BS EN 13547:2013

BSI Standards Publication

Industrial valves — Copper alloy ball valves

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 13547:2013. It supersedes DD CEN/TS 13547:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PSE/18, Industrial valves, steam traps, actuators and safety devices against excessive pressure.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 80130 3

ICS 23.060.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13547

October 2013

ICS 23.060.20

Supersedes CEN/TS 13547:2006

English Version

Industrial valves - Copper alloy ball valves

Robinetterie industrielle - Robinets à tournant sphérique en alliage de cuivre

Industriearmaturen - Kugelhähne aus Kupferlegierungen

This European Standard was approved by CEN on 29 August 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 13547:2013: E

Contents

Foreword

This document (EN 13547:2013) has been prepared by Technical Committee CEN/TC 69 “Industrial valves”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2014, and conflicting national standards shall be withdrawn at the latest by April 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 13547:2006.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 97/23/EC.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

The following elements of the standard have been updated:

— normative references in Clause 2;

— design of shaft in 4.2.1.4;

— materials for manufacture of series A and B valves in Table A.1;

— Annex ZA.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard applies to copper alloy ball valves for general use having flanged, threaded, capillary or compression or loose nut/union body ends.

This European Standard does not apply to copper alloy ball valves for drinking water applications.

This European Standard specifies the design and performance requirements including materials, pressure/temperature ratings for the shell and body seats, dimensions, test procedures and marking.

For some specific fields of application, for example gas, valves to this European Standard can be used provided the requirements of the relevant performance standards are met. Approval by the relevant regulatory body may be required.

The range of nominal sizes is DN 6 to DN 300 and of nominal diameters 6 mm to 110 mm.

The range of pressure designations covered is PN 6 ; PN 10 ; PN 16 ; PN 20 ; PN 25 ; PN 32 ; PN 40 ; PN 63 ; Class 150 and Class 300.

For the applicability of each nominal size/diameter and each pressure designation to the different types of valve end, see 4.1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 19:2002, *Industrial valves — Marking of metallic valves*

EN 558, *Industrial valves — Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems — PN and Class designated valves*

EN 736-1:1995, *Valves — Terminology — Part 1: Definition of types of valves*

EN 736-2:1997, *Valves — Terminology — Part 2: Definition of components of valves*

EN 736-3:2008, *Valves — Terminology — Part 3: Definition of terms*

EN 1092-3:2003, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 3: Copper alloy flanges*

EN 1254-1, *Copper and copper alloys — Plumbing fittings — Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes*

EN 1254-2, *Copper and copper alloys — Plumbing fittings — Part 2: Fittings with compression ends for use with copper tubes*

EN 1254-3, *Copper and copper alloys — Plumbing fittings — Part 3: Fittings with compression ends for use with plastics pipes*

EN 1254-4:1998, *Copper and copper alloys — Plumbing fittings — Part 4: Fittings combining other end connections with capillary or compression ends*

EN 1254-5, *Copper and copper alloys — Plumbing fittings — Part 5: Fittings with short ends for capillary brazing to copper tubes*

EN 1759-3:2003, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 3: Copper alloy flanges*

EN 1982, *Copper and copper alloys — Ingots and castings*

EN 12163, *Copper and copper alloys — Rod for general purposes*

EN 12164, *Copper and copper alloys — Rod for free machining purposes*

EN 12167, *Copper and copper alloys — Profiles and bars for general purposes*

EN 12168, *Copper and copper alloys — Hollow rod for free machining purposes*

EN 12266-1:2012, *Industrial valves — Testing of valves — Part 1: Pressure tests, test procedures and acceptance criteria — Mandatory requirements*

EN 12420, *Copper and copper alloys — Forgings*

EN 12516-3, *Valves — Shell design strength — Part 3: Experimental method*

EN 12570, *Industrial valves — Method for sizing the operating element*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1)*

EN ISO 5211, *Industrial valves — Part-turn valve actuator attachments (ISO 5211)*

EN ISO 6509, *Corrosion of metals and alloys — Determination of dezincification resistance of brass (ISO 6509)*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ASME B1.20.1, *Pipe threads, General purpose, Inch*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 736-1:1995, EN 736-2:1997 and EN 736-3:2008, together with the following apply.

3.1
loose nut end
body end provided with tailpiece which retains a loose internally threaded nut or ring for connection to the mating component

3.2
union end
body end provided with an external thread to which is attached a threaded nut or ring, which retains a tailpiece for connection to the mating component

3.3
NPS
alphanumeric designation of size for components of a pipework system, which is used for reference purposes, and which comprises the letters NPS followed by a dimensionless number indirectly related to the physical size of the bore or outside diameter of the end connections

Note 1 to entry: The number following the letters NPS does not represent a measurable value and therefore is not used for calculation purposes except where specified in the relevant standard.

4 Requirements

4.1 Classification

4.1.1 Nominal sizes

The nominal sizes applicable to each type of body end shall be as specified in Table 1 and Table 2.

NOTE 1 DN is applicable to flanged valves (PN designated) and NPS is applicable to flanged valves (Class designated). Threaded valves are normally identified by the thread size (NPS). Capillary and compression end valves are normally identified by nominal diameter expressed as nominal outside diameter of the connecting tube or pipe. The use of DN for valves with body ends other than flanged is possible.

NOTE 2 DN 6 and DN 8 are not listed in EN ISO 6708 but are the commonly used equivalent nominal size for valves having size 1/8 and ¼ threaded ends respectively.

Table 1 — Nominal sizes for flanged and threaded end valves

Nominal size		Valve body ends		
		Flanged		Threaded
DN	NPS	PN	Class	PN
6	1/8	-	-	●
8	¼	-	-	●
10	3/8	●	-	●
15	½	●	●	●
20	¾	●	●	●
25	1	●	●	●
32	1¼	●	●	●
40	1½	●	●	●
50	2	●	●	●
65	2½	●	●	●
80	3	●	●	●
100	4	●	●	●
125	5	●	●	-
150	6	●	●	-
200	8	●	●	-
250	10	●	●	-
300	12	●	●	-

Table 2 — Nominal diameters for capillary and compression ends valves

Nominal diameter mm	Valve body ends		Nominal diameter mm	Valve body ends	
	Capillary and compression ends for copper tubes	Compression ends for plastic pipe		Capillary and compression ends for copper tubes	Compression ends for plastic pipe
6	O	-	-	-	-
8	O	-	40	X	O
10	O	O	40,5	X	X
12	O	O	42	O	-
14	X	X	50	-	O
14,7	X	X	53,6	X	X
15	O	X	54	O	-
16	X	O	63	-	O
18	O	X	64	O	-
20	-	O	66,7	O	-
21	X	X	70	X	-
22	O	X	75	-	O
25	X	O	76,1	O	-
27,4	X	X	80	X	-
28	O	X	88,9	O	-
32	-	O	90	-	O
34	X	X	108	O	-
35	O	-	110	-	O

NOTE O = recommended European tube or pipe outside diameters.
X = other European tube or pipe outside diameters.

4.1.2 Nominal size relationship

The relationship between nominal size, DN and body end type shall be as given in Table 3.

Table 3 — Relationship between nominal size, DN and body end types

Nominal size	Body end connections					
	Flanged		Threaded	Loose nut, union end	Capillary and compression ends for copper tubes	Compression ends for plastic pipe
	PN	Class				
	Nominal size				Nominal diameter	
	DN	NPS		DN		
DN 6	6	-	1/8	-	6	8
DN 8	8	-	¼	-	8 ; 10	10
DN 10	10	-	3/8	10	12 ; 14	12 ; 14
DN 15	15	½	½	15	14,7 ; 15 ; 16 ; 18	14,7 ; 15 ;16 ;18
DN 20	20	¾	¾	20	21 ; 22	20 ; 21 ; 22
DN 25	25	1	1	25	25 ; 27,4 ; 28	25 ; 27,4 ; 28
DN 32	32	1¼	1¼	32	34 ; 35	32 ; 34
DN 40	40	1½	1½	40	40 ; 40,5 ; 42	40 ; 40,5
DN 50	50	2	2	50	53,6 ; 54	50 ; 53,6
DN 65	65	2½	2½	-	64 ; 66,7 ; 70 ; 76,1	63 ; 75
DN 80	80	3	3	-	80 ; 88,9	90
DN 100	100	4	4	-	108	110
DN 125	125	5	-	-	-	-
DN 150	150	6	-	-	-	-
DN 200	200	8	-	-	-	-
DN 250	250	10	-	-	-	-
DN 300	300	12	-	-	-	-

4.1.3 PN and Class designations

The PN and Class designations applicable to valves having flanged or threaded body ends shall be as specified in Table 4.

NOTE 1 PN 20 and PN 32 are established PN designations for threaded end copper alloy valves and are additional to the list of PN designations given in EN 1333.

Valves with capillary or compression ends are not designated by PN or Class.

NOTE 2 EN 1254-1, EN 1254-2, EN 1254-3 and EN 1254-5 which give details of the body ends for capillary and compression end valves in this document, do not use the PN designation system given in EN 1333. If PN designations are allocated to capillary or compression end valves, it is the responsibility of the manufacturer to provide information on any pressure and/or temperature limitations in service.

Table 4 — Range of PN and Class - Flanged and threaded ends

Body end	PN 6	PN 10	PN 16	PN 20	PN 25	PN 32	PN 40	PN 63	Class 150	Class 300
Flanged	-	•	•	-	•	-	•	-	•	•
Threaded	•	•	•	•	•	•	•	•	-	-

4.1.4 Valve series

Two series of valves are specified: series A for flanged and threaded end valves and series B for flanged, threaded, capillary, compression and loose nut/union end valves.

Series A valves have the shell components constructed from the restricted range of copper-aluminium and copper-tin alloys (see Table A.1) specified in EN 1092-3 and EN 1759-3, and are suitable for the pressure/temperature ratings given in these two flange standards. Additional copper-aluminium and copper-tin alloys are specified in Table A.1 for series A valves and the pressure/temperature ratings for valves in these materials are the same as given in EN 1092-3 and EN 1759-3.

Series B valves have the shell components constructed from copper-zinc-lead or complex copper-zinc alloys (see Table A.2) and have lower allowable pressures at elevated temperatures than series A valves.

4.2 Design

4.2.1 Construction

4.2.1.1 General

Valves shall be properly designed incorporating appropriate safety margins and taking all relevant operating factors into account in order to ensure that they will be safe throughout their intended life. The construction details shall be the responsibility of the manufacturer.

4.2.1.2 Patterns

Valves shall be full bore or reduced bore (see Figure 1).

NOTE The construction details given in Figure 1 are examples; other designs are possible.

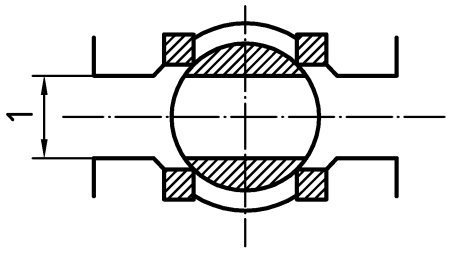


Figure 1a — Full bore

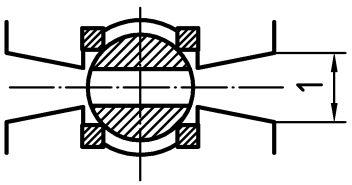


Figure 1b — Reduced bore

Key

1 nominal size

Figure 1 — Valve bore configurations

4.2.1.3 Body

The body may be of one-piece or multi-piece construction.

4.2.1.4 Shaft

a) The angular movement of the valve ball when operated from the fully closed position to the position, at which leakage past the seats occurs, shall be not less than 5° in either direction.

   The manufacturer shall carry out a type test on a production valve to demonstrate that each size of valve will meet this requirement. The type test requirement is given in Annex C.

b) The valve design shall be provided with an anti-blow out shaft.

   Valve design shall be such that the shaft shall be retained in the body, so it cannot be blown out of the body, while under pressure, when the means of actuation or replaceable shaft seals are removed.

c) The shaft end shall be so designed as to clearly indicate the position of the ball port, for example double flats or notched end.

4.2.1.5 Operating mechanism sealing

The design of the operating mechanism sealing shall be one of the following:

a) packing chamber and gland;

b) injector packing form;

c) toroidal sealing rings (0 rings).

The seal of the shaft shall remain tight to atmosphere when the operating element is removed.

4.2.1.6 Stops

Stops shall be provided for both the fully open and fully closed positions of the valve.

4.2.2 Materials

The valve materials shall be in accordance with Annex A.

4.2.3 Pressure/temperature ratings

The pressure/temperature ratings for each type of valve shall be in accordance with Annex B.

4.2.4 Dimensions

4.2.4.1 Body ends

Body ends shall be selected from Table 5.

Table 5 — Body ends

Type	Designation	Dimensions in accordance with
Flanged	PN	EN 1092-3
	Class	EN 1759-3
Threaded	R_C	ISO 7-1
	R_p	
	R	
	G [a]	EN ISO 228-1
	NPT	ASME B1.20.1
Capillary	For copper tube [b] [c]	EN 1254-1 or EN 1254-5
Compression	For copper tube [b] [c]	EN 1254-2
	For plastic pipe	EN 1254-3

[a] See 4.2.4.2.

[b] Tube in accordance with EN 1057.

[c] When valves are required for use with copper or copper alloy tubes to EN 12449 in those outside diameters which are different to EN 1057, this shall be agreed between the purchaser and manufacturer.

4.2.4.2 End sealing faces (type G threads)

End sealing faces for parallel threads in accordance with EN ISO 228-1 shall have a smooth finish at 90° to the thread axis and shall have minimum outside diameters in accordance with Table 6. Thread lengths shall be in accordance with Table 3 of EN 1254-4:1998.

Table 6 — Minimum outside diameters for sealing faces for parallel threaded ends to EN ISO 228-1

Minimum outside diameter mm	**Thread size** inch											
	1/8	¼	3/8	½	¾	1	1¼	1½	2	2½	3	4
D	15,0	18,0	22,0	26,0	32,0	39,0	49,0	55,0	68,0	85,0	98,0	126,0

4.2.4.3 Face-to-face dimensions

Flanged end valves shall have face-to-face dimensions in accordance with EN 558 and selected from the basic series given in Table 7.

Table 7 — Basic series of face-to-face dimensions for flanged valves

Basic series	PN 6	PN 10	PN 16	PN 25	PN 40	Class 150	Class 300
1	•	•	•	•	•	•	•
3	•	•	•	-	-	•	-
4	-	-	-	•	•	-	•
12	•	•	•	-	-	•	-
27	•	•	•	•	•	-	-
28	•	•	•	•	•	-	-

4.2.4.4 End-to-end dimensions

The end-to-end dimensions of threaded, capillary and compression end valves shall be the responsibility of the manufacturer.

4.2.5 Operation

4.2.5.1 Operating capability

All valves shall be operated by one of the operating elements specified in 4.2.5.2.

The operating element shall enable the valve to be:

— operated through the full travel between the fully open and fully closed positions; and

— opened and closed when a differential pressure equal to the maximum allowable pressure at 20 °C exists across the obturator when the valve is in the closed position.

4.2.5.2 Operating element

The manufacturer shall provide all valves with one of the following operating elements.

a) Lever or tee handle: valves intended for lever or tee handle operation shall be designed such that when the valve is in the open position the lever or tee handle is parallel to the flow passage through the ball, and cannot be assembled to the shaft in any other way.

   Levers shall be fitted securely and shall be capable of being removed and replaced if necessary.

b) Handwheel: handwheels shall be fitted securely and shall be capable of being removed and replaced if necessary.

c) Key: for valves which incorporate a shield around the stem, the quantity of keys supplied is determined by the manufacturer.

d) Gearbox or actuator: valves intended for gearbox or actuator operation, where the gearbox or actuator is to be fitted by the purchaser, shall be provided with an actuator attachment in accordance with EN ISO 5211.

Operating elements shall be fitted securely, and shall be capable of being removed and replaced if necessary.

4.2.5.3 Operating direction

Manually operated valves shall close by rotating the operating element in a clockwise direction when facing the operating element, unless meeting a particular performance standard.

4.2.5.4 Sizing the operating element

For lever, tee handle and handwheel operated valves, the minimum size of the operating element shall be determined in accordance with EN 12570. The operating element shall be selected such that the valve can be operated when the line pressure is equal to the maximum allowable pressure at 20 °C and can be seated or unseated against a differential pressure of not less than maximum allowable pressure at 20 °C.

When specified by the purchaser, it is permitted to use a lower differential pressure than the maximum allowable pressure at 20 °C for the determination of the operating element.

4.2.6 Auxiliary connections

Provision of shell tappings for auxiliary connections or for draining or venting purposes is not required unless specified by the purchaser. The thread for any shell tapping shall be selected from and be in accordance with Table 5. If a means of sealing the shell tapping is provided, it shall be suitable for the full pressure/temperature rating of the valve.

4.3 Functional characteristics

4.3.1 Shell design strength

The design strength of the pressure containing shell of the valve shall take account of the loadings appropriate to its intended use and operating conditions. In particular, internal pressure, operating temperatures and other factors such as static pressure and mass of contents in operating and test conditions, attached pipeline stresses, erosion and degradation mechanisms (e.g. corrosion, creep, fatigue).

The shell design strength shall be such that no leakage or structural failure occurs when the shell is subjected to an internal pressure of 2,5 times the maximum allowable pressure at 20 °C. Additionally there shall be no leakage from seals at pressures equal to or below 1,1 times the maximum allowable pressure at 20 °C.

The shell design strength shall be based on either:

a) a calculation design method supplemented if necessary by an experimental design method in accordance with EN 12516-3; or

b) an experimental design method in accordance with EN 12516-3 without calculation, for those valves having the product of maximum allowable pressure at 20 °C, times DN which is less than 3 000 bar.

4.3.2 Flow characteristics

4.3.2.1 Flow-way area

The flow-way area at any position in the valve when fully open shall be not less than the area of the equivalent circle having the diameter given in Table 8.

Table 8 — Diameter of the equivalent circle

Nominal valve size						Diameter of equivalent circle mm	
Flanged ends		Threaded ends	Capillary ends	Compression ends for		Full bore	Reduced bore
PN	Class			Copper tube	Plastic pipes		
-	-	1/8	6	6	-	5,5	-
-	-	¼	8	8	-	7,5	5,5
DN 10	-	3/8	10 ; 12	10 ; 12	10 ; 12	9,0	7,5
DN 15	-	-	14 ; 14,7 ; 15 ; 16 ; 18	14 ; 14,7 ; 15 ; 16 ; 18	14,7 ; 15 ; 16 ; 18	12,0	9,0
DN 20	¾	¾	21 ; 22	20 ; 21 ; 22	20 ; 21 ; 22	17,0	12,5
DN 25	1	1	25 ; 27,4 ; 28	25 ; 27,4 ; 28	25 ; 27,4 ; 28	24,0	17,0
DN 32	1¼	1¼	34 ; 35	34 ; 35	32 ; 34	30,0	23,0
DN 40	1½	1½	40 ; 40,5 ; 42	40 ; 40,5 ; 42	40 ; 40,5	37,0	28,0
DN 50	2	2	53,6 ; 54	53,6 ; 54	50 ; 53,6	49,0	36,0
DN 65	2½	2½	64 ; 66,7 ; 70	64 ; 66,7 ; 70	63	64,0	49,0
DN 80	3	3	76,1 ; 80 ; 88,9	76,1 ; 80 ; 88,9	75 ; 90	75,0	57,0
DN 100	4	4	108	108	110	98,0	75,0
DN 125	5	-	-	-	-	123,0	88,0
DN 150	6	-	-	-	-	148,0	96,0
DN 200	8	-	-	-	-	198,0	144,0
DN 250	10	-	-	-	-	248,0	187,0
DN 300	12	-	-	-	-	298,0	228,0

4.3.2.2 Flow characteristics

The flow coefficient, K_v, for the valve in the fully open position shall be available from the manufacturer. If published in a catalogue, the manufacturer shall identify each valve sufficiently to allow the relevant K_v value to be obtained from the catalogue.

5 Test procedures

5.1 Production pressure testing

All valves shall be pressure tested and there shall be no visually detectable leakage through the pressure containing walls of the valve when tested with a fluid in accordance with EN 12266-1:2012, Test P11.

The minimum test duration for each test on Series B valves may be reduced to 5 s for valves of sizes equal to or smaller than DN 100, NPS 4 or nominal diameter 110 mm.

5.2 Seat leakage rates

The maximum allowable seat leakage rate shall be Rate A when tested in accordance with EN 12266-1:2012, Test P12.

6 Declaration of compliance

The manufacturer shall declare compliance to this document by marking the valve with the number of this document.

7 Designation

Ball valves in accordance with this document shall be designated as follows:

— ball valve;

— EN 13547;

— DN ……. (or other size designation as appropriate - see 4.1.1);

— PN ….. (or Class….. as applicable - see 4.1.3);

— valve series (A or B as appropriate - see 4.1.4);

— material (symbol for shell material - see 4.2.2 and Tables A.1 and A.2);

— body ends (see 4.2.4.1 and Table 5);

— FTF series (for flanged valves only - see 4.2.4.3 and Table 7);

— restrictions of maximum allowable temperature – see Tables B.2 and B.3.

Additional information should be supplied by the manufacturer where this relates to permissible options or additional requirements stated in this document.

8 Marking

8.1 Mandatory markings

Ball valves in accordance with this document shall be marked as follows:

— items 1 to 4, 7 and 9 inclusive in Table 1 of EN 19:2002, except that item 3 may be omitted on certain valves, see 8.3;

— for capillary and compression end valves, the nominal size marking shall be on the body of the valve or on the end fittings, e.g. on the soldering bushes or compression nuts.

8.2 Supplementary markings

All valves can be marked with the following supplementary markings which may be added to the body markings or shown on the identification plate on the valve:

— item 7, maximum allowable temperature, from Table 1 of EN 19:2002, for valves with a temperature limitation, see Table B.2;

— item 10, product identification, from Table 1 of EN 19:2002;

— item 18, year of manufacture, from Table 1 of EN 19:2002;

— ‘DR’ for valves made from dezincification resistance materials or products containing no zinc;

— a reference comprising:

— EN 13547;

— the letter A or B to denote the valve series.

8.3 Omission of markings

a) The body material designation (Item 3 in Table 1 of EN 19:2002) may be omitted from the following sizes of valves:

   1) PN designated flanged valves, equal to or smaller than DN 50;

   2) Class designated flanged valves and threaded valves, equal to or smaller than NPS 2;

   3) capillary and compression end valves, all sizes;

b) For Class designated valves, the word ‘Class’ may be omitted due to the physical size of the valve.

9 Preparation for storage and transportation

9.1 Protection

Each valve shall be drained of test fluid and suitably protected for storage and transportation.

9.2 Obturator position

Obturators shall be in the fully open or fully closed position when the valves are despatched.

9.3 Body ends

Body ends shall be protected to exclude foreign matter during storage and transportation.

Suitable protection may be in the form of plugs, plastic caps, or packaging e.g. perforated plastic bags, cartons or boxes.

Annex A
(normative)

Materials

The materials of shell and trim components, with the exception of non-metallic seating and sealing components shall be selected from Table A.1 for series A valves and from Table A.1 or Table A.2 for series B valves.

The materials of non-metallic seating and sealing components and the material of body end components not in contact with the service fluid are the responsibility of the manufacturer.

Soldering alloys containing lead and brazing alloys containing cadmium are not permitted in the construction of valves used for water for human consumption.

The use of materials or combinations of materials which may be subject to galvanic (electrolytic) corrosion in service should be avoided.

Table A.1 — Materials for manufacture of series A and series B valves

Component	Form	Standard	Alloy designation	
			Symbol	Number
Body Bonnet	Casting	EN 1982	CuAl10Fe2-C	CC331G
			CuAl10Ni3Fe2-C	CC332G
			CuAl10Fe5Ni5-C	CC333G
			CuSn10-C	CC480K
			CuSn12-C	CC483K
			CuSn12Ni2-C	CC484K
			CuSn5Zn5Pb5-C	CC491K
			CuSn7Zn2Pb3-C	CC492K
			CuSn7Zn4Pb7-C	CC493K
			CuSn6Zn4Pb2-C	CC498K
Obturator	Casting	EN 1982	Alloy designations specified for body and bonnet	
	Forging	EN 12420	CuSn6	CW452K
			CuSn8	CW453K
	[a]	Nickel-copper alloys having 30 % nickel minimum		
	[a]	Stainless steels of the 13 % chromium and 18/8 chromium/nickel types		
Stem	Forging	EN 12420 [b]	CuAl6Si2Fe	CW301G
	Bar	EN 12163 [c] EN 12164 [c]	CuAl10Ni5Fe4	CW307G
			CuSn6	CW452K
			CuSn8	CW453K
			CuZn25Al5Fe2Mn2Pb	CW705R
			CuZn39Mn1AlPbSi	CW718R
			CuZn39Sn1	CW719R
	[a]	Nickel-copper alloys having 30 % nickel minimum		
	[a]	Stainless steels of the 13 % chromium and 18/8 chromium/nickel types		

NOTE In Table A.1 only alloy numbers CC331G, CC333G, CC491K, CC492K and CC498K are specified in EN 1092-3 and EN 1759-3 as being suitable for use with valve bodies having integral flanges.

[a] Form not specified.

[b] Not all alloy designations listed are available in this document.

[c] Not all alloy designations listed are available in all these European Standards.

Table A.2 — Materials for manufacture of series B valves

Component	Form	Standard	Alloy designation	
			Symbol	Number
Body Bonnet Obturator Stem [a]	Casting	EN 1982	CuZn33Pb2Si-C CuZn39Pb1Al-C	CC751S CC754S
	Forging	EN 12420 [b]	CuZn40 CuZn36Pb2As CuZn38Pb2 CuZn38Pb4 CuZn39Pb3 CuZn40Pb2 CuZn32Pb2AsFeSi	CW509L CW602N CW608N CW609N CW614N CW617N CW709R
	Bar	EN 12163 [c] EN 12164 [c] EN 12167 [c] EN 12168 [c]		

NOTE In Table A.2, none of the alloys given are specified in EN 1092-3 and EN 1759-3 as being suitable for use with valve bodies having integral flanges.

[a] Material in casting form not to be used for this component.

[b] Not all alloy designations listed are available in this document.

[c] Not all alloy designations listed are available in all these European Standards.

Components which are manufactured from alloys containing more than 10 % zinc and which are required to be resistant to dezincification shall be capable of meeting the acceptance criteria for resistance to dezincification as given in EN 1254-2 when tested in accordance with test method given in EN ISO 6509.

Annex B
(normative)

Pressure/temperature ratings

Valves shall have pressure/temperature ratings as referenced in Table B.1 and, where appropriate, Table B.2 and Table B.3.

Table B.1 — Pressure / temperature ratings

Valve series	Body ends	Designation	Shell material [a]	P/T rating in accordance with
A	Flanged	All PN	CC331G	EN 1092-3 [b]
		All Class	CC332G [d]	EN 1759-3 [b]
	Threaded	PN 10 ; PN 16 ; PN 25 ; PN 40	CC333G CC480K [d]	EN 1092-3 [b]
		PN 20 ; PN 32 ; PN 63	CC483K [d] CC484K [d] CC491K CC492K CC493K CC498K	Table B.2
B	Flanged	All PN	CC751S CC754S CW509L CW602N CW608N CW609N CW614N CW617N CW709R	Table B.3
		Class 150		
	Threaded	All PN		
	Capillary	All		EN 1254-1
	Compression for copper tube	All		EN 1254-2
	Compression for plastic pipe	All		EN 1254-2 [c]

[a] Materials listed in this column for series A valves can also be used for series B valves.

[b] All valves are limited to a maximum allowable temperature of 180 °C.

[c] Compression end valves prepared for use with plastic tube have the same pressure/temperature ratings as compression end valves prepared for use with copper tube, but in service these ratings will be limited to the rating of the plastic tube.

[d] Whilst these materials are not listed in EN 1092-3 and EN 1759-3, the pressure/temperature rating is in accordance with Table 13 of EN 1092-3:2003 or Table 9 of EN 1759-3:2003.

Table B.2 — Pressure/ temperature ratings for series A valves with threaded ends in PN 20, PN 32 and PN 63

Temperature °C	**Maximum allowable pressure** bar [a]		
	PN 20	**PN 32**	**PN 63**
- 10 to 66	20,0	32,0	63,0
100	20,0	32,0	63,0
120	20,0	32,0	58,5
150	20,0	31,4	51,7
170	20,0	29,3	47,2
180	20,0	27,5	45,0
NOTE 1 Intermediate values may be interpolated. NOTE 2 For ratings below - 10 °C, the purchaser should refer to the manufacturer.			
[a] 1 bar = 10^5 Pascal.			

Table B.3 — Pressure/temperature ratings for series B valves with flanged or threaded ends

Temperature °C	**Maximum allowable pressure** bar [a]								
	Body ends	**PN 6**	**PN 10**	**PN 16**	**PN 20**	**PN 25**	**PN 32**	**PN 40**	**PN 63**	**Class 150**
	Flanged	-	•	•	-	•	-	•	-	•
	Threaded	•	•	•	•	•	•	•	•	-
- 10 to 66		6,0	10,0	16,0	20,0	25,0	32,0	40,0	63,0	15,5
100		-	10,0	16,0	20,0	25,0	32,0	40,0	63,0	14,3
120		-	7,5	13,5	17,2	21,8	28,3	36,0	51,9	13,4
150		-	3,5	9,5	13,0	16,5	22,8	30,0	49,5	12,4
170		-	-	7,0	10,3	12,8	19,2	26,0	42,5	11,7
180		-	-	-	9,0	11,3	17,4	24,0	41,0	11,2
NOTE 1 Intermediate values may be interpolated. NOTE 2 For ratings below - 10 °C, the purchaser should refer to the manufacturer. NOTE 3 Valves larger than DN 250 are limited to an allowable temperature of 120 °C.										
[a] 1 bar = 10^5 Pascal.										

Annex C
(normative)

Method of testing for the determination of angular movement of operating element

C.1 General

The purpose of the test is to establish the angular movement of the operating element through which seat tightness is maintained, in both clockwise and anti-clockwise directions relative to the fully closed position, as determined by the stop (see 4.2.1.5) or other means of indication of the closed position.

The test shall be applied to a production valve in each size and basic design. The test is described in two parts. The same valve shall be used for both parts of the test. The test shall be applied to one body seat only and the same body seat shall be used for both parts of the test.

The test requires that the valve is operated and observed whilst under pressure. Suitable safety precautions shall be taken.

C.2 Test method

C.2.1 Test procedure

The test procedure shall be in accordance with the seat test described in EN 12266-1, except where described in C.2.2 and C.2.3. The test fluid shall be air or water at the discretion of the manufacturer.

C.2.2 Anti-clockwise rotation

This part of the test shall commence with the operating element at the fully closed position and the body seat under pressure. The operating element shall then be rotated in an anti-clockwise direction until visually detectable seat leakage occurs. The angular rotation ϕ_1^0 (see Figure C.1) shall be measured and recorded.

C.2.3 Clockwise rotation

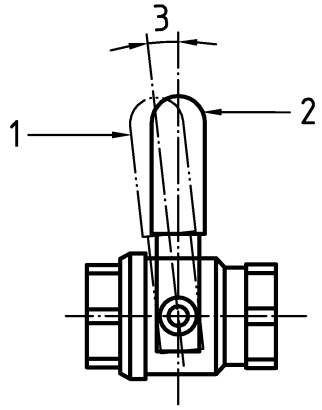
This part of the test shall commence with the operating element at the fully closed position and the body seat under pressure. The operating element shall then be rotated in a clockwise direction until visually detectable seat leakage occurs. The angular rotation ϕ_2^0 (see Figure C.2) shall be measured and recorded.

C.2.4 Stops

If the valve design is such that clockwise rotation of the operating element from the fully closed position is prevented by the stop, it is permissible to remove the stop, but means shall be employed to ensure that the angular movement can be measured relative to the position at which "fully closed" would normally occur.

C.3 Alternative test

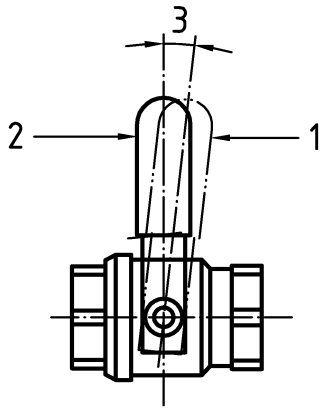
An alternative test to that described in C.2 may be used providing the manufacturer can demonstrate the equivalence of the alternative test with C.2.



Key

1 position at which visually detectable seat leakage occurs
2 fully closed position
3 ϕ_1^0

Figure C.1 — Illustration of angular rotation in an anti-clockwise direction



Key

1 position at which visually detectable seat leakage occurs
2 fully closed position
3 ϕ_2^0

Figure C.2 — Illustration of angular rotation in a clockwise direction

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC (PED)

This European Standard has been prepared under a mandate given to CEN by the European Commission to provide a means of conforming to Essential Requirements of the New Approach Directive 97/23/EC (PED).

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 97/23/EC (PED)

Clauses/subclauses of this EN	Essential requirements of Directive 97/23/EC (PED)	Annex I of PED
4.2.1.1 to 4.2.1.6	General design	2.1
8.1 to 8.3	Marking and labelling	3.3

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

[1] EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

[2] EN 1333, *Flanges and their joints — Pipework components — Definition and selection of PN*

[3] EN ISO 6708, *Pipework components — Definition and selection of DN (nominal size) (ISO 6708)*

[4] EN 12449, *Copper and copper alloys — Seamless, round tubes for general purposes*

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™