

DCM hotbond



## DCMhotbond PRODUCTS

*Operating instruction*

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# DCM hotbond zirconnect



**DCMhotbond zirconnect/ zirconnect spray**  
WAK  $9,7 \times 10^{-6} \text{ K}^{-1} \pm 0,5$  (25-500°C)

### DCMhotbond zirconnect/ zirconnect spray

DCMhotbond zirconnect/ zirconnect spray is a glass based on a silica material, which can be used as a bonding agent for a firmly connection between dental restorations made of a zirconia ( $\text{ZrO}_2$ ) framework, and veneering materials like ceramic or composite. For this purpose, framework material should be fabricated, after processing the white or green parts, out of highly sintered, fully vitrified  $\text{ZrO}_2$  respectively. For processing of **DCMhotbond zirconnect/ zirconnect spray**, spraying of the  $\text{ZrO}_2$  framework's surface is mandatory, in order to create a uniform thickness of surface coating, not exceeding  $20 \mu\text{m}$  by far.

### Indications:

- Surface conditioning of crowns and bridges made of  $\text{ZrO}_2$  before veneering with dental ceramic.
- Surface conditioning of crowns and bridges made of  $\text{ZrO}_2$  before veneering with composite (bonding preparation).
- Surface conditioning of the retention surface of orthodontic retainers and Maryland bridges.

### Contraindications:

DCMhotbond zirconnect/ zirconnect spray is not intended as jointing material between  $\text{ZrO}_2$ - $\text{ZrO}_2$ , and  $\text{ZrO}_2$ -titanium.

DCMhotbond zirconnect/ zirconnect spray should not be used in connection with liners for veneers made of dental ceramic.

### Fields of application of DCMhotbond zirconnect/ zirconnect spray

→  $\text{ZrO}_2$



← Composite,  
Veneering, ceramics,  
Press ceramic,  
Adhesive luting materials

→  $\text{ZrO}_2$



← Composite,  
Veneering, ceramics,  
Press ceramic,  
Adhesive luting materials

zirconnect  
zirconnect spray

is a special bonding agent for zirconia frameworks  
is a special bonding agent for zirconia frameworks

### DCMhotbond zirconnect spray

For coating of the zirconia surface, shake the **DCMhotbond zirconnect spray** can well immediately before use, until rotation of the mixing ball in the container becomes audible. Then, spray a covering layer slowly and evenly from a distance of 20 cm.

### Material-related safety notes

#### Contraindications:

Combinations with materials other than the intended purpose of the described **DCMhotbond product system** are contraindicated!

### Process-specific safety notes:

In accordance with its purpose, material is intended for dental use only!

Processing may only be done by qualified personnel!

Dust and chipping may be produced during processing of ceramic products (grinding and polishing). Keep eyes protected and avoid breathing of abrasive dust. Use suction device, protection masks, and safety glasses respectively. Take care with high temperature during firing process: risk of burning! Use personnel protective equipment (PPE)!

Avoid contact of the material with skin, mucosa, and eyes!

Do not return mixed powder, or indeed any powder that has been in contact with liquid or moisture, to the powder container! Risk of contamination!

Avoid contact between powder and moist brushes, or moist instruments inside the powder container! Risk of contamination!

Attention must be paid to purity of brush, spray attachment, or spatula. Any contamination being caused from the outside may negatively affect firing results. Risk of contamination!

Due to different construction methods of ceramic furnaces available on the market, different firing results may occur. This prerequisite must be taken into consideration, and has to be ascertained on the customer's own responsibility. Indicated firing temperatures are **for guidance only!**



**H222 – Extremely flammable aerosols**  
**GHS02 H229 – Container is under pressure, may explode if heated**

### Storage and security requirements:

Storing: Keep in dry storage at room temperature.

Operating instruction is related to all application areas of **DCMhotbond zirconnect/ zirconnect spray**.

For further information see [www.dcm-hotbond.com](http://www.dcm-hotbond.com)

### Dental laboratory procedure:

#### CAUTION!

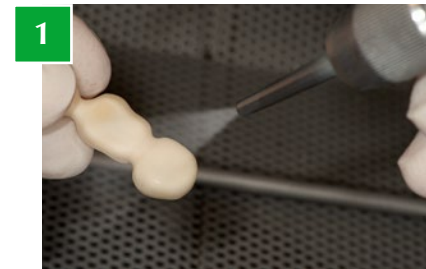
In case regeneration firings are recommended by the manufacturer before veneering, firings shall be performed before lining with **DCMhotbond zirconnect/ zirconnect spray**. If frameworks were soldered with **DCMhotbond zirconia**, a support with an individually fabricated firing tray is recommended.

#### CAUTION!

Retention areas for intraoral adhesive bonding (e.g. retainers of Maryland bridges) must be coated before ceramic veneering with **DCMhotbond zirconnect/ zirconnect spray**.

### Preparation of bridges:

#### 1. Sandblasting



Prior to bonding, bridge surface has to be conditioned by preparation with a coarse grained diamond bur under water irrigation. Dry preparation without water irrigation will lead to an increased risk of cracking and loss of stability. Grit blasting with corundum ( $\text{Al}_2\text{O}_3$ ) with a particle size of 110  $\mu\text{m}$  and a blasting pressure of 2 bar is recommended for surface conditioning. An operation under clean and free of grease conditions is mandatory and should be ensured (Figure 1).

### Preparation of bridges:

#### 1. Spraying



Spraying process on bridge framework (Figure 2).

3



Surface of the bridge framework after completion of spraying process (Figure 3).  
An aqueous solution is mixed with **DCMhotbond zirconnect** and a carrier liquid (preferably Vita Spray On). Consistency of the sprayed surface should be powdery.

### 3. Firing process

4



Subsequently, workpiece is placed on the firing tray (Figure 4).

5



**DCMhotbond zirconnect/ zirconnect spray** shall be evenly distributed on the framework after firing process (Figure 5).

Firing process is performed according to the data as indicated below.

Data for firing process of **DCMhotbond zirconnect/ zirconnect spray** are as follows:

Starting temperature:	450°C
Drying process:	2 min.
Firing temperature:	1000°C
Climb rate:	60°C/min
Hold time:	1 min.
Vacuum on:	450°C
Vacuum until:	1.000°C

### 4. Sandblasting

6



In order to enlarge surface, framework should be sandblasted with corundum ( $Al_3O_2$ ) with a particle size of 110  $\mu m$  and a blasting pressure of 2 bar. Thereby, wetting capacity will be increased. The framework is now ready for veneering with layering ceramic (Figure 6).

#### CAUTION!

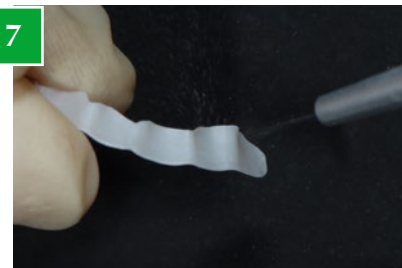
For adhesive cementation or for veneering with composite, surface has to be sandblasted with corundum ( $Al_3O_2$ ) with a particle size of 110  $\mu m$  first. After sandblasting, surface is treated with commercially available etching agents, according to the manufacturer's recommendations.

Ceramic etching agents contain hydrofluoric acid (HF). Therefore, safety regulations for the handling of ceramic acid agents have to be strictly observed.

#### Preparation of retainers:

##### 1. Sandblasting

7

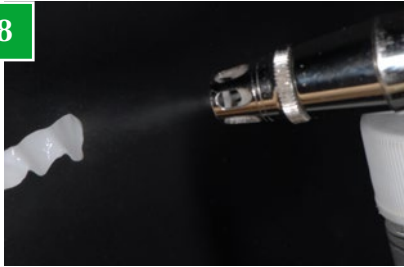


Prior to bonding, bridge surface has to be conditioned by preparation with a coarse grained diamond bur under water irrigation. Dry preparation without water irrigation will lead to an increased risk of cracking and loss of stability. Grit blasting with corundum ( $Al_3O_2$ ) with a particle size of 110  $\mu m$  and a blasting pressure of 2 bar is recommended for surface conditioning (Figure 7). An operation under clean and free of grease conditions is mandatory and should be ensured.

## Preparation of retainers:

### 2. Spraying process

8



An aqueous solution is mixed with **DCMhotbond zirconnect** and a carrier liquid (preferably Vita Spray On). Consistency of the sprayed surface should be powdery (Figure 8).

### 3. Firing process

9



Frameworks for Maryland bridges, retainers, or contour elements are placed on the firing tray and fixed with conventional firing cotton. Firing process is performed according to the data as indicated below. **DCMhotbond zirconnect** surface should appear glassy and shiny, as indication for a successful bonder firing (Figure 9).

Data for firing process of **DCMhotbond zirconnect/ zirconnect spray** are as follows:

Starting temperature:	450°C
Drying process:	2 min.
Firing temperature:	1000°C
Climb rate:	60°C/min
Hold time:	1 min.
Vacuum on:	450°C
Vacuum until:	1000°C

#### CAUTION!

For adhesive cementation or for veneering with composite, prepared **DCMhotbond zirconnect/ zirconnect spray** surface coatings of bridges or retention areas have to be sandblasted with corundum ( $\text{Al}_3\text{O}_2$ ) with a particle size of 110  $\mu\text{m}$  and a pressure of 1 bar first. After sandblasting, surface is treated with commercially available etching agents, according to the manufacturer's recommendations. Ceramic etching agents contain hydrofluoric acid (HF). Therefore, safety regulations for the handling of ceramic acid agents have to be strictly observed.

## 4. Sandblasting

In order to increase wetting capacity of the surface, sandblasting with corundum ( $\text{Al}_3\text{O}_2$ ) with a particle size of 110  $\mu\text{m}$  and a blasting pressure of 1 bar is recommended for surface conditioning.

## Preparation of Maryland bridges

### 1. Sandblasting

10



Prior to bonding, bridge surface has to be conditioned by preparation with a coarse grained diamond bur under water irrigation. Dry preparation without water irrigation will lead to an increased risk of cracking and loss of stability. Grit blasting with corundum ( $\text{Al}_3\text{O}_2$ ) with a particle size of 110  $\mu\text{m}$  and a blasting pressure of 2 bar is recommended for surface conditioning. Surface should be cleaned shortly before bonding with compressed air. An operation under clean and free of grease conditions is mandatory and should be ensured (Figure 10).

## Processing Maryland bridges

### 2. Spraying process

11



Framework is coated by means of an airbrush-gun (Figure 11).

An aqueous solution is mixed with **DCMhotbond zirconnect** and a carrier liquid (preferably Vita Spray On). Consistency of the sprayed surface should be powdery.

### 3. Firing process

12



Object is placed on a conventional firing tray and fixed with firing cotton. A honeycomb-system is endorsed as firing media, in order to guarantee a consistent heat expansion within the system. Firing process is performed according to the data as indicated below (Figure 12).

Data for firing process of **DCMhotbond zirconnect/ zirconnect spray** are as follows:

Starting temperature:	450°C
Drying process:	2 min.
Firing temperature:	1000°C
Climb rate:	60°C/min
Hold time:	1 min.
Vacuum on:	450°C
Vacuum until:	1000°C

### 4. Sandblasting

In order to increase wetting capacity, sandblasting with corundum ( $Al_3O_2$ ) with a particle size of 110  $\mu m$  and a blasting pressure of 1 bar is recommended for surface conditioning.

#### CAUTION!

For adhesive cementation or for veneering with composite, prepared **DCMhotbond zirconnect/ zirconnect spray** surface coatings of bridges or retention areas have to be sandblasted with corundum ( $Al_3O_2$ ) with a particle size of 110  $\mu m$  and a pressure of 1 bar first. After sandblasting, surface is treated with commercially available etching agents, according to the manufacturer's recommendations. Ceramic etching agents contain hydrofluoric acid (HF). Therefore, safety regulations for the handling of ceramic acid agents have to be strictly observed.

# DCMhotbond fusio

## DCMhotbond fusio connect spray

WAK  $9,0 \times 10^{-6} \text{ K}^{-1}$  (25°C – 500°C)

DCMhotbond fusio connect spray is a ready-to-spray glass, based on a modern leucit-free siliceous material. Material is coloured according to the classical Vita B1-colour scale. DCMhotbond fusio connect spray was exclusively prepared for dental use, and processing may only be done by qualified personnel!

DCMhotbond fusio connect spray is intended for further processing within the DCMhotbond fusio system in order to create a firmly bonding between titanium and anatomical veneering units, using  $\text{LS}_2$ ,  $\text{ZrO}_2$  respectively.

### Contraindications:

- Combination with materials beyond the fields of application described in the DCMhotbond product system and/or with materials from third-party manufacturers.
- Coating of materials not being indicated.
- Rough edges on the framework or framework shapes, not being adequately downsized in anatomical terms.
- Type of connection is not suitable for patients with bruxism or parafunctional habits.

### Material-related safety notes

#### Contraindications:

Combinations with materials other than the intended purpose of the described DCMhotbond fusio connect spray are contraindicated!

### Process-specific safety notes

In accordance with its purpose, material is intended for dental use only!

Processing may only be done by qualified personnel!

Dust and chipping may be produced during processing of ceramic products (grinding and polishing). Keep eyes protected and avoid breathing of abrasive dust. Use suction device, protection masks and safety glasses respectively. Take care with high temperature during firing process: risk of burning! Use personnel protective equipment (PPE)!

Avoid contact of the material with skin, mucosa, and eyes!

Do not return mixed powder, or indeed any powder that has been in contact with liquid or moisture, to the powder container! Risk of contamination!

Avoid contact between powder and moist brushes, or moist instruments inside the powder container! Risk of contamination!

Attention must be paid to purity of brush, spray attachment, or spatula. Any contamination being caused from the outside may negatively affect firing results. Risk of contamination!

Due to different construction methods of ceramic furnaces available on the market, different firing results may occur. This prerequisite must be taken into consideration, and has to be ascertained on the customer's own responsibility. Indicated firing temperatures are **for guidance only!**



### Storage and security requirements:

Storing: Keep in dry storage at room temperature.

Operating instruction is related to all application areas of DCMhotbond fusio connect spray.

For further information see [www.dcm-hotbond.com](http://www.dcm-hotbond.com)

### Dental laboratory procedure:

#### 1. Preparation

All surfaces have to be grit blasted with corundum ( $\text{Al}_2\text{O}_3$ ) with a particle size of 110  $\mu\text{m}$  and a blasting pressure of 2 bar. Operating under clean and free of grease conditions is mandatory and should be ensured. For protection against ingress of liquid soldering material, screw channel of individual abutments made of a titanium base should be sealed with liquid firing cotton.

#### 2. Coating of titanium surface with DCMhotbond fusio connect spray

For coating of the respective surface shake DCMhotbond fusio connect spray bottle well, until rotation of the mixing ball in the container becomes audible. Then, spray a covering layer slowly and evenly from a distance of 5-10 cm.



Framework of a titanium bridge, sprinkled with DCMhotbond fusio connect spray



Framework of a titanium crown, sprinkled with DCMhotbond fusio connect spray



Titanium abutment, sprinkled with DCMhotbond fusio connect spray

Locate sprinkled object on a firing tray and fire in a ceramic furnace according to the following recommended data of the firing process.



H222 – Extremely flammable aerosols  
H229 – Container is under pressure, may explode if heated

Data for firing process of **DCMhotbond fusio connect spray** are as follows:

Starting temperature: 450°C  
 Drying process: 6 min.  
 Firing temperature: 800°C  
 Climb rate: 55°C/min  
 Hold time: 1 min  
 Vacuum on: 450°C  
 Vacuum until: 800°C



Titanium crown and bridge fixed on the firing tray after firing process

**Note:** In case results are deficient, an additional surface coating with **DCMhotbond fusio connect spray** is possible. It should be noted, that soldering gap will be diminished according to the additional application of the respective coating.

# DCMhotbond fusio



## DCMhotbond fusio 12

WAK  $9,8 \times 10^{-6} \text{ K}^{-1}$  (25°C – 500°C)

**DCMhotbond fusio 12** is a glassy soldering material for ceramics, based on a siliceous material. It serves for close bonding between  $\text{ZrO}_2$  and anatomic veneering units, made of  $\text{LS}_2$  with a WAK-value of approximately  $10.0 \pm 0.5 \times 10^{-6} \text{ K}$  (100°C-500°C), or between titanium and anatomic veneering units, made of  $\text{LS}_2$  with a WAK-value of approximately  $10.0 \pm 0.5 \times 10^{-6} \text{ K}$  (100°C-500°C), as well as between titanium and  $\text{ZrO}_2$  for dental lab work. **DCMhotbond fusio 12 is being employed for bonding between titanium and  $\text{ZrO}_2$ , as well as for titanium and  $\text{LS}_2$ . Preferable use of DCMhotbond fusio 12 is recommended for soldering gaps between 0.15-0.3 mm.**

Utilization for soldering gaps less than 0.1 mm and larger than 0.3 mm is contraindicated.

### Indications:

Titanium and $\text{ZrO}_2$ Recommendation: DCMhotbond fusio 12	Titanium and $\text{LS}_2$ Recommendation: DCMhotbond fusio 12	$\text{ZrO}_2$ and $\text{LS}_2$ Recommendation: DCMhotbond fusio 12
<b>DCMhotbond fusio connect spray</b> is a ceramic material for surface conditioning of pure titanium, or TiAl6V4-, TiAl6Nb7-alloys respectively, in order to create a close, gap-free, and durable bonding between a titanium base and a superstructure made of $\text{ZrO}_2$ , or with anatomical veneering units, made of $\text{LS}_2$ .		X
<b>DCMhotbond fusio connect spray</b> serves as colour control for the subsequent work procedures on titanium.		X
<b>DCMhotbond fusio connect spray</b> reduces proceeding oxidation of the titanium surface during subsequent work procedures.		X
<b>DCMhotbond fusio 12</b> is a glass ceramic, and serves as main soldering agent between titanium, being coated with <b>DCMhotbond fusio connect spray</b> , and $\text{ZrO}_2$ .	<b>DCMhotbond fusio 12</b> a glass ceramic, and serves as main soldering agent between titanium, coated with <b>DCMhotbond fusio connect spray</b> , and anatomic veneering units, made of $\text{LS}_2$ .	<b>DCMhotbond fusio 12</b> is a glass ceramic, serving as main soldering agent between $\text{ZrO}_2$ and anatomic veneering units, made of $\text{LS}_2$ .



### Contraindications:

DCMhotbond fusio 12 and DCMhotbond fusio connect spray are not suitable for bonding between AlO<sub>2</sub> and ZrO<sub>2</sub>, AlO<sub>2</sub> and titanium, as well as between AlO<sub>2</sub> and LS<sub>2</sub>.

Materials are neither suitable for individually layered LS<sub>2</sub>-veneers, nor for LS<sub>2</sub>-variations beyond a WAK of approximately 10.0 ± 0.5 x 10<sup>-6</sup> K (100°C-500°C).

Usage of DCMhotbond fusio 12 and DCMhotbond fusio connect spray is only approved for the above mentioned indications!

### Material-related safety notes

#### Contraindications:

Combinations with materials other than the intended purpose of the described DCMhotbond product system are contraindicated!

#### Process-specific safety notes

In accordance with its purpose, material is intended for dental use only!

Processing may only be done by qualified personnel!

Dust and chipping may be produced during processing of ceramic products (grinding and polishing). Keep eyes protected and avoid breathing of abrasive dust. Use suction device, protection masks and safety glasses respectively. Take care with high temperature during firing process: risk of burning! Use personnel protective equipment (PPE)!

Avoid contact of the material with skin, mucosa, and eyes!

Do not return mixed powder, or indeed any powder that has been in contact with liquid or moisture, to the powder container! Risk of contamination!

Avoid contact between powder and moist brushes, or moist instruments inside the powder container! Risk of contamination!

Attention must be paid to purity of brush, spray attachment, or spatula. Any contamination being caused from the outside may negatively affect firing results. Risk of contamination!

Due to different construction methods of ceramic furnaces available on the market, may lead to different firing results. This prerequisite must be taken into consideration, and has to be ascertained on the customer's own responsibility. The firing temperatures given are **for guidance only!**

### Storage and security requirements:

Storing: Keep in dry storage at room temperature.

Operating instruction is related to all application areas of DCMhotbond fusio 12.

For further information see [www.dcm-hotbond.com](http://www.dcm-hotbond.com)

### Dental laboratory procedure:

#### 1. Preparation

- A soldering gap of 0.1 mm up to a maximum of 0.3 mm between soldering components is prerequisite.
- All surfaces have to be grit blasted with corundum (Al<sub>2</sub>O<sub>3</sub>) with a particle size of 110 µm and a blasting pressure of 1 bar. Surface must be clean and free of grease.
- For protection against ingress of liquid soldering material, screw channel of individual titanium base abutments should be sealed with liquid firing cotton.

## 2. Jointing

Jointing with DCMhotbond fusio 12 is made as follows:

Use DCMhotbond fusio 12 powder to mix with a dosed quantity of DCMhotbond fusio liquid to a cream-like consistency.



Drop of the solvent with powder



Powder diluted with liquid



Creamy consistency

The creamy mixed DCMhotbond fusio 12 is applied evenly with a brush on the entire solder surface. Please mind working with a surplus quantity of DCMhotbond fusio 12. This has to be done due to powder consumption as a result of the sintering process.

### ZrO<sub>2</sub> bridge framework and LS<sub>2</sub> veneers



Moistening of the outer surface of bridge framework



Lining of the inner surface of veneers is performed separately for each LS<sub>2</sub> veneer unit

3



Merging of bridge framework and veneer unit

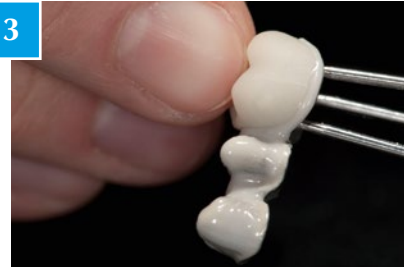
**Crown framework and LS<sub>2</sub> veneer unit**

4



Bridge with veneer units in place and excess soldering material

3



Titanium bridge framework with veneer units in place and excess soldering material

**Titanium crown and LS<sub>2</sub> veneer unit**

1



Moistening of the outer surface of the ZrO<sub>2</sub> crown

2



Lining of the inner surface of the veneers is performed separately for each LS<sub>2</sub> veneer unit

1



Moistening of the outer surface of titanium coping

2



Lining of the inner surface of the veneer is performed separately for each LS<sub>2</sub> veneer unit von innen benetzen

3



Merging of crown and veneer

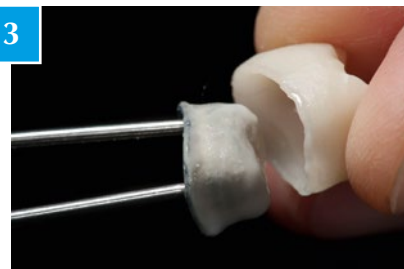
**Titanium bridge framework and LS<sub>2</sub> veneer unit**

4



Crown with veneer unit in place with a surplus of soldering material

3



Merging of coping and veneer

4



Coping with veneer unit in place and a surplus of soldering material

1



Moistening of the outer surface of the titanium bridge framework

2



Lining of the inner surface of veneers is performed separately for each veneer unit

## Titanium base and individual ZrO<sub>2</sub> abutment



Use **DCMhotbond fusio 12** powder to mix with a dosed quantity of **DCMhotbond fusio liquid** to a cream-like consistency.



Application of **DCMhotbond fusio 12** into the ZrO<sub>2</sub> coping is performed with a brush.



Then, after preparation with **DCMhotbond fusio connect**, titanium base is moistened with **DCMhotbond fusio 12**. Abutment screw channel is sealed.



Joined firing unit is fixed upside down on the firing tray using firing cotton.

### Note!

Abutments will be placed and fixed with firing cotton upside down on the firing tray, whereas crowns and bridges are fixed conventionally on the firing tray.

**Fixed objects are pre-dried in an open furnace arrangement for at least 20 minutes at 400°C. For large objects a longer drying period is recommended.**

Data for firing process of **DCMhotbond fusio 12** are as follows:

Starting temperature:	450°C
Drying process:	30 min.
Firing temperature:	770°C
Climb rate:	40°C/min
Hold time:	1 min
Vacuum on:	450°C
Vacuum until:	770°C

For large objects, firing data have to be adjusted individually. On completion of firing, excess of soldering material has to be removed with a diamond bur under constant rinsing with water.

# DCM hotbond zircon



## DCMhotbond zircon (main soldering agent)

WAK  $9,7 \times 10^{-6} \text{ K}^{-1} \pm 0,5$  (25-500°C)

DCMhotbond fusio zircon (main soldering agent) is a soldering material made of glass ceramic, created in order to establish a firmly connection of zirconia frameworks in dentistry/dental technology.

### Indications:

1. For soldering of full-ceramic zirconia ( $\text{ZrO}_2$ ) frameworks made of highly sintered, of fully vitrified  $\text{ZrO}_2$  respectively, of horizontal extension/enlargement of bridges into long-span bridges, with the exclusive use of native, custom-made jointing elements, comprising primary and secondary parts. These two parts are fabricated individually by the dental technician.
2. Soldering of full-ceramic zirconia ( $\text{ZrO}_2$ ) for vertical extension of bridges with a low height of zirconia blanks, as well as in cases with large interalveolar distance. Parts must be fabricated individually with a tongue and groove-connection between the base and the incisal part.
3. Soldering of moulded ceramic parts made of  $\text{ZrO}_2$  for customized solutions in order to increase the abutment's height, or for individual shape adjustments at the abutment's base in order to create an optimized emergence profile by soft tissue-conditioning.
4. Soldering of frameworks with shape-optimized contoured parts, which are not allowed to be subjected to bending, share, or torsion stress.

### Contraindications:

Material is not permitted for blunt (parallel surface areas) soldering of separated or broken bridges in interdental areas, of bridge segments, or for reparation of different structures made of  $\text{ZrO}_2$ .

### CAUTION!

Thermal processing of frameworks, or thermal treatment of  $\text{ZrO}_2$  according to the manufacturer's specifications have to be performed before soldering with DCMhotbond zircon.

### Field of application of DCMhotbond zircon:

→  $\text{ZrO}_2$



$\text{ZrO}_2$  ←

zircon

is a jointing material for zirconia.

### Material-related safety notes:

#### Contraindications:

Combinations with materials other than the intended purpose of the described DCMhotbond product system are contraindicated!

#### Process-specific safety notes:

In accordance with its purpose, material is intended for dental use only!

Processing may only be done by qualified personnel!

Dust and chipping may be produced during processing of ceramic products (grinding and polishing). Keep eyes protected and avoid breathing of abrasive dust. Use suction device, protection masks and safety glasses respectively. Take care with high temperature during firing process: risk of burning! Use personnel protective equipment (PPE)!

Avoid contact of the material with skin, mucosa, and eyes!

Do not return mixed powder, or indeed any powder that has been in contact with liquid or moisture, to the powder container! Risk of contamination!

Avoid contact between powder and moist brushes, or moist instruments inside the powder container! Risk of contamination!

Attention must be paid to purity of brush, spray attachment, or spatula. Any contamination being caused from the outside may negatively affect firing results. Risk of contamination!

Due to different construction methods of ceramic furnaces available on the market, may lead to different firing results. This prerequisite must be taken into consideration, and has to be ascertained on the customer's own responsibility. The firing temperatures given are **for guidance only!**

### Storage and security requirements:

Storing: Keep in dry storage at room temperature.

Operating instruction is related to all application areas of DCMhotbond zircon.

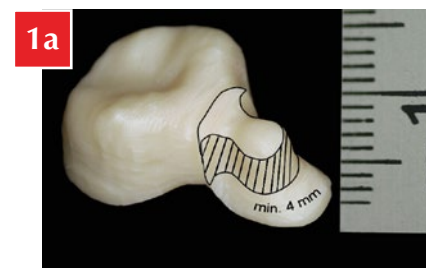
For further information see [www.dcm-hotbond.com](http://www.dcm-hotbond.com)

### Dental laboratory procedure:

#### Preparation:

The special design of the clinching element according to the system specifications, and an equal soldering gap of 0.3 mm up to a maximum of 0.5 mm between primary and secondary elements are prerequisite for a strong and solid bond between  $\text{ZrO}_2$  frameworks. Width of soldering gap may not exceed 0.5 mm.

In order to avoid aesthetical or static disadvantages, primary and secondary elements shall always be integrated in the bridge pontic. Primary jointing element shall be an integral part of the crown, whereas secondary jointing element is located within the bridge pontic. Primary element always is located in the basal part, so that jointing area is charged with a compressive load by the secondary element, which is integrated in the overlying bridgework (Figures 1a and 1b).



In order to get the optimum fit of the framework, modelling and subsequent ceramic manufacturing of primary jointing element should be performed prior to fabrication of the secondary jointing element along with the bridge pontic and the remaining crowns.

Subsequently, the fit of finished ZrO<sub>2</sub>-frameworks has to be checked. Then, soldering gap should be checked according to the aforementioned criteria (please look under the paragraph **Preparation** on page 24), and conditioning of the soldering surface should be started.

Conditioning is performed with coarse-grained diamond burs e. g. Shark Dental, Dortmund (Ref-No. 885-014-8MLX) under constant irrigation with water, and by grit blasting with corundum with a particle size of 110 µm under a pressure of 2 bar.

Surfaces should be cleaned with water vapour prior to soldering process.

For soldering of a zirconia structure, **DCMhotbond zircon**, **DCMhotbond zircon liquid**, commercially available firing cotton, as well as firing trays with carriers are needed.

A honeycomb-system is endorsed as firing media, in order to guarantee a consistent heat expansion within the system.

**Note:**

Make sure that liquid does not show any signs of flocculation. Already mixed, or dried up **DCMhotbond zircon** may not be liquefied for a second time.

**Preparation:**

Mixing of soldering material will be facilitated by dispensing of the **DCMhotbond zircon** powder with a commercially available dosage spoon.

One portion of powder is sufficient for each of the jointing procedures, each centimetre tongue-spoon-connection respectively (Figure 2).



Drip several drops of **DCMhotbond zircon liquid** next to the powder, until entire powder is diluted with liquid.



Mix liquid and powder well with an agate spatula, and prevent formation of bubbles during mixing process (Figure 3). Proper consistency is achieved, when material is in non-dripping, viscous-creamy condition.



Apply soldering material evenly with a brush on all soldering surfaces of primary and secondary parts (Figure 4).



Then, jointing parts are carefully put together (Figure 5). Please mind working with a surplus quantity of soldering material, due to powder consumption as a result of the sintering process. In this case, fast and precise working is required. Then, the exact position of the respective parts has to be checked on the plaster cast.

6



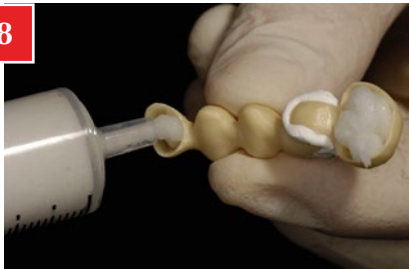
Some bubbles may appear in the soldering gaps due to the pressure applied on the frameworks. It is necessary to close these bubbles. By mutual warming with a hot-air blower, soldering material solidifies within 1-2 minutes (Figure 6). By application of the so-called "acid test", technician is able to check, whether soldering material has turned into a hard and solid condition or not. Consistency of dried soldering material resembles consistency of chalk.

7



In this state, bridgework can be removed from the laboratory cast, without risking dislocation of the joint bridge pieces (Figure 7). Joint framework is now solid enough to take some precautions prior to firing process (e. g. checking optimum fitness of bridgework on the laboratory cast, insertion on prepared teeth respectively). At this working step, adjustments are still possible. Excess soldering material at the crown margin has to be removed with a scalpel.

8



An individual firing tray can be manufactured with firing cotton, in order to prevent dislocation of the different parts of soldered bridgework during firing process. For that purpose, each crown is filled entirely with firing cotton (Figure 8).

9



Soldered construction is fixed on a honeycomb tray, which serves as firing media. An optimal support of the abutment teeth has to be ensured. Fixation of pins on firing tray with liquid firing cotton is recommended, in order to avoid any movement of the framework.

Before starting ceramic firing process, firing cotton should have a dry consistency (Figure 9). This can be reached by exposing firing cotton to the radiation heat of the furnace. Use of liquid firing cotton may be a reasonable support for large bridges.

Firing program for soldering process is listed below. It depends inter alia on the size of the object to be soldered.

Data for firing process of **DCMhotbond zircon** are as follows:

Starting temperature:	450°C
Drying process:	mind. 30 min.
Firing temperature:	1000°C
Climb rate:	30°C/min
Hold time:	3 min
Vacuum on:	450°C
Vacuum until:	1000°C

In dependence of the object's size (large dentures for restoration of the complete arch, or bulky frameworks) firing temperature may be increased by 10°C-20°C.

After soldering, object must cool down in the fire chamber with the door open without tempering, until fire chamber has reached starting temperature again. After completion of the cooling process, carrier pins are removed, and the inner surface of the crowns is grit blasted. After firing, excess soldering material has to be removed with diamond burs under constant rinsing with water. Fabrication of frameworks ends up with checking accuracy of fit.

Repeated soldering of potential imperfections shall be performed with **DCMhotbond zircon** using the same firing program.

Firing temperature of veneering ceramic shall not exceed 980°C. Liquid firing cotton shall be used for manufacturing of an individualized firing tray until the end of firing process. Further processing shall be performed according to the utilized veneering material, and manufacturer's specifications.

#### Note!

All soldered frameworks shall be supported by individualized firing trays made of firing cotton during subsequent firing processes (e. g. repeated soldering, opaque bake, dentin firing, etc.).



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