

ExpressTM PentaTM H

ExpressTM PentaTM H Quick

ExpressTM, regular set, light body (green)

ExpressTM, fast set, light body (blue)

ExpressTM, regular set, regular body (purple)

Technical Product Profile

Introduction	2
Motivation.....	3
History of the Precision Impression	4
Indications.....	5
Material Background.....	6
General Overview.....	6
Reaction Mechanism	6
Material Properties	7
Material Aspects At A Glance	9
Components	10
Technical Overview / Technique Guides.....	12
Express™ Penta™ H / Express™ regular set, light body (green) Step-by-Step	12
Express™ Penta™ H Quick / Express™ fast set, light body (blue) Step-by-Step.....	13
PentaMatic™	14
Instructions for Use.....	15
Express™ Penta™ H / Express™ regular set, light body (green)	15
Express™ Penta™ H Quick / Express™ fast set, light body (blue).....	15
Summary	20
Technical Data	21
Bibliography	23

Introduction

Express™ impression materials are addition-cured vinyl polysiloxane impression materials (A-silicones) with especially distinct properties for **taking precision impressions**. Express™ Penta™ impression materials have the same precision and reliability as the classical Express™ STD Putty variations, but have been optimised for automatic mixing in the Pentamix™. Both Express™ Penta™ variations can be optimally combined with the low-viscosity Express™ impression materials from the dispenser system for the particular impression technique.

Express™ Penta™ H or Express™ STD Putty – regular-setting - and Express™ regular set, light body (green) are the regular setting variations of the Express™ product range and were designed especially for the specific demands of the **one-step putty wash technique** (two phases executed in a single operation) and extensive prosthetic work.

Express™ Penta™ H Quick or Express™ STD Putty – fast-setting - and Express™ fast set, light body (blue) are the fast setting variations for the **two-step putty wash technique** (two phases executed in a double operation) and smaller prosthetic work with the one step putty wash technique.

All Express™ products can be combined with each other according to clinical requirements, indications or special techniques.

Express™ impression materials comply with the ISO 4823 standards for impression materials and are classified as Type 1, High Viscosity (Express™ Penta™ H, Express™ Penta™ H Quick) or Type 3, Low Viscosity (Express™ regular set, light body (green), Express™ fast set, light body (blue), Express™ regular set, regular body (purple)).

The Express™ Putty variations Type 0 are still available (Express™ STD Putty – regular-setting, Express™ STD Putty – fast-setting).

*H designates high viscosity or consistency

** L designates low viscosity or consistency

Motivation

Express™ impression materials are distinguished by their high reproduction of detail, dimensional stability and by their reliability. After Express™ products were introduced, they have been constantly developed over the years. The low-viscosity Express materials were the first impression materials from the hand dispenser system that could be mixed automatically. Currently, the latest step in this constant development is the adaptation of highly viscous materials for automatic mixing in the Pentamix™.

The Pentamix™ system has become successfully established in a large number of dental practices. Since treatment can be carried out using various materials and techniques, according to differences in the indications for impressions, it is in the interests of 3M ESPas a system provider to accommodate all requirements and wishes.

With Express™ Penta™ H and Express™ Penta™ H Quick, highly viscous materials for filling the tray are available, which can be dispensed exactly and mixed homogenously and void-free. This means none of the inherent weaknesses that occur with kneading by hand, such as insufficient mixing or distortions after previous cross-linking.

The very good hydrophilic and thixotropic or intrinsically viscous properties, combined with the material properties of Express™ impression materials that are specifically adapted for the one-step and two-step putty wash techniques, guarantee high fitting precision even in difficult clinical situations.

The following chapters will show that with Express™, vinyl polysiloxane impression materials were created that comply with all requirements for modern impression materials and guarantee successful patient treatment at the same time.

History of the Precision Impression

Following the first impression methods with wax, plaster and zinc oxide eugenol pastes, real precision impressions began to be taken with hydrocolloids around 75 years ago in 1925. Even today, hydrocolloids have their steady if small share in the precision impressions that are carried out. On the other hand, the polysulphides introduced a little later are quite insignificant in the field of precision impressions today.

In the 1950s, a class of material was introduced to the dental world that was not originally intended to be used in the mouth: C-silicones (condensation cross-linking). The major drawbacks of these products were and are inherent shrinkage (condensation cross-linking means that a by-product decomposes) and hydrophobia.

A decade later (see Figure 1), the polyether was introduced by 3M ESPE. This is an addition-cured hydrophilic impression material that has far superior mechanical qualities (e.g. tearing strength) to hydrocolloids and C-silicones and displays almost no shrinkage (addition curing does not release any by-products).

History of the Precision Impression

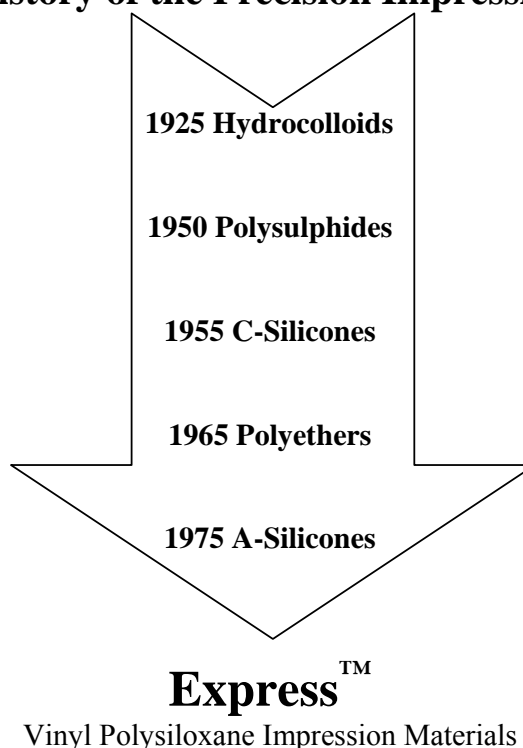


Fig. 1: Chronology of Impression Materials

Another ten years later, silicones in their developed form were used as impression materials. However, the addition-cured A-silicones were still hydrophobic. It has only been achieved in the past few years to reduce their hydrophobia conditioned by molecular chemicals. The material's hydrophobia is increased by the addition of soap-like molecules (surfactants).

In the new vinyl polysiloxane impression materials from 3M ESPE, specially developed and patented surfactants ensure hitherto unknown hydrophilic properties that contribute to clinical success both during impression taking (flow properties) and curing (casting characteristics).

With Express™ Penta™ H and Express™ Penta™ H Quick, new impression materials on a vinyl polysiloxane base are being introduced, which, interacting with the proven low-viscosity Express™, combine all the positive properties of A-silicones with easier handling for the patient and in the laboratory.

Indications

Express™ Penta™ H, Express™ regular set, light body (green) and Express™ regular set, regular body (purple) are regular setting variations of the Express™ product range for taking crown and bridge impressions and taking impressions of inlay and onlay preparations with the one-step putty wash technique.

Express™ Penta™ H Quick and Express™ fast set, light body (blue) are fast-setting variations suitable for taking crown and bridge impressions and taking impressions of inlay and onlay preparations with the two step putty wash technique.

Material Background

General Overview

No by-products are created as a result of addition curing ($A + B \rightarrow C$). This is the reason for the dimensional stability of impressions taken using A-silicones (A means addition-cured) and polyethers.

By contrast, condensation cross-linking in C-silicones produces alcohol as a by-product ($A + B \rightarrow C + D$). This leads to a corresponding shrinkage in volume.

Automatic mixing in the Pentamix or dispenser system guarantees an exact, reproducible and void-free mixture. Furthermore, secondary reactions such as the production of hydrogen as a result of excess hydrogen siloxane in the presence of the platinum catalyst (cf. Figs. 4-6) can only occur on a small scale. Nevertheless, a waiting time of 30 minutes after removal from the mouth should be observed until the plaster is cast.

Reaction Mechanism

The addition reaction of hydrogen siloxane (-O-Si-H) on vinyl siloxane ($\text{CH}_2=\text{CH-Si-O-}$) to create vinyl polysiloxane takes place on the platinum catalyst.

The latter is a platinum compound and serves as a molecular “docking station” for both partners in the reaction, which subsequently leave the platinum compound again coupled to one another, Figs. 2 and 3.

Figs. 2 and 3: Setting reaction of hydrogen siloxane and vinyl siloxane to vinyl polysiloxane

Fig. 4: If excess hydrogen siloxane finds no vinyl siloxane as a reaction partner, the hydrogen may decompose if the hydrogen siloxanes react in the presence of the platinum catalyst. The result can be voids in the impression caused by hydrogen gas production.

Fig. 5: If the hydrogen siloxanes are not fully cross-linked after setting has finished, hydrogen can also be produced under the influence of e.g. water from the plaster suspension during casting of the impression. However, this only applies in the event of an insufficient waiting time before casting. In this case, voids on the plaster model are the result.

Fig. 6: The resulting reaction product silanol in Fig. 5 reacts further with water decomposition.

Material Properties

To turn the fluid siloxane starting compounds of Express™ impression materials into a paste and **stabilise** the mixture, highly dispersed silicone dioxide acting as an inorganic filler has been added to the catalyst and base paste. The particle size of the fillers has been optimised to ensure that they thicken the pastes, but without agglomerating. The surface of the filler particles is pretreated to incorporate them into the silicone pastes. Among other things, this results in the good **thixotropic** or **structurally viscous** properties of the materials. That means that the materials flow very well under pressure, i.e. when syringing around the teeth or when the tray is seated. If no more pressure is exerted, the impression materials are thixotropic and do not further flow from the abutment or tray. Besides the quality of the impression, thixotropy is jointly responsible for easier handling of the various viscosities or consistencies.

Express™ Penta™ H Quick contains more filler than Express™ Penta™ H, which results in a higher Shore hardness and improved cutting properties. Express™ Penta™ H Quick is therefore especially suitable as a preliminary impression material for the two-step putty wash technique.

With their excellent thixotropic and hydrophilic properties the low-viscosity Express™ wash materials are particularly suitable for the one-step and two-step putty wash techniques. They also guarantee optimal flow properties even in the always-moist area in the mouth and under difficult clinical conditions such as severe undercuts or subgingivale preparation limits.

Reproducibility of the excellent material properties of Express™ Penta™ tray materials is guaranteed by perfect mixing in the **Pentamix**. The pastes have different colors to enable the operator to see how **homogeneous** the mixture is.

Express™ impression materials are distinguished by their extraordinary **dimensional stability**. The impression can be stored for several weeks for the production of models without any loss of quality. However, the model should be cast no sooner than 30 minutes after the impression has been taken, so that the process of elastic recovery after deformation (incurred during removal from the mouth) is completed.

The dimensional stability of Express™ impression materials is unaffected by longer disinfection times. Immersing the material in disinfectant for 10 minutes (e. g. in Impresept™) is perfectly sufficient. Spray disinfection is not recommended, as it is not particularly effective.

The **elastic recovery** by far exceeds the ISO limit (96.5%) for all Express™ products, which emphasizes the exceptional dimensional stability of the materials.

In addition, the **reproduction of detail** also far exceeds the required ISO standards.

Due to the proven chemical base (siloxanes), the material is **tasteless** which is pleasant for the patient.

As Express™ products are hydrophilic, dental plasters flow onto them well and produce precise and void-free **models**.

Ecological aspects were taken into account while developing the Pentamix system. There is no waste mixture on spatulas or mixing blocks; accurate dispensing leaves less than 5g of material in the Penta mixing tip, or 1.5g in the dispenser. The foil bags are completely emptied and create much less waste than tubes.

Material Aspects At A Glance

Express™ impression materials are suitable for the following requirements:

- Hydrophilicity
- Exact setting reaction
- Exact reproduction of detail
- Thixotropy – structural viscosity
- Exact flow properties
- High stability
- Very good elasticity
- Dimensional stability
- No taste
- Wide range of indications
- Can be copper or silver-plated
- Exact dispensing, homogenous and void-free mixing in the Pentamix™ or dispenser system.

Components

The chemical base and qualitative composition of Express™ impression materials are comparable. However, the special properties of the different consistencies or viscosities and setting times are adjusted by quantitative changes to the individual components. The appropriate choice of e.g. silicone oils combined with highly dispersed silicone dioxide not only influence the impression materials' viscosity, but also their thixotropic properties, flowability, Shore hardness and cutting properties.

Express™ Penta™ H Quick contains more filler than Express™ Penta™ H. Among other things, this results in higher Shore hardness (cf. Technical Data). On the other hand, this is necessary to achieve the appropriate resistance pressure for the two-step putty wash technique and to prevent inaccuracies in the impression caused by elastic effects. This change also has positive effects on the cutting properties of the impression and on the reduction of the setting time.

The following tables provide an overview of the qualitative compositions of Express™ impression materials:

Express™ Penta™ H - Express™ Penta™ H Quick :

Base	Catalyst
Hydrogen siloxane	Vinyl siloxane
Silicone oil	Silicone oil
Silicone dioxide (silanised)	Highly dispersed silicone dioxide (silanised)
Quartz (silanised)	Silicates (silanised)
Pigments (light green)	Pigments (green)
Hydrophilising agent (carbosi-lane surfactant)	
Vinyl siloxane	Platinum complex

Express™ L, low viscosities or consistencies:

Base	Catalyst
Hydrogen siloxane	Vinyl siloxane
Silicone oil	Silicone oil
Highly dispersed silicone dioxide (silanised)	Highly dispersed silicone dioxide (silanised)
Pigments (pink)	Pigments (pink)
Hydrophilising agent (surfactant)	Hydrophilising agent (surfactant)
Vinyl siloxane	Platinum complex

Final color after mixing Express™ Penta™ H: orange

Final color after mixing Express™ Penta™ H Quick: light green

Final color after mixing Express™ regular set, light body (green): green

Final color after mixing Express™ fast set, light body (blue): blue

Final color after mixing Express™ regular set, regular body (purple): purple

Technical Overview / Technique Guides

Express[™] Penta[™] H / Express[™] regular set, light body (green) Step-by-Step

[Bitte hier Daten der SBS Express Penta H (orange) einfügen]

Express™ Penta™ H Quick / Express™ fast set, light body (blue) Step-by-Step

[Bitte hier Daten der SBS Express Penta H Quick (hellgrün) einfügen]

PentaMatic™

With the aim of providing optimum ease of handling for the Penta system, a self-opening mechanism for the foil bags was developed which eliminates the task of having to cut the bags open by hand in the preparation phase and automatically makes the contents of the foil bags available for use as soon as the plunger disc exerts pressure on the foil bag.

The main modification to this system was made to the foil bags. The Pentamix units 1 and 2 as well as the cartridge bodies can be used as before without any modification. The cartridge covers are now attached directly to the foil bags (Fig. 7). After the Pentamix unit is loaded, the pressure in the foil bag increases and the foil stretches in the prepared cavity of the cartridge cap. Spikes fitted in this area now pierce the overextended foil and cause it to burst over the entire cavity area. The user is alerted to this by a clicking sound when the material is released.

The time before the self-opening of the foil bag is about 20–25 seconds with the Pentamix 1 and around 10–15 seconds with the Pentamix 2 unit.

With the PentaMatic it is therefore no longer necessary to cut the foil bags open by hand. The PentaMatic design integrates the cartridge cover into the foil bag thereby eliminating the risk of user errors during opening, which greatly enhances the safety of the system. The PentaMatic thus represents a major step towards better hygiene and more economical working procedures in the dental practice.



Fig. 7: Principle of the PentaMatic bag self-opening mechanism

Instructions for Use

Express™ Penta™ H / Express™ regular set, light body (green)

Express™ Penta™ H Quick / Express™ fast set, light body (blue)

Product Description

Express Penta H and Express Penta H Quick are high consistency addition reaction silicone materials for use with the Pentamix™ mixing unit, all three products are manufactured by 3M ESPE. Express Penta H is hydrophilic.

The Express Penta H and Express Penta H Quick foil bags are sealed with a PentaMatic sealing cap. The PentaMatic sealing cap automatically opens the foil bag once sufficient pressure is established by the plunger of the Pentamix.

Express Medium Body - Regular Set, Express Light Body - Regular Set and Express Light Body - Fast Set are hydrophilic addition reaction silicone materials, manufactured by 3M ESPE, for direct intraoral application with the dispenser (No. 7304).

- ▶ For details on all products mentioned below, please refer to the corresponding Instructions for Use. These Instructions for Use should not be discarded for the duration of product use.

Areas of Application

- Impression of inlay, onlay, crown, and bridge preparations.

Preparation

Impression Tray:

Particularly suitable are rigid, non-perforated metal trays or custom plastic trays. Perforated trays may also be used. Blocking of the distal edge of the tray with a silicone or thermoplastic material provides for controlled flow properties affording beneficial effects especially in the distal molar area.

- For sufficient adhesion, apply a thin layer of VPS Tray Adhesive, manufactured by 3M ESPE, to the tray and allow to dry completely (at least 5 min - test with a finger, 15 min drying time is ideal).

Penta cartridge/poly bag:

- Place Express Penta H in the designated Express Penta H cartridge and Express Penta H Quick in the designated Express Penta H Quick cartridge only!
- Express Penta H and Express Penta H Quick poly bags must only be used with Penta Mixing Tips, manufactured by 3M ESPE.
- Discard the first 3 cm of mixed paste extruded from newly filled cartridges prior to the first use for impression taking. The color of the dispensed paste must be uniform.
- If a new mixing tip was already installed when the cartridge was inserted, make sure the drive shaft is engaged prior to mixing.

Dispenser/cartridge:

- Place Express Medium Body - Regular Set, Express Light Body - Regular Set or Express Light Body - Fast Set in the dispenser.

- Shortly before application, ensure that both cartridge openings are not clogged. When using a new cartridge, extrude a small amount of paste until both base and catalyst paste emerge uniformly.
- Then attach a new mixing tip (Nr. 9415) and, if necessary, attach an intraoral tip (Nr. 7319).
 - If desired, fill a separate Elastomer syringe directly from the mixing tip without using an intraoral tip.
 - Material that has set inside the mixing tip should not be extruded by force as this may damage the cartridge and mixing tip and result in the formation of leaks.

Retraction

- Areas from which impressions are to be taken should be kept dry.
- In subgingival preparations, hemostatic threads or rings may be used.
- Epipak*, manufactured by 3M ESPE, is a suitable retraction solution. Prior to taking the impression, completely remove any residue of the retraction agent by rinsing and drying.
 - * Epipak is not available in all countries.

Dosing and Mixing

- Express Penta H and Express Penta H Quick are automatically dosed and mixed in the Pentamix unit. The mixing ratio by volume is 5:1, base paste:catalyst.
- Express Medium Body and Light Body impression materials are dosed and mixed statically in the dispenser. The mixing ratio by volume is 1:1, base paste:catalyst.

Times

	Processing time from start of mixing*	Intraoral setting time**
	min:sec	min:sec
Express Penta H	1:30 (23°C/74°F)	5:00
Express Penta H Quick	1:00 (23°C/74°F)	3:30
Express Medium Body Regular Set	1:30 (23°C/74°F) 1:00 (37°C/95°F)	5:00
Express Light Body Regular Set	1:30 (23°C/74°F) 1:00 (37°C/95°F)	5:00
Express Light Body Fast Set	1:00 (23°C/74°F) 0:30 (37°C/95°F)	3:30

These are the processing times at 23°C/74°F or 37°C/95°F respectively. Higher temperatures shorten, and lower temperatures prolong, total processing times.

* Start of mixing = entry of paste into the mixing tip.

** For product combinations: the longer time stated is valid.

Impression Taking

Note

- At the onset of mixing, closely monitor the entry of paste into the mixing tip and ensure that both base paste and catalyst paste flow into the mixing tip (green and white paste with Express Penta H, light green and dark green paste with Express Penta H Quick, violet and light brown paste with Express Medium Body - Regular Set, green and blue paste with Express Light Body - Regular Set, and blue and grey paste with Express Light Body - Fast Set).

- Premature injection of the syringe material into the sulcus and onto the prepared tooth may cause this material to set more rapidly than the tray material due to exposure to the higher temperature of the mouth. This may distort the impression.

Two Step/Two Viscosities Technique

- Load the impression tray prepared with adhesive with Express Penta H or Express Penta H Quick and take the preliminary impression.
- Clean and dry the preliminary impression thoroughly. Trim out any undercuts and cut spillways liberally.
- Apply Express Medium Body - Regular Set, Express Light Body - Regular Set or Express Light Body - Fast Set in the appropriate spaces of the preliminary impression and, if required, apply around the preparations. During application, the tip of the intraoral tip should be immersed in the material at all times to avoid including air bubbles.
- Reseat the preliminary impression in the mouth.
- Once the setting has elapsed, remove the impression from the mouth.
- Thoroughly examine and explore the sulcus of the prepared teeth and surrounding dentition. Remove any residual cured impression material.

One Step/Two Viscosities Technique

- Load the impression tray prepared with adhesive with Express Penta H or Express Penta H Quick.
- While the assistant loads the tray, the dentist may begin to apply Express Medium Body - Regular Set or Express Light Body - Regular Set around the preparation. Depending on the number of teeth, initiate application such that tray loading and application of material around the preparation are completed at the same time. During application, the tip of the intraoral tip should be immersed in the material at all times to avoid inclusion of air bubbles.
- Slowly place the loaded tray in the mouth parallel to the vertical axes of the prepared teeth, and take the impression without applying pressure. Avoid contact of the teeth with the tray.
- Once the setting time has elapsed, remove the impression from the mouth.
- Thoroughly examine and explore the sulcus of the prepared teeth and surrounding dentition. Remove any residual cured impression material.

Hygiene

- Place the impression in a standard disinfectant solution, e.g. Impresept™*, manufactured for 3M ESPE, for the period of time recommended by the manufacturer, i.e. 10 min, if Impresept is used. Excessive disinfection may damage the impression.
* Impresept is not available in all countries.
- After disinfection, rinse the impression under running water for approx. 15 sec.

Pouring the Model

- To avoid introducing bubbles in the model, briefly pre-rinse with water and dry or use a silicone surfactant.
- Pour the impression using a commercial specialized stone plaster commencing after 30 minutes and no longer than 2 weeks. There are no other limitations on time.
- The impressions can be silver- or copper-coated.

Cleaning

- Disassemble the dispenser, and sterilize the dispenser handle and plunger separately up to 135°C/275°F or with commercial cleaning agents containing no organic solvents, such as alcohols. Do not use disinfectants.

- Paste that has not set may be removed with ethanol.
- The adhesive can be removed from metal trays with acetone.

Notes

- The oxygen inhibition layer of composite materials, e.g. in fillings or post-core preparations, may impair the setting of silicone materials, and should therefore be removed completely before taking the impression.
- Keep the filled mixing tip on top of the cartridge to serve as a seal until the next use. Removing and replacing the spent mixing tip may lead to carry-over of paste and the ensuing formation of hardened material.
- Express impression materials must not be combined with condensation reaction silicone materials as even traces of these materials impair setting.
- Disposable latex gloves impair the setting of impression materials. Hence, vinyl gloves are more suitable.
- The impressions should not be exposed to solvent-containing liquids, as this may result in swelling and imprecise modeling.

Incompatibilities

In susceptible individuals, sensitization to the product can not be excluded. Use of the product should be discontinued and the product completely withdrawn from the patient, if sensitivity or allergic reactions are observed.

Technical Data

The impression materials comply with ISO 4823.

	Express Penta H	Express Penta H Quick	Express Medium Body Regular Set	Express Light Body Regular Set	Express Light Body Fast Set
Strain in compression:	2,9%	2,7%	2-6%	2-6%	2-6%
Recovery from deformation:	99,7%	99,5%	>99,0%	>99,0%	>99,0%
Linear dimensional change (after 24 h):	-0,2%	-0,2%	<0,3%	<0,3%	<0,3%

Storage and Stability

Do not store the product above 25°C/77°F.

Do not use after the expiration date.

Store impressions below 30°C/86°F.

Information valid as of 01/02

Tips and Tricks

The following tips and tricks are intended to help solve any problems which may arise and to avoid potential errors.

Problem	Remedy
Difficulties arising from jaw formation (large undercuts) resulting in tears in the impression material.	Block out the tray with wax (so the material cannot run off via the shortest route but instead flows to the problem area) and insert it slowly into the mouth.
Inadequate adhesion of the material to the tray (e. g. in the case of large undercuts separation can occur when removing the tray).	Use an adhesive (e.g. 3M™ ESPE™ VPS Tray Adhesive) and trays with retention (e.g. Rim Lock).
Plaster does not flow onto the surface properly.	Use one of the usual wetting agents and blow it off with compressed air.
Working time is inadequate (large tray, high temperature).	Use standard-setting Express Penta H and Express wash materials. Refrigerate the foil bag and cartridge in advance. -> Check in the mouth when the material should be removed.
Surface of the impression is smeared.	Finish or isolate fresh composite fillings or core build-ups.
Material does not set on the surface.	Certain types of latex glove may impede setting--> check for compatibility and change the make if necessary.
Material does not bond with other impression materials.	Express impression materials are not compatible with C-silicone, alginate or polyether.
Voids on the plaster model	With casting, the waiting time should not be less than 30 minutes, otherwise voids can form on the model.

Summary

The Express™ regular setting variations for the Pentamix™ and hand dispenser system described above represent important elements of the 3M ESPrange of precision impression materials for the Pentamix™ system. If the fast setting Express™ Quick alternatives are also taken into consideration, then the dentist has the ideal products and product combinations at his disposal, both for the one-step putty wash and two-step putty wash techniques.

Express™ impression materials combine all the good properties of vinyl polysiloxane impression materials with maximum comfort for dentists, patients and dental technicians and offer the best conditions for clinical success when combined with the Pentamix 2 system, Express dispenser and PentaMatic.

Technical Data

Properties	Limit	Express™ Penta™ H	Express™ Penta™ H Quick
<i>DIN EN 24823 (Type 1)</i> <i>ISO 4823 (Type 1)</i> Total working time* [min:sec]	> 2:00 > 1:30 (Quick)	1:45	0:30
Viscosity [mm]	<= 335	30	29
Recovery from deformation [%]	96.5 - 100	99.7	99.5
Strain in compression [%]	0.8 -20	3.0	2.4
Linear dimensional change [%]	< - 1.5	- 0.2	- 0.2
Compatibility with plaster Line [mm] (Visibility of line)	0.050	complies	complies
Detail reproduction of line [mm] (Visibility of line)	0.050	complies	complies
DIN 53 505: Shore hardness A after 15 min	---	57	70
1 h	---	57	71
24 h	---	62	73
In-House Tests			
Flowability	---	5.0	2.0

* = the data from the ISO test for total working time may differ from real working time in the dental practice, accounting for possible differences in user instructions.

Times

	Working from Start of Mixing* [min:sec]	Setting Time in Mouth [min:sec]
Express™ Penta™ H	2:00	3:30
Express™ Penta™ H Quick	1:30	2:30

The working times apply at 23°C. Higher temperatures reduce the total working time, while lower temperatures lengthen it.

* Start of Mixing = when the paste enters the mixing tip

Properties	Limit Light Body	Express™ Light Body Regular Set	Express™ Light Body Fast Set	Limit Regular Body	Express™ Regular Body
<i>DIN EN 24823 (Type 3)</i> <i>ISO 4823 (Type 3)</i> Total working time* [min:sec]	> 1:30 > 1:00 (Quick)	4:40	2:40	1:30	2:25
Consistency [mm]	>36	41	42	31-41	38
Recovery from deformation [%]	96.5 - 100	99,8	99,7	96.5 - 100	99,7
Strain in compression [%]	2,0-20	3,1	3,3	2,0-20	2,7
Linear dimensional change [%]	< - 1.5	-0,2	-0,3	< - 1.5	-0,2
Compatibility with plaster Line [mm] (Visibility of line)	0.050	complies	complies	0.050	complies
Detail reproduction Line [mm] (Visibility of line)	0.020	complies	complies	0.020	complies
<i>DIN 53 505:</i> Shore hardness A after					
15 min	---	50	48	---	55
1 h	---	50	48	---	55
24 h	---	55	52	---	59
In-House Tests					
Flowability	---				

* = The data from the ISO test for total working time may differ from real working time in the dental practice, accounting for possible differences in user instructions.

Times

	Working from Start of Mixing* [min:sec]	Setting Time in Mouth [min:sec]
Express™ regular set, light body (green)	1:30	5:00
Express™ fast set, light body (blue)	1:00	3:30
Express™ regular set, regular body (purple)	1:30	5:00

The working times apply at 23°C. Higher temperatures reduce the total working time, while lower temperatures lengthen it.

** Start of Mixing = when the paste enters the mixing tip

** With product combinations, the longer time applies in each case.

Bibliography

- (1) **Anusavice K. J.,**
Phillips' Science of Dental Materials, 10th Edition, W. B. Saunders,
Philadelphia, 1996.
- (2) **Meiners H., Lehmann K. M.,**
Klinische Materialkunde für Zahnärzte, Carl Hanser Verlag, München
Wien, 1998.
- (3) **Peutzfeldt A., Asmussen E.,**
Effect of disinfecting solutions on accuracy of alginate and elastomeric impressions,
Scand J Dent Res 97, 470-475, 1989.
- (4) **Meiners H., Rohring R.,**
Kompatibilität des Desinfektionsmittels Impresept mit Abformmassen, dental-labor,
XXXVIII, Heft 9, 1223-1224, 1990.
- (5) **Espe Dental AG (Hrsg.),**
Die Präzisionsabformung – ein Leitfaden für Theorie und Praxis, 62, 1999.
- (6) **Langenwalter E. M., Aquilino S. A., Turner K. A.,**
The dimensional stability of elastomeric impression materials following disinfection, J
Prosth Dent 63,270-276, 1990.
- (7) **Wirz J., Jäger K., Schmidli F.,**
Abformung in der zahnärztlichen Praxis, G. Fischer Verlag, Stuttgart, 1993.
- (8) **Wöstmann B.,**
Zum derzeitigen Stand der Abformung in der Zahnheilkunde, Habili-
tationsschrift, Münster, 1992.
- (9) **Millon B.,**
An update on elastomeric impression materials, Dental News, Vol II No. II,
p.17, 1995.
- (10) **ISO 4823 Dental elastomeric impression materials, 1992.**
- (11) **DIN 53505 hardness tests according to Shore A, C and D.**