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**Dentistry — Hose connectors for air  
driven dental handpieces**

*Art dentaire — Connexions pour pièces à main dentaires à air  
comprimé*



Reference number  
ISO 9168:2009(E)

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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 9168 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 4, *Dental instruments*.

This third edition cancels and replaces the second edition (ISO 9168:1991), which has been technically revised. The following changes were made:

- a) requirement resistance to sterilization has been replaced by reprocessing requirement;
- b) language-independent figures;
- c) introduction of definition for “hose connector” and updated references and Bibliography.

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# Dentistry — Hose connectors for air driven dental handpieces

## 1 Scope

This International Standard is applicable for achieving reliable interchangeability between hoses from dental units and dental handpieces.

This International Standard specifies four types of hose connector for use between air driven dental handpieces and the flexible hoses of the dental unit which supply the handpieces with water, air and light, and provide for exhaust.

## 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.

ISO 261, *ISO general purpose metric screw threads — General plan*

ISO 1942, *Dentistry — Vocabulary*

ISO 7494-1, *Dentistry — Dental units — Part 1: General requirements and test methods*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1942 and the following apply.

### 3.1

#### **hose connector**

connector at the dental handpiece to enable one to connect the hose with the handpiece

## 4 Classification

For the purpose of this International Standard, hose connectors for air driven dental handpieces are classified into the following four types:

- Type 1: connector with two or three outlets and connection thread 9/16 – 40 UNS;
- Type 2: connector with four or five outlets and connection thread 0,555 – 36 UNS;
- Type 3: connector with four outlets and electrical contacts and connection thread 0,555 – 36 UNS;
- Type 4: connector with three outlets and connection thread M12 × 0,5, in accordance with ISO 261.

## 5 Requirements

### 5.1 General

Hose connectors for air driven dental handpieces are specific parts of dental handpieces. Requirements for dental handpieces are specified in the relevant product standards.

NOTE Relevant product standards for dental handpieces are e.g. ISO 7785-1, ISO 13294 and ISO 15606.

### 5.2 Dimensions

The dimensions, the outlet configuration and the use of the outlets shall be as specified in Figure 1, Figure 2, Figure 3 and Figure 4.

The thread characteristics for Type 1, Type 2 and Type 3 shall be as specified in Table 1. The thread characteristics for Type 4 (M12 × 0,5) shall be in accordance with ISO 261.

Testing shall be carried out in accordance with 7.1.

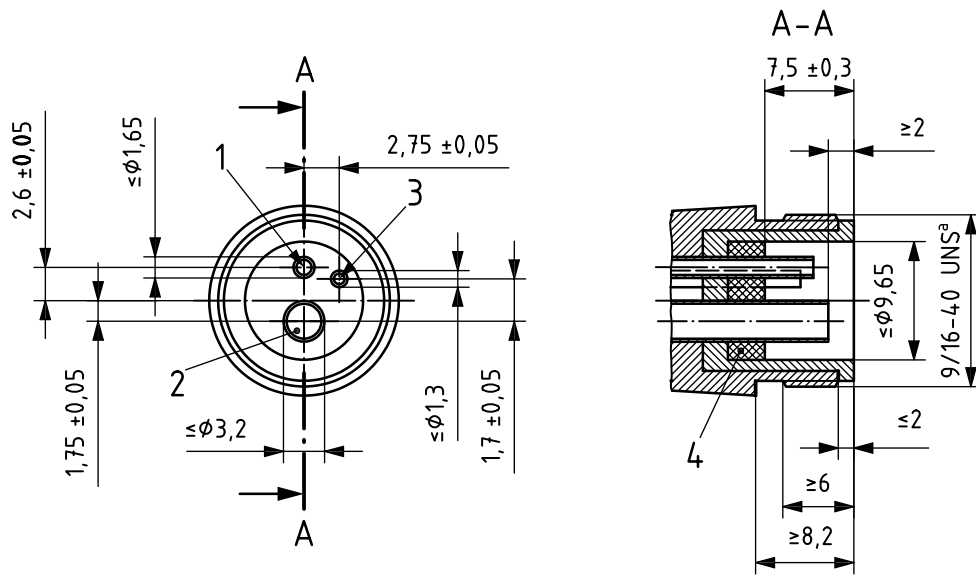
### 5.3 Resistance to reprocessing

Hose connectors shall be capable of withstanding a minimum of 250 reprocessing cycles as defined in the manufacturer's instructions for use without deterioration in appearance or performance.

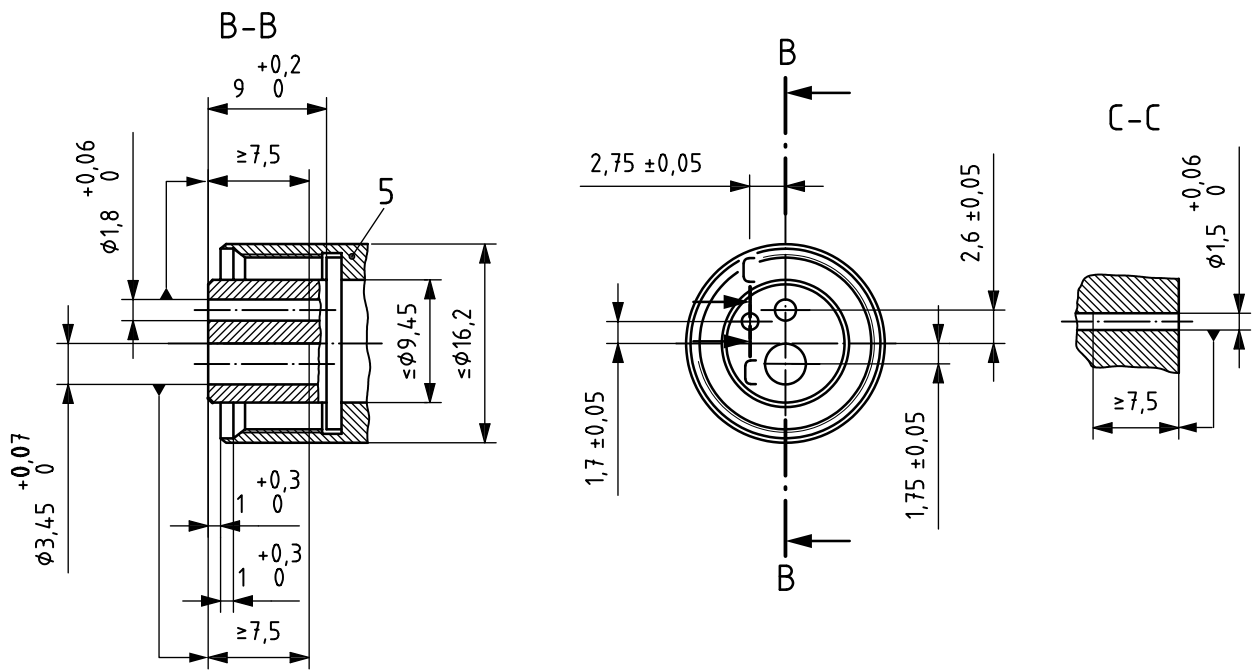
Quick connectors with and without lights supply, which are not permanently fixed to the instrument, shall be capable of withstanding the reprocessing procedure as given in the manufacturer's instructions. In this case the requirements of ISO 7494-1 are applicable.

Testing shall be carried out in accordance with 7.2.

Dimensions in millimetres



a) Handpiece part



b) Hose part

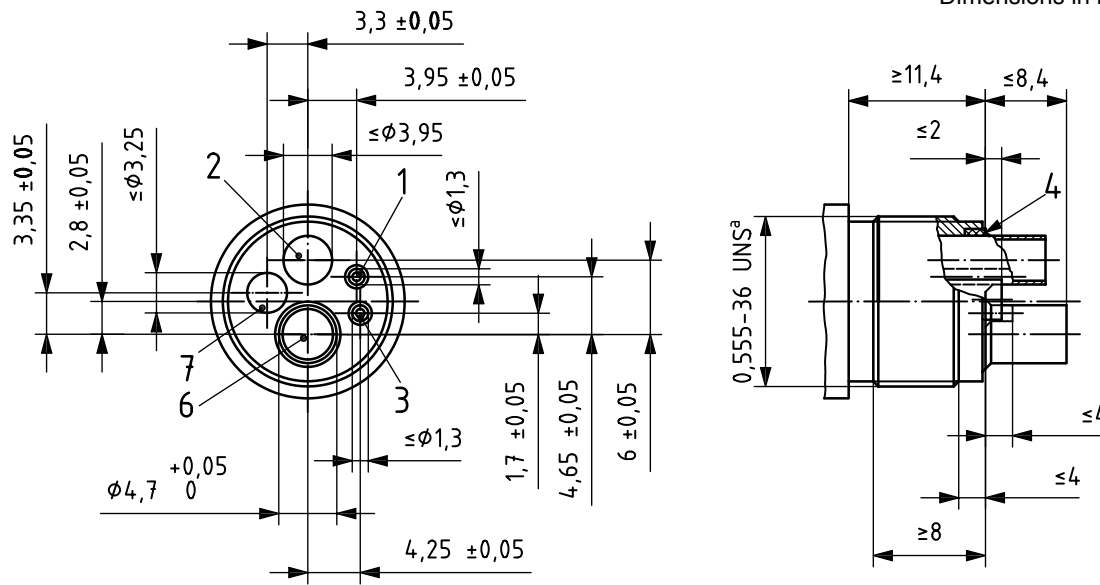
**Key**

- 1 water
- 2 drive air
- 3 spray air
- 4 gasket
- 5 nut

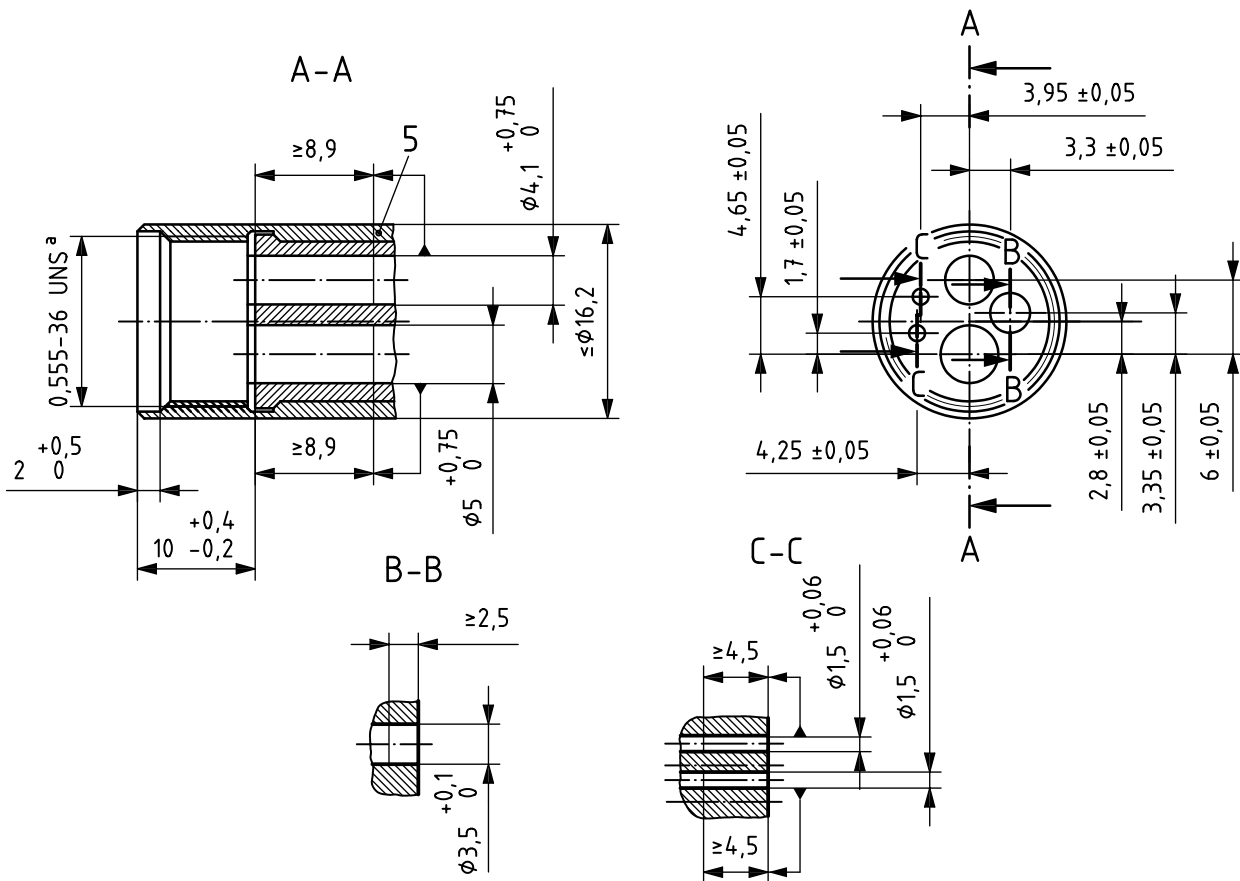
a See Table 1 for thread characteristics.

**Figure 1 — Type 1 connector**

Dimensions in millimetres



a) Handpiece part



b) Hose part

Key

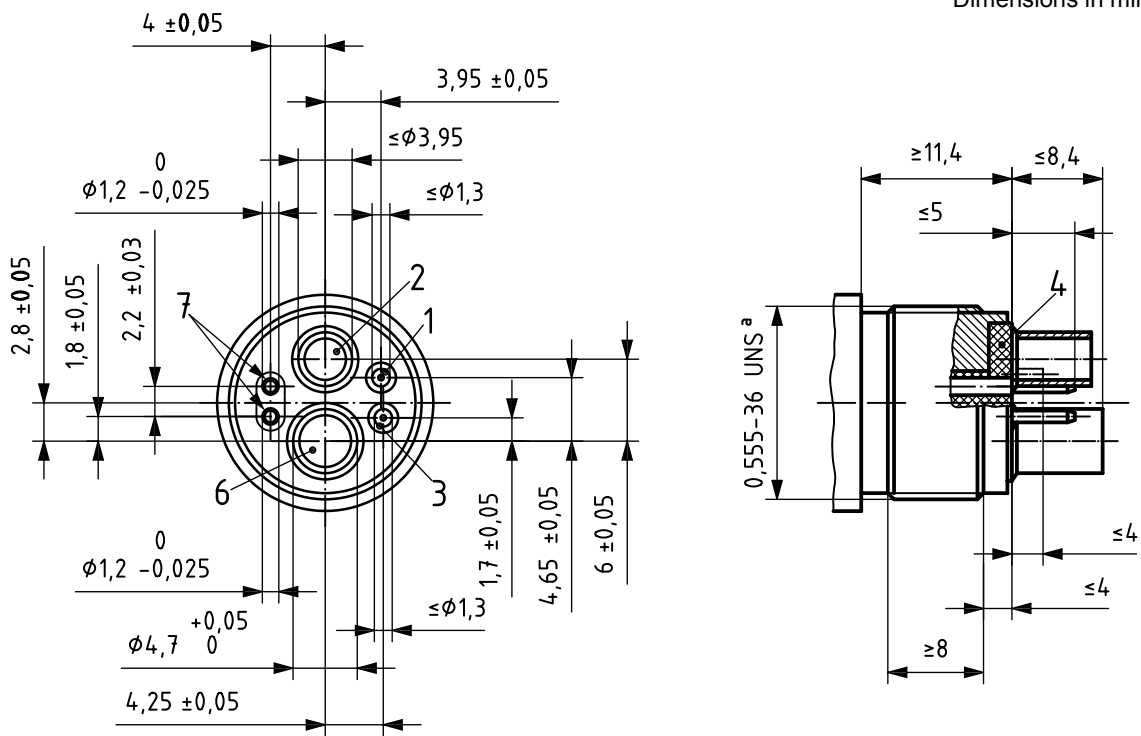
- |   |           |   |         |   |             |
|---|-----------|---|---------|---|-------------|
| 1 | water     | 4 | gasket  | 7 | fibre optic |
| 2 | drive air | 5 | nut     |   |             |
| 3 | spray air | 6 | exhaust |   |             |

a See Table 1 for thread characteristics.

Figure 2 — Type 2 connector

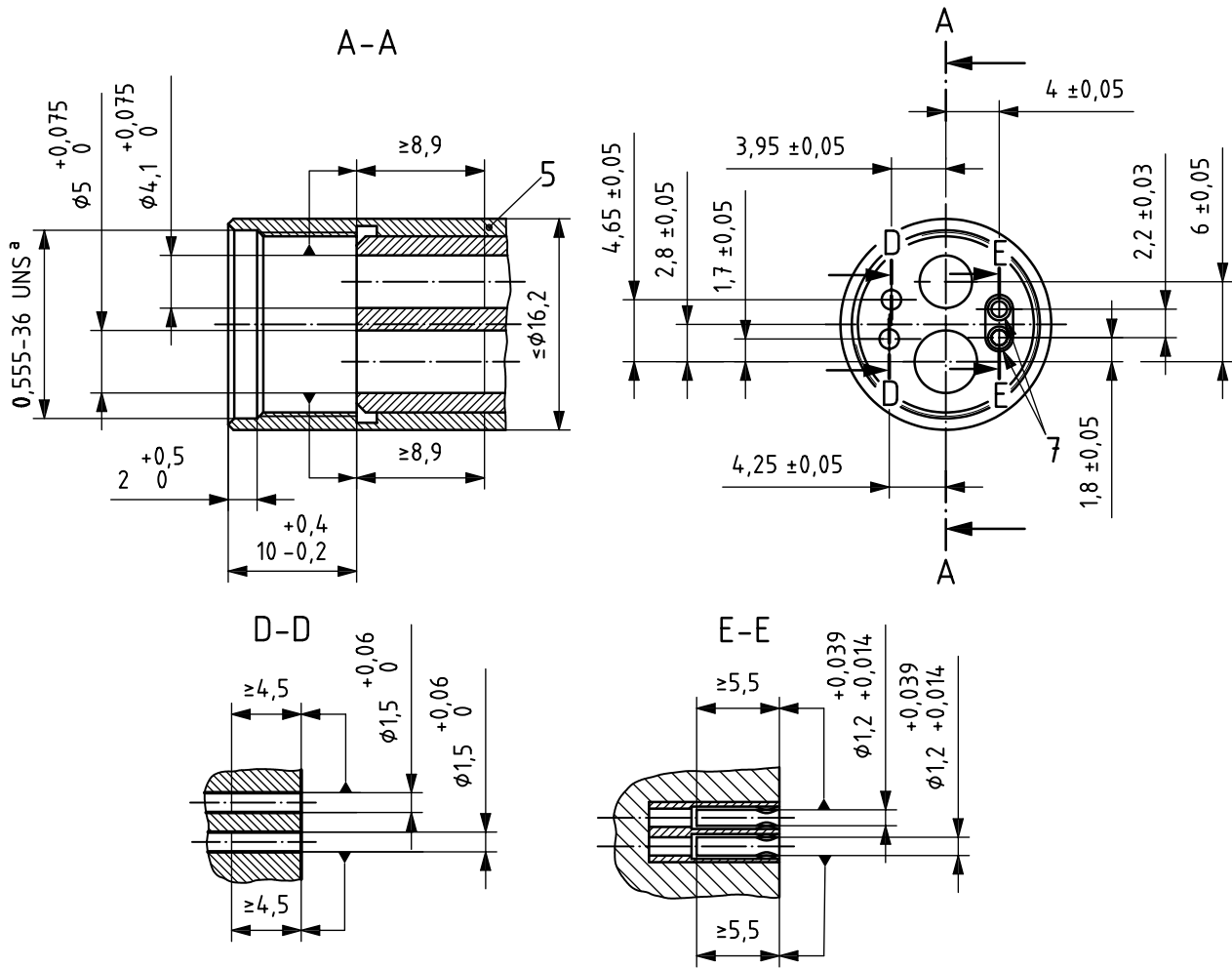


Dimensions in millimetres



a) Handpiece part

Figure 3 — Type 3 connector (continued)



b) Hose part

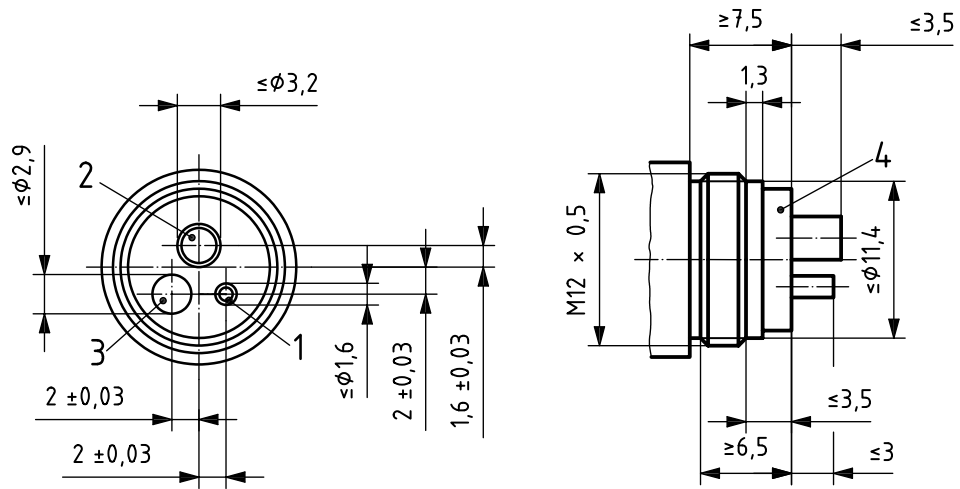
Key

- 1 water
- 2 drive air
- 3 spray air
- 4 gasket
- 5 nut
- 6 exhaust
- 7 electrical contacts

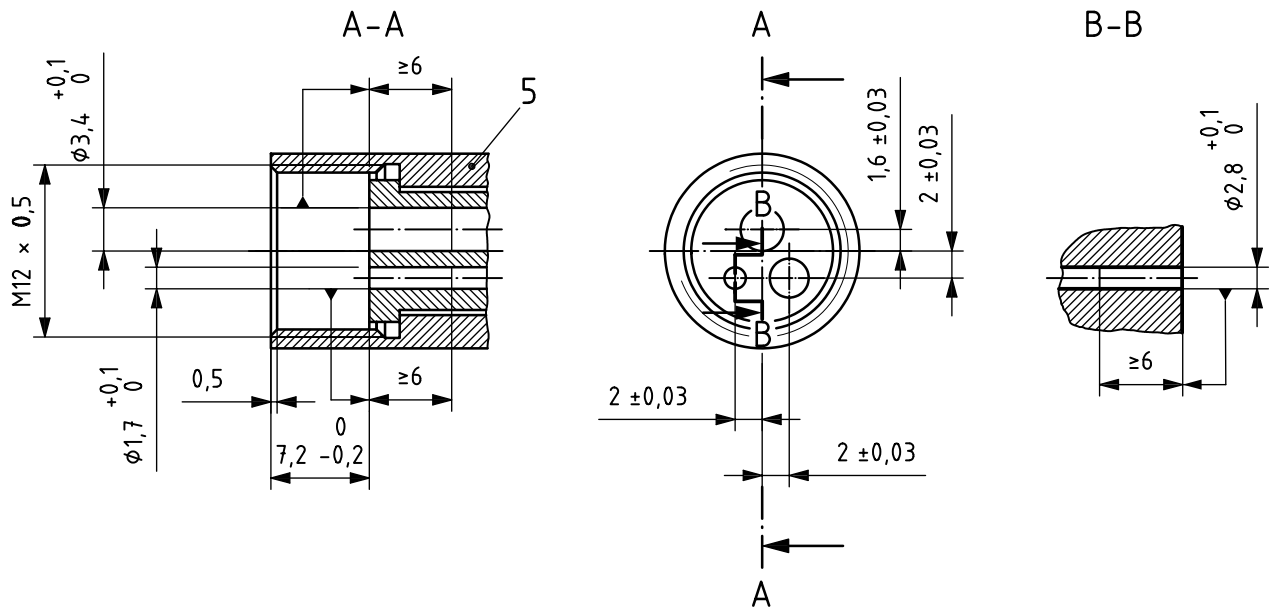
<sup>a</sup> See Table 1 for thread characteristics.

Figure 3 — Type 3 connector

Dimensions in millimetres



a) handpiece part



b) Hose part

**Key**

- 1 water
- 2 drive air
- 3 exhaust
- 4 gasket
- 5 nut

**Figure 4 — Type 4 connector**

## 6 Sampling

One representative sample of the hose connector types shall be selected for the test.

**Table 1 — Thread characteristics**

Unless otherwise specified, dimensions in millimetres

| Thread characteristics  |                 |      | Dimensions of single-start right-hand thread for |                   |
|---|-----------------|------|--|-------------------|
|   |                 |      | Type 1   | Type 2 and Type 3 |
| Thread designation <sup>a</sup>   |                 |      | 9/16 – 40 UNS                                    | 0,555 – 36 UNS    |
| Pitch   |                 |      | 0,635  | 0,706             |
| Thread angle  |                 |      | 60°  | 60°               |
| Major diameter  | Internal thread | max. | 14,379   | 14,198            |
|   |                 | min. | 14,287   | 14,097            |
|   | External thread | max. | 14,262   | 14,071            |
|   |                 | min. | 14,133   | 13,932            |
| Basic major diameter  |                 |      | 14,287   | 14,097            |
| Pitch diameter  | Internal thread | max. | 13,980   | 13,777            |
|   |                 | min. | 13,876   | 13,640            |
|   | External thread | max. | 13,851   | 13,614            |
|   |                 | min. | 13,769   | 13,530            |
| Basic pitch diameter  |                 |      | 13,876   | 13,640            |
| Minor diameter  | Internal thread | max. | 13,767   | 13,512            |
|   |                 | min. | 13,589   | 13,335            |
|   | External thread | max. | 13,482   | 13,208            |
|   |                 | min. | 13,437   | 13,157            |
| <sup>a</sup> The screw threads 9/16 – 40 UNS and 0,555 – 36 UNS used for the connectors are based on ANSI B1.1. The diameter/pitch combinations specified in this International Standard are not, however, included in ANSI B1.1; the necessary thread characteristics are therefore specified in this table. |                 |      |  |                   |

## 7 Test methods

### 7.1 Dimensions

Using measuring devices such as a gauge, dial indicator, etc. with an accuracy of  $\pm 0,01$  mm for linear dimensions or  $\pm 1^\circ$  for angles, measure and record the dimensions shown in Figures 1, 2, 3 and 4.

### 7.2 Resistance to reprocessing

Subject the test pieces to 250 reprocessing cycles using the parameters defined by the manufacturer in the instructions for use.

After the final sterilization cycle, inspect the sterilized items visually. There shall be no visible signs of deterioration or corrosion.

Submit the sterilized items to the test procedures specified in 5.3. All requirements shall be met.

## **Annex A** (informative)

### **Performance and general design**

#### **A.1 General**

Hose connectors should be comfortable for the operator to use and easy to manipulate. The outside surface of the hose connectors should be easy to clean and particular attention should be given to providing secure gripping surfaces for operator manipulation. In order to reduce glare, highly polished surfaces should be avoided.

#### **A.2 Construction and layout**

The construction of hose connectors should provide for their safe and reliable operation. If field-repairable, the hose connectors should be capable of being easily disassembled and reassembled for maintenance and repair utilizing either readily available tools or special tools supplied by the manufacturer.

## Bibliography

- [1] ISO 7785-1, *Dental handpieces — Part 1: High-speed air turbine handpieces*
- [2] ISO 13294, *Dental handpieces — Dental air-motors*
- [3] ISO 13402, *Surgical and dental hand instruments — Determination of resistance against autoclaving, corrosion and thermal exposure*
- [4] ISO 15606, *Dental handpieces — Air-powered scalers and scaler tips*
- [5] ISO 17664, *Sterilization of medical devices — Information to be provided by the manufacturer for the reprocessing of resterilizable medical devices*
- [6] ANSI B1.1, *Unified Inch Screw Threads (UN and UNR Thread Form)*

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