



IPS **e.max**[®]

CAD / ZirCAD

The proven all-ceramic for
CAD/CAM practices

All ceramic,
all you need.

Reliable and esthetic all-ceramic

IPS e.max® offers digital dental practices maximum flexibility. The portfolio comprises IPS e.max CAD, the reliable lithium disilicate glass-ceramic, and IPS e.max ZirCAD, the high-strength zirconia material. Both types of materials ideally complement each other. They open up a host of chairside treatment possibilities.

The universal IPS e.max CAD Crystall stains and glazing materials round off the IPS e.max assortment.

Unrivalled
indication spectrum

in CAD/CAM glass-ceramics

High strength
and esthetics

530 MPa¹ / 850²

Maximum
flexibility

adhesive, self-adhesive or
conventional cementation

Complete
confidence

96 % survival rate³:
more than 10 years of long-term
clinical evidence



¹ Mean biaxial flexural strength over a period of 10 years IPS e.max CAD, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

² Typical mean value of the biaxial flexural strength IPS e.max ZirCAD MT Multi, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

³ IPS e.max, Scientific Report, Ivoclar Vivadent AG, Schaan, Liechtenstein, Vol. 03/2001-2017



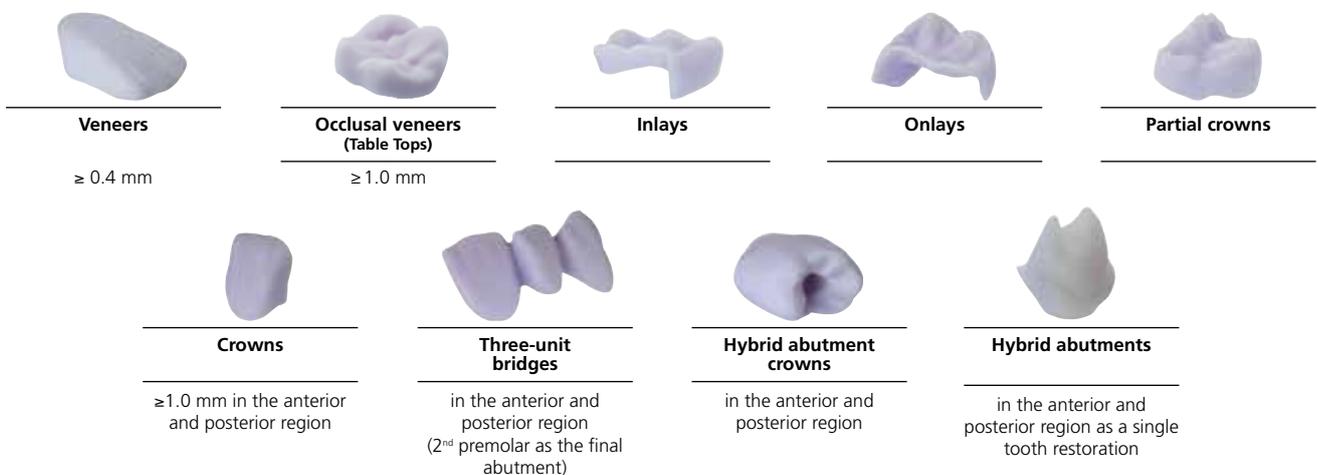
Made
of the
legendary
blue block

IPS e.max[®] CAD

Maximum versatility

IPS e.max CAD is the top-selling glass-ceramic¹ in the world. Moreover, its clinical reliability has been more thoroughly documented than that of hardly any other dental material.² Among CAD/CAM glass-ceramics, IPS e.max CAD exhibits an unmatched high biaxial flexural strength of 530 MPa³. This is the outcome after more than 10 years of ongoing quality testing.

The material is suitable for the efficient fabrication of full-contour restorations showing excellent esthetic properties and high flexural strength. It covers an exceptionally wide indication spectrum. Depending on the indication at hand, the restorations can be placed using either the adhesive, self-adhesive or conventional luting technique.



The manufacturing options for “blue” restorations include:

- polishing and then crystallization
- glazing and crystallization in one step
- staining, glazing and crystallization in one step

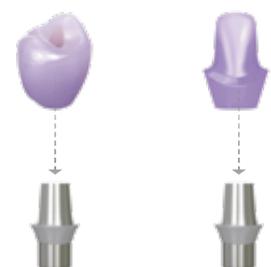
Abutment Solutions

An innovative system

IPS e.max CAD blocks feature a prefabricated interface for the extraoral bonding with a titanium base, e.g. Ti-Base (Dentsply Sirona). Therefore, chairside implant-supported hybrid abutments and hybrid abutment crowns can be fabricated with clinically proven products.

The self-curing Multilink[®] Hybrid Abutment luting composite is used for extraoral bonding tasks.

The Implant Care products provide the dental team with additional support in the different phases of the implant treatment process including after care.



Hybrid abutment crown Hybrid abutment

¹ Based on sales figures

² IPS e.max, Scientific Report, Ivoclar Vivadent AG, Schaan, Liechtenstein, Vol. 03/2001-2017

³ Mean biaxial flexural strength over a period of 10 years, R&D Ivoclar Vivadent, Schaan AG, Liechtenstein

**Complete
confidence**
in this innovative
material



IPS e.max[®] CAD

Proven reliability

96%

survival rate¹

less than

1%

probability of fracture
after 15 years²

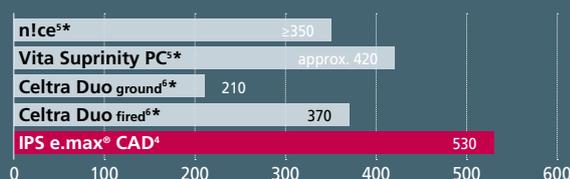
“All-ceramic, high-strength lithium disilicate restorations in the daily clinical application for single tooth restorations form an alternative to the metal ceramic gold standard.”³

Department of Prosthodontics, Dusseldorf University Hospital, Germany

Unrivalled high flexural strength

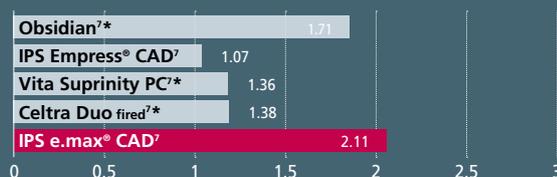
More than 10 years of ongoing quality testing show that among CAD/CAM glass-ceramics, IPS e.max CAD exhibits an unrivalled high biaxial flexural strength of 530 MPa¹. The IPS e.max lithium disilicate also shows high fracture toughness. This combination of properties is particularly sought after in minimally invasive dentistry.

Flexural strength [MPa]



High flexural strength is of major importance for load bearing restorations. Flexural strength is measured as the load or force at the point of fracture.

Fracture toughness [MPa · m^{1/2}]

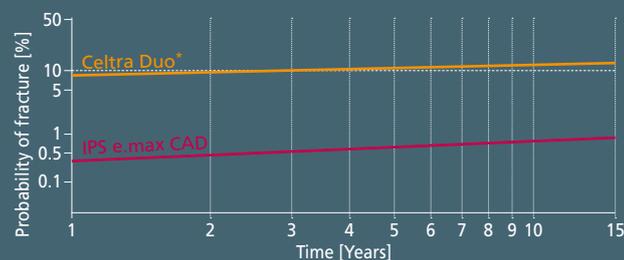


A high fracture toughness is achieved due to the resistance to crack propagation: The higher the reading, the better the long-term clinical behaviour.

Long-lasting reliability

An in vitro study shows² that the probability of fracture of a premolar crown made of IPS e.max CAD is less than 1% after 15 years, while that of a competitive product is more than 10%.

Probability of fracture as a function of time



Applied force $\sigma = 35$ MPa (representative of the premolar region) and assumed 1400 chewing cycles per day [(SEM calculation (Preclinic, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein) based on the test results³]

¹ IPS e.max, Scientific Report, Ivoclar Vivadent AG, Schaan, Liechtenstein, Vol. 03/2001-2017

² "Ring on Ring Test" according to ASTM (American Society for Testing and Materials) C1499, Jülich Forschungszentrum [Institut für Energie- und Klimaforschung (IEK), Abteilung: Werkstoffstruktur und -eigenschaften (IEK-2)], 2018

³ Boldt J, Spitznagel F.A. (2017). Lithium disilicate: Indications and scientific evidence. DZZ 72 (4)

⁴ Mean biaxial flexural strength over a period of 10 years, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

⁵ Information provided by the manufacturer

⁶ Information provided by the manufacturer, three-point flexural test

⁷ Hill T, Tyrowsky G. Fracture toughness, K_{1C}, of Five CAD/CAM glass-ceramics. AADR/CADR Annual Meeting: 1672, 2016

* These brands are not registered trademarks of Ivoclar Vivadent AG.

IPS e.max[®] CAD

You can rely on the original all-ceramic

Initial situation



IPS e.max CAD LT veneer after three years in situ



IPS e.max CAD LT veneer after 8.5 years in situ



Dr Hidetaka Sasaki, Japan



“I have been providing chairside treatments with IPS e.max CAD for around ten years now. The material offers an exceptional balance of strength, esthetics, biocompatibility and reliability.”

Dr Hidetaka Sasaki
Japan

Clinical case with exquisite, natural-looking outcomes



Tooth 11 and 21 of the patient were damaged in an accident. They were restored with a composite resin.



The esthetic result was unsatisfactory for the patient. Therefore, another restoration was planned and the teeth were correspondingly prepared according to minimally invasive principles.



The examination after three years in situ did not reveal any signs of ageing of the IPS e.max CAD Impulse restoration.

Dr Andreas Kurbad, Viersen, Germany



120 million restorations¹
fabricated with
IPS e.max materials:
A **good feeling** for
dentists and their patients.

¹ Based on sales figures



NEW

IPS e.max[®] ZirCAD MT Multi: Innovative zirconia

IPS e.max ZirCAD allows you to efficiently to produce esthetic, monolithic zirconia restorations in your dental practice with the help of efficient speed sintering programs. Due to the material's high flexural strength and fracture toughness, it can be used to fabricate restorations with very thin walls. As a result, the teeth can be prepared according to minimally invasive principles and then conventionally cemented.

Zirconia can be used for a wide variety of indications:



Crowns



Three-unit bridge

The manufacturing options available after sintering include:

- polishing
- glazing and firing
- optional staining, glazing and firing

IPS e.max CAD Crystall./Glaze, with or without fluorescent properties, is available for glazing purposes.

IPS e.max ZirCAD MT Multi cleverly combines the properties of two types of materials. The class 5Y-TZP zirconia imparts a high level of translucency to the incisal region. The more opaque class 4Y-TZP zirconia is responsible for reinforcing the stability of the dentin region (850 MPa)¹.

The realistic progression of shade and translucency from the opaque dentin region to the translucent incisal region and the corresponding colour effect is ensured by IPS e.max ZirCAD MT Multi without any additional characterization for maximum lifelike results.



Exceptional zirconia for digital dentists

¹Typical mean value of the biaxial flexural strength of IPS e.max ZirCAD MT Multi, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

Two raw materials for a **realistic, natural progression of translucency**

20 % incisal zone
5Y-TZP

20 % transition zone
4Y TZP & 5Y-TZP

60 % dentin zone
4Y-TZP



IPS e.max® ZirCAD MT Multi
Superb quality

high strength of

850 MPa¹

naturally

reliable

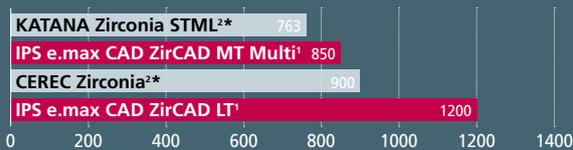
Realistic, natural progression of translucency



A natural progression of translucency means there is a high degree of translucency in the incisal area and high opacity in the dentin area – an appearance resembling that of natural dentition. Due to the multiple raw material mixture, the difference in translucency between the dentin and incisal region of IPS e.max ZirCAD MT Multi is more pronounced than that of KATANA Zirconia STML*.

Superior strength

Flexural strength [MPa]



High flexural strength is of major importance for load bearing restorations. It is measured as the load or force at the point of fracture.

In comparison to other multi zirconia materials, IPS e.max ZirCAD MT Multi exhibits a much higher flexural strength. The 3Y-TZP materials have a high level of flexural strength, but a lower level of opacity, which affects their esthetic appearance.

Fracture toughness [MPa · m^{1/2}]



A high fracture toughness is achieved due to the resistance to crack propagation: The higher the reading, the better the long-term clinical behaviour.

¹ Typical mean value of the biaxial flexural strength, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

² Flexural strength according to the information of the manufacturer

³ Measurements of the fracture toughness according to the Vickers indentation test R&D Ivoclar Vivadent AG, Schaan, Liechtenstein (2017)

⁴ Thickness of the test specimens: 1 mm, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

* These brands are not registered trademarks of Ivoclar Vivadent AG.

Comprehensive spectrum of shades and indications

The IPS e.max CAD and IPS e.max ZirCAD blocks are available in a wide variety of sizes, shades and translucency levels. This enhances the flexibility of the dental practice, since you always have a suitable block in the desired shade at your disposal.

IPS e.max blocks are equipped with a holder for the authorized CAD/CAM systems of PrograMill One (Ivoclar Digital), CEREC® (Dentsply Sirona) and Planmeca Fit (Planmeca).

| | Lithium disilicate glass-ceramic (LS ₂) | | | | |
|---|--|--|---|---|---|
| | IPS e.max CAD HT | IPS e.max CAD MT | IPS e.max CAD LT | IPS e.max CAD MO | IPS e.max CAD Impulse |
| Block |  |  |  |  |  |
| Translucency¹ |  High translucency similar to that of natural enamel |  Medium translucency |  Low translucency similar to that of natural dentin |  Medium opacity |  Lifelike opalescent effect for the replacement of enamel |
| Indications | Thin and occlusal veneers, veneers, inlays, onlays, partial crowns, crowns ² , 3-unit bridges ² | Thin and occlusal veneers, veneers, partial crowns, crowns | Veneers, partial crowns, crowns, bridges ³ , hybrid abutments and hybrid abutment crowns | Frameworks on lightly stained dies, crowns ⁴ and hybrid abutments | Thin, occlusal veneers, veneers |
| Shades⁵ | 20 (4 Bleach BL, 16 A–D) | 7 (BL2, BL3, BL4, A1, A2, A3, B1) | 20 (4 Bleach BL, 16 A–D) | 5 (MO 0, MO 1, MO 2, MO 3, MO 4) | 2 (Opal 1, Opal 2) |
| Sizes⁵ | I 12, C 14, B 40 ² , B 40L ² | C 14 | I 12, C 14, C 16, A 14, A 16, B 32 | C 14, A 14 | C 14 |
| Flexural strength | 530 MPa ⁶ | | | | |
| Fracture toughness | 2.11 MPa · m ^{1/2} ⁸ | | | | |
| Wall thickness anterior Wall thickness posterior | 1 mm ¹⁰ 1.2 mm and incisal crown third 1.5 mm ¹¹ 1 mm ¹⁰ 1.5 mm ¹¹ | | | | |
| Cementation | adhesive, self-adhesive ¹² or conventional ¹² | | | | |
| Blasting | — | | | | |
| Conditioning | e.g. Monobond Etch & Prime® | | | | |
| Cementation | e.g. Variolink® Esthetic | | | | |

¹ Thickness of test sample, 1 mm, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

² For the IPS e.max CAD-on technique on zirconia frameworks

³ Only up to the second premolar as the distal abutment

⁴ Up to the second premolar

⁵ The range of products varies according to the different CAD/CAM systems

⁶ Mean biaxial flexural strength over a period of 10 years, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

⁷ Typical mean value of the flexural strength, R&D Ivoclar Vivadent AG, Schaan, Liechtenstein

⁸ Hill T, Tysowsky G. Fracture toughness, K_{IC}, of Five CAD/CAM glass-ceramics. AADR/CADR Annual Meeting: 1672, 2016

⁹ Dentin, measurement of the fracture toughness using the Vickers indentation test method R&D Ivoclar Vivadent AG, Schaan, Liechtenstein (2017)

¹⁰ If the adhesive technique is used

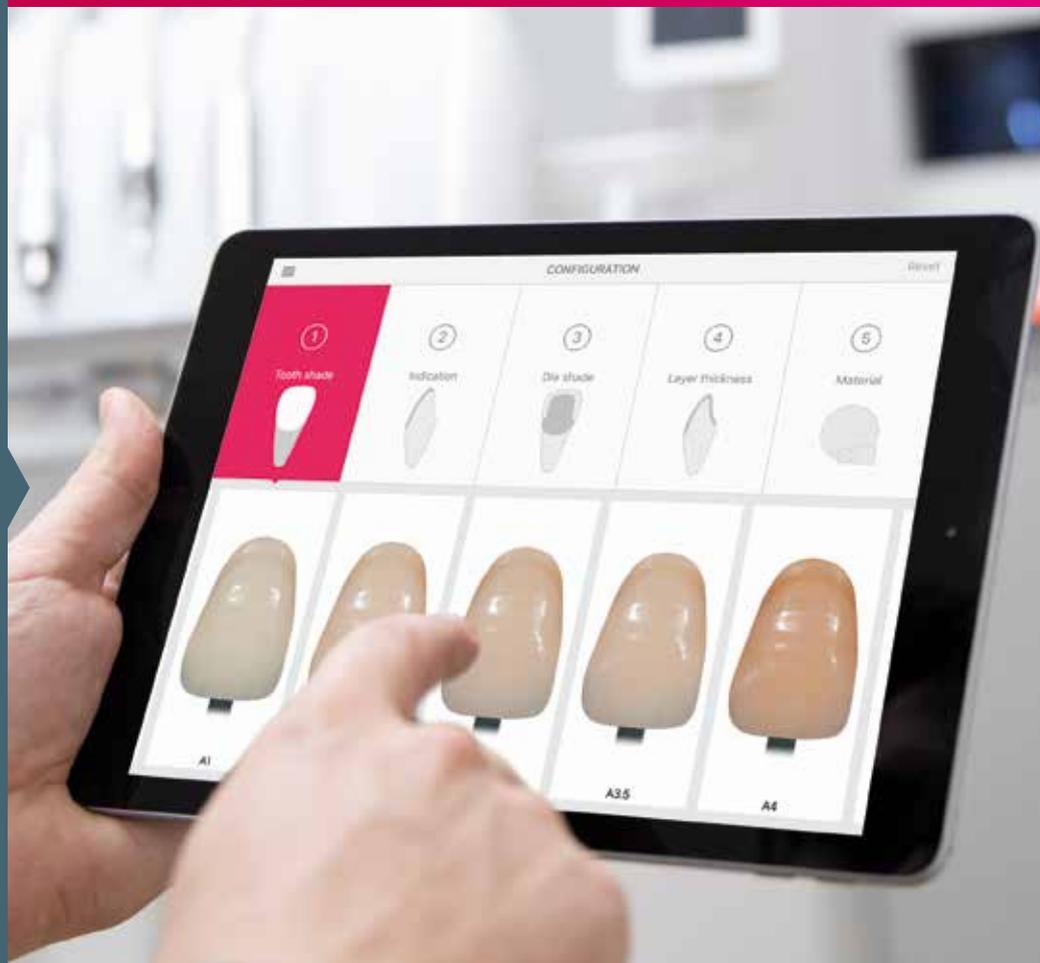
¹¹ Adhesive, self-adhesive or conventional cementation

¹² Crowns and bridges

¹³ Monobond® Plus, if Multilink Automix is used

IPS e.max[®] Shade Navigation App

| Zirconium oxide ceramic (ZrO ₂) | |
|--|---|
| IPS e.max ZirCAD MT Multi | IPS e.max ZirCAD LT |
|  |  |
|  |  |
| Progression of shade and translucency from the dentin to the incisal area | Low translucency |
| Crowns, 3-unit bridges | crowns, 3-unit bridges |
| 8 (BL1, A1, A2, A3, B1, B2, C2, D2) | 8 (BL, A1, A2, A3, B1, B2, C2, D2) |
| C 17, B 45 | C 17, B 45 |
| 850 MPa ⁷ | 1,200 MPa ⁷ |
| 3.6 MPa · m ^{1/2} ⁹ | 5.1 MPa · m ^{1/2} ⁹ |
| 0,8 mm 1,0 mm | 0,4 mm 0,6 mm |
| adhesive, self-adhesive or conventional | |
| Cleaning with Al ₂ O ₃ at max. 1 bar | |
| — ¹³ | |
| e.g. SpeedCEM [®] Plus | |



Five easy steps
to finding the
correct shade and
translucency level

Everything for one-appointment treatments



Optimally complemented

IPS e.max CAD and IPS e.max ZirCAD are complemented by the highly esthetic IPS Empress® CAD block, the Tetric® CAD composite block and the Telio® CAD block for the fabrication of provisional restorations.

8 Appropriate cementation

Ivoclar Vivadent supplies a coordinated cementation system. Depending on the indication at hand, the restorations can be placed using either the adhesive, self-adhesive or conventional luting technique.

- Variolink® Esthetic – the esthetic light and dual-curing luting composite ensures excellent colour stability.
- SpeedCEM® Plus – the self-adhesive composite cement is particularly suitable for cementing zirconia restorations.



The CNS provides practical information regarding all questions related to the shade selection process.

www.cementation-navigation.com

7 Straightforward conditioning



IPS e.max CAD restorations are conditioned with the self-etching glass-ceramic primer Monobond Etch & Prime®.

6 Superior **crystallization,** **sintering and glazing**



In the compact multifunctional Programat® CS4

NEW

1 Virtual smile consultations



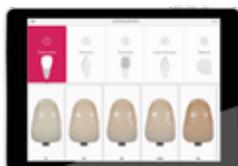
IvoSmile¹, an innovative dental app, transforms your iPad² into a virtual mirror: The patient can preview their potential new smile during the consultation appointment.

2 Intraoral scanning made easy



The latex-free lip and cheek retractor OptraGate[®] heightens the efficiency and comfort of the dental treatment.

3 Effortless block selection



The IPS e.max Navigation App (SNA) assists you in finding the most suitable shade and translucency – for reliable and relaxed working.

4 Fast and precise machining



In the PrograMill[®] One, the world's smallest smart 5-axis milling machine

5 Precision finishing



With IPS e.max Crystall./Shades/Stains and Glaze materials or with the OptraFine[®] polishers

¹ IvoSmile was introduced in a few selected markets in November 2018.

² Not a registered trademark of Ivoclar Vivadent AG

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721205/en/2019-02

The logo for Ivoclar Vivadent features a series of seven colored dots (yellow, green, blue, grey) arranged in a slight arc above the text. The text "ivoclar" is in a blue sans-serif font, and "vivadent" is in a larger, bold blue sans-serif font. A registered trademark symbol (®) is located to the right of "vivadent". Below the company name, the tagline "passion vision innovation" is written in a smaller, black sans-serif font.

ivoclar
vivadent[®]
passion vision innovation