**Indications**

For single and multiple unit temporaries
- Crowns
- Bridges
- Inlays and onlays
- Veneers
- Also indicated for long term temporization

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**Introduction**

Temporary restorations are an indispensable part of the complete crown and bridge restorative procedure, and the roles which a temporary restoration must fulfill have become more demanding over time. In the past, the functional aspects of temporary restoration predominated. However, with recent advancements in restorative dentistry, there is an ever increasing demand placed on esthetics as well as structural strength.

3M ESPE, with more than 40 years of experience in temporization, meets this demand with the introduction of Protemp™ Plus Temporization Material. This unique bis-acrylic material sets new industry standards with the following key features:

- The first bis-acrylic composite with a new generation of sophisticated fillers – a result of advances by 3M ESPE in nanotechnology.
- Even stronger and longer lasting than the well proven Protemp™ 3 Garant™ Temporization Material.
- Highly esthetic through natural gloss and fluorescence.
- Easy handling with no polishing necessary.\(^1\)

Protemp Plus temporization material joins a family of high quality, reliable temporization materials designed to meet the evolving needs of the dental professional.
With a String of Unparalleled Features, Protemp™ Plus Temporization Material is Unique in the Market

Protemp™ Plus Temporization Material is the latest development of bis-acrylic composite crown and bridge material in the 10:1 Garant™ Cartridge from 3M ESPE.

Protemp Plus temporization material was developed to fulfill the most demanding customers' requirements such as:

• High fracture resistance and strength
• High esthetics
• Easy handling and fast procedure

In vitro tests show that Protemp Plus temporization material ranks high or even highest in these important mechanical characteristics:

• Fracture toughness
• Flexural and compressive strength

Results from mastication testing which comes closest to the in vivo situation corroborate these findings.

The high mechanical performance profile of Protemp Plus temporization material translates not only into enhanced clinical safety, but also into enhanced convenience for patients and dentists.

Additionally, Protemp Plus temporization material with its top-of-the-class fracture resistance and remarkable esthetics is well equipped to be the first choice for the most demanding discipline in temporization, i.e. as a long-term temporary.

Record Breaking Toughness — In Every Respect!

Protemp Plus temporization material is the best-in-class material in a test that indicates its durability under in vivo stress.

Material Toughness

Material toughness can be measured as “fracture work” which shows the energy that a material can absorb until fracture. The higher this value the more likely the material will resist to fracture under stress.

Fracture Toughness (determined as K1c value)

Fracture toughness is a quantitative way of expressing “A material’s resistance to crack propagation when a crack is present”. The higher the value the higher the resistance of the material to fracture.

Mechanical Strength Under Stress

The various toughness measurements indicate a higher chance of survival in real life for Protemp Plus temporization material. To simulate this as close as possible to the in vivo situation, the temporization materials were subjected to mastication simulations. Again, Protemp Plus temporization material showed best mechanical strength and maintained this mechanical strength even after prolonged stress.

Consequently, Protemp Plus temporization material showed the highest survival rate in a mastication simulation of 3 unit-bridges:

1 In case excess material has to be removed or adaptations have to be made the resulting surface needs to be finished and polished as usual.

Fig. 2: Fracture toughness. (Dr. Rosentritt, University of Regensburg, Germany – K1c value [MPa*m1/2] Test)

Fig. 3: Change of mechanical strength after thermocycling (5-55ºC, 3,000 thermocycles) and mechanical loading (480,000 loading cycles; 100N). 3M ESPE internal TCML study results corresponding to 2 years mastication simulation with 3 unit-bridges.

* Mechanical strength of control group without TCML

Consequently, Protemp Plus temporization material showed the highest survival rate in a mastication simulation of 3 unit-bridges:

Fig. 4: Survival of 3-unit bridge in the mastication tests: 10 samples of each product tested with 450,000 loading cycles (100N) and 3,000 thermocycles (5-55°C). (3M ESPE internal data)
Outstanding Compressive Strength

Mechanical study results comparing Protemp™ Plus Temporization Material to competitive materials further confirms the excellent mechanical properties of Protemp Plus temporization material.

![Compressive Strength Graph]

Dentist’s Gave Best Rating to the Overall Strength of Protemp Plus Temporization Material

According to the 2008 3M ESPE Protemp Plus temporization material field evaluation, dentists and their patients agree that Protemp Plus temporaries are highly esthetic and natural looking.

![Esthetics Graph]

Outstanding Esthetics

Brilliant, Natural Gloss Without Polishing

Fluorescence Close to Nature

Protemp Plus temporization material fluorescence pigments match very well with the fluorescence of natural teeth, creating temporaries that look naturally beautiful in various lighting conditions.

Five Shades that Match with Filtek™ Supreme Plus Flowable Restorative

Five fluorescent shades are available and designed to match with Filtek Supreme Plus flowable restorative:

![Shades Image]
No Polishing, No Glaze Required
Benchmark In Surface Quality Makes Polishing Unnecessary

Due to its new sophisticated generation of fillers, 3M ESPE sets new industry standards. Right from the beginning, the unique surface quality of Protemp Plus temporization material is obvious (see AFM topography pictures below) compared to common materials. Just wiping off with ethanol will get the surface glossy and shiny immediately, making the whole procedure faster as the polishing and glaze working step is no longer required.

The excellent surface quality of Protemp Plus temporaries will immediately be felt and seen by the patient. This was confirmed during the field evaluation test.

Fig. 10: Fastness of obtaining a glossy and shiny surface, final surface quality testimonials. (Top 2 box results on a 5 scale from “excellent” to “very poor” from the 3M ESPE Protemp™ Plus Temporization Material field evaluation 2008)

Better Color Stability Thanks to Improved Surface Quality

![Fig. 9: Surface topology of Protemp™ Plus and other temporization materials after removing the inhibition layer with alcohol and no further polishing. (3M ESPE internal data – Atomic Force Microscopy (AFM) images by 3M Corporate Research Analytical Laboratory – CRAL)](image)

![Fig. 11: Coffee test: 3 days immersed in coffee at 36°C. (3M ESPE internal data)](image)

![Fig. 12: Ratings for shade stability of Protemp™ Plus Temporization Material and competitive temporary materials currently used by evaluators. (Top 2 box results on a 5 scale from “excellent” to “very poor” from the 3M ESPE Protemp™ Plus Temporization Material field evaluation 2008)](image)
**Easy Handling — Minimal Preparation for Maximum Results!**

**Tangibly Less Inhibition Layer That Is Easier to Remove: Feel the Difference!**

No more messy or sticky procedures. Feel the difference with Protemp™ Plus Temporization Material which has tangibly less inhibition layer compared to common bis-acrylic materials. This earned high credits from the dentists in the 2008 3M ESPE field evaluation.

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**Gingival Health**

**Easy to Clean and High Wearing Comfort**

Due to the smooth surface of Protemp Plus temporization material, plaque can be easily cleaned. Patients have a high wearing comfort with Protemp Plus temporaries according to 3M ESPE field evaluation results. In a 3M ESPE in vitro experiment with full human saliva based plaque 48 hours on Protemp Plus temporization material basement cleaned 5 seconds with Aronal® tooth paste on electrical tooth brush Oral-B® Professional Care® 5000, Protemp Plus temporization material excellent surface quality properties showed clearly that plaque can be easily removed and cleaned.

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**Customer Satisfaction**

As with all new 3M ESPE products, Protemp Plus temporization material was tested in dental offices before market introduction. The Protemp Plus temporization material field test was carried out in 2008 and involved more than 200 dental offices in Germany, Italy, Switzerland, and the UK. During the 8 week test period approximately 4400 temporary restorations were fabricated and placed. The main indications were single unit crowns and bridges, but temporary inlays, onlays, and veneers were also fabricated with Protemp Plus temporization material.

Many of Protemp Plus temporization materials' attributes were highly rated by evaluators leading to an overall satisfaction level of more than 90%. In addition, 95% of all evaluators would recommend Protemp Plus temporization material to their colleagues.

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*Fig. 13: Ratings for Thinness of Inhibition Layer of Protemp™ Plus Temporization Material and competitive temporary materials currently used by evaluators. (Top 2 box results on a 5 scale from “excellent” to “very poor” from the 3M ESPE Protemp™ Plus Temporization Material field evaluation 2008)*

*Fig. 14: SEM photos of Protemp™ Plus Temporization Material surface with plaque before cleaning and after cleaning: 500 fold magnification. (3M ESPE Internal data)*

*Fig. 15: Overall satisfaction. (Top 2 box results on a 5 scale from “excellent” to “very poor” from the 3M ESPE Protemp™ Plus Temporization Material field evaluation 2008)*
The First-class Solution for Temporaries!

What Dentists are Saying About New Protemp™ Plus Temporization Material From 3M ESPE

“Is easier to trim and finish, less smear layer than with Protemp™ 3; is better removable from the tooth than Protemp 3, surfaces can be worked out and polished well.”
— Dr. Kustermann

“We are testing right now your Protemp™ Plus and are totally enthusiastic. Use Snap so far. That is for sure no comparison at all.”
— Dr. Menrath

“The four single temporary crowns which I inserted until now, were so easily done. Even individualization with thin margin survived excellently to the wearing time of 7–14 days. Also at removal, this thin margin did not crack as it usually happens with other materials.”
— Dr. Riedl

“The material can be repaired very easily, especially because one can simply use readily available flowable (Filtek™ Supreme Plus Flowable Restorative). No stock keeping of a special repair material is necessary anymore. The margins are hardly visible.”
— Dr. Vetter

Key Benefits for You at a Glance:

Record Breaking Toughness
- High fracture resistance
- Better abrasion stability through new sophisticated filler technology
- Also indicated for long term temporization

Outstanding Esthetics
- Brilliant, natural gloss without polishing
- 5 fluorescent shades (Bleach, A1, A2, A3, B3) matched with Filtek™ Supreme Plus Flowable Restorative
- Excellent color stability, virtually no color change

Easy and Fast Handling
- Tangibly less inhibitor layer than other bis-acrylic materials
- No polishing required — just cleaning with ethanol will get the surface immediately shiny!
- No glaze necessary

Gingival Health
- Plaque can be easily cleaned
- Pleasant wearing comfort for patients

Protemp™ Crown Temporization Material

The first preformed malleable and light curable crown.

Protemp™ Plus Temporization Material

The first-class solution for temporaries! What dentists are saying about new Protemp™ Plus temporization material from 3M ESPE.

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