
**Dentistry — Plant area equipment —
Part 2:
Compressor systems**

Art dentaire — Installation de la zone technique —

Partie 2: Systèmes de compression

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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.

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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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/TS 22595-2 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 6, *Dental equipment*.

ISO/TS 22595 consists of the following parts, under the general title *Dentistry — Plant area equipment*:

- *Part 1: Suction systems*
- *Part 2: Compressor systems*

Introduction

This Technical Specification applies to dental compressor equipment and their working conditions, and all other machines installed in the plant area.

The air compressor equipment consists of the compressor unit, compressed-air line, fittings and shut-off valve.

Ancillary equipment may include air conditioning, heating, hot water and equipment that may be installed in the plant area.

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Dentistry — Plant area equipment —

Part 2: Compressor systems

1 Scope

This Technical Specification applies to compressor units for dental air and specifies quality requirements for dental air, fittings, pipe lines and valves in the plant area, used to source compressed air for the dental units, dental instruments and technical dental lab equipment.

This Technical Specification gives recommended guidelines for performance as well as test procedures for compressor units for dental air with at least a compressor motor set including compressor head, air receiver, air dryer system, condensed water tap, pressure switch, valves, pipes, fittings and quality requirements for dental air.

The technical specifications of the compressor unit are limited to the compressed-air main line connection point.

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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 1942, *Dentistry — Vocabulary*

ISO 3746, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane*

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

ISO 7494-2:2003, *Dentistry — Dental units — Part 2: Water and air supply*

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

ISO 8573-2, *Compressed air — Part 2: Test methods for oil aerosol content*

ISO 8573-3, *Compressed air — Part 3: Test methods for measurement of humidity*

ISO 9687, *Dental equipment — Graphical symbols*

ISO/TS 22595-1, *Dentistry — Plant area equipment — Part 1: Suction systems*

IEC 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements*

IEC 60364-6, *Low-voltage electrical installations — Part 6: Verification*

IEC 60364-7-710, *Electrical installations of buildings — Part 7-710: Requirements for special installations or locations — Medical locations*

IEC 60601-1:2005, *Medical electrical equipment — Part 1: General requirements for basic safety and essential performance*

IEC 61010-1, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60601-1, ISO 1942, ISO 7494-1, ISO 7494-2, ISO/TS 22595-1 and the following apply.

**3.1
air dryer system**
device designed to reduce the humidity of compressed dental air and which is part of the compressor unit

**3.2
air filter**
device designed to remove solid particles from the compressed air

**3.3
air receiver**
device designed to store compressed air, which is a pressure vessel and part of the compressor unit

**3.4
bacterial filter**
device designed to minimize the content of bacteria in the dental air

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**3.5
compressed-air main line**
pipeline through which compressed air from the compressor unit is carried via the compressed-air main line connection point to all consuming dental devices

**3.6
compressed-air main line connection point**
location where the air main line is connected to the pipes of all consuming dental devices

**3.7
compressor motor set**
device consisting of one or more electrically driven compressor heads

**3.8
compressor unit**
electrically driven device that creates dental air for dental surgeries and dental laboratory applications and which consists of one or more compressor motor sets

**3.9
compressor unit connection point**
location where the compressed-air main line is connected to the compressor unit

**3.10
condensed water tap**
device designed to drain off condensed water from the air receiver

3.11**compressor fresh air inlet**

location where the compressor unit sucks in the atmospheric air

3.12**dental air**

common ambient air available in the dental office, used in dental procedures in the oral cavity of the patient

NOTE This air is different from medical air used for anaesthetic purposes or for surgical purposes (e.g. during endoscopy).

[ISO 7494-2:2003, definition 3.22]

3.13**fittings**

materials that are used to connect the compressor unit, valves and devices with the pipes

3.14**flexible tube**

device to connect the inlet muffler and the air inlet filter of the compressor unit or compressor motor sets with the fresh air connection point

3.15**fresh air inlet**

location where the compressor unit or each compressor motor set can draw in the atmospheric air from a source located outside the plant area

3.16**fresh air ventilation**

location where atmospheric air enters the plant area

3.17**inlet muffler and air inlet filter**

device designed to protect the compressor unit against solid particles in atmospheric air and reduce the noise level of the intake of atmospheric air

3.18**oil separator**

device that is installed in an oil-lubricated compressor unit in order to reduce the oil contamination of the compressed air

3.19**plant area fresh air connection point**

location where the compressor unit or each compressor motor set and the ventilating pipe are connected

3.20**pressure-regulating valves**

compressor unit components that limit the maximum air pressure delivered into the main air line by the compressor unit

3.21**quick-release coupling device**

device that is installed behind the shut-off valve at the compressor unit connection point to disconnect the compressor unit from the compressed-air main line for maintenance and measurement of air flow rate, air humidity, ambient temperature and noise level

3.22**shut-off valve**

device that is installed between the compressor unit and the compressor unit connection point and which is used for maintenance to isolate the compressor unit from the compressed-air main line

3.23

ventilating pipe

pipe from the fresh air connection point to the fresh air inlet

3.24

air outlet

location where the air exits the plant area

4 Classification

4.1 According to the type of compressor motor set

Compressor units are classified according to the type of compressor motor set into the following two types.

- **Type 1: oil-lubricated system:** the compressor heads are oil-lubricated.
- **Type 2: non-oil-lubricated system:** the compressor heads are designed and constructed so that there is no oil lubrication required.

4.2 According to the type of protection against electric shock

4.2.1 Class I equipment

Equipment in which protection against electric shock does not rely on basic insulation only, but includes an additional safety precaution that provides means for the connection of accessible conductive parts to the protective (earth) conductor in the fixed wiring of the installation, such that accessible conductive parts cannot become live in the event of a failure of the basic insulation.

4.2.2 Class II equipment

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Equipment in which protection against electric shock does not rely on basic insulation only, but in which additional safety precautions, such as double insulation or reinforced insulation, are provided, there being no provision for protective earthing or reliance upon installation conditions.

4.3 According to mode of operation

Compressor units are classified as applicable for either intermittent or continuous operation.

5 Requirements

5.1 Electrical

For compressor units the requirements of IEC 60335-1, IEC 60204-1 or IEC 61010-1 apply.

5.2 Performance

5.2.1 Compressor unit

The compressor unit shall have a capacity of continuous flow at atmospheric pressure of at least 50 l/min at a nominal pressure of 5 bar at the incoming air connection point (see ISO 7494-2:2003, Figure 1, key item 11) for one dental unit.

For more than one dental unit, a clinic or a technical laboratory with more than three dental compressed-air devices, an agreement between the parties concerned shall specify the quantity of air at atmospheric pressure that is required to simultaneously operate a number of dental units and/or technical laboratory benches.

The manufacturer shall state the maximum number of units compatible with the compressor unit maintaining the correct air pressure.

NOTE All pressure data are pressures in excess of atmospheric pressure.

5.2.2 Ventilating pipe

If the pipe between the fresh air inlet and a fresh air connection point is necessary to supply the compressor unit with filtered air, the internal diameter of the pipes, the material and the fittings shall be installed according to the manufacturer's instructions.

The fresh air ventilation shall supply low-contaminated atmospheric air to the plant area.

If it is not possible to prevent the air of the plant area from being contaminated by other installed devices, the compressor unit shall be connected with the ventilating pipe at the fresh air connection point.

The coupling with each compressor motor set of the compressor unit at the fresh air connection point shall be achieved by a flexible tube according to the manufacturer's instructions.

Testing shall be carried out by visual inspection.

5.2.3 Inlet muffler and air inlet filter

If a fresh air inlet is installed and the compressor unit is connected with the ventilating pipe at the fresh air connection point, air inlet filters and inlet mufflers shall be fitted between the compressor unit or each compressor motor set and the fresh air connecting point.

The manufacturer's instructions shall define the interval and method for changing the filter element.

Testing shall be carried out by visual inspection and by comparing the observations with the technical data of the manufacturer.

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5.2.4 Oil separator/filter

The device of an oil-lubricated compressor shall remove oil and oil vapour from compressed air. The oil content shall be $< 0,1 \text{ mg/m}^3$ by atmospheric pressure. ISO 8573-1, Class 2, applies.

Replacements for the filter elements shall be carried out in accordance with the requirements and recommendations of the manufacturer [see 7.2 j)].

Testing shall be carried out by comparing the technical data and the test results, in accordance with ISO 8573-2.

5.2.5 Air receiver

The device shall be internally coated to prevent corrosion or shall be made of corrosion-resistant materials.

Testing shall be carried out by visual inspection, if required, in accordance with national regulations.

5.2.6 Condensed water tap

If the dryer is located upstream of the receiver, the device shall be at the lowest point of the receiver to drain off condensed water in preparation for a fault condition and for maintenance purposes.

If the dryer is located downstream of the receiver and the receiver acts as a secondary after-cooler, an automatic condensed water trap shall be installed.

Testing shall be carried out by visual inspection and the possibility of manually opening and closing the water tap.