
**Dentistry — Stationary dental units
and dental patient chairs —**

**Part 2:
Air, water, suction and wastewater
systems**

*Médecine bucco-dentaire — Units dentaires fixes et fauteuils
dentaires patient —*

*Partie 2: Systèmes d'alimentation en air et en eau, d'aspiration et
d'évacuation des eaux usées*

ISO 7494-2:2022

<https://standards.iteh.ai/catalog/standards/sist/d4326f41-e9ca-4e50-a9bf-cc1bf87907d5/iso-7494-2-2022>



iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 7494-2:2022

<https://standards.iteh.ai/catalog/standards/sist/d4326f41-e9ca-4e50-a9bf-cc1bf87907d5/iso-7494-2-2022>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	2
4 Classification.....	4
4.1 Classification of suction systems.....	4
4.2 Classification of suction air flow rate.....	4
5 Requirements.....	4
5.1 Connections from the stationary dental unit to dental handpieces.....	4
5.1.1 General.....	4
5.1.2 Powered scaler.....	4
5.1.3 Multifunction handpiece.....	5
5.1.4 Handpiece and motor.....	5
5.1.5 Powder jet handpiece.....	5
5.1.6 Simultaneous use of more than one dental handpiece.....	6
5.2 Supply connections to the stationary dental unit.....	6
5.3 Water and wastewater systems.....	8
5.3.1 General.....	8
5.3.2 Incoming water.....	8
5.3.3 Materials used for construction of procedural water systems within the stationary dental unit.....	8
5.3.4 Backflow prevention device for stationary dental units connected to the external drinking water supply.....	9
5.3.5 Cuspidors.....	9
5.3.6 Water venturi.....	9
5.3.7 Particle filter.....	9
5.3.8 Bacterial filter.....	9
5.3.9 Bottled water system supplying procedural water or solution.....	9
5.3.10 Retraction.....	9
5.3.11 Treatment method for biofilm.....	10
5.3.12 Water sampling connection point.....	10
5.3.13 Wastewater drain connection.....	11
5.4 Air system.....	11
5.4.1 General.....	11
5.4.2 Incoming dental air.....	11
5.4.3 Particle filters.....	11
5.4.4 Bacterial filters.....	11
5.5 Stationary dental unit suction systems.....	12
5.5.1 General.....	12
5.5.2 Maximum suction pressure.....	12
5.5.3 Suction pressure head loss.....	12
5.5.4 Configuration of cannula connectors and cannula.....	12
5.5.5 Operating hoses with cannula connectors.....	14
5.5.6 Solids filter.....	14
5.5.7 Air separator.....	14
5.5.8 Stationary dental unit suction source connection point.....	14
5.6 Test report.....	14
6 Sampling.....	14
7 Measurement and test methods.....	14
7.1 Visual inspection.....	14
7.1.1 Visual inspection of device.....	14
7.1.2 Visual inspection of documentation or test reports.....	14

7.2	Dental handpiece connection test.....	15
7.2.1	Apparatus.....	15
7.2.2	Procedure.....	15
7.3	Systems directly connected to external drinking water supply test.....	17
7.4	Cuspidor test.....	17
7.5	Particle filter test.....	17
7.6	Retraction test.....	17
7.7	Stationary dental unit suction systems test.....	18
7.7.1	General.....	18
7.7.2	Static suction pressure test.....	18
7.7.3	Suction pressure head loss test.....	19
7.8	Treatment method for the prevention or inhibition of biofilm formation.....	20
7.9	Treatment method for biofilm removal.....	20
8	Instructions for use.....	20
9	Technical description.....	21
Annex A	(informative) Example of schematic diagram of components and connections in a stationary dental unit.....	23
Annex B	(informative) Dental handpiece connection test jig.....	25
Annex C	(informative) Test sequence.....	26
Bibliography	31

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 7494-2:2022

<https://standards.iteh.ai/catalog/standards/sist/d4326f41-e9ca-4e50-a9bf-cc1bf87907d5/iso-7494-2-2022>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 6, *Dental equipment*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 55, *Dentistry*, in accordance with the Agreement with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 7494-2:2015), which has been technically revised.

The main changes are as follows:

- the requirements in this document have been limited to stationary dental units;
- the requirements for connections from the stationary dental unit to dental handpieces have been added in [5.1](#);
- measurement procedures for air flow and water flow have been added in [7.2.2](#);
- requirements for treatment methods for dental unit waterline biofilm have been added in [5.3.11](#);
- the requirement for noise level for dental suction systems has been removed since that main contribution to noise comes from the cannula, which is outside of the scope of this document.

A list of all parts in the ISO 7494 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 — Stationary dental units and dental patient chairs —

Part 2: Air, water, suction and wastewater systems

1 Scope

This document specifies requirements and test methods for stationary dental units concerning

- a) the properties of stationary dental unit connections to the compressed air supply, water supply, suction supply, and wastewater drain plumbing,
- b) the materials, design, and construction of the compressed air and water system within the stationary dental unit,
- c) the quality for incoming water and air,
- d) the performance of stationary dental unit suction system, and
- e) the air, water, suction and wastewater properties of stationary dental unit connections to the interfaces to dental handpieces.

This document also specifies requirements for instructions for use and technical description.

This document does not specify requirements or test methods for the effectiveness of stationary dental unit waterline biofilm control.

NOTE Test methods for the effectiveness of stationary dental unit waterline biofilm control are specified in ISO 16954.

This document is only applicable to stationary dental units that are not used for oral surgery treatment requiring sterile air and water supplies. Amalgam separators are not included in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1942, *Dentistry — Vocabulary*

ISO 7494-1, *Dentistry — Stationary dental units and dental patient chairs — Part 1: General requirements*

ISO 8573-1, *Compressed air — Part 1: Contaminants and purity classes*

ISO 10637, *Dentistry — Central suction source equipment*

ISO 14457, *Dentistry — Handpieces and motors*

ISO 18397, *Dentistry — Powered scaler*

ISO 20608, *Dentistry — Powder jet handpieces and powders*

ISO 22569, *Dentistry — Multifunction handpieces*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1942, ISO 7494-1, ISO 10637, ISO 14457, ISO 18397, ISO 20608, ISO 22569 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
bacterial filter**
filter designed to restrict the passage of bacteria and reduce bacteria in the *procedural water* (3.15) or in the compressed air

**3.2
backflow**
flow of water and/or another medium back into the external drinking water supply

**3.3
backflow prevention device**
safety device to hinder *backflow* (3.2)

**3.4
bottled water system**
water system of the stationary dental unit in which *procedural water* (3.15) is supplied by an included reservoir which is not connected to an external drinking water supply system and is manually filled with *procedural water* (3.15)

**3.5
dental air**
compressed air supplied through the stationary dental unit for powering, controlling, and/or assisting various dental handpieces and equipment, as well as for assisting practitioners with procedures in the oral cavity, but not for procedures requiring medical air or sterile air, such as endoscopy, oral surgery, analgesia, and life support

**3.6
incoming dental air connection point**
port on the stationary dental unit for connection to an external compressed air supply

**3.7
stationary dental unit suction system**
components located between the facility suction pipeline connection point and the cannula connector that are part of the stationary dental unit which enable an air flow to be induced which is designed to remove liquids, solids, and airborne liquid or solid particulates from the mouth of the dental patient during dental treatment

Note 1 to entry: Suction source equipment may be included in either stationary dental unit or dental patient chair, or both, in which case no facility suction pipeline connection point exists.

**3.8
stationary dental unit suction source connection point**
port on the stationary dental unit for connection to a supply of dental suction

**3.9
exhaust air**
dental air discharged from an air motor or turbine after being used to power the air motor or turbine

**3.10
filter**
apparatus that restricts targeted constituents from passing through it

3.11**incoming solution**

solution of substances specified by the manufacturer, and introduced in combination with, or in place of, the *incoming water* (3.12) in order to improve or maintain the quality of the *procedural water* (3.15) or for other reasons

EXAMPLE Coolant for cutting burs or medicament for oral cavity.

3.12**incoming water**

water supplied to the stationary dental unit for procedural use or non-procedural use

3.13**incoming water connection point**

port on the stationary dental unit for connection to an external drinking water supply

3.14**non-procedural water**

water supplied by the stationary dental unit for purposes other than use in the oral cavity

EXAMPLE Cuspidor bowl rinse water, *water venturi* (3.20), supply water.

3.15**procedural water**

water supplied by the stationary dental unit for use in the oral cavity

EXAMPLE Handpiece coolant water, multifunction handpiece (syringe) water, scaler coolant water, cup fill water.

3.16**retraction**

re-entry of water, air, and/or other medium into the stationary dental unit or the dental handpiece due to flow reversal

EXAMPLE Momentary dynamic pressure variations during turning off the handpiece.

3.17**spill-over level**

highest possible level of water or solution in a device above which the fluid will flow over the edge

3.18**wastewater**

solution that is discharged into the drainage system by way of the cuspidor drain, saliva ejector, air separator, amalgam separator, or other component or system of the stationary dental unit

3.19**water disinfection system**

system designed to reduce the microbiological contamination in a stationary dental unit *procedural water* (3.15)

3.20**water venturi**

device using waterflow to produce a suction

3.21**wastewater connection point**

port for the connection through which *wastewater* (3.18) flows and is discharged into the drains

4 Classification

4.1 Classification of suction systems

According to ISO 10637, suction systems are classified to the type of suction as follows:

- a) dry-suction system;
- b) semi-dry-suction system;
- c) wet-suction system.

4.2 Classification of suction air flow rate

According to ISO 10637, suction systems are classified to the type of air flow rate as follows:

- **Type 1:** Suction system intended to supply a minimum air flow rate of 250 l/min at one suction cannula connector on the stationary dental unit.

NOTE 1 Often referred to as “high-volume suction systems”.

- **Type 2:** Suction system intended to supply a minimum air flow rate of 170 l/min at one suction cannula connector on the stationary dental unit.

- **Type 3:** Suction system intended to supply a minimum air flow rate of 90 l/min at one suction cannula connector on the stationary dental unit.

NOTE 2 Often referred to as “medium-volume suction systems”.

5 Requirements

5.1 Connections from the stationary dental unit to dental handpieces

5.1.1 General

Technical description shall include the configuration of the air and water connections to the applicable dental handpieces.

NOTE This information helps dentists to select dental handpieces that perform clinically as expected.

5.1.2 Powered scaler

The flowrate and pressure for air and water supplied by the stationary dental unit at the connection to the powered scaler shall meet the specifications of the manufacturer.

NOTE Air and water flowrate specifications for powered scalers according to ISO 18397 and typical values are as follows:

- a) Air-powered and electrical powered scalers: A minimum water flowrate is specified in ISO 18397. An adjustable flow rate up to 25 ml/min at a pressure specified by the manufacturer is typical.
- b) Air-powered scalers: An air flowrate of up to 66 l/min at a pressure of (300 ± 100) kPa is specified in ISO 18397. An air flow rate of 30 l/min at a pressure of 300 kPa is typical.

Test in accordance with [7.2](#).

The manufacturer's specification for air and water flowrate and pressure at the connection to the powered scaler shall be provided in the technical description and in the instructions for use.

5.1.3 Multifunction handpiece

The flowrate and pressure for air and water supplied by the stationary dental unit at the connection to the multifunction handpiece shall meet the specifications of the manufacturer.

NOTE Air and water flowrate specifications for multifunction handpiece according to ISO 22569 and typical values are as follows:

- a) An air flowrate of at least 10 Nl/min at a pressure specified by the manufacturer is specified in ISO 22569. An air flowrate of 10 Nl/min at a pressure of 300 kPa is typical.
- b) A water flowrate of at least 50 ml/min at a pressure specified by the manufacturer is specified in ISO 22569. A water flow rate of 50 ml/min at a pressure of 140 kPa is typical.

Test in accordance with [7.2](#).

The manufacturer's specification for air and water flowrate and pressure at the connection to the multifunction handpiece shall be provided in the technical description and in the instructions for use.

5.1.4 Handpiece and motor

The flowrate and pressure for air and water supplied by the stationary dental unit at the connection to the handpiece or motor shall meet the specifications of the manufacturer.

NOTE Air and water flowrate specifications for handpiece and motor according to ISO 14457 and typical values are as follows:

- a) For high-speed air turbine handpieces, air motors, handpieces with integrated air motor and prophylaxis handpieces with integrated air motor a maximum air flow rate of 80 Nl/min at a pressure of (300 ± 100) kPa is specified in ISO 14457. An air flow rate of 55 Nl/min at a pressure of 300 kPa is typical for a wide range of high speed air turbine handpieces.
- b) For electrical motors equipped with an air-cooling system a maximum air supply with 40 Nl/min at a pressure range of 250 kPa to 500 kPa is specified in ISO 14457. An air flow rate of 20 Nl/min at a pressure of 250 kPa to 500 kPa is typical.
- c) A spray air flowrate of at least 1,5 Nl/min at a pressure of 250 kPa is specified in ISO 14457 and is typical.
- d) A water flow rate of at least 50 ml/min at a pressure of 250 kPa is specified in ISO 14457 and is typical.

Test in accordance with [7.2](#).

The manufacturer's specification for air and water flowrate and pressure at the connection to the handpiece or motor shall be provided in the technical description and in the instructions for use.

5.1.5 Powder jet handpiece

The flowrate and pressure for air and water supplied by the stationary dental unit at the connection to the powder jet handpiece shall meet the specifications of the manufacturer.

NOTE Air and water flowrate specifications for powder jet handpieces according to ISO 20608 and typical values are as follows:

- a) A maximum drive air flowrate of 40 Nl/min at 250 kPa is specified in ISO 20608.
- b) A water flowrate of at least 20 ml/min at 150 kPa is specified in ISO 20608 and is typical.

Test in accordance with [7.2](#).

The manufacturer's specification for air and water flowrate and pressure at the connection to the powder jet handpiece shall be provided in the technical description and in the instructions for use.

5.1.6 Simultaneous use of more than one dental handpiece

Unless the simultaneous use of multiple dental handpieces is excluded by design or contraindicated in the instructions for use, the requirements for minimum water flow rate and minimum air flow rate specified in 5.1.1 to 5.1.5 shall be met when the multifunction handpiece is operated simultaneously with each of the other dental handpieces or motors.

Test in accordance with 7.2.

5.2 Supply connections to the stationary dental unit

Technical description shall include the configuration of the supply connections for the stationary dental unit. The specified configuration of the supply connections shall be within a maximum area of 180 mm × 220 mm.

Technical description shall include detailed information of the position and the dimensions of supply connections (see Figure 1) for the stationary dental unit in the dental practice.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 7494-2:2022

<https://standards.iteh.ai/catalog/standards/sist/d4326f41-e9ca-4e50-a9bf-cc1bf87907d5/iso-7494-2-2022>