International Standard

ISO 3964-1

First edition
2026-06

# Dentistry — Coupling dimensions for handpiece connectors —

## Part 1: Mechanical properties

*Médecine bucco-dentaire — Dimensions d'accouplement pour pièces à main dentaires —*

*Partie 1: Propriétés mécaniques*



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# Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 4, *Dental instruments,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 55, *Dentistry,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).



This first edition cancels and replaces ISO 3964:2016, which has been technically revised. It also incorporates the Amendment ISO 3964:2016/Amd 1:2018.

The main changes are as follows:

— the technical drawings have been improved;

— new dimensions and optional figures have been added.

A list of all parts in the ISO 3964 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

# Dentistry — Coupling dimensions for handpiece connectors —

# Part 1: Mechanical properties

## 1 Scope

This document specifies coupling between handpieces and motors that are connected to dental units. For the purposes of this document, the couplings described in this document are not equipped with electronic terminal(s).

This document specifies the nominal dimensions, tolerances and extraction force of coupling systems for use between handpieces and motor which supply the handpiece with water, air and light and rotation energy.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.



ISO 1942, *Dentistry — Vocabulary*

ISO 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*



ISO 22081, *Geometrical product specifications (GPS) — Geometrical tolerancing — General geometrical specifications and general size specifications*

ISO 14457, *Dentistry — Handpieces and motors*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1942, ISO 14457 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

**3.1**
**coupling dimension**
description of the dimensions of connectors between air and electrical motors and straight and angled handpieces, used to connect and supply the handpiece system

**3.2**
**coupling system**
combination of connector parts between air and electrical motors and straight and angled handpieces, used to connect and supply the handpiece system

# 4 Classification according to the supply of water, air and light

For the purpose of this document, coupling systems are classified into the following types:

— Type 1: Coupling system for straight and angled handpieces and motors without internal spray supply and without light supply;

— Type 2: Coupling system for straight and angled handpieces and motors with internal spray supply and without light supply;

— Type 3: Coupling system for straight and angled handpieces and motors with internal spray supply and with light supply;

— Type 4: Coupling system for straight and angled handpieces and motors without internal spray supply and with light supply.

# 5 Requirements

## 5.1 General

Types of coupling for handpieces and motors are specific parts of dental handpieces. Requirements for dental handpieces are specified in ISO 14457.

## 5.2 Dimensions

The dimensions and the configuration of handpiece-sides and motor-sides shall be as specified in Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, Figure 7 and Figure 8. The coupling dimensions $X_1$ and $X_2$ are specified in Table 1.



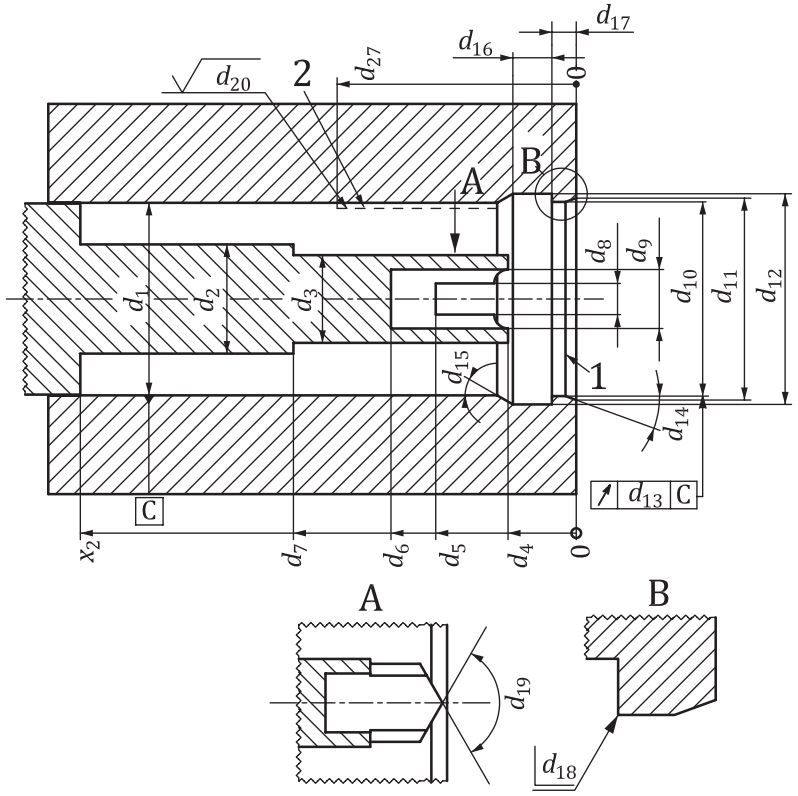
**Table 1 — Coupling dimensions $X_1$ and $X_2$**

| Coupling | Dimension | Long | Middle | Short | Extra short |
|---|---|---|---|---|---|
| Motor | $X_1$ | max. 31,8 mm | max. 24,8 mm | max. 22,8 mm | max. 18,8 mm |
| Handpiece | $X_2$ | min. 32 mm | min. 25 mm | min. 23 mm | min.19 mm |



Dimensions without tolerances shall be in accordance with ISO 2768-1 (ISO 2768-f) and ISO 22081. Alternative designs of the coupling lock system are permitted.

The type of handpiece length shall be indicated in the manufacturer's instructions for use. Testing shall be carried out in accordance with 7.1.




**Key**

1 grooves and geometry for sealing rings given by the manufacturer

2 sealing surface

Edges shall be burr-free or round.

Dimensions $d_1$ to $d_{38}$ are specified in Table 2.



**Figure 1 — Type 1: Handpiece**

**Table 2 — Dimensions for Figure 1**

| No. | Dimension mm | No. | Dimension mm | No. | Dimension mm | No. | Dimension mm |
|---|---|---|---|---|---|---|---|
| $d_1$ | $\phi 9,87^{+0,01}_{0}$ | $d_{11}$ | $10,2^{+0,25}_{0}$ | $d_{21}$ | not used | $d_{31}$ | not used |
| $d_2$ | $\leq \phi 5,6$ | $d_{12}$ | $\geq \phi 10,5$ | $d_{22}$ | not used | $d_{32}$ | not used |
| $d_3$ | $\phi 4,5^{0}_{-0,5}$ | $d_{13}$ | 0,03 | $d_{23}$ | not used | $d_{33}$ | not used |
| $d_4$ | $3,5^{+0,2}_{-0,4}$ | $d_{14}$ | 15~30 ° | $d_{24}$ | not used | $d_{34}$ | not used |
| $d_5$ | $\geq 7,2$ | $d_{15}$ | 15~45 ° | $d_{25}$ | not used | $d_{35}$ | not used |
| $d_6$ | $\geq 9,5$ | $d_{16}$ | $1,95^{+0,95}_{0}$ | $d_{26}$ | not used | $d_{36}$ | not used |
| $d_7$ | $\geq 14,5$ | $d_{17}$ | $1,25^{0}_{-0,07}$ | $d_{27}$ | $\geq 12,1$ | $d_{37}$ | not used |
| $d_8$ | 1,6 ± 0,05 | $d_{18}$ | $-0,08$<br>$-0,25$ | $d_{28}$ | not used | $d_{38}$ | not used |
| $d_9$ | $\phi 3,02^{+0,03}_{0}$ | $d_{19}$ | 120 ° ± 5 ° | $d_{29}$ | not used | | |
| $d_{10}$ | $\phi 9,95^{+0,022}_{0}$ | $d_{20}$ | Rz ≤ 4,5 | $d_{30}$ | not used | | |