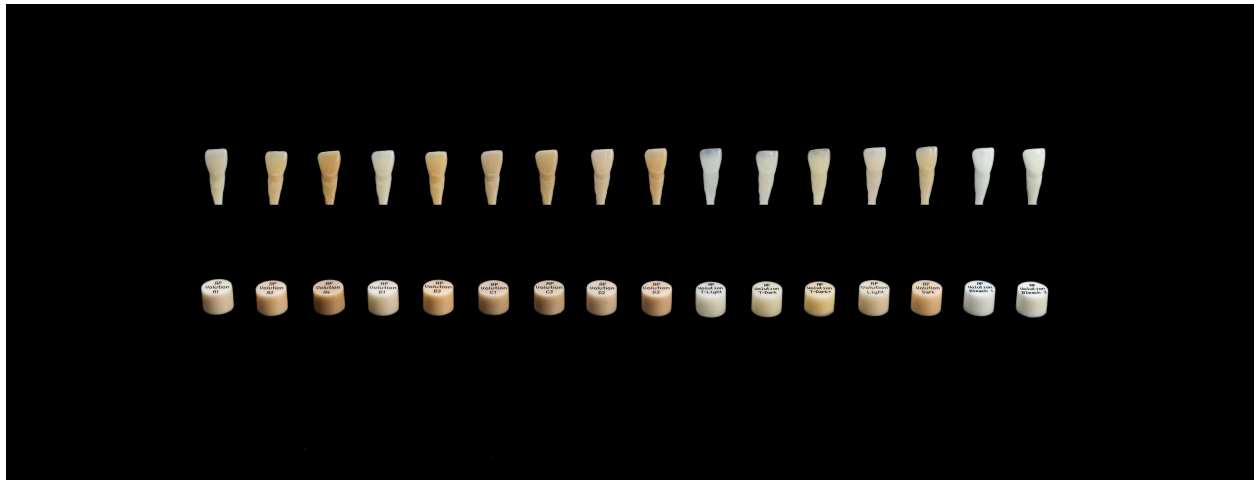


# APVolution S

## Aesthetic-Press Workbook



CE 0044



## APVolution S

## AP Manual-Workbook

Table of contents	Pages
Warnings	3
1 Overview	4
2 Material indication and contra indication	5-7
3 Ingot Selection	8-10
4 Spruing Rules	11-12
5 AP Investment - Easy Vest Speed	13-17
6 Divesting procedure	18-19
7 Internal Staining Technique	20-23
8 Layering technique	24-25
9 Overview Of Colors & Firing Charts	30-32
10 Technical Data	33-35



## 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.

Inhaling dust from investment material can harm the respiratory system and affect your lungs.



\*VITA is a registered trade mark of the VITA- Zahnfabrik, Bad Säckingen

# 1. Overview

## Aesthetic-Press™ APVolution S

Press Ingots

&

Layering Powder

for  
single crowns and smaller three unit bridges



## 2. Material indication and contra indication

The Aesthetic Press pressable ingots are based on a high strength glass ceramic. The colors are designed to match the VITA Classic Shade guide.

APVolution S is intended for dental applications and for use by trained professionals.

Mechanical strength and optical properties qualify APVolution S to press all ceramic single unit restorations (anterior and molar crowns, veneers, inlays, partial crowns/onlays) and three unit anterior bridges. Respect carefully all minimum wall thicknesses and connector cross sections mentioned.

Pressed objects may be completed in layering or staining technique with the Aesthetic Press APVolution layering porcelain and AP stains or AP Chroma shades and AP glaze.

### Contraindications:

- Combination with materials beside the mentioned Aesthetic-Press products and/or materials from foreign manufacturers.
- Manufacturing of non-mentioned restorations.
- Manufacturing of restorations with smaller wall thicknesses and connectors cross sections than mentioned.
- Dental ceramic and complete ceramic restorations made of glass ceramics are not recommended for patients with bruxism or parafunction or patients with substantially reduced residual dentition.

### Overview APVolution S pressable ingots

- . APVolution S pressable ingots for different finishing techniques are offered in four ranges of translucency:

**HT / HT+ High Translucency ingots** for staining technique

**MT Medium Translucency ingots** for staining or layering technique and

**LT Low Translucency ingots** for layering technique.

Translucency	Technique	Indication
--------------	-----------	------------

		staining	cut back & layering	veneer	inlay	partial crown	anterior crown	bridge
High	HT	X		X	X			
Medium	MT	X	X	X	X	X	X	X
Low	LT		X	X		X	X	X

## Preparation guideline and minimum restoration thickness

The preparation of the tooth hard tissue follows the common rules for all ceramic restorations:

- Preparation of a deep chamfer or shoulder with rounded inner edge
- Rounded edges and angles
- Preparation of retentive surfaces and sufficient preparation height for conventional cementation

Minimum wall thickness for the indicated restorations and finishing techniques and connector cross sections are given in the following table:

**Reference:** “*Methodical Tooth Preparation for Predictable Esthetic Excellence*”, by Robert Ritter DMD, Published Inside Dentistry , March 2011

<http://www.google.de/imgres?imgurl=https%3A%2F%2Fwww.dentalaegis.com%2Fmedia%2F7458%2F&imgrefurl=https%3A%2F%2Fwww.dentalaegis.com%2Fid%2F2011%2F03%2Fmethodical-tooth-preparation-for-predictable-esthetic-excellence&h=432&w=650&tbnid=zCmMY3Xqg4-fLM%3A&zoom=1&docid=rKJaZiPGQrWJM&ei=XEiaVd28AYHMsgHBoLfABg&tbm=isch&iact=rc&uact=3&dur=526&page=1&start=0&ndsp=20&ved=0CD8QrQMwCg>

		Veneer	Inlay	Onlay	crown		three unit bridge	
					anterior	posterior	anterior	praemolar
Staining	circular	0.3-0.6	1.0	1.5	1.2	1.5	1.2	1.5
cut back	incisal/occlusal	0.4-0.7	1.0	1.5	1.5	1.5	1.5	1.5
layering	circular	0.6			1.2	1.5	1.2	1.5
	labial/occlusal	0.4			0.4	0.8	0.8	0.8
	incisal/occlusal				0.6	0.8	0.8	0.8
	in general				anatomically reduced tooth shape			
	connector cross section						16	16
	max pontic width						11	9

Caution: 50% of the total restoration dimension must be made in high strength pressable ceramic! In case of excess space always compensate the dimensions in high strength pressable ceramic APVolution S and not in layering porcelain.

## Model preparation

Prepare a segmented plaster working model as usual.

According to the preparation spacer is applied in one or two layers:

- For partial crowns, crowns and veneers apply two layers up to 1 mm apical of the preparation margin.
- For Inlays and Onlays apply two layers to the walls and three layers to the bottom up to 1mm distance to the preparation margin.

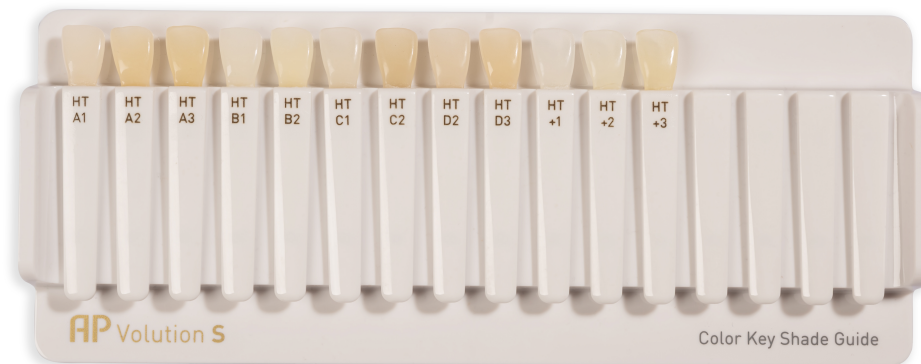
### 3. Ingot Selection

There are four main different ingot opacity categories:

- HT high translucent Ingots for the Press and Staining / or Press and Layering technique for single crowns (depending on situation and color effects)
- HT + high translucent ingots for the Press and Staining technique for inlays and onlays
- MT medium translucent ingots for the Press and Layering technique
- LT low translucent ingots for the Press and Layering technique
- Bleach ingots for the Press and Layering / Press and Staining technique

All ingots are available in 3.0 g

### High translucency ingots and HT +



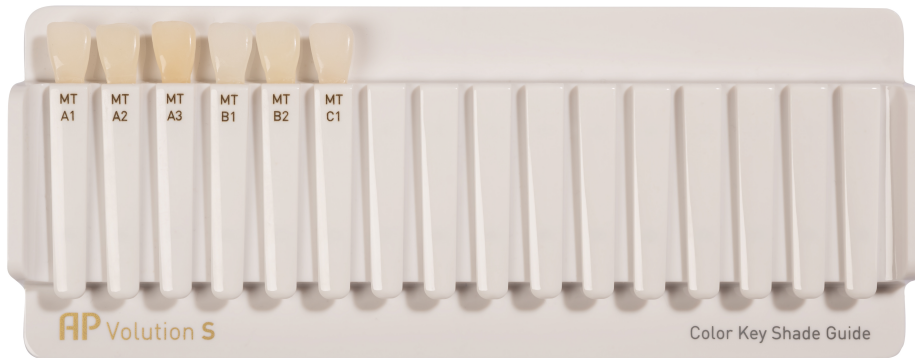
The APVolution S HT and HT + ingots are available in the following shades:

HT	HT+
A1, A2, A3, B1, B2, C1, C2, D3, D4	1, 2, 3





## Medium translucency ingots

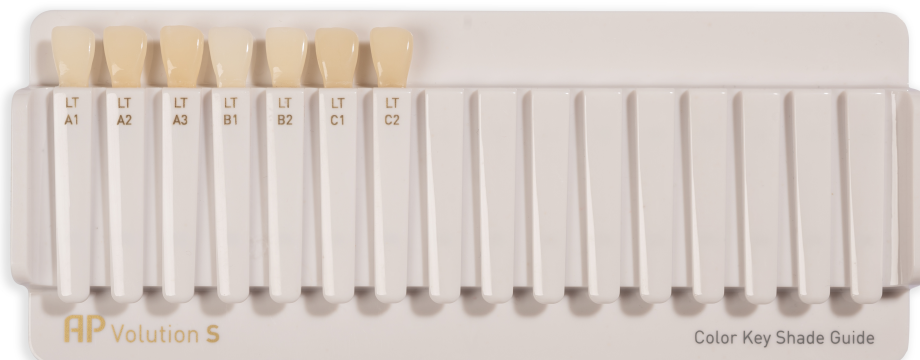


The APVolution S MT ingots are available in the following shades:

MT
----

A1, A2, A3, B1, B2, C1
------------------------

## Low translucency ingots



The APVolution S LT ingots are available in the following shades:

LT
----

A1, A2, A3, B1, B2, C1, C2
----------------------------

# Bleach ingots



The APVolution S bleach ingots are available in the following shades

LT	MT	HT
BL1, BL2, BL3, BL4	BL1, BL2, BL3	BL1, BL2, BL3, BL4

Press Program							
Idle	Rising Temp	End Temp	Hold Time	Vac on	Vac off	Ring size	Press-Level
900	max.	915	18	700	915	200g	5

Please be advised, that temperatures can vary widely in different furnaces. The temperatures in this chart work well for the DEKEMA 654 press-i-dent

Build Up-Powder							
	Idle Temp	Rising °C/ min	Final Temp	Pre Heat	Hold Time	Vac on	Vac off
Build Up Powder	400	55	780	6	1	450	780
Glaze Bake	400	55	775	6	1	-	-

Please be advised, that temperatures can vary widely in different furnaces. The temperatures in this chart work well for the DEKEMA 654 press-i-dent



## 4. 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 compiled rules regarding spruing objects are good, but not absolutely necessary.

### Introduction

The results, of working with the press ceramic by Aesthetic Press), 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

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. 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

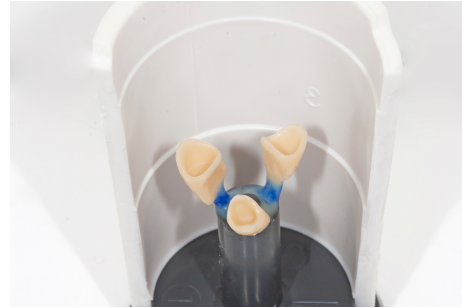
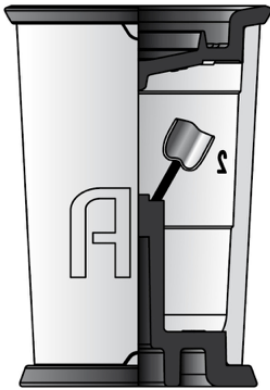
### **Angulation of Sprues: 45 degrees are ideal but not mandatory!**

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).

see the angulation of the single units





single units pressed and divested



### 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 fractures 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.

## 5. AP Investment - Easy Vest Speed *Premium*

***No reaction layer on lithium disilicate!***



### **Speed Investment for all pressable ceramics.**

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!**

**Mixing Ratio for APVolution S and Easy Vest Speed *Premium* Investment:**

AP Volution S/ Silicate reinforced	100 g 14 ml Liquid - 9 ml Water	200g 28 ml Liquid - 18 ml Water
------------------------------------	------------------------------------	------------------------------------

**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)

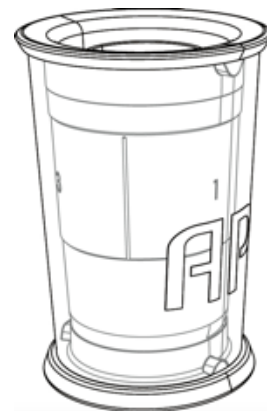
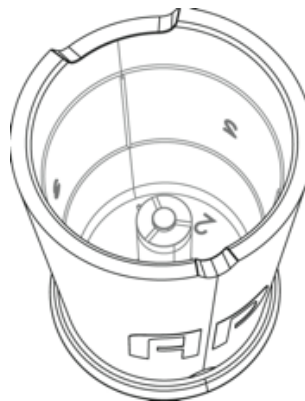
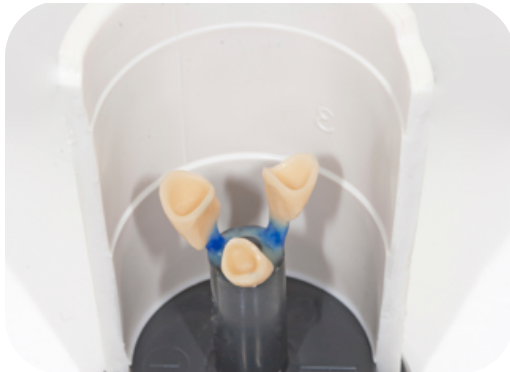
Hold times:

200 g ring 45min



### Warning:

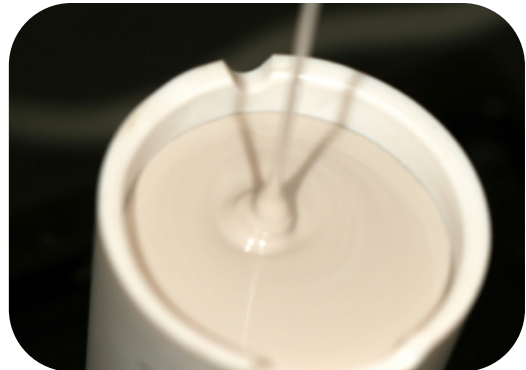
1. Investment contains silica – avoid inhaling dust- danger to lungs and respiratory system
2. Do not open furnace during burn out phase – wax steams might catch fire in the air.



Simple spruing angulation for single units. Choose this angulation for posterior bridges to avoid bubbles on the occlusion. place sprue straight onto the incisal edge.

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 divest 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 Speed *Premium* 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.



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.

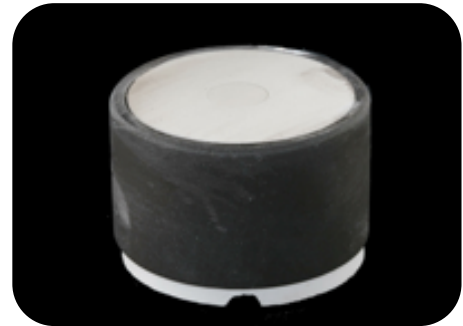


The plunger maker can be filled with the investment material used to invest the regular units. Make sure not to use high expansion ratios. A 50% expansion ratio for the press over porcelain and respectively the plungers are recommended.

## 6. 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, whether 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.

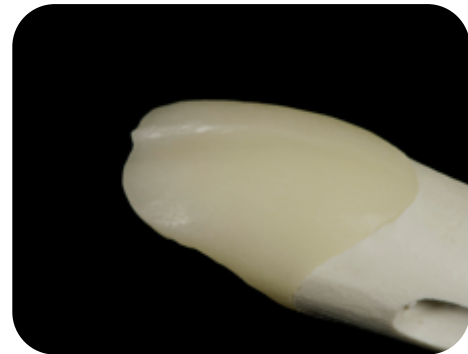


With just a short amount of sandblasting, the invested crowns will be clean and ready to process. As the photo shows, there is no reaction layer!

## 7. 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 too translucent porcelain ares. 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	-	-



## 8. Layering Technique

The Aesthetic-Press S&Z Powders are available for:

Aesthetic-Press APVolution S ingots	APVolution S&Z Powders are compatible for these pressable ingots.
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### The following Shades are available

These Aesthetic-Press Dentin Shades for powder porcelains are available:

Liner	L1	L2	L3	L4	L5		A	B	C	D						
Dentin	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
Enamel	E1	E2	E3	E4												
Opal	OE1	OE2	OE3	TO1	TO2	TO3										
Modifier	A	B	C	D		White	Yellow	Orange	Brown	Pink	Violet	Blue				

See photos on page 26/27

### Dentin-Bake

Mix ceramic powder (Dentin and/or Incisal) with Modeling 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 6 minute closing time and then heated at 55 C/min with vacuum (vacuum starting at 450°C) to 780°C (bake temperature). Hold time: 1 minute without vacuum. After the first dentin/incisal firing is complete, a second layer of dentin and incisal powders is required to complete the anatomy due to the shrinkage of the porcelain.





## 2nd Bake

Same procedure as at the first Dentin firing. Any further Dentin firings should be carried out at 780°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. The Aesthetic-Press Glaze paste can be applied in thin layers. For the color characterization, all conventional Aesthetic Press stains and glaze can be applied and fired.

**WARNING: Be careful not to apply the glaze paste too thick. This can lead to whitish spots!**

Build Up-Powder							
	Idle Temp	Rising °C/min	Final Temp	Pre Heat	Hold Time	Vac on	Vac off
Build Up Powder	400	55	780	6	1	450	780
Glaze Bake	400	55	775	6	1	-	-



Porcelain Powders

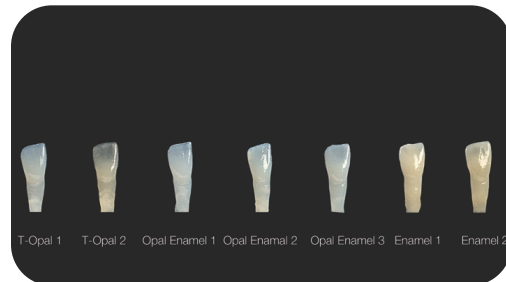
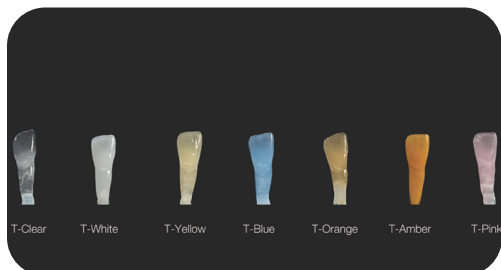
Aesthetic Press APVolution

CTE : DIN EN ISO 6972 2 bakes:  $9.4 \times 10^{-6} \times K^{-1}$   
 4 bakes:  $9.4 \times 10^{-6} \times K^{-1}$

Transformation temperature DIN EN ISO 6972 635° C

The Aesthetic-Press APVolution S&Z Enamel, Transpa & Opalescent Powders are available:

APVolution S&Z Powder						
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 because different thickness. These indicators are all handmade and individually finished. It is our recommendation to 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																		
	L1	L1	L2	L2	L2	L4	L1	L1	L1	L2	L2	L1	L3	L3	L4	L1	L5	L5
Liner																		
	A	B	C	D		Orange	Braun	Lune	Neutral									
Dentin																		
	A0	A1	A2	A3	A3,5	A4	B0	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
Opaque Dentin																		
	A0	A1	A2	A3	A3,5	A4	B0	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
Opal																		
	OE1	OE2	OE3	OE4		O1	O2	O3	O4									
Modifier																		
	A	B	C	D		White	Yellow	Orange	Brown	Pink	Violet	Blue						

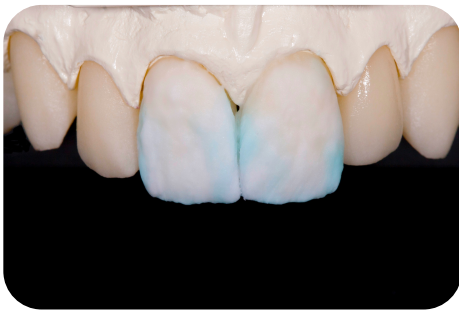
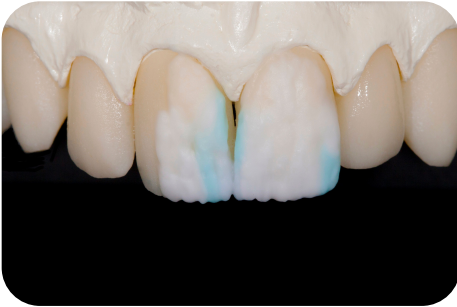
The following Gingiva colors are available as powders and press ingots for press over zirconia.



## Layering Technique in Detail:

Once the first bake has been established or alternatively the Dentin core has been pressed with the Aesthetic Press APVolution S ingot, 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.





# 9. Overview Of Colors & Firing Charts

## Ingot Shades

The following Aesthetic-Press APVolution S Dentin ingot shades are available:

LT	A1	A2	A3			B1	B2			C1	C2						
MT	A1	A2	A3			B1	B2			C1							
HT	A1	A2	A3			B1	B2			C1	C2		D2	D3	HT +1	HT +2	HT +3
Bleach	LT	LT	LT	LT		MT	MT	MT		HT	HT	HT	HT				
	BL 1	BL 2	BL 3	BL 4		BL 1	BL 2	BL 3		BL 1	BL 2	BL 3	BL 4				

Press Program						
Idle	Rising Temp	End Temp	Hold Time	Vac on	Vac off	Ring size
700	max.	915*	18	700	915	200g

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							
	Idle Temp	Rising °C/min	Final Temp	Pre Heat	Hold Time	Vac on	Vac off
Build Up Powder	400	55	780	6	1	450	780
Glaze Bake	400	55	775	6	1	-	-



# 10. Technical data

## Aesthetic-Press APVolution Powder Porcelain

Material information:

Material: silicate glass ceramic

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

SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Li<sub>2</sub>O, P<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, Na<sub>2</sub>O, CaO, B<sub>2</sub>O<sub>3</sub>

### Classification acc. DIN EN ISO 6872:2015

Classification acc. ISO EN DIN 6872:2015 APVolution S Powder				
Type:	1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/>	class:	1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/>	a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/>



**Aesthetic-Press APVolution S ingots**

Coefficient of thermal expansion	DIN EN ISO 6872	pressed $10 \times 10^{-6} \times K^{-1}$ 25-500°C
Transformation Temperature	DIN EN ISO 6872	520°C

**Technical Data:**

Product Description				
Product Name:	APVolution S ingots			
Product reference	various			
Shade:	Special shades	Shade guide	Internal standard	
	A1-A4	Shade guide	V-Shades	
Physical State	paste <input type="checkbox"/>	paste <input type="checkbox"/>	ingot <input checked="" type="checkbox"/>	blank <input type="checkbox"/>

Indication	
Intended use	Pressable porcelain for single unit restorations and anterior three-unit bridges including second praemolar as terminal post
compatible layering porcelain	APVolution Powder without liner/margin

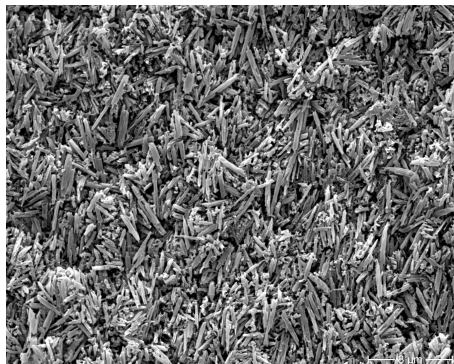




<b>Chemical composition:</b>	Major components bonded to the glass ceramic structure: SiO <sub>2</sub> , Li <sub>2</sub> O, K <sub>2</sub> O, Al <sub>2</sub> O <sub>3</sub> , ZnO, ZrO <sub>2</sub> , P <sub>2</sub> O <sub>5</sub>
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Classification acc. ISO EN DIN 6872:2015 APVolution S Ingots			
<b>Type:</b>	1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/>	<b>class:</b>	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> a <input type="checkbox"/> b <input checked="" type="checkbox"/> c <input type="checkbox"/>

Physical -chemical properties			
Property	Standard / method		Internal specification
<b>coefficient thermal expansion</b>	no specifications	ISO EN DIN 6872	$10 \times 10^{-6} \cdot K^{-1} (\pm 0.5)$
<b>transformation temperature</b>	no specifications	ISO EN DIN 6872	520 °C (± 20)
<b>bending strength</b>	> 300MPa	ISO EN DIN 6872 ch.7.3.2, three/point beding,	> 350 MPa
<b>Weibull strength/ modulus</b>	no specifications	ISO EN DIN 6872 ch.7.3.2, three/point beding,	n.a.
<b>fracture toughness</b>	No specification	ISO EN DIN 6872, SEVNB	> 2 MPa√m
<b>chemical solubility</b>	< 100 µg · cm <sup>-2</sup>	ISO EN DIN 6872	< 60 µg · cm <sup>-2</sup>
<b>cytotoxicity</b>	no cytotoxicity	ISO 10993-5	n.a.
<b>radioactivity</b>	<1Bq·g <sup>-1</sup> U <sup>238</sup>	ISO EN DIN 6872	n.a.



**Silicate reinforcement increases MPA strengt**

