New as of: 09.2017

sirona
The Dental Company

inCoris ZI meso

Zirconium oxide ceramic blocks for CEREC and inLab
Processing instructions: Manufacturing mesostructures
(not valid for USA)

English

This product is covered by one or more of the following US patents:

- US7178731
- US7901209

Table of contents

1 General

CE 0123

The CEREC Zirconia meso product bears the CE mark in accordance with the provisions of Council Directive 93/42/EEC of June 14, 1993 concerning medical devices.

CEREC Zirconia meso blocks are intended for use in manufacturing individually designed mesostructures, which are glued to a fitting titanium base after milling and sintering.

Please also observe the instructions provided by the manufacturer of the titanium base or the implant.

For the USA only

USA: Rx only

CAUTION: Federal law (USA) restricts sale of this device to or on the order of a physician, dentist, or licensed practitioner.

2 Scope of supply

inCoris Zi meso blocks are each available in two different colors and in two different sizes for connecting to the titanium base:

REF	Connection size	Color
62 31 802	S	F0.5
62 31 828	S	F2
62 31 810	L	F0.5
62 31 836	L	F2

The scanbodies are Sirona products and can be procured from dealers.

Lab implants and titanium bases can be procured from the implant manufacturer.

3 Material

inCoris ZI meso ceramics constitute blocks comprised of zirconium oxide.

The blocks are initially delivered partially sintered; then, enlarged by the CEREC or inLab CAD/CAM system, they are individually processed to specification, and finally, densely sintered.

The advantages of inCoris ZI meso are:

- High strength
- Resistance to corrosion
- Good biological compatibility of the product,
- Coloration of the blocks to match dentin color.

4 Chemical composition

Component	inCoris ZI and inCoris ZI meso
$ZrO_2+HfO_2+Y_2O_3$	≥ 99.0%
Y_2O_3	> 4.5 - ≤ 6.0%
HfO_2	≤ 5%
Al_2O_3	≤ 0.5%
Other oxides	≤ 0.5%

5 Technical data

The following specifications apply to material that is densely sintered in an CEREC SpeedFire, inFire HTC or inFire HTC speed sintering furnace.

Density:	6.05 ± 0.2 g cm^{-3}
Fracture toughness K_{IC}	5.8 MPa $m^{1/2}$
Coefficient of thermal expansion (20 - 600°C):	$11 \cdot 10^{-6}$ K^{-1}
Bending strength:	> 900MPa
Grain size	≤ 0.4 µm
Chemical solubility	0 µg/cm^2

Colors:

The blocks are tinted in the colors:

- F0.5
- F2

Therefore it is not necessary to carry out subsequent coloring using a submersion solution or liners.

6 Intended use, indications and contraindications

6.1 Intended use

To manufacture of individually designed restorations made from inCoris ZI meso blocks by means of the Sirona CAD/CAM-Systems CEREC and inLab.

inCoris ZI meso blocks are used in manufacturing individually designed mesostructures, which are glued to a fitting titanium base after milling and sintering only.

6.2 Indications

InCoris ZI Mesostructures may only be used for the respective titanium bases or implants. Please refer to the user guide of the titanium basis, which connection geometry (S or L) shoud be used for the inCoris meso block. Indications and contraindications of the used implantsystem must be considered.

Two-piece individually designed abutments consisting of a TiBase and an inCoris ZI meso mesostructure.

Sinter furnace inFire HTC Speed:

Classic sintering: inCoris ZI meso can be sintered only in Classic program.

Sinter furnace CEREC SpeedFire:

inCoris ZI meso can be sintered with the CEREC SpeedFire furnace.

6.3 Contraindications

- Insufficient oral hygiene
- Insufficient space available
- Bruxism
- For restorations with angulation correction of more than 20° to the implant axis
- For individual tooth restorations with free end saddle
- For restorations with a length to implant length ratio of more than 1:1.25.

7 Producing the mesostructure

7.1 Scanning, designing and milling

More details can be found in the following documents:

- CEREC/CEREC Premium/inLab SW, User manual

1. Plug a TiBase onto the lab implant of the master model or a CEREC ScanPost directly onto the implant in the mouth.
   Plug a scanbody onto this until it comes to rest on the shoulder of the implant without any gaps. The scanbody is scannable **without** powder or scan spray.
2. Acquire the situation alternatively with inEos Blue, inEos X5 or CEREC AC.
3. Use the CEREC/CEREC Premium/inLab SW software to design the individual shape of the mesostructure and mill the shape from an inCoris ZI meso block (see User Manual). The following information must be observed when designing, reworking and sintering zirconium oxide.

7.2 Design information

- Maintain a minimum wall thickness of 0.5 mm circularly around the screw channel.
- Design the outer form of the mesostructure in adherence to the preparation guidelines for the required superstructure.
- If the mesostructure is to be veneered immediately, make sure that this doesn't narrow the screw channel. The connection point to the base and the screw channel should not be coated.
- Make sure that no sharp edges or corners are produced.

7.3 Reworking the milled restoration

After finishing the milling process and prior to sintering the milled mesostructure, separate it from the remaining block and remove the pin with a diamond point tool.

Make sure you do not inhale abrasive dusts. Use a vacuum system and wear a mask.

Block remains and the block holder do not need to be disposed of separately. They can be disposed of as normal household waste.

7.4 Sintering

inCoris ZI mesostructures have to be sintered in dry conditions.

The Sirona inFire HTC, inFire HTC speed, or CEREC SpeedFire sintering furnaces offer programs with a pre-drying function.

The sintering process should only be performed in a Sirona sintering furnace.
When sintering in the inFire HTC/HTC speed, use the pre-programmed inCoris ZI programs.

When sintering in the CEREC SpeedFire, the CEREC software automatically selects the program. Observe the information in the operating instructions for the furnace.

As an alternative, the sintering process can be carried out in the compatible VITA Zyrcomat or Ivoclar Vivadent Sintramat high temperature furnace. Use a zirconium oxide program for this.

The classic program for sintering with CEREC Zirconia meso is the same as for inCoris ZI. The sintering result from furnaces other than those specified here cannot be guaranteed by Sirona.

Sintering program for other furnaces

Heating rate °C/min	Holding temperature °C	Holding time min
25	800	0
15	1510	120
30	200	0

In any case, the details in the manuals for the respective furnaces are to be adhered to.

7.5 Additional notes: procedure after sintering

In the case of yellow staining of inCoris ZI mesostructures after the sintering process, the high-temperature furnace should be cleansed by performing an empty run. The details in the manuals for the respective furnaces are to be adhered to in this case.

This is not necessary for CEREC SpeedFire due to the different heating concept.

Sintering beads that adhere are to be removed carefully.

After the sintering process, the inCoris mesostructures must be cooled down to room temperature at atmosphere before further processing.

7.6 Reworking the sintered mesostructure

The surface condition of ceramic materials is decisive for their bending strength. Reworking sintered mesostructures with milling tools must be avoided at all costs.

Therefore make corrections to the ground mesostructure if possible before sintering.

However, if reworking should be necessary, comply with the following basic rules:

- Reworking in the sintered condition should be performed with a wet grinding turbine (approx. 2.5 – 3 bar) or rubber polishers (low speed) or for primary telescopes with a grinding unit using water cooling and with low grinding pressure. As an alternative it is possible to rework with soft, diamond rubber polishers and a handpiece at low speed and low pressure. The tool must be applied flat and must not “chatter”.
- New diamond burrs with varied grain size should be used if possible.
- Areas that are under tension in clinical use should not be milled.
- We recommend subjecting the framework to thermal treatment after the milling process to reverse any phase transformation which may have occurred on the surface. Microscopic cracks cannot be regenerated.

  The following firing adjustment should be selected for this purpose:

Vt. °C	→ min.	↗ min.	↗ °C/min.	ca. Temp. °C	→ min.	VAC min.
500	-	5.00	100	1000	15.00	-

Sand-blast the surfaces on which a superstructure is to be conventionally attached or glued, using the one-way blasting process with maximum 50 µm corundum (Al_2O_3). Pressure < 2.5 bar. Observe the operator manual of the respective restoration material as to the suitability of the fastening material.

NOTICE

Observe usage information

Etching with hydrofluoric acid does not produce a retentive surface. Silanization is not required

Please observe the information on use of the fastening materials of the corresponding manufacturers.

The mesostructure must be treated with the usual disinfectant before it is inserted in the patient's mouth.

7.7 Veneer

The areas of the mesostructures to be veneered that are made of inCoris ZI meso must not be sandblasted. Sandblasting could lead to an undesirable phase transformation of the zirconium dioxide. For the veneer, this would cause complex diffusions of stress along the interface which might lead to cracks or late cracks in the veneer after the restoration is inserted.

Mesostructures made of inCoris ZI meso can be veneered using all standard veneer ceramics for zirconium oxide ceramic.

In this case the manufacturer's processing instructions must be observed without fail.

8 Recommended tools and materials

- Modeling wax
  - Scan wax (Sirona) (suitable for scans with the inLab scanner, not for exposures with inEos)
- Wet grinding turbines:
  - KaVo K-AIR plus (KaVo);
  - IMAGO (Steco-System-Technik GmbH & Co.KG);
  - NSK Presto Aqua (Girrbach);
  - Turbo-Jet (Acurata)
- Grinding tools for reworking with the wet grinding turbine/with handpiece
  - Diamond grinding element sets Ceramic-Line, Telescope-Line (Sirius Dental Innovations).
  - Diamond porcelain polisher for handpiece, green-orange (Hager & Meisinger, Art. No. HP 803 104 372 533 170).
  - Diamond polisher for handpiece (green and orange), EVE Diacera.
- Other:
  - Suitable colored contact materials
- Preparation sets:
  - Preparation set acc. to Küpper (Hager & Meisinger, Art. No. 2560);
  - Preparation set acc. to Baltzer and Kaufmann (Hager & Meisinger, Art. No. 2531);

9 Gluing the mesostructure to the titanium base

Prior to gluing, check to make sure that the mesostructure can be easily placed on the titanium base. No gap should be visible between the mesostructure and the attachment surface of the titanium base.

The anti-rotation groove has an especially narrow tolerance. If the mesostructure cannot be easily positioned, first check to see if a small amount of material has to be removed from the groove (see "Reworking the sintered mesostructure" [→ 11]).

⚠ CAUTION

Observe the manufacturer's instructions for handling the titanium base.

The contact surfaces of the titanium base to the implant should not be sand-blasted or otherwise processed.

The diameter of the titanium base should not be reduced (e.g. by grinding). Shortening the titanium base is not recommended.

The surfaces of the titanium base intended for gluing to the zirconium oxide ceramics have to be sand-blasted and cleaned.

Surfaces of the zirconium oxide ceramics and the titanium base to be glued must be free of dust and grease.

1. Sand-blast the gluing surfaces of the zirconium oxide ceramics and the titanium base with 50 µm aluminum oxide and up to 2.0 bar.
2. Clean the adhesive surfaces with alcohol or steam. For easier handling during the gluing process, it is recommended that the titanium base be screwed into a lab implant or a polishing tool.
3. Cover the hex head of the abutment screw with wax.

NOTICE

Use "PANAVIA ™ F 2.0" (www.kuraray-dental.de) extraoral as the adhesive for connecting the titanium base and the zirconium oxide ceramics.

4. Mix the glue according to the manufacturer's instructions and apply it to the titanium base.
5. Press on the customized zirconium oxide ceramics as far as it will go. Make sure it latches into the rotation and position stops.
6. Remove excess glue immediately.
7. Apply the Airblocker ("Oxygard") to the junction where the ceramic and titanium surfaces meet and to the screw funnel for final hardening.
8. Remove residue with a rubber polisher after hardening.

We reserve the right to make any alterations which may be required due to technical improvements.

D3487.201.05.08.02 09.2017
Sprache: englisch
Ä.-Nr.: 123 980
Printed in Germany

Sirona Dental Systems GmbH

Fabrikstraße 31
64625 Bensheim
Germany
www.dentsplysirona.com

Contact in the USA:
Sirona Dental, Inc.
4835 Sirona Drive
Charlotte, NC 28273
USA

Order No **62 29 418 D3487**