Instructions for use for Zirconia Discs

Beyond MULTI-Y | ORIGIN APEX™

B&D DENTAL TECHNOLOGIES

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Product Description

Beyond Plus Multi-Y and ORIGIN APEX blanks are pre-sintered yttria stabilized tetragonal zirconia polycrystalline ceramics (YTZP) for use as CAD/CAM milling blanks. These blanks are pre-shaded in the following shades: A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4 and OM2. After full sintering, the material densifies into a high strength dental ceramic listed as Type 2 Class 5 according to ISO 6872.
Indications For Use - The Origin Zirconia is indicated for use as an integrated system of dental ceramic which supports dental restorations, such as crowns, bridges, and copings, for partial and fully edentulous patients. The material can be milled into a variety of customized dental restorations to meet the specific needs of individual dental patients.
Contraindications - Improper framework design. Use on patients who are allergic or hypersensitive to zirconia (Y-TZP). Use on patients who are medically unfit for an oral surgical procedure.

COMPOSITION *(in wt%)*	
ZrO2 (+HfO2)	> 90%
Y2O3	> 7%
Al2O3	< 1%

TECHNICAL DATA †	
Coefficient of Thermal Expansion (25-500°C)	10.5 x 10^{-6}/ °C
Flexural Strength:	1200 MPa
Vickers Hardness (HV10):	< 0.2%
Chemical Solubility:	< 1%

† As per ISO 6872

Finishing and Preparing for Sintering

It is recommended that adjustments to zirconia restorations be completed as much as possible prior to sintering. Only use suitable grinding instruments at low speed with light pressure to avoid flaking, chipping and introducing micro fractures in the restoration.

- Carefully separate the milled restoration from the disc using a long carbide bur and smooth out the attachment area using a suitable grinding instrument.
- Then clean the milled restoration with a brush, compressed air or water as needed.
- If the restoration is moist or wet, it should be dried prior to sintering. E.g. 30 minutes under a heat lamp.

Oven Calibration & Sintering Principles

Sintering ovens are not all the same. The actual temperature in the chamber of numerous sintering ovens varies significantly (even in brand new, quality ovens). Therefore, B&D Dental strongly advises the calibration of all ovens and provides temperature control rings with instructions and a chart.

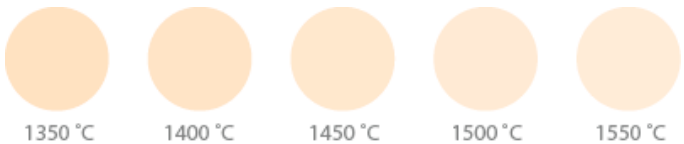
Example	1450 °C	Standard A2 Shade will be lightened up at a higher temp
	1400 °C	Standard A2
	1350 °C	Standard A2 Shade will be darkened at a lower temp

Contact B&D Dental for the Oven Calibration Procedure document which details the exact instructions for calibrating oven.

The batch # on the bottom of the chart must match the batch number imprinted on the ring.

Additional guidelines:

- Temperature adjustments may be necessary to 'dial in' the chroma and value. The higher temperatures decrease chroma which in turn will cause the white L* value to increase; resulting in a 'whitish' restoration.
- If your restoration comes out too light after sintering, lower the high temperature of the sintering program by 50 °C.
- Continue to incrementally adjust the temperature up (lighter) or down (darker) by 25 °C for ½ shade and 50 °C for a full shade.
- Once the optimal temperature for an accurate A2 shade (for example) is determined, the rest of the shades should follow.



Notes:

- Strength and Translucency are set and will not be compromised after heating above 1300 °C.
- B&D Dental Technologies uses D65 (natural daylight, 5,500 Kelvin, CRI 95%) light source for taking shades.

Manufacturer Contact Info

B&D Dental Technologies, 2371 S. Presidents Dr. Suite E, West Valley City, UT
Telephone: 800-255-2839
Website: www.bnddental.com

Sintering Cycles

1) Speed Cycle - Single Crowns (up to 3 units per cycle)

	Stage	Rate / min	Ramp Time	Hold Time
1	Ramp to 1000 °C	150 °C / min*	7 min	0 min
2	Ramp to 1420 °C*	50 °C / min	8 min	7 min
3	Cooling to 30 °C	100 °C / min	14 min	n/a
Total time		**22 Minutes + Cooling (14 Minutes)**		

* Up to 150 °C/min, or the maximum your oven supports.

2) Speed Cycle - Single Crowns to 6 Unit Anterior Bridges (up to 50 units per cycle)

	Stage	Rate / min	Ramp Time	Hold Time
1	Ramp to 900 °C*	150 °C / min*	6 min	0 min
2	Ramp to 1400 °C**	12 °C / min	42 min	10 min
3	Cooling to 30 °C	23 °C / min	60 min	n/a
Total time		**1 Hour + Cooling (1 Hr)**		

** The bottom tray must be slotted and top tray uncovered if stacking

3) Speed Cycle - Single Crowns, Bridges & All-on-X Cases

	Stage	Rate / min	Ramp Time	Hold Time
1	Ramp to 900 °C	150 °C / min*	6 min	0 min
2	Ramp to 1400 °C*	6 °C / min	84 min	30 min
3	Cooling to 23 °C	23 °C / min	60 min	n/a
Total time		**2 Hours + Cooling (1 Hr)**		

4) Conventional Cycle - Single Crowns & 3 Unit Bridges

	Stage	Rate / min	Ramp Time	Hold Time
1	Ramp to 1000 °C	20 °C / min	50 min	0 min
2	Ramp to 1400 °C*	6 °C / min	67 min	65 min
3	Cooling to 30 °C	23 °C / min	60 min	n/a
Total time		**3 Hours + Cooling (1 Hr)**		

5) Conventional Cycle - Single Crowns, Bridges & All-on-X Cases

	Stage	Rate / min	Ramp Time	Hold Time
1	Ramp to 1050 °C	20 °C / min	49 min	60 min
2	Ramp to 1250 °C	8 °C / min	32 min	30 min
3	Ramp to 1400 °C	5 °C / min	30 min	160 min
4	Cooling to 30 °C	23 °C / min	60 min	n/a
Total time		**6 hours + Cooling (1 Hr)**		

Important:

Include a drying step for wet milled restorations

Do not start opening the furnace above 800°C.

Do not remove from the furnace above 500°C.

Cleaning Cycle for M0SI2 Ovens

If using a sintering furnace with molybdenum disilicide (MOSI2) heating elements a cleaning cycle should be run if: (i) it is the first use of a new heating element(s), or (ii) sintered frameworks have come out discolored (yellowish).

Heat Rate	Heat to	Hold Time	Cool
20 °C/min	1600 °C	2 hours	Natural Cool

Note: The effect of the Cleaning Cycle is to generate a protective silica (SiO2) coating on the heating elements, to prevent discoloration of restorations.

Storage, Handling and Transportation

Store in a cool, dry place. Do not drop. Transport in original packaging.

Disposal Considerations

Dispose in accordance with all national and local regulations.

Warning And Safety Instructions

Do not inhale grinding dust. A dust mask and protective eyewear should be worn when processing zirconia. Refer to SDS for additional information.

Stain & Glaze or Porcelain Layering

Follow the manufacturer's instructions for porcelain, stain & glaze firings. There are two key aspects that affect the zirconia and should be followed: 1) Vacuum should be applied during stain & glaze, 2) The oven should not begin opening before 500°C for large bridges. The following is an example of an appropriate cycle with cool down.

Parameters for glaze firing (example)

	Preheating Temp [°C / **F**]	Drying Time [min]	Temp Speed (Heat Rate) [°C / **F** min]	Final Temp [°C / **F**]	Holding Time [min]	Vacuum Start [°C / **F**]	Vacuum End [°C / **F**]
Glaze Firing	403 / **757**	6:00	100 / **212**	790 / **1454**	1:30	450 / **842**	789 / **1452**

Parameters for cool down (example)

	Option 1 *(Standard)*	**Option 2** *(Extended time for big bridges)*
800 °C	Oven starts to open slowly	Oven does not open
700 °C	54 seconds	1 min 19 seconds
600 °C	2 min 26 seconds *(cumulative)*	4 min 03 seconds *(oven starts to open at 600 °C)*
500 °C	4 min 47 seconds *(cumulative)*	6 min 51 seconds
400 °C	7 min 18 seconds *(cumulative)*	10 min 50 seconds
300 °C	8 min 22 seconds *(cumulative)*	11 min 20 seconds
Total Glazing Time	**about 23 minutes**	**about 29 minutes**

Applying vacuum during stain and glaze is required. If the vacuum is not used then restorations will likely look opaque and the shade will be too light.

It is important to have enough cooling time after glazing to avoid possible (micro) cracks in the zirconia restoration. Cooling too fast may result in cracks in the areas between thick pontics and thin walls.