New as of: 04.2013

sirona
The Dental Company

CEREC Blocs C In

Industrially manufactured silicate glass ceramic blocks
Processing instructions

English

Table of contents

1 Symbols used

NOTICE! Observe operating instructions!

This product is a medical device in accordance with Council Directive 93/42/EEC.

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

Article number

Batch number

This product is intended for single use only

unsterile

2 Material

CEREC Blocs C In are industrially manufactured, silicate ceramic blocks used to produce crowns with CEREC or inLab.

The key advantage of CEREC Blocs C In is that restorations can be inserted immediately after the milling operation. Dentists also appreciate the good polishability and outstanding enamel-like abrasion properties of CEREC Blocs C In.

The selected composition, the fine microstructure and the industrial sintering process used in producing the ceramic blocks are the chief reasons for the good polishability and outstanding enamel-like abrasion properties of restorations produced from CEREC Blocs C In.

The outstandingly millable CEREC Blocs C In enable dentists to reproduce the color gradients characteristic of natural teeth with respect to both translucence and intensity at the treatment unit by means of the chromatic dentine core acquired in the translucent enamel, thereby also achieving improved integration of the restoration into the remaining dentition. The software tool developed for this block particularly supports block positioning of anterior teeth restorations and allows dentists to make the right color setting with ease.

The milling tool saving, silicate ceramics impress users with their antagonist-friendly abrasion properties corresponding to those of natural tooth substance, as well as through optimal light conducting effects and white fluorescence.

These two layers in a single CEREC Blocs C In enable a unique naturalness in the restoration: The upper layer of enamel is less intensive and, at the same time, more translucent than the other layers; the dentine core layer has stronger pigmentation and, similarly to a natural tooth, is less translucent.

Tooth restorations made from CEREC Blocs C In thus resemble natural teeth without requiring any subsequent surface individualization or characterization. The use of CEREC Blocs C In also enables enhanced integration of the restoration into the remaining dentition.

The advantages of silicate ceramics are:

- The material is ideally suited to the CEREC CAD/CAM system
- Many years of experience working with the material
- Maximum market acceptance
- Clinical acceptance
- Highly esthetic appearance
- Very good translucence properties
- Chameleon effect
- Antagonist-friendly abrasion properties

3 Chemical composition

Oxide	% of total weight
SiO_2	55 - 65
Al_2O_3	17 - 24
Na_2O	5 - 9
K_2O	7 - 11
B_2O_3	0 - 2

The chemical composition values specified above are batch-dependent.

Oxides, contained in very low concentrations and used e.g. for coloring, are not specified here.

4 Technical Data

Physical properties

Properties	Unit	Value
Coefficient of thermal expansion CTE (20 - 500°C)	$10^{-6}K^{-1}$	9,3 ± 0,3
Density	g/cm^3	2,36
Bending strength (ISO 6872)	MPa	123 ± 18
Transformation range	°C	620 ± 20

The CEREC Blocs C In are available in 11 classic colors and one block size.

Block size

CEREC Blocs C In are available in the following block size: 13 x 15 x 15 mm = M

Block colors

CEREC Blocs C In are available in 10 classic colors (A-D) and an additional bleach color:

- BL2
- A1; A2; A3; A3.5; A4
- B2; B3
- C2; C3
- D3

5 Indications and preparation instructions

5.1 Indication

CEREC Blocs C In are indicated for CEREC/inLab CAD/CAM production of crowns and veneers:

Material indication	Silicate ceramics
Anterior tooth crowns	Recommended
Veneers	Recommended
Premolars	Possible
Molars	Not recommended (this is for aesthetic reasons, CEREC Blocs C In have an aesthetic design optimized for anterior teeth).

5.2 Contraindications

- Insufficient oral hygiene
- Insufficient preparation results
- Insufficient tooth structure
- Insufficient space available
- Bruxism

Hyperfunction: Patients diagnosed with excessive mastication, especially "gnashers" and "pressers" are contraindicated for restorations from CEREC Blocs C In. An absolute contraindication applies to the treatment of devital teeth of hyperfunction patients with CEREC Blocs C In restorations.

Endocrown premolars: Endocrowns on premolars are contraindicated due to their small adhesive surfaces and delicate root cross sections.

Bridges: Since CEREC Blocs C In are ceramic blocks made of silicate ceramics, they cannot be used to produce bridge restorations of any kind prior to processing due to their limited strength of approx. 120 MPa.

Fully ceramic frameworks: CEREC Blocs C In must not be used as framework ceramics. A suitable veneer made of this material must not therefore be used as a full veneer of a crown cap.

5.3 General preparation instructions

The preparation can optionally be performed with a chamfer or a shoulder with rounded internal angle. A circular depth of cut of one millimeter should be aimed for. The vertical preparation angle should be at least 3°. All transitions from the axial to the occlusal or incisal areas must be rounded off. Uniform and smooth surfaces are advantageous. A WaxUp and the production of silicone keys to check the preparation are advantageous for diagnosis as well as for clinical implementation (defect-oriented preparation):

Shoulder preparation

Chamfer preparation

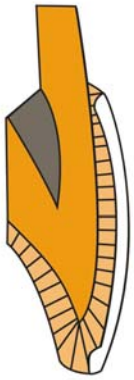
Over-contoured chamfer preparation

Tangential preparations are contraindicated.

5.4 Preparation of veneers

The ceramic layer thickness of the CEREC Blocs C In veneer should be at least 0,3 mm to enable reliable adhesive bonding:

Labial

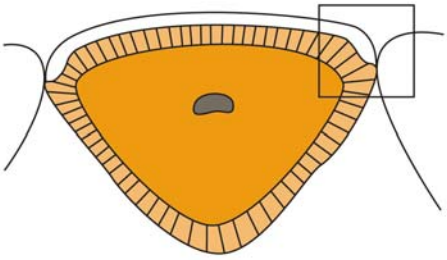


- Average labial reduction: 0,3 mm
- Progression of vestibular tooth contour maintained

Cervical

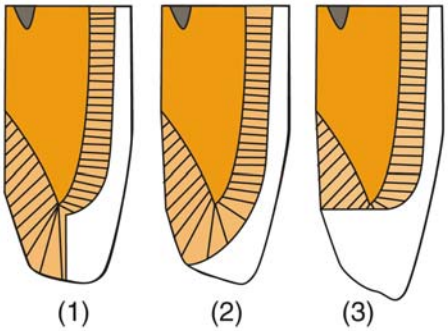
- Easily rounded shoulder or chamfer running parallel to the gingival margin, supragingival

Proximal



- Aim for proximal margins in the sense of a chamfer
- "Saddle-shaped" perimeter
- Natural contact points preserved where possible

Incisal



- Labial-incisal "chamfering" without extension (1)
- A slight reduction allows for a thicker ceramic layer for an individual characterization (2)
- For "extension", flatten incisal edge and round off edge (3)

5.5 Preparation of anterior and posterior tooth crowns

Incisal ceramic layer thicknesses for crowns

The minimum layer thickness of the ceramics must be 1.5 mm.

Check the cavity for sufficient dimensions while making the preparation.

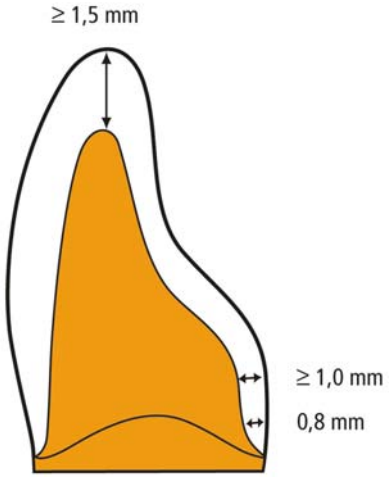
The establishment of functional dentine adhesion makes the laying of a subfilling unnecessary and prevents reduction of the ceramic material thickness at a specified preparation depth.

The layer thickness must be checked in the milling preview of the 3D software.

Reduction below the minimum layer thickness by means of manual reworking following insertion must be avoided.

To ensure the clinical success of crowns made from CEREC Blocs C In, always observe the following **minimum ceramic layer thicknesses**:

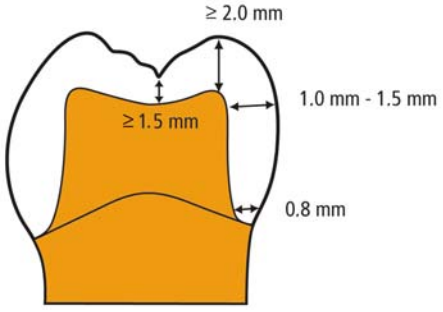
Preparation of anterior teeth



The incisal wall thickness should be at least 1.5 mm, the circular wall thickness at least 1.0 mm.

The tapering crown edge should be 0.8 mm thick.

Preparation of posterior teeth (premolars and molars)



At the lowest point of the main fissure, the material thickness should be 1.5 mm.

For the cusp design, a material thickness of at least 2.0 mm should be ensured.

The circular wall thickness should be 1.0 - 1.5 mm.

The tapering crown edge should be 0.8 mm thick.

6 Producing a restoration

Producing a restoration in a dental practice	Producing a restoration in a dental laboratory
1) Following preparation, dry the tooth directly or indirectly and then apply contrast powder or contrast spray depending on the acquisition system used (e.g. CEREC Optispray).	1) Produce a master model.
2) Take an optical impression with the CEREC Bluecam.	2) Create a scan model. Alternatively: Create a wax model.
3) Check the quality of the optical impressions. Avoid camera shake.	3) Scan preparation
4) Initiate a 3D model reconstruction. Check the 3D model for irregularities.	4) Fasten scan model to scan holder. Alternatively: Fix wax model on special wax-up holder.
5) Design the desired restoration with CEREC software.	5) Scanning
6) Specify tooth color and incisor enamel thickness.	6) Design restoration with CEREC/ inLab software.
7) Milling	7) Specify tooth color and incisor enamel thickness.
8) Fit check	8) Check restoration data quality.
9) Polishing of proximal areas Alternatively: Customize/enamel	9) Produce restoration with inLab.
10) Adhesive bonding in the mouth	10) Possible monitoring
	11) Polishing of restoration Alternatively: Individualization/ characterization

6.1 Using CEREC Blocs C In

6.1.1 Introduction

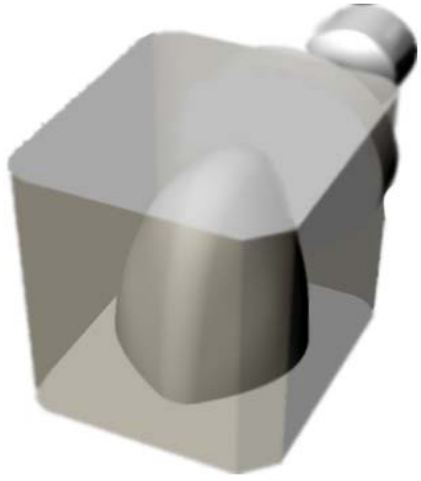
Until now, interaction between chromatic dentine and the translucent cutting area limited use of CAD/CAM-supported systems in the visible anterior tooth region. However, this is now possible with CEREC Blocs C In and the software algorithm set on these blocks.

The blocks consist of an inlying, highly-chromatic dentine core and an overlying translucent enamel layer. Dentine cores are modeled on the morphology of natural teeth's dentine cores. The external morphology of the tooth is defined by the biogenerics saved to the software. A new algorithm that is saved to the software enables positioning of the restoration in the block. This position depends on the two layers in the block, meaning that the tooth color specified by the user can be precisely matched. This makes it possible to mill esthetic anterior restorations.

6.1.2 CEREC Blocs C In blocks for producing esthetic anterior restorations

- C stands for Classic Colors (A1-D4),
- whereas In stands for Integral. The block consists of one dentine core integrated into the enamel.
- The blocks consist of leucite-free silicate ceramics.
- The special dentine core shape enables all maxillary and mandibular anterior teeth to be covered with just one core shape. The dentine core is used from two sides.
- The new software tool for coloring purposes makes the CEREC Blocs C In system easy and safe to use, with maximum efficiency.
- The CEREC Blocs C In in the anterior tooth region perfectly complement the CEREC Blocs C in the posterior tooth region.
- Additional partial veneers and customizations with paints are possible.

6.1.3 Schematic view of the dentine core positioning in the block



The dentine core is used from both sides. As such, the same core can be used for extremely narrow maxillary anterior teeth, but also for wide mandibular anterior teeth.

6.1.4 Range of blocks

One block size:	M
11 colors:	BL2
	A1; A2; A3; A3.5; A4
	B2; B3
	C2; C3
	D3

6.2 Designing a restoration using CEREC Blocs C In

The exact instructions for designing a restoration with CEREC or inLab software can be found in the corresponding documents, "CEREC Software, Operator's Manual" or "inLab Software, Operator's Manual".

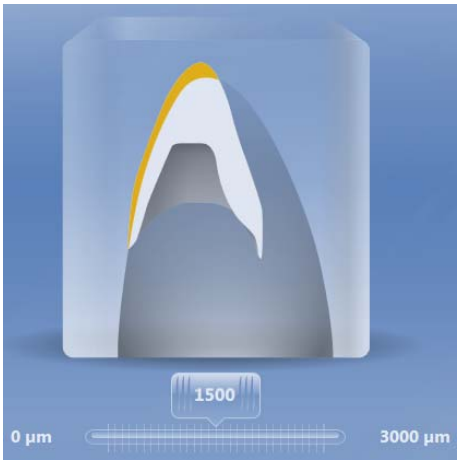
This chapter only examines the innovations and changes which are important to CEREC Blocs C In.

Select material

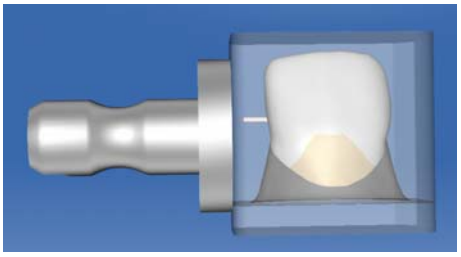
1. When selecting material, choose `SIRONA` and `CEREC Blocs C In`.
2. Proceed to the milling preview as with all restorations (see "operator's manual").

Select tooth color in the milling preview

1. After finishing the design of the crown, you automatically return to the *"Select Color"* step in the step menu. In this step, you can select the desired color at just a click in the center of the color.



2. In addition, for the incisal edge version, there is the option of adjusting the dentine core of the individual situation to either the incisal or apical direction. The enamel layer overlying the dentine core should be evaluated for the remaining teeth in the patient's mouth. To do this, click on the *"Incisal Edge"* selection field in the *"Select Color"* step. You can use the slider to adjust the thickness of the incisor enamel overlying the dentine core here (refer to illustration on the left).
3. Confirm with *"Ok"* after entering your values.
   ↳ The stored software automation/algorithm is activated and positions the crown in the block according to the parameters selected.



4. You can control the positioning in the block in the milling preview.
5. In the display option, you can also illustrate the restoration in a transparent manner, so as to control the position of the dentine core.

6.3 Possible software messages

Error message	Remedy:
Warning: The colour shade calculated by the software will be lost due to the manual positioning of the restoration in the block. Do you want to continue? Yes / No	Moving the restoration after automatic positioning in the block would lead to loss of the calculated color, and is therefore not recommended. Whoever would like to do this anyway can confirm the message with "Yes".
Warning: It is not possible to achieve the desired restoration colour shade due to the limited labial space available.	The amount of space offered by the labial surface is not sufficient to achieve the desired color via the dentine-enamel color mixture. The labial surface of the restoration should be increased using the design tools. If this is not sufficient, additional space must be created on the stump in the labial direction.

6.4 Scanning and milling

Exact instructions can be found in the corresponding documents, "CEREC software, Operator's Manual" and "inLab software Operator's Manual".

6.5 Reworking/Polishing

CEREC Blocs C In restorations from finely structured silicate ceramics must not under any circumstances be reworked with hard metal instruments, as they could damage the ceramics and cause microcracks; the following therefore applies:

- The finishing should be performed applying less pressure and under cooling (e.g. with water drops).
- Localized overheating must be avoided in all cases. Excessive milling generally causes microcracks inside the ceramic structure of all ceramic materials and may result in a restoration failure due to cracks and flaking of the restoration.
- Only fine-grain diamond burs (40 µm) should be used for contouring and diamond finishing burs (8 µm) should be used for prepolishing (e.g. EVE Diasynt Plus / Diapro).
- The polishing is best performed with flexible disks coated with Al_2O_3, polishing brushes and diamond polishing paste. Finally, the restoration can be polished to a high gloss using a high-luster buffing wheel made of cotton (e.g. Polyrapid) as a handpiece.

6.6 Characterization/Individualization

In particular for restorations with a large surface area made from Sirona CEREC Blocs C In, additional finishing with stain and glaze firing should be implemented for color surface characterization purposes. The painting and glazing materials must correspond to the CTE of the ceramic material (e.g. Cercon Ceram Kiss; Vita Akzent Plus; Ivoclar IPS e.max Ceram). The glaze firing must not be carried out at more than 850°C. We recommend the following stain and glaze firing for CEREC Blocs C In restorations:

General firing program	Pre-heat temp. [°C]	Drying time [min.]	Heating rate [°C/min.]	Burning temp. [°C]	Holding time [min.]	Vacuum [%]	Slow cooling [min.]
Glaze firing 1/Stain firing	500	6	45	850	1	100	-
Glaze firing 2/Stain firing	500	6	45	850	1	100	-

NOTICE

Maximum firing temperature for glaze and stain firing: 850°C! The restoration may be warped at temperatures exceeding 850°C. The coefficient of thermal expansion ($CTE_{25\text{-}500°C}$) (EN ISO 6872) of the ceramic material is approx. 9.3 $*10^{-6}$ K^{-1}. The glazing and painting materials should lie within this range.

It is essential that you observe the manufacturer's relevant processing instructions.

6.7 Bonding

The indications for ceramic restorations made from CEREC Blocs C In mentioned above apply solely to adhesive bonding using a recognized and correctly applied functional enamel-dentine adhesive system (total bonding).

Preparing ceramics

Silicate ceramics are used in luting composites. These adhesive materials create an adhesive bond between the hard tooth substance and the ceramic restoration which creates a positive bond. The bonding mechanism on the tooth and on the ceramic surface is decisive for clinical success.

Etching

One important prerequisite for bonding is enlargement of the adhesive area. The surface of silicate ceramics can be enlarged by partially dissolving the glass matrix with hydrofluoric acid to create a microretentive pattern, e.g. using

- **IPS Ceramic Etching Gel (Ivoclar)**
  HF concentration: < 5%
  reaction time (min:sec): **CEREC Blocs C In** 4:00
- **Porcelain Etch (Ultradent)**
  HF concentration: 9.5%
  reaction time (min:sec): **CEREC Blocs C In** 2:00

Silanizing

In addition to micromechanical anchoring between ceramics and luting composite, an additional bond can be created via silanization. The silane is applied to the ceramic surface following the etching process. It is important here that the solvent can evaporate completely.

Bonding

In order to improve the moistening of the ceramic surface when using luting composites of higher viscosity, a thin layer of bonding material can be spread over the ceramic surface. This bonding layer is not cured. It polymerizes together with the luting composite.

6.8 Error processing

Error/fault	Cause of error	Remedy:
Object broken during milling	Bur worn	Replace bur
	Thickness of restoration below minimum level	Minimum thickness: 0.5 mm
Cracks in the object	Localized overheating of ceramics during processing	Process under water cooling at max. 5000 rpm
	Blasting pressure too high while blasting surfaces to be etched	Sand blast objects with 110 µm aluminum oxide at max. 0.5 bar to 1.0 bar
	Sharp corners and edges in the preparation	Avoid sharp corners and edges in the preparation
	Faulty framework design and/or preparation	Observe framework design and preparation instructions
	Inherent friction on tooth stump	Restoration must be mounted on stump without tension. Inherent friction on the tooth stump is contraindicated.
	Glazing material applied too thick	Apply the glazing material in thin layers and bake it twice.
	Use hard metal instrument for finishing	Use only fine diamond burs (40µm grain size) for finishing
	Glaze firing temperature too high	Max. 850°C

6.9 Removal of inserted restorations

Diamond instruments must be used to remove full ceramic restorations. Hard metal instruments are not suitable.

Removal of adhesively bonded partial restorations

The problem with these restorations is that it is difficult to discern the borders between the restoration, the luting composite material and the tooth when performing the required wet milling. Since it is not desirable to penetrate further into the tooth substance than is absolutely necessary, it is helpful to intermittently stop milling and blow the tooth dry. The bond to the enamel is usually so good that the entire restoration must be milled out, while those parts that border the dentine automatically come loose.

Recommendation: standard-grain diamond bur (105 - 124 µm) with cylindrical shape.

6.10 Trephination

To create a trephination opening, the coarse grained diamond cylinder must be applied transversely. Once the opening has been milled, the conventional treatment can be resumed.

7 Certification

CEREC Blocs C In are manufactured and marketed by Sirona Dental Systems GmbH.

Sirona Dental Systems GmbH is certified according to the Medical Device Directive.

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

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