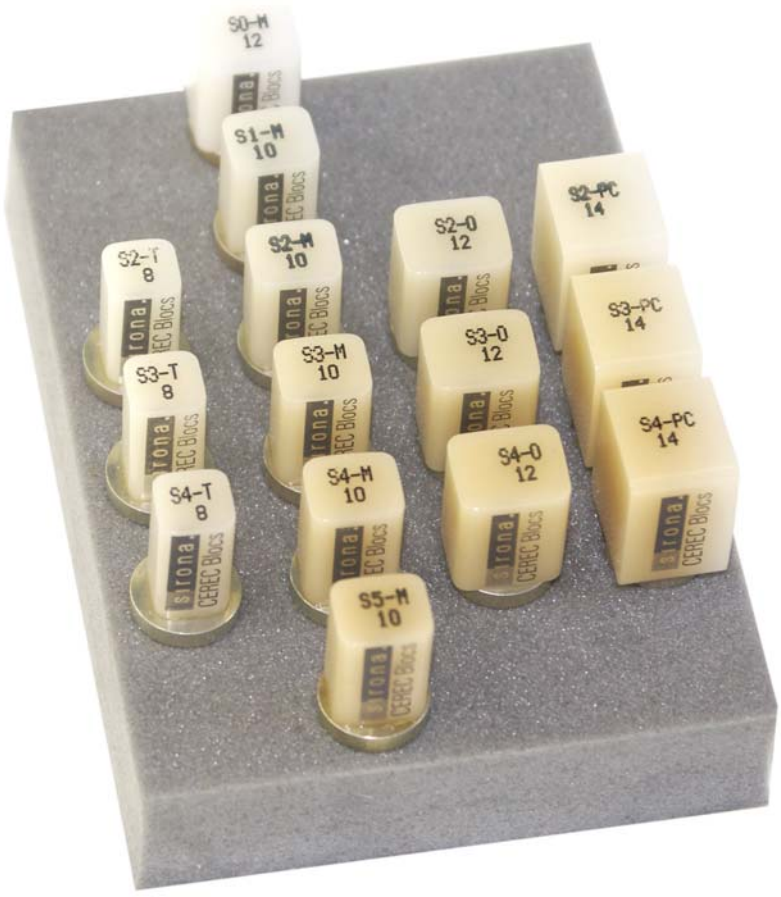
New as of: 08.2010

sirona
The Dental Company

CEREC Blocs

Industrially manufactured fine-structured feldspathic ceramic blocks
Operating Instructions

English



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1 Material

CEREC Blocs are industrially manufactured, fine-structured feldspathic ceramic blocks used to produce inlays, onlays, crowns and veneers with CEREC or inLab.

The key advantage of CEREC Blocs 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.

The select 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.

The outstandingly millable CEREC Blocs PC enable dentists to reproduce the color gradients characteristic of natural teeth with respect to both translucence and intensity chairside, thus achieving improved integration of the restoration in the remaining dentition as well.

The milling tool saving, fine-structured feldspathic ceramics are characterized by antagonist-friendly abrasion properties corresponding to those of natural tooth substance, as well as optimal light conducting effects and white fluorescence.

A special production process has made it possible to integrate three different color saturation levels (chroma) in the CEREC Blocs PC, and thus three different levels of translucence in a single ceramic layer block.

Through these three layers in a single CEREC Blocks PC, it is now possible to attain a unique naturalness in the restoration: The upper layer of enamel is the least intensive and, at the same time, most translucent one; the middle dentin layer corresponds to the normal level of intensity, while the lower cervical layer has the strongest pigmentation and, like a natural tooth, the least translucence.

Restorations made from CEREC Blocs PC thus resemble natural teeth more strongly without requiring any subsequent surface individualization or characterization. The use of CEREC Blocks PC also enables enhanced integration of the restoration in the remaining dentition.

The material and processing advantages of CEREC Blocs/CEREC Blocs PC feldspathic ceramics have been verified by scientific studies and correlated to the more than 14 million restorations produced with the VITA-BLOCS fine-structured feldspathic ceramic blocks from VITA in Bad Säckingen to-date.

The advantages of fine-structure feldspathic 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 aesthetic appearance
- Very good translucence properties
- Chameleon effect
- Antagonist-friendly abrasion properties

2 Chemical composition

Oxide	% of total weight
SiO_2	56 - 64
Al_2O_3	20 - 23
Na_2O	6 - 9
K_2O	6 - 8
CaO	0,3 - 0,6
TiO_2	0,0 - 0,1

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.

3 Technical Data

Physical properties[1]

Property	Unit of measure	Value
Coefficient of thermal expansion CTE (20 - 500°C)	$10^{-6}\,K^{-1}$	9.4 ± 0.1
Density	g/cm^3	2.44 ± 0.01
flexural strength (Schwickerath) (ISO 6872)	MPa	154± 15
flexural strength (ISO 6872) (1.2x4x15mm surface prepared by the CEREC machine)	MPa	113 ± 10
Fracture toughness (SEVNB)	$MPa\cdot\sqrt{m}$	1.7 ± 0.1
Fracture toughness (Vickers indentation)	$MPa\cdot\sqrt{m}$	2.2 ± 0.1
Young`s modulus (Resonance Method)	GPa	45 ± 0.5
Transformation area	°C	780 - 790
Knoop hardness HK 0.2/30		521 ± 8
Vickers hardness HV 0.1/15		640 ± 20
Refractive index		1.501 ± 0.001
Mixture of feldspatic crystalline particles embedded in a glassy matrix	Vol %	~ 30

CEREC Blocs are available in up to six brightness steps: three areas for the value of the color saturation or chroma (translucent, medium and opaque) and three as polychromatic CEREC Blocs PC layer blocks.

The designation of the CEREC Blocs indicates the manufacturer, Sirona (S), the brightness step (0 - 5) and the area of the color saturation value (T, M, O).

More information concerning available block sizes and colors can be obtained from the two tables below:

1. The technical and physical values specified here are typical measurement results obtained by the manufacturer using internally available measuring equipment to measure internally produced samples. Different results can be expected when measuring samples produced elsewhere with other measuring instruments.

Block sizes

The following block sizes are available:

	Size	Dimensions
CEREC Blocs	8	8 x 8 x 15 mm
	10	8 x 10 x 15 mm
	12	10 x 12 x 15 mm
	14	12 x 14 x 18 mm
CEREC Blocs Polychromatic	PC12	10 x 12 x 15 mm
	PC14	12 x 14 x 18 mm
	PC14/14	14 x 14 x 18 mm

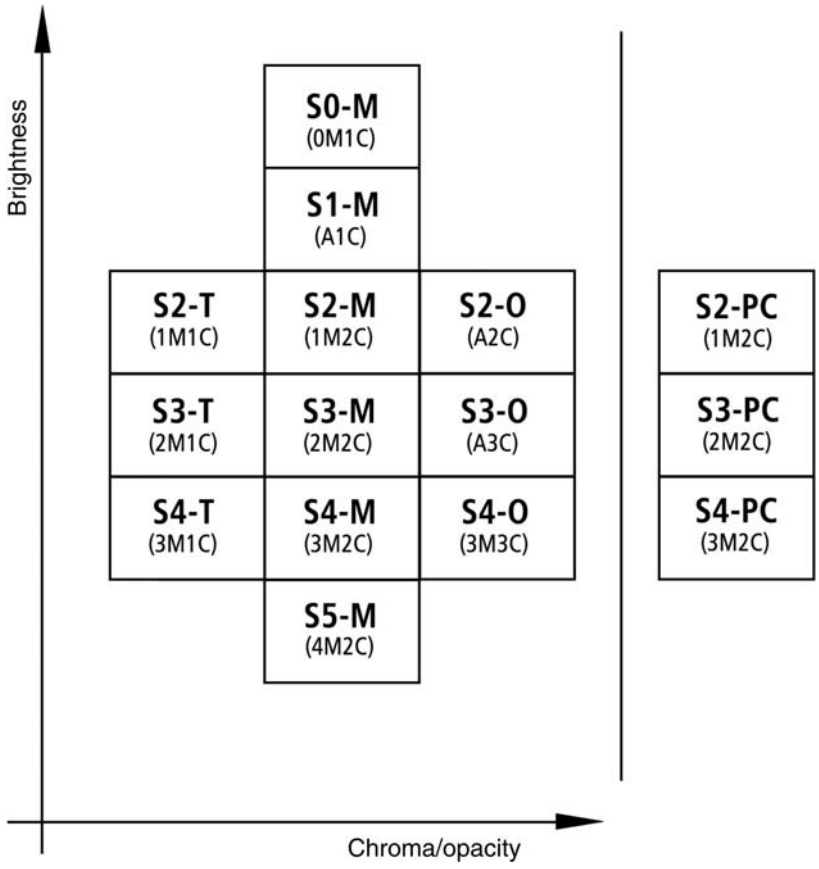
Block colors

CEREC Blocs are offered in the usual sizes, 8, 10, 12 and 14, and in the color saturation values translucent (T), medium (M) and opaque (O).

Furthermore, CEREC Blocs PC polychromatic layer blocks are available in sizes 12, 14 and 14/14 and colors S2-PC, S3-PC and S4-PC:

Block size Block color	CEREC Blocs				CEREC Blocs PC		
	8	10	12	14	PC12	PC14	PC14/14
S2-T	X	X	X	X			
S3-T	X	X	X	X			
S4-T	X	X	X	X			
S0-M			X	X			
S1-M	X	X	X	X			
S2-M	X	X	X	X			
S3-M	X	X	X	X			
S4-M	X	X	X	X			
S5-M	X	X	X	X			
S2-O	X	X	X	X			
S3-O	X	X	X	X			
S4-O	X	X	X	X			
S2-PC					X	X	X
S3-PC					X	X	X
S4-PC					X	X	X

The following chart (incl. the specification of the VITA reference colors) provides detailed information for color selection:



4 Indications and preparation instructions

4.1 Indication

CEREC Blocs are indicated for the CEREC/inLab CAD/CAM production of inlays, onlays, overlays, partial crowns, full crowns and endocrowns on molars as well as for the veneering structure in multilayer systems:

Material Indication	Finely structured feldspathic ceramics	
	CEREC Blocs	CEREC Blocs Polychromatic
Inlays	●	○
Onlays	●	○
Veneers	●	●
Partial crowns	●	●
Anterior tooth crowns	●	●
Posterior tooth crowns	●	●
Multilayer veneering structure (frame structure from inCoris ZI)	●	●

○ – possible

● – recommended

4.2 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. An absolute contraindication applies to the treatment of devital teeth of hyperfunction patients with CEREC Blocs restorations.

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

Bridges: Since CEREC Blocs are ceramic blocks made of finely structured feldspathic 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 and CEREC Blocs PC must not be used as framework ceramics. A suitable veneer (e.g. VITA VM9) made of this material therefore must not be used as a full veneer of a crown cap.

4.3 General preparation instructions

The preparation can be optionally 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

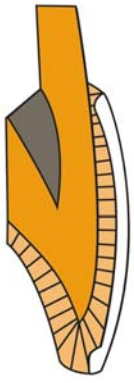
Chamfer preparation

Over-contoured chamfer preparation

Tangential preparations are contraindicated.

4.4 Preparation of veneers

The ceramic layer thickness of CEREC Blocs veneers should be at least 0.5 mm to enable reliable adhesive bonding:

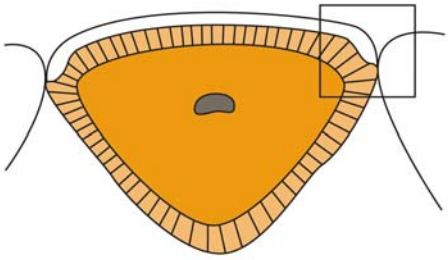


Labial

- Average labial reduction: 0.5 mm
- Progression of vestibular tooth contour maintained

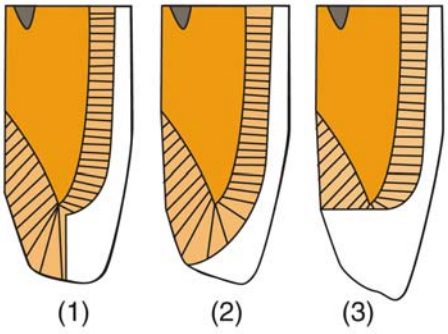
Cervical

- Lightly 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

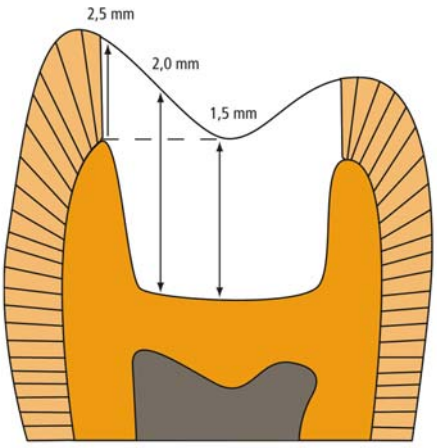
- Labial-incisal "chamfering" without extension (1)
- A slight reduction allows for a thicker ceramic layer for an individual characterization (2)
- For "extension", flatten incisal edge and round off edge (3)

4.5 Preparation of inlays and onlays

The following guidelines apply to the production of inlays and onlays from CEREC Blocs finely structured feldspathic ceramics:

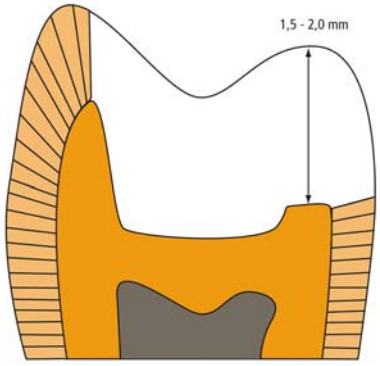
- Minimum depth at bottom of fissure: 1.5 mm
- Minimum depth at edge of cavity: 2 mm
- If the edge of the cavity comes to rest near the cusp tip: 2.5 mm
- The cervical step must be detached from the neighboring tooth.
- Minimum width of proximal step: 1.5 mm
- Angle between lateral wall of proximal box and proximal surface: ≥ 60°

Preparation of inlays



The minimum layer thickness of CEREC Blocs ceramics below the bottom location of the fissure should be 1.5 mm.

Preparation of onlays



For onlay restorations from CEREC Blocs, make sure that the minimum thickness of the ceramic material in the area of the cusp overcoupling is 1.5 - 2 mm.

4.6 Preparation of anterior and posterior tooth crowns

Occlusal ceramic layer thicknesses for crowns

In the main fissure: While the occlusal margins taper off thin, the minimum layer thickness of the ceramic material under the lowest point of the fissure is 1.5 mm.

Check the cavity for sufficient dimensions while making the preparation.

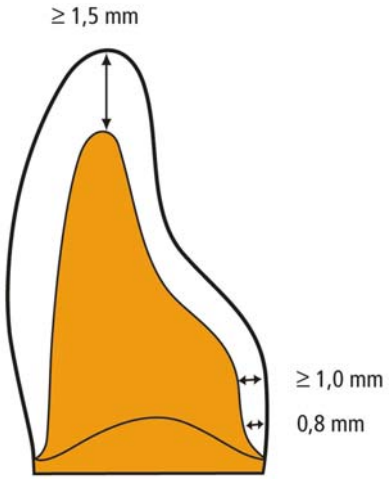
The establishment of functional dentin adhesion makes the laying of a subfilling unnecessary and prevents reduction of the ceramic material thickness at a specified preparation depth.

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

Reduction below the minimum layer thickness via manual reworking of the fissure following insertion must be avoided.

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

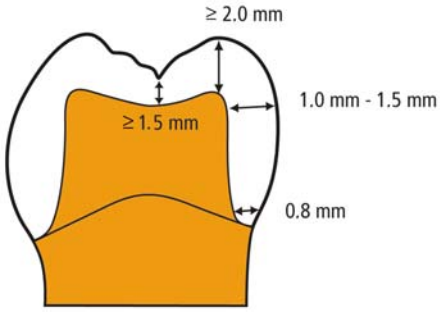
Preparation of anterior teeth



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 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.

5 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 power or contrast spray.	1) Produce a master model.
2) Take an optical impression with the CEREC 3D camera.	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 WaxUp holder.
5) Design of the desired restoration with CEREC 3D.	5) Scanning
6) Milling	6) Design of restoration with CEREC/inLab 3D software.
7) Fit check	7) Check of restoration data quality
8) Polishing of proximal areas Alternatively: Individualization/glazing	8) Production of restoration with inLab
9) Adhesive bonding in the mouth	9) Possible monitoring
	10) Polishing of restoration Alternatively: Individualization/characterization

5.1 Scanning, designing and milling

Exact instructions can be found in the corresponding documents, "CEREC 3D Operator's Manual" and "inLab 3D Operator's Manual".

5.2 Reworking/Polishing

CEREC Blocs restorations from finely structured feldspathic 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:

- Reworking of the material should be performed applying minimal force and with ample water cooling.
- Only fine-grain diamond burs (40µm) should be used for contouring and diamond finishing burs (8µm) should be used for prepolishing.
- The polishing is best performed with flexible disks coated with Al_2O_3, polishing brushes and diamond polishing paste.

5.3 Characterization/Individualization

Especially with restorations with large surface areas from Sirona CEREC Blocs, an additional finishing for color surface characterization should be performed with a final firing with the VITA Shading Paste paints (or VITA accent paints). In addition, these finely structured feldspathic ceramic blocks are optimally suited to individualization using VITA VM 9 veneer ceramics.

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

5.4 Bonding

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

Preparing ceramics

Finely structured feldspathic ceramics are inserted with luting composites. These adhesive materials create an adhesive bond between the hard tooth substance and the ceramic restoration which guarantees 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 finely structured feldspathic ceramics can be enlarged by partially dissolving the glass matrix with hydrofluoric acid (e.g. for 60 sec. with approx. 5 % HF) to create a microretentive pattern.

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.

5.4.1 Multilayer bonding: Adhesive bonding of veneering structure and frame structure

Important information

The bonding of frame and veneering structure must be performed extraorally, i.e. before inserting the restorations.

Suitable protective goggles/face shield and protective gloves must be worn.

Observe the manufacturer's processing instructions for the recommended bonding agents.

Recommended bonding agents

Adhesive bonding	Phosphate-modified agent	Self-adhesive agent
Device name	PANAVIA 21	RelyX Unicem Clicker
Color	TC	Translucent or A2 Universal
Polymerization	- self-holding (anaerobic)	- self-holding - dual-curing

PANAVIA 21® is a registered trademark of the company KURARAY Medical Inc., Japan.

RelyX® Unicem Clicker® is a registered trademark of the company 3M ESPE Dental AG, Seefeld, Germany.

5.5 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 dentin automatically come loose.

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

5.6 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.

6 Certification

Sirona CEREC Blocs/CEREC Blocs PC are manufactured under the responsibility of VITA Zahnfabrik.

VITA Zahnfabrik is certified according to the Medical Device Directive.

VITA Zahnfabrik
Spitalgasse 3
79713 Bad Säckingen
Germany

CE mark

CE
0124

The products CEREC Blocs and CEREC Blocs PC are certified and bear the identification mark CE 0124

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

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