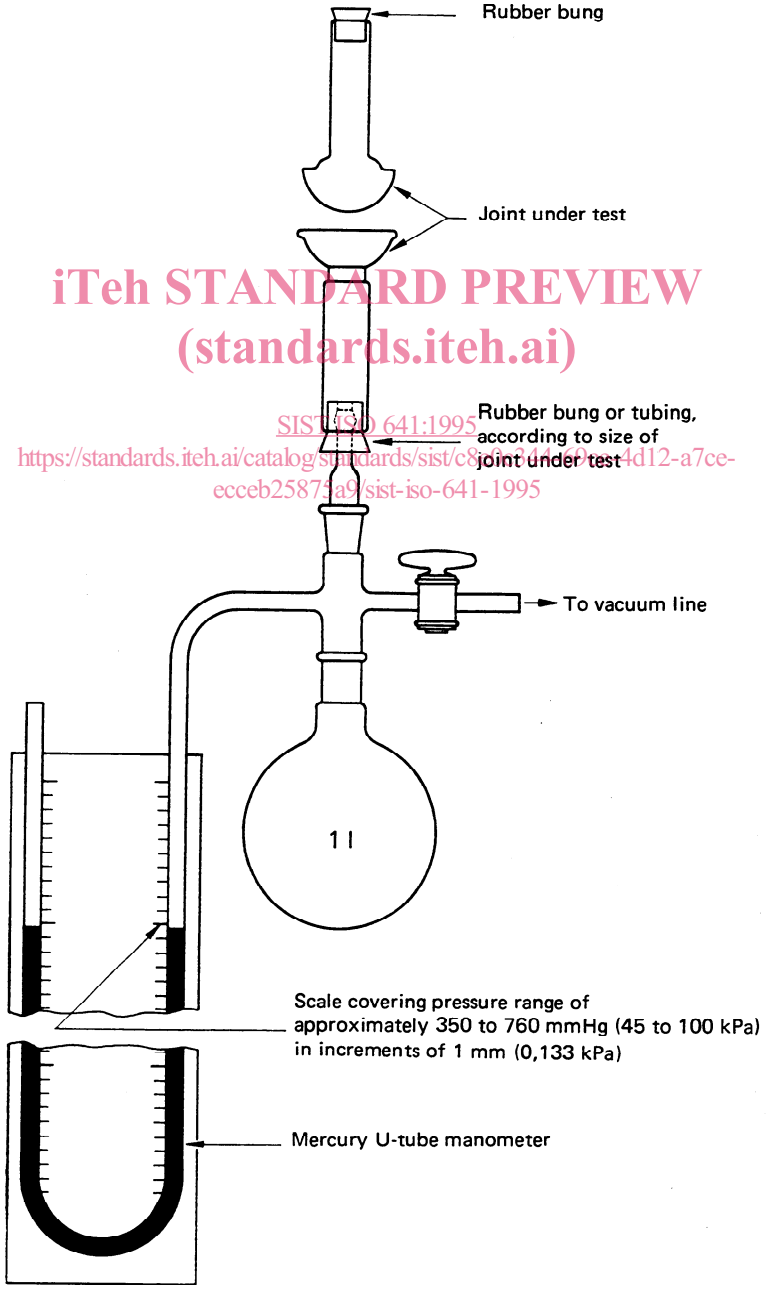

FIGURE 2 – **Suitable apparatus for leakage test on spherical joints**