

# Panasonic



## // PURE STRENGTH //

NANOZR - high-performance ceramics better balance with nano crystals  
safe / flexible / esthetic



# NANOZR

Twice the fracture toughness



1 mm thick disc  
made of NANOZR

## The break test

Steel balls, weighing 6, 14, 25 and 32 grams, were dropped from a height of 60 centimeters onto 1 mm thick discs made of aluminium oxide, yttrium-stabilized (Y-TZP) zirconium oxide and NANOZR which were centered on a steel ring. Aluminium oxide cracked when struck by the 6 gram ball, Y-TZP cracked when struck by the 25 gram ball. NANOZR easily withstood the 32 gram ball.

## NANOZR

- > Up to twice the fracture toughness in comparison with conventional zirconium oxide ceramics
- > High bending strength
- > High defect stability
- > Resistant to Low Temperature Aging Degradation (LTAD)
- > High Weibull modulus (stands for very homogeneous material)
- > Bio-compatible

## // ZrO<sub>2</sub> / Al<sub>2</sub>O<sub>3</sub> - CER STABILIZED //

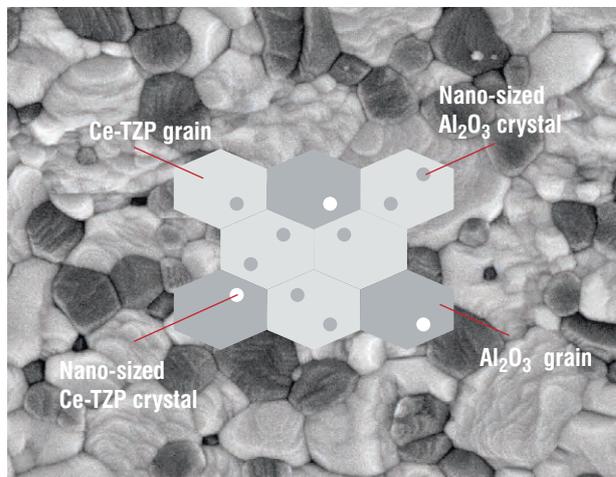
Unique material properties for maximum safety / flexibility / esthetics

The new NANOZR is a zirconium oxide / aluminium oxide alloy reinforced with nano crystals, the physical properties of which are unique. It is much more resilient than comparable dental ceramics. The very high fracture toughness offers the utmost degree of safety. Furthermore, NANOZR is bio-compatible, resistant to aging and its color provides an esthetic veneer. It is ideally suitable for crown and bridge application as well as for telescope structures, superstructures and tertiary structures.

## The Microstructure

In a patented procedure developed by Panasonic an intragranular nanostructure occurs when the main components Ce-TZP and  $\text{Al}_2\text{O}_3$  are sintered. By integrating Ce-TZP and  $\text{Al}_2\text{O}_3$  particles on a scale of a few nanometers (one billionth of a meter) in grains of the other component, the fracture toughness is increased by a factor of 2 in comparison with conventional zirconium dioxide ceramics.

The homogeneous structure of the ceramic matrix has a very high resistance to aging after a hydrothermal load (LTAD).

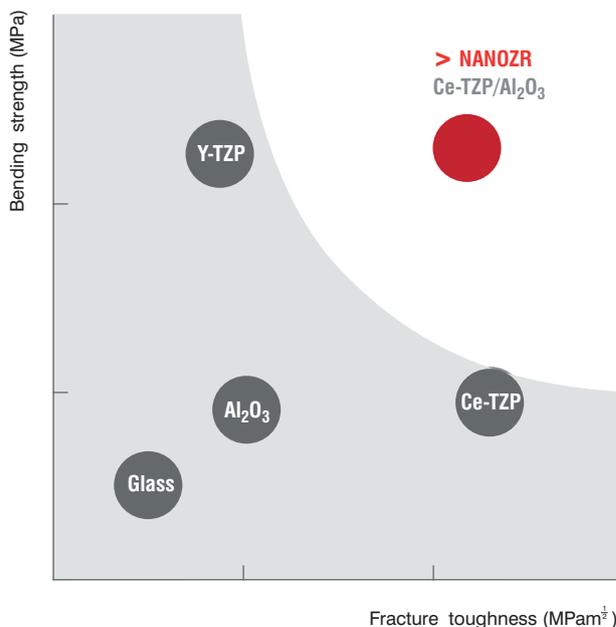


## Ceramic structure reinforced with nano crystals

NANOZR combines high bending strength with high fracture toughness (indicator for defect stability).

Also provides structural integrity which no other dental ceramic has. Perfect properties for dental restoration.

- > Ce-TZP stands for high **durability**
- >  $\text{Al}_2\text{O}_3$  nano structure stands for **high strength**
- > Ce-TZP +  $\text{Al}_2\text{O}_3$  stands for **high resistance (LTAD)**



## Technical Data

| // Properties         | // Measured Values | // Unit                          | // Standard Used    |
|-----------------------|--------------------|----------------------------------|---------------------|
| Density               | 5.52               | g / cm <sup>3</sup>              | JS R 1634           |
| Bending strength      | 1290               | MPa                              | ISO 6872 (Biaxial)  |
| Fracture toughness    | 8.62               | MPam <sup>1/2</sup>              | ISO 6872 (SEVNB)    |
| CTE (25 ° C- 500 ° C) | 10.0               | 10 <sup>-6</sup> K <sup>-1</sup> | ISO 6872            |
| Hardness              | 11.5               | GPa                              | JS R 1610 (Vickers) |
| Elastic modulus       | 245                | GPa                              | JS R 1602           |
| Thermal expansion     | 6.22               | W/(mK)                           | Laser Flash         |
| Radioactivity         | 0.067              | Bq /g                            | ISO 6872            |
| Solubility            | 0.00               | µg / cm <sup>2</sup>             | ISO 6872            |

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The Panasonic brand, known for high quality and the proverbial Japanese precision in manufacturing, has developed another innovative solution. This time in the dental area. The new ceramic material is used in the manufacture of various restorations, NANOZR is based on over 10 years of groundwork and clinical research. It is characterized by unique properties which no other material possesses and opens up new, challenging opportunities in reconstructive dentistry.



### Specification

## NANOZR for Dental Ceramics Restoration in CAD/CAM systems

|                |                                |
|----------------|--------------------------------|
| Trade name     | NANOZR milling blank           |
| Diameter (mm)  | 98.3                           |
| Thickness (mm) | 10, 12, 14, 16, 18, 20, 22, 25 |
| Indications    | ex.) crown, bridge, etc.       |

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