

# Catch the New Wave

with

 **KATANA™ Zirconia**

and

**PANAVIA™**

A synergy between  
inorganic and organic material from  
Kuraray Noritake Dental, Inc.





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## ■ Introduction

***One vision and two paths converge to become a market leader in organic and inorganic dental materials- Kuraray Noritake Dental, Inc.***

Kuraray Co.,Ltd, a company rich in tradition and technology, founded in 1926, is known for developing and enriching the industries it services. Over 40 years ago, Kuraray Co.,Ltd entered the dental arena with unique solutions for the dentist in organic materials.

Noritake Co., Limited., synonymous with the famous ceramics company, embarked on its journey of innovation from 1904. Over 25 years later, Noritake Co., Limited. became a market leader by providing celebrated ceramists around the world with the tools they needed to showcase their work for the ultimate consumer-the patient.

With the merging of technologies of organic and inorganic materials in the dental industry, Kuraray Noritake Dental, Inc. is forging ahead to beautify and simplify the experiences of the laboratory technician, dentist and patient while combining art with science.

As a manufacturer of both dental resin and ceramic materials, Kuraray Noritake Dental, Inc. is able to take its technological expertise in adhesion and relate it to the fabrication of indirect restorations. Our original adhesive monomer, MDP (found in our PANAIA™ products) provides a high bond strength to multi-layered / translucent, Zirconia, making our cements ideally suited to use with our latest product, KATANA™ Zirconia UTML/STML. A smart choice for combining esthetics and durability.

*Better laboratory results +  
More effective chairside solutions =  
Exceptional patient experience.*

**JOIN KURARAY NORITAKE DENTAL, INC.  
AS WE EMBRACE THE FUTURE!**

## ANTERIOR RESTORATION WITH KATANA™ Zirconia



### • Enamel-like Translucency

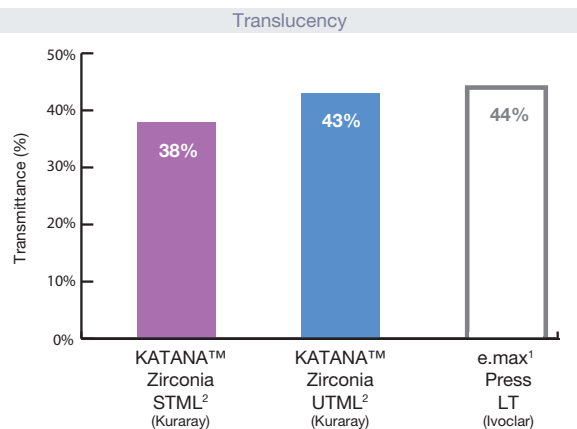
KATANA™ Zirconia UTML / STML has enamel-like translucency with innovative multi-layered technology, making it suitable for full-contour zirconia crowns including anterior restorations.

KATANA™ Zirconia UTML / STML has a comparable translucency to e.max, as well as a higher mechanical strength as compared with e.max¹.

### • Zirconia Bonding with MDP

Zirconia bonding is most successfully achieved through the use of resin cement, and proper treatment of the internal surface with MDP adhesive monomer and sandblasting (Refer to page 6).

### • Comparable Translucency to e.max¹



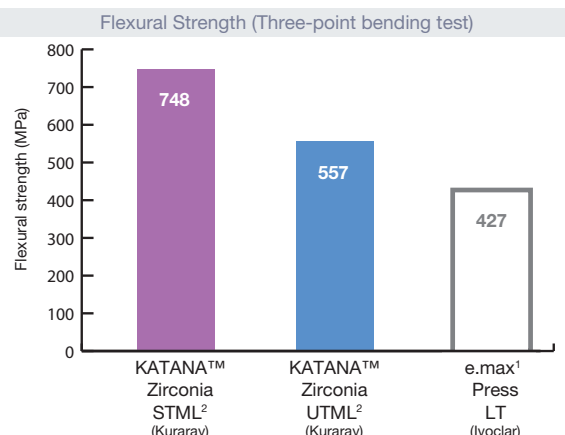
¹ Not a trademark of Kuraray Co., Ltd.

² Measurement Conditions: Evaluated by raw material (white color) |

Wave length of light: 700nm | Sample thickness: 0.5mm

Source: Kuraray Noritake Dental, Inc. | The numerical value varies according to a condition.

### • 30-75% Stronger than e.max¹



¹ Not a trademark of Kuraray Co., Ltd.

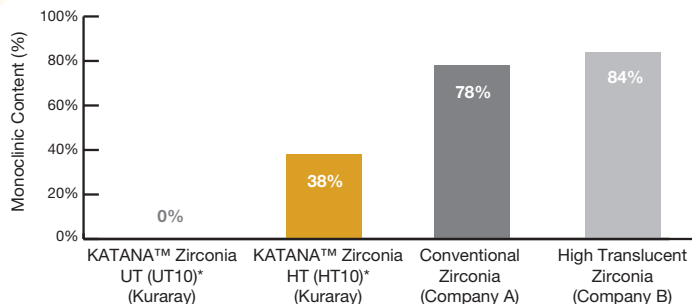
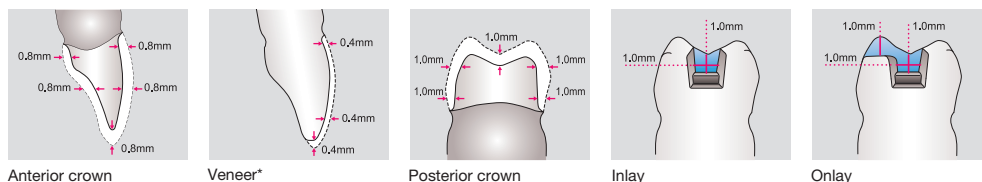
² Measurement Conditions: Evaluated by raw material (white color) according to ISO 6872 : 2008 | A ratio of the distance : 30mm | Sample size : 3x4x40mm

Source: Kuraray Noritake Dental, Inc. The numerical value varies according to a condition.

## MINIMUM WALL THICKNESS OF KATANA™ Zirconia UTML/STML

Design a restoration using the suggested guideline for minimum wall thickness.

\* Thickness only for zirconia without porcelain build-up. Keep 0.8mm in case of porcelain build-up. You can reduce to 0.4mm when finishing with glaze and polish.



\*UT (UT10) and HT (HT10) are unshaded materials of UTML and ML respectively.

Source: Kuraray Noritake Dental, Inc.

Kuraray Noritake Dental, Inc.'s Zirconia powder is processed in-house, making its formulation unlike its competitors. This chemistry produces an esthetic restoration which provides predictable results for the laboratory technician and dentist.

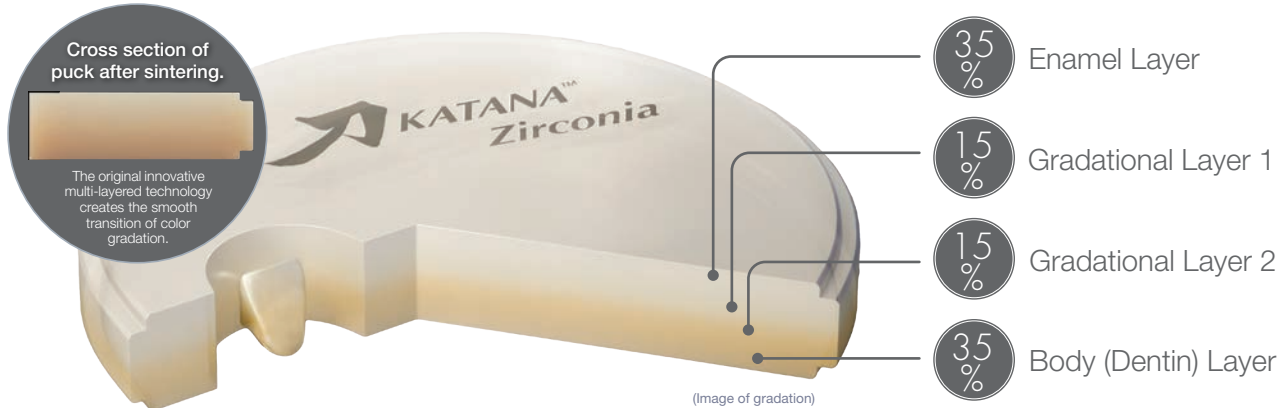
Zirconia inherently has three systems monoclinic, tetragonal and cubic.

A tetragonal system transforms into a monoclinic system on the zirconia surface under hydrothermal conditions. This may cause a decrease in strength.

KATANA™ Zirconia HT exhibits a minimal monoclinic shift; whereby KATANA™ Zirconia UT exhibits virtually no monoclinic shift, due to its cubic system- both products will maintain their strength and durability.



The KATANA™ Zirconia series mostly has a four-layer structure with chromatic gradation, which makes prosthetic adjustment easier. Different levels of translucency and mechanical properties are available. See ("Recommended Applications") for various options.



## • Recommended Applications

KATANA™ Zirconia UTML/STML is designed to achieve superior results with both gradational chroma and translucency for esthetic restorations.



UTML

STML

ML/HT\*

Anterior / posterior crown and inlay: Yoshiteru Tomita, CDT (Feal Dental Laboratory) • Veneer: Kazunobu Yamada, CDT (Cusp Dental Supply)

\* KATANA™ Zirconia ML & HT are high strength zirconia. KATANA™ Zirconia HT exhibits no layered structure.  
 \*HT\* is recommended for the framework if you overlay with layered porcelains.

## READY FOR A LAB?

Visit [kuraraydental.com/lab](http://kuraraydental.com/lab)  
 for the latest update on lab locations  
 that can mill KATANA™ Zirconia.



# ZIRCONIA BONDING WITH

# PANAVIA™ V5



- Designed for all indications including Zirconia and Lithium Disilicate (including e.max<sup>1</sup>)

Since 1983, with the introduction of PANAVIA™ EX resin cement and the original MDP monomer, Kuraray has provided innovative and exceptional technologies that have improved the quality of adhesive dentistry and influenced the dental industry.

## EXCEPTIONAL ZIRCONIA BOND STRENGTHS

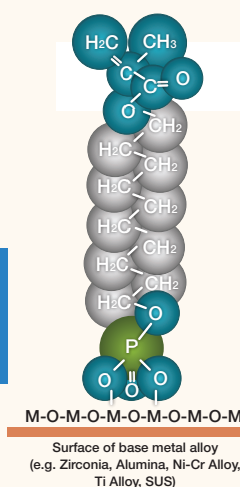
Based on Research gathered over 15 years:

“...regardless of the conditioning methods, MDP-monomer based cements presented the most favorable bond values compared to those of other resin cements.”

### Systematic Review of Adhesion Studies on Zirconia

M. Özcan, J Dent Res Vol# 90 A: 374, 2011 www.iadr.org

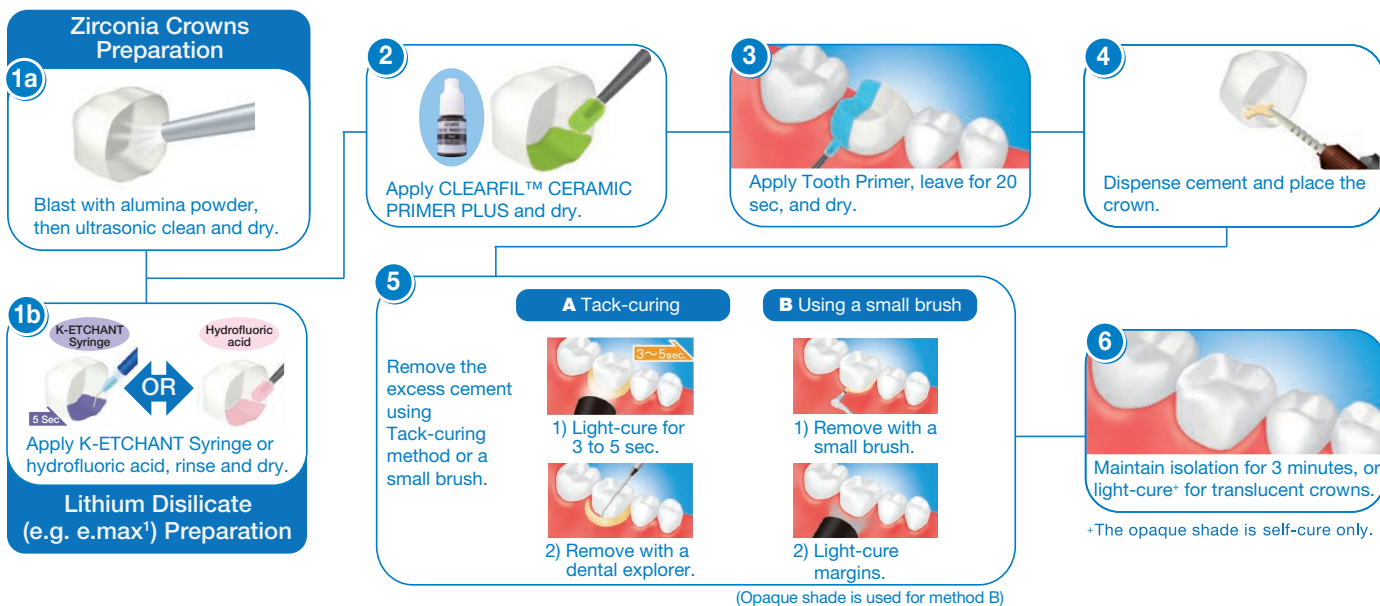
MDP  
Molecular Structure



TYPE	Dual-cure resin cement with primers (PANAVIA™ V5 Tooth Primer and CLEARFIL™ CERAMIC PRIMER PLUS)
FOR	<ul style="list-style-type: none"> <li>• Zirconia</li> <li>• Lithium Disilicate (including e.max<sup>1</sup>)</li> <li>• Metal (including PFM, Titanium)</li> <li>• Composite Resin Block</li> </ul>
RECOMMENDED APPLICATIONS	<ul style="list-style-type: none"> <li>• Crown</li> <li>• Veneer</li> <li>• Inlay/Onlay</li> <li>• Bridge (including Maryland bridge)</li> </ul>
FEATURES	<ul style="list-style-type: none"> <li>• MDP inside (both primers)</li> <li>• Exceptionally high bond strength to dentin</li> <li>• Amine-free*: color stable</li> <li>• 5 Esthetic shade choices</li> </ul>
SHADES	<ul style="list-style-type: none"> <li>• Universal (A2)</li> <li>• Clear</li> <li>• White</li> <li>• Brown (A4)</li> <li>• Opaque</li> </ul>

+ Amine in Self-cure mode

- Basic Procedure for Zirconia & Lithium Disilicate (e.max<sup>1</sup>) Restorations with PANAVIA™ V5



# PANAVIA™ CEMENTS

## PANAVIA™ SA Cement Plus

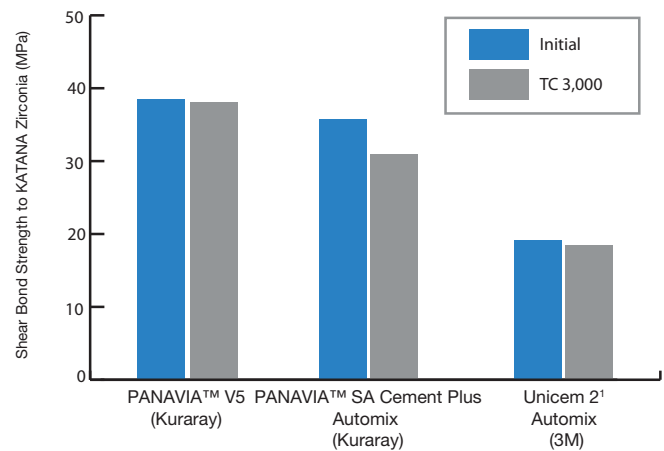


### • Designed for ease of use with Zirconia

Zirconia is a non-silica-based ceramic, which will not respond to a traditional pretreatment method such as hydrofluoric acid etching to the internal surface. Micro-mechanical retention achieved through sandblasting and chemical bonding through adhesion (ex. MDP) are key factors for successful zirconia bonding.

PANAVIA™ V5 and PANAVIA™ SA Cement Plus, which both include the MDP adhesive monomer, have high bond strength and durability to zirconia.

Shear Bond Strength to KATANA™ Zirconia (Sandblasted)



Data Source: Kuraray Noritake Dental Inc.

TYPE	Dual-cure resin cement (Self-adhesive)
FOR	<ul style="list-style-type: none"> <li>Zirconia</li> <li>Metal (including PFM, Titanium)</li> <li>Lithium Disilicate (when used with CLEARFIL™ CERAMIC PRIMER PLUS)</li> </ul>
RECOMMENDED APPLICATIONS	<ul style="list-style-type: none"> <li>Crown</li> <li>Inlay/Onlay</li> <li>Bridge</li> </ul>
FEATURES	<ul style="list-style-type: none"> <li>MDP inside (paste)</li> <li>Extremely easy clean-up</li> <li>Choice of Handmix and Automix</li> <li>Stable Room Temperature Storage (2-25°C/36-77°F)</li> </ul>
SHADES	<ul style="list-style-type: none"> <li>Universal (A2)</li> <li>Translucent</li> <li>White</li> </ul>

### • Basic Procedure for Zirconia Restoration with PANAVIA™ SA Cement Plus

**1 Conditioning the prosthetic restoration**

Follow the Instructions for Use of the restoration material. In the absence of specific instructions, we recommend the following procedure:

Metal

or

Metal oxide ceramic (e.g. Zirconia), Composite resin

Silica-based ceramic\*

Blast with alumina powder, then ultrasonic clean and dry.

For optimum performance when using composite resin, apply a phosphoric acid, rinse and dry. Then apply a silane coupling agent and dry.

Apply a hydrofluoric acid or phosphoric acid, wash and dry.

Hydrofluoric acid or Phosphoric acid (5sec)

Apply a silane coupling agent and dry.

**2 Apply over the prosthetic restoration or the entire tooth surface within the cavity.\***

**3 Place the crown.**

**4 Light-cure for 2 to 5 seconds or chemical-cure for 2 to 4 minutes, then remove the excess cement.**

**5 Maintain isolation for 5 minutes.\***

\* As necessary, blast with alumina powder, then ultrasonic clean and dry. The air pressure should be properly adjusted to suit the material and/or shape of the prosthetic restoration, using caution to prevent chipping.

\* Refer to table 1 for working time.

\* For a translucent restoration, light-cure.

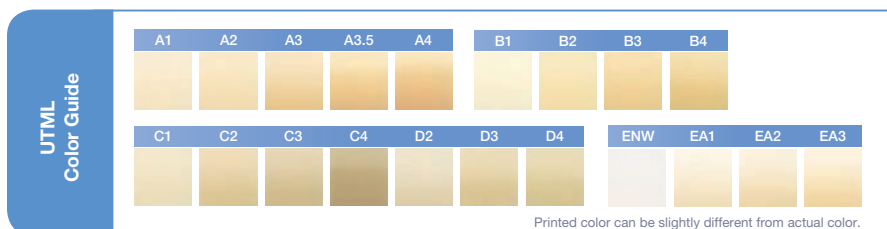
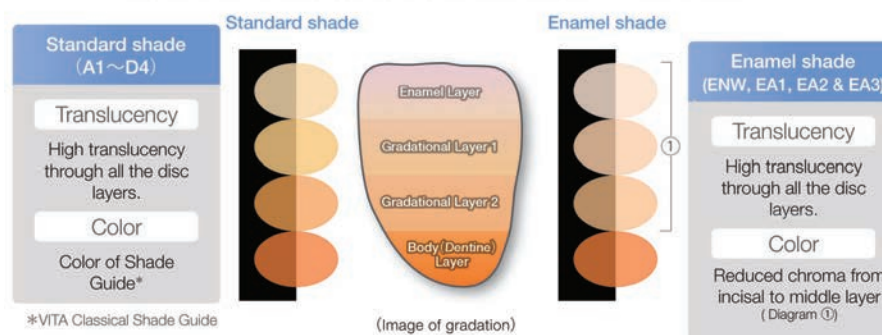
1 Not a trademark of Kuraray Co., Ltd.

## ENAMEL-LIKE TRANSLUCENCY WITH UTML

KATANA™ Zirconia UTML is the most translucent among the series recommended for fabricating anterior crowns or laminate veneers. Two different shade types are available: Standard shade and Enamel shade.



### COLOR AND TRANSLUCENCY OF THE LAYERS AFTER SINTERING



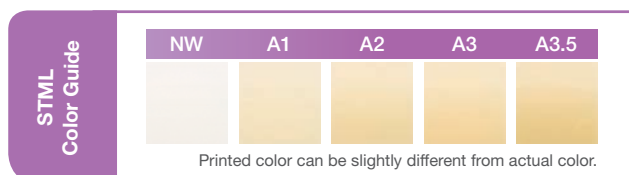
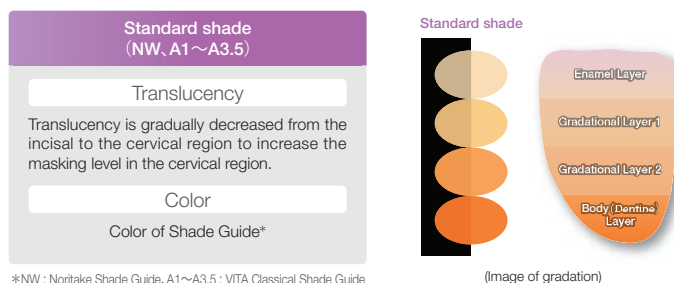
	Transmittance (%)	Flexural Strength (MPa)
<b>UTML</b>	<b>43</b>	<b>557</b>
e.max <sup>1</sup> (Lithium disilicate)	44	427

<sup>1</sup> Not a trademark of Kuraray Co., Ltd.

## WELL-BALANCED TRANSLUCENCY AND STRENGTH WITH STML



### COLOR AND TRANSLUCENCY OF THE LAYERS AFTER SINTERING

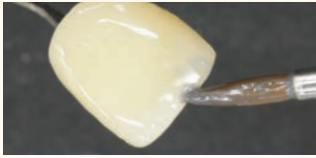


	Transmittance (%)	Flexural Strength (MPa)
<b>STML</b>	<b>38</b>	<b>748</b>
Prettau Anterior <sup>1</sup> (Zirconia)	37	722

<sup>1</sup> Not a trademark of Kuraray Co., Ltd.



KATANA™ Zirconia has many outstanding features, which includes a shorter staining technique, due to its natural chromatic gradation. It does not require a wax-up or investment, such as pressable material, thereby saving time. The pucks are accurately pre-sintered, assuring you of a reduction in chipping and improved marginal integrity of the prosthetic.



- Less staining process
- No need of wax-up and investing



## PUCK SHADE SELECTION:

- Depending on an abutment color, select a proper translucency (refer to the table on the right).
- For posterior restorations, it is recommended to select a shade one darker than the desired shade.
- The final color may appear different after glazing and polishing. UTML and STML shades are designed to be finished by glazing. It is therefore recommended to select one shade brighter to achieve the desired shade after polishing.

Range of masking level compared to the prepared abutment colors

Abutment color examples



UTML

STML

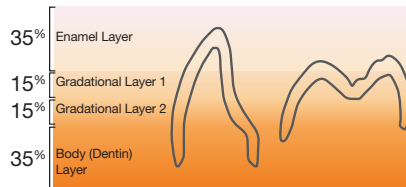
ML / HT

You can select a shade tab that corresponds to the final desired color.

Select a shade tab one level brighter than the final color. (It would be necessary to finish with external stains)

## PUCK THICKNESS SELECTION:

Three thickness are available for KATANA™ Zirconia: UTML, STML and ML (14, 18, 22 mm). Approximately 20% will shrink after sintering. Depending on the desired actual size and shade of the desired prosthetic, select a proper thickness.



Relationship between puck thickness and gradation

Thickness after sintering (before sintering)

11.2mm (14mm) 14.4mm (18mm) 17.6mm (22mm)

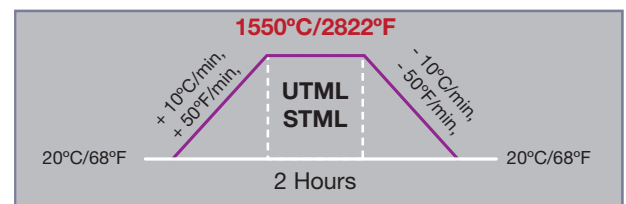


Color : A3.5

Printed color can be slightly different from actual color.

## SINTERING SCHEDULE:

Follow the sintering schedule below. Some adjustment will be required depending on the furnace used. The maximum temperature is 1550°C/2822°F and differs with the use of KATANA™ Zirconia ML/HT.



## FINISHING BY GLAZE AND STAIN:



### Restorations of Monolithic Anterior Zirconia Crowns made from KATANA™ Zirconia UTML

1. Shade Taking
2. Applying the Glaze and the External Stain
3. Seating in the Mouth



### Restorations of Monolithic Anterior Zirconia Crowns made from KATANA™ Zirconia STML with an external stain

1. Preparation
2. Checking of the Restoration on the Model
3. Seating in the Mouth (Left: Buccal view, Right: Occlusal view)

Clinical cases from Keiko Okubo, DDS. Restorations fabricated by Kazunobu Yamada, CDT

# ACHIEVING THE STRONGEST AND ESTHETIC RESTORATION WITH ML/HT

## KATANA™ Zirconia **ML** Multi Layered / KATANA™ Zirconia **HT** High Translucent



KATANA™ Zirconia ML/HT has the highest mechanical strength among the series. With its strength, KATANA™ Zirconia ML is suitable for both full contour zirconia and bridge framework combined with porcelain, while KATANA™ Zirconia HT is suitable for bridge framework.



### PUCK SHADE SELECTION:

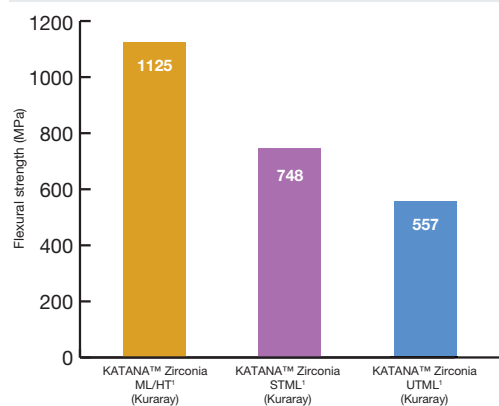
KATANA™ Zirconia ML is designed for full contour restorations, due to the chromatic layers throughout the puck. It may also be applied to framework. The shades of KATANA™ Zirconia ML are designed to be finished by polishing; therefore, it is recommended to adjust the restoration by staining in case of excessive brightness.

KATANA™ Zirconia HT is monolithic and suitable for framework. When veneering over this framework with porcelain, an enamel-like appearance is easy to achieve.

	ML Multi Layered						HT High Translucent		
Shade	A White	A Light	A Dark	B Light	C Light	D Light	HT10	HT12	HT13
	NW0-NW0.5	A1.5-2	A2.5-3.5	B1.5-2	C1.5-2	D1.5-2	for all shades (white)	A1-1.5 / B1-2	A2-3
Cover range of Noritake Shade Guide									

KATANA™ Zirconia ML/HT has the highest mechanical strength among the series.

Flexural Strength (Three-point bending test)



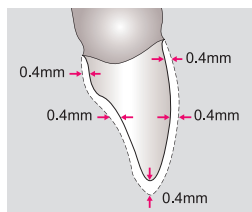
<sup>1</sup> Measurement Conditions: Evaluated by raw material (white color) according to ISO 6872 : 2008 | A ratio of the distance: 30mm | Sample size: 3x4x40mm

Source: Kuraray Noritake Dental, Inc. | The numerical value varies according to a condition.

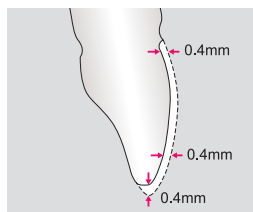
### MINIMUM WALL THICKNESS REQUIRED WHEN USING KATANA™ Zirconia ML/HT

Suggested guideline for minimum wall thickness\*.

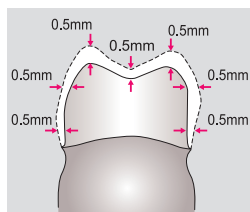
\* Thickness only for zirconia without porcelain build-up



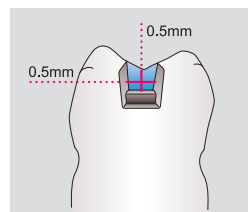
Anterior crown



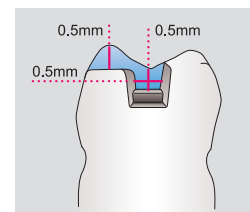
Veneer



Posterior crown



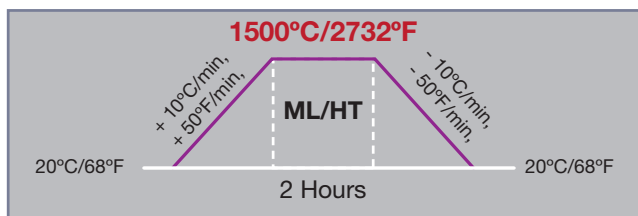
Inlay



Onlay

### SINTERING SCHEDULE:

Follow the sintering schedule below. Some adjustment will be required depending on the furnace used. The maximum temperature is 1500°C/2732°F and differs with the use of KATANA™ Zirconia UTML/STML.



## FULL CONTOUR ZIRCONIA WITH KATANA™ Zirconia ML

Pearl Surface Z is a diamond paste ideal for polishing the zirconia surface to a final finish on Full Contour Zirconia Crowns. Specially developed for the KATANA™ Zirconia series, it is the simplest and fastest way to achieve finished Full Contour Zirconia Crowns.



\* Pearl Surface Z can be used for 100 FCZ molar crowns averagely per bottle (20g)

- Smooth the zirconia surface as soon as possible with the silicon diamond point before using Pearl Surface Z.
- Take the proper amount of Pearl Surface Z on the polishing brush and start to polish.

## MATERIALS FOR FULL CONTOUR ZIRCONIA (FCZ) CROWNS FL GLAZE AND VC GLAZE\*

### ► FL GLAZE

FL Glaze is a colorless and transparent glaze powder containing high fluorescence.

### ► VC GLAZE

VC Glaze is a colored glaze powder used to lower the value of a full contour zirconia crown. It also contains fluorescence (the fluorescence of VC Glaze is less intense than FL Glaze).



\*Composition of CERABIEN™ ZR External Stain.

## KATANA™ ZIRCONIA: FULL CONTOUR ZIRCONIA (FCZ) SOLUTION

CERABIEN™ ZR (CZR) Internal & External Stain and E Glaze will give more esthetic result with minimum intervention.



### Postoperative Outcome

(The molar is FCZ made from KATANA™ Zirconia A Dark by polishing finish with Pearl Surface Z)

A Dark Multi layered Disc is used to get A3 Shade.

## PORCELAIN FUSED ZIRCONIA WITH KATANA™ Zirconia HT

### ► CERABIEN™ ZR (CZR) AND CZR PRESS



### Best matching with KATANA™ Zirconia Materials

CERABIEN™ ZR (CZR) Series is a porcelain specifically developed for making all ceramic crowns in use zirconia frameworks. Crown and Bridge made from KATANA™ Zirconia can be used in the posterior as well as anterior due to its extremely high flexural strength and excellent fracture toughness. The combination of CERABIEN™ ZR (CZR) Series and KATANA™ Zirconia will give you enhanced esthetics and fitness with maximum strength for an overall superior restoration.

*"The patient expressed a lack of confidence in her smile due to esthetic issues with her maxillary central incisors. Final crowns created using Noritake KATANA all-ceramics were cemented. The result is a beautiful smile with completely natural- looking teeth."*

Testimonial provided by Naoki Hayashi, CDT

### KATANA™ Zirconia & CERABIEN™ ZR (CZR) Porcelain Fused Zirconia (PFZ) Solution



Preoperative

Final restorations on the model

Postoperative outcome

Naoki Hayashi, CDT, Ultimate Styles Dental Laboratory





**FREE APP NOW AVAILABLE!**  
Download the **NEW KATANA™ APP**  
For iPhone and Android.

The KATANA™ App is a handy tool for lab technicians who work with or have an interest in KATANA™ Zirconia.



- Measurement data cited in this brochure were obtained by Kuraray Noritake Dental, Inc. The values may vary according to the measuring conditions.
- The colors shown in this brochure may be different from those of the actual product.
- The specifications and appearance are subject to change without notice.
- Before using products, read the Instructions for Use.

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kuraraydental.com

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