We have made the No.1 even better!

PATTERN RESIN
from GC
Low Shrinkage Modelling Resin

TIPS & TRICKS
Technique and Handling of GC Pattern Resin
Introduction

Contemporary materials, equipment and techniques enable dental technicians to manufacture high precision, aesthetic restorations – and naturally they prefer procedures, which are clear, easy to learn and safe to apply. In this context, accessory materials, which may at first glance appear unimportant, have in fact become absolutely indispensable.

Dental prostheses are as individual as the patients. It takes real teamwork to achieve perfect technical results and genuine satisfaction for patients. An exact transfer of intraoral situations to the laboratory using precise and reproducible laboratory methods makes the team-oriented interaction of dentists and dental technicians easier. “Little helpers”, such as a universal high precision modelling resin are invaluable for these procedures.

GC Pattern Resin LS

Low Shrinkage Modelling Resin

A modelling resin with unique properties

In more than 15 years of service to the dental and dental technician professions Pattern Resin LS Low Shrinkage modelling resin has proven a safe, versatile and easy to handle material. Pattern Resin LS was specially developed for the brush technique. Its unique handling properties make it suitable for as different indications as attachment, crown and bridge, implant and electroforming techniques.

Pattern Resin LS is further well established and proven for a number of detail applications – such as resin dies, fixation prior to soldering or milling, or core build-ups. Our aim is to enable you to take full advantage of this unique material. The present manual lists some of the numerous chairside and laboratory indications and provides you with application examples from various fields of dental technology.

Take a look inside to learn some new Applications, Tips & Tricks with Pattern Resin LS.
Indications

| Attachment technique | Conical or telescopic crowns  
|----------------------|-----------------------------  
|                      | Bars                          
|                      | Custom attachments            
|                      | Resin dies                    
|                      | Fixation of crowns for transfer impressions |
| C&B technique        | Inlays, onlays                
|                      | Adhesion bridges (Maryland)   |
| Soldering            | Splinting for soldering procedures |
| Model cast partial dentures | Modelling of extensions, lingual bars and clasps |
| Implant technique    | Manufacture of custom implant abutments |
|                      | Implant bite registrations   |
|                      | Intra-oral splinting of transfer abutments |
|                      | Superstructures              |
| Electroforming (Galvano) | Resin dies for electroforming technique |

Features and Benefits

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low polymerization shrinkage</td>
<td>Perfect fit of the pattern and the cast object</td>
</tr>
<tr>
<td>Perfect handling properties for brush technique</td>
<td>Easily controlled and precise application</td>
</tr>
<tr>
<td></td>
<td>Even large extensions can be built up without problems</td>
</tr>
<tr>
<td></td>
<td>Quick setting, but convenient application with brush technique</td>
</tr>
<tr>
<td></td>
<td>Economical usage</td>
</tr>
<tr>
<td>Favourable flow behaviour and high wettability</td>
<td>Easy workability</td>
</tr>
<tr>
<td></td>
<td>Does not flow from applied areas</td>
</tr>
<tr>
<td></td>
<td>Homogeneous resin workpieces</td>
</tr>
<tr>
<td></td>
<td>Optimally adapted to brush technique</td>
</tr>
<tr>
<td></td>
<td>Efficient and economical</td>
</tr>
<tr>
<td>Burns out without residues</td>
<td>Homogeneous castings</td>
</tr>
<tr>
<td>High hardness and strength</td>
<td>High stability even in thin layers</td>
</tr>
<tr>
<td></td>
<td>Fine surface adjustments can be made with burs</td>
</tr>
<tr>
<td></td>
<td>Smooth surfaces after grinding or milling</td>
</tr>
<tr>
<td>Short setting time</td>
<td>Time-saving and economical, also for mixing technique</td>
</tr>
<tr>
<td>Perfect adhesion to already polymerized Pattern Resin LS</td>
<td>Homogeneous, smooth casting surfaces with precise margins</td>
</tr>
<tr>
<td>Unlimited dimensional stability of Pattern Resin LS dies</td>
<td>Dimensionally stable dies even after hours or days</td>
</tr>
<tr>
<td></td>
<td>No dimensional changes due to room temperature</td>
</tr>
</tbody>
</table>
**Physical properties**

- **Working time (23° C)**: 2-3 min
- **Setting time (23° C)**: 4 min
- **Flexural strength (37 °C, after 10 min)**: 63 MPa
- **Polymerization shrinkage after 30 min**: 0,36 %
- **Polymerization shrinkage after 24 h**: 0,37 %

**Chemical composition**

- **Powder**: Polymethylmethacrylate, Polyethylmethacrylate, Dibenzoyl peroxide
- **Liquid**: Methylmethacrylate, 2-Hydroxyethyl-Methacrylate

**Brush Technique – Packaging**

The 1-1 package of Pattern Resin LS contains everything you need for the brush technique: 2 mixing cups, 1 brush, 1 pipette for exact liquid dosage, and Pattern Resin LS powder and liquid to be mixed in suitable ratios.

**Pattern Resin LS**

Low Shrinkage Modelling Resin

1-1 Pack: 100 g Powder, 105 ml Liquid

**Accessories:**

- 2 Mixing Cups,
- 1 Brush No. 4,
- 1 Pipette
Brush Technique – Step by Step

1. Mix powder and liquid. Dispense adequate amounts of powder and liquid into the respective mixing cups. 

   Tip: The pipette helps to dispense the exact amount of liquid.

2. Slightly moisten the brush. 

   Tip: Squeeze out excess moisture by pressing the tip of the brush on the inner wall of the mixing cup. This also creates a finely pointed tip.

3. Pick up a small amount of Pattern Resin LS powder with the moist brush. 

   Due to the material’s thixotropic properties, a small resin bead will form on the tip of the brush.

4. The resin bead remains stable on top of the brush and is ready e.g. for modelling of secondary crown patterns.

5. Deposit the resin bead on the metal surface of a primary crown. Working time: 2-3 min Setting time: 4 min

   Tip: No separating agent is needed on smooth metal surfaces.

6. Tip: To clean in between times - dip the brush into Pattern Resin LS liquid and dry with a tissue.

7. Repeat the above procedure to cover the whole surface with a thin layer of Pattern Resin LS. 

   Tip: As fresh Pattern Resin LS adheres perfectly to already polymerized material separate small dots can easily be connected.

8. Even where high precision is required, e.g. at primary crown margins, Pattern Resin LS exhibits perfect flow and fit.

9. After polymerization of Pattern Resin LS carefully remove the pattern to check the internal surface.

   Tip: Small retentions help to remove the pattern from the primary crown.

10. The inside of the pattern shows the same glossy surface as the primary crown.

11. Place the pattern back on the primary crown and make fine adjustments with a suitable grinding instrument (e.g. cross-cut tungsten carbide).

12. Evenly reduce the thickness of the pattern to 0.3 - 0.4 mm and check with a calliper. Also check the margins.
Brush Technique – Step by Step

13. Place the pattern back on the primary crown.

14. Prepare the wax-up using an appropriate inlay wax. Check occlusion, contact area and contour as usual.

15. The wax-up is ready for connection of the sprues.

16. Connect the sprues according to the casting system and method used.

17. Position crown in the casting ring.

18. Mix and pour phosphate-bonded investment (Fujivest Super, Stellavest or Fujivest II) according to the instructions for use.

19. Heating-up is carried out according to the schedules given in the instructions for use. Cast in the usual manner.

20. Deflask in the usual way and clean the cast metal surface with glass beads.

21. Check the inner surface carefully and remove inaccuracies with an appropriate grinding instrument.

22. The inside of the secondary crown shows a homogenous, glossy finish.

23. The secondary crown fits perfectly on the primary crown.

Tip: Investing Pattern Resin LS workpieces always requires a greater proportion of investment liquid than wax patterns. For detailed information refer to the respective instructions for use.

Photographs: ZTM V. Brosch
Implant Restorations

Some examples for the use of Pattern Resin in implantology:

Case 1

1. Step-by-step build-up of an implant suprastructure with Pattern Resin LS.

2. Suprastructure with integrated horizontal screw threads. Further crown build-up will be carried out with modelling wax.

3. The implant analogues have been fixed with Pattern Resin LS and cast-on titanium tubes screwed into the analogues prior to manufacture of the superstructure.

4. Pattern Resin LS buildup as a preparatory step for the manufacture of the superstructure.

5. Reduced Pattern Resin LS frame as a stabilizing basis for the superstructure.

Case 2

Example of a technique for passive transfer of the intra-oral situation to the working die.

Further examples:

Intra-oral splinting of transfer abutments

Case 3

1. Maxillary transfer template after intra-oral connection of the transfer abutments with Pattern Resin LS. Implant analogues are already inserted for preparation of the working die.

2. The transfer template on the working die.

Transfer of the intra-oral positions of ceramic abutments.

Customized abutment made of Pattern Resin LS ready for CAD/CAM technique (left). Milled zirconium abutment (right).

Photographs: ZTM U. Buhr, ZTM B. Weissmann, ZTM O. van Iperen
Electroforming Restorations

In connection with electroforming technology Pattern Resin LS has been successfully applied in several indications:

1. Electroformed die made of Pattern Resin LS, with stainless steel screw as a removal aid
2. AGC® electroformed coping after gold deposition.
3. Removal aid made of Pattern Resin LS, for easy removal of the metal coping to avoid deformation.

Electroforming in connection with bridge techniques:

1. Tension-free pontic shaped with Pattern Resin LS, for galvano cast-on technique.
2. Occlusal view of a posterior bridge.

(For technical details please refer to “AGC® Galvano technique” instructions for use)

Core build-up

Core build-up of a molar crown, prior to preparation.

Telescopnic bridges

Pattern Resin LS secondary crowns for a telescopic bridge.

The cast metal structure.

Completed restoration.

Photographs: Wieland Dental + Technik, ZTM C. Gadau
Photographs: ZTM V. Brosch
Investing and casting

Mixing ratios:
When investing Pattern Resin LS workpieces, always use a higher proportion of investment liquid than with wax patterns. For details please refer to the instructions for use of the respective phosphatebonded investments.

Modelations:
All Pattern Resin LS workpieces should be covered with a thin layer of wax to avoid deterioration of the investment surface during heating-up.

Heating-up:
In connection with larger Pattern Resin LS workpieces, heat up progressively to avoid aggressive burningout. It is recommended that the temperature is kept at 250° C for 1 hour before raising to the final burn out.

Questions and answers

1. Should I insulate the surface of the primary component before building up Pattern Resin LS?
Insulation of the primary component is not required if Pattern Resin LS is used on a smooth, milled metal surface.

2. How can I tell that I am using the right mixing ratio of powder and liquid for the brush technique?
After dipping the wet brush into the powder, the little bead on the tip of the brush should be slightly wet and have a shiny surface.

3. Which burs are recommended for adjustments of the polymerized Pattern Resin LS surface?
For adjustments or milling use tungsten carbide burs or cross-cut instruments.

4. Can I mill the surface of Pattern Resin LS in the same manner as wax?
Dies and workpieces made of Pattern Resin LS can be shaped, contoured and milled by means of a milling machine.

5. Which steps should I observe when I use Pattern Resin LS on stone dies?
Check the stone die, stumps or cavities for undercuts, inaccuracies or rough surfaces. Block-out undercuts with an appropriate wax and seal the die surface with Die Hardener. Wet the cavity or stump surfaces with a separating agent.

6. In connection with the brush technique, can I apply Pattern Resin LS in small dots?
Pattern Resin LS can be built up in small sections or dots. Each section will polymerize separately and adhere to the other sections. After covering the complete base, Pattern Resin LS shows a homogenous surface. This technique minimizes total polymerization shrinkage.

7. How can I clean the brush?
For intermediate cleaning dip the brush into Pattern Resin LS liquid and dry with a tissue.

8. How can I remove a secondary pattern from the primary component in a safe and easy way?
Small opposing retention beads attached to the surface help to remove the pattern.

9. Should I treat Pattern Resin LS objects with a wetting agent before investing?
Generally, the quality of casting surfaces depends on the use of a wetting agent. However, if Pattern Resin LS is applied on smooth or polished metal surfaces without undercuts, there is no need to use a wetting agent. If there are wetting agent residues the internal surface of the cast restoration will not be smooth.
Related Products

**GC Fujirock EP**
Type 4 Dental Stone

The superior quality Type 4 Dental Die Stone is ideal for all kinds of prosthodontics, with high precision, outstanding edge hardness and high-pressure stability. Thus a precise model as a basis for precise prosthodontics is achieved.

**GC Fujirock OptiXscan**

With CAD/CAM & implant technologies gaining importance every day, GC has developed a special type 4 stone. Thanks to its specially adapted powder composition Fujirock EP OptiXscan is compatible with all existing scanning devices.

**GC Fujirock OptiFlow**

Thin flowing Type 4 Dental Stone for basing Fujirock EP arches. The 4 colours - Terracotta Red, Dynamic Purple, Peppermint Green and Sapphire Blue - meet the requirements for the individualised and aesthetic construction of master models. An optimal combination is achieved in conjunction with the four colours of Fujirock EP.

**GC Fujivest Super**
The carbon-free phosphate-bonded investment for precision castings of precious, semi-precious and Pd-base alloys, with special attention to complicated implant castings. Fujivest Super can be used in both quick heating and slow heating procedures.

**GC Fujivest Premium**

Exact solutions for flexible needs: Fujivest Premium, crown & bridges casting investment, suitable for all types of dental alloys with special attention for non-precious alloys: versatile and robust.

**GC Fujivest II**

A carbon-free phosphate-bonded investment for precision crown and bridge castings of all dental alloys, including Ni-Cr and Co-Cr.

**GC Fujivest Platinum**

Exact solutions for the highest demands: Fujivest Platinum, investment material for precious and semi-precious alloys: highly precise castings, offering consistent top quality.

**GC Fujivest II**

With CAD/CAM & implant technologies gaining importance every day, GC has developed a special type 4 stone. Thanks to its specially adapted powder composition Fujirock EP OptiXscan is compatible with all existing scanning devices.

**GC Fujivest Platinum**

Exact solutions for the highest demands: Fujivest Platinum, investment material for precious and semi-precious alloys: highly precise castings, offering consistent top quality.

**GC Fujivest Platinum**

Exact solutions for the highest demands: Fujivest Platinum, investment material for precious and semi-precious alloys: highly precise castings, offering consistent top quality.

**GC Casting Liner**

A special ceramic-fibre liner to allow a free expansion of all investments.

**GC Fitchecker II**

White A-silicone material, especially for checking pressure spots and the fit accuracy of crowns, bridges, precast posts, inlays & dentures.