



DPC: 25/30440238 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 26 June 2025

Origin: European

Latest date for receipt of comments: 19 August 2025

Project No. 2021/01748

Responsible committee: PSE/18/3 Part turn valves (Ball, plug and butterfly)

Interested committees:

Title: Draft BS EN 593 Industrial valves - Metallic butterfly valves.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 19 August 2025

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

Industrial valves - Metallic butterfly valves

Robinetterie industrielle - Robinets métalliques à papillon

Industriearmaturen - Metallische Klappen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 69.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	8
4 Design requirements	9
4.1 General.....	9
4.2 Shell.....	12
4.3 Body	13
4.3.1 General.....	13
4.3.2 End connections.....	13
4.4 Obturator (disc).....	16
4.5 Seat seal	16
4.6 Driving shaft.....	16
4.7 Shaft seal	16
4.8 Optional design features	17
4.9 Materials.....	18
4.9.1 Shell materials.....	18
4.9.2 Trim materials	18
4.9.3 Body and cover bolting material	18
4.9.4 Corrosion protection.....	19
4.10 Pressure/temperature ratings.....	19
4.11 Dimensions and tolerances	20
4.11.1 Face-to-face and end-to-end dimensions	20
4.11.2 Body, flanged end.....	20
4.11.3 Body, wafer/lug-type	20
4.11.4 Body, butt welding end.....	20
4.11.5 Threaded end.....	20
4.12 Operation	20
4.12.1 Operational capability.....	20
4.12.2 Manual or power operating device.....	21
4.13 Manufacturing	22
4.13.1 Welding.....	22
4.13.2 Non-destructive testing (NDT) of joint welding.....	22
4.13.3 Heat treatment.....	22
4.13.4 Traceability	22
4.14 Functional characteristics and performances.....	23
4.14.1 Application	23
4.14.2 Flow characteristics	23
4.15 Additional requirements for butterfly valves classified as pressure accessories in accordance with EN 16668:2025.....	24
4.16 Additional requirements for butterfly valves intended to be used in other applications.....	24
5 Final assessment	24

6	Designation	25
7	Marking and preparation for storage and transportation	25
7.1	Marking	25
7.1.1	Mandatory marking	25
7.1.2	Supplementary marking	26
7.2	Preparation for storage and transportation.....	26
8	Documentation	26
	Annex A (informative) Valve data sheet.....	27
	Annex B (informative) Trim material list	29
	Annex C (informative) Environmental corrosion protection	30
	Annex D (informative) Correspondence between DN and NPS.....	31
	Annex E (informative) Example for valve shaft calculation	32
E.1	General	32
E.2	Calculation.....	33
E.2.1	Shear stress.....	33
E.2.2	Combined shear stress (at valve bearing) (section 2-2).....	33
E.2.3	Combined tensile stress at seating due to torsion and bending (section 2-2)	33
E.2.4	Shear stress at reduced area (sections 1-1, 3-3, 4-4).....	34
E.3	Examples of influence of flow velocity/hydrodynamic torques for shaft sizing	34
	Annex F (informative) Relationship between this document and EN 16668:2025	37
	Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU (Pressure Equipment Directive) aimed to be covered	39
	Bibliography	41

European foreword

This document (prEN 593:2025) has been prepared by Technical Committee CEN/TC 69 “Industrial valves”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 593:2017.

This document includes the following significant technical changes with respect to EN 593:2017:

- a) inclusion of an introduction to explain the reason of this revision;
- b) the inclusion of a sentence in the scope to clarify that this document applies to all industrial applications;
- c) addition of new 4.15 and 5.3 on the design requirements and final assessment for the European legislation for pressure equipment;
- d) addition of a new Clause 8 for the documentation;
- e) addition of Annex F providing the relationship between the clauses/subclauses of this document and those of EN 16668:2025;
- f) update of Annex ZA.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Introduction

This document was revised to refer to EN 16668:2025 for those requirements related to the European legislation for pressure equipment applicable to butterfly valves.

EN 16668:2025 was drafted to cover the requirements for the European legislation on Pressure Equipment. Therefore, for the applications in accordance with the European legislation for pressure equipment, EN 16668:2025 applies together with this document.

Annex F provides the relationship between the clauses/subclauses of this document and those of EN 16668:2025.

NOTE Annex ZA of this document is identical to Annex ZA of EN 16668:2025, for those requirements applicable to butterfly valves.

1 Scope

This document specifies minimum requirements applicable to design, final assessment, designation, marking and documentation for butterfly valves having metallic bodies for use with all type of pipe end connections (e.g. wafer, lug, flange, butt welding, threaded ends) and used for isolating, regulating or controlling applications.

The PN and Class ranges are:

- PN 2,5; PN 6; PN 10; PN 16; PN 25; PN 40; PN 63; PN 100; PN 160;
- Class 150; Class 300; Class 600; Class 900.

The size range is:

- DN 20; DN 25; DN 32; DN 40; DN 50; DN 65; DN 80; DN 100; DN 125; DN 150; DN 200; DN 250; DN 300; DN 350; DN 400; DN 450; DN 500; DN 600; DN 700; DN 750; DN 800; DN 900; DN 1 000; DN 1 050; DN 1 100; DN 1 200; DN 1 400; DN 1 500; DN 1 600; DN 1 800; DN 2 000; DN 2 200; DN 2 400; DN 2 600; DN 2 800; DN 3 000; DN 3 200; DN 3 400; DN 3 600; DN 3 800; DN 4 000.

DN 750 and DN 1 050 apply only for Class 150 and Class 300.

NOTE 1 Sizes are listed in Table D.1.

For applications in accordance with the European legislation for pressure equipment, EN 16668:2025 applies together with this document.

NOTE 2 Exclusions are given in the European legislation for pressure equipment.

For chemical applications, EN 12569:2020 apply together with this document.

For gas distribution systems, EN 13774:2013 apply together with this document.

For gas transport systems, EN 1594:2024 apply together with this document.

For water supply application, EN 1074-1:2000 and EN 1074-2:2000 apply together with this document.

For process control application, EN 1349:2009 and EN 60534-2-1:2011 apply together with this document.

The correspondence between DN and NPS is given for information in Annex D.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 19:2023, *Industrial valves - Marking of metallic valves*

EN 558:2022, *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 736-1:2018, *Valves - Terminology - Part 1: Definition of types of valves*

EN 736-2:2016, *Valves - Terminology - Part 2: Definition of components of valves*

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

EN 764-1:2015+A1:2016, *Pressure equipment - Part 1: Vocabulary*

EN ISO 1043-1:2011, *Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics (ISO 1043-1:2011)*

EN 1074-2:2000,¹ *Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 2: Isolating valves*

EN 1092-1:2018, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges*

EN 1092-2:2023, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 2: Cast iron flanges*

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

EN 1092-4:2002, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 4: Aluminium alloy flanges*

EN 1267:2012, *Industrial valves - Test of flow resistance using water as test fluid*

EN 1349:2009, *Industrial process control valves*

EN 1759-1:2004, *Flanges and their joint - Circular flanges for pipes, valves, fittings and accessories, Class designated - Part 1: Steel flanges, NPS 1/2 to 24*

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

EN 1759-4:2003, *Flanges and their joint - Circular flanges for pipes, valves, fittings and accessories, class designated - Part 4: Aluminium alloy flanges*

EN ISO 5211:2023, *Industrial valves — Part-turn actuator attachments (ISO 5211:2023)*

EN 10269:2013, *Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties*

EN ISO 10497:2022, *Testing of valves — Fire type-testing requirements (ISO 10497:2022)*

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

EN 12266-2:2012, *Industrial valves - Testing of metallic valves - Part 2: Tests, test procedures and acceptance criteria - Supplementary requirements*

EN 12516-1:2014+A1:2018, *Industrial valves - Shell design strength - Part 1: Tabulation method for steel valve shells*

EN 12516-2:2014+A1:2021, *Industrial valves - Shell design strength - Part 2: Calculation method for steel valve shells*

EN 12516-3:2002, *Valves - Shell design strength - Part 3: Experimental method*

¹ Document impacted by EN 1074-2:2000/A1:2004.

EN 12516-4:2014+A1:2018, *Industrial valves - Shell design strength - Part 4: Calculation method for valve shells manufactured in metallic materials other than steel*

EN 12569:2020, *Industrial valves - Valves for chemical and petrochemical process industry - Requirements and tests*

EN 12570:2000, *Industrial valves — Method for sizing the operating element*

EN 12627:2017, *Industrial valves - Butt welding ends for steel valves*

EN 12982:2009, *Industrial valves - End-to-end and centre-to-end dimensions for butt welding end valves*

EN 13774:2013, *Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements*

EN 16668:2025, *Industrial valves - Requirements and testing for metallic valves as pressure accessories*

EN 16722:2015, *Industrial valves - End-to-end and centre-to-end dimensions for valves with threaded ends*

EN 60534-2-3:2016, *Industrial-process control valves - Part 2-3: Flow capacity - Test procedures*

EN IEC 60534-4:2022, *Industrial process control valves – Part 4: Inspection and routine testing*

ISO 1629:2025, *Rubber and latices — Nomenclature*

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 736-1:2018, EN 736-2:2016, EN 736-3:2008, EN 764-1:2015+A1:2016 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

butterfly valve

valve in which the obturator rotates about an axis at right angle to the direction of flow and, in the open position, the flow passes around the obturator, designed as double flange body, single flanged body, lug type body, wafer type body or with butt weld ends

[SOURCE: EN 736-1:2018, 4.1.5, EN 736-2:2016, 3.1.1.4 to 3.1.1.7, 3.1.1.12]

3.2

maximum allowable pressure

PS

maximum pressure for which the pressure equipment is designed

[SOURCE: EN 764-1:2015+A1:2016, 3.2.87 – “as specified by the manufacturer” deleted.]

3.3**maximum allowable temperature** **$TS_{\max}$**

maximum temperature for which the pressure equipment is designed

[SOURCE: EN 764-1:2015+A1:2016, 3.1.9 – “as specified by the manufacturer” deleted.]

3.4**end of line service**

condition that occurs when the downstream side of the valve is opened to atmosphere

3.5**driving shaft**

shaft connected to the obturator to operate the valve in the case of a multi-shaft valve

3.6**trim**

functional components of a valve excluding the shell components which are in contact with the fluid inside the valve

[SOURCE: EN 736-2:2016, 3.2]

3.7**eccentration****offset**

deviation of the operating axes in respect to the reference axes of the pipe/valve

3.8**body bolting**

bolting which connects the body components

4 Design requirements**4.1 General**

The requirements of the design shall be agreed. For this purpose, it is recommended to use the valve data sheet (including for service conditions) in accordance with Annex A.

The valve shall be of either concentric design (see Figure 1) or eccentric design (see Figures 2 to 4). The offset can be single, double or triple.

A first offset is an axial offset of the shaft to the seat contact.

A second offset is an offset from the pipe centreline to the valve obturator centreline.

In the triple offset design, the seat and seal contact surface centreline is inclined in respect to the pipe/valve centreline, whatever the form of the contact.

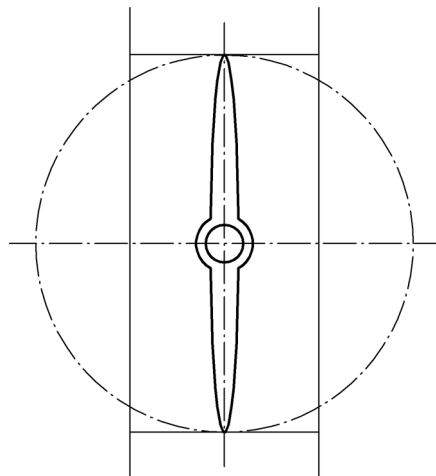
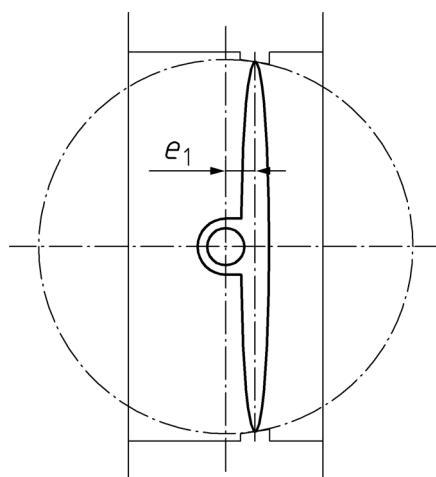


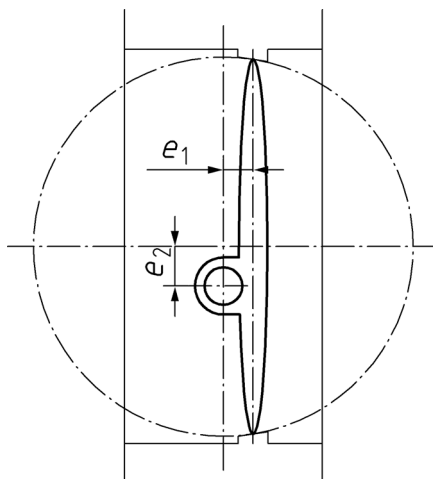
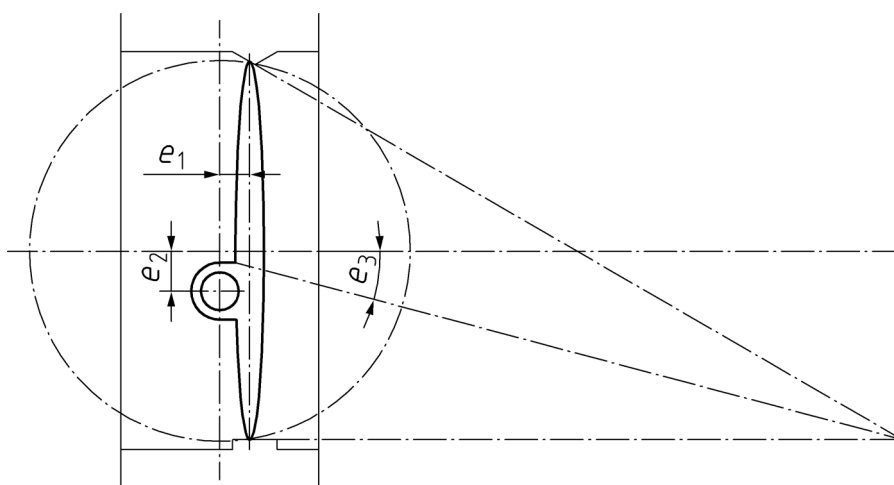
Figure 1 — Concentric design



Key

e_1 eccentricity 1

Figure 2 — Single eccentric design (single offset)

**Key** e_1 eccentricity 1 e_2 eccentricity 2**Figure 3 — Double eccentric design (double offset)****Key** e_1 eccentricity 1 e_2 eccentricity 2 e_3 eccentricity 3**Figure 4 — Triple eccentric design (triple offset)**

The design details are not specified in this document.

The butterfly valve can be:

- soft sealing; or
- metallic sealing.

NOTE The choice of design and material depends on the design working temperature and the physical and chemical characteristics of the fluid.

This document does not cover the dimensioning procedures of parts, except the shell, using materials other than those specified in EN 12516-1:2014+A1:2018, EN 12516-2:2014+A1:2021, EN 12516-3:2002 or EN 12516-4:2014+A1:2018.

The design of the parts other than the shell is determined for a differential pressure defined by the pressure/temperature rating or for a differential pressure which shall be indicated on the valve.

In the framework of the environmental urgency and sustainability requirements, the butterfly valve shall be designed to be easily repairable, durable, recyclable; spare parts shall be made available.

The engineering best practices are applicable (for example, number of screw threads engaged, two screw threads overrun, ...).

4.2 Shell

4.2.1 The shell is the combination of valve components comprising the pressure containing envelope, like:

- the body and the body bolting if any,
- the retaining elements of the shaft seal ring,
- the cover and the cover bolting if any,
- if used in end of line service, the obturator (disc).

4.2.2 The shell strength shall be determined:

- a) according to EN 12516-2:2014+A1:2021 for steel valves, and EN 12516-4:2014+A1:2018, 5.5.1, for copper alloy, aluminium and cast iron valves, for the permissible membrane stress;
- b) according to EN 16668:2025, 5.1.2.1.

4.2.3 For applications out of the scope of the European legislation for pressure equipment, the following standards shall apply:

- a) for steel valves designed by the tabulation method: according to EN 12516-1:2014+A1:2018;
- b) for steel valves designed by calculation solely: according to EN 12516-2:2014+A1:2021;
- c) for copper alloy, aluminium and cast iron valves: according to EN 12516-4:2014+A1:2018;
- d) an experimental method: according to EN 12516-3:2002.

4.2.4 Other dimensioning methods (i.e. finite elements) are not specified in this document.

If the foreseeable conditions lead to the assumption that the allowable limits will be exceeded, then the design shall take this into account.

NOTE See Annex F showing the relationship between this document and EN 16668:2025 requirements concerning dimensioning.