

# 3M™ ESPE™ Soft Monophase

# 3M™ ESPE™ Monophase

Polyether Impression Material



## Technical Data Sheet

**3M** ESPE

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Passionate about  
Precision

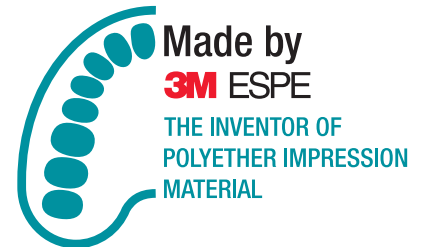


# 1 3M™ ESPE™ (Soft) Monophase Material – from the inventor of polyether impression materials

3M™ ESPE™ Soft Monophase and Monophase Polyether Impression Materials are the materials of choice for all kinds of precision impressions – and are especially well suited for implant and edentulous impressions.

The bright new colour guarantees enhanced readability and patients will enjoy a fresh minty flavour and appreciate how easily the impression can be removed from the mouth.

Both materials are available for convenient automatic mixing in the Pentamix™ System from 3M ESPE, delivering high-quality mixing results and ultimate efficiency at the touch of button.



## Features & Benefits:

- Great readability thanks to bright new colour
- Enhanced patient comfort thanks to fresh minty flavour and easy removal from the mouth of “Soft” version
- Outstanding impression precision due to outstanding initial hydrophilicity
- Excellent flow properties delivering great details
- Unique “snap-set” behaviour to prevent setting while you are working
- Secured implant coping position due to rigidity of polyether materials
- Available for automatic mixing with the Pentamix™ 2 and Pentamix™ 3 Mixing Unit

## Indications:

- Implant impressions
- Functional impressions
- Crown and bridge impressions
- Inlay and onlay impressions
- Fixation impressions



## Benefits of automatic mixing with the Pentamix™ System

- **Fast, time-saving** procedure and **push-button activation**
- **Homogeneous, void-free mixtures** of reproducible quality
- **Economical, accurate dispensing** of material
- **Hygienic** direct filling of trays and syringes
- **More efficient workflow** and higher productivity

Automatic mixing of impression materials using the Pentamix system results in a mixing quality that is free from streaks and voids. Figure 1 shows the difference between a common hand-mix material kneaded by hand (left) and automatically mixed 3M™ ESPE™ Soft Monophase Polyether Material (right).

A recent study at the University of Washington (Seattle, USA)\* investigated operators' preference for different mixing techniques and durations of mixing and tray loading. All users, from dental students to experienced dentists, preferred automated mixing with a Pentamix system to hand-mixing or automatic mixing using a hand dispenser, regardless of the viscosity of the impression material employed. Use of a Pentamix device also made it easier to achieve equal mixing ratios between base and catalyst, leading to a better-quality mix (Fig. 1).



Fig. 1: Mixing quality of automatically mixed 3M™ ESPE™ Soft Monophase Material (right) compared to a common hand-mix material. Source: 3M ESPE internal data

## Development of 3M ESPE automatically mixed precision impression materials

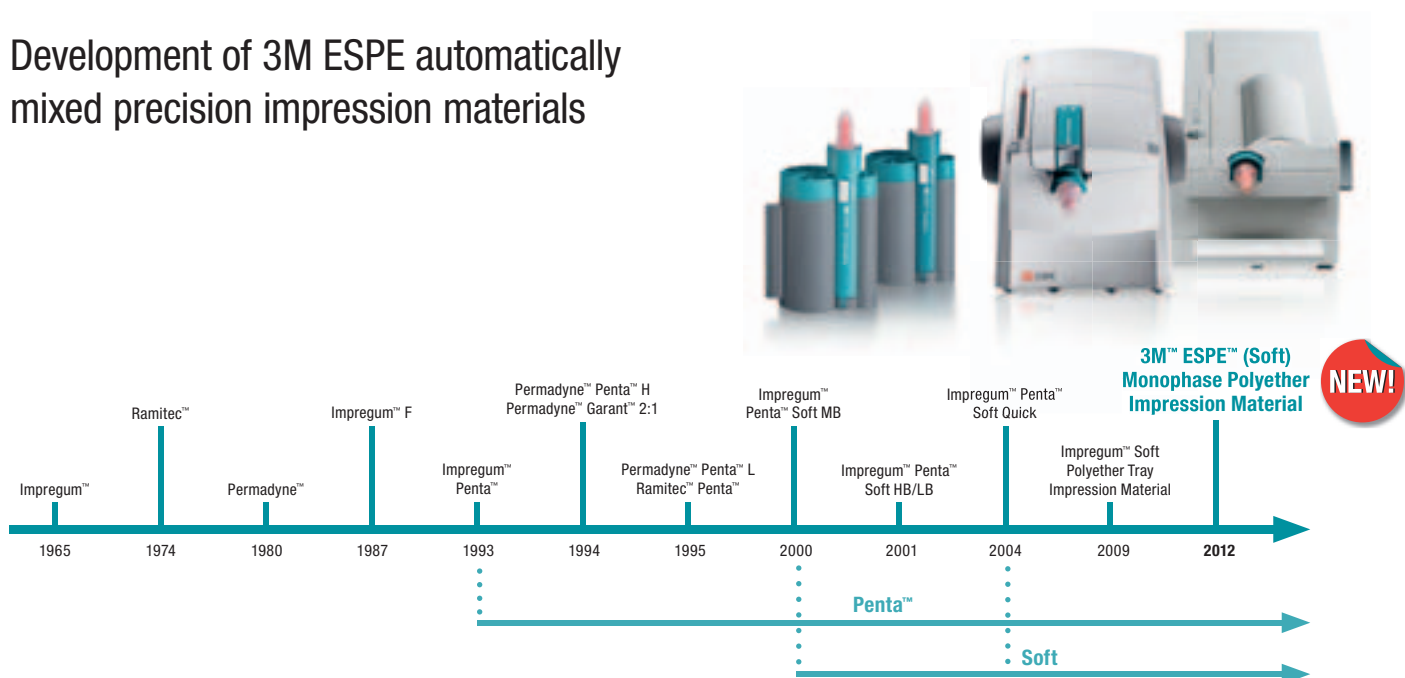


Fig. 2: Development of 3M™ ESPE™ automatically mixed precision impression materials. Source: 3M ESPE internal data

\* J. NAM, A. J. RAIGRODSKI, J. TOWNSEND, X. LEPE, and L. A. MANCI; Assessment of preference of mixing techniques and duration of mixing and tray loading for two viscosities of vinyl polysiloxane material; J Prost Dent 2007;12-17

Since the introduction of the first polyether impression materials more than 45 years ago, 3M ESPE innovations have continuously advanced impression technology.

## 2 Polyether characteristics

With its unique and proven material characteristics, 3M™ ESPE™ (Soft) Monophase Polyether Impression Material reliably delivers exceptionally detailed impressions – even under difficult clinical conditions – and a very precisely fitting final restoration work.

### 2.1 Hydrophilicity of unset and set materials

The superb detail reproduction of polyether impression material is primarily a result of its initial hydrophilicity, which in turn is due to polyether's chemical makeup. Hydrophilicity allows the material to precisely reproduce surfaces that are moist with saliva or even blood.

The contact angle of a water droplet placed on the surface of an impression material indicates its hydrophilicity: the lower the contact angle, the higher the hydrophilicity.

High hydrophilicity of an impression material right from the start of the working time is of the utmost clinical relevance. Figure 3 shows a comparison of the initial hydrophilicity before setting of 3M ESPE Monophase and Soft Monophase polyether impression materials and four well-known competing VPS monophase materials. 3M ESPE materials exhibit the lowest contact angles and therefore the highest hydrophilicity.

3M ESPE polyether materials are hydrophilic by nature and therefore show excellent flow properties throughout the entire working time, whereas VPS materials have to be hydrophilized by surface-active additives that must first “migrate” to the surface before the impression material fully develops its hydrophilic properties.

**3M™ ESPE™ (Soft) Monophase Impression Material shows a significantly lower contact angle and therefore higher hydrophilicity.**

#### Hydrophilicity of 3M™ ESPE™ (Soft) Monophase Polyether Impression Material in unset state

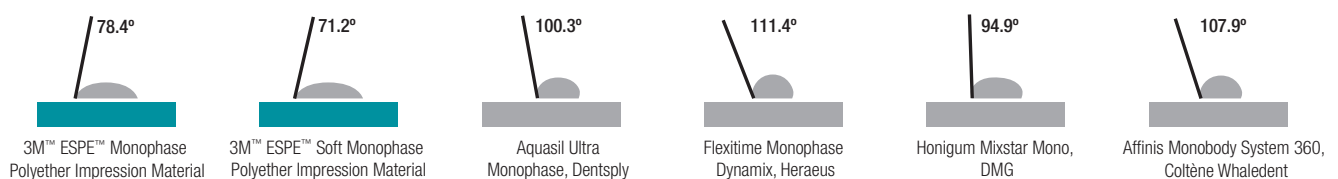


Fig. 3: Initial contact angles of water drops on different impression materials. The water drops were set on the pastes 45 seconds after the start of mixing. The contact angle was measured directly at a drop age of 0 seconds. Source: 3M ESPE internal data

#### Hydrophilicity of 3M™ ESPE™ (Soft) Monophase Polyether Impression Material in set state

To ensure excellent results for disinfection and pouring, high hydrophilicity is needed to ensure a wettable surface. Due to its hydrophilic behaviour, the impression can be poured without using an additional wetting agent.

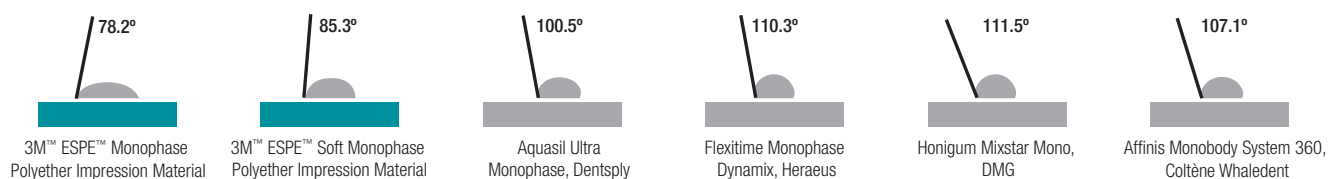


Fig. 4: Initial contact angles of water drops on different impression materials. The water drops were placed on set material. The contact angle was measured directly at a drop age of 0 seconds. Source: 3M ESPE internal data

## 2.2 Snap-set behaviour

3M™ ESPE™ Monophase and Soft Monophase Polyether Impression Materials both offer a very long working time. In contrast to A-type silicones (VPS), 3M ESPE (Soft) Monophase material does not change its consistency during the working time.

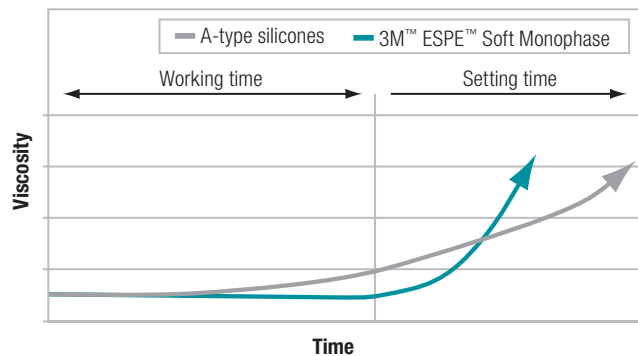


Fig. 5: Schematic overview of setting in A-silicones and polyethers.

To show the materials' behaviour during working time, the consistencies of different impression materials were measured according to ISO 4823:2000 after 25 seconds and at the end of each material's working time (Method is described in Hader S., Kuppermann B., Ranftl D., Klettke T.: Flow of Fast-Setting Light Bodied Impression Materials During Working Time, CED 2005, #607). Figure 6 shows that the flowability of 3M ESPE (Soft) Monophase material does not change until the end of the working time. This guarantees reliable handling during the impression procedure even for complex cases.

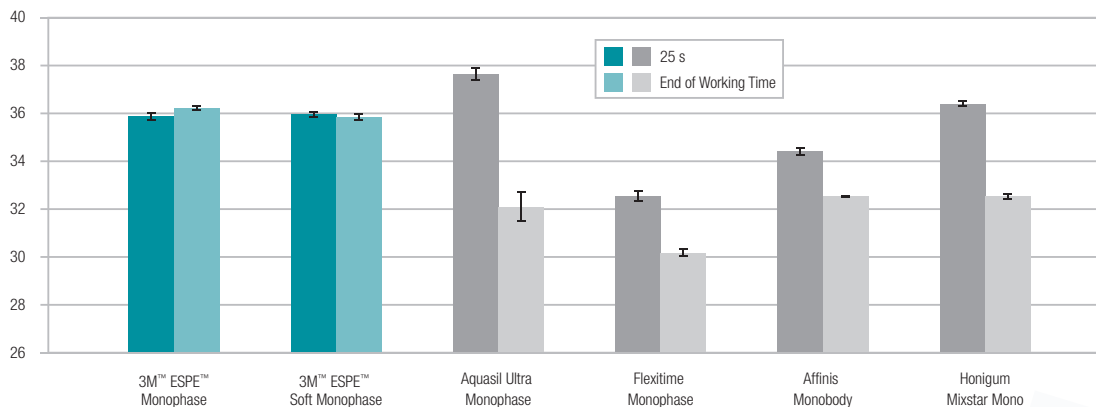
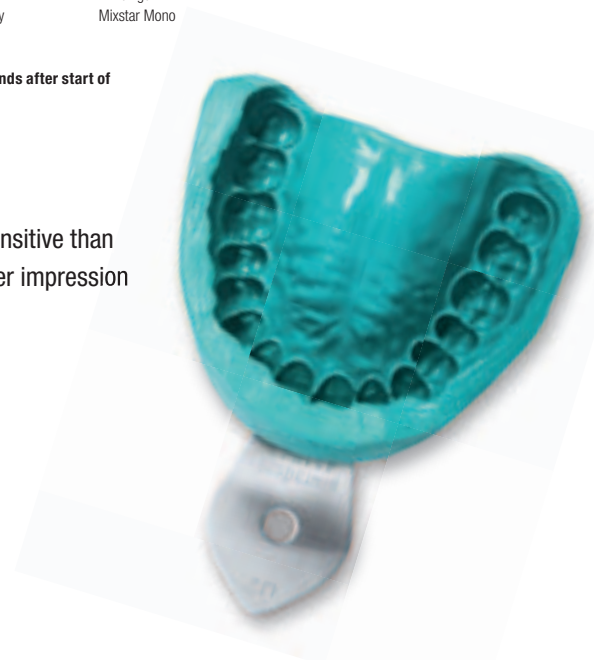


Fig. 6: Diameter of discs for different materials according to ISO 4823:2000 consistency test. The discs were produced 25 seconds after start of mixing and at the end of the respective working time. Source: 3M ESPE internal data

Moreover, studies\* show that polyether impression materials are less temperature sensitive than A-silicones. These results support the clinically proven reliability of 3M ESPE polyether impression materials.

\* Source: Berg et al.: Temperature effects on the rheological properties of current polyether and polysiloxane impression materials during setting, J Prosth Dent. 90:2 (2003):150-161; Klettke et al.: Temperature effect on the setting of dental impression materials, IADR 2007 #914



## 2.3 Flow properties

As well as being hydrophilic, 3M ESPE polyether's structural background also makes it thixotropic. The result is a unique polyether, well suited for the monophasic technique. 3M™ ESPE™ (Soft) Monophase Material offers a balanced flow – stable in the tray but flowable for syringing the preparation.

A study analysing the insertion forces of different tray impression materials confirms the suitability of 3M ESPE polyether as a tray material. (Klettke et al.: Insertion force of tray impression materials, IADR 2008 #3194). Moreover, both 3M ESPE Monophase and Soft Monophase fulfil even the ISO criterion for detail reproduction applied for wash materials. Thanks to their thixotropy, all 3M ESPE polyether impression materials are ideal for the monophasic technique.

## 2.4 Detail reproduction

3M ESPE (Soft) Monophase impression material shows outstanding detail reproduction and is able to capture the finest details of surfaces – even in moist environments.

Especially for the monophasic technique, it is important to have a suitable colour for good margin readability and detail examination. The fresh green colour of both materials allows for easy checking of all details captured by the impression.



## 2.5 Material properties

Properties	3M™ ESPE™ Monophase Polyether Impression Material	3M™ ESPE™ Soft Monophase Polyether Impression Material
Consistency of mixture [mm]	35	36
Hardness [Shore A/24h]	56	47
Tear strength [MPa]	2.42	1.94
Elongation at rupture [%]	396	351
Toughness [J]	1.26	0.86
Linear dimensional change [%]	-0.43	-0.29
Recovery from deformation [%]	97.5	98.3
Strain in compression [%]	3.2	5.4

## 3 Clinical

Polyether impression materials from 3M ESPE – tried and tested for many years and practically synonymous with top-notch impression precision – offer all clinically relevant properties for optimum implant-supported prosthetic restorations.

### 3.1 Polyether impression materials from 3M ESPE – the leaders in implant impressions.

Among dental professionals, 3M ESPE polyether impression material represents the ultimate in impression precision and is also a preferred choice for challenging implant impressions.

The results of a survey\* carried out in Europe (Germany, Italy) and the U.S. show that 3M ESPE polyether material is the impression material most often used for implant-supported prosthetic restorations.

Of the dentists who participated in the survey, 75% of those in Germany, close to 50% in Italy, and 36% in the U.S. preferred 3M ESPE polyether materials to restore implants – making these materials leaders in the field of implant impressions.

\* GfK Globus 2005



The implant treatment plan can only be as accurate as the impression. The performance and detail reproduction of 3M ESPE Monophase and Soft Monophase Polyether Impression Material help you:

- **Achieve a detailed impression on the first take.** Whether using an open or closed tray technique, or making implant or abutment-level impressions, a detailed impression reduces the chance of costly retakes.
- **Capture impressions of transfer copings with confidence.** Ensure the precise orientation and position of the implant in the mouth. Using various impression materials, Perry et al. showed significantly higher torque strength for 3M ESPE polyethers. Higher torque strength means less implant rotation, which is beneficial for maintaining secure implant positions (Perry et al.: Effects of various impression materials on implant coping torque strength, IADR 2007 #1477).

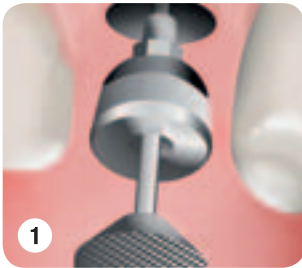
### 3.2 Excellent impression results using any implant system you choose.

Several implant companies offer excellent implant options to choose from. No matter which system is preferred, using 3M ESPE (Soft) Monophase impression material can help dentists to achieve the desired outcome, using the technique the clinician decides is best for the indication. There are numerous techniques for making implant impressions. The three most common ones are **the open tray (direct) pick-up technique, closed tray (indirect) transfer impression technique and closed tray (direct) snap-on technique.**

## Open tray (direct)

In this technique, the direct transfer coping gets “picked up” and remains in the set impression upon removal from the mouth. Once the impression has set, the screw holding the coping on the implant is accessed through the hole above/below the implant in the open tray and unscrewed to allow removal of the impression from the mouth. Once outside of the mouth, the implant analogue is connected to the transfer coping prior to pouring the stone model.

### Removal of healing abutment



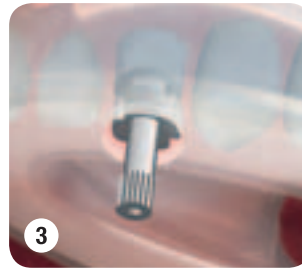
- Remove healing abutment
- Confirm prosthetic platform is free of bone debris or soft tissue
- Seat the coping and secure it—using the method recommended by the implant manufacturer

### Placement of transfer coping



- Verify correct seating of the coping with a radiograph

### Tray selection—open tray try-in



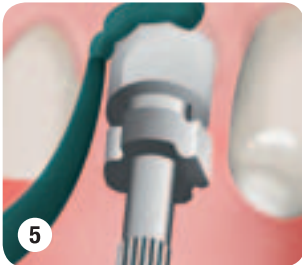
- Try-in the tray and create access window
- Ensure there is appropriate clearance for entire arch with no contact between tray and tissue
- Evaluate tray-coping fit, ensuring there is enough clearance for coping to fit easily through window in tray

### Load tray



- Load the tray material after using proper bleeding technique
- Keep the mixing tip submerged in the tray material to prevent voids
- Do not under-fill the tray

### Syringe around coping



- While loading the tray, syringe the wash material around the coping, and ensure continuous flow around the entire coping
- Keep the mixing tip submerged in the wash material at all times to avoid trapping air bubbles

### Tray seating and immobilisation



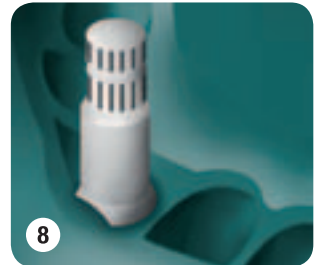
- Insert the loaded tray straight and evenly into mouth—avoid rotation
- Don't let patient bite down on tray
- Immobilize the tray using passive pressure
- Follow the recommended setting time in the mouth—using a timer

### Tray and coping removal



- Once impression material has set, remove screw holding coping in place, following implant manufacturer's instructions
- Remove tray from mouth carefully, with coping embedded in the set impression
- Replace healing abutment immediately to prevent soft tissue collapse

### Evaluate final impression with coping inserted (indexed)



- Rinse impression before inspection
- Evaluate the impression for correct transfer and common impression errors (see side bar on this page)
- Attach the implant analogue to coping embedded in the impression
- Dry and disinfect impression before shipping

### Bite registration



- Apply a layer of 3M ESPE Imprint™ Bite Material with a thickness of approximately 5 mm occlusal-incisally to the entire lower arch
- Have patient bite into proper occlusion
- Disinfect prior to shipping
- Make an impression of the opposing arch and submit it with case



### Tips

#### Common causes for retakes:

#### Distorted impression:

To prevent distortion, stabilize the tray while material is setting

#### Voids and bubbles:

Use enough material and keep tip submerged in extruded material

#### Pick-up technique:

Tray-abutment contact: Widen implant windows in tray

### RECOMMENDED MATERIAL

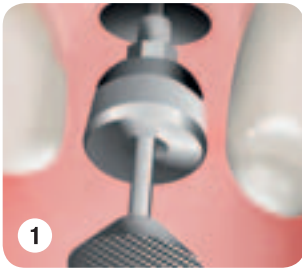
**3M™ ESPE™ (Soft) Monophase**

# transfer impression technique

## Closed tray (indirect)

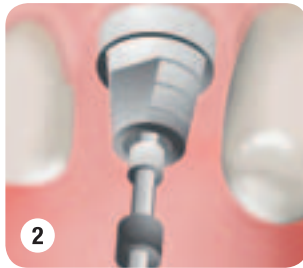
In this technique, the indirect transfer coping remains on the implant during removal of the set impression from the mouth. Once the impression has been removed, the coping is removed from the implant and connected with the implant analogue. The coping/analogue assembly is then indexed (transferred) back into its corresponding position in the impression.

### Removal of healing abutment



- Remove healing abutment
- Confirm prosthetic platform is free of bone debris or soft tissue
- Seat the coping and secure it—using the method recommended by the implant manufacturer

### Placement of transfer coping



- Verify correct seating of the coping with a radiograph
- Block out hex-hole with material or components recommended by the manufacturer

### Tray selection—open tray try-in



- Try-in the tray
- Ensure there is appropriate clearance for entire arch
- Evaluate tray-coping fit, ensuring there is no impingement/interference

### Load tray



- Load the tray material after using proper bleeding technique
- Keep the mixing tip submerged in the tray material to prevent voids
- Do not under-fill the tray

### Syringe around coping



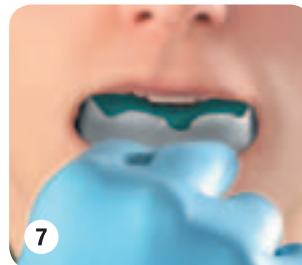
- While loading the tray, syringe the wash material around the coping, and ensure continuous flow around the entire coping
- Keep the mixing tip submerged in the wash material at all times to avoid trapping air bubbles

### Tray seating and immobilisation



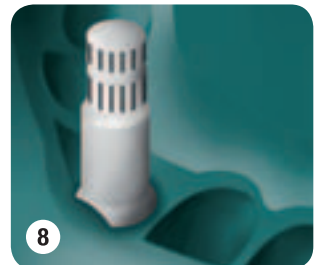
- Insert the loaded tray straight and evenly into mouth—avoid rotation
- Don't let patient bite down on tray
- Immobilize the tray using passive pressure
- Follow the recommended setting time in the mouth—using a timer

### Tray and coping removal



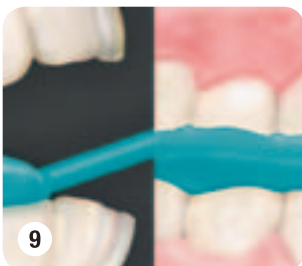
- Remove tray from mouth carefully after end of setting time
- Remove coping post or assembly from implant after tray has been removed, following implant manufacturer's instructions
- Replace healing abutment immediately to prevent soft tissue collapse
- Assemble coping with implant analogue

### Evaluate final impression with coping inserted (indexed)



- Rinse impression before inspection
- Evaluate the impression for correct transfer and common impression errors (see side bar on this page)
- Insert coping assembly into impression
- Ensure the coping is properly aligned (indexed) within the impression
- Dry and disinfect impression before shipping

### Bite registration



- Apply a layer of 3M ESPE Imprint™ Bite Material with a thickness of approximately 5 mm occlusal-incisally to the entire lower arch
- Have patient bite into proper occlusion
- Disinfect prior to shipping
- Make an impression of the opposing arch and submit it with case



## Tips

### Common causes for retakes:

#### Distorted impression:

To prevent distortion, stabilize the tray while material is setting

#### Voids and bubbles:

Use enough material and keep tip submerged in extruded material

#### Insufficient capture of detail around coping:

Syringe material without creating air bubbles around copings by keeping mixing tip submerged

## RECOMMENDED MATERIAL

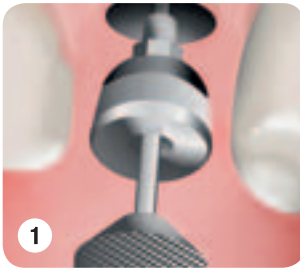
**3M™ ESPE™ (Soft) Monophase**

# snap-on technique

## Closed tray (direct)

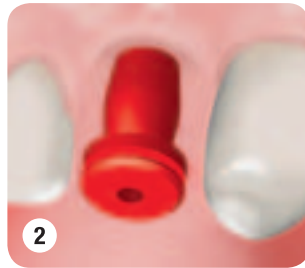
The snap-on procedure is best described as a hybrid between the two techniques shown previously. In this closed tray procedure, the direct transfer coping “snaps-on” to the top of the implant abutment in the mouth. Once the impression has set, the coping becomes embedded in the impression and is pulled off of the implant abutment when the set impression is removed from the mouth. Once outside of the mouth, the implant analogue is connected to the transfer coping prior to pouring the stone model.

### Removal of healing abutment



- Remove healing abutment
- Confirm prosthetic platform is free of bone debris or soft tissue

### Placement of transfer coping



- Seat the abutment and secure it—using the method recommended by the implant manufacturer
- Attach the snap-on transfer coping assembly (see completed assembly in step 5)

### Tray selection—open tray try-in



- Try-in the tray
- Ensure there is appropriate clearance for entire arch
- Evaluate tray-coping fit, ensuring there is no impingement/interference

### Load tray



- Load the tray material after using proper bleeding technique
- Keep the mixing tip submerged in the tray material to prevent voids
- Do not under-fill the tray

### Syringe around coping



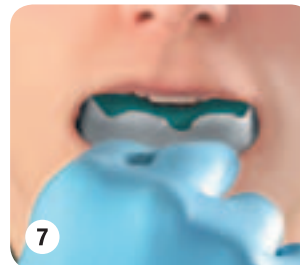
- While loading the tray, syringe the wash material around the coping, and ensure continuous flow around the entire coping
- Keep the mixing tip submerged in the wash material at all times to avoid trapping air bubbles

### Tray seating and immobilisation



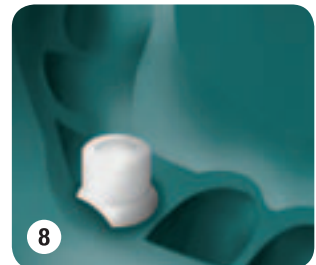
- Insert the loaded tray straight and evenly into mouth—avoid rotation
- Don't let patient bite down on tray
- Immobilize the tray using passive pressure
- Follow the recommended setting time in the mouth—using a timer

### Tray and coping removal



- Once impression material has set, remove tray from mouth carefully, with snap-on coping embedded in the set impression
- Depending on the implant system used, either
  - A) Replace healing abutment immediately to prevent soft tissue collapse, OR
  - B) Create the appropriate temporary restoration to protect the abutment
- Assemble coping with implant analogue

### Evaluate final impression with coping inserted (indexed)



- Rinse impression before inspection
- Evaluate the impression for correct transfer and common impression errors (see side bar on this page)
- Dry and disinfect impression before shipping

### Bite registration



- Apply a layer of 3M ESPE Imprint™ Bite Material with a thickness of approximately 5 mm occlusal-incisally to the entire lower arch
- Have patient bite into proper occlusion
- Disinfect prior to shipping
- Make an impression of the opposing arch and submit it with case



## Tips

### Common causes for retakes:

#### Distorted impression:

To prevent distortion, stabilize the tray while material is setting

#### Voids and bubbles:

Use enough material and keep tip submerged in extruded material

#### Snap-on technique:

Coping-tray contact: Try-in the tray prior to making impressions and ensure proper size

## RECOMMENDED MATERIAL

**3M™ ESPE™ (Soft) Monophase**

# Our Expertise™ guidebooks – your resource for optimum results

## Expertise™ Impression Compendium

A formula for success: All about impressioning – with expert theoretical and practical knowledge that provides valuable guidelines on achieving a perfect professional outcome.



## Expertise™ Impression Trouble Shooting Guide

Based on our experience, know-how and clinical input, this guide helps to identify common problems when making an impression and provides you with solutions.



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