



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS A 5207 : 2022

(JSEIA/JSA)

Sanitary wares

ICS 91.140.70 ; 97.020

Reference number : JIS A 5207 : 2022 (E)

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A 5207 : 2022

Date of Establishment: 1953-10-02

Date of Revision: 2022-08-22

Date of Public Notice in Official Gazette: 2022-08-22

Investigated by: Japanese Industrial Standards Committee
Standards Board for ISO area
Technical Committee on Architecture

JIS A 5207 : 2022, First English edition published in 2023-01

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

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Printed in Japan

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Sanitary Equipment Industry Association (JSEIA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS A 5207** : 2019), which has been technically revised.

However, **JIS A 5207** : 2019 may be applied in the **JIS** mark certification based on the relevant provisions of Article 30, paragraph (1), etc. of the Industrial Standardization Act until 21 August 2023.

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Sanitary wares

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 31600** : 2022, Edition 1, with some modifications of the technical contents to reflect the local conditions in Japan.

Of the eight products specified in the said corresponding International Standard, this Standard covers water closets and urinals, and additionally covers requirements for face basins, hand basins and service sinks.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JE. The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex JF.

Requirements for fittings for sanitary ware are given in Annex JA, those for water closets and water supply devices, in Annex JB, those for Japanese-style water closets, in Annex JC, and consideration regarding discharge characteristics of water closets, in Annex JD.

1 Scope

This Standard specifies requirements for water closets, urinals, face basins, hand basins, and service sinks (hereafter referred to as the wares).

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 31600 : 2022 *Water efficiency labelling programmes — Requirements with guidance for implementation* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

- | | |
|------------|--|
| JIS K 6251 | <i>Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties</i> |
| JIS K 8150 | <i>Sodium chloride (Reagent)</i> |
| JIS K 8180 | <i>Hydrochloric acid (Reagent)</i> |

JIS K 8576	<i>Sodium hydroxide (Reagent)</i>
JIS P 3801	<i>Filter paper (for chemical analysis)</i>
JIS P 4501	<i>Toilet tissue papers</i>
JIS S 6006	<i>Pencils, coloured pencils and leads for them</i>
JIS Z 8722	<i>Methods of colour measurement — Reflecting and transmitting objects</i>

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1

trap

structure having an internal water-seal that prevents odorous air and sanitary insects from rising through the drain pipe and into the room through the drain outlet, as well as to prevent adhesion or sedimentation of waste contained in the sewage while not disturbing the drainage flow (see Figures 5 and 8)

3.2 Flushing system

3.2.1

gravity flush tank system

water supply system of a water closet that uses a tank to store waste flushing water and supply the water by gravity (see Figure JB.1)

3.2.2

flushometer valve system

water supply system of a water closet or a urinal that uses a flushometer valve to supply water by means of the public water supply pressure (see Figures JB.2 and JB.5)

3.2.3

built-in flushing device system

water supply system of a water closet or a urinal that uses a built-in water supply unit to supply water by means of the public water supply pressure or a booster (see Figures JB.3 and JB.6)

Note 1 to entry Water closets of this type are provided with an internal vacuum breaker.

Note 2 to entry A vacuum breaker is a device which, in the occurrence of negative pressure in the water supply pipe, automatically sucks in air to prevent the water discharged from or used in water-using equipment from being siphoned back into the water supply system.

3.3 Flush volume

3.3.1

flush volume of water closet

volume of water used in one full flush operation (action) of the water closet

3.3.2

flush volume of urinal

volume of water used in one flush operation (action) of the urinal

Note 1 to entry The flush volume does not include the volume of water used for pre-use wetting of the urinal bowl and for drain line protection purposes such as restraining urinary stone adhesion in the drain line.

3.4

manufacturer's nominal flush volume

flush volume of the water closet or the urinal indicated in a catalogue or other documents issued by the manufacturer

Note 1 to entry This volume may be stated as a volume range (minimum and maximum values) in the case of a urinal having a flushing system that automatically regulates the flush volume according to the user's frequency of use.

3.5

water closet with an adjustable roughing-in part

water closet that includes adjustable parts for roughing-in to replace the existing water closet in the installation place (see Figure JB.8)

3.6

water closet with mechanical evacuation

water closet equipped with a mechanism that moves a trap unit to evacuate wastes (see Figure JB.9)

3.7

hold type

type of flush operation that allows water to flow continuously for as long as the lever is turned or for as long as the button is pressed down

3.8

non-hold type

type of flush operation performed by operating a lever or a button once to allow a pre-determined amount of water to flow regardless of operation time

3.9

low-lip wall-mounted urinal

wall-mounted urinal designed with a low flood level to facilitate use by children (see

Figure 10)

3.10

flood level

lowermost end of the portion from which water overflows

3.11

flushing surface

surface that is flushed over with water and particularly visible during the use of the ware

3.12

condensation-free water closet

water closet condensation-proofed to prevent formation of condensation on the outer surface of the bowl

3.13

full flush

higher-volume flush of a water closet having a switching mechanism between full and reduced flushes

3.14

reduced flush

lower-volume flush of a water closet having a switching mechanism between full and reduced flushes

4 Types and classification

The types of water closets and urinals shall be as per Tables 2 to 4. Types I and II in Tables 2 to 4 correspond to the flush volume classification in Table 1. Type II of water closet and Types I and II of urinals are classified as water saving types.

Examples of water closets and urinals given in Tables 2 to 4 are shown in Annex JB.

Types of face and hand basins and types of service sink are given in Tables 5 and 6, respectively.

NOTE The horizontal bar (–) in the table indicates absence of applicable product.

Table 1 Flush volume classification

Type	Classification ^{a)}	Flush volume (L) ^{a)}
Water closet ^{a)}	Type I	8.5 or less
	Type II	6.5 or less
Urinal ^{b)}	Type I	4.0 or less
	Type II	2.0 or less
Note ^{a)} The flush volume of a water closet shall satisfy the value for the applicable type within the specified tolerance when tested as per 5.1.7. Note ^{b)} The flush volume of a built-in flushing device system urinal shall satisfy the value for the applicable type when tested as per 5.2.6. The classification of a flushometer valve system urinal shall be determined by the manufacturer's nominal flush volume. Note ^{c)} <u>The corresponding International Standard leaves the classification and the flush volume to the national standard or regulations of the country of intended installation.</u>		

Table 2 Types of water closets (Part 1)

Type	Name of type ^{a)}			Code ^{a)}		Drawing No.		
	Flushing system	Installation mode	Drain	Type I	Type II	Flushing system	Installation mode	
Water closet	Gravity flush tank	Floor-mounted	Floor drain outlet	C1200R	C1200S	See Figure JB.1.	See Figure JB.4.	
			Wall drain outlet	C1201R	C1201S			
		Wall-mounted	Wall drain outlet	—	—			
	Flushometer valve	Floor-mounted	Floor drain outlet	C710R	C710S	See Figure JB.2.		
			Wall drain outlet	C730R	C730S			
		Wall-mounted	Wall drain outlet	C1810R	C1610S			
	Built-in flushing device	Floor-mounted	Floor drain outlet	—	C810S (C810SM)	See Figure JB.3.		
			Wall drain outlet	—	C830S (C830SM)			
		Wall-mounted	Wall drain outlet	—	C1630S			
NOTE The letter M in the codes stands for “water closet with mechanical evacuation”. <u>Note ^{a)} The corresponding International Standard leaves the names of types and codes to the national standard or regulations of the country of intended installation.</u>								

Table 3 Types of water closets (Part 2)

Type	Name of type ^{a)}	Code ^{a)}		Drawing No.
		Type I	Type II	
Water closet	Childrens'	—	C760S	See Figure JB.10.
	Raised height	C1111R	C1111S	See Figure JB.11.
Note ^{a)} The corresponding International Standard leaves the names of types and codes to the national standard or regulations of the country of intended installation.				

Table 4 Types of urinals

Type	Name of type ^{a)}			Code ^{a)}		Drawing No.	
	Flushing system	Installation mode	Size	Type I	Type II	Flushing system	Installation mode
Urinal	Flush-ometer valve	Floor-mounted	Large	U510	—	See Figure JB.5.	See Figure JB.7.
			Small	U511	—		
		Wall-mounted	Large	U520	—		
			Small	U521	—		
	Built-in flushing device	Floor-mounted	Large	—	U610	See Figure JB.6.	
			Small	—	—		
		Wall-mounted	Large	—	U620		
			Small	—	—		
Note ^{a)} The corresponding International Standard leaves the names of types and codes to the national standard or regulations of the country of intended installation.							

Table 5 Types of face basins and hand basins

Type	Name of type		Code	Drawing No.
	Purpose	Size		
Face basin	General	Large	L410	Figure 14
		Small	L420	
	For the disabled (mainly for wheelchair users)	—	L511	Figure 15
Hand basin	—	—	L710	Figure 14

Table 6 Type of service sink

Type	Name of type	Code	Drawing No.
Service sink	—	S210	Figure 17

5 Performance

5.1 Performance of water closets

The performance requirements of water closets shall be as follows.

The specific requirements for Japanese-style water closets are given in Annex JC.

5.1.1 Surface wash

When the test as per 8.2.1.1 is performed, no trace of ink shall remain on the flushing surface.

5.1.2 Media discharge

When tested as per 8.2.1.2, the media discharge performance of the water closet shall be as follows.

- a) **Ball-passing performance** When tested as per 8.2.1.2 d) 1), the water closet shall be capable of passing a ball completely through the drainage channel.
- b) **Full-flush media discharge** When tested as per 8.2.1.2 d) 2), the water closet shall evacuate medium A as per 8.2.1.2 b) 1) completely out of the bowl and shall evacuate 85 or more medium B balls per 8.2.1.2 b) 2) out of the bowl.
- c) **Reduced-flush media discharge** When tested as per 8.2.1.2 d) 3), the gravity flush tank system or built-in flushing device system water closet shall evacuate medium C per 8.2.1.2 b) 3) completely out of the bowl.
- d) **Reduced-flush trap seal replacement** When tested as per 8.2.1.2 d) 4), the gravity flush tank system or built-in flushing device system water closet shall have a trap seal replacement ratio of 95 % or more.

5.1.3 Trap seal restoration

The trap seal depth as shown in Figure 5, measured with the trap filled with water, shall be not less than 50 mm. Water closets with mechanical evacuation shall additionally meet the following requirements:

- a) **Endurance performance** When the water closet is tested as per 8.2.1.3 a) 1), the trap seal depth shall be 50 mm or more. In addition, the water closet shall operate in the same way as it did in the initial operation.
- b) **Deterioration resistance** When tested as per 8.2.1.3 a) 2), the water closet shall operate in the same way as it did in the initial operation.
- c) **Acid resistance** When the test per 8.2.1.3 a) 3) is performed using a rubber specimen, the change in reference length of the dumbbell-shaped specimen shall be 30 % or less. When tested using rubber test parts, the water closet shall operate in the same way as it did in the initial operation.
- d) **Alkali resistance** When the test per 8.2.1.3 a) 4) is performed using a rubber specimen, the change in reference length of the dumbbell-shaped specimen shall be 30 % or less. When tested using rubber test parts, the water closet shall operate in the same way as it did in the initial operation.
- e) **Emergency readiness** The water closet shall be equipped with a mechanism that always returns the movable trap back to a prescribed position when a power failure occurs.

5.1.4 Water leakage resistance

When tested as per 8.2.1.4, the water closet shall be free from water leakage.

5.1.5 Air leakage resistance

When tested as per 8.2.1.5, the water closet shall be free from air leakage. If built to allow visual access to the test point per 8.2.1.5, the water closet shall be free from discontinuities that let out air when visually checked for air leakage.

5.1.6 Condensation prevention performance

When tested as per 8.2.1.6, the condensation-free water closet shall be free from condensation that drips on the floor.

5.1.7 Flush volume

When measured as per 8.2.1.7, the flush volume of Type I or Type II water closet in one flush operation shall satisfy the following as well as Table 1.

- a) For Type I, the permitted deviation from the manufacturer's nominal flush volume is +0.5 L or -1.0 L.
- b) For Type II, the permitted deviation from the manufacturer's nominal flush volume is ± 0.5 L.

NOTE..... For discharge characteristics of water closet, see Annex JD.

5.1.8 Structural integrity of wall-mounted water closet

When tested as per 8.2.1.8, the wall-mounted water closet shall remain undamaged.

5.2 Performance of urinals

5.2.1 Surface wash

When the test as per 8.2.2.1 is performed, no trace of ink shall remain on the flushing surface.

5.2.2 Media discharge

When tested as per 8.2.2.2, the urinal shall be capable of passing a ball completely through its drainage channel.

5.2.3 Trap seal restoration

The trap seal depth as shown in Figure 8 shall be not less than 50 mm.

5.2.4 Water leakage resistance

When tested as per 8.2.2.3, the urinal shall be free from water leakage.

5.2.5 Air leakage resistance

When tested as per 8.2.2.4, the urinal shall be free from air leakage. If built to allow visual access to the test point per 8.2.2.4, the urinal shall be free from discontinuities that let out air when visually checked for air leakage.

5.2.6 Flush volume

When measured as per 8.2.2.5, the flush volume of the urinal in one flushing operation (action) shall meet the requirement in Table 1.

5.3 Performance of face and hand basins (structural integrity of face and hand basins)

When tested as per 8.2.3, the face or hand basin shall remain undamaged.

6 Shapes and dimensions

6.1 Shapes and dimensions

The shapes and dimensions of water closets and urinals shall be as per Figures 1 to 10, and shapes and dimensions of face basins, hand basins and service sinks shall be as per Figures 11 to 17.

In the figures, the dimensions indicated in rectangular enclosures are critical dimensions, and other dimensions are recommended dimensions.

The critical dimensions shall be strictly complied with, including the dimensional tolerances for wares, to ensure proper connection and performance; the recommended dimensions should be adopted wherever possible to promote standardization and simplification.

See Annex JA for the details of fittings to be mounted on the supply water inlet and drain outlet of wares.

6.2 Dimensional tolerances

The wares shall satisfy the following dimensional tolerances, except where other dimensional tolerances are indicated in Figures 1 to 10 in the case of water closets and urinals, and in Figures 11 to 17 in the case of face basins, hand basins and service sinks :

- ± 2 mm for any dimension less than 40 mm;
- ± 5 % for any dimension 40 mm or greater. Fractions less than 1 mm shall be rounded up, and the maximum tolerance shall be ± 25 mm.

7 Materials

7.1 Types of materials

The types of materials used for water closets and urinals shown in Tables 2 to 4, and those used for face basins, hand basins and service sinks shown in Tables 5 and 6 shall be as per the following :

- a) Water closet body : Ceramic or resin
- b) Urinals, face basins, hand basins, and service sinks : Ceramic

7.2 Quality of ceramic

7.2.1 Appearance of flushing surface and visible surface after installation¹⁾

The tolerances on defects in ceramics as checked by visual observation, boundary sample, etc., shall be as per Table 7.

The surface treatment (matte finish, etc.) intentionally applied by the manufacturer

to the ceramic for decorative or design purposes shall not be deemed as defects.

Note ¹⁾ A surface readily visible after installation when viewed from the front.

Table 7 Tolerances on visual defects

Defect	Description	Requirement
Blisters	hollow raised portions of the glazed surface	None greater than 6 mm in diameter
Discolouration	coloured spots in the glazed surface	
Exposed body	unglazed portions of a fixture	None greater than 1.5 mm in diameter
Crazes	fine cracks in the glazed surface	None
Fire cracks	fine shallow cracks in the body that is not covered with glaze	
Cracks	fractures in the glaze or the body, or fractures in the glaze penetrating to the body	

7.2.2 Ink penetration

When tested as per **8.1.1 a)**, the ceramic specimen shall not be penetrated by ink beyond 3 mm.

7.2.3 Cold impact resistance

When tested as per **8.1.1 b)**, the ceramic specimen shall be free from cracking in the body or the glazing.

7.2.4 Crazing resistance

When tested as per **8.1.1 c)**, the ceramic specimen shall be free from crazing.

7.3 Quality of resin

7.3.1 Mechanical strength

When tested as per **8.1.2 a)**, the resin water closet body shall be free from defects such as fissures, cracks, fractures, or deformation.

7.3.2 Strength durability

When tested as per **8.1.2 b)**, the resin water closet body shall be free from defects such as fissures, cracks, fractures, or deformation.

7.3.3 Stain resistance

When tested as per **8.1.2 c)**, the resin specimen representing the water closet body shall have a cleanliness recovery rate of 85 % or more.

7.3.4 Acid resistance

When tested as per **8.1.2 d)**, the resin specimen representing the water closet body shall be free from fissures, cracks, or other abnormalities and shall be free from residual line marks.

7.3.5 Alkali resistance

When tested as per 8.1.2 e), the resin specimen representing the water closet body shall be free from fissures, cracks, or other abnormalities and shall be free from residual line marks.

8 Test methods

8.1 Material tests

8.1.1 Ceramics

Ceramic materials for water closets, urinals, face basins, hand basins and service sinks shall be tested as follows.

- a) **Ink penetration test** Immerse a dry specimen in a 1 percent (by mass) aqueous solution of eosin Y (hereafter referred to as red ink) for 1 h or longer and then break it to measure the penetration depth of red ink into the body.

The penetration depth into the body is the maximum penetration depth as measured from the surface of fracture exposed to the red ink. The foregoing does not apply to linear penetrations that occur at the centre of the thickness of double-cast parts.

- b) **Cold impact resistance test** Hold a specimen approximately 100 mm × 100 mm in size and 15 mm or less in thickness in a preheated oven for 30 min or longer, and then quench it in water. Immerse the specimen in red ink or apply red ink on the specimen to check for cracking in the body or the glazing.

The difference between the heating temperature and the water temperature shall be 110 °C or more.

- c) **Crazing resistance test** Fix a specimen approximately 100 mm × 100 mm in size and 15 mm or less in thickness in an autoclave avoiding contact with water, and heat while regulating the autoclave so that the inner pressure of the autoclave reaches 1 MPa in about 1 h, and then heat further for 1 h at $1^{+0.1}_0$ MPa. Stop the heating, release steam, and after leaving for 1 h or longer, remove the specimen from the autoclave. Immerse the specimen in red ink or apply red ink on the specimen to check for crazing.

8.1.2 Resin

Resin materials shall be as follows.

- a) **Mechanical strength test** Lift open the lid of the water closet, place a rubber plate 10 mm in thickness and 300 mm in diameter on the seat of the water closet, and place on it a steel plate 5 mm in thickness and 300 mm in diameter. Then, apply a vertical force of 1 500 N to the central part of the closet seat for 10 min. Check the water closet for fissures, cracks, fractures, deformation or other defects.
- b) **Strength durability test** Lift open the lid of the water closet, place a rubber plate 10 mm in thickness and 300 mm in diameter on the seat of the water closet, and place on it a steel plate 5 mm in thickness and 300 mm in diameter. Then, apply a

vertical force of 1 250 N to the central part of the closet seat 100 000 times at the rate of 10 to 20 times per minute. Check the water closet for fissures, cracks, fractures, deformation or other defects.

- c) **Stain resistance test** Use three specimens approximately 100 mm × 100 mm in size. First, determine the diffuse reflectance of Y stimulus values of specimens as specified in **JIS Z 8722** using a colour difference meter. Prepare approximately 1 g of contaminant by mixing white petrolatum and carbon black for pigments (equivalent to HAF class or N330) per Japanese Pharmacopoeia at a mass ratio of 10 to 1 and apply it on a cloth. Using this cloth, rub the contaminant into the specimen surface by using five vertical and five lateral reciprocating motions applying uniform force. Cover the stained portion of the specimen with a watch glass, and leave at ambient temperature for 30 min. After a duration of 30 min, wipe clean the specimen thoroughly using a cloth, and determine the diffuse reflectance. Then determine the cleanliness recovery rate using the formula below, and report the mean value of the results of three specimens.

$$R = \frac{Y_1}{Y_2} \times 100 \dots\dots\dots (1)$$

where, R : cleanliness recovery rate (%)
 Y_1 : diffuse reflectance after staining and cleaning
 Y_2 : diffuse reflectance before staining

- d) **Acid resistance test** Place three filter papers, 30 mm × 30 mm in size and conforming to Class 2 specified in Clause 2 of **JIS P 3801**, on top of one another, on a specimen approximately 100 mm × 100 mm in size. Using a dropping pipette, drop as many drops of 10 percent (by mass) hydrochloric acid solution as necessary to soak the filter papers through. Leave the specimen at ambient temperature for 15 min. After removing the filter papers, rinse the specimen with water and wipe with a dry cloth. Draw several lines on the test face of the specimen with an HB pencil specified in 6.2 of **JIS S 6006** by applying strong pressure, and rub these lines off using a piece of gauze previously soaked in water and squeezed well. Check the specimen for fissures, cracks, or other abnormalities, and residual lines.
- e) **Alkali resistance test** Place three filter papers, 30 mm × 30 mm in size and conforming to Class 2 specified in Clause 2 of **JIS P 3801**, on top of one another, on a specimen approximately 100 mm × 100 mm in size. Using a dropping pipette, drop as many drops of 2 percent (by mass) sodium hydroxide solution as necessary to soak the filter papers through. Leave the specimen at ambient temperature for 15 min. After removing the filter papers, rinse the specimen with water and wipe with a dry cloth. Draw several lines on the test face of the specimen with an HB pencil specified in 6.2 of **JIS S 6006** by applying strong pressure, and rub these lines off using a piece of gauze previously soaked in water and squeezed well. Check the specimen for fissures, cracks, or other abnormalities, and residual lines.

8.2 Performance tests

8.2.1 Performance tests for water closets

The performance tests for water closets shall be as per the following.

The specific test methods for Japanese-style water closets are given in Annex JC.

8.2.1.1 Surface wash test

Shall be as per the following :

a) Test conditions

- 1) **Water closet using a gravity flush tank** Adjust to the manufacturer's specified water level and fully close the stopcock.
- 2) **Water closet using a flushometer valve** With a water supply pressure of 0.1 MPa or less (under flowing conditions), and with the flushometer valve connected to the water closet, adjust to the maximum instantaneous flow rate of 100 L/min or less and to the manufacturer's nominal flush volume.
- 3) **Water closet using a built-in flushing device** With a water supply pressure of 0.1 MPa or less (under flowing conditions), conduct the test at the instantaneous flow rate and flush volume regulated by the ware.

- b) **Test operation** After filling the trap with water, draw an approximately 50 mm wide ink line around the circumference of the flushing surface and approximately 30 mm below the peripheral water ejector. Immediately give a reduced flush, if the water closet is of gravity flush tank system or built-in flushing device system and has full- and reduced-flush options, and give a full flush in the case of other water closets, and check for any trace of ink on the flushing surface.

Use an ink of a colour that is in clear contrast with the colour of the water closet.

8.2.1.2 Media discharge test

Shall be as per the following.

- a) **Test paper** Toilet tissue paper (single ply) specified in **JIS P 4501** or equivalent toilet tissue paper.

b) Test media

- 1) **Medium A** Cut the test paper into slips approximately 760 mm in length, and roll the slips into seven loose balls approximately 50 mm to 75 mm in diameter. Alternatively, similar medium at least equivalent to these in conditions may be used.
- 2) **Medium B** Use 100 resin balls with a diameter of approximately 19 mm and a specific gravity of 0.85 to 0.95. Alternatively, similar medium at least equivalent to these in conditions may be used.
- 3) **Medium C** Cut the test paper into slips approximately 760 mm in length, and roll the slips into three loose balls approximately 50 mm to 75 mm in diameter. Alternatively, similar medium at least equivalent to these in conditions may be used.

c) Test conditions