



Instructions for Use



DESCRIPTION

CAROZiiR® zirconia blanks are used for the fabrication of esthetic, full-contour zirconia restorations.

The blanks are available in various heights and shades based on the VITA™ Classical guide. After sintering, restorations display a gradient shading and inherent fluorescence. The restorations are designed using dental CAD software, and the data is converted into milling parts by CAM software. The blanks can be processed in milling units suitable for pre-sintered zirconia. Milled restorations must be finally sintered in a furnace suitable for zirconia, using the cycle designated for CAROZiiR®.

INDICATIONS

CAROZiiR® zirconia can be used to fabricate the following restorations for anterior and posterior teeth when the prescribed wall thickness and connector cross-sectional areas are followed (see chapter “Restoration Design”):

- Single Crowns
- Bridges with a maximum of one pontic between two crowns.
- Inlays, onlays, and veneers.

The range of indications may be limited by the use of CAROZiiR® in combination with other products (e.g. veneering ceramics or cements). Always follow the instructions for use from the manufacturer of the specific product.

TOOTH PREPARATION

Observe the recommendations from the professional associations when preparing all-ceramic restorations. A chamfer preparation is recommended.

RESTORATION DESIGN

The transition from incisal to dentin shade is set vertically in the blank and does not become visible until sintering. The printed side of the blank marks

the incisal area which is located in the upper 3mm of the blank, followed by a transition zone to the dentin shade. The minimum wall thicknesses and connector cross-sectional area are important design parameters for the strength of the finished restoration. The restoration design, position of any holding pins, and the orientation in the blank are carried out in the dental CAD/CAM program.

The design specifications below must be observed in the finished CAROZiiR® restorations.

	Wall Thicknesses [mm]	Bridge Connector Cross-Sectional Area [mm²]
Anterior tooth	≥ 0.8	≥ 12
Posterior tooth	≥ 0.8	≥ 14

CAUTION

Failure to observe the prescribed minimum wall thickness or connector cross-sectional area may result in fracture. In extreme cases, the patient may swallow or even aspirate the parts, resulting in health risks. Users are responsible for the use of CAROZiiR® only for the approved indications and must follow the prescribed minimum wall thickness and connector cross-sectional area.

SCALING FACTOR

All restoration designs must be enlarged by a certain factor before milling, to compensate for shrinkage of the material during final sintering. The scaling factor is shown on each blank and must be entered in the CAM software.

PROCESSING IN THE MILLING UNIT

Clean the milling chamber before processing CAROZiiR® zirconia.

PROCESSING AFTER MILLING

Caution, ceramic dust: Use a suction device with a dust filter commonly used in the dental lab. Use appropriate personal protective equipment, including safety eyewear, when processing restorations.

REMOVAL OF THE MILLED RESTORATIONS

Use of a hand piece with a fine, cross-meshed hard metal milling tool is recommended for removal of the milled restorations. Special care must be taken during the removal so that the restoration is not damaged.

First, notch all holding pins on their top as closely as possible to the restoration from the occlusal side and then carefully extend the notches from the opposite side to cut them off. Use as little pressure as possible in removing the restoration and let it gently fall into your hand or onto a soft pad.

FINISHING OF THE MILLED SURFACE

Careful preparation of the restoration in its pre-sintered state is desired as adjustments made to the sintered restoration can be time-consuming. Once it has been sintered, the restoration should only be fitted in place. Care should be taken to make sure the piece remains in compliance with the required minimum wall thicknesses and connector cross-sectional area after sintering.

- White Universal Polishers, for example, can be used for processing, rotational speed 10,000-20,000 rpm.
- Finish the holding pin joints, then all of the edges outside the crown margin.
- The presence of notches and sharp edges or damage on the bottom side of the connectors may substantially reduce the stability of the sintered restorations. These surfaces must be smoothed.
- When finishing the outer contour in the vicinity of the crown margin, make sure the crown margin is not damaged.

- When preparing full-contour zirconia restorations, smooth the surface with fine-grain sandpaper (2500 grain) and trim the occlusal surface.

CAUTION

CAROZiiR® zirconia must not be used in combination with dyeing liquids. The use of dyeing liquids can reduce the strength of the material and compromise fluorescence and shading.

CLEANING OF MILLED RESTORATIONS

- Handle restorations only with clean hands.
- Use an artificial hair brush to completely remove any milling dust from all surfaces of the restoration, including the inner surfaces of the crown. Residual milling dust can leave a spotty, matte appearance after sintering.

POSITIONING FOR SINTERING

Air circulation around the fired pieces during the sintering process is important to obtain the correct shade. Do not sinter restorations in a closed container as this can impact shade. Covered sintering trays should have openings for ventilation. The restoration must ideally be positioned to allow linear shrinkage during sintering while at the same time retaining the precision to fit. The following positioning is recommended:

POSITIONING ON SINTERING BEADS

- Fill a suitable sintering tray to a level of about 3mm with sintering beads suitable for zirconia.
- Place the restorations carefully on the sintering beads with the occlusal or buccal side facing down. Make sure bridges have as many points of contact to the bead bed as possible and are well supported along the full length, however, they must not be “buried”

POSITIONING OF MILLED SINTERED PINS

- A smooth, even sintering base suitable for the sintering of zirconia must be used when sintering on milled sintering pins. A smooth base enables a low friction surface so the restoration can freely shrink during sintering. The sintering base can become rough over time and should be inspected and changed as needed.

SINTERING

CAROZiiR® zirconia restorations can only be sintered in sintering furnaces suitable for zirconia. Before sintering CAROZiiR® zirconia, make sure that the furnace can reach the required heating rates and final temperatures as shown in the table below. Refer to the Operating Instructions of the furnace for information about operating and programming the sintering furnace.

The following cycle parameters must be set for sintering CAROZiiR® zirconia:

For S grade temperature range is 1500-1530°C.

Program Steps	Starting Temperature (°C/Min)	Final Temperature (°C/Min)	Time Min	Heating Rate (°C/Min)
1	30	500	188	2.5
2	500	1000	83.3	6
3	1000	1530	132	4
4	1530	1530	120	0
5	1530	800	121	-6
6	800	150	Natural Cooling	

For T and ST grade temperature is 1450°C.

For T+ grade temperature is 1450-1500°C.

Program Steps	Starting Temperature (°C/Min)	Final Temperature (°C/Min)	Time Min	Heating Rate (°C/Min)
1	30	500	188	2.5
2	500	1000	83.3	6
3	1000	1450	112	4
4	1450	1450	120	0
5	1450	800	109	-6
6	800	150	Natural Cooling	

Note: Using a different sintering cycle can have negative effects in strength, translucency, and shade. The calibration of the sintering furnace should be checked at regular intervals.

FINISHING OF SINTERED RESTORATIONS

- Use a diamond disk to separate and grind any sintering pins.
- Finish sintered restorations using a turbine at 30,000 to 120,000 rpm or with a fast-running hand piece at up to 30,000 rpm. The use of water cooling is recommended.
- To avoid overheating, apply only light pressure and smooth a particular area for only a short time.
- When a diamond grinder is used, use only fine-grain diamonds with grain sizes between fine 30µm and extra fine 15µm.
- Grinding traces and contact points must be smoothed and polished with rubber polishers to preserve the strength and the beneficial abrasion properties of the restoration.

- Check the minimum values for wall thicknesses and connector cross-section areas after completing the work. These values must be retained.

VENEERING AND PARTIAL VENEERING OF FRAMEWORKS

When veneering CAROZiiR® zirconia, a veneering ceramic system with low firing temperature (<900°C) suitable for use with zirconia is recommended. When used in combination with a veneering ceramic, the instructions for use from the specific manufacturer must be observed.

FINISHING OF FULL-CONTOUR RESTORATIONS

It is recommended to glaze restorations to achieve the best match to the selected shade and a natural aesthetic appearance.

- Low- temperature (<900°C) firing glazes and stains suitable for use with zirconia must be used. A vacuum during the glaze firing holding time is not recommended. When CAROZiiR® zirconia is used in combination with a glaze, the instructions for use from the specific manufacturer must be observed.
- Alternatively, the restoration can be polished using rubber polishers and polishing brushes with diamond polishing paste. This may cause a change in the shading results. This can be avoided, in part, if a shade lighter than desired is selected.

Notes on Cementation, Occlusion Check, and Removal of Restorations.

PERMANENT CEMENTATION OF RESTORATIONS

Depending on the requirements CAROZiiR® zirconia restorations may be cemented conventionally.

- Sandblast the surfaces to be cemented with $\leq 50 \mu\text{m}$ aluminum oxide at a pressure of 2 bar and subsequently clean thoroughly with alcohol. Do not use phosphoric acid to clean the restoration.
- If sandblasting is carried out prior to try the fit, any surfaces that are contaminated with saliva must be cleaned with a sodium hypochlorite

solution, rinsed with water, and dried. For detailed information on the application of specified cements, please refer to their corresponding instructions for use.

OCCLUSION CHECK FOR FULL-CONTOUR RESTORATIONS

- Zirconia occlusal surfaces are not subject to a noteworthy abrasive wear. This must be considered when planning treatment. Special attention must be paid to the design of the occlusal surface so that the dynamic and static occlusion is correct. This should be checked regularly by a dentist during preventive check-ups.
- If the finished restoration was adjusted after placement in the patient's mouth, these surfaces need to be polished.

REMOVAL OF SEATED ZIRCONIA RESTORATIONS

- Use conventional rotating diamonds tools and adequate water cooling to introduce a slit and lift the restoration and/or common office instruments as an aid to pull the restoration off.

ERRORS

Error	Cause	Solution
Restoration fractures during removal from the remaining material	Holding pin was separated too far from the object.	Separate closer to the object to reduce vibrations.
	Hand piece wobbles.	Check the hand piece. Use a turbine, if available.
	Cutter is blunt.	Use a new cutter.
Restoration does not fit.	Restorations poorly positioned during final	Ensure proper positioning during

	sintering	sintering as described under “Sintering”.
Whitish spots apparent on the restoration surface.	Milling dust was not removed.	Carefully remove all milling dust prior to sintering.
Full-contour restoration looks too dark.	Positioning of the restoration in the blank too low.	Position the restoration higher in the incisal area of the blank.
	Wrong sintering cycle or sintering temperature too low.	Use the prescribed sintering cycle.
		Check furnace calibration.
Full-contour restoration looks too light.	Positioning of the restoration in the blank too high.	Position the restoration lower in the dentin area of the blank.
	Wrong sintering cycle or sintering temperature too high.	Use the prescribed sintering cycle.
		Check furnace calibration.
	Firing temperature setting for glaze/veneering firing too high.	Use low-temperature firing glaze/veneering material with a firing temperature <900°C.

STORAGE AND SHELF LIFE

Store CAROZiiR® zirconia blanks at room temperature. 5 years is an estimated replacement time. The product is not expected to degrade during this time period.

WARRANTY

Carol Zircolite Pvt. Ltd. warrants this product will be free from defects in material and manufacture. Carol Zircolite Pvt. Ltd. MAKES NO OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. User is responsible for determining the suitability of the product for user's application. If this product is defective within the warranty period, your exclusive remedy and Carol Zircolite Pvt. Ltd. sole obligation shall be repair or replacement of the Carol Zircolite Pvt. Ltd. product.

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SYMBOLS USED ON THE LABELS

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	Date of expiry		Registered
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	Consult instructions for use		Avoid direct sunlight