dima® Mill Zirconia
Sintering Guidelines

Giving a hand to oral health.
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dima® Mill Zirconia

dima Mill Zirconia is synonymous with outstanding milling properties, which will impress you with simple and tool-sparing processing with high edge stability. The homogeneous structural density of the dima material discs also gives you maximum and torsion-free control during sinter shrinkage.

dima Mill Zirconia offers aesthetics for discerning customers in four different heights, from semi- to highly translucent.

- dima Mill Zirconia ST: semitranslucent zirconia
- dima Mill Zirconia HT: highly translucent zirconia
- dima Mill Zirconia ML: multilayered hightranslucent zirconia
- dima Mill Zirconia HTE: highly translucent esthetic zirconia

For more information about our dima products, please visit www.kulzer.com/dima
Bars for the milling process

Bars are holding bars which connect the individual jobs to the rest of the blank during the milling process.

The bars, which have a predefined diameter, are also required for the later sintering process in the case of larger, curved frameworks.

Crowns

Single-tooth restorations are bonded to the milling disc with a minimum of three bars to secure them during the milling process.

These bars are completely removed before sintering.

Restoration of bridges

- Terminal elements are connected with two bars each.
- All additional elements are connected with one bar each.
- Large work can contain additional bars

Larger straight or curved bridges

Curved bridges are stabilised for the sintering process using a sintering bar and bars. The bars are placed on the terminal elements and on all bridge elements. A bar is placed on each second crown unit when pure crown restorations are performed.

Straight bridges only require bars for the milling process. These bars are removed before sintering.
Work without sinter bars can be separated directly from the blank. Diamond-coated separating discs or suitable abrasive tools (e.g. 1-mm reamer) can be used at low rotational speed and low contact pressure. Each bar should first be divided in half in order to avoid stress peaks, which result in premature damage to the work caused by material breakages. Next, the bars can be reduced to one predetermined breaking point and can then be completely divided. After the work has been carefully removed from the blank, the protruding bars can be ground.

Bridges with sinter bars must not be separated from the sinter bars before sintering. Depending of the curvature of the work, they must remain bonded to the oral bars. The retention of the bars has a direct influence on the later accuracy of fit of the work.

The following points are also to be observed.

- Bars on the terminal elements are retained.
- Preferably leave the bars in place on the pontics or at least on each second bridge element (abutment or pontic).

The following section provides an example showing the procedure for separating a 14-element bridge:

1. Milled work in the blank after milling
2. Separation of the bars on the inner, unused material block
3. Separated inner block
4. Careful separation of the vestibular bars
5. Grinding the attachments of the bars
6. Surface grinding of the sintering bar contact area for better gliding during sintering
7. Removal of the sander dust from the cavities
8. Bridge with sinter bars ready for sintering

Important information before sintering.

The framework must be completely clean and dry before sintering. It must not feature any impurities, milling dust or grinding particles. These could lead to insufficient fit of individual abutment teeth, to rocking of the entire work, or to discolorations or inclusions. The unsintered restoration must not be cleaned with the steam cleaner or be blasted with a sandblasting machine.
3. Sintering program

Sintering

The sintering process takes place in an appropriate sintering furnace, e.g., in the cara Mill sinter. The predefined programs for the cara AS sinter are saved on the first four program channels.

Please ensure that you select the correct program!
Only the correct program guarantees the respective final material properties.

### General sintering programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Initial temperature (°C)</th>
<th>Heating (°C/min)</th>
<th>Final temperature (°C)</th>
<th>Sintering time (min)</th>
<th>Cooling (°C/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconia ST Crowns*</td>
<td>Room temperature</td>
<td>10</td>
<td>1500</td>
<td>60</td>
<td>10 (20)**</td>
</tr>
<tr>
<td>Zirconia ST Bridges</td>
<td>Room temperature</td>
<td>5</td>
<td>1500</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>Zirconia HT Crowns*</td>
<td>Room temperature</td>
<td>10</td>
<td>1450</td>
<td>120</td>
<td>10 (20)**</td>
</tr>
<tr>
<td>Zirconia HT Bridges</td>
<td>Room temperature</td>
<td>5</td>
<td>1450</td>
<td>120</td>
<td>10</td>
</tr>
<tr>
<td>Zirconia HTE Crowns*</td>
<td>Room temperature</td>
<td>10</td>
<td>1450</td>
<td>120</td>
<td>10 (20)**</td>
</tr>
<tr>
<td>Zirconia HTE Bridges</td>
<td>Room temperature</td>
<td>5</td>
<td>1450</td>
<td>120</td>
<td>10</td>
</tr>
<tr>
<td>Zirconia ML***</td>
<td>Room temperature</td>
<td>8</td>
<td>1450</td>
<td>120</td>
<td>8</td>
</tr>
</tbody>
</table>

* If crowns and bridges are sintered at the same time, always use the sintering program for bridges!
** In sintering ovens with two-stage cooling programming, cool down at a rate of 10°C/min above 900°C, and cool down at a rate of 20°C/min below 900°C.
*** No differentiation for crowns and bridges

### Sinter storage

**Notes**

- The sinter pearls (e.g., cara Sinterpearls) tend to adhere during the first sintering processes. These can, however, be easily separated again. The adhesion tendency disappears with further sintering processes.
- The sintering plate/sinter tray can be completely loaded with restorations.
- The restorations must not touch one another.
- Crowns and bridges made from the same material, as well as restorations with sinter support, can be sintered in parallel using a sintering plate.
4. Completing the sintered work

Objects without sinter support

- Single copings can be placed on the occlusal or vestibular surfaces and sintered. The sintering plate/sinter tray, such as the one delivered with the cara DS sinter, is to be used for this purpose. Single copings can be sintered in the numbered indentations, with or without sinter pearls.
- Work without sinter bars is sintered in a sintering bed (with sinter pearls). Please ensure equivalent support during this process.

Objects with sinter support

- Work with sintering bars is carefully placed on a monolayer made of sinter pearls (on the sintering plate, flat side) in a standing position and then sintered.

The sintering of work made from the same material is possible on a maximum of two planes in the cara AS sinter, for example. Please ensure that there is sufficient space within the sintering area of the first plane and particularly in the area of the combustion chamber during this process.

Please also follow the manufacturer’s instructions for the sintering furnace.

Completion

Only water-cooled diamond tools, or tools suitable for use with zirconia, may be used for the mechanical processing. Local overheating may occur if these tools are not used, which may damage the material and leads to cracks.

The following points should also be adhered to.

- The more delicate the framework is, the more carefully work must be done.
- Always use a low contact pressure for grinding.
- Where necessary, remove milling dust that was included during sintering.
- Where possible, perform grinding appropriate for ceramics and avoid sharp corners and edges. Grind transitions to be as round and soft as possible.
- Avoid processing by using separating discs in the interdental region.
- Clean the framework with water or a commercially-available steam cleaner.
- Check the framework afterwards for defects, sufficient wall strength and fit.
- Veneer the framework exclusively with veneering ceramics intended for zirconia (e.g. HeraCeram Zirconia 750).
dima Mill Zirconia HT & HTE – Now available in 16 Shades

dima Mill Zirconia is now available in two new lines, each with 16 shades (+ bleach and white). The natural dentine shades of dima Mill Zirconia HT provide the perfect base for ceramic layering, while dima Mill Zirconia HTE shines with extra translucence for excellent monolithic restorations or ceramic veneers that glow from within.

The highly compact and homogeneous material discs offer excellent edge stability, good millability and torsion-free sintering shrinkage.

Visit www.kulzer.com/dima for more information.