

AP Manual Workbook

APVolution M



AP Manual-Workbook

Table of contents:	Pages
1 Overview	3
2 Information about the layering porcelain	4
3 The preparation of the metal framework	5
4 Bonder	6
5 Opaque	7
6 Shade selection for the AP Opaque	8
7 Ingot Selection	9
8 Press & Layering Technique	10
9 Spruing Rules	11-13
10 AP Investment - AP 400 ring	14-20
11 Divesting procedure	21-22
12 Internal Staining Technique	23-26
13 Instructions for the layering porcelain	28-32
14 Overview Of Colors & Firing Charts	34-37
15 Technical Data	38
16 Warnings	39

1. Overview

APVolution M

Press to Metal

Layering Powder

for
High Noble-Noble-Non Precious Alloys



2. Information about the layering porcelain:

The Aesthetic Press layering ceramic APVolution M is a leucite glass ceramic.

The shading system is colored according to the Vita^{®*} classical shade guide A1-D4. The Aesthetic Press APVolution M layering ceramic is only intended for dental applications and for use by trained professionals. A matching transparency and fluorescence allows the reconstruction of natural looking teeth in the form of metal ceramic crowns or bridges on conventional alloys with a thermal expansion of $14 - 15 \times 10^{-6} \times K^{-1}$ (25 - 500° C).

Contraindications:

- Combinations with ceramic materials outside of Aesthetic-Press APVolution M described range of product systems and/or material from another manufacturer.
- Use of non-approved framework materials.
- Sharp edges and corners on the framework or non-anatomically reduced frame shapes.
- Dental ceramic and complete ceramic restorations made of glass ceramics are not recommended for patients with bruxism or parafunction.

Fabrication of Metal Framework

The fabrication of metal framework (casting, processing, cleaning/oxidation) must be performed according to the manufacturer's instructions. The framework must have a reduced anatomical shape and should provide enough space for an even coating of layering ceramic < 2 mm. Sharp edges and corners need to be rounded off.

FOR MORE DETAILS SEE PAGE 4

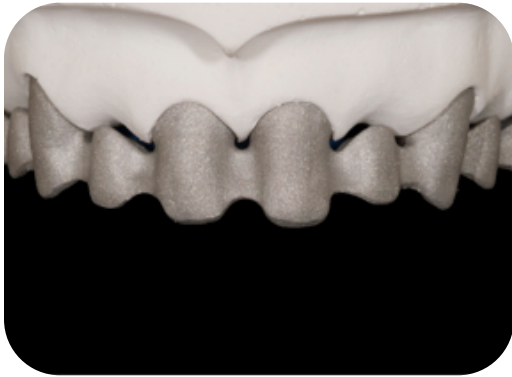
3. The preparation of the metal framework

The application of the bonder and opaque.

For metal:

Fabrication of Metal Framework

The fabrication of metal framework (casting, processing, cleaning/oxidation) must be performed according to the manufacturer's instructions. The framework must have a reduced anatomical shape and should provide enough space for an even coating of layering ceramic < 2 mm. Sharp edges and corners need to be rounded off.



For non-precious alloys, the usage of a bonder is indicated. The framework should be treated with Alumina Oxide 110-240 microns. It is recommended to degas the alloy before the application of the bonder/opaque

4. Bonder

One Firing Only!

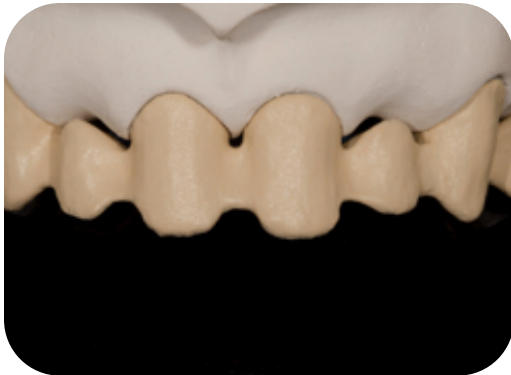
Idle	Dry Time	Rising Temp./ min	Final Temp	Hold Time	Vac on	Vac off
400 °C	6 min	80 °C	980 °C	6 min	450 °C	980 °C



After thoroughly cleaning the frame with a steam cleaner, a solid layer of the AP Bonder shall be applied. Do not use any liquid to dilute the thickness of the bonder. Apply the material with a brush onto the frame. One coat is sufficient. See the result after the firing on the photo

5. Opaque

Two firings recommended



The Opaque for the APVolution M, a light and dark opaque is available for using the Value based ingots. For the Transpa Dentin and Dentin ingots a selection of 16 opaque shades is available as well as a bleach opaque. Two firings should be sufficient to cover the frame and ensure a solid visual result. If certain areas still show some grey spots from uncovered metal, an additional coat is needed. Do not dilute the paste opaque too much as this might be the cause for insufficient covering.

	Idle	Dry Time	Rising Temp./ min	Final Temp	Hold Time	Vac on	Vac off
1. Bake	400 °C	6 min	80 °C	960 °C	1 min	450 °C	960 °C
2. Bake	400 °C	6 min	80 °C	950 °C	1 min	450 °C	950 °C

6. Shade selection for the AP Opaque

Light and Dark- easy to use!

The AP Opaque shading concept is based on the value of the AP Opaque in addition with the blend of the AP porcelain, whether using layering powder or press ingots. For the AP shading system, three different opaque types are indicated.

- Opaque Light for all light shades
- Opaque Dark for all dark shades
- Opaque Bleach for all bleach shades
- Opaque from A1-D4 for Dentin and Transpa Dentin Ingots

	AP Shading System	Vita* Shades
	Opaque Bleach	All bleach shades
Value based ingots	Opaque Light	A1, A2, B1, B2, C1, C2, D2
	Opaque Dark	A3, A3,5, A4, B3, B4, C3, C4, D4
Dentin Ingots	A1, A2, A3, A3.5, A4, B1,B2, B3, B4, C1, C2, C3, C4, D2, D3, D4	
Transpa Dentin Ingots		

7. Ingot Selection

There are two main different ingot categories:

- Ingots for the press and staining technique (Value based, Transpa Dentin)
- Ingots for the press and layering technique (Dentin Ingots)

Press & Staining Technique Aesthetic-Press™ Value Based System

	VITA Shades	Aesthetic Press ingots / powders
Value based system	A1, A2, B1, B2, C1, C2, D1, D2	APVolution M Light
	A2, B2, C2, D2	APVolution M Medium
	A3, A3,5, B3, C3, C3, D3	APVolution M Dark
	A4, B4, C4, D4	APVolution M Dark Plus
	Bleach Shades	APVolution M Bleach
	Gingiva	APVolution M Gingiva
Transpa Dentin	A1-D4	A1-D4

For the press and staining technique, four different values are available to achieve the 16 Vita Shades. These main categories are for press to metal.

- Light
- Medium
- Dark
- Dark Plus

Bleach Shades:

For bleach shades, the Aesthetic Press APVolution M Bleach ingots in combination with the Bleach Opaque cover the range of bleach shades necessary.

All ingots are available in 2g (12mm ø) and 3 g (16mm ø)

8. Press & Layering Technique

	VITA Shades	APVolution M Dentin
Dentin Ingots	A1-D4	A1-D4

The master kit consists of all 16 Dentin shades from A1-D4
All ingots are available in 2g (12mm ø) and 3 g (16 mm ø)

Press Program						
Ring size	Idle	Rising Temp	End Temp	Hold Time	Vac on	Vac off
200g	700	65	930	20	700	930
300g	700	65	930	20	700	930
400g	700	65	970	40	700	970

Build Up-Powder							
	Idle Temp	Rising °C/ min	Final Temp	Pre Heat	Hold Time	Vac on	Vac off
Build Up Powder HF	400	55	920	6	1	450	920
Build Up Powder LF	400	55	780	6	1	450	780
Glaze Bake LF	400	55	760	6	1	-	-
Glaze Bake HF	400	55	880	6	1	-	-

9. Spruing Rules

Problem: In many different spruing instructions for use available, state that there are rules "must comply" regarding spruing techniques.

SOLUTION: According to my experience some of the complied rules regarding spruing objects are good, but not absolutely necessary.

Introduction

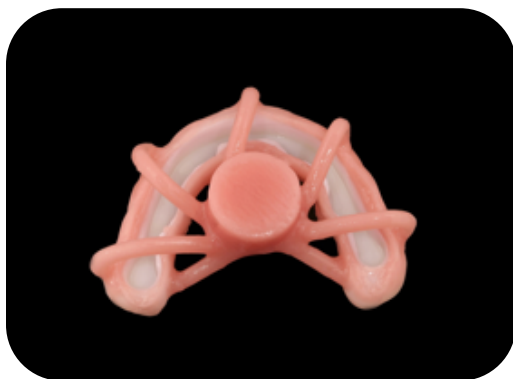
The results, of working with the press ceramic by Aesthetic Press (San Francisco, USA), put clear that some rules when spruing objects are not absolutely necessary.

When spruing objects, there are basically the following parameters, which should be considered and discussed.

- Length
- Diameter
- Angel
- Shape

The length of the sprue can be between 0.3 mm to several inches.

Figures 1 and 2 show examples of which one can already see at first glance the press result from the long sprues, which may well be longer than expected. Thus the lengths of sprues during pressing, using pink ingots (Aesthetic Press) are several inches long. Also subsequent pressing of the white portions illustrate the dynamic possibilities.



in this example, 6 x 2.5 g pink pellets pressed together



in the second step, white portions pressed

After years of experience, the author uses 0.3cm - 3 cm sprue length to obtain these possibilities.

The diameter of the sprues should be 3 mm or gauge 8

One can say that there is no compulsory fixed angle rule. Figure 1 pressed in pink ceramic illustrates the sprues going up and down rapping around the object justifying the particularly good pressing properties of the AP-pressed ceramic enabling difficult cases possible.

In general, one can maintain the length of the sprues as short as possible for minimal material usage.

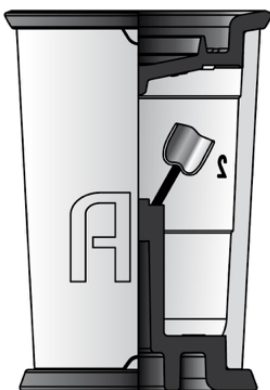
Since there is no minimal sprue length required, it is safer when cutting the sprues to have at least a 2 mm distance to the crown. This will avoid excessive heat in cuspal regions, which can cause cracks.

The most important fundamental rule is to keep the sprues clean and smooth. Poorly unfinished waxed up areas increase the risk of investment embedding into the ceramic. Spruing angles can easily from 30- 90 degrees

Angulation of Sprues: 45 degrees are ideal but not mandatory!

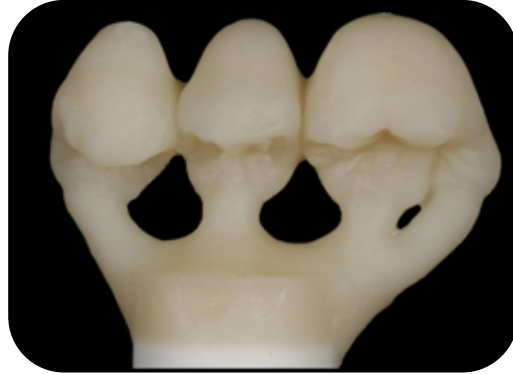
The sprues should be placed at the edge of the main plunger channel stand. This enables the object to be in the warmer region of the muffle. Sprued objects in the middle of the plunger stand are more prone to a faulty pressing, since the temperature in this area is cooler.

The distance of the crown to the mold bottom or the walls should be at least 0.75 cm (fig. 3).



Recommended angle for single units

A posterior bridge with molars



Clean spruing allows for a good pressing result

Tips how to press implant crowns

To successfully press implant crowns, it is necessary to use the metal pins of the honey-comb firing tray. They will stabilize the die in the investment, since the diameter of the implant crown is often times quite thin, which may lead to fracture if unsupported!



Conclusion

Correct spruing justifies good homogeneous results in the press technology. Many believed rules as previously mentioned i.e. sprue angles, are not a compulsory necessity. Common sense and the need for simplicity often offer the right answer to frequently asked questions.

10. AP Investment - Easy Vest Speed *Premium*



Speed Investment for all pressable ceramics and all dental alloys

The AP Phosphate Bonded Investment material was especially developed to press lithium disilicate ingot.

At the same time, this type of investment material can be used for regular press technique over metal or zirconia as well as of casting alloys.

AP offers this high tech type of investment material for Hi-Noble and long-span superstructures to non-precious and pressable investments. The Easy-Vest is an extremely high-quality product, which has been specifically designed to produce consistently accurate castings and due to the fine material, the castings/press units show a smooth surface which is important for the fit of metal frames and pressed porcelains.

Mixing ratio: 23 ml Liquid to 100 Gramm Powder

General Rules:

The higher the liquid concentration, the more expansion will be achieved.

Keep mixing bowl clean and slightly moist before use- Do not wipe with towel!

Procedure for casting alloy:

It is suggested to premix the investment 15 seconds by hand first before mixing under vacuum for 120 seconds.

Metal Casting Ring: 1 layer for flask liner for small ring, size X 1+3
 2 layers for flask liner for large ring, size X 6+9

How to use the speed technique:

After investing it is required to wait 30 minutes before placing the ring into the preheated oven. The temperature should be around 850-900 ° C depending on alloy. This rule applies to rings with a metal ring surrounded.

Metal free rings can be placed in the oven after a 15 min bench set time.

Holding Times:

Small ring: 45 min

Large ring: 60 min

Add additional 10min for multiple rings in the furnace

Mixing Ratio for Speed Investment:

AP Volution S/ Silicate reinforced	100 g 14 ml Liquid - 9 ml Water	200g 28 ml Liquid - 18 ml Water
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Investing procedure for pressable ceramics:

It is suggested to mix the investment 15 seconds by hand first before mixing under vacuum for 120 seconds.

Bench Set Time:

After investing it is required to wait 15 min before placing the ring in the preheated furnace. (850° C)

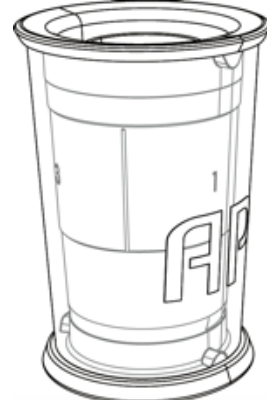
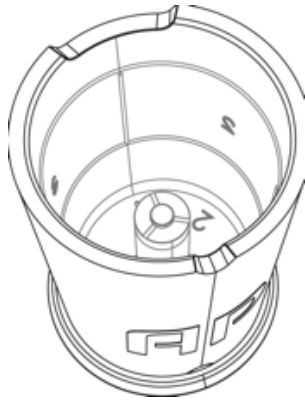
Holding times:

200 g ring 45min

300 g ring 60min

Important Note:

1. Investment contains silica – avoid inhaling dust.
2. Do not open furnace during burn out phase – wax steams might catch fire in the air.



Simple spruing angulation for single units. place sprue straight onto the incisal edge.

Choose this angulation for posterior bridges to avoid bubbles on the occlusion.

The AP investment rings show their numbered section on the bottom part, on the inside off the ring and on the top part. Aligning units always starts from sector one. This will help to shorten the devest cycle. It is important to know where the invested units are, so one can trim the pressed ring in various directions.

After mixing the investment for 120 seconds under vacuum, the Easy Vest shows a nice flow characteristic. Filling up the ring can be done rapidly without fearing of bubbles. The key to a nice and clean result lies in the angulation of the to be pressed units.



keep the angulation open to avoid bubbles



pour the investment between the upper line and the upper edge of the ring



The lid of the investment ring closes in only one position. Place the lid firm onto the rubber ring and let the excess material flow through the excess holes. Remove lid and ring after 15 min bench set time. Due to the tapered geometry, the set investment will be released effortlessly. Clean the rubber immediately, since due the warmth of the investment material, the rubber is soft and easy to clean!



The 200 g ring with the bottom and top part.



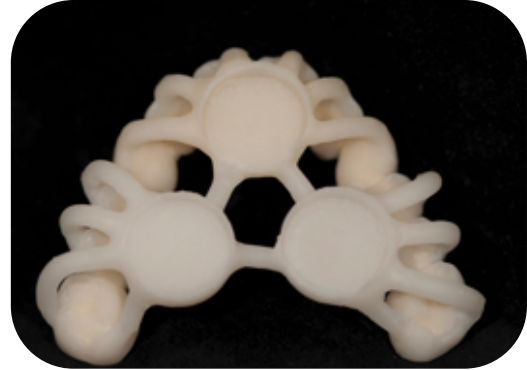
The plunger maker can be filled with the investment material used to invest the regular units. Make sure not to use high expansion ratios. A 50% expansion ratio for the press over porcelain and respectively the plungers are recommended.

The AP 400g ring

This ring is designed to be able to press full arch cases, such as large implant cases. Alternatively, the AP 400g ring is ideal for large operations to reduce the invest- burn out- press & divest up to procedures. The time savings are up to 50%, which saves time and money. With the ability to press up to 20 units and up to 30 g of porcelain, this ring is unique and can be used for any furnace in the market.



make sure to sprue all posteriors from buccal and lingual



anteriors are pressed in dentin ingot for layering, posteriors in classic light ingot for staining



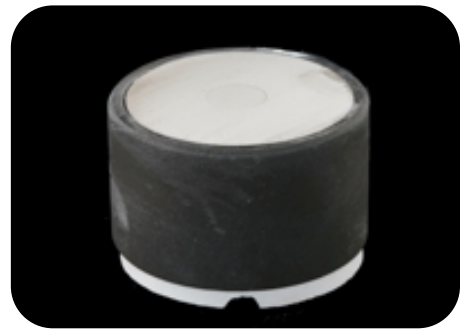
11. Divesting procedure

AP investment rings made to divest efficient

Align units always starting from sector one (see page 18). This will help to shorten the divest cycle. It is important to know where the invested units are, so one can trim the pressed ring in various directions.



After the press cycle, remove the ring quickly out of the furnace. Place the hot ring at a safe location away from the press furnace to cool. The metal ring will oxidize outside the furnace, which might cause some metal particles to show.



The quickest way to divest is to trim the ring up to the edge of the safety belt. A model trimmer, wether wet or dry can be used for this procedure.



The ring shows the reduction, which is right at the midline of the AP 200 ring in this case. The reduction for the AP 300g and the AP 400g ring follows the same procedure.



Since the invested units are in sector one, the ring will be trimmed from the back on the opposite side. It is apparent how quickly the units will be released from the investment material. With just a short amount of sandblasting, the invested crowns will be clean and ready to process.



It is recommended to use 50 microns of glass beads and about 2- 3 bar of air pressure.



With just a short amount of sandblasting, the invested crowns will be clean and ready to process.

12. Internal Staining Technique



The anterior restoration has been fit on the model after the diagnostic wax up has been pressed with the Dentin A1 ingots.



A precise reduction for the enamel and transpa layers is cut from the incisal edge all the way to the margin. The goal is that all the stains are on the inside and not too much on the surface. This way a better surface texture can be achieved as well.



At the mesial corner, a touch of blue stain is added to create translucency.



In order to create some contrast within the color scheme and to highlight the mesial ridge, white stain is placed to increase the value



The stain kit from Aesthetic-Press offers a fluorescent paste, which has a wide temperature range for Low Fusing porcelains and up to High Fusing temperatures. The range can be from 750 C to 930 C



Even for full zirconia crowns the paste offers a wide range of options to achieve lifelike and matching colors.



Mamelon stains are used to match the incisal characteristics. The intense orange can be placed on the right place with the desired intensity. This technique is by far more controlled and predictable. This will lead the technician to a successful result, with no shrinkage or color surprises



Much like on the mesial the distal line angle will be highlighted with the white stain. Distally, a soft tone of translucent blue is added. Often these characteristic should reflect the ones shown by the lower incisors.



The margin stain is added to the cervical area to avoid a too translucent porcelain. In case of discolorations, the margin stain can cover these areas.



Just with one staining cycle, a most lifelike result is achieved with the fluorescent Effect Stains and the Mamelon Stains.

Firing chart for internal staining						
Idle	Dry time	Rising temp	End Temp	Holding time	Vac on	Vac off
450	6	55	770	1	-	-

13. Layering Technique

The Aesthetic-Press APVolution M Dentin Powders are available for:

Press over Metal	A separate powder kit with High Fusing and Low Fusing powders are available
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APVolution M Value ingots	APVolution Powders are compatible for both types of pressable ingots.
APVolution M Dentin ingots	

The following Dentin Shade System is available

At Aesthetic-Press we believe in lean manufacturing and in economic sized systems. Therefore, we reduced the Dentin Shade assortment to nine shades to match the Vita Shade spectrum.

The APVolution M Dentin Shades for powder porcelains and for pressable ingots are:

Vita*	A1	A2	A3	A3.5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
-------	----	----	----	------	----	----	----	----	----	----	----	----	----	----	----	----

Dentin-Bake

Mix ceramic powder (Dentin and/or Incisal) with Modelling Liquid to a creamy consistency. Apply Dentin or Incisal ceramic in small portions to the cervical and interdental area and compact by light vibration. Then more Dentin or Incisal is applied according to the tooth layering.

1st Bake

After the Dentin application the crown is placed on a firing tray at a starting temperature of 400°C. Subsequently the furnace is closed with a 4 minute closing time and then heated at 60 K/min with vacuum (vacuum starting at 450°C) to 920°C (bake temperature). Hold time: 1 minute without vacuum. After the first Dentin/Incisal firing is complete, trim the crown or bridge and clean. Next, apply a second layer of Dentin and Incisal for the second Dentin firing.

2nd Bake

Same procedure as by the first Dentin firing, except with a firing temperature of 910°C. Any further Dentin firings should be carried out at 910°C



Each powder bottle comes with the “scoop” to measure a precise amount for layering porcelain.

A power master kit is available a la carte. All the nine Dentin Shades, three value based shades and a gingiva shade is available next to fourteen enamel transpa and opalescent powders

Glaze finish/Glaze Bake

After completely finishing the surface with a diamond instrument, thoroughly clean the crown or bridge. Apply the glaze paste or glaze powder and liquid mix in thin layers. For the color characterization, all conventional Aesthetic Press stains and glaze can be applied and fired. Since there are Low Fusing and Hi Fusing porcelains to Metal, it is important to be aware of the different firing temperatures. A wrongful temperature can lead to a dissatisfactory result.

Build Up-Powder							
	Idle Temp	Rising °C/min	Final Temp	Pre Heat	Hold Time	Vac on	Vac off
Build Up Powder HF	400	55	920	6	1	450	920
Build Up Powder LF	400	55	780	6	1	450	780
Glaze Bake LF	400	55	760	6	1	-	-
Glaze Bake HF	400	55	880	6	1	-	-

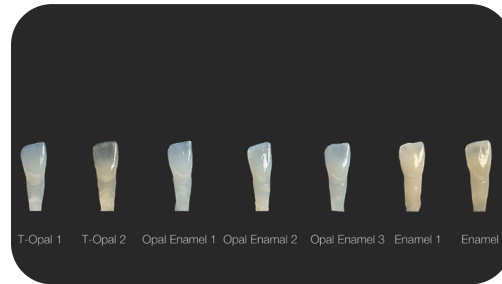
Porcelain Powders

APVolution M

CTE : $14 - 15 \times 10^{-6} \times K^{-1}$ (25 - 500° C)

The **APVolution M** Enamel, Transpa & Opalescent Powders are available:

APVolution M						
T Opal 1	T Opal 2	Opal Enamel 1	Opal Enamel 2	Opal Enamel 3	Enamel1	Enamel 2
T-Clear	T-White	T-Yellow	T-Blue	T-Orange	T-Amber	T-Pink



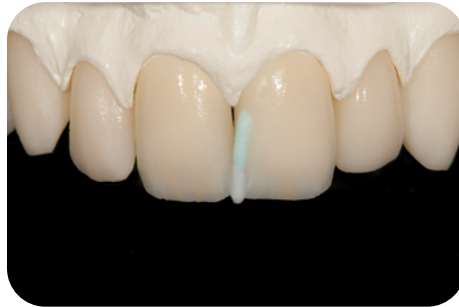
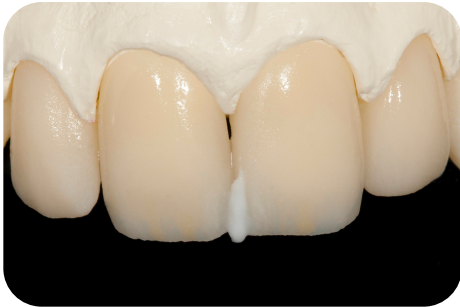
The indicators show the color and the variety of appearance with different thicknesses. These indicators are all handmade and individually finished. It is our recommendation for every technician to fabricate such indicators to truly understand the porcelain used. This will also allow to really compare the individual brands on the market.

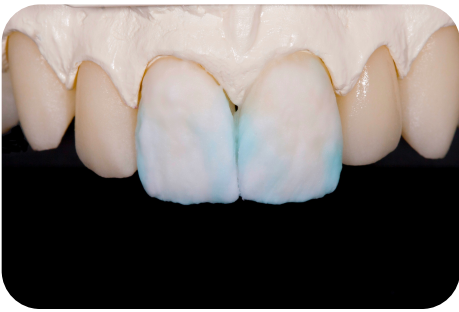
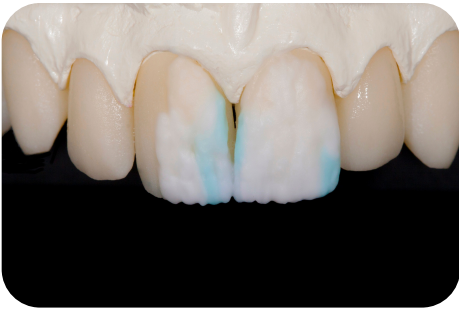
Additional Color Chart:

	A0	A1	A2	A3	A3,5	A4	B0	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
Liner																		
Liner																		
	A	B	C	D														
Opaque Dentin																		
Dentin																		
Opal																		
Modifier																		

Layering Technique in Detail:

Once the first bake has been established or alternatively the Dentin core has been pressed with the Aesthetic Press Classic ingot onto the metal frame, the technician can layer with a selection of enamel and transpa or opalescent materials. Once the dentin core has been established and the internal characteristic are defined with the internal staining technique, the powders can now complete the tooth the the desired anatomical form.





14. Overview Of Colors & Firing Charts

Opaque

Two Firings recommended-to use with the same parameters

	Idle	Dry Time	Rising Temp./ min	Final Temp	Hold Time	Vac on	Vac off
1. Bake	400°C	6 min	80 °C	960 °C	1 min	450 °C	960 °C
2. Bake	400°C	6 min	80 °C	950 °C	1 min	450 °C	950 °C

APVolution M Shading System	
Opaque	Light, Dark, Bleach, A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4
Opaque Dentin	A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4
Dentin	A1, A2, A3, A3.5, A4, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4
Enamel	E1, E2, E3, E4

APVolution M Transpa-, Opal- Powders						
T Opal 1	T Opal 2	Opal Enamel 1	Opal Enamel 2	Opal Enamel 3	T-Pink	
T-Clear	T-White	T-Yellow	T-Blue	T-Orange	T-Amber	
Opal	OE1	OE2	OE3	TO1	TO2	TO3
Modifier	A	B	C	D	White	Yellow
	Brown	Pink	Violet	Blue	Orange	Orange

Firing chart for internal staining						
Idle	Dry time	Rising temp	End Temp	Holding time	Vac on	Vac off
450	6	55	770	1	-	-

Build Up-Powder APVolution M							
	Idle Temp	Rising °C/min	Final Temp	Pre Heat	Hold Time	Vac on	Vac off
Build Up Powder HF	400	55	920	6	1	450	920
Build Up Powder LF	400	55	780	6	1	450	780
Glaze Bake LF	400	55	780	6	1	-	-
Glaze Bake HF	400	55	900	6	1	-	-

APVolution M Enamel-, Transpa-, Opal- Powders						
T Opal 1	T Opal 2	Opal Enamel 1	Opal Enamel 2	Opal Enamel 3	Enamel1	Enamel 2
T-Clear	T-White	T-Yellow	T-Blue	T-Orange	T-Amber	T-Pink

Press Programs

Press Program APVolution M						
Idle	Rising Temp	End Temp	Hold Time	Vac on	Vac off	Ring size
700	65	930	20	700	930	200g
700	65	930	20	700	930	300g
700	65	970	40	700	970	400g

Press & Layering Dentin Ingots

APVolution M Dentin Powders
A1, A2, A3, A3.5, A.4, B1, B2 , B3, B4, C1, C2, C3, C4, D2, D3, D4,
APVolution M Bleach 1,2,3

Press & Stain Shade Specific Transpa Dentin Ingots

APVolution M Transpa Dentin ingots
A1, A2, A3, A3.5, A.4, B1, B2 , B3, B4, C1, C2, C3, C4, D2, D3, D4,

Press & Stain Value Based Ingots

VITA Shades	Aesthetic Press Shade System
A1, A2, B1, B2 , C1, C2, D1, D2	APVolution M Light
A2, B2, C2, D3	APVolution M Medium
A3, A3,5, B3, C3, C3, D3	APVolution M Dark
A4, B4, C4, D4	APVolution M Dark Plus
Bleach Shades 1, 2, 3, 4	APVolution M Bleach 1,2,3
Gingiva	APVolution M Gingiva

The following Gingiva shades are available:



15. Technical data: AP Opaque

Opaque		
Coefficient of thermal expansion	DIN EN ISO 6972	2 bakes $13.1 \times 10^{-6} \times K^{-1}$ 4 bakes $13.1 \times 10^{-6} \times K^{-1}$
Transformation temperature	DIN EN ISO 6972	560 °C

APVolution M Powder Porcelain

Material information:
Material: APVolution M silicate glass ceramic

Chemical composition: mayor components bonded to the glass ceramic structure:

SiO_2 , Al_2O_3 , K_2O , Na_2O , CaO , B_2O_3

Classification acc. DIN EN ISO 6872:2008

Typ 1

Class 1a

APVolution M Dentin, Incisal, etc

Coefficient of thermal expansion	DIN EN ISO 6972	2 bakes $13.1 \times 10^{-6} \times K^{-1}$ 4 bakes $13.1 \times 10^{-6} \times K^{-1}$
Transformation Temperature	DIN EN ISO 6972	580°C

Warnings

Only to be used by trained personnel

When working on ceramic restorations safety glasses should be used. Remove dust and fragments by suction.

Be careful of high firing and pressing temperatures. Danger of getting burnt! Use oven pincers and gloves!

Due to the different ceramic ovens available on the market, the firing conditions may differ. This must be taken into account and is under the responsibility of the client!!!
The indicated firing temperatures are only APPROXIMATE VALUES!!!

Warning for Investment Material:

The investment material contains quartz powder. AVOID inhaling dust, wear a protective mask and safety glasses. Read the warning on the investment packaging.



Recommended storage temperature: 12-38° C and normal air humidity 40-60%.

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