



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

☞ **JIS K 6792** : 2004
(JPBPA/JPIF/JSA)

**Polybutene (PB) pipes for
water supply**

ICS 23.040.20; 83.140.30; 91.140.60

Reference number : **JIS K 6792 : 2004 (E)**

PROTECTED BY COPYRIGHT



Documents

Document Sharing Hub

188

Foreword

This translation has been made based on the original Japanese Industrial Standard 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 Polybutene Pipe Association (JPBPA)/The Japan Plastics Industry Federation (JPIF)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS K 6792 : 1997** is replaced with this Standard.

In order to conform to the International Standard, this revision has been prepared based on **ISO 15876-2 : 2003** *Plastics piping systems for hot and cold water installations—Polybutylene (PB)—Part 2 : Pipes*.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

Date of Establishment: 1997-09-20

Date of Revision: 2004-03-20

Date of Public Notice in Official Gazette: 2004-03-22

Investigated by: Japanese Industrial Standards Committee

Standards Board

Technical Committee on Chemical Products

JIS K 6792 : 2004, First English edition published in 2004-07

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2004

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Definitions	2
4 Classification	2
5 Performance	2
6 Appearance and shape	3
6.1 Appearance	3
6.2 Shape	3
7 Dimensions and tolerances thereof	3
8 Materials	5
9 Test method	5
9.1 Appearance and shape	5
9.2 Dimensions	5
9.3 Tensile test	5
9.4 Pressure resistance test	5
9.5 Hot internal pressure creep test	5
9.6 Leaching test	5
9.7 Chlorine water test	5
9.8 Expression method for numerical value of test results	6
10 Inspection	6
11 Markings	7
12 Precautions in handling	7
Annex 1 (normative) Moulding materials of polybutene pipes for water works	8

Annex 2 (normative)	Tensile test method of polybutene pipes for water works	10
Annex 3 (normative)	Hot internal pressure creep test method of polybutene pipes for water works	13
Annex 4 (normative)	Leaching test method of polybutene pipes for water works	16
Annex 5 (normative)	Chlorine water test method of polybutene pipes for water works	17
Annex 6 (informative)	Comparison table between JIS and corresponding International Standard	22

Polybutene (PB) pipes for water supply

Introduction This Japanese Industrial Standard has been prepared based on **ISO 15876-2** *Plastics piping systems for hot and cold water installations—Polybutylene (PB)—Part 2 : Pipes* published in 2003 with some modifications of the technical contents.

Portions given sidelines or dotted underlines are the matters modified from the original International Standard. The list of modifications with their explanations is given in annex 6 (informative).

1 Scope This Standard specifies the polybutene (PB) pipes to be mainly used for indoor piping for water works (hereafter referred to as “pipes”) of which the working pressure is not more than 0.75 MPa.

Remarks 1 Polybutene pipes shall be in accordance with **JIS K 6778**.

2 The International Standard corresponding to this Standard is as follows.

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**.

ISO 15876-2 : 2003 *Plastics piping systems for hot and cold water installations—Polybutylene (PB)—Part 2 : Pipes*
(MOD)

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7502 *Micrometer callipers*

JIS B 7507 *Vernier, dial and digital callipers*

JIS K 0050 *General rules for chemical analysis*

JIS K 6778 *Polybutene (PB) pipes*

JIS K 6900 *Plastics—Vocabulary*

JIS K 7112 *Plastics—Methods of determining the density and relative density of non-cellular plastics*

JIS K 7113 *Testing method for tensile properties of plastics*

JIS K 7162 *Plastics—Determination of tensile properties Part 2 : Test conditions for moulding and extrusion plastics*

JIS K 7210 *Plastics—Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

JIS K 8001 *General rule for test methods of reagents*

JIS K 8005 *Reference materials for volumetric analysis*

JIS K 8051 *3-Methyl-1-butanol*

JIS K 8637 *Sodium thiosulfate pentahydrate*

JIS K 8659 *Starch, soluble*

JIS K 8913 *Potassium iodide*

JIS S 3200-1 *Equipment for water supply service—Test methods of hydrostatic pressure*

JIS S 3200-7 *Equipment for water supply service—Test methods of effect to water quality*

JIS Z 8102 *Names of non-luminous object colours*

JIS Z 8401 *Guide to the rounding of numbers*

JIS Z 8703 *Standard atmospheric conditions for testing*

3 Definitions For the main terms used in this Standard, the definitions in **JIS K 6900** apply, and the rest of the terms are as follows:

- a) **working pressure** The pressure of water in the normal service condition, which is the maximum working pressure (hydrostatic pressure).
- b) **ordinary temperature** The temperature condition in which the temperature under the standard condition specified in **JIS Z 8703** is 20 °C and the tolerance is grade 15 (± 15 °C) of temperature in 3.1 of **JIS Z 8703**, that is, $20\text{ °C} \pm 15\text{ °C}$.
- c) **chlorine water test** The test in which the test piece is immersed in chlorine water, and the chlorine water resistance is judged by the inner surface condition.
- d) **nominal diameter** The designation based on inside diameter as the reference.
- e) **nominal outside diameter** The designation based on outside diameter as the reference.

4 Classification The classification of pipes shall be as follows:

- a) For the outside diameter and wall thickness, the dimensions used up to now in Japan shall be class J.
- b) S3.2 (ND12, ND16), S4 (ND20, ND25) and S5 (ND32, ND40, ND50) out of the dimensions of pipes specified in **ISO** Standard shall be class I.

5 Performance The performance of pipes shall be tested according to 9.3 to 9.7, and shall conform to the requirements of table 1.

Table 1 Performance

Performance item		Performance	Applicable subclause
Tensile strength at yield point		16.0 MPa min.	9.3
Pressure resistance property		Free from leakage or any other defects.	9.4
Hot internal pressure creep property		Free from leakage or any other defects.	9.5
Leaching property ⁽¹⁾	Turbidity	2 degrees max.	9.6
	Chromaticity	5 degrees max.	
	Consumption of potassium permanganate	10 mg/L max.	
	Total organic carbon (TOC)	5 mg/L max.	
	Loss of residual chlorine	0.7 mg/L max.	
	Odour	No abnormality.	
	Taste		
Chlorine water resistance		No water bubbles.	9.7

Note (1) The test temperature shall be ordinary temperature. Turbidity, chromaticity, potassium permanganate consumption, TOC, and loss of residual chlorine shall be obtained from the difference from the blank test value. Consumption of potassium permanganate shall be applied until Mar. 31, 2005, and TOC shall be applied from Apr. 1, 2005.

6 Appearance and shape

6.1 Appearance The appearance of pipes, when observed visually without magnifying, shall be smooth on outside and inside surfaces and free from defects such as flaws, fissures, twist which are detrimental to use. The colour of pipes shall be bright beige with tinge of greyish red specified in **JIS Z 8102**.

6.2 Shape The shape of pipes shall be practically right-circular in cross-section.

7 Dimensions and tolerances thereof The dimensions and tolerances thereof shall be in accordance with table 2 and table 3.

Table 2 Dimensions and tolerances thereof for class J pipes

Unit: mm

Nominal diameter	Outside diameter		Inside diameter		Thickness		Length		Informative	
	Basic dimension	Tolerance on mean outside diameter	Basic dimension	Tolerance on mean inside diameter	Basic dimension	Tolerance	Basic dimension (m)	Tolerance (%)	Mass (kg/m)	Coil inside diameter (cm)
10	13.0	±0.15	9.8	±0.25	1.60	±0.20	120	+2 0	0.053	80 min.
13	17.0		12.8		2.10				0.090	100 min.
16	22.0		16.8		2.60				0.122	
20	27.0		21.2	±0.30	2.90				0.202	
25	34.0	±0.25	28.1	±0.40	2.95	±0.25	100		0.265	
30	42.0	±0.30	34.9	±0.80	3.55		60		0.395	
40	48.0	±0.35	39.8	±0.95	4.10	±0.30	5		0.520	—
50	60.0	±0.40	49.9	±1.10	5.05	±0.35			0.802	

Remarks 1 The tolerance of mean outside diameter means the difference between the basic dimension and the mean value of measured values of outside diameter (mean outside diameter) in two directions which are mutually at equal intervals at any cross-section.

2 The tolerance of mean inside diameter means the difference between the basic dimension and the value of mean outside diameter subtracted by double mean thickness.

In addition, the mean thickness means the mean value of thickness at four points which are mutually at equal intervals at the same cross-section as the measuring positions of outside diameter.

3 The length may be changed according to the agreement between the parties concerned with delivery.

Information : The mass is calculated based on the dimensions of pipes regarded as the basic dimensions and the density of material to be used for pipes regarded as 0.92 g/cm³.

Table 3 Dimensions and tolerances thereof for class I

Unit: mm

Nominal outside diameter	Outside diameter		Thickness	
	Minimum diameter	Tolerance (+)	Minimum diameter	Tolerance (+)
16	16.0	0.30	2.20	0.40
20	20.0		2.30	
25	25.0		2.80	
32	32.0		2.90	
40	40.0	0.40	3.70	0.50
50	50.0	0.50	4.60	0.60

8 Materials The materials of pipes shall be mainly composed of 1-butene polymer and be in accordance with annex 1.

9 Test method

9.1 Appearance and shape The appearance and shape of pipes shall be examined visually without magnifying.

The pipes to be used for the test shall be sampled after 24 h have elapsed from manufacture.

9.2 Dimensions The dimensions of the pipes shall be measured by micrometer calipers specified in **JIS B 7502**, vernier, dial and digital calipers specified in **JIS B 7507**, or an instrument with the accuracy at least equivalent thereto after the test pipe is conditioned at $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for at least 1 h.

9.3 Tensile test The tensile test of the pipes shall be conformed to annex 2.

9.4 Pressure resistance test The pressure resistance test of pipes shall be conformed to **JIS S 3200-1**. The test hydrostatic pressure shall be 2.5 MPa, and its holding time shall be 2 min.

9.5 Hot internal pressure creep test The hot internal pressure creep test of the pipes, shall be conformed to annex 3.

9.6 Leaching test The leaching test of the pipe shall be conformed to annex 4. The length of the test pipe shall be conformed to table 4.

Table 4 Length of test pipe for leaching pipe

Unit: m

Nominal diameter	Length	Nominal outside diameter	Length
10	8	16	5
13	5	20	3
16	3	25	2
20	2	32 min.	1
25 min.	1		

Remarks : The pipe of not less than 2 m in length may be divided into a piece of 1 m in length to test.

9.7 Chlorine water test The chlorine water test method of pipes and the preparation method of the test water shall be in accordance with annex 5. Three tubular or strip-shaped test pieces of about 50 mm in length shall be cut from the test pipe, the cut section shall be finished smooth, the inner and outer surfaces and end surface of the test piece shall be sufficiently cleaned with water specified in annex 5, and dried on filter paper at ordinary temperature to make test pieces.

9.8 Expression method for numerical value of test results The test results of consumption of potassium permanganate or total organic carbon (TOC) of **9.3** and **9.6** and loss of residual chlorine shall be obtained to one place lower than the specified value and rounded off according to **JIS Z 8401**.

10 Inspection The inspection of pipes shall be classified into the type inspection⁽²⁾ and the delivery inspection⁽³⁾, and tested according to clause **9**.

The sampling method of the samples for the inspection shall be subjected to the agreement between the parties concerned with delivery.

Notes ⁽²⁾ The type inspection means the inspection to judge whether the quality has been conformed to all performances indicated in the design.

⁽³⁾ The delivery inspection means the inspection to judge whether the pipes have been conformed to the performance required at the delivery of the pipes.

a) **Type inspection** The type inspection shall be carried out on the following items.

- 1) Inspections for appearance and shape
- 2) Dimension inspection
- 3) Material inspection
- 4) Tensile inspection
- 5) Pressure resistance inspection
- 6) Hot internal pressure creep inspection⁽⁴⁾
- 7) Leaching inspection
- 8) Chlorine water inspection
- 9) Marking inspection

Note ⁽⁴⁾ The hot internal pressure creep inspection shall be carried out at 20 °C and 95 °C specified in annex 3. Provided that the inspection time at 95 °C shall be any one of the times as shown in annex 3 table 1.

b) **Acceptance inspection** The acceptance inspection shall be carried out on the following items.

- 1) Inspection for appearance and shape
- 2) Dimension inspection
- 3) Tensile inspection
- 4) Pressure resistance inspection
- 5) Hot internal pressure creep inspection⁽⁵⁾
- 6) Leaching inspection⁽⁶⁾
- 7) Marking inspection

Notes ⁽⁵⁾ The hot internal pressure creep test shall be carried at the test temperature of 95 °C for the test time of 22 h or 1 h out of the values shown in annex 3 table 1.

⁽⁶⁾ The leaching test shall be periodically carried out.

11 Markings The following items shall be marked indelibly on the outer side of the pipe.

- a) Nominal diameter or nominal outside diameter⁽⁷⁾
- b) Month and year of manufacture or abbreviation thereof
- c) Name of manufacturer or the abbreviation thereof

Note ⁽⁷⁾ The mark "ND" shall be attached just before nominal outside diameter.

12 Precautions in handling The following contents should be described in the instruction manual, etc., as the precautions on handling.

- a) Pipes are easily damaged, and shall not be thrown or dragged.
- b) Pipes shall be stored indoors. When they are unavoidably stored outdoors, they shall be covered by a sheet to prevent direct sunshine or rain.
- c) When the piping is unavoidably arranged under exposure outdoors, an external covering without negative influence on pipe shall be applied so as to prevent direct sunshine from the pipes.
- d) When the pipes are installed at a place where a large amount of organic solvent such as kerosene and gasoline is handled, the water quality may be adversely affected, therefore, the checking of the degree of pollution of the soil, refilling with non-polluted soil, and examination of the route which is less subject to adverse effect shall be performed.