

CONTEC

Comissão de Normalização
Técnica

SC-16

Industrial Safety

**Industrial Hydrants and Accessories to
Connection Type Storz**

Revalidation

Revalidated em 01/2016.

CONTECComissão de Normalização
Técnica**SC-16**

Industrial Safety

**Industrial Hydrants and Accessories to
Connection Type Storz****1st Amendment**

This is the 1st Amendment to PETROBRAS N-111 REV. G and it is used to alter the text of the Standard in the parts indicated below:

NOTE 1 The news pages with the performed amendments are placed in its corresponding positions.

NOTE 2 The amended pages, indicated the date of the amendment, are placed at the end of this standard, in chronological order, and shall not be used.

CONTENTS OF THE 1st AMENDMENT - 04/2014**- Section 2:**

Exclusion of ABNT NBR 6314.

- Table A.1:

Alteration of the text.

- Table B.1:

Alteration of the text.

- Table C.1:

Alteration of the text.

Industrial Hydrants and Accessories to Connection Type Storz

Standardization

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the sections, subsections and enumerates thereof.

Technical Requirement: A provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("non-conformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by imperative nature.

Recommended Practice: A provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by verbs of a nonmandatory nature. It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "non-conformities" to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the section, subsection and enumerate to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

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Introduction

PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting specialized of Technical Collaborators from Company and its Subsidiaries), are commented by Company Units and its Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of technicians from the same specialty, representing the various Company Units and its Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the Company Units and its Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard N-1. For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

Foreword

This Standard is the English version (issued in 02/2011) of PETROBRAS N-111 REV. g 02/2011. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

1 Scope

1.1 This Standard standardizes the hydrants types, connection, adapter and plug for fire hose for use in onshore and offshore facilities of the PETROBRAS.

1.2 This Standard applies to design starting from its issue date.

1.3 The application of this Standard in the case of companies of the PETROBRAS System headquartered abroad shall be based on respect for local legislation, as well as for the other applicable requirements. It shall be understood that all other existing Brazilian legislation or references pointed out in this Standard may serve as input to its adaptation process.

1.4 This Standard contains Technical Requirements and Recommended Practices.

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.

PETROBRAS [N-76](#) - Piping Materials for Refining and Transportation Plants;

ABNT [NBR 5425](#) - Guia para Inspeção por Amostragem no Controle e Certificação de Qualidade;

ABNT [NBR 5426](#) - Planos de Amostragem e Procedimentos na Inspeção por Atributos;

ASME [B1.5](#) - Acme Screw Threads;

ASME [B1.20.1](#) - Pipe Threads, General Purpose (Inc);

ASTM [A536](#) - Standard Specification for Ductile Iron Castings;

ASTM [B36/B36M](#) - Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar;

ASTM [B62](#) - Standard Specification for Composition Bronze or Ounce Metal Castings;

ASTM [B75](#) - Standard Specification for Seamless Copper Tube;

ASTM [B124/B124M](#) - Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes;

ASTM [D2000](#) - Standard Classification System for Rubber Products in Automotive Applications;

NFPA [1963](#) - Standard for Fire Hose Connections;

SAE [J452](#) - Chemical Compositions, Mechanical and Physical Properties of SAE Aluminum Casting Alloys;

SAE [J461](#) - Wrought and Cast Copper Alloys.

NOTE For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

3 General Conditions

3.1 Hydrants Types

There are seven hydrants types according to Figures 1 to 7:

- a) type I - vertical hydrant with two outlets (Figure 1);
- b) type II - vertical hydrant with for outlets (Figure 2);
- c) type III - vertical hydrant with six outlets (Figure 3);
- d) type IV - vertical hydrant with for outlets with an adapter to nozzle (Figure 4);
- e) type V - horizontal hydrant with two outlets (Figure 5);
- f) type VI - horizontal hydrant with for outlets (Figure 6);
- g) type VII - horizontal hydrant with six outlets (Figure 7).

NOTE For reasons of ergonomics, it is recommended that section of pipe in the network of fire near the channels or pipelines are used hydrants horizontal type. **[Recommended Practice]**

3.2 Diameters

The inlet and outlet diameters of the hydrants are in Table 1.

Table 1 - Inlet and Outlet Diameters

Hydrant type	Inlet (nominal diameter)		Side outlet to hose (nominal diameter)				Upper outlet to nozzle (nominal diameter)		Number of outlets to hoses
	mm	in	mm		in		mm	in	
I	100	4"	38	65	1 1/2"	2 1/2"	-	-	2
II	150	6"	65		2 1/2"		-	-	4
III	150	6"	65		2 1/2"		-	-	6
IV	150	6"	65		2 1/2"		80	3"	4
V	100	4"	65		2 1/2"		-	-	2
VI	150	6"	65		2 1/2"		-	-	4
VII	150	6"	65		2 1/2"		-	-	6

3.3 Materials

3.3.1 Tubes, Flanges, Connections and Block Valves

It shall be in according with the PETROBRAS [N-76](#) and the scope design.

3.3.2 65 mm (2 1/2") or 38 mm (1 1/2") Angular Valve

- a) working pressure - 1 400 kPa (14,5 kgf/cm²);
- b) sealing test pressure (closed valve) - 1 724 kPa (17,5 kgf/cm²);
- c) body hydrostatic test pressure - 2 800 kPa (29 kgf/cm²);
- d) body and internal sides of bronze ASTM [B62](#);
- e) inlet with internal screw thread 2 1/2" - 8 NPT (ASME [B1.20.1](#)) or 1 1/2" - 11,5 NPT (ASME [B1.20.1](#)) and outlet with external screw thread 2,5 - 7,5 NH (NFPA [1963](#));

- f) spindle with center of 19,0 mm (3/4") diameter and external screw thread ACME (ASME [B1.5](#)) with 6 wires per inch; socket valve handle with square section with 12,7 mm (1/2") side; non-fixed sealing disc to the spindle with neoprene ring and vertical displacement until a position above the discharge mouth;
- g) valve handle with 152,4 mm (6") diameter in nodular iron ASTM [A536](#), brass ASTM [B36/B36M](#) or aluminium alloy SAE 323, (SAE [J452](#)) in a manner that the valve handle is capable to resist a 90 N.m (900 kgf.cm) torque applied to the hoop or radius without present a visible deformation, cracks or any type of failure; the spindle fastening shall be by a 6,3 mm (1/4") washer and bolt.

3.3.3 Fire Hose Adapter

Shall be in accordance with Annex A.

3.3.4 Fire Hose Cap

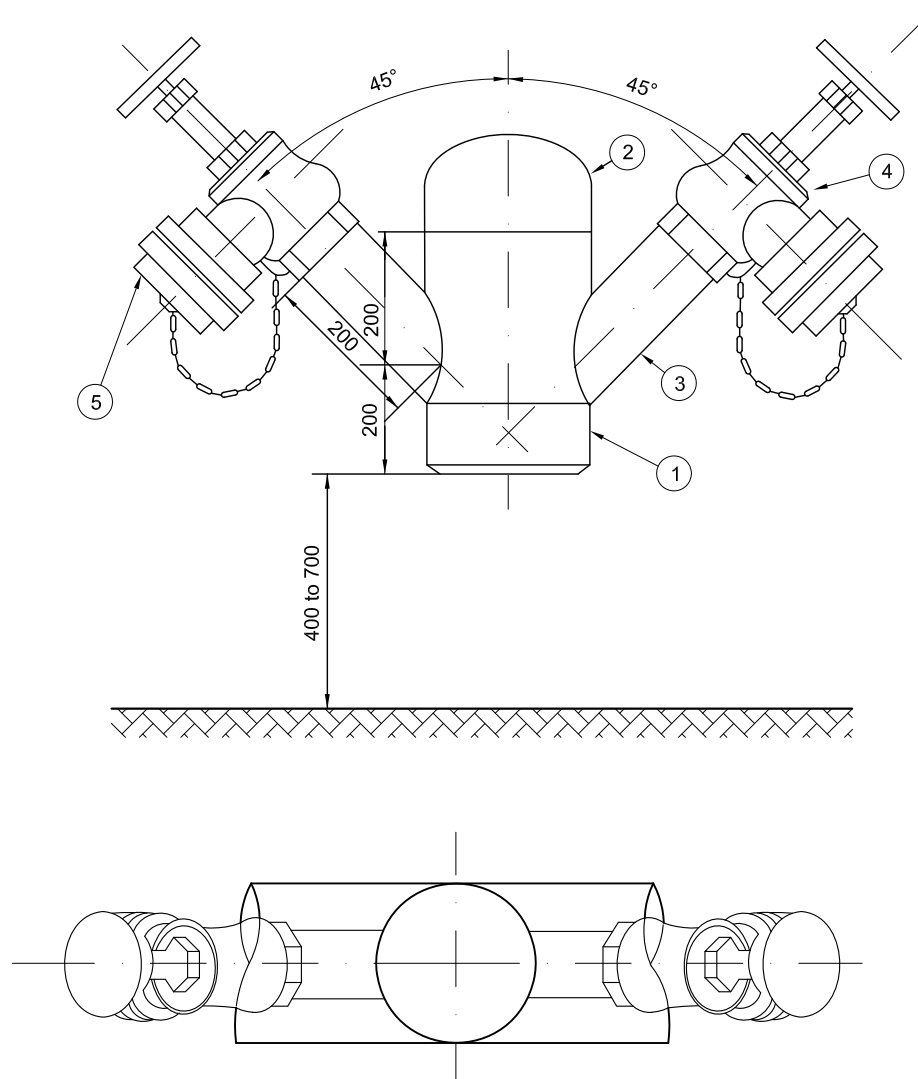
Shall be in accordance with Annex B.

3.3.5 Union Hose Fire

Shall be in accordance with Annex C.

3.4 End

The hydrants shall be supplied with welded end beveled.

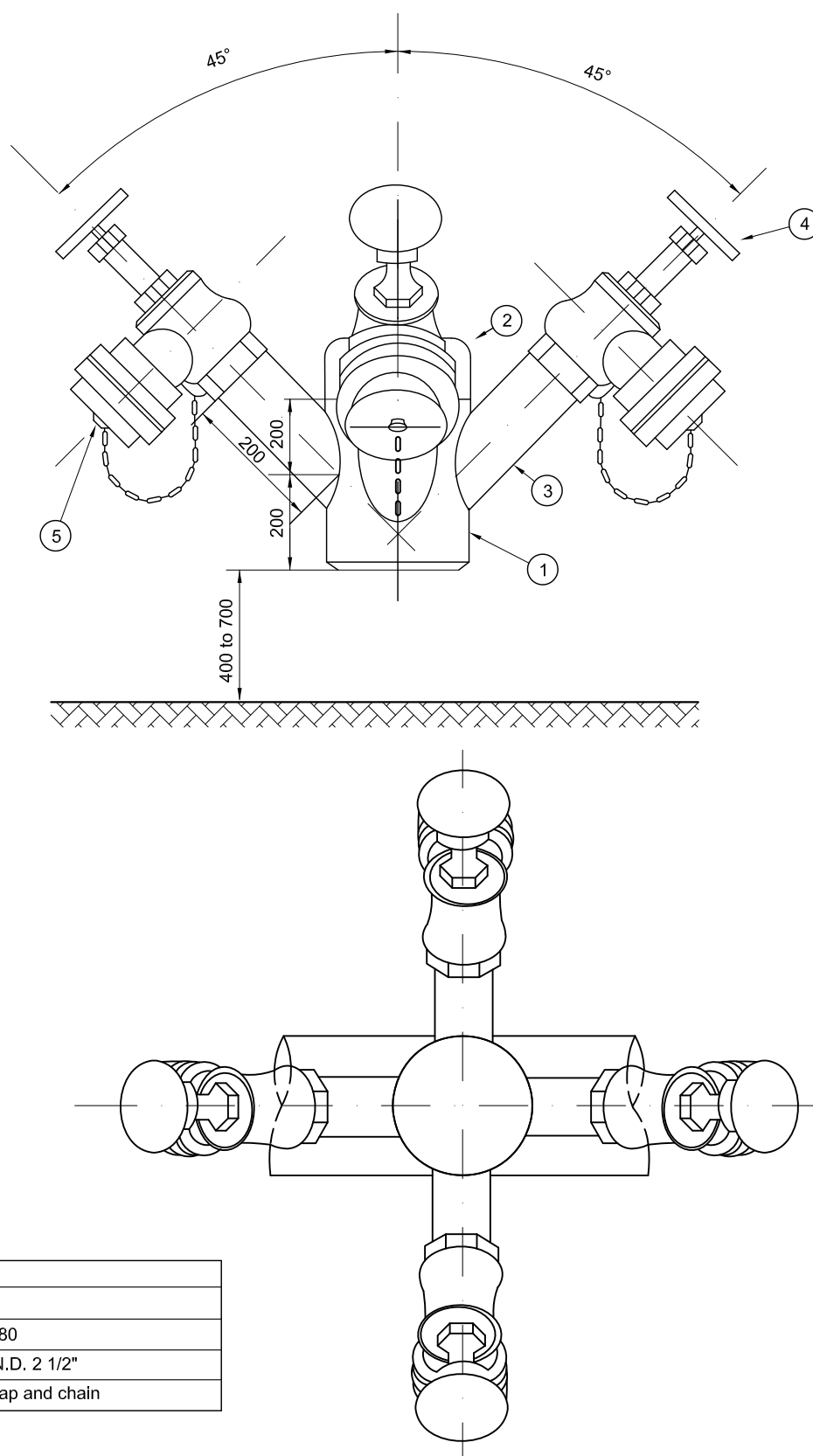


1	Tube N.D. 4", SCH. 40
2	Cap N.D. 4", SCH. 40
3	Tube N.D. 2 1/2", SCH. 80 or N.D. 1 1/2", SCH 80
4	Hydrant angular valve, N.D. 2 1/2" or N.D. 1 1/2"
5	Fire hose adapter with cap and chain

NOTE 1 Measures in millimeters, unless otherwise specified.

NOTE 2 Tolerance - angles: $\pm 5^\circ$.
- dimensions ± 5 mm.

Figure 1 - Hydrant Type I

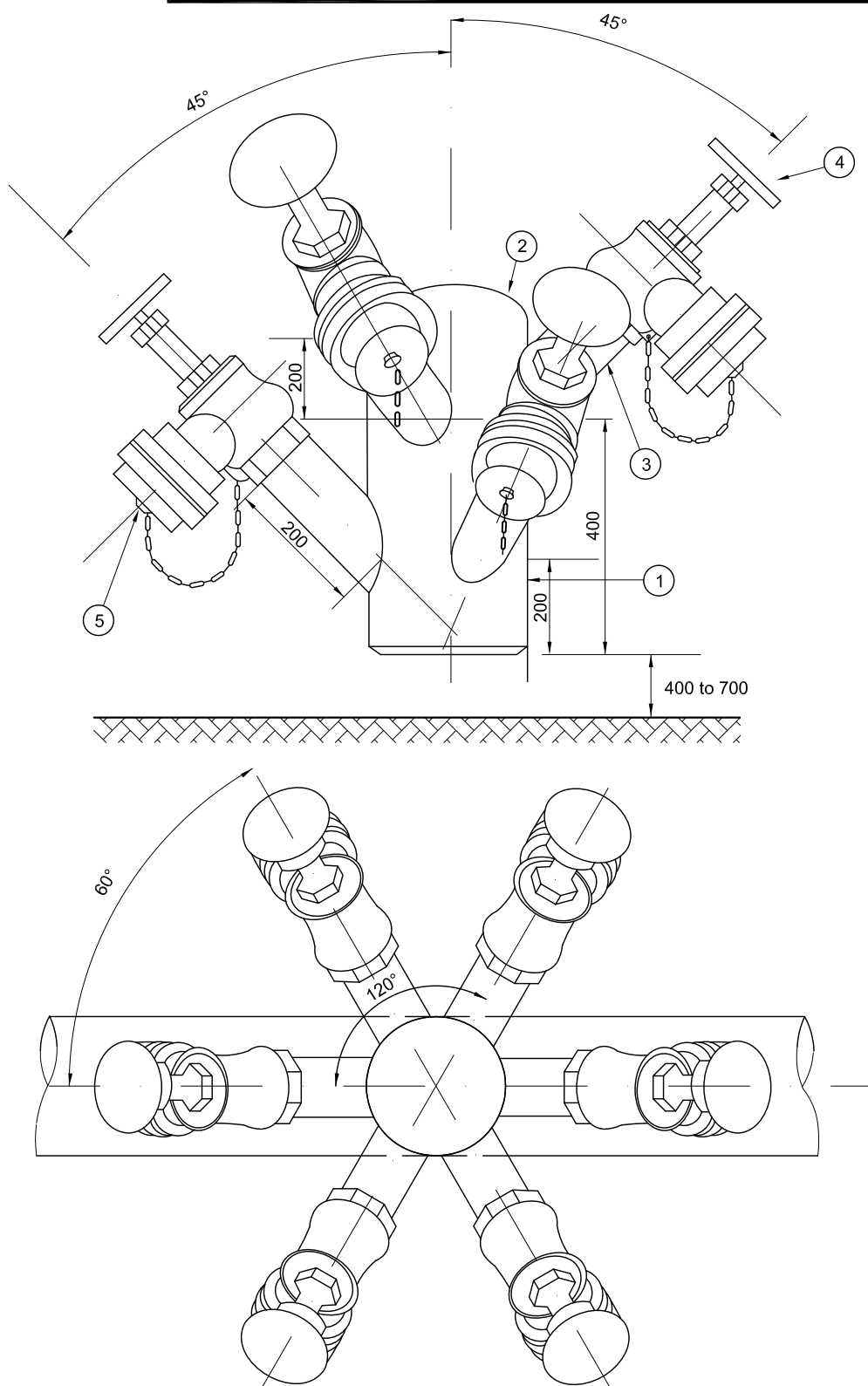


1	Tube N.D. 6", SCH. 40
2	Cap N.D. 6", SCH. 40
3	Tube N.D. 2 1/2", SCH 80
4	Hydrant angular valve, N.D. 2 1/2"
5	Fire hose adapter with cap and chain

NOTE 1 Measures in millimeters, unless otherwise specified.

NOTE 2 Tolerance - angles: $\pm 5^\circ$.
- dimensions ± 5 mm.

Figure 2 - Hydrant Type II

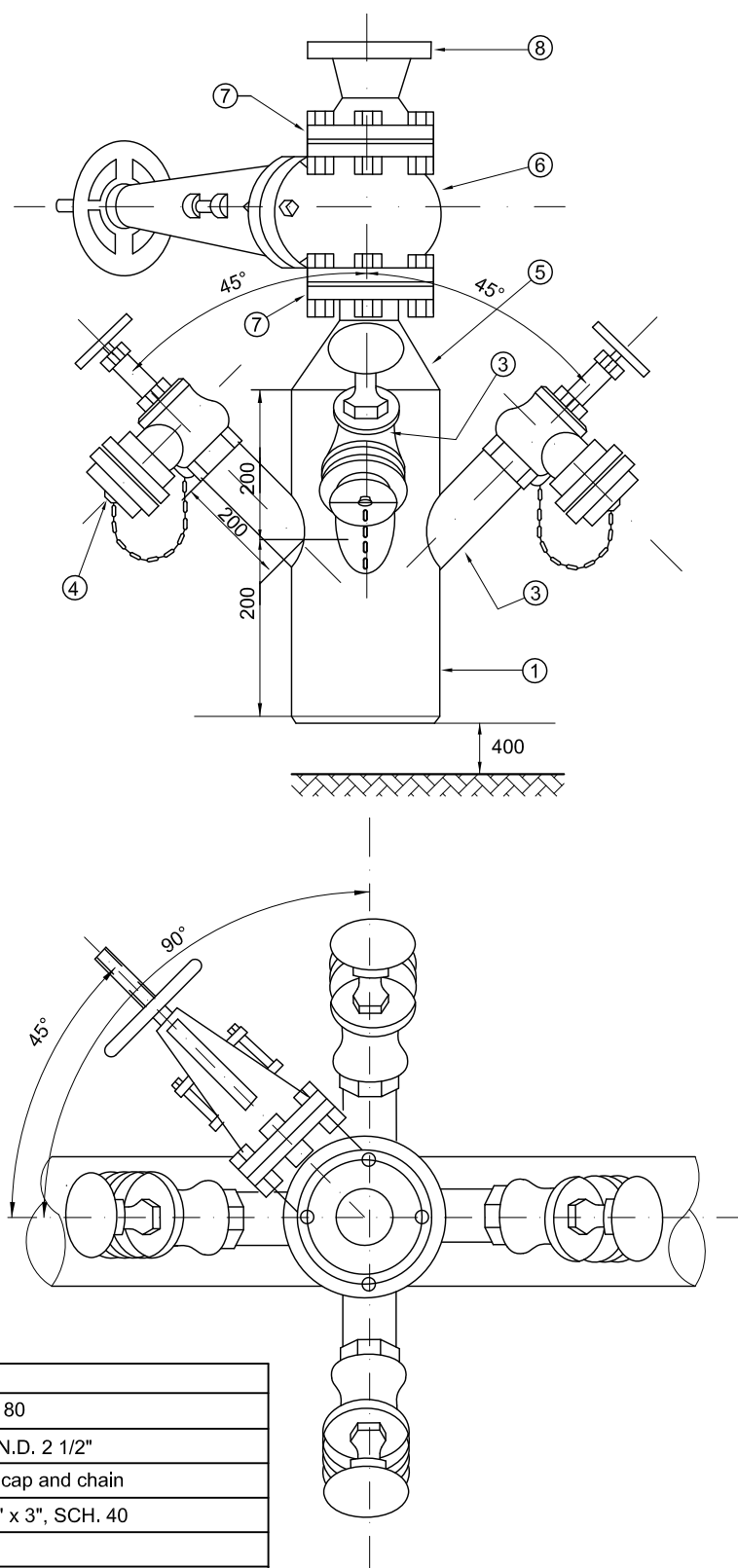


1	Tube N.D. 6", SCH. 40
2	Cap N.D. 6", SCH. 40
3	Tube N.D. 2 1/2", SCH 80
4	Hydrant angular valve, N.D. 2 1/2"
5	Fire hose adapter with cap and chain

NOTE 1 Measures in millimeters, unless otherwise specified.

NOTE 2 Tolerance - angles: $\pm 5^\circ$.
- dimensions ± 5 mm.

Figure 3 - Hydrant Type III



1	Tube N.D. 6", SCH. 40
2	Tube N.D. 2 1/2", SCH. 80
3	Hydrant angular valve, N.D. 2 1/2"
4	Fire horse adapter with cap and chain
5	Concentric reduction, 6" x 3", SCH. 40
6	Flanged gate valve 3"
7	Welding neck flange 3", SCH. 40
8	Welding neck flange 3" SCH. 40 class 1,50 (ASME B16.5) FP

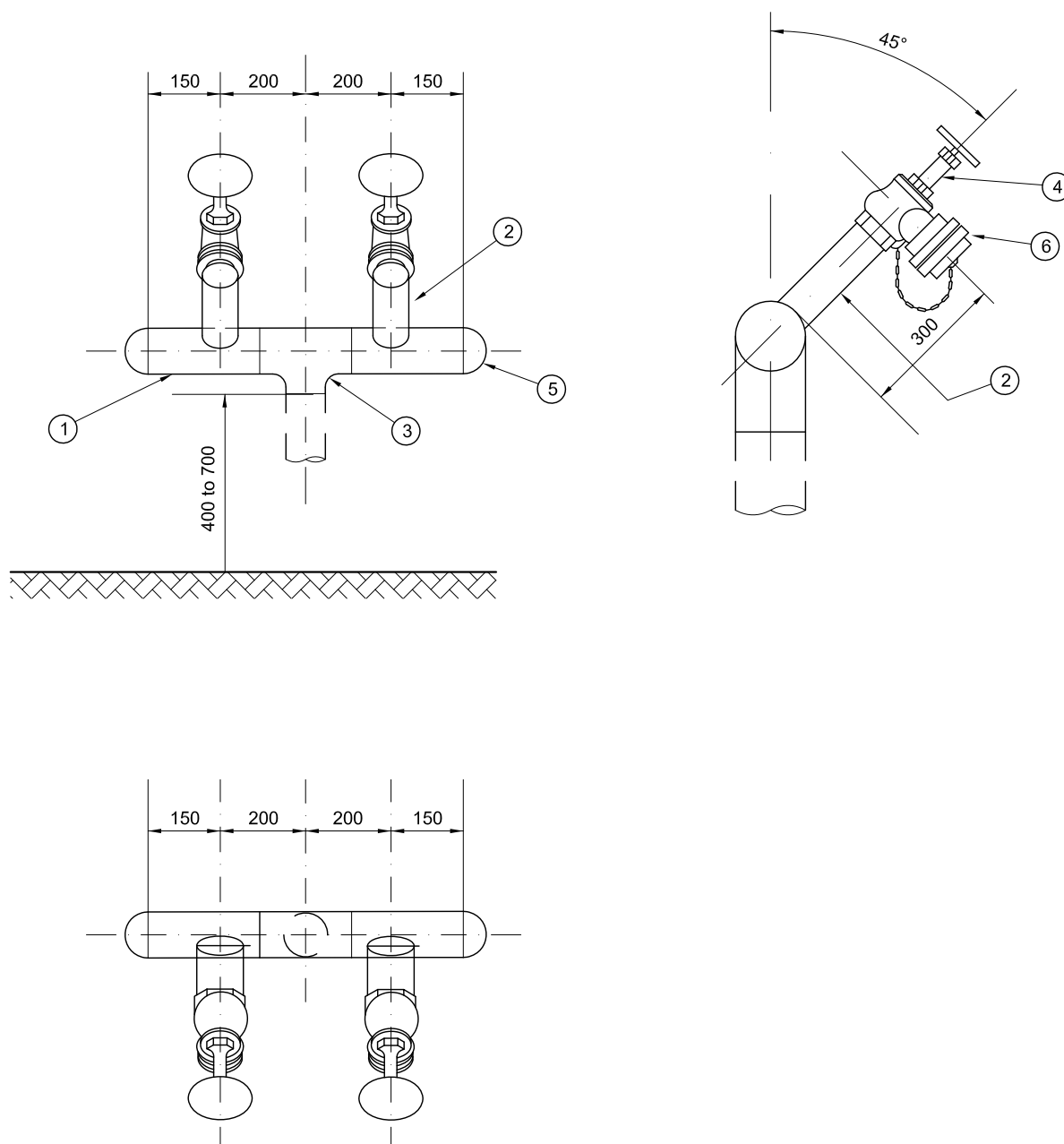
NOTE 1 Measures in millimeters, unless otherwise specified.

NOTE 2 Tolerance - angles: $\pm 5^\circ$.
- dimensions ± 5 mm.

NOTE 3 This hydrant type shall only be used with underground fire line.

NOTE 4 The monitor nozzle installation for air lines shall be done separated of the hydrant.

Figure 4 - Hydrant Type IV

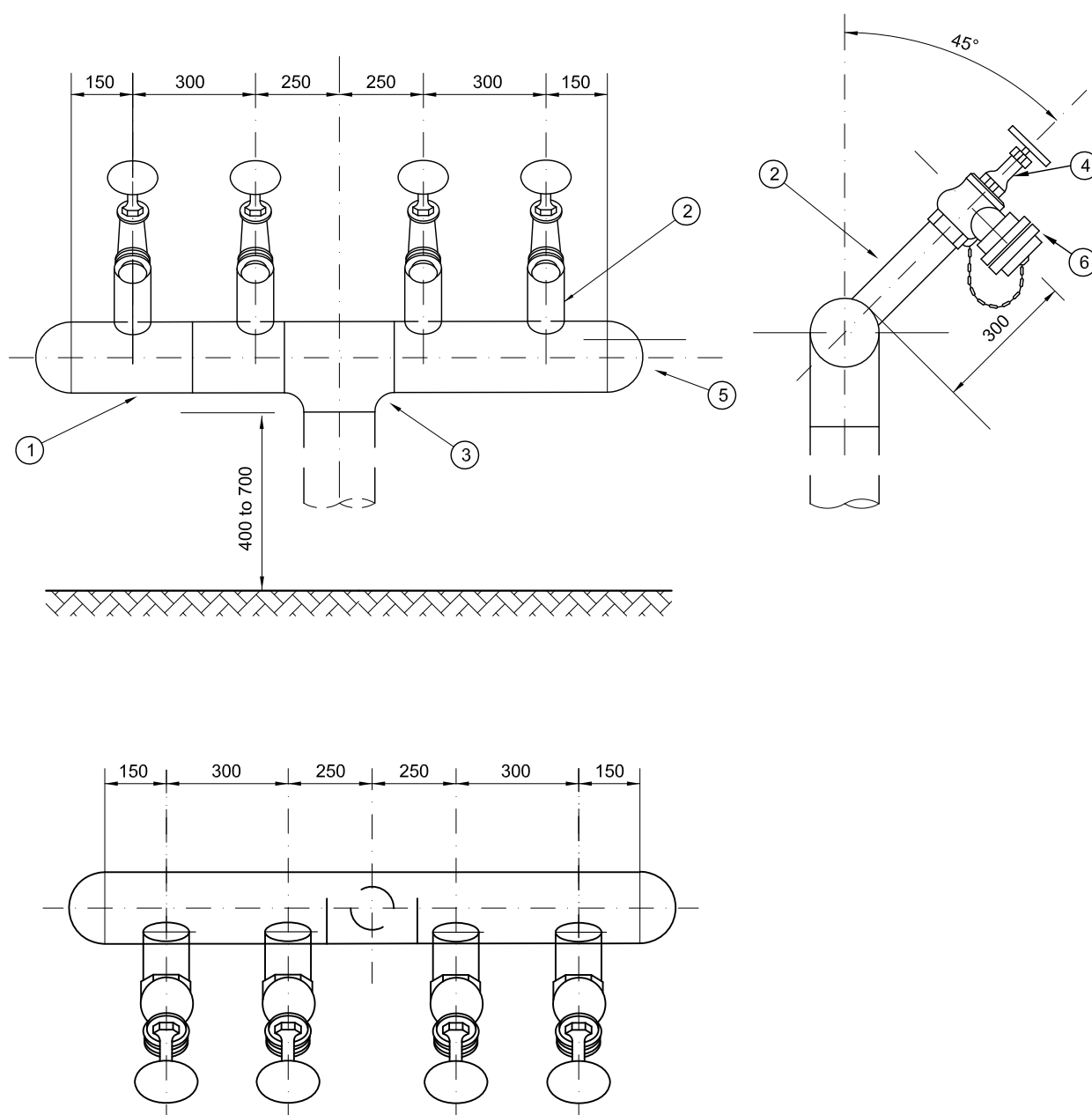


1	Tube N.D. 4", SCH. 40
2	Tube N.D. 2 1/2", SCH. 80
3	"T" N.D. 4", SCH 40
4	Hydrant angular valve, N.D. 2 1/2"
5	Cap N.D. 4", SCH. 40
6	Fire hose adapter with cap and chain

NOTE 1 Measures in millimeters, unless otherwise specified.

NOTE 2 Tolerance - angles: $\pm 5^\circ$.
- dimensions ± 5 mm.

Figure 5 - Hydrant Type V

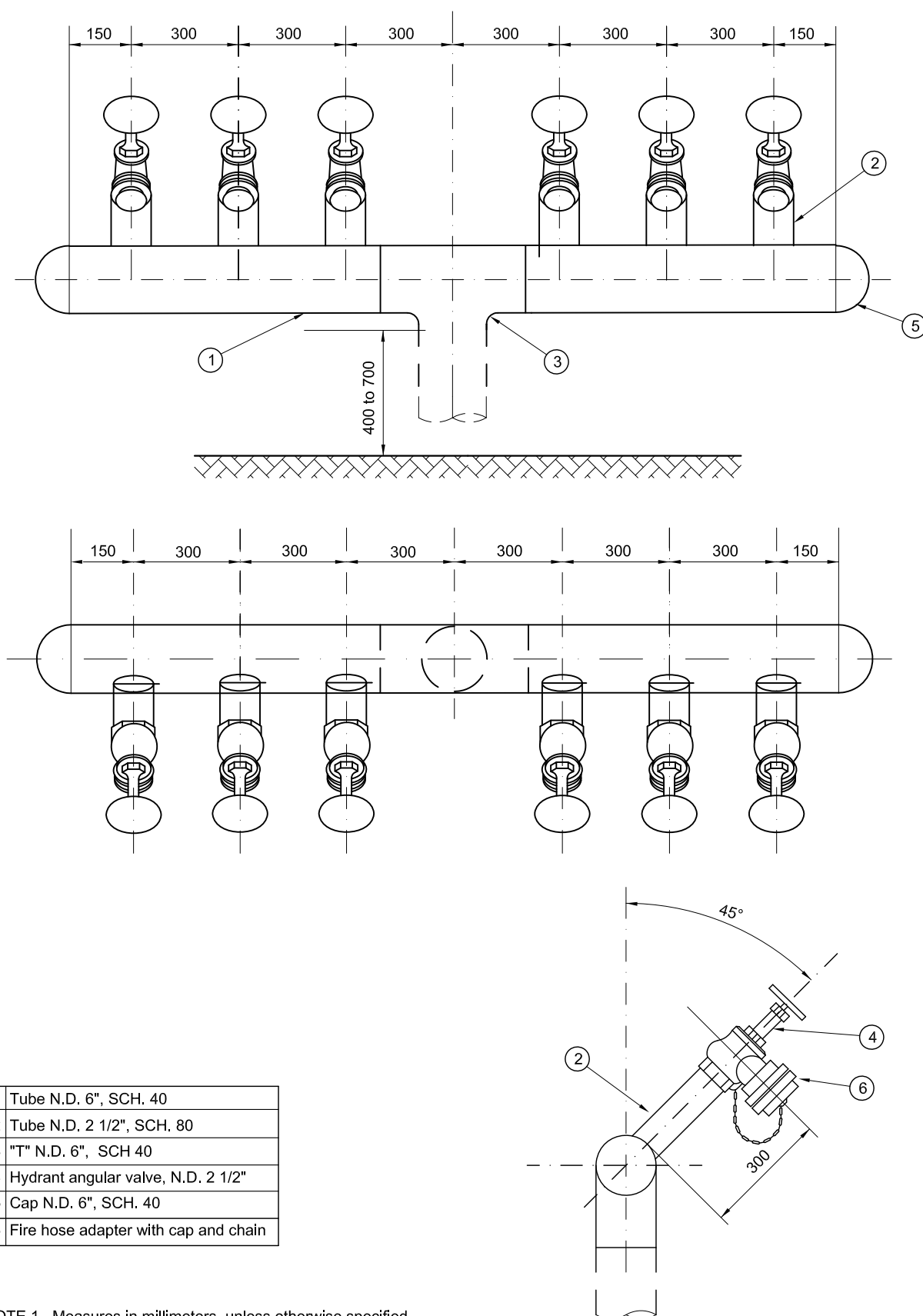


1	Tube N.D. 6", SCH. 40
2	Tube N.D. 2 1/2", SCH. 80
3	"T" N.D. 6", SCH 40
4	Hydrant angular valve, N.D. 2 1/2"
5	Cap N.D. 6", SCH. 40
6	Fire hose adapter with cap and chain

NOTE 1 Measures in millimeters, unless otherwise specified.

NOTE 2 Tolerance - angles: $\pm 5^\circ$.
- dimensions ± 5 mm.

Figure 6 - Hydrant Type VI



NOTE 1 Measures in millimeters, unless otherwise specified.

NOTE 2 Tolerance - angles: $\pm 5^\circ$.
- dimensions ± 5 mm.

Figure 7 - Hydrant Type VII

Annex A - Fire Hose Adapter

A.1 Scope

A.1.1 This Annex establishes the conditions for the quick hitch adapter type of internal or external thread of 38 mm (1 1/2 ") and 65 mm (2 1/2").

A.1.2 The adapter specified in this Annex is used to connect fittings or accessories provided with internal or external thread, with other, like quick, storz.

A.2 General Conditions

A.2.1 The purchase unit is one adapter (according to A.3.1.1).

A.2.2 The material shall be packaged in such a manner as to ensure its full integrity and right Identification

A.2.3 Each adapter shall have the mark of the manufacturer's name or brand and the nominal diameter in low or high relief.

A.2.4 The purchase specification shall state:

- a) if the rubber of the sealing ring shall be resistant to petroleum products;
- b) type of inspection to be used (according to Annex D).

A.3 Specific Conditions

A.3.1 Components

A.3.1.1 Each adapter (see Figures A.1 to A.4) shall be comprised of:

- a) one adapter flange;
- b) one sealing ring;
- c) one sealing washer.

NOTE 1 Only female threaded adapters have the component indicated in A.3.1.1 c).

NOTE 2 The female or male thread of the adapter shall be specified as NPT or BSPT, according to the type of thread adopted in the piping system to be connected. For connections in fire-fighting equipment, the thread shall be specified according to standard NFPA 1963.

NOTE 3 For the barrel hydrants should be built from 2,5 to 7,5 NH (see NFPA 1963).

A.3.1.2 The adapter flange shall be manufactured by:

- a) mold casting or shell molding; or
- b) forging from a bar.

A.3.2 Material

The components materials shall be in accordance with Table 1.

Table A.1 - Materials Composition

Piece	Material	Composition	Standards
Adapter flange	Special brass or forged bar of copper alloy (Note 1)	C-86400 alloy type CA-377 or Alloy 2	SAE J461 and ASTM B124/B124M
Sealing ring	Rubber (Note 2)	Grade R-515A1B	ASTM D2000
Sealing washer	Rubber (Note 2)	-	-
<p>NOTE 1 The selection shall be due to the manufacturing process according to the A.3.1.2.</p> <p>NOTE 2 The purchase specification shall indicate if the rubber shall be resistant to petroleum products, in which case grade SC-515A1B rubber is used.</p>			

A.3.3 Dimensions and Tolerances

The dimensions of the adapter's components are defined together with the tolerances in Figures A.1 to A.4. The tolerances that are not indicated shall be considered to be $\pm 0,3$ mm and $\pm 0,5$ mm for 38 mm and 65 mm adapters, respectively.

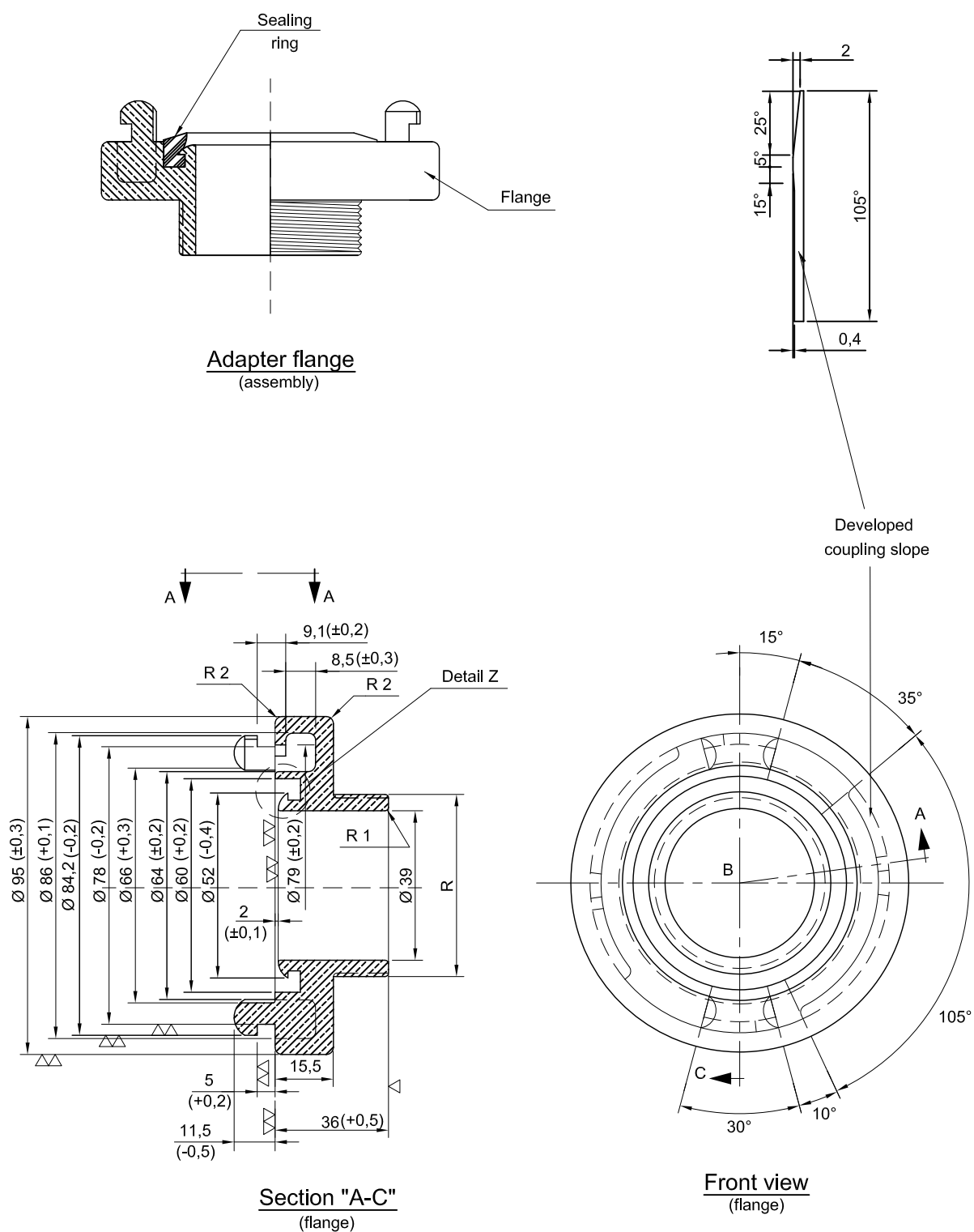
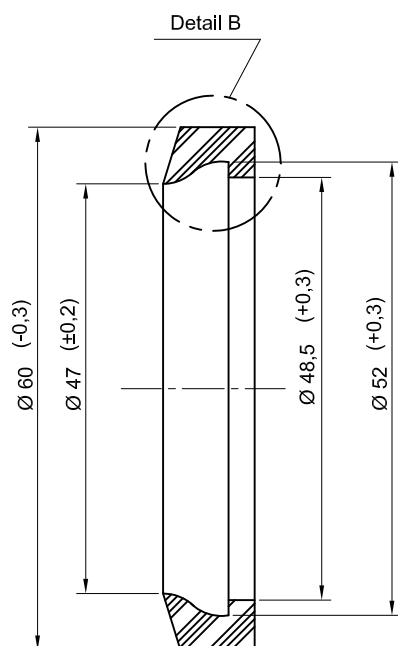
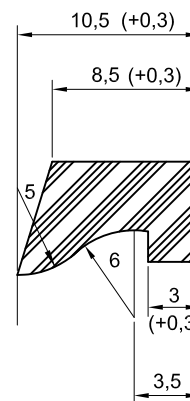


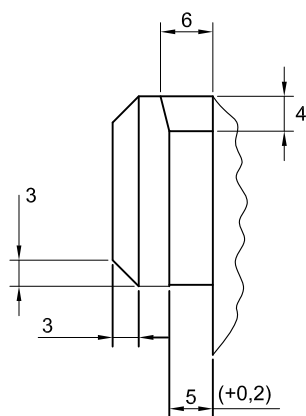
Figure A.1 - 38 mm Male Thread Adapter



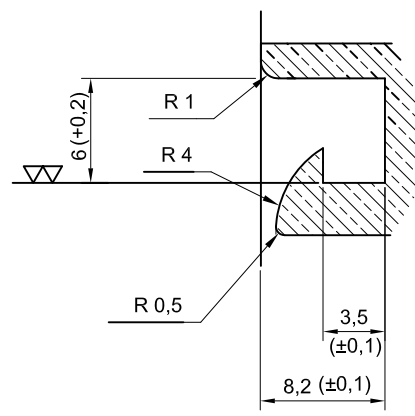
Sealing ring



Detail B
(enlarged)



Section "A-A"
(coupling clamp)



Detail Z
(enlarged)

NOTE Dimensions in millimeters, unless otherwise indicated.

Figure A.1 - 38 mm Male Thread Adapter (Continue)

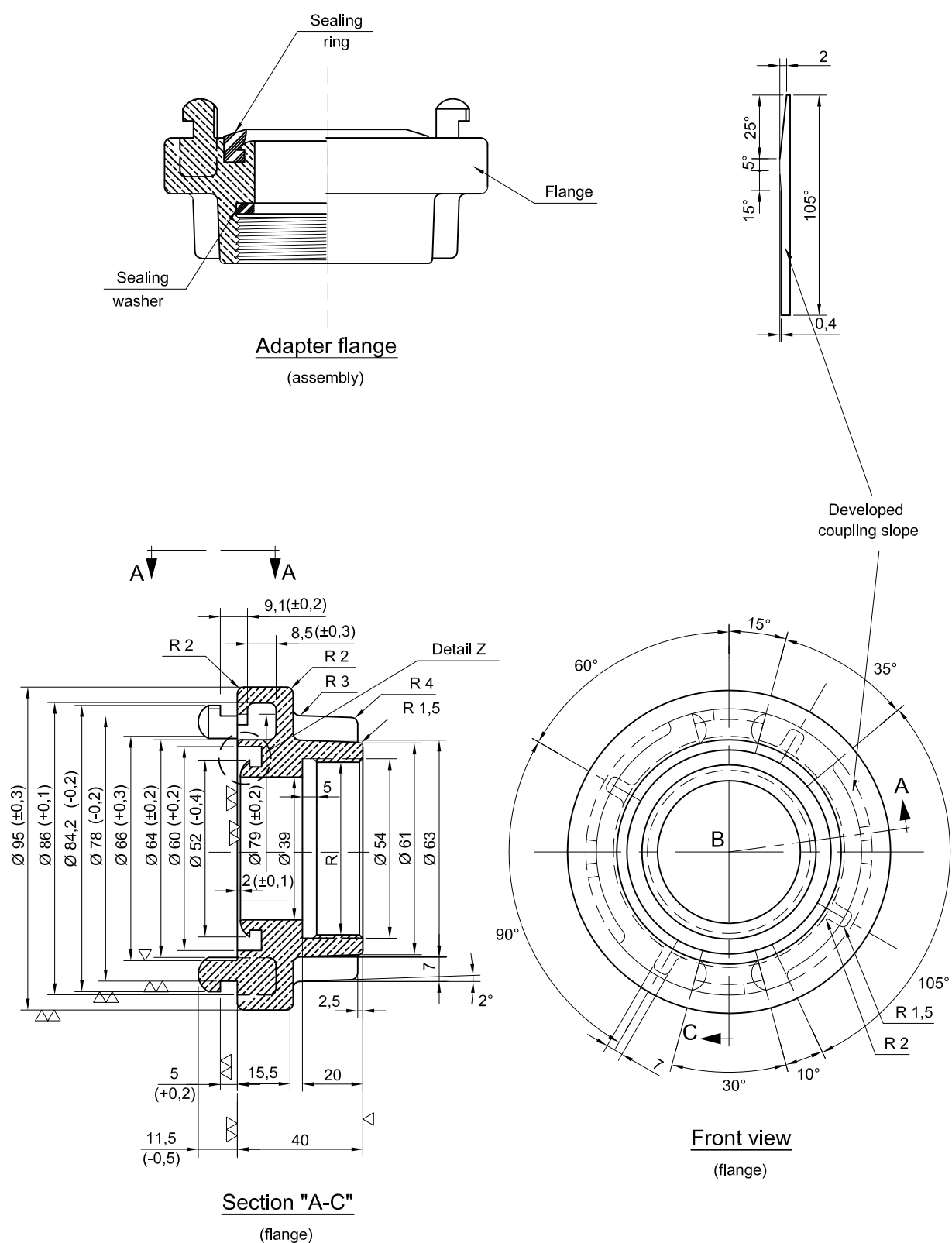
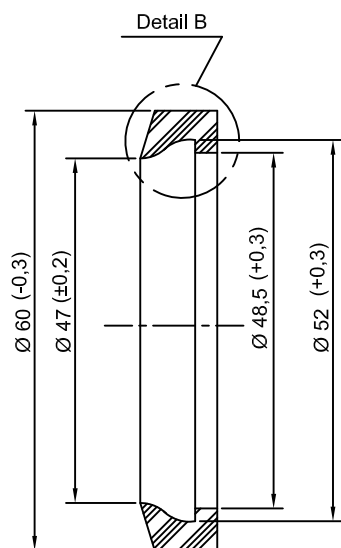
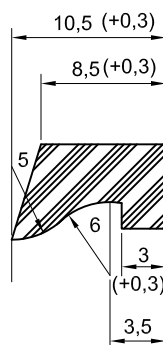


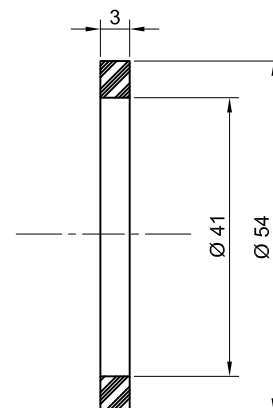
Figure A.2 - 38 mm Female Thread Adapter



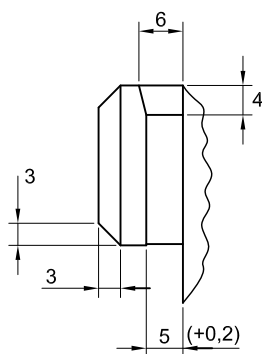
Sealing ring



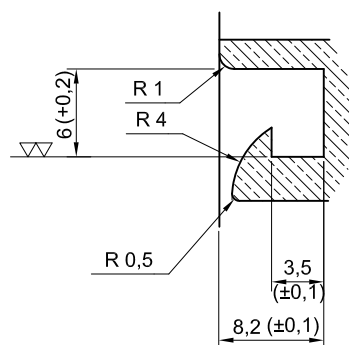
Detail B
(enlarged)



Sealing washer



Section "A-A"
(coupling clamp)



Detail Z
(enlarged)

NOTE Dimensions in millimeters, unless otherwise indicated.

Figure A.2 - 38 mm Female Thread Adapter (Continue)

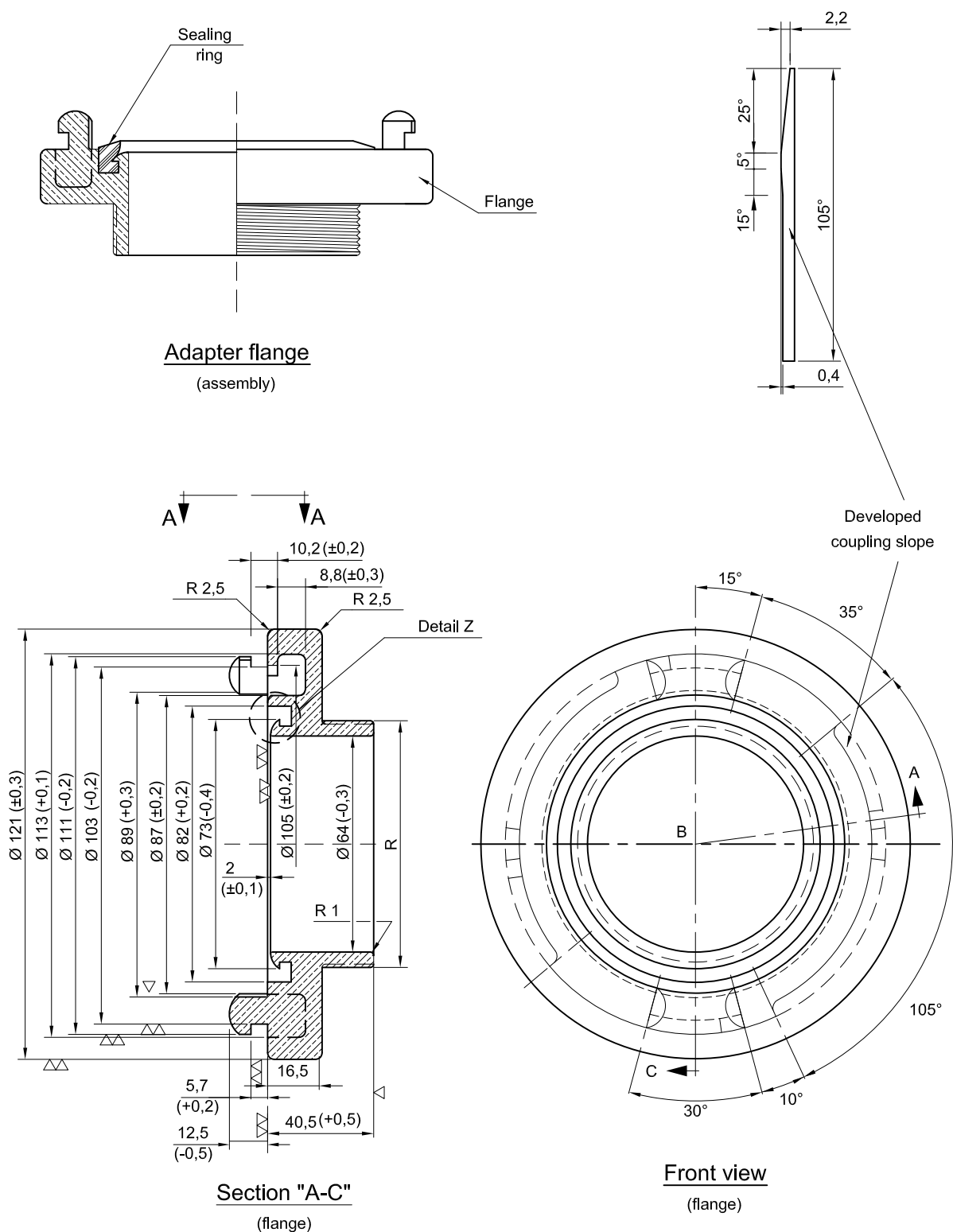
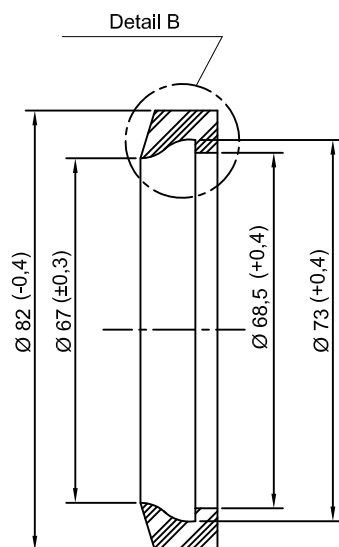
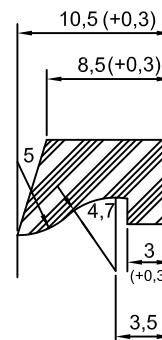


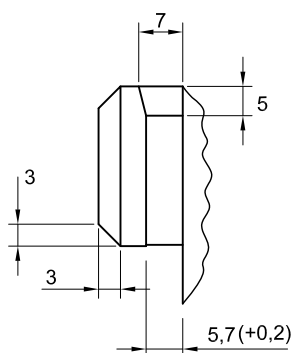
Figure A.3 - 65 mm Male Thread Adapter



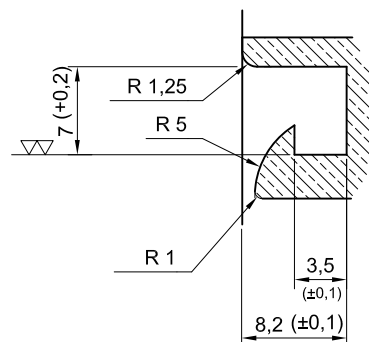
Sealing ring



Detail B
(ampliado)



Section "A-A"
(coupling clamp)



Detail Z
(enlarged)

NOTE Dimensions in millimeters, unless otherwise indicated.

Figure A.3 - 65 mm Male Thread Adapter (Continue)

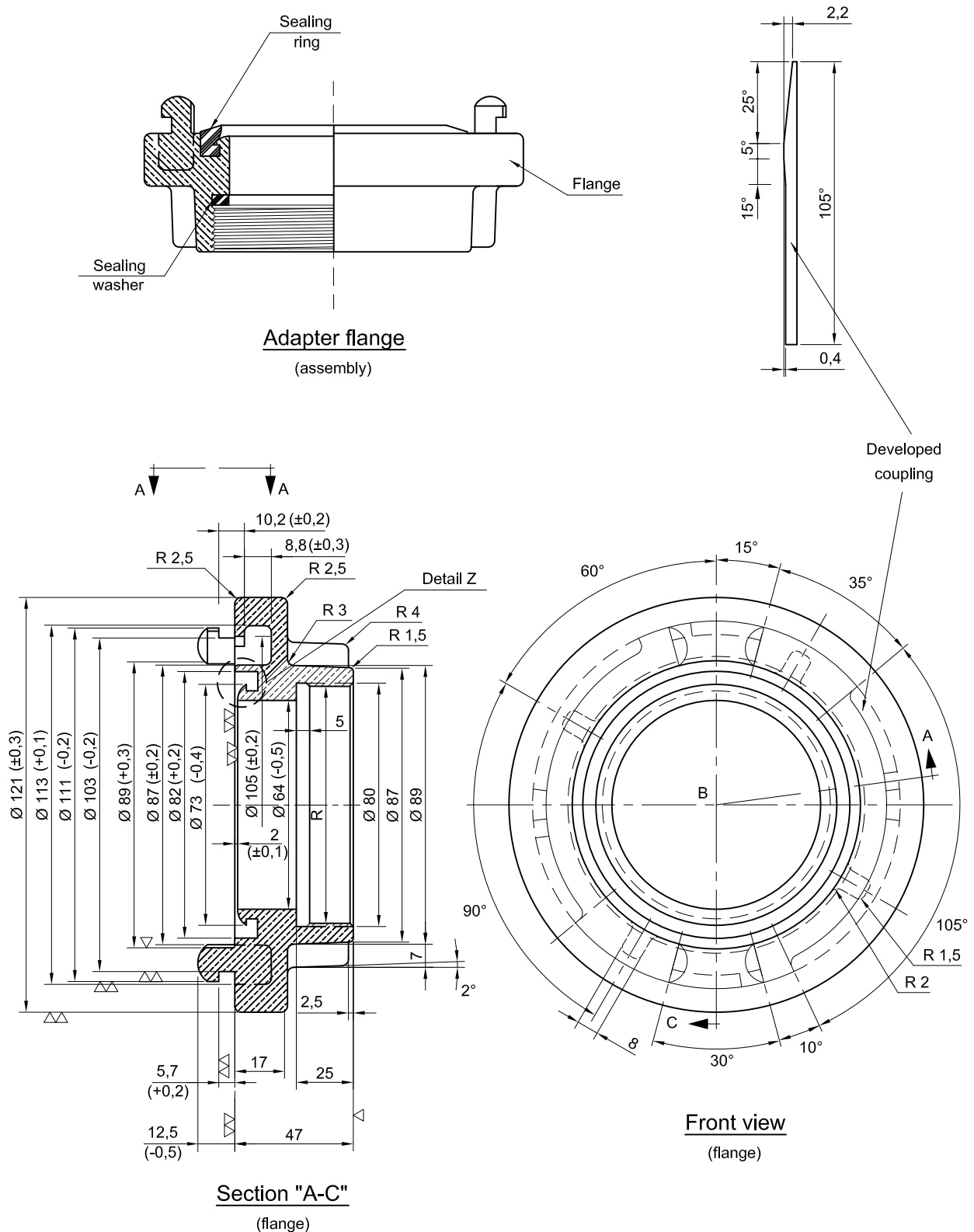
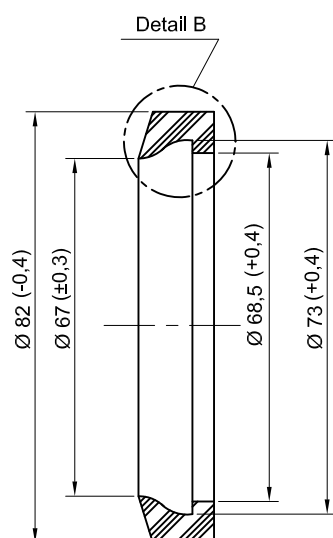
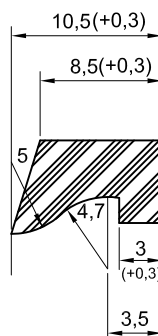


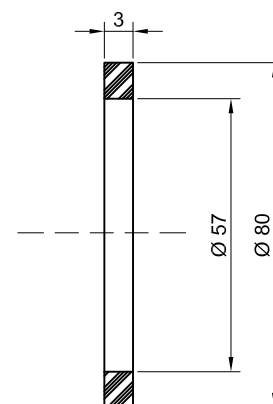
Figure A.4 - 65 mm Female Thread Adapter



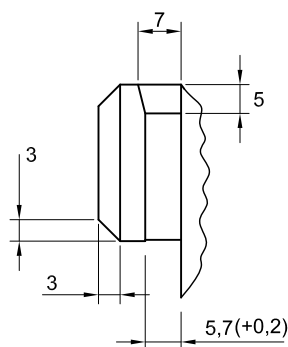
Sealing ring



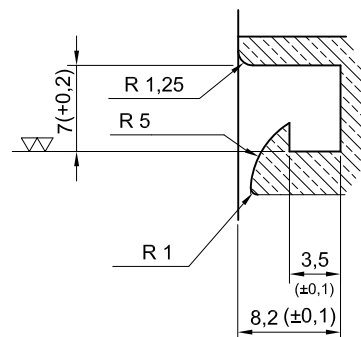
Detail B
(enlarged)



Sealing washer



Section "A-A"
(coupling clamp)



Detail Z
(enlarged)

NOTE Dimensions in millimeters, unless otherwise indicated.

Figure A.4 - 65 mm Female Thread Adapter (Continue)

Annex B - Fire Hose Plug

B.1 Scope

B.1.1 This Annex establishes the conditions required for the following types of plug 38 mm (1 1/2") and 65 mm (2 1/2") plugging connections.

B.1.2 The plugs specified in this Annex are used for closing and sealing connection type quick coupler, storz.

B.2 General Conditions

B.2.1 The purchase unit is one plug (according to B.3.1.1).

B.2.2 The material shall be packaged in such a manner as to ensure its full integrity and right identification.

B.2.3 Each plug shall have the mark of the manufacturer's name or brand and the nominal diameter in low or high relief.

B.2.4 The purchase specification shall state:

- a) if the rubber of the sealing ring shall be resistant to petroleum products;
- b) type of inspection to be adopted (according to Annex D).

B.3 Specific Conditions

B.3.1 Components

B.3.1.1 Each plug (Figures B.1 and B.2) shall be comprised of:

- a) one coupling flange;
- b) one cap;
- c) one locking ring;
- d) one sealing ring.

NOTE The plug of the hydrant valve angle shall be supplied with brass chain for attachment to the valve.

B.3.1.2 The coupling flange and cap shall be manufactured by:

- a) mold casting or shell molding; or
- b) forging from a bar.

B.3.2 Material

The components materials shall be in accordance with Table B.1.

Table B.1 - Materials Composition

Piece	Material	Composition	Standard
Coupling flange	Special brass or forged bar of copper alloy (Note 1)	C-86400 alloy type CA-377 or alloy 2	SAE J461 and ASTM B124/B124M
Cap	Special brass or forged bar of copper alloy (Note 1)	C-86400 alloy type CA-377 or alloy 2	SAE J461 and ASTM B124/B124M
Locking ring	Steel (Note 2)	-	-
Sealing ring	Rubber (Note 3)	Grade R-515A1B	ASTM D2000
<p>NOTE 1 The selection shall be due to the manufacturing process according to B.3.1.2.</p> <p>NOTE 2 Steel wire treated against corrosion.</p> <p>NOTE 3 The purchase specification shall indicate if the rubber shall be resistant to petroleum products, in which case grade SC-515A1B is used.</p>			

B.3.3 Dimensions and Tolerances

The dimensions of the components of the plug shall be defined together with the tolerances in Figures B.1 and B.2. The tolerances which are not indicated shall be considered as $\pm 0,3$ mm and $\pm 0,5$ mm for 38 mm and 65 mm plugs, respectively.

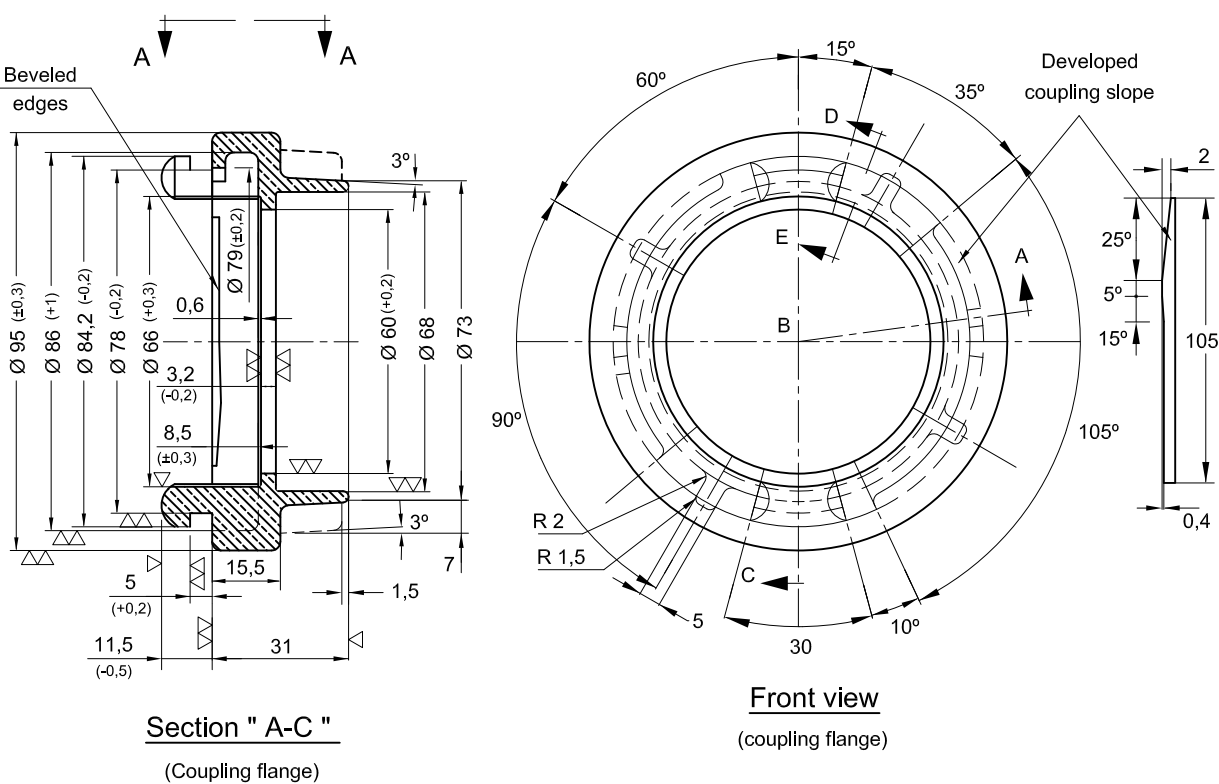
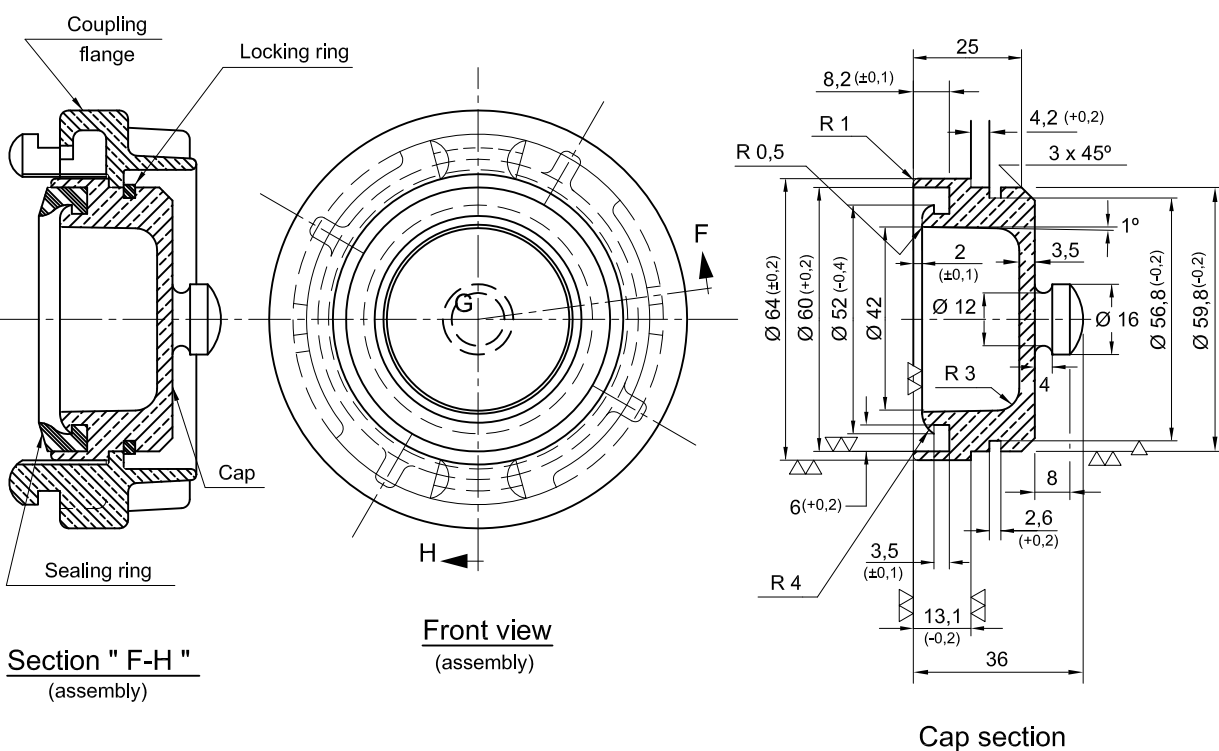
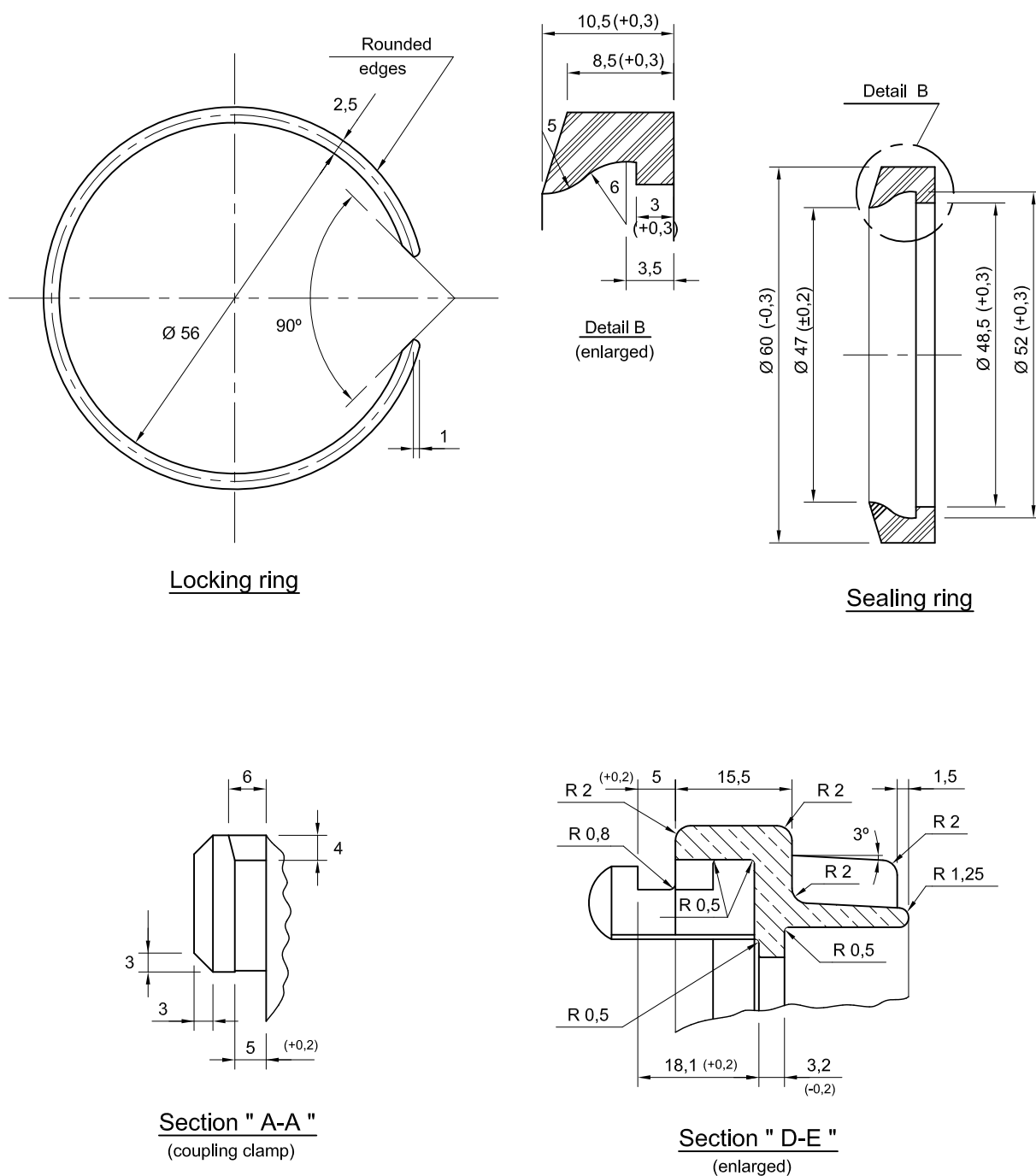


Figure B.1 - 38 mm Plug



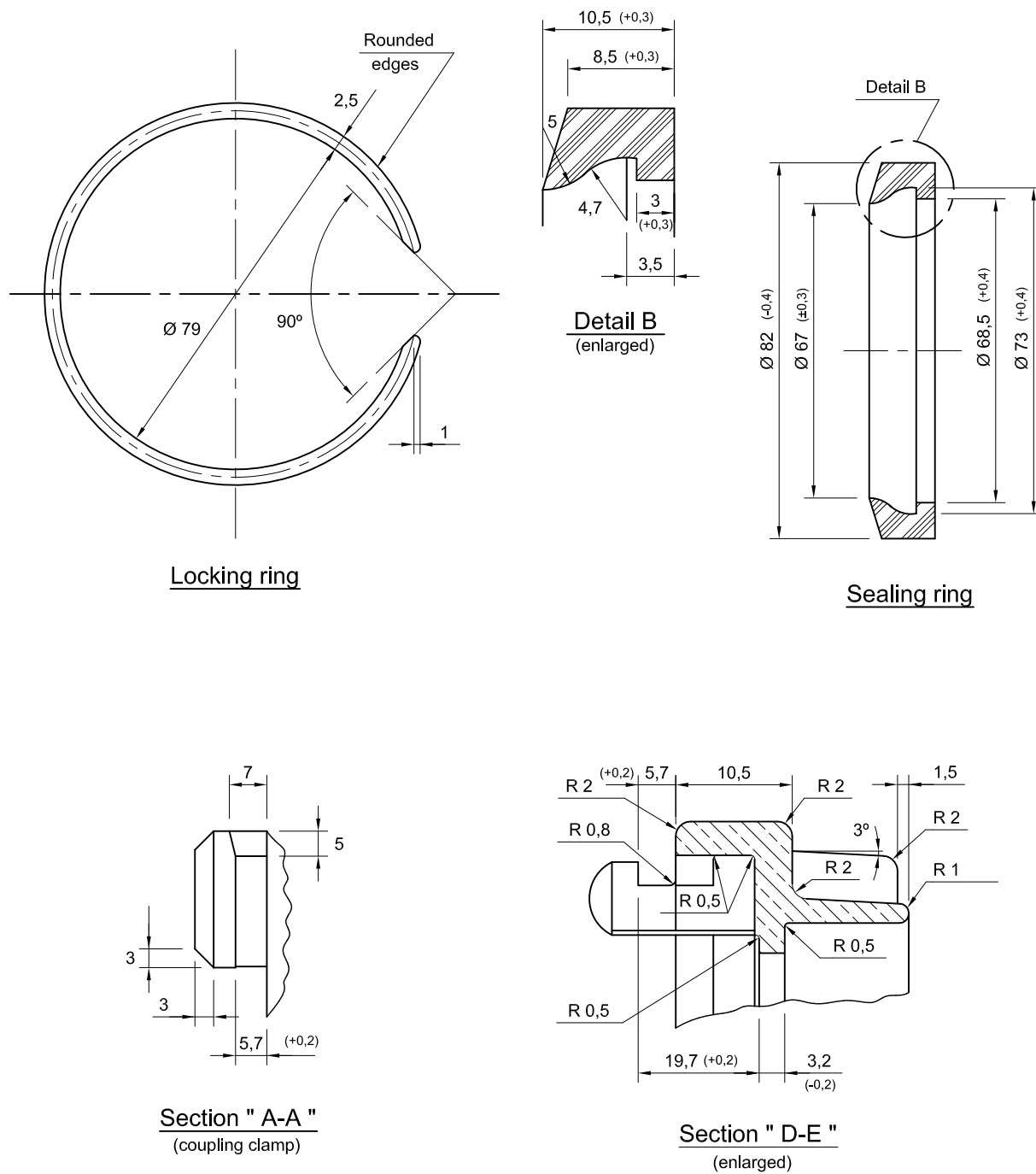
NOTE Dimensions in millimeters, unless otherwise indicated.

Figure B.1 - 38 mm Plug (Continue)

Cap section

Front view
(coupling flange)

Figure B.2 - 65 mm Plug



NOTE Dimensions in millimeters, unless otherwise indicated.

Figure B.2 - 65 mm Plug (Continue)

Annex C - Fire Hose Connection

C.1 Scope

C.1.1 This Annex establishes the conditions required for 38 mm (1 1/2") and 65 mm (2 1/2") plugging connections.

C.1.2 Each connection has as its main characteristic the coupling system which provides identity of format and dimensions of both half-connections comprising it. It is known as plugging connections, storz types.

C.2 General Conditions

C.2.1 The purchase unit is one connection (according to C.3.1.1).

C.2.2 The material shall be packaged in such a manner as to ensure its full integrity and right identification.

C.2.3 Each coupling flange shall have the mark of the manufacturer's name or brand and the nominal diameter in low or high relief.

C.2.4 The purchase specification shall indicate:

- a) nominal diameter of the sleeves according to the type of hose to be used;
- b) if the rubber of the sealing ring and thrust washer shall be resistant to petroleum products;
- c) type of inspection to be adopted (according to Annex D).

C.3 Specific Conditions

C.3.1 Components

C.3.1.1 Each connection (Figures C.1 and C.2) shall be comprised of:

- a) two coupling flanges;
- b) two sleeves;
- c) two sealing rings;
- d) two thrust washers;
- e) two expansion rings;
- f) two locking rings.

C.3.1.2 Coupling flanges and sleeves shall be manufactured by:

- a) mold casting or shell-molding; or
- b) forging from a bar.

C.3.2 Material

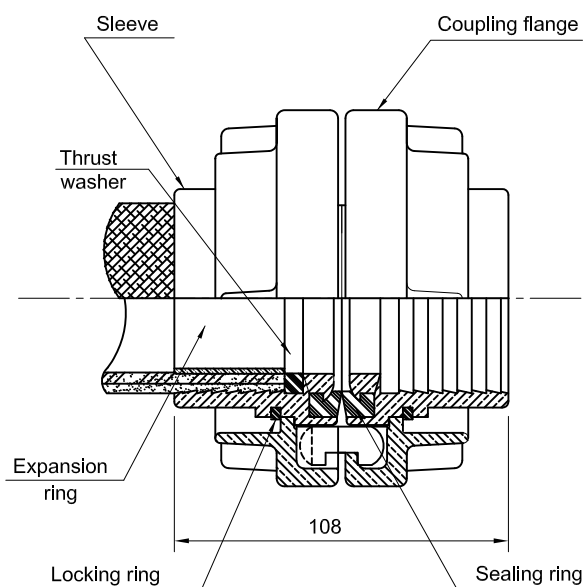
The components materials shall be in accordance with Table C.1.

Table C.1 - Materials Composition

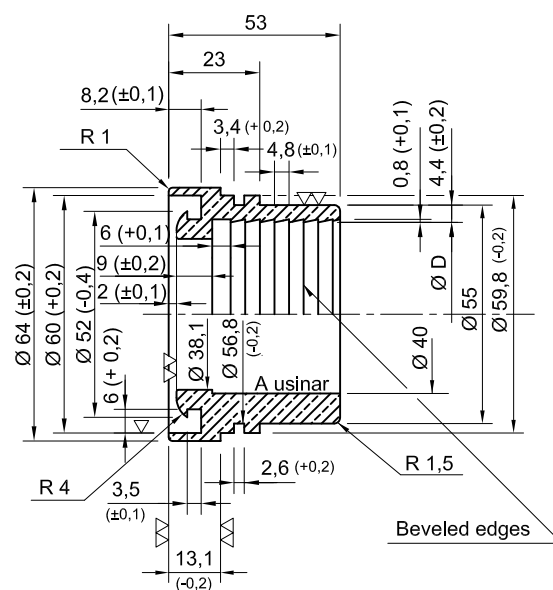
Piece	Material	Composition	Standard
Coupling flange	Special brass or forged bar of copper alloy (see Note 1)	C-86400 alloy type CA-377 or Alloy 2	SAE J461 and ASTM B124/B124M
Sleeve	Special brass or forged bar of copper alloy (see Note 1)	C-86400 alloy type CA-377 or Alloy 2	SAE J461 and ASTM B124/B124M
Sealing ring	Rubber (see Note 2)	Grade M1BA510	ASTM D2000
Thrust washer	Rubber (see Note 2)	Grade M1BA510	ASTM D2000
Expansion ring	Annealed copper	DHP alloy	ASTM B75
Locking ring	Steel (see Note 4)	-	-
<p>NOTE 1 The selection shall be done due to the manufacturing process according to C.3.1.2.</p> <p>NOTE 2 The purchase specification shall indicate if the rubber shall be resistant to petroleum products, in which case grade M1BB510 rubber is used.</p> <p>NOTE 3 Cut from a seamless annealed copper tube.</p> <p>NOTE 4 Steel wire treated against corrosion.</p>			

C.3.3 Dimensions and Tolerances

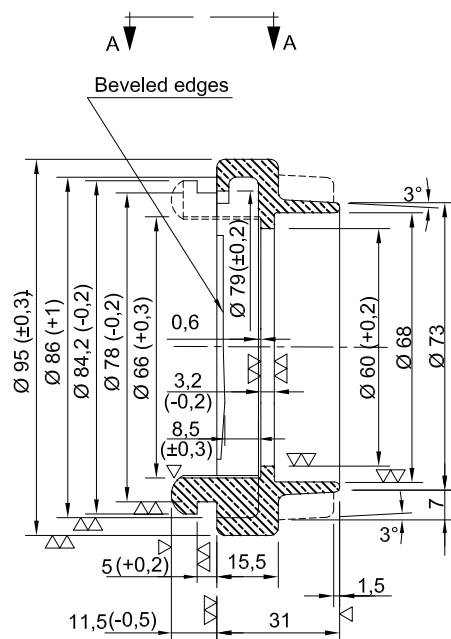
The dimensions of each connection shall be defined together with the tolerances in Figures C.1 and C.2. The tolerances which are not indicated are considered as $\pm 0,3$ mm and $\pm 0,5$ mm, for 38 mm and 65 mm connections, respectively.



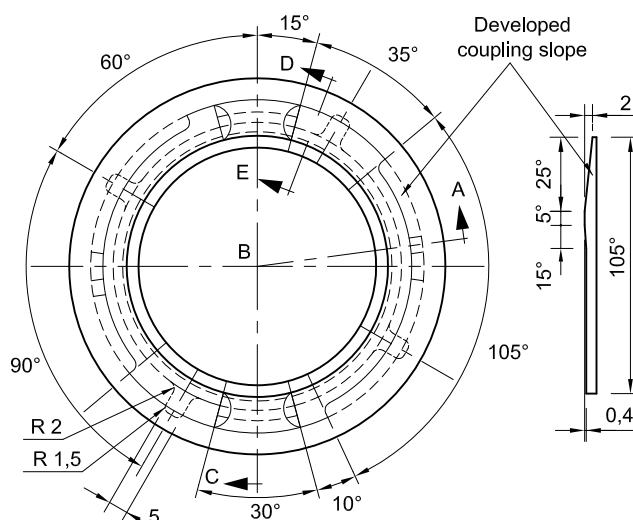
Assembly



Sleeve

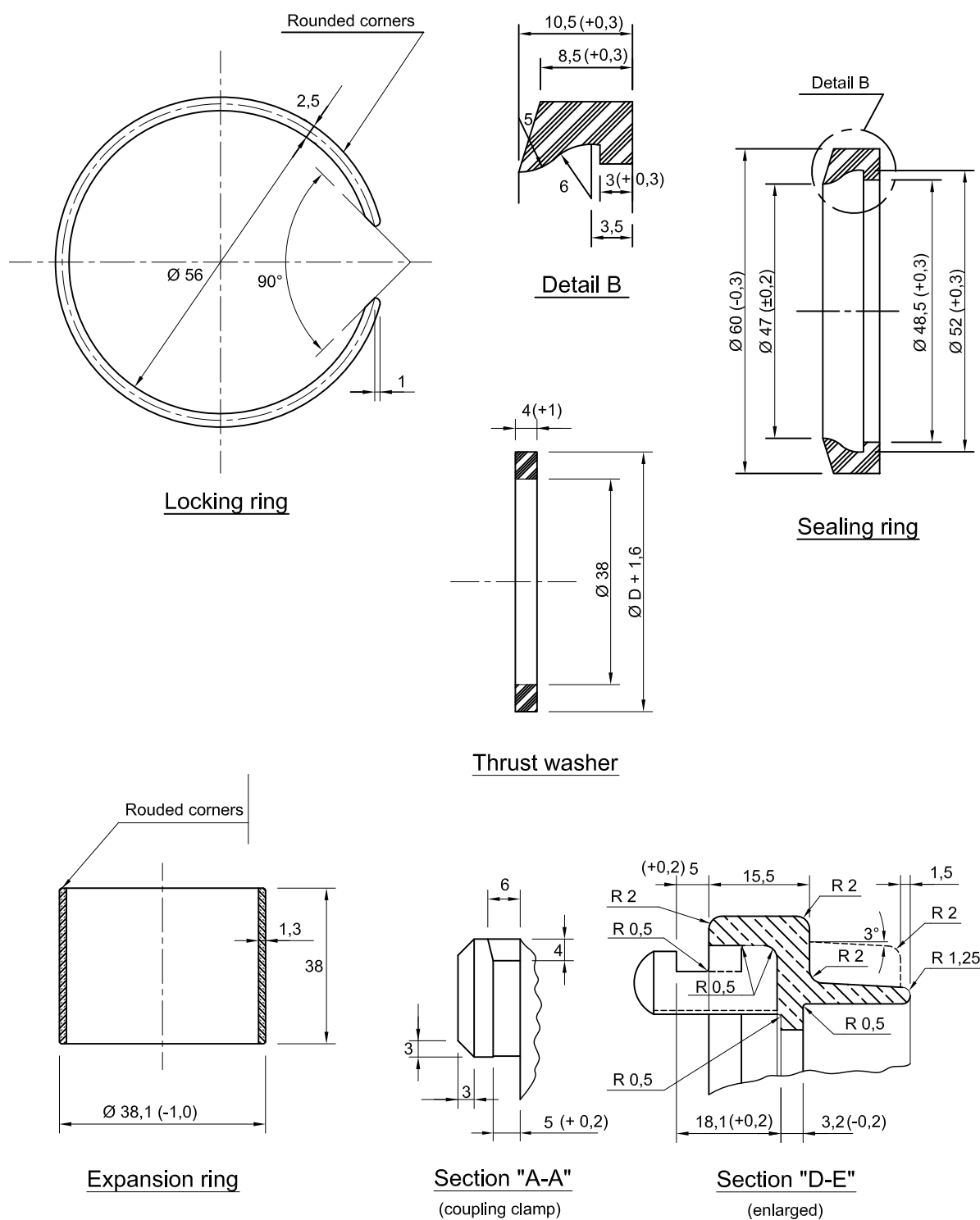


Section "A-C"
(coupling flange)



Front view
(coupling flange)

Figure C.1 - 38 mm Connection



NOTE Dimensions in millimeters, unless otherwise indicated.

Figure C.1 - 38 mm Connection (Continue)

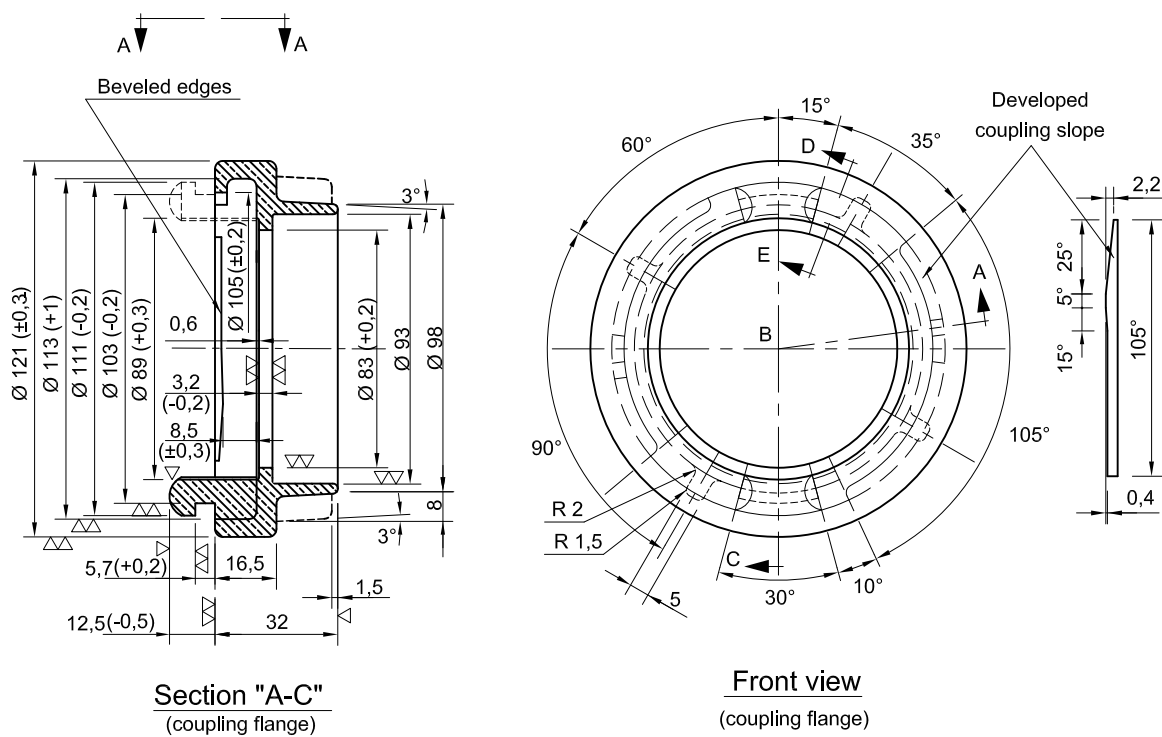
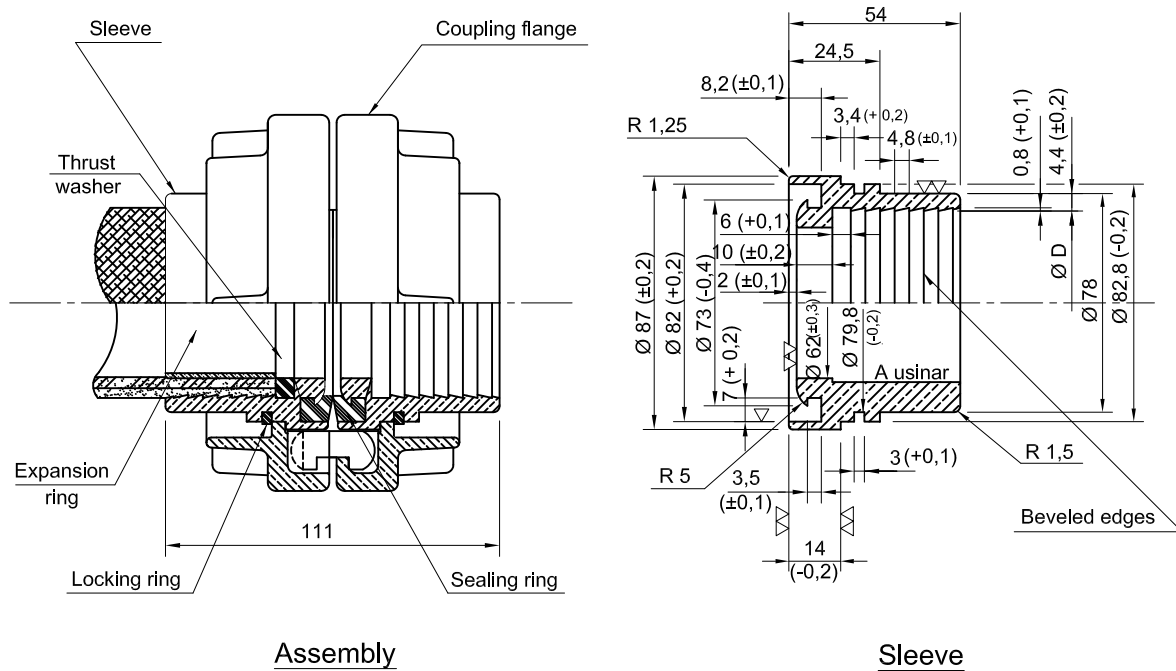
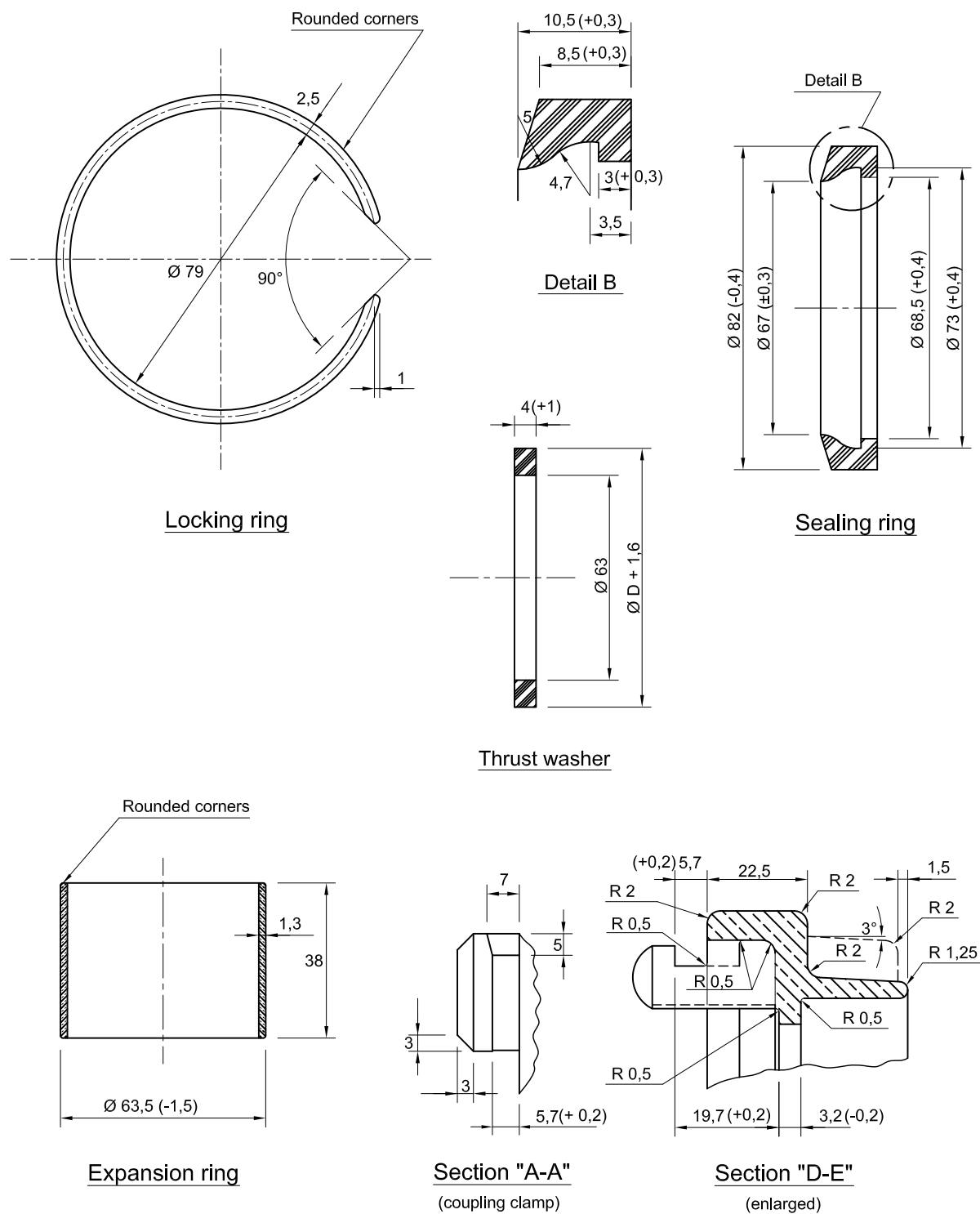


Figure C.2 - 65 mm Connection



NOTE Dimensions in millimeters, unless otherwise indicated.

Figure C.2 - 65 mm Connection (Continue)

Annex D - Inspection and Acceptance Criteria for Adapter, Connection and Plug

D.1 Inspection

D.1.1 General

D.1.1.1 The supplier or manufacturer is responsible for meeting all the requirements established in the Annex A, B and C, before subjecting the product to inspection by the purchaser. Unless otherwise specified, all tests shall be performed at the factory or at the facilities of the supplier, who shall facilitate the action of the inspector accredited by PETROBRAS.

D.1.1.2 The inspection shall be conducted by statistical or unit sampling, that is, of 100 % of the lot, according to the provisions in the purchase specification.

D.1.2 Sampling

D.1.2.1 Sampling shall be performed in accordance with ABNT [NBR 5426](#) and with the concepts of ABNT [NBR 5425](#).

D.1.2.2 The inspection level adopted shall be the normal level (II) and the acceptable quality level (NQA, with its abbreviature in Portuguese) shall be 1,5 %.

D.1.2.3 Each plug shall comply with the conditions specified regarding materials, dimensions, finishing, hydrostatic pressure and identification. The non-compliance in each one of those conditions shall characterize a defective plug.

D.1.3 Tests

D.1.3.1 Visual and Dimensional

D.1.3.1.1 The coupling flange and the cap shall be visually inspected for checking the non-machined surfaces (rough-cast surfaces), which shall be smooth and free from depressions, granulation, burrs, as well as the machined surfaces, which shall have the finishing indicated in the Figures A.1 to A.4 for adapter, Figures B.1 and B.2 for connection and Figures C.1 and C.2 for plug.

D.1.3.1.2 The sealing ring shall be inspected according to the classification ASTM [D2000](#).

D.1.3.2 Hydrostatic Pressure

D.1.3.2.1 It shall be performed on an appropriate bench, according to a suitable method, at a pressure of 2 800 kPa (29 kgf/cm²) applied progressively and kept within the limit for 2 minutes.

D.1.3.2.2 It shall be performed directly exposing the entire inner surface of the plug to hydrostatic pressure.

D.1.3.3 Chemical Composition and Mechanical Tests

It shall be determined by certificates provided by the manufacturer.

D.2 Acceptance and Rejection

D.2.1 The lots or pieces, which do not comply with the conditions established in the Annex A, B and C, shall be rejected.

D.2.2 When the inspection is performed by statistical sampling, a reinspection with the procedure indicated below is allowable by mutual agreement between the purchaser and the manufacturer:

- a) the pieces which gave rise to the lot rejection shall be replaced;
- b) the new lot shall be 100 % inspected by the manufacturer in the characteristic(s) of the tests that gave rise to its rejection;
- c) the lot shall be subjected again to inspection by the purchaser.

INDEX OF REVISIONS

REV. A, B, C, D and E

There is no index of revisions.

REV. F

Affected Parts	Description of Alteration
	Revalidation

REV. G

[illegible]

Foreword

This Standard is the English version (issued in 02/2011) of PETROBRAS N-111 REV. g 02/2011. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

1 Scope

1.1 This Standard standardizes the hydrants types, connection, adapter and plug for fire hose for use in onshore and offshore facilities of the PETROBRAS.

1.2 This Standard applies to design starting from its issue date.

1.3 The application of this Standard in the case of companies of the PETROBRAS System headquartered abroad shall be based on respect for local legislation, as well as for the other applicable requirements. It shall be understood that all other existing Brazilian legislation or references pointed out in this Standard may serve as input to its adaptation process.

1.4 This Standard contains Technical Requirements and Recommended Practices.

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.

PETROBRAS [N-76](#) - Piping Materials for Refining and Transportation Plants;

ABNT [NBR 5425](#) - Guia para Inspeção por Amostragem no Controle e Certificação de Qualidade;

ABNT [NBR 5426](#) - Planos de Amostragem e Procedimentos na Inspeção por Atributos;

ABNT [NBR 6314](#) - Peças de Ligas de Cobre Fundidas em Areia;

ASME [B1.5](#) - Acme Screw Threads;

ASME [B1.20.1](#) - Pipe Threads, General Purpose (Inc);

ASTM [A536](#) - Standard Specification for Ductile Iron Castings;

ASTM [B36/B36M](#) - Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar;

ASTM [B62](#) - Standard Specification for Composition Bronze or Ounce Metal Castings;

ASTM [B75](#) - Standard Specification for Seamless Copper Tube;

ASTM [B124/B124M](#) - Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes;

ASTM [D2000](#) - Standard Classification System for Rubber Products in Automotive Applications;

NFPA [1963](#) - Standard for Fire Hose Connections;

SAE [J452](#) - Chemical Compositions, Mechanical and Physical Properties of SAE Aluminum Casting Alloys;

Table 1 - Materials Composition

Piece	Material	Composition	Standards
Adapter flange	Special brass or forged bar of copper alloy (Note 1)	C-86400 alloy type CA-377 or Alloy 2	ABNT NBR 6314 , SAE J461 and ASTM B124/B124M
Sealing ring	Rubber (Note 2)	Grade R-515A1B	ASTM D2000
Sealing washer	Rubber (Note 2)	-	-
NOTE 1 The selection shall be due to the manufacturing process according to the A.3.1.2.			
NOTE 2 The purchase specification shall indicate if the rubber shall be resistant to petroleum products, in which case grade SC-515A1B rubber is used.			

A.3.3 Dimensions and Tolerances

The dimensions of the adapter's components are defined together with the tolerances in Figures A.1 to A.4. The tolerances that are not indicated shall be considered to be $\pm 0,3$ mm and $\pm 0,5$ mm for 38 mm and 65 mm adapters, respectively.

AMENDED SHEET IN 04/2014
DO NOT USE

Table B.1 - Materials Composition

Piece	Material	Composition	Standard
Coupling flange	Special brass or forged bar of copper alloy (Note 1)	C-86400 alloy type CA-377 or alloy 2	ABNT NBR 6314 , SAE J461 and ASTM B124/B124M
Cap	Special brass or forged bar of copper alloy (Note 1)	C-86400 alloy type CA-377 or alloy 2	ABNT NBR 6314 , SAE J461 and ASTM B124/B124M
Locking ring	Steel (Note 2)	-	-
Sealing ring	Rubber (Note 3)	Grade R-515A1B	ASTM D2000
<p>NOTE 1 The selection shall be due to the manufacturing process according to B.3.1.2.</p> <p>NOTE 2 Steel wire treated against corrosion.</p> <p>NOTE 3 The purchase specification shall indicate if the rubber shall be resistant to petroleum products, in which case grade SC-515A1B is used.</p>			

B.3.3 Dimensions and Tolerances

The dimensions of the components of the plug shall be defined together with the tolerances in Figures B.1 and B.2. The tolerances which are not indicated shall be considered as $\pm 0,3$ mm and $\pm 0,5$ mm for 38 mm and 65 mm plugs, respectively.

AMENDED SHEET IN 04/2014
DO NOT USE

C.3.2 Material

The components materials shall be in accordance with Table C.1.

Table C.1 - Materials Composition

Piece	Material	Composition	Standard
Coupling flange	Special brass or forged bar of copper alloy (see Note 1)	C-86400 alloy type CA-377 or Alloy 2	ABNT NBR 6314 , SAE J461 and ASTM B124/B124M
Sleeve	Special brass or forged bar of copper alloy (see Note 1)	C-86400 alloy type CA-377 or Alloy 2	ABNT NBR 6314 , SAE J461 and ASTM B124/B124M
Sealing ring	Rubber (see Note 2)	Grade M1BA510	ASTM D2000
Thrust washer	Rubber (see Note 2)	Grade M1BA510	ASTM D2000
Expansion ring	Annealed copper	DHP alloy	ASTM B75
Locking ring	Steel (see Note 4)	-	-
NOTE 1 The selection shall be done due to the manufacturing process according to C.3.1.2. NOTE 2 The purchase specification shall indicate if the rubber shall be resistant to petroleum products, in which case grade M1BB510 rubber is used. NOTE 3 Cut from a seamless annealed copper tube. NOTE 4 Steel wire treated against corrosion.			

C.3.3 Dimensions and Tolerances

The dimensions of each connection shall be defined together with the tolerances in Figures C.1 and C.2. The tolerances which are not indicated are considered as $\pm 0,3$ mm and $\pm 0,5$ mm, for 38 mm and 65 mm connections, respectively.