Glass Ionomers

Reputable, Durable, Long Lasting
Ketac™-Molar
Glass Ionomer Restorative Material

The high viscosity Glass Ionomer for posterior teeth

Indications
• Permanent small Class I restorations
• Semi-permanent posterior teeth restorations
• Primary teeth fillings (as amalgam substitute)
• Core build-up under crowns
• Base material under composite restorations

Advantages
• Good compressive strength
• Low abrasion
• Excellent surface hardness
• Plastic contouring properties
• Amalgam like packability
• Fluoride release

Fluoride release and regeneration profile.
Source: Internal data 3M ESPE AG

88% of restorations are still intact after 4 years.
* Restorations of less than 50% of occlusion surface.
Source: Internal data 3M ESPE AG
Ketac™-Molar Quick
Glass Ionomer Restorative Material

The Glass Ionomer for quick restoration of posterior teeth

**Indications**
- Permanent small Class I restorations
- Semi-permanent posterior teeth restorations
- Primary teeth fillings (as amalgam substitute)
- Extended fissures
- Impatient patients

**Advantages**
- Short mixing time
- Short setting time
- Adequate working time
- Long capsule nozzle for easy direct application, even in small cavities
- Fluoride release

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Ketac™-Fil Plus
Glass Ionomer Restorative Material

The proven Glass Ionomer for anterior tooth restorations

**Indications**
- Class III and V restorations
- Small Class I restorations
- Primary teeth fillings
- Fissure sealing
- Restorations of wedge-shaped defects

**Advantages**
- 8 shades for a more natural colour-match
- Tooth-like thermal expansion coefficient
- Radio opaque
- High fluoride release

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**Preparation Times**

<table>
<thead>
<tr>
<th></th>
<th>Ketac-Molar Quick Material</th>
<th>Ketac-Molar Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capmix mixing time</td>
<td>0.10 min.</td>
<td>0.15 min.</td>
</tr>
<tr>
<td>Setting time from</td>
<td>3.30 min.</td>
<td>4.30 min.</td>
</tr>
<tr>
<td>start of mixing</td>
<td>1.40 min.</td>
<td>2.15 min.</td>
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<tr>
<td>Preparation time</td>
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</tbody>
</table>

*Comparison of the preparation times of Ketac-Molar Quick Material and Ketac-Molar Material. Source: Internal data 3M ESPE AG*

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**Thermal Expansion Coefficient**

<table>
<thead>
<tr>
<th>Material</th>
<th>ppm/°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentine</td>
<td>10</td>
</tr>
<tr>
<td>Enamel</td>
<td>15</td>
</tr>
<tr>
<td>Ketac-Fil Plus</td>
<td>13</td>
</tr>
<tr>
<td>Material</td>
<td>35-75</td>
</tr>
<tr>
<td>Composites</td>
<td>25-35</td>
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<tr>
<td>Amalgam</td>
<td></td>
</tr>
</tbody>
</table>

*The thermal expansion coefficient of Ketac-Fil Plus Material corresponds to that of the natural tooth substance. Source: Internal data 3M ESPE AG*
Resin-modified Glass Ionomer Restoratives

Photac™-Fil Quick
Glass Ionomer Restorative Material

The light-cured Glass Ionomer in the capsule

Indications
• Primary teeth fillings
• Class III and V restorations
• Semi-permanent Class I and II restorations
• Fissure sealing
• Restorations of wedge-shaped defects
• Cavity liners

Advantages
• Quick command set due to light-cure capability
• No cavity conditioning required
• No protective varnish required
• 8 shades for a more natural colour-match
• High fluoride release

Vitremer™
Glass Ionomer Core Build-up/Restorative Material

The Glass Ionomer with the patented three-way curing process

Indications
• Primary teeth fillings
• Restorations in Classes III and V
• Semi-permanent Class I and II restorations
• Root caries
• Filling of undercuts in crown preparations
• Lining and core build-up

Advantages
• Patented technology for three-way curing: light curing, chemical hardening, additive autopolymerisation
• Good aesthetic quality with 6 standard and 2 special colours
• Low abrasion
• High fluoride release

Color penetration test of different glass ionomers in Class V restorations.

Abstraction rates of various glass ionomers measured by the „pin on disc“ method.
**RelyX™ Luting**

Glass Ionomer Luting Cement

The resin-strengthened Glass Ionomer luting cement

**Indications**
- Fixing of crowns and bridges to tooth structure or cores from amalgam, glass ionomer or composite
- Fixing of metal inlays or onlays
- Fixing of prepared or moulded root pins
- Fixing of orthodontic bands

**Advantages**
- Minimal solubility, thus excellent marginal fit
- High fracture resistance
- Easy preparation thanks to „mousse-like“ consistency
- Very easy removal of excess
- Reduced sensitivity

**Solubility**

![Fluid uptake](source: Internal data 3M ESPE AG)

**Ketac™ Cem µ**

Glass Ionomer Luting Cement

The easy-mix Glass Ionomer luting cement

**Indications**
- Fixing of inlays, onlays, crowns and bridges made of metal, metal ceramic or resin blends
- Fixing of pins and screws
- Fixing of orthodontic bands
- Linings

**Advantages**
- Granular formulation makes it very light and quick to mix
- Excellent fit thanks to thin film layer
- Good grip to tooth
- Good pulp tolerance

**Fluid uptake with Ketac Cem radiopaque**

**Fluid uptake with the new Ketac Cem µ**

**Fluid uptake with Ketac Cem** tested in accordance with ISO 9917; 1991 (E); Acid erosion test.

Source: Internal data 3M ESPE AG

**Fluid uptake with the new Ketac Cem µ** tested in accordance with ISO 9917; 1991 (E); Acid erosion test.

Source: Internal data 3M ESPE AG
**RotoMix™**

**Rotation Mixing Unit**

The rotation mixing unit with centrifugal capability

**Advantages**

- Homogenous mixing according to the rotation mixing principle
- Centrifuged mixing gives material that is practically void-free and easy to apply
- Shorter mixing time by an average of 30% (compared to 3M™ “ESPE™ CapMix™”)
- Easy insertion of capsule into self-locking capsule holder
- Free choice of mixing time as well as preset times
- Low-noise mixing
- Centrifugal movement can be switched off if required
- Suitable to mixing amalgam when used without centrifuge option

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**Elipar™ FreeLight**

**LED Curing Light**

The new freedom in light curing

**Advantages**

- Innovative LED technology
- Cable-free working
- Efficient polymerisation
- Minimal heat release
- Noise-free operation
- Ergonomic design

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**Formation of bubbles with conventional mixing unit - mixing time 10 secs.**

**RotoMix - Mixing time 8 secs. + 3 secs. Centrifuge**


**Spectral distribution of Elipar FreeLight and a halogen light unit (Elipar TriLight) in relation to the photo initiator camphor-quinone. Wavelengths above 490 nm can hardly be used for polymerisation.**

Source: Internal data 3M ESPE AG
## Times and Dosage Notes at a Glance

<table>
<thead>
<tr>
<th>Product</th>
<th>Special Material Properties</th>
<th>Dosage</th>
<th>Activation time</th>
<th>Capmix or handmix mixing time</th>
<th>RotoMix mixing time</th>
<th>Preparation time (incl mixing)</th>
<th>Settingtime from start of mixing</th>
<th>Light curing e.g. FreeLight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketac™-Molar Aplicap™</td>
<td>- Good compressive strength  - Low abrasion</td>
<td>0:02 0:15 0:10 2:00 4:30</td>
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<tr>
<td>Ketac™-Molar Hand-mix version</td>
<td>- Short mixing time  - Short setting time</td>
<td>0:02 0:10 0:09 1:40 3:30</td>
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<tr>
<td>Ketac™-Molar Quick Aplicap™</td>
<td>- High fluoride release  - Tooth-like expansion coefficient</td>
<td>0:02 0:10 0:08 1:30 7:00</td>
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<tr>
<td>Ketac™-Fil Plus Aplicap™</td>
<td>- Light-cured  - No conditioning required</td>
<td>0:02 0:15 0:10 2:00 0:20</td>
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<tr>
<td>Ketac™-Fil Plus Hand-mix version</td>
<td>- Patented triple curing  - Good aesthetics</td>
<td>0:02 0:10 0:09 1:40 3:30 0:40</td>
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<tr>
<td>Photac™-Fil Quick Aplicap™</td>
<td>- Thin film thickness  - Good grain size distribution</td>
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<td>Photac™-Fil Quick Hand-mix version</td>
<td>- Minimal solubility  - High fluoride release</td>
<td>0:02 0:10 0:09 2:30 12:30</td>
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<tr>
<td>Vitremer™ Hand-mix version</td>
<td>- Increases the bond strength of glass ionomer fillings</td>
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<tr>
<td>Ketac™-Conditioner</td>
<td>- Light-curing varnish for glass ionomer fillings</td>
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<td>0:10</td>
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