BS EN 16051-1:2012

BSI Standards Publication

Inflation devices and accessories for inflatable consumer products

Part 1: Compatibility of valves and valve adapters

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 16051-1:2012.

The UK participation in its preparation was entrusted to Technical Committee SW/136/8, Swimming pools and aquatic equipment.

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 69787 6

ICS 23.080

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 January 2012.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16051-1

January 2012

ICS 23.080

English Version

Inflation devices and accessories for inflatable consumer products - Part 1: Compatibility of valves and valve adapters

Dispositifs et accessoires de gonflage pour biens de consommation gonflables - Partie 1: Compatibilité des valves et adaptateurs de valves

Pumpen und Pumpenzubehör für aufblasbare Verbraucherartikel - Teil 1: Kompatibilität von Ventilen und Ventiladaptern

This European Standard was approved by CEN on 29 October 2011.

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, 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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 16051-1:2012: E

Contents

Page

Foreword

This document (EN 16051-1:2012) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, the secretariat of which is held by DIN.

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 July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

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.

EN 16051, *Inflation devices and accessories for inflatable consumer products*, consists of the following parts:

— *Part 1: Compatibility of valves and valve adapters*

— *Part 2: Safety requirements, durability, performance, compatibility and test methods of inflators*

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, 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.

Introduction

The process of inflating a floating leisure article should be considered in two ways:

a) the device for inflating the product, a pump;

b) the compatibility between the pump and the valve or valves on the product itself.

This standard, EN 16051, is in two parts and addresses the performance, safety requirements, durability and test methods that should be applied to the pump and the compatibility between a pump and the device to be inflated to ensure that the inflation process can be conducted efficiently and safely.

Unless a device is supplied and sold with a pump, by the manufacturer, where it is reasonable to expect the pump to be compatible with the product, there is generally a requirement to have an adaptor between a pump and the device valves to ensure that the air hose or other connector fits into or onto the valves on the device.

This part of the standard, Part 1, addresses the requirements for valves and where necessary, adaptors to ensure good fit and mechanical efficiency when inflating the device.

1 Scope

This document specifies the valve side interface geometry between valves and pump adapters as well as strength requirements of valves and valve adapters for inflatable consumer articles (see definition in 3.1).

This document does not apply for

— valves of personal flotation devices according to EN ISO 12402;

— diving accessories and buoyancy compensators according to EN 1809.

This document excludes the following valve types:

— valves used for bicycles and vehicles;

— needle valves (e. g. valves used for team sport balls).

2 Normative references

The following referenced documents are indispensable for the application 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 16051-2, *Inflation devices and accessories for inflatable consumer products — Part 2: Safety requirements, durability, performance, compatibility and test methods of inflators*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
inflatable consumer articles
group of articles and related accessories which are used for leisure purposes on land and water or in households or children's play

NOTE Typically these articles are floating leisure devices for use on or in the water, small inflatable boats, air beds, air furniture, air mattresses, swimming aids, inflatable toys, aquatic toys etc.

3.2
valve
device intended to inflate air chambers, to close the inflated air chambers and to deflate them after use

3.3
screw valve
valve in which the connection of valve body to valve base and the connection between valve body and valve closure (cap, plug) is designed as a threaded connection

3.4
plug valve
valve in which valve base and valve body form a unit and the closed condition is created by a plug inserted into the valve body

3.5
valve with twist lock closure
connection with inflation device is sealed by a twist lock closure

3.6
non-return device
valve component preventing air discharge even with the valve closure opened

3.7
valve without non-return device
valve in which the escape of air is unimpeded after removal of the closure (cap, plug)

3.8
valve adapter
device which provide compatibility between a pump and a valve

3.9
valve closure
element which provides the main and/or final sealing function of the valve

3.10
interface
those dimensional locations where the pump adapter and the valve connect

3.11
nominal pressure
working pressure defined by the manufacturer

4 Valves

4.1 Dimensions, designation

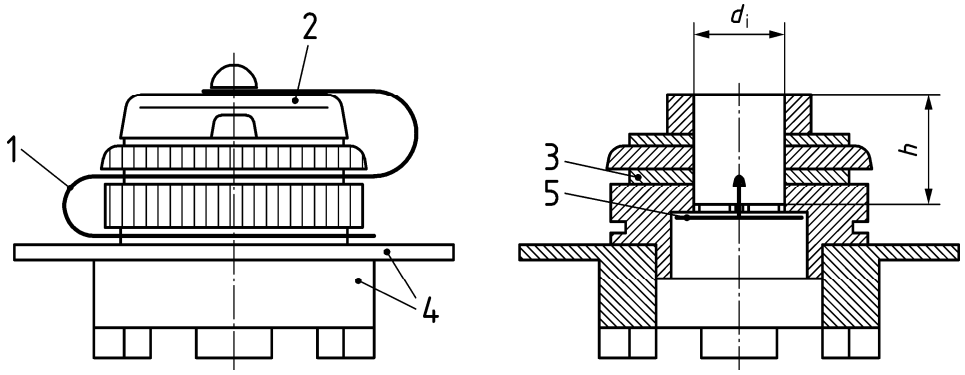
4.1.1 General

Dimensions are given in millimetres.

The valves need not correspond to the pictorial representations, only the interface dimensions specified have to be complied with.

4.1.2 Screw valve with non-return device

Closure: Cap (see Figure 1)



a) front view (with cap) **b) sectional view (without cap)**

Key
1 tethering strap or anchors
2 valve closure (cap)
3 valve body
4 valve base with weld flange
5 back pressure seal

d_i inner diameter of connection opening
h minimum inner depth of connection opening

Figure 1 — Example of a screw valve with non-return device and cap without twist lock closure

Design types:

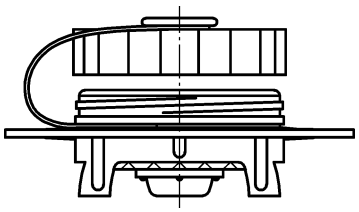
1) Valve base screwed with air chamber sheeting;

2 Valve base welded with air chamber sheeting;

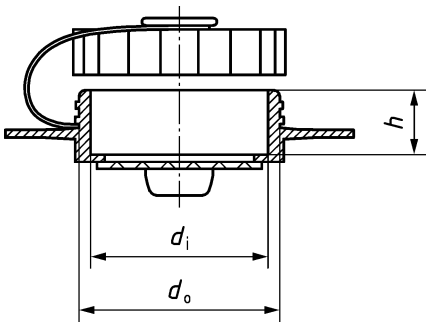
3) Valve body integrated into valve base;

4) Valve body screwed into valve base.

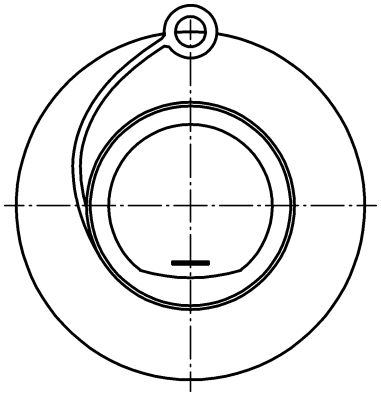
Closure: Cap with twist lock closure (see Figure 4)



a) front view



b) section side view



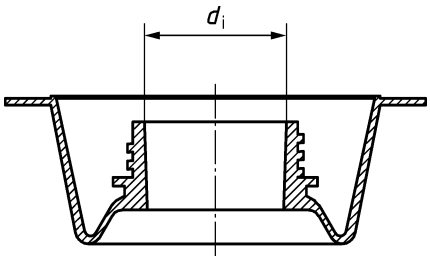
c) bottom view

Key

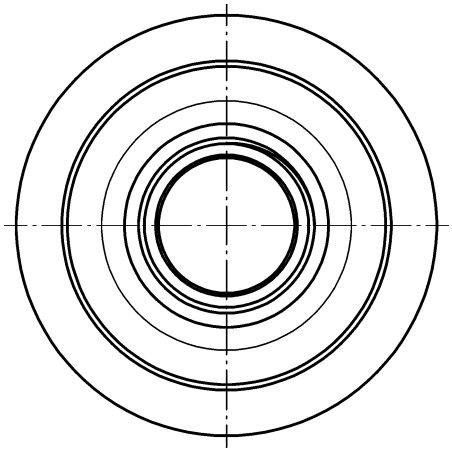
d_i inner diameter of connection opening
d_o outer diameter of connection opening
h minimum inner depth of connection opening

Figure 2 — Example of a X-large screw valve with non-return device

Valve adapters regarding the bayonet closure valve and the X-large screw valve have to be provided together with the product by the manufacturer. These adapters shall provide complete compatibility with the valve and the pump hose intermediate adapter as shown in Figure 3. This is not applicable if product and pump provide an independent system.



a) sectional view without cap



b) top view

Key

d_i inner diameter of connection opening

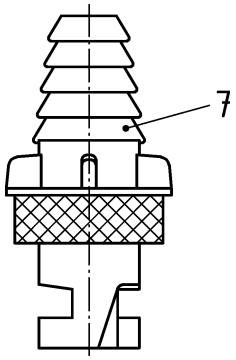
Figure 3 — Intermediate adapter

For typical connecting interface dimensions of screw valves with non-return device see Table 1.

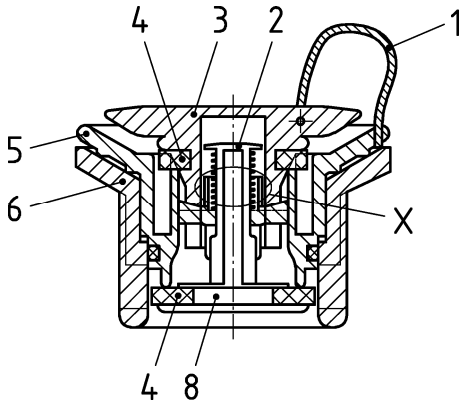
Table 1 — Typical connecting interface dimensions of screw valves with non-return device

Valve size	Symbol	Inner diameter of connection opening d_i	Minimum inner depth of connection opening[a] h
X-Large	**4**	**46,8**	**17**
Large	**3**	**31,0**	**13**
Medium	**2**	**24,0**	**13**
Small	**1**	**17,5**	**13**
[a] Measured from upper edge of valve body to the first constriction which is less than the nominal dimension or its lower tolerance.			
bold = preferred size and preferred dimensions			

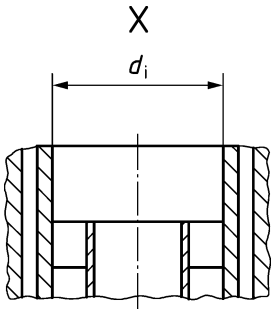
4.1.3 Valve with non-return device and a twist lock closure



a) pump adapter to twist lock closure valve



b) sectional view



c) interface details

Key
1 tethering strap or anchors
2 non-return device
3 valve closure (cap) with twist lock closure
4 gasket
5 valve body
6 valve base
7 valve adapter with twist lock closure
8 base of non-return device
d_i inner diameter

For other details see Figure 1.

Figure 4 — Example of the valve with non-return device and cap with twist lock closure (typical dimensions)

4.1.4 Plug valve

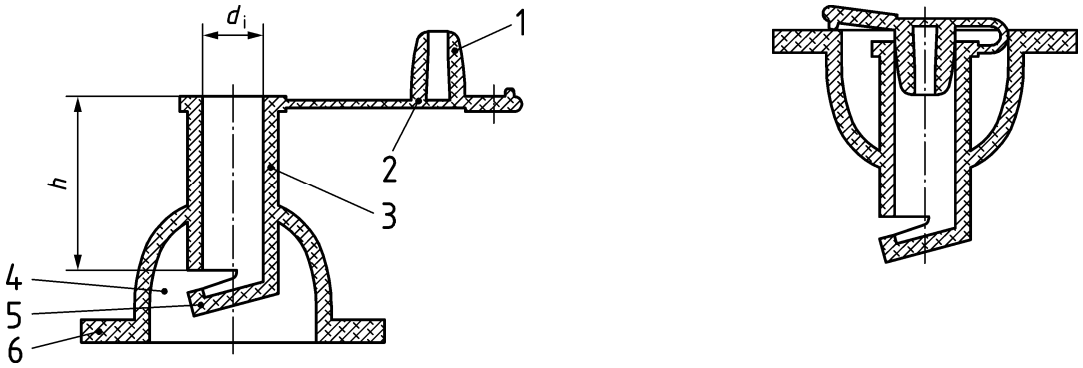
The shape of the valve describes the following characteristics of the plug valve (see Figures 2 and 3):

Valve body can be sunk into the outer skin "s"/"ns" (sinkable/not sinkable).

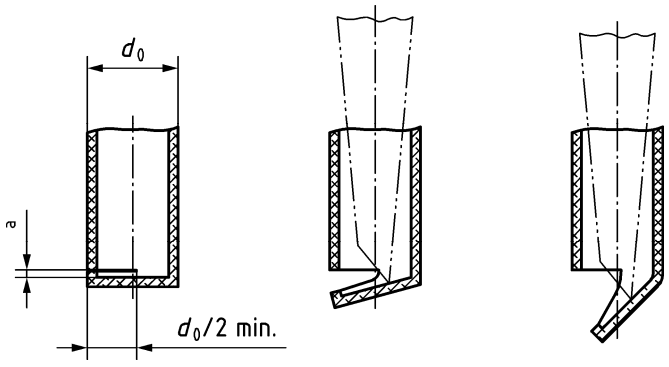
Non-return device: "w n-r“/"wo n-r“ (with/without non-return device).

Assembly condition	non-return device
s/wn-r	sinkable, with non-return device (for an example see Figure 5)
s/wo n-r	sinkable, without non-return device (for an example see Figure 6)
ns/w n-r	not sinkable, with non-return device
ns/wo n-r	not sinkable, without non-return device

For typical connecting interface dimensions of plug valves with or without non-return device see Table 2.



a) in pulled-out condition **b) in closed-in condition**

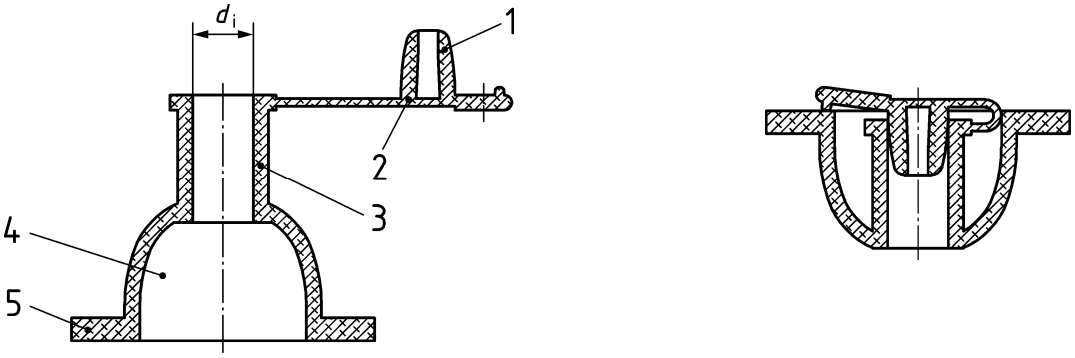


c) detail of non-return flap

Key

1	plug	4	valve base
2	securing device	5	back pressure flap
3	valve body	6	weld flange
d_i	inner diameter of connection opening	2 mm ≤ a ≤ 3 mm	
d_o	outer diameter of connection opening	*h*	variable height

Figure 5 — Example of a plug valve, sinkable, with non-return device (s/wn-r)



a) in pulled-out condition **b) in closed-in condition**

Key
1 plug
2 securing device
3 valve body
4 valve base
5 weld flange
d_i inner diameter of connection opening

Figure 6 — Example of a plug valve, sinkable, without non-return device (s/wo n-r)

Table 2 — Typical connecting interface dimensions of plug valves with or without non-return device

Valve size	Symbol	Inner diameter of valve body d_i	Minimum inner length of connection nozzle[a] h
XX large (XXL)	5	24	-
X large[b] (XL)	4	18	36
Large (l)	**3**	**8,5**	**21**
Medium (m)	**2**	**7,5**	**21**
Small (s)	**1**	**6,5**	**21**

[a] Measured from the upper edge of the valve body to the first constriction which is less than the nominal dimension or its lower tolerance.

[b] Special size, not covered by the pump/valve adapter.

bold = preferred size and preferred dimensions

4.2 Pressure classes

Depending on the permissible operating pressure (= nominal pressure) for which the article has been designed, valves are classified according to the following pressure classes:

0,3 bar < pressure class A ≤ 0,8 bar

0,06 bar ≤ pressure class B ≤ 0,3 bar

pressure class C < 0,06 bar

4.3 Requirements and testing

4.3.1 Test conditions

Unless otherwise specified, tests shall be carried out at room temperature.

4.3.2 Requirements for valves with non-return device

4.3.2.1 Cap/plug

Valves with a non-return device shall be equipped with a cap/plug including a securing device.

4.3.2.2 Securing device for all component parts of valves

4.3.2.2.1 Requirement

The individual components shall be connected with the valve in such manner which prevents that they can be lost even when opened unintentionally. The individual parts of the valve with non-return device shall remain securely connected to the air chamber even after the cap or plug has been removed and/or the insert has been taken out (for quick deflating).

4.3.2.2.2 Testing

Testing of the securing device is carried out using a force of 10 N at 40 °C for a period of 10 min. With the cap/plug of the valve with non-return device opened, the test force is applied onto the securing device at 90° to the closure axis.

4.3.2.3 Retaining force between valve and adapter of inflation device

4.3.2.3.1 Requirement

The connection between the valve and the adapter of the inflation device shall not become disengaged at 1,2 times the value of the nominal pressure.

4.3.2.3.2 Testing

Testing is carried out using the adapter defined in EN 16051-2.

The adapter is firmly attached by hand.

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.™