

A Collection of Clinical Results





Introduction

Developing and manufacturing high-quality impressioning products is one of our core businesses and we understand the importance of a perfect impression on the way to a perfect restoration. Thus, we focus our innovation and expertise on products that satisfy our customers' needs with regard to performance, quality, ease of use, and reliability.

With Express[™] 2 VPS Impression Materials, 3M ESPE introduced the next generation of VPS materials – a complete range of regular and fast-setting tray and wash materials for the 1-step and 2-step impression techniques. With its remarkable balance of clinically relevant properties – i.e. hydrophilicity, tensile strength, elongation potential, toughness, and recovery from deformation – the Express 2 product family gives you first-class precision impressions and a great fit of the final restoration.

This booklet focuses on the results of a European-wide evaluation of Express 2 VPS impression materials by more than 400 dentists. What we at 3M ESPE learned is that practitioners were most convinced by the convenient handling characteristics, the high product performance and the reliability of Express 2 VPS materials, as well as the excellent impressioning results.

In the future, we will continue to use the feedback from dental professionals, so we can constantly improve our products and meet our customers' demands.

Kind regards

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Dr. Joachim Zech Research & Development 3M ESPE



Content

Uncompromising impression accuracy	4				
Express [™] 2 Penta [™] VPS Impression Materials at a glance6					
Express [™] 2 Handmix VPS Impression Materials at a glance8					
Focus on clinically relevant material properties	10				
Distortion-free removal from mouth and model	12				
Outstanding balance of properties	14				
Great performance where it counts	15				
Results European Clinical Survey	17				
2.1. General information on the market survey	18				
2.2. Impression techniques and indications	20				
2.3. Overall satisfaction with Express [™] 2 VPS Impression Materials	22				
2.4. Evaluation of Express [™] 2 Wash Materials					
2.5. Evaluation of Express [™] 2 Tray Materials	29				
2.6. Rating of the final impression	34				
2.7. Comparison with currently used impression materials					
2.8. Assessment of tested Express" 2 Materials based on the feedback from dental laboratories	40				
2.9. Rating of final restoration adjustment time compared to the currently used impression material combination	41				
2.10. Major advantages of Express [™] 2 VPS Impression Materials	42				
2.11. Would you recommend Express [®] 2 VPS Impression Materials?	43				
2.12. Evaluation of automatic mixing of impression materials with the Pentamix [™] Automatic Mixing Unit	44				
2.13. Main benefits of the Pentamix [™] Mixing Unit	47				
Testimonials	49				
Frequently Asked Questions					
,,					



4

Express[™] 2 VPS Impression Materials

Uncompromising impression accuracy

3M ESPE - More than 40 years of experience in impressioning

As the worldwide leader in impression materials, 3M ESPE is renowned for its dedication to quality and its innovative products. Since the introduction of the first impression materials more than 40 years ago, 3M ESPE has continuously improved and enlarged its impressioning portfolio: today, it offers a wide range of polyether and VPS impression materials that meet virtually all dental professionals' requirements and preferences, ranging from different impression techniques and indications to delivery choices.

Express[™] 2 VPS Impression Materials – Next VPS generation for uncompromising impression accuracy

Based on an advanced VPS formula, Express 2 VPS Impression Materials from 3M ESPE set the stage for uncompromising impression accuracy and excellent fitting indirect restorations. Designed for the 1-step and 2-step impression technique and available in a wide range of viscosities – from putty to ultra-light body – Express 2 Tray and Wash Materials are the right choice for virtually all precision impressions.

Express 2 Wash Materials are very hydrophilic and show great flow properties. To minimize the risk of tearing and distortions upon removal from the mouth, Express 2 Wash Materials have high tensile strength and demonstrate nearly 100% recovery from deformations during removal. All wash materials can be automatically mixed in the 3M ESPE Garant[™] Dispenser.



Express 2 Penta[™] Tray Materials are delivered in Penta cartridges for automatic mixing in the Pentamix[™] System from 3M ESPE. Putty users can choose between automatic and hand mixing.

Meeting the requirements of dental practice and lab

Express 2 VPS Impression Materials are a first-class basis for highly accurate impressions and well-fitting restorations – saving time and enhancing comfort for dentist, dental technician and patient alike. This has been confirmed by 3M ESPE's internal tests in which Express 2 Materials showed its winning combination of clinically relevant properties compared to other leading VPS impression materials.

Indications

All precision impressions, for crowns, bridges, in- and onlays. The fast setting "Quick" products are especially suited for small restorations (1 or 2 units).



6

Express[™] 2 Penta[™] VPS Impression Materials at a glance

Portfolio overview

Product	Dispen- sing System	Viscosity	Setting version	Working Time at 23°C min:sec	Intra-oral Setting Time min:sec
TRAY MATERIALS					
Express [™] 2 Penta [™] Putty		Putty	Regular Set	1:30	3:00
Express [™] 2 Penta [™] H		Heavy Body	Regular Set	2:00	3:30
Express [™] 2 Penta [™] H Universal Quick	1 m	Heavy Body	Fast Set	1:30	2:30
Express [™] 2 Penta [™] H Quick		Heavy Body	Fast Set	1:15	2:30
WASH MATERIALS					
Express [™] 2 Ultra-Light Body Quick	ł		Fast Set	1:30	2:30
Express [™] 2 Light Body <i>Flow</i>	ł		Regular Set	2:00	3:30
Express [™] 2 Light Body <i>Flow</i> Quick			Fast Set	1:30	2:30
Express [™] 2 Light Body <i>Standard</i>	ł		Regular Set	2:00	3:30
Express [™] 2 Light Body Standard Quick			Fast Set	1:30	2:30
Express [™] 2 Regular Body			Regular Set	2:00	3:30
Express [™] 2 Regular Body Quick			Fast Set	1:30	2:30



Overview per technique

Impression Technique	Color Tray Material	VPS Impression Materials Tray & Wash Material Combinations per Technique	Dispensing System
Express [™] 2 Penta [™]	Putty > rea	al putty consistency	
2-Step Technique		Express [™] 2 Ultra-Light Body Quick	
1-Step Technique		Express [™] 2 Regular Body ▶ stays very well at tooth	
Express [™] 2 Penta [™]	H ▶ hydropł	nilic heavy body 2 choices:	\checkmark
1 Otan Tanhnisua		Express [™] 2 Light Body <i>Flow</i> ▶ offers great flow	
		Express [™] 2 Light Body Standard	T
Express [™] 2 Penta [™] H Universal Quick → heavy body with excellent carving properties			
2-Step Technique		Express [™] 2 Light Body <i>Flow</i> Quick ▶ offers great flow	
1-Step Technique		Express [®] 2 Light Body <i>Standard</i> Quick • stays very well at tooth	
Express [™] 2 Penta [™] H Quick → hydrophilic heavy body 2 choices:			
1-Step Technique		Express [™] 2 Light Body <i>Flow</i> Quick ▶ offers great flow	$\overline{\mathbf{N}}$
		Express [®] 2 Light Body <i>Standard</i> Quick • stays very well at tooth	



8

Express[™] 2 Handmix VPS Impression Materials at a glance

Portfolio overview

Product	Dispen- sing System	Viscosity	Setting version	Working Time at 23°C min:sec	Intra-oral Setting Time min:sec
TRAY MATERIALS					
Express [™] 2 Putty Soft	= 0	Putty	Regular Set	2:00	3:30
Express [™] 2 Putty Quick		Putty	Fast Set	1:30	2:30
WASH MATERIALS		•			
Express [™] 2 Light Body <i>Flow</i>			Regular Set	2:00	3:30
Express [™] 2 Light Body <i>Flow</i> Quick			Fast Set	1:30	2:30
Express [™] 2 Light Body <i>Standard</i>	T		Regular Set	2:00	3:30
Express [™] 2 Light Body <i>Standard</i> Quick			Fast Set	1:30	2:30
Express [™] 2 Regular Body			Regular Set	2:00	3:30
Express [™] 2 Regular Body Quick			Fast Set	1:00	2:30



Overview per technique

Impression Technique	Color Tray Material	VPS Impression Materials Tray & Wash Material Combinations per Technique	Dispensing System
Express [™] 2 Putty Sof	t ► lower ha	dness for easy removal from mouth 2 choices:	<u> </u>
2-Step Technique		Express [™] 2 Light Body <i>Flow</i>	
2-oteb recrimique		Express [™] 2 Light Body <i>Standard</i>	T
		2 choices:	
1-Step Technique	Express [™] 2 Light Body <i>Standard</i>	T	
		Express [™] 2 Regular Body	
Express 2 Putty Quick > higher hardness with excellent carving properties 2 choices:			
0 Ctop Technique		Express [™] 2 Light Body <i>Flow</i> Quick	
		Express ^w 2 Light Body Standard Quick	
2 choices:			
1-Step Technique		Express [™] 2 Light Body <i>Standard</i> Quick	
		Express [™] 2 Regular Body Quick	$\overline{\mathbf{N}}$



Focus on clinically relevant material properties

The overall goal of an impression is to create an exact copy of the intra-oral situation, especially the detailed reproduction of the preparation margins – a prerequisite for excellent fitting restorations. To capture the margin, an impression material needs to have excellent properties in the unset stage, especially hydrophilicity and flowability. To avoid any kind of permanent deformation when the impression is removed from the mouth, an impression material needs superior properties in the set stage. The new Express[™] 2 VPS Impression Materials meet these requirements – even under challenging clinical conditions – the first time.



Excellent hydrophilicity and flow properties

Excellent flow to tooth of Express[™] 2 Light Body Flow Quick (left) and Express[™] 2 Light Body Standard Quick (right).

The hydrophilicity of an impression material contributes to the reproduction of detail in a moist environment. The method most often used to determine the hydrophilicity of an impression material is the contact angle measurement: the lower the contact angle – the better the hydrophilicity.



11



Contact angle on set material

Express[™] 2 VPS Impression Materials show the fastest decrease in contact angle and therefore outstanding hydrophilicity among all leading VPS impression materials tested.



¹² Distortion-free removal from mouth and model

When an impression is removed from the mouth, it is exposed to two principal forces, elongation and compression. Express[™] 2 VPS Impression Materials have an unique ability to withstand these deformation forces.

Necessary characteristics of an impression material to withstand mouth removal:

- Ability to avoid tearing
 - tensile strength
 - elongation
 - toughness
- Ability to elongate and compress
 - elongation and compression potential
- Ability to recover from elongation and compression
 - recovery from deformation

Toughness: the potential to resist tearing!

To avoid tearing while the set impression is removed from the mouth, an impression material does not only need to have high tensile strength but also high elongation potential that allows the material to stretch.

The combination of these two parameters is described as toughness. It is defined as the total amount of energy an impression material can absorb until it tears. Therefore toughness is the best measure of an impression material's ability to withstand the forces it is exposed to – during mouth removal and when the model is fabricated – without tearing.



Toughness can be easily explained by comparison with a bungee jumper who has to rely on his rope. The rope needs to elongate but must not tear.

In comparison with different VPS wash materials, Express[™] 2 Light Body Standard VPS Impression Material displays high values for toughness. Clinically this means that Express 2 impressions are less likely to tear upon removal from the mouth.



Toughness at mouth removal

Toughness values for different VPS wash materials of same setting version (regular) and comparable viscosity. Source: 3M ESPE

Express[™] 2 Light Body Standard exhibits noticeably higher toughness values than Aquasil[™] Ultra LV, President[™] Plus Jet light and Affinis[™] Regular Body.



¹⁴ Outstanding balance of properties

The winning combination of clinically relevant characteristics of Express[™] 2 VPS Impression Materials are:

- Tensile strength
- Elongation potential
- Toughness
- Recovery from elongation
- Hydrophilicity



Compilation of 5 clinically important properties of Express 2 VPS impression materials and leading VPS materials: tensile strength, elongation potential, toughness, recovery from elongation and hydrophilicity (waterdrop contact angle on set material after 2 seconds). Values for each property are given in a scale ranging from 1 = poor to 10 = excellent. In this study Express 2 VPS impression material shows the best overall performance – covering the biggest area in the diagram, with no value below 8.



Great performance where it counts

Express[™] 2 Light Body Standard VPS Impression Material (green line) shows very convincing performance in this compilation of clinically important properties. It is the only material that performs very well in each of the five tested properties, whereas all the other tested materials show weaknesses at least for one property.

This outstanding balance of properties of Express 2 VPS impression material offers excellent potential for highly accurate impressions and better fitting restorations – a benefit for dentist, patient and dental technician.





17

Results European Clinical Survey



18

Express[™] 2 VPS Impression Materials

2.1. General information on the market survey

Comprehensive evaluation of Express[™] 2 VPS Impression Materials

410 dentists from 13 European countries took part in this Europe-wide evaluation of Express[™] 2 VPS Impression Materials (response rate 50%). Results are based on 2,468 reported precision impressions.

Country	Participants
Germany	120
Norway	10
Sweden	10
Denmark	10
Finland	5
UK	50
Austria	10
France	100
Belgium	15
Netherlands	15
Switzerland	5
Italy	30
Spain	30
Total	410

The testers assessed Express 2 VPS impression materials assembled in four different test kits, each package contained one tray material and two wash materials.

Customer satisfaction and handling benefits were evaluated in a detailed survey. In unsolicited short comments the test dentists also described the new Express[™] 2 VPS Impression Materials to their colleagues.



In the final part of the survey, dentists rated the automatic mixing of Express[™] 2 VPS Tray Materials in the Pentamix[™] 2 Mixing Unit.

Test kit 1	Express [™] 2 Penta [™] Putty Express [™] 2 Ultra-Light Body Quick Express [™] 2 Light Body <i>Standard</i>
Test kit 2	Express [™] 2 Penta [™] H Express [™] 2 Light Body <i>Flow</i> Express [™] 2 Light Body <i>Standard</i>
Test kit 3	Express [™] 2 Penta [™] H Quick Express [™] 2 Light Body <i>Flow</i> Quick Express [™] 2 Light Body <i>Standard</i> Quick
Test kit 4	Express [™] 2 Penta [™] H Universal Quick Express [™] 2 Light Body <i>Flow</i> Quick Express [™] 2 Light Body <i>Standard</i> Quick

Current impression techniques

The participating dentists currently use one or more of the below mentioned impression techniques.

Impression technique/volume	Current impression techniques (%)
2-step Putty/Wash technique	41
1-step Putty/Wash technique	45
2-step HB/LB technique	20
1-step HB/LB technique	88
Monophase technique	39
	233



²⁰ 2.2. Impression techniques and indications

In this study the 1-step or 2-step technique were used for 2,459 precision impressions made with Express[™] 2 VPS Impression Materials. 944 impressions (38%) were made with the 2-step technique, 1,515 (62%) were made with the 1-step technique.



Number of Express[™] 2 impressions made



21



Express[™] 2 impressions per technique





The indications of more than 70% of all impressions were crowns (45%) and bridges (26%).





2.3. Overall satisfaction with Express[™] 2 VPS Impression Materials



Overall, participants were very satisfied with the tested Express[™] 2 VPS Impression Materials. On a scale from 1 to 5, almost 70% gave 1 and 2 ratings.

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Excellent detail reproduction

Express[™] 2 impression exhibiting 360° preparation margins





2.4. Evaluation of Express[™] 2 Wash Materials

```
Overall rating
                                                48
                              26
    Detail reproduction
                                                     40
         Flow to tooth
                                 40
                                                     38
          Consistency
      Flow into sulcus
                              29
                                                 46
                               32
                                                 42
Captures prepped teeth
         Tear strength
                                                 41
    Stays well at teeth
                                              46
                       0 %
                                20 %
                                           40 %
                                                     60 %
                                                               80 %
                                                                        100 %
                                            % Dentists
                       excellent
                                        very good
                                                        good
                       satisfactory
                                        poor
```

Ranking of material characteristics

Overall rating of Express[™] 2 wash materials



74 % of participants gave "excellent" or "very good" ratings for their overall satisfaction with the evaluated Express[™] 2 Wash Materials. Additional 18% rated their overall satisfaction as good.



²⁴ Evaluation of Express[™] 2 *Wash Materials*

Material characteristics in detail





Flow to tooth and gingiva of Express" 2 Light Body Flow (green) and Express" 2 Light Body Standard (lavender) Wash Materials. The more flowable Express" 2 Light Body Flow creates a very smooth surface, whereas Express" 2 Light Standard exhibits more structure.

Detail reproduction was top-scored, followed by flow to tooth, consistency and flow into sulcus.



25



Detail reproduction

79% indicated that the detail reproduction of Express[™] 2 Wash Materials was excellent or very good.



Flow to tooth

78% of participating dentists judged the flow to the tooth of Express[™] 2 Wash Materials as excellent or very good.



²⁶ Evaluation of Express[™] 2 *Wash Materials*



78% of the dentists found the consistency of the Express[™] 2 Wash Materials excellent or very good.



Flow into sulcus

The flow into the sulcus was rated as excellent or very good by 75% of testers. Additional 18% considered the Express[™] 2 Wash Materials' flow into the sulcus as good.



27



Captures prepared teeth

74% rated the Express[™] 2 *Wash Materials*' ability to capture prepared teeth as excellent or very good. Further 19% judged it as good.



Tear strength

The tear strength of Express[™] 2 Wash Materials was assessed as excellent or very good by 73% of the participating dentists.



²⁸ Evaluation of Express[™] 2 *Wash Materials*



Stays well at teeth

69% of testers indicated that the capability of Express[™] 2 *Wash Materials* to stay at the tooth was excellent or very good. Additional 21% rated it as good.



2.5. Evaluation of Express[™] 2 *Tray Materials*



Ranking of material characteristics





74% of participating dentists rated the Express[™] 2 *Tray Materials* as excellent or very good, additional 20% of participants judged them as good.



³⁰ Evaluation of Express[™] 2 *Tray Materials*

Material characteristics in detail



Initial impression Express[™] 2 Penta[™] H Universal Quick after carving

"Final hardness" and "working time" of the Express[™] 2 *Tray Materials* were top-scoring characteristics in the view of the participating clinicians. "Seating pressure/insertion resistance" and "ease of carving" also earned especially brilliant ratings.



Final hardness

82% of dentists assessed the final hardness of the Express[™] 2 *Tray Materials* as excellent or very good.



31



The working time of the Express[™] 2 *Tray Materials* was judged as excellent or very good by 81 % of the participants.



Seating pressure

74% of the test dentists gave "excellent" or "very good" ratings for the insertion resistance/seating pressure of the Express[™] 2 *Tray Materials.*



³² Evaluation of Express[™] 2 *Tray Materials*



Ease of carving of the Express[™] 2 *Tray Materials* was rated as excellent or very good by 74 % of participants.



Consistency

73% of dentists described the consistency of the Express[™] 2 *Tray Materials* as excellent or very good.



33



71 % considered the setting time of the Express[™] 2 *Tray Materials* as excellent or very good.

Setting time







Ranking of material characteristics

Overall rating of the final impression



The final impression made with Express[™] 2 VPS Impression Materials was rated overall as excellent or very good by 74 % of dentists.



Characteristics of the final impression in detail

Ease of mouth removal was top-scored by the participants, followed by fit of restoration and readability of details.



Ease of mouth removal

82% of testers considered the ease of mouth removal of Express[™] 2 impressions as excellent or very good.



Fit of restorations

Altogether 80% of dentists assessed the fit of restorations based on Express[™] 2 impressions as excellent (40%) or very good (40%). Additional 16% judged it as good.



³⁶ Rating of the *final impression*



The readability of details of Express[™] 2 impressions was judged as excellent or very good by 77 % of dentists.



No defects

The absence or very low incidence of defects like voids or flow defects in Express[™] 2 impressions was rated as excellent, very good or good by 89% of the test dentists.



2.7. Comparison with currently used impression materials

Ranking of wash material characteristics compared to the materials the testers currently prefer to use



Clinically most relevant characteristics of all Express[™] 2 Wash Materials were rated as much better or better than the participants' currently preferably used wash materials by at least 36% of all test dentists, top scoring were detail reproduction (43%), flow properties (43%), and consistency (41%).



Excellent flow to tooth of Express[∞] 2 Light Body Flow Quick (left) and Express[∞] 2 Light Body Standard Quick (right).



38

Comparison with currently used impression materials

Ranking of tray material characteristics compared to the materials the testers currently prefer to use



The important characteristics of Express[™] 2 *Tray Materials* were assessed as much better or better than the participants' currently preferred tray materials by at least 41 % of all test dentists, with top ratings for final hardness (50%), carving (50%), consistency and seating pressure (46% each).



Ranking of characteristics of the final Express™ 2 impression

Evaluation of final Express[™] 2 impressions compared with impressions made with materials the testers currently prefer to use.



Compared with the test participants' currently used impression materials the impressions made with the tested Express[™] 2 Materials were rated overall as much better or better by 42 % of dentists. The readability of details received especially good ratings from 44 % of all testers.



40

2.8. Assessment of tested Express[™] 2 Materials based on the feedback from dental laboratories



87 % of dentists indicated that the labs' rating of Express[™] 2 VPS Impression Materials was excellent, very good or good.



2.9. Rating of final restoration adjustment time compared to the currently used impression material combination



Compared with the test dentists' currently used impression materials, the adjustment time for the final restoration, based on Express[™] 2 impressions, was much shorter or shorter under average clinical conditions during impression making to 27 % of dentists. Under challenging clinical conditions during impression making the adjustment time was much shorter or shorter for 29 % of testers.



42

2.10. Major advantages of Express[™] 2 VPS Impression Materials



Asked for the two major advantages of the new Express[™] 2 VPS Impression Materials, the following features were most often mentioned: **detail reproduction/precision, automatic mixing, easy handling and right setting time.**



2.11. Would you recommend Express[™] 2 VPS Impression Materials?



79% would recommend the new Express[™] 2 VPS Impression Materials to their colleagues.



44

2.12. Evaluation of automatic mixing of impression materials with the Pentamix[™] Automatic Mixing Unit

Benefits of automatic mixing with Pentamix[™] Mixing Unit





Overall rating of automatic mixing with Pentamix[™] Mixing Unit

The Pentamix[™] Mixing Unit was rated overall as excellent or very good by 96% of all test participants.



45



Benefits of Pentamix[™] Mixing Unit in detail Mixing quality

99% judged the mixing quality of 3M ESPE's mixing unit as excellent or very good.

Absence of bubbles



The absence of bubbles was rated as excellent or very good by 98% of all testers.



46

Evaluation of automatic mixing of impression materials with the Pentamix[™] Automatic Mixing Unit

Benefits of automatic mixing with Pentamix[™] Mixing Unit Hygiene



96% percent of the test dentists considered the hygienic aspects of the Pentamix[™] Mixing Unit as excellent or very good.



Ease of automatic mixing

94% of all participants assessed the ease of automatic mixing with the Pentamix[™] Mixing Unit as excellent or very good.



2.13. Main benefits of the Pentamix[™] Mixing Unit

The most often mentioned benefits of the Pentamix[™] Mixing Unit were: easy mixing, excellent mixing quality, hygiene, cleanliness and always reproducible mixing quality.











49

Testimonials



The testers have been asked to describe the new colleagues in one sentence:

Very good results.

Simply better!

Modern, high precision, good quality, quick.

Excellent product!

Very good accuracy, easy to handle, putty easy to carve.

Incredible - Impressive - Impressions!

Accurate, quick, easy to use.

Trustable, easy to use, precise.

Easier to work with, perfect fit.

The best material I've ever used ...

Precise, easy to use, tear resistance.

It makes impression-taking easier.



Express[™] 2 Impression Materials to their

Less working time and very good marginal precision.

Outstanding for patients' comfort and excellently controllable for the dentist.

It makes you feel good to have a good impression.

Very recommendable!

Comfortable and precise material.

High quality of impressions with reduced time need.

Fully matured system.

... high detail reproduction also in difficult situations.

Reproducible quality with modern mixing technique.





53

Frequently Asked Questions



1. What Express[™] 2 VPS Impression Materials viscosity combinations are recommended and why?

2-step technique:

For the 2-step technique it is important that the tray material offers a high insertion pressure to push the wash material deep into the sulcus. Also the tray material must have good carving properties as well as a high hardness in the set stage. The latter is important for not being distorted during the second impression by the pressure that is applied to push the wash material into the sulcus. The wash material has to have the ability to generate very thin layers on the set tray material (in the initial impression). Ideal are wash materials with a low viscosity and a high structural viscosity (thixotropic) allowing them to flow very well when pressure is applied. Highly viscous and only slightly thixotropic wash materials on the other hand would lead to thick layers on the set tray material or even displace it, causing distortions.

The ideal product combination for the 2-step technique is the combination Express[™] 2 Penta[™] Putty – Express[™] 2 Ultra-Light Body Quick as it offers all of the described features (for details please see overviews on pages 6–9).

1-step technique:

For the 1-step technique the ideal tray material should be hydrophilic to perform well in the moist intra-oral environment. It has a somewhat lower hardness in the set stage for an easy removal from the mouth. Express[™] 2 Penta[™] H and Express[™] 2 Penta[™] H Quick have been designed to meet these requirements. It is difficult to recommend a certain viscosity of the wash material for this impression technique. It is more a matter of user



preference and experience what viscosity to use. If a very good flowability is desired we recommend a lower viscosity. In case it is more important that the wash material stays very well at the tooth, we recommend a thicker viscosity (for details please see overviews on pages 6–9).

2-step and 1-step technique:

Quite a number of dentists wish to have an impression material that can be used for both, the 2-step and the 1-step technique. For those dentists we recommend to use Express[™] 2 Penta[™] H Universal Quick – in case a heavy body consistency is desired. Alternatively Express[™] 2 Penta[™] Putty also can be used – in case a putty consistency is preferred.

No matter what tray material consistency is preferred – putty or heavy body – we recommend to use a low viscous wash material for the 2-step technique.

For the 1-step technique with Express[™] 2 Penta[™] Putty we recommend a wash material with a higher viscosity. Low viscous wash materials, especially Express[™] 2 Ultra-Light Body, are more likely to be displaced.

The appropriate wash materials are shown in the overviews on pages 6–9.



2. Existing Express[™] and Dimension[™] customers: How do the new Express[™] 2 Wash Materials viscosities correspond to existing Express / Dimension wash viscosities?

Express[™] 2 Light Body *Flow* / Express[™] 2 Light Body *Standard* Wash Materials have a lower viscosity compared to existing Express and Dimension washes. The reason for this shift towards lower viscosities is to enable a better flow onto the prepared tooth and into the sulcus, especially for challenging clinical situations (e.g. tight sulcus, deep subgingival preparations). Express[™] 2 Light Body *Flow* (-Quick) is the more fluid version of the two new viscosities. It offers an excellent flow to the tooth and gingiva while still retaining sufficient drip resistance. Upon syringing, the material flows very well into the sulcus by itself. Express[™] 2 Light Body *Standard* (-Quick) is slightly more viscous so that it stays better at the tooth. It still offers great flow characteristics.

For Express Light Body (-Quick) and Dimension Garant L (-Quick) users who want to stay with their viscosity, we recommend to use the high viscous Express[™] 2 Regular Body, which is closest to their existing products.



3. Are Express[™] 2 VPS Impression Materials compatible with other 3M ESPE VPS materials (Dimension[™], Express[™] and Imprint[™] II products)?

From a chemical perspective, all Express[™] 2 Impression Materials can be combined with each other and with other 3M ESPE VPS impression materials. The individual products may differ in their working and setting times, especially if we talk about regular setting and fast setting products. In case two products with different working times are combined in the 1-step (simultaneous) impression technique, the working time of the combination is determined by the material with the shorter working time, and the intra-oral setting time is determined by the material with the longer setting time (for exact times see corresponding IFU's).

The ideal combination of Express 2 tray and wash materials with other 3M ESPE impression materials also depends on the applied impression technique (as described in FAQ 1).

Differences between the materials may occur for their pouring times (minimum 2 hours after impression taking for all Express 2 and Imprint II products, 30 min for Dimension, and 30 min for Express products). In case products with different pouring times are combined, the minimum pouring time is determined by the material with the longer pouring time.

Finally the product colors may also limit the combination of certain tray and wash material. Not all combinations of Express 2 VPS impression materials and other 3M ESPE VPS materials offer an excellent color contrast between tray and wash material, resulting in a less optimal readability.



4. What kind of impression trays are suitable for Express[™] 2 VPS Impression Materials?

All impression trays, full arch, quadrant and dual-arch impression trays generally used for precision impressions are suitable (metal and plastic trays, non-perforated and perforated trays, stock and custom trays). Generally, we recommend the use of rigid trays. In particular for the 2-step technique or when using Express[™] 2 Penta[™] Putty (in cases when high insertion pressure is applied), flexible trays would bend during insertion of the impression, resulting in uncontrolled distortion after removing the impression from the mouth.

For sufficient adhesion, it is important to apply a thin layer of VPS tray adhesive from 3M ESPE 5–15 minutes before the tray is filled. Dual-arch trays also require application of tray adhesive onto all surfaces, including the gauze, that are in contact with the impression material.



5. What is the cause of smeary impression surfaces in the preparation area?

Such smear layers are an indicator that the impression material has not set properly. Primary reason is contact with chemicals, e.g. sulphur from latex gloves, acrylate and methacrylate residues that inhibit polymerization.

Such effects are often not seen until casting, where adhesion of plaster to the impression or the adhesion of impression material to the plaster cast can occur. We recommend the following precautions to avoid such effects:

Cause	Solution
Placement of a composite restoration or composite core build- up material just performed	 Finish, clean, isolate restoration or core build-up materials
Temporary restoration produced directly before precision impression taking	 Clean affected teeth surface with solvents, e.g. orange oil, isopropyl alcohol, ethanol and cotton swab To best avoid inhibition caused by temporary restoration materials make the precision impression before fabricating the temporary
Not all traces of retraction solutions removed	 Carefully remove retraction solution using water spray
 Use of Latex gloves sulphur form gloves transferred to either retraction cord, impression material, teeth or soft tissue 	 Check Latex gloves for compatibility or use nitrile gloves which are recommended for VPS material
Use of surface anaesthetic containing adrenaline	Ask patient to rinse out well and air-dry
Contact with C-silicones, e.g. when blocking off	 Use VPS or light-cured plastic for blocking off



60

6. What reasons may cause poor bonding of the wash material to the tray material?

Cause	Solution
Viscosities of tray and wash material not compatible	 Do not combine Express[®] 2 products with C-silicones, alginates, hydrocolloids and polyethers
 Temporary restoration was produced directly before precision impression making, or precision impression was also used as temporary work key 	 Produce temporary restoration after precision impression has been made, or create separate temporary work key
Wash material already in setting phase when tray is seated	 Do not exceed working times for tray and wash materials
2-step technique only: preliminary impression was not clean enough	 Carefully clean preliminary impression with warm water and dry it afterwards



7. Does the working time of the materials depend on the temperature?

Like for all VPS materials, the working time for the Express[™] 2 VPS Impression Materials depend on temperature. At room temperatures above 25° C, the working times for all Express 2 products are much shorter compared to the values given in the instructions for use. The shorter working time may reduce syringing of the typical amount of prepared teeth with the impression material. Also the whole impression making procedure becomes rushed.

For such hot days we recommend storing the Express 2 VPS impression materials in the refrigerator at 8° C–10° C and placing them into the warm operatory approx. 1 hour before making the impression.

We strongly advise against mixing the paste in the Pentamix[™] 2 Mixing Unit directly after removal from the refrigerator without warming it up beforehand. The higher viscosity of the cold paste (<18° C) will increase the dispensing forces, causing heavy wear on the Pentamix unit, especially when Express[™] 2 Penta[™] Putty is used.



8. How to avoid the formation of voids in the plaster model?

The most common reason for the formation of voids in the plaster model is that the casting of the impression is carried out too early. This is due to the release of hydrogen gas into the surface of the plaster from the polymerization reaction of the molecules.

This chemical reaction is completed about 2 hours after impression making for Express[™] 2 Penta[™] Putty and after 30 minutes for all other Express 2 impression materials. On cooler days or environment, this may take longer.



63

9. Pentamix[™] 2 Mixing Unit: tips and tricks for first time users

a) General questions on the Pentamix[™] 2 Mixing Unit

Pentamix [™] 2 Mixing Unit: What to do when…	Cause	Solution
Unit does not start	Plunger is in bottom or top position	 Turn plunger away from bottom or top position by using adjustment knob
Paste not dispensed	 Cartridge is empty 	Insert new foil bags
	 Foil bag openings glued up with cross- contaminated impres- sion material 	▶ Clean foil bag openings
	Plunger is blocked	 Check that handwheel moves freely
Unit does not switch off	Start button is jammed	 Press start button again, if necessary remove mains plug and release start button
Paste flows too slowly or not at all	Paste temperature too low	 Bring up to room tempera- ture, min. 18°C
Cartridge cannot be inserted into unit	 Plungers not in top position 	 Move up plungers by turning handwheel clockwise as far as it will go and hold.
	 Cartridge locking lever not closed 	 Close cartridge locking lever
Initially dispensed	There has been a mini-	 Store cartridges horizontally
material not homoge- neous in color	mal change in the length of the foil bags through the cartridges being stored vertically outside the unit	 Always check mixing quality for a uniform color typical of paste
Material not homoge- nously mixed	Penta [™] Mixing Tip not properly fastened onto drive shaft ▶ Rotor inside the Penta [™] Mixing Tip not turning	 Attach new Penta[™] Mixing Tip after cartridge is placed inside the Pentamix[™] Mixing Unit Push Penta[™] Mixing Tip onto drive shaft and then into corresponding holes in the cartridges. If necessary, rotate mixing tip on drive shaft for proper seating



64

b) Questions related only to Express[™] 2 Penta[™] Putty

Pentamix [™] 2 Mixing Unit: What to do when…	Cause	Solution
Penta" Mixing Tip gets warm so that the working time of the impression material is shortened	The unit operated a long time without impression material being dispensed, because:	
	A new foil bag was opened	In case a new foil bag is opened, don't release the Pentamix" 2 Mixing Unit's activation button after paste is dispensed in a uniform color, but immediately load tray
	The plunger was not in contact with the foil bag when activation button was pressed	 Before pressing the Pentamix 2 Mixing Unit's activation button turn down handwheel until plunger is in contact with foil bag
	The tray filling proce- dure was interrupted by releasing and pressing again the Pentamix Unit's activa- tion button while the tray was loaded	 Load the tray in a single operation without releasing the Pentamix 2 Mixing Unit's activation button









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