The System Press Ceramic

PLATINA® press is a leucite glass ceramic, indicated for the production of inlays, onlays, veneers, and crowns for staining and layering technique.

PLATINA® press combines all benefits of the low-fusing PLATINA® m ceramic:

- unrivalled aesthetic results
- excellent abrasion behaviour adapted to the natural tooth
- low plaque affinity
- easy to polish
- outstanding durability

Three production techniques (layering, reduced layering and staining technique) offer high flexibility in terms of pricing.

The thermal expansion coefficient (TEC) of the PLATINA® press ceramic has been ideally adapted to the low-fusing PLATINA® m ceramic, maximising the stability and the crack resistance of full-ceramic crowns.

Therefore only PLATINA® m facing ceramic should be used for the layering and staining technique.
Model fabrication

Models are fabricated using white or pastel hard stone, as this best reproduces the color of the natural tooth die and facilitates the reproduction of the respective tooth color.

Fabricate the basic model in the usual way using dies. Then apply a light spacer to the tooth stumps according to the manufacturer’s directions.

(It is important not to use colored varnishes in order to avoid any color irritation of the pressed ingot).

Perfect fit and optimum border seal will be achieved if the spacer used is applied up to a 1 mm distance to the preparation margin.
A thin layer of commercially available isolating material (isolates plaster from wax) is applied prior to wax-up contouring.

Then fabricate a wax-up in view of anatomical and functional aspects using wax that burns out without leaving residue. The wax must be absolutely clean and must not contain any impurities.

Inlay/Onlay
For anatomical contouring of the occlusal surface, special attention has to be paid to the contact points and the correct reproduction of the fissure area.

Veneer
Contour the veneer exactly and reproduce the final shape and surface structure accurately.

Anterior tooth
For aesthetical reasons, the layering technique should be applied.

As with metal ceramic, the reduced base framework should represent the crown form on a smaller scale. To create a waxed-up model of ideal thickness, the minimum thickness should not be less than 0.8 mm.

General recommendation:
For shoulder preparations you should work with a supporting wall thickness of 1 mm.

Posterior tooth
The wax thickness should not be less than 1.5 mm in the posterior tooth area, when designing cusps and occlusal surfaces.

Basic rule for the layering technique: To rule out adverse effects on the stability of the full-porcelain material, the volume of the pressed objects is set to at least 2/3 of the total size and may be expanded by no more than 1/3, using PLATINA®m layering ceramic.

In the posterior tooth area, the layering procedure should not be performed in one work step but rather it should be tried to obtain matching tooth morphology in smaller dimensions and several firing cycles.
We recommend using wax wires with a diameter of 2 – 3 mm as sprues. Attach the press channel at the thickest point of the wax-up; it must not taper in the bonding zone and should rather be designed rounded.

Two press channels may have to be used for larger objects. The length of the sprues should not exceed 5 – 8 mm.

- With very small inlays, the sprues should be attached to the basal area in order not to damage the occlusal surface structure.
- Depending on the size of the waxed-up inlays, the wax wire has to be attached to the approximal side.

If only one wax pattern is available, a blanc sprue has to be attached as a counter bearing in addition.

The end of the wax wires is rounded in the investment ring area to ensure easy penetration of the viscous ceramic. The investment material may break if any sharp edges are present.

Since 1 or 2 ceramic ingots can be placed into the investment ring, it is advisable to determine the wax weight of the entire wax-up to ensure that the required material quantity is available. Generally, the casting objects are weighed with the sprues.

The following rule applies:

- Up to a maximum wax weight of 0.6 g = 1 ingot per investment ring
- Up to a maximum wax weight of 1.4 g = 2 ingots per investment ring

Small investment ring (100 g Durocont investment material) = max. 3 units per investment ring
Large investment ring (200 g Durocont investment material) = max. 4 units per investment ring

In order to avoid adverse reactions with the Durocont investment material, relaxants are not to be used!
Place the waxed-up objects into the phosphate-bonded investment material Durocont.

Mixing ratio:
Mix 100 g powder / 25 ml liquid (overall), i.e.
10 ml Durocont liquid / 15 ml distilled water.
Put liquid mixture into a mixing bowl, add 100 g Durocont powder and pre-mix manually for approx. 20 seconds.
Then mix for 60 seconds under vacuum.

- More Durocont liquid yields a higher setting expansion
- Less Durocont liquid results in a lower setting expansion
- When using 100 g powder, at least 8.5 ml liquid have to be mixed with 16.5 ml distilled water.

Therefore:
To withstand the required pressure, at least 33 % of the entire liquid must consist of concentrated investment liquid.

The setting time for speed investment is 15 – 30 minutes. If you wait more than 30 minutes, the Durocont investment material has to be heated up normally. Two special silicone rings of different size, are available for the investments. Let the investment ring harden depending on the heat-up type (speed/normal) and make sure it is not subject to vibrations. Remove the investment ring former and make sure that the investment ring bottom is level (parallel to the pressing platform of the ceramic furnace).

**Speed**
After a setting time of 15 – 30 minutes, take the investment ring out of its form, remove excess investment material and then grind the basic area of the investment ring until it is plane. Place the investment ring upright, with the opening facing down, into the furnace which has been pre-heated to 850 °C. The holding time is 60 minutes.

**Normal**
After a setting time of more than 30 minutes, put the investment ring at room temperature into the furnace. Heat it up to 250 °C by increasing the temperature approx. 5 – 10 °C per minute, hold this temperature for 30 minutes, then heat it up to 850 °C by increasing the temperature 8 – 10 °C per minute and hold this temperature for 45 minutes.

**Important!**
The alumina plunger (can be used several times) must be pre-heated up together with the investment ring. The one-time plunger (can be used only once) has to be inserted into the hot investment ring together with the cold ingot.
Pressing process in the PLATINA® mat

- Turn furnace on and select a programme between programme memory no. 90 – 99. The PLATINA® press programme is located at programme memory no. 90.
- Push the Start button. The furnace now checks the function of the pressure jack. After approx. 10 – 20 seconds you will hear a beep.
- Push the Start button. The furnace closes and the temperature starts rising from a base temperature of 450 °C up to 700 °C the parameter drying temperature. As soon as this value is reached, you will hear another beep.
- Push the Start button.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling phase</td>
<td>0 min</td>
</tr>
<tr>
<td>Internal cooling/Pressing</td>
<td>7 min</td>
</tr>
<tr>
<td>Holding time</td>
<td>20 min</td>
</tr>
<tr>
<td>Final temperature</td>
<td>960 °C</td>
</tr>
<tr>
<td>Vacuum stop/Hold</td>
<td>1250 °C/0 min</td>
</tr>
<tr>
<td>Vacuum strength</td>
<td>90 %</td>
</tr>
<tr>
<td>Vacuum start</td>
<td>700 °C</td>
</tr>
<tr>
<td>Heat-up rate</td>
<td>60 °C/min</td>
</tr>
<tr>
<td>Drying time</td>
<td>700 °C</td>
</tr>
<tr>
<td>Closing time</td>
<td>0 min</td>
</tr>
<tr>
<td>Base temperature</td>
<td>450 °C</td>
</tr>
</tbody>
</table>
Step 1
- The furnace now opens and its base plate moves down. Now replace the hot investment ring from the pre-heating furnace into the centre (recess) of the press platform.
- Make sure that the investment ring is placed in a perfect upright position in the press platform!

Step 2
- Place a corresponding cold ingot into the investment ring.

Step 3
- Then insert the hot and clean alumina plunger into the investment ring. Ceramic residues on the alumina plunger may result in miscasts! If necessary, clean the alumina plunger with glass beads.
- A one-time plunger, if used, has to be placed cold into the hot investment ring.
- Push the Start button.
- The pressing process now proceeds automatically. The vacuum pumps starts up and the temperature rises with 60 °C/minutes to the final temperature of 960 °C. When reached, this temperature will be held for 20 minutes. Then the malleable ingot is pressed into the investment ring for 7 minutes at a maximum pressure of 3.5 bar (PLATINA® mat).
Step 4
- At the end of the programme the furnace opens for about 5 cm and remains in this safety mode. Again, this setting is indicated by a beep.
- Push the Start button.

Step 5
- Now the safety mode is cancelled and the support tray of the furnace opens all the way (final position). Take the investment ring out, place it on a fireproof tray and allow it to cool to room temperature.
Divesting
Using a second press plunger, mark the inner end of the press piston on the outer surface of the investment ring (all around). Using a large diamond disk, carefully cut open the investment material along the marking line and make sure not to touch the alumina plunger.

Clean the alumina plunger for further pressing procedures by blasting it with glass beads. Make sure no ceramic residues will be left on the plunger.

Thereafter use 50 – 100 µm glass beads at 3 – 4 bar to remove the pressed objects from the investment material. Reduce the pressure to approx. 2 bar as soon as the objects become visible.

Because of the abrasive effect, no Acryl beads or aluminium oxid shall be used!

The consequences would be poor fit and cracks as a result of too much heat.

Remove the investment material completely from the surface. Even smallest residues may cause minor bubbles during further firing cycles and may have a detrimental effect on subsequent work.

Finishing
Carefully detach the sprues using a thin, sintered diamond disk. Remove irregularities and early contacts using diamonds and occlusion spray (e.g. touch-on) and carefully fit the pressed parts onto the die.

Fire diamond and ceramic unheels are suitable for work at the object and subsequent surface structuring.

Due to the risk of fractures, please avoid overheating of selective points when working on the surface. Apply fairly little pressure when grinding.

After finishing the pressed restorations, blast them with glass beads and then clean them thoroughly.

Now you may continue working according to the technique employed (layering, reduced layering or staining technique).
Layering technique

The colour definition of the dentine structure is essentially depending on the oral stump situation.

Tooth stumps without any dominant colour deviations are pressed with ingots from the ST assortment (layering technique “Transparent”).

In case of substantial colour irritations, for example for darker areas in the root area or for residual fillings, use of the SO layering technique (layering technique “Opaque”) is recommended.

Shade guide for layering technique – VITA® colour system

**ST (layering technique transparent)**
- A1, A2, A3, A3.5
- B1, B2, B3
- C1, C2
- D2

For young to middle-aged patients.

**SO (layering technique opaque)**
- AW, A1, A2, A3, A3.5, A4
- BW, B1, B2, B3, B4
- C1, C2, C3, C4
- D2, D3, D4

For colour changes due to seniority and depositions at the tooth stump.

The ingots AW, BW with layering ceramic, PLATINA®m dentine A0, dentine B1 and in addition dentine modifier white are available for bleaching variations.

VITA® is a registered trademark of the Vita-Zahnfabrik, Bad Säckingen, Germany.
Build up the pressed object using the familiar layering scheme with PLATINA®m ceramic using dentine, enamel and transparent materials. Reproduce the natural individuality of each single tooth in detail using modification materials from the PLATINA®m assortment. The final tooth shape as well as the surface characteristics however will be designed professionally by the dental technician.

If the entire surface of the pressed object has been covered by layers of ceramic material and fired, only one subsequent glaze firing will be required to achieve the result in the usual manner.

Thin metal pins are used to keep the number of support and contact points as low as possible.

Do not use pins made of ceramic (risk of fracture)!

<table>
<thead>
<tr>
<th></th>
<th>Base temp.</th>
<th>Preheating</th>
<th>Heat rate</th>
<th>Vac. start</th>
<th>Final temp.</th>
<th>Holding time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[°C]</td>
<td>[min]</td>
<td>[°C/min]</td>
<td>[°C]</td>
<td>[°C]</td>
<td>[min]</td>
</tr>
<tr>
<td>Dentine/Incisal</td>
<td>400</td>
<td>4 – 6</td>
<td>45</td>
<td>450</td>
<td>770</td>
<td>1</td>
</tr>
<tr>
<td>Glaze firing</td>
<td>400</td>
<td>4</td>
<td>55</td>
<td>–</td>
<td>750 – 760</td>
<td>1</td>
</tr>
</tbody>
</table>
Staining technique MT

Colour classification M 1 – M 6 (VITA® colour system)

The staining technique is preferably used for inlays and onlays. After shaping of the final form and surface, the pressed object has to be cleaned thoroughly. The pressed object is stained, glazed and fired repeatedly until the desired tooth shade and gloss effect is obtained.

M 1  Transparent, lighter effect, for younger to middle-aged tooth substance

M 2  Transparent, glassy effect, rather used for older tooth substance

M 3  A1, A2, B1, B2, C1, D2  Indication: inlay, onlay, veneers

M 4  A3, A3.5, A4, D3  Indication: inlay, onlay, veneers

M 5  B3, B4, D4  Indication: inlay, onlay, veneers

M 6  C2, C3, C4  Indication: inlay, onlay, veneers

4 shades and 10 staining colours are available for individual characterisation.

Two glaze firing cycles are carried out to obtain a smooth surface.

1st firing: For individualisation, mix staining colours with glaze liquid.

2nd firing: Mix glaze material and glaze liquid until you get a creamy consistency.

In order to obtain a higher efficiency for these firing cycles, we recommend using the mixed material well sintered.

Place inlays, onlays, and veneers on firing cotton for glaze firing.

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Fitting/Seating

With respect to the later colour of the bonding composite, the use of stained glycerine paste (e.g. Variolink II Try-in/Vivadent or Calibra Try-in/DeTrey Dentsply) plays an important role in order to achieve the desired aesthetic results.

Prior to integration of the restorations, the degreased and acid-activated inside of the ceramic has to be silanized (e.g. Monobond S/Vivadent or Silicer/Heraeus Kulzer) to ensure adequate bonding.

Typically, a dual-hardened adhesive system is recommended for bonding of the respective bonding composite to enamel and dentine.

Only chemical or dual-hardened composite cement may be used as bonding composite. Inorganic cements are contra-indicated and increase the risk of fracture.

Generally, suitable dual-hardened composite cements (e.g. Variolink II/Vivadent or Calibra/DeTrey Dentsply) offer various colour graduations and consistencies.

Note: Always comply with the manufacturer’s direction for the bonding system or the bonding composite.

Preparation

For an full-ceramic restoration that is sufficiently able to withstand pressure, the dental preparation has to be oriented at the specific requirement of the materials.

We do not recommend using feather edge preparations or edged internal angles.

The PLATINA® press ceramic needs a circular substance removal of at least 1.0 mm, occlusal of at least 1.5 mm – 2.00 mm.
<table>
<thead>
<tr>
<th>Result</th>
<th>Possible cause</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impurities (black specks) in the pressed object</td>
<td>Preheating furnace dirty</td>
<td>Clean preheating furnace</td>
</tr>
<tr>
<td>Porosities in the pressed object</td>
<td>Temperature in furnace chamber too high</td>
<td>Reduce temperature</td>
</tr>
<tr>
<td></td>
<td>Wrong modelling wax used</td>
<td>Use special, organic wax</td>
</tr>
<tr>
<td></td>
<td>Investment material residues broken in hollow form</td>
<td>Distribute wax modelling evenly in the investment ring, avoid sharp edges during sprueing</td>
</tr>
<tr>
<td>Single wax-ups not pressed out</td>
<td>Inaccurate sprueing</td>
<td>Always attach a sprue as counter bearing if only one object has been placed in the investment ring</td>
</tr>
<tr>
<td>Miscasts</td>
<td>Investment ring not placed vertically in the furnace chamber</td>
<td>Press platform dirty, supporting area of investment ring bottom not level</td>
</tr>
<tr>
<td>Cracks in investment ring</td>
<td>Investment ring not placed upright</td>
<td>Take conical form of investment ring platform into account while surface grinding the bottom area</td>
</tr>
<tr>
<td></td>
<td>Check investment material</td>
<td>If the share of Durocont liquid is too low – instability of the investment ring, pay attention to the mixing ratio</td>
</tr>
<tr>
<td></td>
<td>Check investment material liquid</td>
<td>Please store liquid at room temperature</td>
</tr>
<tr>
<td></td>
<td>Relaxant reacts with investment material</td>
<td>Do not use any relaxant</td>
</tr>
<tr>
<td></td>
<td>Dirty alumina plunger may get canted during pressing</td>
<td>Always keep alumina plunger clean</td>
</tr>
</tbody>
</table>