BS EN 417:2012

BSI Standards Publication

Non-refillable metallic gas cartridges for liquefied petroleum gases, with or without a valve, for use with portable appliances — Construction, inspection, testing and marking

bsi.

...making excellence a habit.™

Document Sharing Hub

National foreword

This British Standard is the UK implementation of EN 417:2012. It supersedes BS EN 417:2003, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GSE/24, Dedicated LPG appliances.

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.

© The British Standards Institution 2012
Published by BSI Standards Limited 2012

ISBN 978 0 580 71867 0

ICS 23.020.30

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 March 2012.

Amendments issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS EN 417:2012

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 417

March 2012

ICS 23.020.30

Supersedes EN 417:2003

English Version

Non-refillable metallic gas cartridges for liquefied petroleum gases, with or without a valve, for use with portable appliances - Construction, inspection, testing and marking

Cartouches métalliques pour gaz de pétrole liquéfiés, non rechargeables, avec ou sans valve, destinées à alimenter des appareils portatifs - Construction, contrôle et marquage

Metallische Einwegkartuschen für Flüssiggas, mit oder ohne Entnahmeventil, zum Betrieb von tragbaren Geräten - Herstellung, Inspektion, Prüfung und Kennzeichnung

This European Standard was approved by CEN on 23 December 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

© 2012 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 417:2012: E

Documents
Document Sharing Hub

Full document details: BS EN 417:2012

Contents

page

Foreword 3
Introduction 4
1 Scope 5
2 Normative references 5
3 Terms and definitions 5
4 Materials, design and construction 6
5 Requirements on the filling of gas cartridges 14
6 Type testing 14
7 Manufacturing and filling tests and examination 22
8 Marking 24
Annex A (normative) **Cartridges with valves, mounted in a single layer, threaded centre boss valve cup** 27
Annex B (normative) **Pressure strength test on finished cartridges — Test method** 28
Annex C (normative) **Translation of mandatory sentences** 30
Bibliography 40

Documents
Document Sharing Hub

Full document details: BS EN 417:2012

Foreword

This document (EN 417:2012) has been prepared by Technical Committee CEN/TC 181 “Dedicated liquefied petroleum gas appliances”, 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 September 2012, and conflicting national standards shall be withdrawn at the latest by March 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 EN 417:2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This European Standard has been submitted for reference into the RID and/or the technical annexes of the ADR.

The following is a list of technical changes made since the previous edition:

— addition of an internal leakage limiter mandatory for pierceable cartridges;

— possibility of an alternative marking for "butane" cartridges of type 200;

— addition of a reference to ADR [4] and RID [6];

— editorial modifications.

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 the United Kingdom.

Documents
Document Sharing Hub
Full document details: BS EN 417:2012

Introduction

This standard covers “non-refillable metallic cartridges for liquefied petroleum gases, with or without a valve, for use with portable appliances”.

It has become necessary to establish a specific standard for these cartridges, as the European Directive 2008/47/EC [2] concerning aerosol generators does not cover the essential functions of cartridges for liquefied petroleum gas, i.e. containing a gas suitable for the operation of the appliance and supplying the appliance in a gas tight fashion, taking account of its geometry and the heating that might occur.

The safety of the user therefore depends on the use of cartridges complying with this standard, which in consequence, will be marked, inspected and tested in accordance with the requirements of this standard.

This standard also defines the tests to be used as a basis for type examination and describes a procedure which can serve as a guide to the person in the organisation who is responsible for issuing type examination certificates.

The cartridges covered by this standard may fall under the scope of various directives, which are listed in the bibliography.

Documents
Document Sharing Hub

Full document details: BS EN 417:2012

1 Scope

This European Standard specifies material, construction, inspection and marking requirements for non-refillable metallic gas cartridges with or without a valve for use with portable appliances which comply with the requirements of EN 521.

This European Standard is applicable to cartridges with a total capacity of between 50 ml and 1 000 ml, designed to contain stenched liquefied petroleum gas or stabilized mixtures of liquefied petroleum gas with propadiene and/or methyl acetylene and/or di-methyl-ether or equivalent, where the pressure developed by the contents of the cartridge at 50 °C does not exceed 13,2 bar.

However, stenching of these gases is optional for cartridges with a total capacity not exceeding 150 ml.

This European Standard is not applicable for aerosol dispensers — manufactured, filled, tested and marked in accordance with Directive 2008/47/EEC.

This European Standard does not apply to appliances with an integral gas container which is not interchangeable, or to cartridges for filling such containers (e.g. lighters).

2 Normative references

EN 521, *Specifications for dedicated liquefied petroleum gas appliances — Portable vapour pressure liquefied petroleum gas appliances*

3 Terms and definitions

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

3.1
gas cartridge
non-refillable container filled once only with gas or a mixture of gases for fuelling portable gas appliances which burn the gas or gases in use

3.2
pierceable gas cartridge
cartridge without a valve

NOTE The gas supply is obtained by piercing the cartridge by means of a specific device, which is part of the portable appliance with which the cartridge is to be used.

3.3
two pieces gas cartridge with valve
cartridge constructed of two pieces with an aperture at the top end into which a male or female valve is fitted

NOTE The gas supply is obtained by the connection of the portable appliance to the valve.

3.4
three pieces gas cartridge with valve
cartridge constructed of three pieces with an aperture at the top end into which a male or female valve is fitted

NOTE The gas supply is obtained by the connection of a portable appliance to the valve.

AVA Documents
Document Sharing Hub

Full document details: BS EN 417:2012

3.5
total capacity
internal volume of the empty gas cartridge at 20 °C before any accessories are fitted

NOTE 1 Accessories are such as valves, etc.

NOTE 2 The total capacity is expressed in millilitres.

3.6
net capacity
volume, expressed in millilitres, which is available to receive the contents when the gas cartridge is sealed and fitted with its accessories

3.7
test pressure
pressure that is equal at a temperature of 50 °C to 1,5 times the pressure which would be developed by gas with which the cartridge will be filled, or 10 bar, whichever is the greater

3.8
burst pressure
minimum pressure which causes leakage from the gas cartridge

3.9
volume for the liquid phase
volume occupied by the liquid phase of the gas or gases within the gas cartridge

3.10
liquefied petroleum gas
low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases

3.11
stenched liquefied petroleum gas
liquefied petroleum gas with the addition of an odorant detectable in the gas/air mix

3.12
female valve
valve designed so that the spigot fitting of an appropriate appliance enters into the valve to open it

3.13
male valve
valve fitted with a stem protruding from the centre of the valve which, when depressed, opens the valve

3.14
valve cup
support of the valve destined to be fixed to the cartridge

3.15
internal leakage limiter
internal device which limits the gas flow when the cartridge is pierced and not fitted to the gas appliance

4 Materials, design and construction

4.1 Materials

4.1.1 The body of the gas cartridge and the valve cup where applicable, with the exception of the sealing material, shall be made of metal.

Documents
Document Sharing Hub
Full document details: BS EN 417:2012

For the body of the cartridges the composition and the mechanical characteristics of the metal shall be detailed in a document provided by the material manufacturer.

4.1.2 The materials used for the container, the valve, any internal lining, external coatings, internal leakage limiter and seals shall be compatible with the gases to be contained by the cartridge and shall withstand the reasonably foreseeable mechanical, thermal and chemical conditions which may occur during use and storage.

Gas cartridges designed to contain mixtures of liquefied petroleum gas and methylacetylene shall not be manufactured from materials containing more than 70 % copper.

4.2 Design and construction – General

4.2.1 Gas cartridges shall be constructed from one or more parts, these being assembled by welding, brazing, crimping, etc.

4.2.2 Gas cartridges with an outside diameter of 40 mm and above shall be provided with a concave base.

4.2.3 Gas cartridges shall be so designed and constructed that they do not leak or show visible permanent deformation when subjected to an internal pressure equal to the test pressure.

4.2.4 Gas cartridges shall be so designed and constructed that they do not leak or burst until a pressure 1,2 times the test pressure has been reached or passed.

4.2.5 The concave form of the base of gas cartridges with an outside diameter greater than or equal to 40 mm shall reverse in form before any leak appears or rupture occurs. However, for three pieces construction cartridges with valves, with an outside diameter greater than or equal to 40 mm, either the concave form of the base shall reverse or the domed top shall permanently extend before any leak appears or any rupture occurs.

4.2.6 Gas cartridges shall be so designed and constructed that they do not leak at temperatures from –20 °C to + 70 °C.

4.2.7 The dimensions of the cartridge shall be such so as to ensure that it is compatible with the appliances designated on the cartridge (see 8.2).

4.2.8 The internal leakage limiter shall not disturb the correct operation of the cartridge and/or the appliance.

4.3 Pierceable cartridges

4.3.1 General

Pierceable cartridges shall not be fitted with valve cups.

Pierceable cartridges shall be fitted with an internal leakage limiter (an example of design is shown for information in Figure 6).

4.3.2 Type 200 cartridges

For type 200 cartridges, (inside diameter 86 mm, containing approximately 190 g of gas), the dimensions in Figure 1 shall be maintained.

Documents
Document Sharing Hub
Full document details: BS EN 417:2012

Dimensions in millimetres

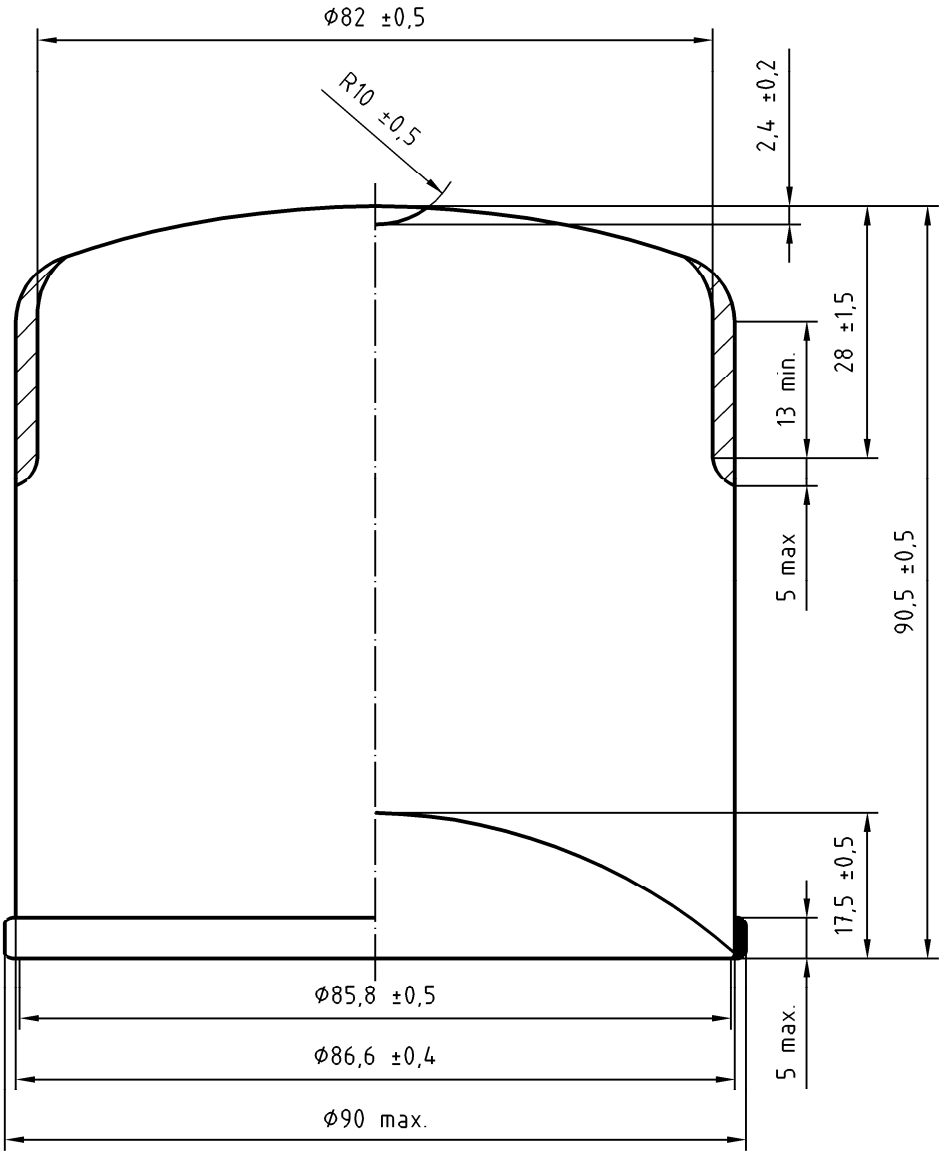


Figure 1 — Cartridge type 200

Across the whole height of the hatched area (except for the rounded edges top and bottom), the diameter shall be:

a) (86,6 ± 0,4) mm; or

b) (82 ± 0,5) mm; or

c) the design shall be such that the diameter alternates between the dimensions in a) and b) above.

NOTE In this area, each cartridge manufacturer should choose the shape that is best suited to ensure the safety of the connection of the cartridge to the appliance, according to the characteristics of the appliances likely to be fuelled by his cartridges.

Documents
Document Sharing Hub
Full document details: BS EN 417:2012

4.3.3 Other pierceable type cartridges

Other capacities, dimensions and shapes of pierceable cartridges are permitted, provided that they cannot be fitted into and pierced by appliances designed for type 200 cartridges.

4.4 Cartridges with valves

4.4.1 General requirements for every type of valve

Cartridges with valves shall be designed in such a way that it is not possible to operate the valve without the use of a special adaptor unless an adequate protection against inadvertent discharge is provided with and fitted on the cartridge.

NOTE The connection on the appliance with which the gas cartridge is designed to be used may be considered as a special adaptor.

The valves shall be of such a design that, under conditions of normal use, they close when the special adaptor is removed or the valve released. Valves which close by means of internal gas pressure only are not permitted.

After 50 opening and closing operations, the valve shall not show signs of leakage or other defects (see 6.6).

The valve cup, if any, shall be free from burrs and sharp edges.

4.4.2 Cartridges fitted with threaded centre boss valve cups

The valve cup shall be made from carbon or alloy steel of suitable uniform quality, which may be coated, (e.g. hot-dipped tinplate).

The valve or closure shall be one of the following types:

— type 1: Female valve (see 3.12) mounted in a double layer, threaded centre boss valve cup;

— type 2: Male valve (see 3.13) mounted in a double layer, threaded centre boss valve cup;

— type 3: Female valve (see 3.12) mounted in a single layer, threaded centre boss valve cup (see Annex A);

— type 4: Male valve (see 3.13) mounted in a single layer, threaded centre boss valve cup (see Annex A).

Type 3 and 4 are only admitted if:

a) The total mass of gas contained in the cartridge is less than 70 g,

b) The cartridge diameter is less than 50 mm.

The valve shall not break when a torque of 15 N·m is applied as indicated in 6.8.

4.4.3 Filled cartridges fitted with type 1 valves

Filled cartridges fitted with type 1 valves shall comply with the following:

a) the valve cup component shall be manufactured from a double layer of material;

b) the thickness of the valve cup shall be between 0,30 mm and 0,57 mm;

NOTE Special attention is drawn to the material thickness at the root of the thread.

Documents
Document Sharing Hub
Full document details: BS EN 417:2012

c) the centre boss of the valve cup shall be externally threaded for at least four and a half full threads with the following external screw thread:

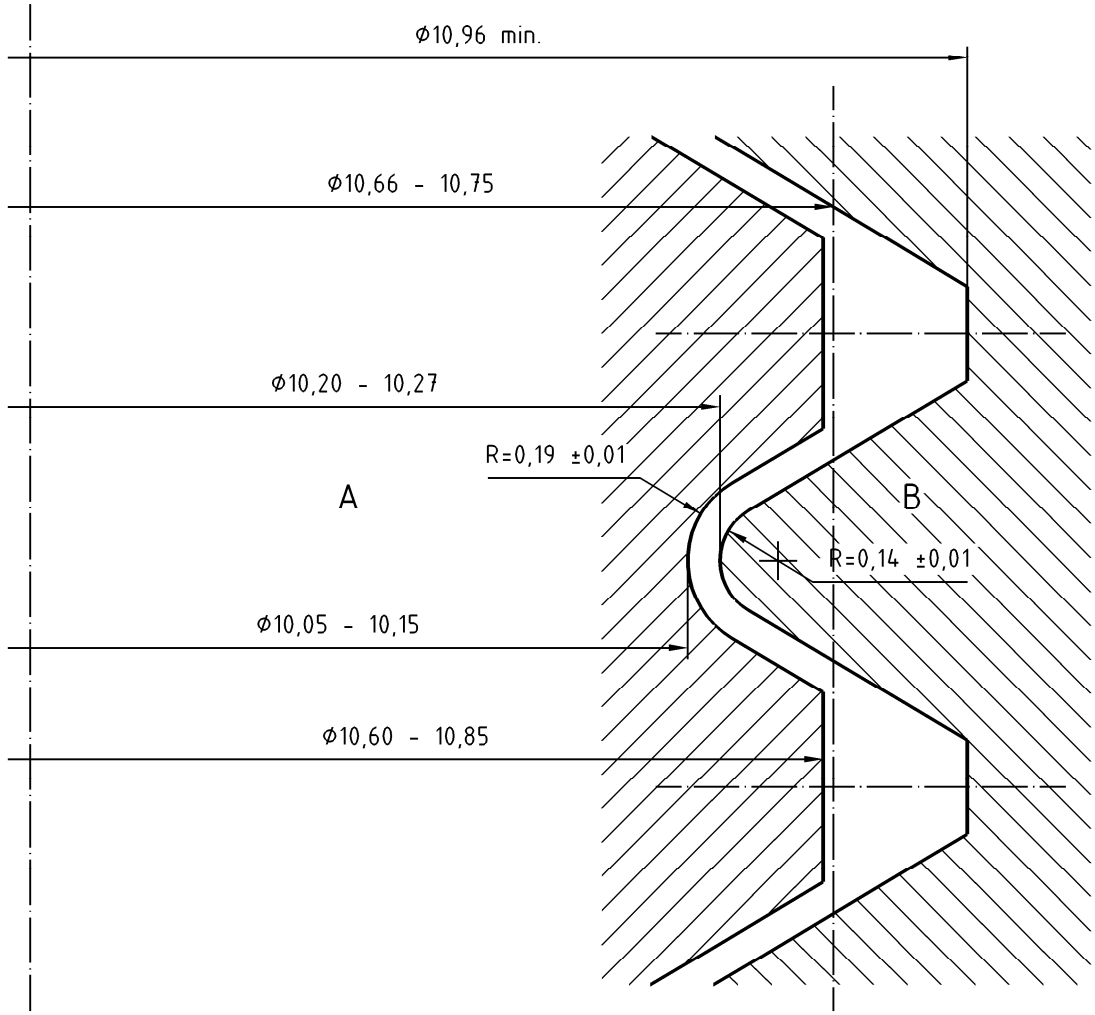
— 7/16 28 UNIFIED FORM SPECIAL — EXT. ;

— Major diameter 10,60 mm to 10,85 mm;

— Minor diameter 10,05 mm to 10,15 mm;

— The thread shall be a rolled thread (see Figure 2);

Dimensions in millimetres



Key

A valve

B adaptor

Figure 2 — Thread tolerances of the valve and of the adaptor

Documents
Document Sharing Hub
Full document details: BS EN 417:2012

d) the top surface of the centre boss shall be raised at an angle of 25° to the horizontal over an area defined by a circle of (5,65 ± 0,15) mm which is concentric with the major diameter of the thread tolerance: 0,15 mm maximum (see Figure 3);

e) the raised portion shall be pierced with a circular hole of (3,45 ± 0,2) mm diameter, concentric with the major diameter of the thread (tolerance: 0,15 mm maximum), (see Figure 3);

f) the flat surface of the boss surrounding the raised area shall be square to the central axis of the thread (± 2°);

g) when the valve is crimped and the cartridge is filled with gas the flat surface of the boss surrounding the raised area shall be not less than 0,9 mm and not more than 1,4 mm above the plane of the top surface of the cup rim (see Figure 3) and shall be parallel to that plane (± 2°);

h) the upper surface(s) of the centre boss shall form the sealing surface(s) for an appliance screwed onto the valve;

i) the inner diameter of the swaged cup shall not be less than 23 mm and the outer diameter of the swaged cup shall not exceed 34 mm (see Figure 3). The inner and outer diameters of the swaged cup shall be concentric with the major diameter of the thread (tolerance: 0,3 mm maximum);

j) when the valve is crimped and the cartridge is filled with gas the horizontal clearance between the centre boss and the inner wall of the valve cup shall not be less than 5,8 mm and shall be maintained over a vertical distance of at least 8 mm below the plane of the flat surface of the centre boss surrounding the raised area (see Figure 3);

NOTE 1 The clearance dimensions between the major diameter of the valve cup boss thread and the inner diameter of the valve cup is a minimum dimension for the valve cup and a reference dimension for the maximum size of the corresponding part of the appliance.

NOTE 2 It is essential that any part of the appliance which makes contact with the cartridge or cartridge valve rim during assembly does not interfere with the safe sealing process of the cartridge to the appliance.

k) the inner diameter of the inner gasket shall be concentric with the major diameter of the thread (tolerance: 0,3 mm maximum). The inner diameter shall not be less than 2,5 mm and not greater than 2,9 mm when assembled in the valve;

l) the valve shall remain fully closed when the distance from the centre of the spigot seat to the flat surface of the boss surrounding the raised area is less than 1,85 mm (see dimension A in Figure 4). The valve shall be fully opened when the distance is more than 3,5 mm (see dimension B in Figure 4);

It shall be possible to depress the centre of the spigot seat at least 4,15 mm below the flat surface of the boss surrounding the raised area without damage to the valve or the valve-housing (see dimension C in Figure 4).

NOTE 3 When the appliance is attached to the cartridge, the cartridge valve is opened by a spigot on the appliance. The requirements specified in 4.4.3 should assist the appliance designer to establish the appropriate size of spigot to avoid leakage of gas when fitting the appliance to the cartridge. In addition, it is essential that when the appliance is fitted, the spigot does not extend more than 4,15 mm below the flat surface of the boss surrounding the raised area, as this can damage the valve possibly leading to unrestricted loss of gas.

AVA Documents
Document Sharing Hub

Full document details: BS EN 417:2012

Dimensions in millimetres

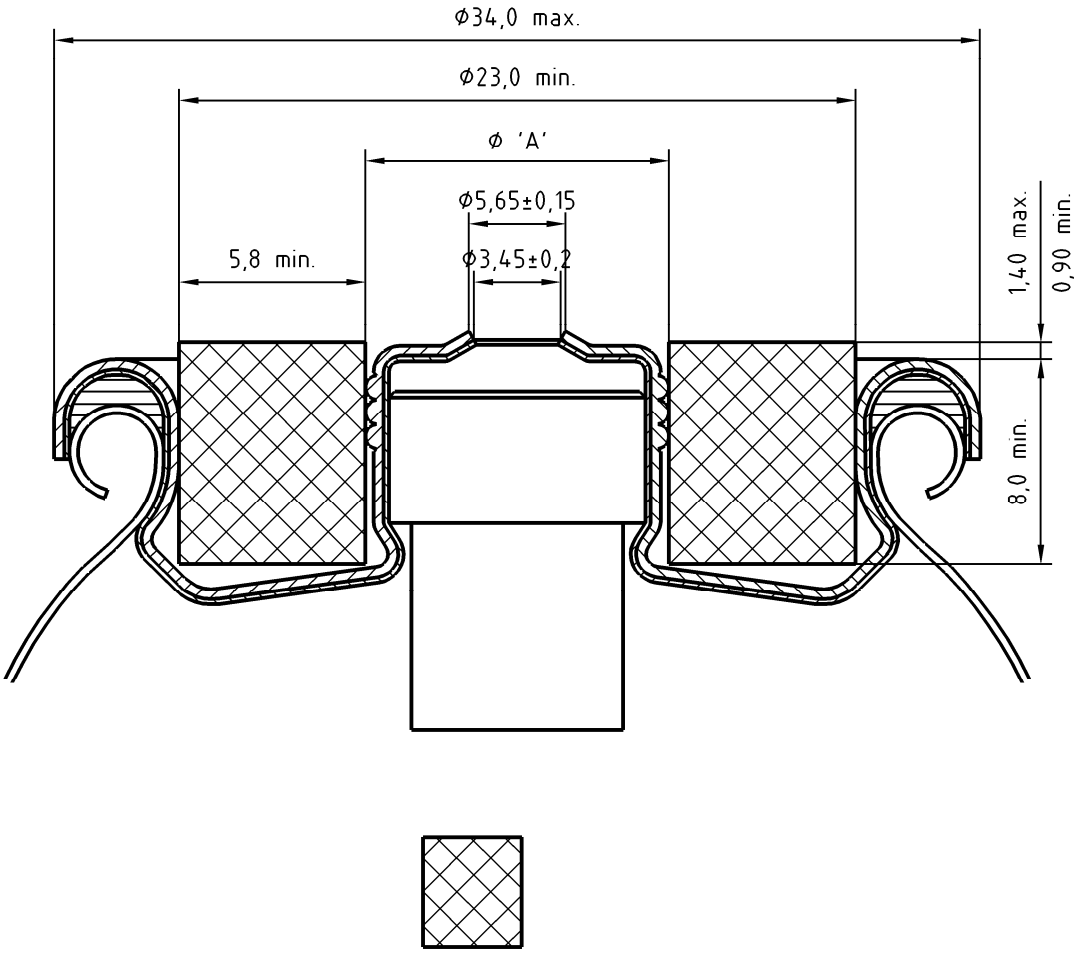


Figure 3 — Section of a threaded centre boss valve cup (type 1)

Documents
Document Sharing Hub
Full document details: BS EN 417:2012