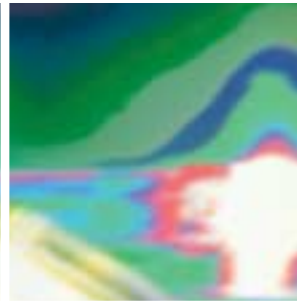
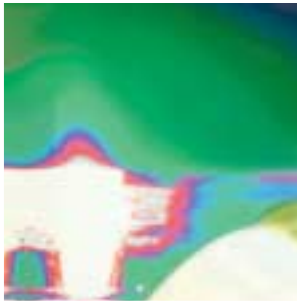
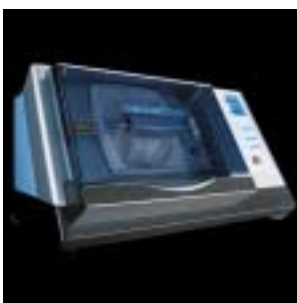
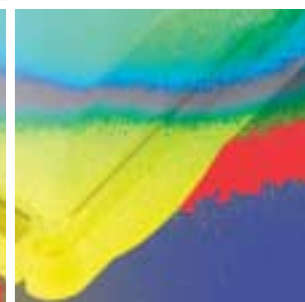


cercon
smart ceramics



Instructions for Use

Cercon smart ceramics –
zirconia all-ceramic
system



Contents

General Notes	2–5
---------------	-----

Introduction	6
--------------	---

Laboratory instructions for use	7–18
---------------------------------	------

Model preparation	7
-------------------	---

Waxing up	8–9
-----------	-----

Setting up	10–12
------------	-------

Scanning and milling	13
----------------------	----

Sintering	14
-----------	----

Fitting	15
---------	----

Veneering	16
-----------	----

Cercon link technique	17–18
-----------------------	-------



Manufacturer:
DeguDent GmbH
A Dentsply International Company
Rodenbacher Chaussee 4
63457 Hanau-Wolfgang
GERMANY
Phone +49 6181 59 57 59
Fax +49 6181 59 59 62
www.degudent.de

Distributed by:
DENTSPLY International Inc.
Prosthetics Division
570 West College Ave.
York, PA 17405-0872
USA
Phone: (800) 877-0020

© October 2006 by DeguDent GmbH

No liability is assumed for errors. We reserve the right to make changes. This documentation may not be reproduced or provided to third parties without our permission.

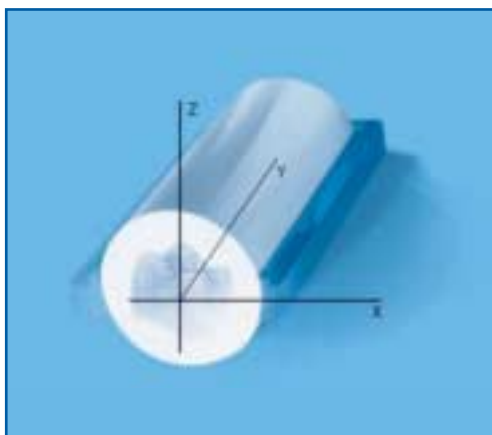
Technical data

CTE:	10.5 (25–500 °C)
Color:	white, ivory
Flexural strength:	approx. 900 MPa
Modulus of elasticity:	210 GPa

Composition

Zirconia	
and	
Yttrium oxide	5%
Hafnium oxide	<2%
Aluminium oxide + silicon oxide	<1%
(Total composition 100%)	

Store Cercon base blanks in a cool (frost-free), dry place.



Refer also to our detailed instructions for use for:

- Cercon brain
- Cercon clean
- Cercon heat
- Cercon art
- Cercon ceram kiss
- Cercon ceram press

Indications for use:

Cercon smart ceramics is a zirconia all-porcelain system from DeguDent that provides a simple, cost-effective method of processing the innovative framework material zirconia. It offers a reliable procedure for fabricating high-strength, biocompatible, aesthetic and accurate all-porcelain restorations for the anterior and posterior regions using zirconia. These instructions for use contain step-by-step and easy-to-follow instructions for the basic technique.

Technical data

Material description of zirconia

Y-TZP Yttria-stabilized tetragonal zirconia polycrystal

Components

Yttrium oxide is the component that provides stability. It is therefore crucial for the strength of the material.

Hafnium oxide occurs naturally with zirconia in its raw state. As it cannot be removed chemically (it is very similar to zirconia), all tests on zirconia (e.g. biocompatibility tests) always relate to zirconia with a low hafnium oxide content.

Other applications

Zirconia has been used in orthopaedics since about 1969 for fabricating the heads of hip joints. Industrial uses include cutting instruments or as a component in brake discs.

Quality

The purity of every batch of material used is tested by an independent institute. Our quality data is certificated.

Cercon brain

Triaxial CAM scanning and milling unit with light optical scanning of the wax pattern.

Full details about **CAD/CAM procedures** can be found in our separate Cercon art manuals. Full instructions for subsequent porcelain veneering with Cercon ceram kiss or Cercon ceram press can be found in the instructions for use for these materials, which you can obtain from your DeguDent representative or order free from DeguDent.

Contraindications

If the patient is hypersensitive to zirconia or any of the other components, this medical product should not be used or used only under the strict supervision of the patient's doctor/dentist. When using this medical product, the dentist should take into consideration any known cross-reaction or interaction of the medical product with other medical products or materials already in the mouth.

Warnings

Due to the general TLV (threshold limit values in the workplace) for zirconia of 1 mg/m³, ensure that there is bench extraction when preparing.

Caution:

- The product should not come into contact with the eyes.
- Avoid contact with the mucosa.
- Wash hands and apply cream after use.
- Do not eat or drink when using the product.
- Do not swallow the product.
- Do not inhale the grinding dust.
- Use extraction and wear a face mask when preparing.

Precautions

The safety instructions and warnings listed before the instructions for use describe how to use the system components in a risk-free manner. Give all the above information to the dentist in charge of treatment when using this medical product for a specific restoration and ensure that you adhere to the current instructions for use and safety data sheets when using the product.

Adverse reactions

Undesired side effects of this medical product are extremely rare if it is prepared and used properly. Immunoreactions (e.g. allergies) and/or local discomfort (e.g. taste impairment or inflammation of the oral mucosa) cannot be completely ruled out in principle. Please contact us if there are any occurrences of undesired side effects – even in borderline cases.

There are no known risks and/or side effects associated with Cercon base framework porcelain or Cercon ceram kiss and Cercon ceram press veneering porcelains.

Transport and storage conditions

 Keep dry

Please pay attention to the following symbols on the product labels:

REF Catalogue number

LOT Batch code



Pay attention to the instructions for use



Single use only. Do not reuse.



Federal law restricts this device to sale by or on the order of a dentist.

A smart solution for an innovative material:
Cercon smart ceramics – the zirconium oxide full-ceramic system

Framework material	Zirconium oxide <ul style="list-style-type: none"> • Cercon base (white) • Cercon base colored (ivory)
Veneering ceramic	Cercon ceram kiss Cercon ceram press
Shading	Using layering or painting techniques
Indications for anterior and posterior teeth	<ul style="list-style-type: none"> • Primary telescope crowns • Crowns • Multi-unit bridges with a max. anatomical length of 47 mm • Inlay bridges
Contraindications	<ul style="list-style-type: none"> • Bruxism and therapy-resistant parafunctions • Bridges with more than two pontics in a row
Temporary cementation	Possible
Permanent cementation	By means of conventional cementation or adhesive bonding techniques

Clear coordinates for optimum results

	Dimensions (W/H/D)	Weight	Power consumption
Cercon brain	850/520/620 mm 33.46 in/20.47 in/24.40 in	Approx. 120 kg Approx. 264.55 lb	Approx. 750 W
Cercon clean	450/550/500 mm 17.71 in/21.65 in/19.68 in	Approx. 15 kg Approx. 33.06 lb	Approx. 600 W
Cercon heat	500/520/620 mm 19.68 in/20.47 in/24.40 in	Approx. 80 kg Approx. 176.36 lb	Approx. 1,600 W
Cercon art PC	200/370/370 mm 7.87 in/14.56 in/14.56 in	Approx. 11 kg Approx. 24.25 lb	
Cercon art monitor	369/495/268 mm 14.52 in/19.48 in/10.55 in	Approx. 6,5 kg Approx. 14.33 lb	
Cercon eye	490/447/569 mm 19.29 in/17.59 in/22.40 in	Approx. 31 kg Approx. 68.34 lb	Approx. 100 W

CE 0124

Cercon smart ceramics in your laboratory: instructions for use for the zirconia all-ceramic system



These instructions for use describe the **CAM procedure** with the Cercon system. From waxing up to scanning, milling, sintering and finally finishing, these instructions provide a quick and reliable procedure for attaining high-strength, aesthetic and accurate all-ceramic frameworks.

Full details about **CAD/CAM procedures** can be found in our separate Cercon art manuals.

Full instructions for subsequent porcelain veneering with Cercon ceram kiss or Cercon ceram press can be found in the

instructions for use for these materials, which you can obtain from your DeguDent representative or order free from DeguDent.

DEGUDENT
CERCON. BRAIN

The Cercon brain and Cercon® heat units guide you through the working procedures using the menu (illustration Cercon).

Reference Point
search Press START

First switch on the Cercon brain with the key switch. Follow the menu instruction, dial between the classic and CAD-mode (Cercon art), and start the reference drive.

Reference search
busy

After a standby phase of 30 minutes, the Cercon brain is operational for all scanning and milling procedures using the start key.

Cercon brain software is protected by copyright and should only be used for the purpose intended. Improper use is not permitted and will result in claims for damages.

Model and die preparation

Preparation of the dies is crucial in determining the accuracy of the subsequent restoration. It is therefore important to complete the following working stages very carefully.

Master models are prepared in the same way as when fabricating crowns and bridges using precious dental alloys.

All model segments should be removable so that the model frame can fit over the wax pattern to allow the pattern to be waxed into the frame.

We recommend the following techniques to ensure accurately fitting crowns and bridges.

DeguDent Cergo die spacer (Order no. 6590 0001) is ideal as a spacer. One coat (thickness approx. 15 μm) of the die spacer is applied to the preparation surface of the die to approx. 1 mm short of the preparation margin to allow a gap for the cement.

The application of die spacer also rounds off any sharp edges. The die spacer is carefully removed from the die before fitting the framework.

Thin vacuum-formed foil can also be used as a spacer. Undercut areas should be blocked out before waxing up. Light-curing, flowable resin is suitable for this as well as blocking out wax or sticky wax.

As the laser can only measure points to a maximum angle of 88°, ensure that the dies taper is $\geq 2^\circ$. Very steep surfaces appear perpendicular in the milled framework, as they cannot be accurately recorded by the scanner.

A clearly defined marginal contour is important to obtain an optimum result in this area.





With several single crowns that are to be prepared together of one blank or with bridges, the common path of insertion (0° scan alignment) for each crown framework should be recorded individually in the model table using the surveyor.



Wax up the reduced anatomical shape of the crown or bridge using the same technique as for bonding porcelain. With this technique the veneering porcelain should also be fired as uniform in thickness as possible.

Waxing up should be completed as follows minimum:

Single crowns in the anterior region

- 0.3 mm wall thickness with a 0.2 mm marginal edge

Single crowns in the posterior region

- 0.4 mm wall thickness with a 0.2 mm marginal edge

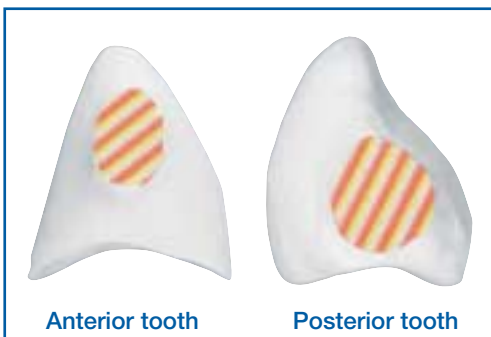
Abutment crowns for bridge frameworks (anterior and posterior)

- 0.4 mm wall thickness
- 3 mm x 3 mm connectors

The coping base can be made from vacuum-formed foil, dipping wax, wax or resin. You can use the material you prefer.

To obtain an optimum recording by the laser, the surfaces should be lightly powdered with scanning powder (Order no. 5557 0131) prior to scanning. The inner and outer surfaces of the vacuum-formed foil should be sandblasted (aluminium oxide, 50 µm, at 0.5 bar) to obtain a rough surface that can be scanned.

Contour the connectors with concave or convex junctions to the abutment crowns. This gives the best results when scanning.



Avoid sharp indentations, as they could create cracks. Sharp edges and corners should also be rounded when waxing up.

An accurate wax-up saves time-consuming grinding of the sintered framework. Check in particular the cervical margins under a microscope to ensure that they have been accurately contoured.

Fibres, etc. should be removed from the wax surface, as they would otherwise be recorded by the laser and included in the milled framework.

The pattern should be easy to remove from the dies (remove the die spacer if required). Check that the wax pattern is easy to remove before waxing it into the model frame.

Avoid excessive deviations in temperature and a long interval between waxing up and scanning.

Working stages:

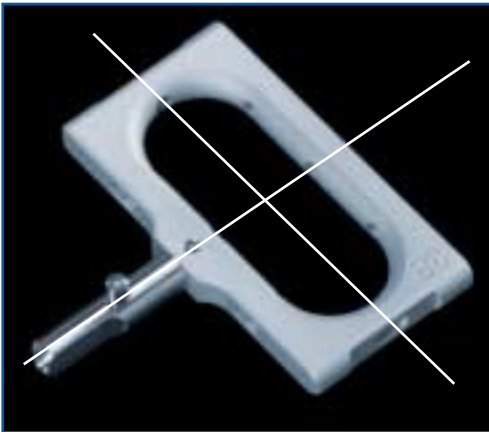
- Determine the preparation margin.
- Block out undercut areas. We recommend using a 2° thermal tip.
Also ensure there are no undercut areas in the deep chamfer.
- Harden the die.
- Apply a thin coat of die varnish (this remains on the die during fitting).
- Apply one coat of die spacer, preferably with a probe.
- Dry the die spacer with warm air (hairdryer, furnace, etc.).
- Apply separating agent to the die as usual.
- Wax up the crown coping and bridge framework (abutment crowns) with a slightly thicker cervical area.

Securing the pattern in the model frame

The patterns are secured in the model frame with wax or plastic rods. Use the positioning template, which gives the position of the pattern within the Cercon base blank, when securing the pattern in the frame.

Working stages:

- Select the model frame (12, 30, 38 or 47).
Illustration: Model frame 38
- Insert the model frame into the three-jaw chuck of the milling or surveying unit (multipurpose spindle of the DeguDent milling unit) and lower over the pattern and fix in position.
- Wax the pattern onto the model frame using wax or plastic sticks. We recommend attaching the sticks at 90° in the longitudinal and horizontal axes to the model frame (see reference lines illustrated).
- Raise the model frame carefully (support the pattern if necessary).



Powdering

Working stages:

- Remove the model frame from the spindle.
- Cover the pattern and sticks with scanning powder.



Inserting the blank

- Insert the model frame in the left holder of the rotary and turning unit. The slot and spring close flush; the setscrew (thread pin) is tightened.



Working stages:

- Select the correct size of model frame for the Cercon base blank (12, 30, 38 or 47, white or colored) and the matching milling frame.



- Hold the barcode of the blank over the barcode scanner (do not hold it too close). The barcode has been scanned when the red light goes out and an acoustic signal denotes that scanning is complete.



Read Barcode
Insert Mat.

Using the milling frame

Working stages:

Protect the precision bearings of the rotary and turning unit from unnecessary loading. Always remove the milling frame before inserting the blank or removing the finished milled framework.



- Insert the blank in the milling frame and on the locking frame.
- The locking frame is fixed in its final position using the safety catch with a quarter turn lock.
- Always tighten the screws of the frame for the Cercon base 47 alternately.

Ensure the frames are clean.

- Place the milling frame in the right holder of the rotary and turning unit.

The slot and spring close flush; the setscrew is tightened.

Working stages:

Ensure that the Cercon® clean is switched on to allow the Cercon brain the precise extraction of the milling dust. The milling procedure will not start if the Cercon® clean is not in operation. After 100 milled units the display in the Cercon brain indicates that the milling instruments should be changed.

- Close the protective cover and press the Cercon brain start key.

Scanning and milling are carried out fully automatically and without interruption. Depending on the amount of data, the following times are required for each size of blank:

Cercon base 12	approx. 30 min.
Cercon base 30	approx. 60 min.
Cercon base 38	approx. 75 min.
Cercon base 47	approx. 140 min.

- Open the protective cover after scanning and milling is complete, loosen the left and right setscrews in the axis of the rotary and turning unit and remove the model and the milling frame.
- Separate the milled framework from its frame by carefully sandblasting the connectors (aluminium oxide, 110–125 µm, max. 3.5 bar). It is advisable to leave the framework in the milling frame when sandblasting to provide added stability.
- Carefully smooth all the connector areas using clean crosscut cutters and make any fine adjustments if required.

Insert Mat.
Press START





Protect the daily output of milled frameworks against contamination prior to sintering.

Check the power supply of the Cercon heat for sintering overnight.

Working stages:

- Position the frameworks with the incisal or occlusal surfaces slightly submerged in the sintering bed and place the sintering bed on the furnace tray. The frameworks are uniformly supported by the beads, which prevents distortion.
- Close the furnace and press the start key to initiate the sintering process.



Always use water cooling when grinding zirconia frameworks. Do not apply pressure or apply only minimum pressure during grinding to be avoid overheating of the framework. Use only diamond rotary instruments that are in perfect condition if possible, as a reduction in cutting capacity may be compensated for by an increase in pressure.

The framework should have the following minimum dimensions:

Single crowns in the anterior region

- 0.3 mm wall thickness with a 0.2 mm marginal edge

Single crowns in the posterior region

- 0.4 mm wall thickness with a 0.2 mm marginal edge

Abutment crowns for bridge frameworks (anterior and posterior)

- 0.4 mm wall thickness
- 3 mm x 3 mm connectors

The interdental connector areas should not be ground, particularly from the basal, or separated after sintering (risk of causing microcracks)!

Working stages:

- Sandblast the framework after sintering (aluminium oxide, grit size 110–125 µm, 3.5 bar pressure).
- Fit the restoration onto the die.
- When fitting a bridge framework, leave the dies in the model and fit the bridge as a single unit.
- After fitting, no further grinding should be carried out on the framework.
- Sandblast the surfaces to be veneered (aluminium oxide, 110–125 µm, 3.5 bar pressure). Caution: The margins may be damaged by sand-blasting.
- Clean the framework before applying porcelain.





Only **Cercon ceram S**, **Cercon ceram kiss** and **Cercon ceram press** bonding porcelains, which have been specially developed for use with zirconia and tailored to Cercon base, should be used for veneering Cercon base frameworks.

Refer to the separate instructions for Cercon ceram S, Cercon ceram kiss and Cercon ceram press.



Cercon link product description

Indication

Cercon link is an extracoronal attachment for fabricating sectional bridges when the abutment teeth are divergent. The attachment is placed between the distal abutment tooth and the connecting bridge pontic. The Cercon link can be used for connecting bridges with two pontics in the anterior and posterior regions.

FEM calculations

The geometry of the prefabricated patrix was optimised using finite element method (FEM) calculations to take into account the characteristics of the porcelain framework material (Fig. 1).

Contouring aid

This produced a contouring aid made from polysulfone, a plastic that can be accurately milled. The contouring aid is conical and can therefore be optically digitized by the Cercon brain. It has a visible mark for the recommended minimum cross section of the connector. A radius guide on the top of the paralleling mandrel is used for checking the minimum radii for stress reduction on all surface edges (Fig. 2, 3).

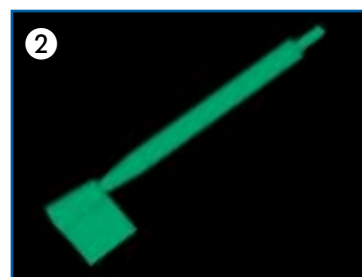
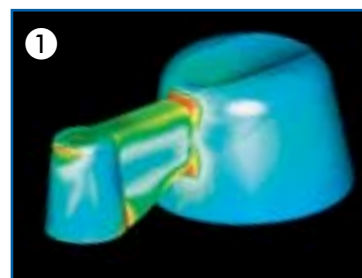
Fracture tests and masticatory simulation

The static fracture strength of sectional 3-unit bridge frameworks was recorded to check the calculations for optimising the contouring aid. When the attachment was retained adhesively, there were no significant differences compared with one-piece frameworks with the same dimensions.

Masticatory simulation was also carried out on sectional and one-piece bridges to verify the durability of the Cercon material system. The result was that there were no fractures or splitting off of porcelain in either group.

Technical data

Can be shortened to:		
Height, with paralleling mandrel	41.0 mm	
Height	7.0 mm	4.0 mm
with a height of 4.0 mm		
Width, connector	3.1 mm	2.5 mm
Width, conical section	4.5 mm	3.9 mm
Length	9.0 mm	
Patrx, polysulfone	25 patrices	REF 2401 5200



Cercon link instructions for use

Adhere to the following working stages for fabricating a sectional Cercon bridge with the Cercon link sectional attachment (contouring aid):



① Wax up the coping for the primary unit.



② Fit the modelling aid proximally and basally. Only grind the bottom surface of the connector (rough surface) to maintain the calculated minimum cross section required for strength (Fig.1, 2).



③ Align the contouring aid to the path of insertion of the divergent abutment using the paralleling mandrel on the contouring aid and wax the Cercon link onto the coping. Separate the shank (Fig.3).



④ Round off all inner radii, particularly basally. The radius in the region of the papilla should not be less than 0.75 mm. Use the radius gauge on the top of the paralleling mandrel to check this dimension.

The connector should not be ground after sintering, particularly on the basal surface, to avoid causing microcracks! Complete this working stage very carefully. Wax the pattern into the scan frame and fabricate the primary unit with Cercon in the usual manner.



⑤ Fit the Cercon primary unit and veneer it with porcelain (Fig.5).

Coat the conical section of the attachment with die spacer to create a gap for the adhesive. Ensure that the die spacer is removed after the secondary unit is finished.



⑥ Wax up the secondary unit on the conical section of the attachment and second abutment. A minimum wall thickness of 1 mm should be maintained occlusally in the area of the attachment (Fig.6).

Fabricate the secondary unit as usual with the Cercon brain and veneer it with porcelain.

The Cercon link should be sandblasted with aluminium oxide (approx. 110–125 µm) at max. 3.5 bar before the restoration is given to the dentist. The rough surface produced by sandblasting improves retention of the connector material. The bridge sections are connected by the dentist when fitting the restoration.

Though the crowns can be retained on the abutments using either cement or adhesive, the attachment should be connected using adhesive, e.g. Panavia 21.



cercon smart ceramics®
www.cercon-smart-ceramics.com



DeguDent GmbH
P.O. Box 13 64 · 63403 Hanau
GERMANY
www.degudent.com

DeguDent
A Dentsply International Company