EMPOWER YOUR DENTAL LAB

"KATANA™ Zirconia" YML

Kuraray Noritake Dental Inc. reinvented its original zirconia multi-layer technology by integrating newly developed raw materials with different yttria content into the proven multi-layer colour structure. The material that is based on this innovative technology, “KATANA™ Zirconia” YML, offers a well-balanced flexural strength, chroma and translucency gradation throughout the blank.

According to pilot users of the new zirconia discs, the greatest benefit of using "KATANA™ Zirconia" YML is in the true empowerment of the laboratory. We asked Kuraray Noritake’s EU Scientific Manager Dental Ceramics & CAD/CAM Materials, Mathias Fernandez Lombardi, to explain how the new material is able to positively affect work routines in the dental laboratory.

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Mathias Fernandez Lombardi, who should consider working with "KATANA™ Zirconia" YML?

"KATANA™ Zirconia" YML is designed for laboratories and milling centres with a strong focus on simplification. With its strong body and highly translucent enamel layer, it offers exactly the properties required for an unlimited indication range. Being perfectly suited for the production of durable monolithic long-span posterior bridges and of highly aesthetic anterior crowns or partial restorations, "KATANA™ Zirconia" YML is a true all-rounder that eliminates the need for another zirconia or even ceramic CAD/CAM material. At the same time, it supports highly automated production procedures and requires minimal hand work.

What are the benefits of using a single material for every indication?

Several benefits are related to the use of a single, all-round material. It leads to a reduced number of blanks to be stored, which simplifies inventory management and minimizes the storage space needed. Moreover, it facilitates standardization of laboratory workflows. Using the same material every time means that there are no differences in the basic design and milling parameters like minimum wall thicknesses and connector strengths, in the sintering protocols and finishing options to be taken into account. Hence, errors are less likely to occur and routines are easily established. Finally, the risk of cross-contamination is eliminated when a single material is processed with the available equipment (milling machine, milling and finishing tools, and sintering furnace). Predictable outcomes and flawless aesthetics are usually the result.

What are the benefits related to the use of "KATANA™ Zirconia" YML as the only ceramic CAD/CAM material?

I guess that the most important argument is that aesthetic outcomes are easily and efficiently achieved with "KATANA™ Zirconia" YML for all kinds of restorations, even for long-span bridges. It is usually sufficient to produce monolithic restorations for the posterior region, which are just polished or glazed. Anterior restorations may

be designed monolithically or with minimal cut-back, and the user may choose between "CERABIEN™ ZR" (CZR) FC Paste Stains and CZR Internal Stains plus glaze to obtain a natural look. Another benefit of "KATANA™ Zirconia" YML is its seamless multi-layer structure combined with an extraordinary blank quality.

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Why is this seamless structure and high blank quality important for users?

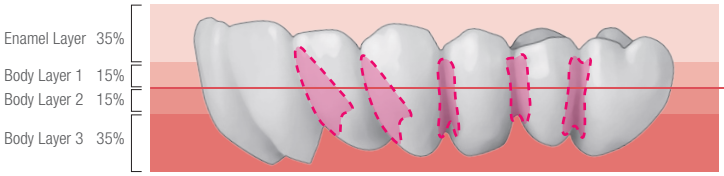
The seamless multi-layer structure, that is a smooth transition from one layer to the next, is the precondition for structural integrity and flawless aesthetics. It ensures that the material is free of transition lines, offers accurate dimensions after sintering (due to uniform shrinkage) and shows a reliable long-term performance not compromised by internal tensions. In "KATANA™ Zirconia" YML, a completely homogeneous composition, with carefully aligned CTE-values and shrinkage ratios in all parts of the blank, is responsible for this benefit.

For its development, Kuraray Noritake Dental leveraged its long-standing expertise in dental ceramics and the advantages of an end-to-end in-house blank production process, without which it would have been impossible to reach the requested quality level. Due to the fact that the material is so well aligned, it was even possible to develop a 54-minute sintering programme that produces equally good results as the proven 90-minute or 7-hour programmes and becomes the go-to option for all rush cases. With this feature, "KATANA™ Zirconia" YML becomes the “jack of all trades” material: It offers highest comfort and security like an SUV, but

	Temp.1	Rate of Temp. Increase °C/°F min	Temp.2	Rate of Temp. Increase °C/°F min	Temp.3	Rate of Temp. Increase °C/°F min	Temp.4	Hold Time	Rate of Temp. Increase °C/°F min	Temp.5
54- minute	Room Temp.	120°C/216°F	1450°C/2642°F	10°C/18°F	1600°C/2912°F	–	–	20 min.	-120°C/216°F	800°C/1472°F
90-minute	Room Temp.	50°C/90°F	1400°C/2552°F	4°C/7°F	1500°C/2732°F	10°C/18°F	1560°C/2840°F	16 min.	-50°C/90°F	800°C/1472°F
7-hour	Room Temp.	10°C/18°F	1550°C/2822°F	–	–	–	–	2-hour	-10°C/18°F	RT.

The above sintering recommendations represent only a guideline; depending on each individual furnace and condition, some adjustments might be necessary.
If the 54 or 90-minute sintering program is not programmable in your furnace, it is not possible to set the furnace according to one of these schedules.
*The material is removed from the furnace at 800°C. A furnace with a configurable YML sintering program is required.

RELATION BETWEEN SETTING POSITION AND CROSS-SECTION



	3 UNITS OR LESS	4 UNITS OR MORE
A	Anterior 12 mm² ≥ Posterior 16 mm² ≥	N/A
B	Anterior 7 mm² ≥ Posterior 9 mm² ≥	Anterior 7 mm² ≥ Posterior 9 mm² ≥

3 UNITS OR LESS — Connector cross-section area can be placed in any layer.
A The maximum number of pontics is one. Not suitable for a cantilevered bridge.

4 UNITS OR MORE — At least 50% of the connector cross section should be positioned in the bottom (lower) half of the disc.

B The maximum number of pontics between two abutments (teeth) should not exceed two.
For cantilever bridge, keep the number of pontics at one. In this case, the connector cross-section must be at least 12 mm².

Positioning of long-span restorations in the middle of the disc.

when it comes to speed, it is in no way inferior to a sports car. **Users who have already tested ceramic materials with a strength gradient know that positioning of long-span restorations in the blank can be tricky. What are the rules to be respected when positioning a long-span bridge in a YML blank?**

Positioning of restorations in "KATANA™ Zirconia" YML discs is extraordinarily easy. The reason is that the gap between the lowest flexural strength found in the enamel area and the highest flexural strength found in the lowest body layer is comparatively small. Moreover, the Body Layer 1 that is found adjacent to the enamel layer already offers a flexural strength that is higher than the 800 MPa requested for bridges with four or more units. Consequently, users are on the safe side whenever they place their long-span restorations in the middle of the blank. More specifically, half of the connector cross section needs to be in the lower half of the disc, which is quite different from other materials with strength gradation that allow for connector positioning in the body area only. "KATANA™ Zirconia" YML restorations with a maximum of three units may be positioned in any layer. In this context, the fact that the thickness of each layer increases proportionally with the height of the disc comes as a benefit: The enamel layer is large enough to exploit its aesthetic potential in single-unit or small bridge cases. **What would you recommend dental technicians who would like to empower their laboratory or milling centre?**

I can truly recommend testing "KATANA™ Zirconia" YML in the laboratory environment to see how it handles and to assess its potential. The exceptional blank quality and seamless integration of the different layers, the ease of positioning and processing efficiency are factors potential users need to experience in real life to understand what they mean for their daily work. Similarly, the aesthetic outcomes need to be assessed in the clinical environment for an authentic impression of the natural look and feel obtained. I am sure that "KATANA™ Zirconia" YML will be able to convince virtually everyone who wants to empower the laboratory with an easy-to-use, efficient universal zirconia solution that fits virtually every patient's and every dentist's needs! Kuraray Noritake Dental knows that dental technicians and practitioners are in need of products that support their striving for simplification, standardization and increased efficiency so urgently needed in present times. Therefore, our product innovations are all focused on delivering more performance with less effort. "KATANA™ Zirconia" YML is the latest addition to a whole series of materials pursuing this goal.

GUIDELINE OF CONNECTOR CROSS-SECTION

Please observe the following guidelines of applicable cross-section wall thickness:

LOCATION & INDICATION	CONNECTOR CROSS SECTION*
Anterior 2-3 units	7 mm² or more
Anterior 4 units or more	9 mm² or more
Posterior 2-3 units	9 mm² or more
Posterior 4 units or more	9 mm² or more

Minimum size if more than half of the cross-section areas are in the bottom half of disc (up to 50% height from the bottom [lower]).

Minimum connector cross-sections are to be respected during the computer-aided design of "KATANA™ Zirconia" YML restorations.

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