Celtra® Duo
Zirconia – Reinforced Lithium Silicate (ZLS)

Developed to make a difference
Brochure for the dental laboratory
The ultra-fine microstructure makes all the difference

The outstanding properties of ZLS (zirconia-reinforced lithium silicate) are a function of its unique microstructure. The presence of 10% zirconia in the glass phase in atomically dissolved form provides high strength and ensures safe and long-lasting restorations. The zirconia is essentially responsible for the nucleation of crystal phase.

The result is a large number of very fine-grained lithium silicate, whose high glass content give the material its excellent light-optical and mechanical properties. Translucency, opalescence, fluorescence and the chameleon effect all benefit, with high edge stability and excellent polishability being an added plus. This ultra fine microstructure allows Celtra to be processed quickly and efficiently in a dental laboratory in its crystalline state and in the appropriate tooth shade.

Photos: Dr med. dent. Sven Rinke M.Sc., M.Sc., Hanau / Klein-Auheim, Germany
The inclusion of 10% zirconium oxide ensures particularly high strength. The crystallites formed are four to eight times smaller than crystals of conventional lithium disilicates. The result is an ultra-fine microstructure that combines high average flexural strength with a high glass content. This has positive effects on the light-optical and mechanical properties of the material.

**CELTRA - ZIRCONIA-REINFORCED LITHIUM SILICATE**

**ZLS**

Glass with completely dissolved zirconia

Lithium silicate crystallites 500 - 700 nm

**LITHIUM DISILICATE CERAMIC**

The crystallites embedded in the glass phase are 2000–4000 nm in size and thus significantly larger than Celtra, influencing both the light-optical and mechanical properties of the material. This is associated with lower light conductivity and requires a greater polishing effort.
Optical properties and their benefits

Celtra meets the highest aesthetic standards: Natural opalescence, fluorescence and pronounced chameleon effect give Celtra restorations the appearance of natural teeth.

Opalescence

NATURAL OPALESCENCE

Opalescence is a light-scattering effect. The blue short-wave portion of the daylight spectrum are scattered in all directions, while the orange long-wave light passes the enamel almost without scattering. The dynamic colour interplay of blue, yellow, amber and orange affects the appearance of the entire tooth.

The lithium silicate crystallites in Celtra, 500–700 nm in size, correspond exactly to the wavelength range of natural daylight that is responsible for the opalescence. Celtra thus behaves like a natural tooth enamel.
Fluorescence

**FLUORESCENCE AND CHAMELEON EFFECT**

The fluorescence of Celtra materials is graded by brightness. The fine crystals of the microstructure and the high glass content create a deep fluorescent effect and make the intensity easy to adjust. The high light conductivity and shade adaptation of Celtra in conjunction with the remaining natural teeth and the pronounced opalescence create the desired chameleon effect. With its light-optical properties based on the ZLS microstructure, Celtra has a reduced greying risk.

Partial crown is only polished – neither stained nor glazed

Perfect shade adaptation in situ
Simplicity that matters

One highly aesthetic block – two processing options

With Celtra® Duo (ZLS), you’re always in control, and that includes your choice of processing technique.

**Option 1**
Mill and Polish – 210 MPa flexural strength*

Wet-firing technique: Mill → Stain and glaze → Fire

**Option 2**
Mill and Fire – 370 MPa flexural strength*

Dry-firing technique: Mill → Polish → Fire

*3-point bending test
Quick and easy polishing

POLISHING IN THE LABORATORY
Thanks to the unique microstructure of Celtra, restorations can be polished quickly and easily. The fine lithium silicate crystallites embedded in the glass matrix give Celtra its homogeneous surface that retains its typical light-optical properties. For optimum results always follow the step by step polishing protocol in the directions for use.

POLISHING IN THE DENTAL OFFICE
With Celtra, the necessary intraoral occlusal adjustments and subsequent polishing of the milled surfaces are quickly accomplished. The surface quality achieved is excellent thanks to the microstructure.

Intraoral polishing

Final restorations
Strength you can rely on

HIGH EDGE STABILITY

The high edge stability of Celtra is evident. During both the actual milling process and manual machining delicate edges and fine structures remain safely preserved. In testing, standardized copings are cut back at the edges to a wall thickness of 200 µm to examine edge stability.

STRENGTH RESERVES AFTER ARTIFICIAL AGING – CHEWING SIMULATIONS

In the chewing simulation, Celtra behaves in a way that is atypical of ceramic materials. While ceramics usually lose some of their strength in the aging process, Celtra retains its high level of strength due to ample strength reserves – a strength that contributes to the long-term safety of the restoration.

![Comparison of fracture strengths for IPS Empress® CAD, VITABLOC® Mark II, IPS e.max®, and Celtra Duo (ZLS).](image)

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<tr>
<th>Material</th>
<th>Median Fracture Strength [N]</th>
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<tr>
<td>Celtra</td>
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<td>E.max</td>
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<td>Before artificial aging</td>
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Load at fracture, anterior crowns – thermal cycling (5°C-55°C), 6000 cycles, followed by 1.2 million chewing cycles at 70 N.
Source: Rues S, Müller D, Schmitter M. University of Heidelberg 2012. Data available on request.
BENDING STRENGTH MEASUREMENT
The following 3-point and biaxial bending strengths were measured for Celtra Duo.

### 3-point-bending strength

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<th>Specimen</th>
<th>Support</th>
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<tbody>
<tr>
<td>Celtra Duo only polished</td>
<td>210 MPa*</td>
<td>413 MPa**</td>
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<tr>
<td>Celtra Duo healing firing 820°C</td>
<td>370 MPa*</td>
<td>560 MPa**</td>
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</table>

* In-house measurements Dentsply Sirona
** Justus-Liebig-Universität Gießen (see bar diagram on the right)

Delivers **smaller bending strength values**.

### Biaxial bending strength

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<td>Celtra Duo fired at 820°C</td>
<td>370 MPa</td>
<td>560 MPa</td>
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Delivers **higher bending strength values**.
Clinical success you can count on

Indications for Celtra® Duo

› Crowns
› Partial crowns
› Inlays
› Onlays
› Veneers

Restoration with Celtra® Duo (ZLS)

Baseline situation

Final restoration with Celtra Duo (ZLS): Indistinguishable aesthetics with adjacent teeth
Restoration with Celtra® Duo (ZLS)

Initial situation

Final restoration with Celtra Duo (ZLS): Indistinguishable aesthetics with natural teeth

Celtra crown on a natural tooth root – indistinguishable from natural aesthetic.
Simple cementation system

A combination of Prime&Bond elect® Adhesive and Calibra® Ceram Cement makes it easy to achieve excellent results.

The Celtra® Duo (ZLS) 3-Step Restoration and Cementation System
Designed to simply work better together

**STEP 1**
Design and mill the restoration
Design the restoration as usual with inLab MC XL or inLab MC X5, then mill it out using Celtra Duo (ZLS) material.

Celtra Duo (ZLS) advantages:
- You choose the processing pathway: fire or polish - you’re always in control

**STEP 2**
Apply Prime&Bond elect Adhesive

Prime&Bond elect advantages:
- Universal application means you’re in control: self-etch, total-etch and selective-etch - it’s always your choice
- Low film thickness
- Virtually no post-op sensitivity

Developed to make a difference
Apply Calibra® Ceram Cement

After etching and silanating the intaglio surface of the restoration, apply a thin, uniform layer of Calibra Ceram Cement to the internal surface of the restoration.

Calibra Ceram Cement advantages:

• High bond strength for long-term restoration success

• Easy excess cement cleanup:
  > wide tack cure window of up to 10 seconds means no worry of over-curing
  > 45-second extended gel phase gives you the time you need for a thorough and effective cleanup

STEP 3
Seat restoration

Seat the restoration; the cement will set permanently after final light curing of all areas of the restoration.
## Ordering information Celtra® Duo

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