

CERAMAX

Directions for Use



OD
ALPHADENT

Device Name

<i>Proprietary Name</i>	CERAMAX®
<i>Common Name</i>	Dental Ceramic
<i>Classification Name</i>	Porcelain powder for clinical use

Indication for Use

CERAMAX is indicated for veneering of metal framework and copings for the preparation of crowns and bridges.

Contraindication

The application of CERAMAX is contraindicated if

- the coping of artificial teeth is made of ceramic materials.
- a crack occurred by compression or tension.
- a patient is likely to be allergic to any ingredients of dental ceramic.

Characteristics

Good Matching the CTE of Metal Frame

Safe from cracks worried in repeated firing and cooling.

Controlling Precisely Particle Size Distribution

Good workability of build-up.

Adding the Bonding Agents in Opaque Porcelain

Enhanced the bond strength of porcelain to metal.

Adding the Fluorescent Pigment

Improved esthetic nature of artificial teeth.

Recommended Alloys for CERAMAX

CERAMAX is recommended to be used in conjunction with alloys of which CTE (the coefficient of thermal expansion) is $13.8\sim14.3\times10^{-6}/^{\circ}\text{C}$ ($25\sim500^{\circ}\text{C}$). The CTE of porcelain can be adjusted by controlling the cooling time, and therefore it can be used with any alloys with CTE ($25\sim500^{\circ}\text{C}$) up to $14.5\times10^{-6}/^{\circ}\text{C}$



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Description

CERAMAX is a dental material product composed of feldspar, quartz, oxides, carbonates and color pigments including fluorescent pigment. It consists of Opaque (including Powder opaque, Paste opaque and Opaque modifier), Dentine (including Dentine modifier and Opaciously dentine), Enamel, Translucent, Cervical, Margin, Gum, Glaze and Stain. They are used by dental technicians for the preparation of crowns and bridges. It is used in prosthetic dentistry by heating the powder mixture to a high temperature in a furnace to produce a hard prosthesis with a glass-like finish.

Standard and Classification

(1) Applicable standard;

ISO 6872 [2008] Dentistry – Ceramic materials
ISO 9693 [1999]/Amd 1[2005] Metal–ceramic dental restorative systems
ISO 9693–1 [2012] Dentistry – Compatibility testing –
Part 1 : Metal–ceramic systems
ISO 9693–2 [2014] Dentistry – Compatibility testing –
Part 2 : Ceramic–ceramic systems

(2) Classification by ISO6872:2008; Type I, Class 1

According to clause 4 of ISO6872, Type I includes ceramic products which are provided as powders, pastes and aerosols, and Type II includes all other forms of ceramic products. All components of CERAMAX are included in ceramic products as powder and paste. Therefore, only Type I can apply to classify all components by ISO6872:2008. And CERAMAX belongs to Class 1 since it is the aesthetic ceramic for coverage of a metal substructure.

Color Combination Chart (Shade Table)

Shade (Vita Lumin)	A1	A2	A3	A3.5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
OPAQUE (Powder & Paste)	A10	A20	A30	A3.50	A40	B10	B20	B30	B40	C10	C20	C30	C40	D20	D30	D40
DENTINE	A1D	A2D	A3D	A3.5D	A4D	B1D	B2D	B3D	B4D	C1D	C2D	C3D	C4D	D2D	D3D	D4D
OPACIOUS DENTINE	ODA1	ODA2	ODA3	ODA3.5	ODA4	ODB1	ODB2	ODB3	ODB4	ODC1	ODC2	ODC3	ODC4	ODD2	ODD3	ODD4
CERVICAL	AC1+ A1D	AC1+ A2D	AC1	AC2+ A3.5D	AC2	BC+ B1D	BC+ B2D	BC+ B3D	BC	CC+ C1D	CC+ C2D	CC+ C3D	CC	DC+ D2D	DC+ D3D	DC
ENAMEL	E2	E2	E3	E3	E4	E1	E3	E3	E3	E2	E3	E3	E4	E2	E3	E3

TRANSLUCENT	Clear	OPal	Pearl	Brown	Blue	Milky		
	TCL	TOP	TPE	TBR	TBL	TMI		
	Color Modifier	Yellow	Orange	Pink	Dark Brown	Grey	White	Blue
	OPAQUE	OM-Y	OM-O	OM-P	OM-DB	OM-G	OM-W	-
	DENTINE	DM-Y	DM-O	DM-P	DM-DB	DM-G	DM-W	DM-B
MARGIN (Shoulder)	S1	S2	S3	S4	S5	GUM	LIGHT PINK	DARK PINK
	A1, B1	A1, B2, C1, D2	A3, B3, B4	C2, D3, D4	A3.5, A4, C3, C4			

GLAZE & STAIN

- GLAZE: GLAZE, PINK
- YELLOW: YELLOW, LILAC
- ORANGE: ORANGE, BLUE
- OCHER: OCHER, BLACK
- BROWN: BROWN, GREY
- RED BROWN: RED BROWN, WHITE
- DARK BROWN: DARK BROWN

- PASTE OPAQUE : 16 Shades and Base Opaque (POP-ACE; Orange & Light Orange)

Bleaching Shade of CERAMAX

Shade	A00	A0	B00	B0
DENTINE	AooD	AoD	BooD	BoD
OPAQUE	AoO		BoO	
OPACIOUS DENTINE	ODAo		ODBo	

Colors of CERAMAX

Porcelain	Colors	Packing Unit	Name
OPAQUE (PASTE)	19	5g	POP-A10/ A20/ A30/ A3.50/ A40/ B10/ B20/ B30/ B40/ C10/ C20/ C30/ C40/ D20/ D30/ D40/ Ao0/ Bo0/ ACE-O
OPAQUE (POWDER)	18	10g 50g	A10/ A20/ A30/ A3.50/ A40/ B10/ B20/ B30/ B40/ C10/ C20/ C30/ C40/ D20/ D30/ D40/ Ao0/ Bo0
OPAQUE MODIFIER	6	10g 50g	OM-Y/ OM-O/ OM-P/ OM-DB/ OM-G/ OM-W
OPACIOUS DENTINE	18	10g 50g	ODA1/ ODA2/ ODA3/ ODA3.5/ ODA4/ ODB1/ ODB2/ ODB3/ ODB4/ ODC1/ ODC2/ ODC3/ ODC4/ ODD2/ ODD3/ ODD4/ ODAo/ ODBo
DENTINE	20	10g 50g	A1D/ A2D/ A3D/ A3.5D/ A4D/ B1D/ B2D/ B3D/ B4D/ C1D/ C2D/ C3D/ C4D/ D2D/ D3D/ D4D/ AooD/ AoD/ BooD/ BoD
DENTINE MODIFIER	7	10g 50g	DM-Y/ DM-O/ DM-P/ DM-DB/ DM-G/ DM-W/ DM-B
ENAMEL	4	10g 50g	E1/ E2/ E3/ E4
TRANSLUCENT	6	10g 50g	TCL/ TOP/TPE/TOR/TBR/TMI/TBL/TPI
CERVICAL	5	10g 50g	AC1/ AC2/ BC/ CC/ DC
MARGIN	5	10g 50g	S1/ S2/ S3/ S4/ S5
GUM	2	10g 50g	Light Pink/ Dark Pink
GLAZE & STAIN	14	3g	GLAZE, PASTE GLAZE / STAIN Yellow, Orange, Ocher, Brown, Red Brown, Dark Brown, Pink, Lilac, Blue, Black, Grey, White

Kit of CERAMAX

MASTER KIT



PASTE OPAQUE (5g) A20/ A30/ B20/ B30/ ACE-O
OPACIOUS DENTINE (10g) ODA2/ ODA3/ ODB2/ ODB3
DENTINE (10g) A2D/ A3D/ B2D/ B3D
ENAMEL (10g) E2/ E3
TRANSLUCENT (10g) TCL/ TOP/TPE/TBR/TMI/TBL
MODIFIER (10g) DM-Y/ DM-O/ DM-W
CERVICAL & MARGIN (10g) AC1/ BC/ S-2/ S-3
GLAZE (3g) GLAZE
LIQUIDS Build-up(15ml)/ POP(10ml)/ Glazing(10ml)

COMPLETE KIT

All porcelains of CERAMAX

TRIAL KIT



PASTE OPAQUE (5g) A20/ A30
OPACIOUS DENTINE (10g) ODA2/ ODA3
DENTINE (10g) A2D/ A3D
CERVICAL (10g) AC1
ENAMEL (10g) E2/ E3
TRANSLUCENT (10g) TCL/TMI
GLAZE (3g)
GLAZING LIQUID (10ml)
BUILD-UP LIQUID (15ml)



Firing Schedule



Firing Schedule

Condition		PreDry		Firing			Vacuum (mmHg)
Bake		Start Temp.	Time	Heating Rate	Final Temp.	Holding Time	
1st OPAQUE (Wash)	Paste	450 °C	8 min	60 °C/min	960 °C	1 min	full
	Powder	500 °C	5 min	60 °C/min	930 °C	1 min	full
2nd OPAQUE	Paste	450 °C	8 min	60 °C/min	950 °C	1 min	full
	Powder	500 °C	5 min	60 °C/min	920 °C	1 min	full
MARGIN(Shoulder)		500 °C	5 min	60 °C/min	910 °C	1 min	full
1st BUILD-UP(Body)		500 °C	5 min	60 °C/min	880 °C	1 min	full
2nd BUILD-UP(Body)		500 °C	5 min	60 °C/min	870 °C	1 min	full
GLAZING	Self-	500 °C	3 min	60 °C/min	880 °C	1 min	-
	Powder	500 °C	5 min	60 °C/min	870 °C	1 min	-

- This firing schedule is just recommended conditions for your good firing results.

- You should change the firing temperature according to your porcelain furnace, and control the holding time within 1min for the size of bridges.

Variation of Firing Condition for Bridges

Condition		PreDry		Firing			Vacuum (mmHg)
Bake		Start Temp.	Time	Heating Rate	Final Temp.	Holding Time	
1st BUILD-UP	1-3 Bridges	500 °C	5 min	60 °C/min	880 °C	1 min	full
	4-5 Bridges	500 °C	8 min	60 °C/min	885 °C	1 min	full
	> 6 Bridges	500 °C	10 min	60 °C/min	890 °C	1 min	full
GLAZING	1-3 Bridges	500 °C	3 min	60 °C/min	880 °C	1 min	-
	> 4 Bridges	500 °C	5 min	60 °C/min	890 °C	1 min	-

Properties

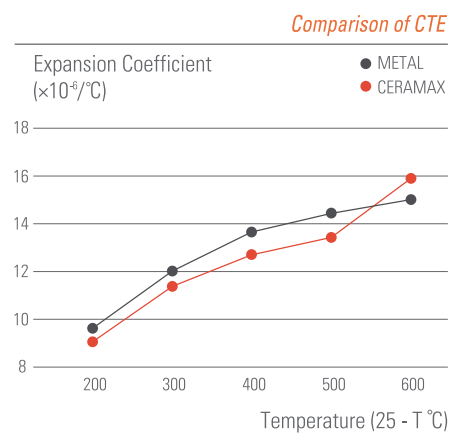


Thermal Expansion

The coefficient of thermal expansion (CTE) of dental porcelain powder is a key property of PFM. It must be consistent with the CTE of the metal so as to manufacture a excellent artificial teeth of high coherency with metal.

Leucite crystal is used for the CTE of dental porcelain powder and the gap of which and the CTE of metal should be within $1 \times 10^{-6}/^{\circ}\text{C}$.

Developed the technology of manufacturing process for controlling of precise coefficient of thermal expansion and for avoiding a prosthesis changing variation in process of firing.



Physical and Chemical Properties

The result of physical and chemical properties of dental porcelain powder measured in accordance with KFPA, CE, ISO standard is as follows.

These results are adaptable to KFPA, CE, ISO and other international standards.

Porcelain Properties	Opaque	Dentine	Enamel
Coeff. of Thermal Expansion ($\times 10^{-6}/^{\circ}\text{C}$)	12.5	13.1	13.1
Glass Transition Temperature ($^{\circ}\text{C}$)	540.8	504.1	504.1
Chemical Solubility ¹⁾ (loss-in-mass, $\mu\text{g}/\text{cm}^2$)	34.4	34.4	34.4
Flexural Strength ²⁾ (MPa)	77.8	71.7	71.7
Bond Strength ³⁾ (MPa)	31.2		

Requirements of ISO Standard

¹⁾ Chemical Solubility < 100 $\mu\text{g}/\text{cm}^2$

²⁾ Flexural Strength > 50 MPa

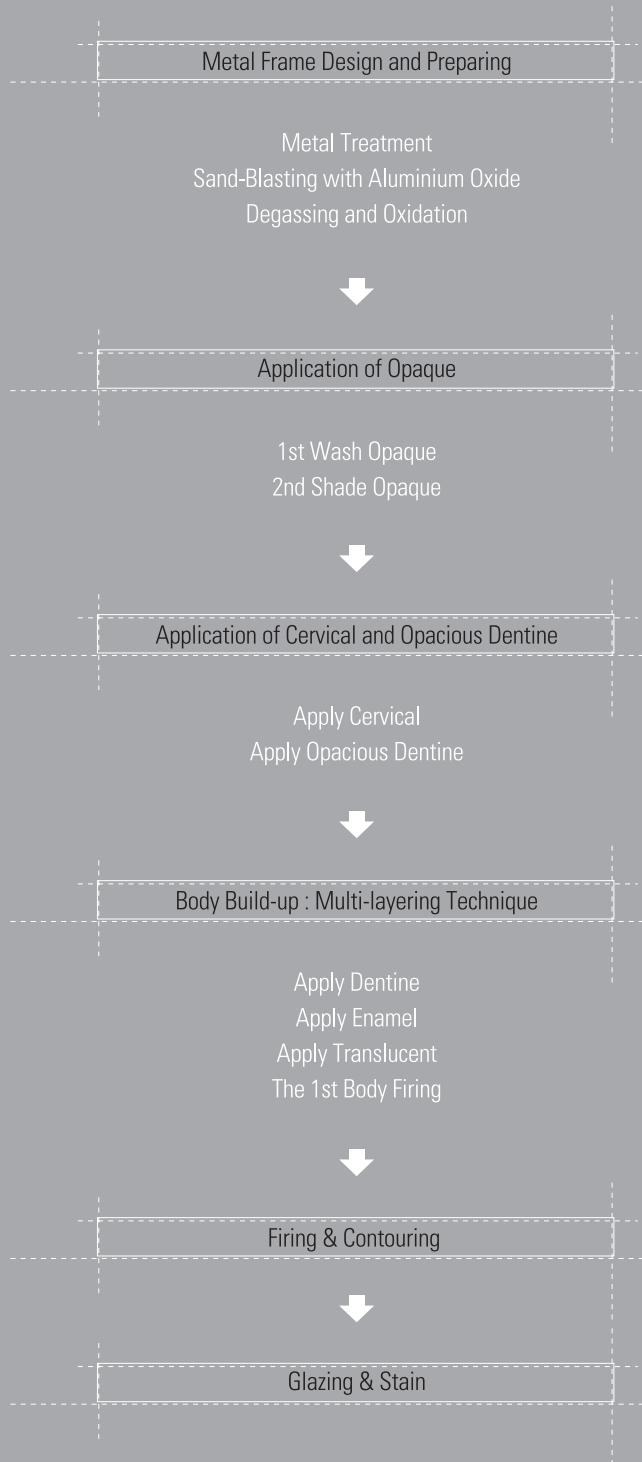
³⁾ Bond Strength > 25 MPa

Particle Size Distribution

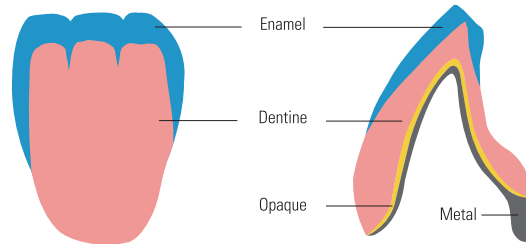
Porcelain	Diameter (μm)	
	Mean	Max.
OPAQUE, Powder	12~14	80
OPAQUE, Paste	7	40
BODY	17~20	100
GLAZE & STAIN	5	40

Using Instruction

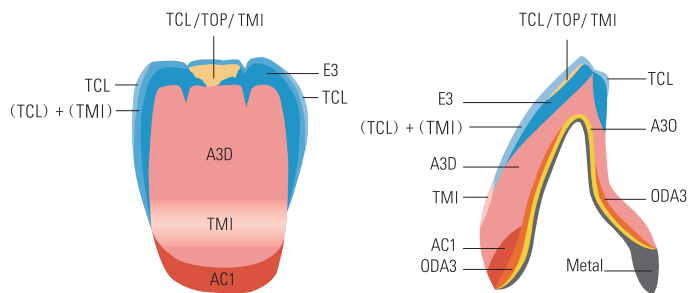







Basic Build-up



Multi-Layering Build-up



1	Preparation of the framework	
2	Sandblasted the framework	
3	Degassing and Oxidation	

Metal Frame Design and Preparing

Metal Treatment

Metal Surface should be prepared using carborundum point or tungsten carbide bur after casting and fitting.

Sand-Blasting with Aluminium Oxide

Precious metal alloys : 50 - 125 μm
Non-precious metal alloys : 110 - 250 μm
Sand blasting by air pressure of 2 - 4 bars.

Pretreatment varies with the type of alloys, and it includes surface grinding and cleaning, according to the instructions of the manufacturer.

Degassing and Oxidation

Please observe the instruction of the alloy manufacturer for degassing and oxidation of metal frame.

Application of Opaque

1st Wash Opaque

Apply Paste Opaque-ACE(Orange color) for wash opaque thinly with a brush to feel warm.

The wash opaque is fired at 20-30°C higher temperature than that of 2nd opaque.





ACE light orange is used for A1, B1, and bleaching shades, and orange color is used for the other shades.

2nd Shade Opaque

Apply Shade Opaque uniformly onto metal framework after firing 1st opaque.

Add Modifier in order to control the shade of opaque partially.

- (ex) · Cervical Part OM-O : shade opaque=1:8
 · Proximal Part OM-DB : shade opaque=1:10
 · Incisal Part OM-G(or B) : shade opaque=1:5

	1 Application of 1st Opaque with Base Paste Opaque(ACE)
	2 1st Opaque firing
	3 Application of 2nd Opaque with Shaded Paste Opaque
	4 2nd Opaque firing

Application of Cervical and Opacious Dentine

Apply Cervical

Apply Cervical in order to increase the chroma in the cervical area.

Apply Opacious Dentine



Build-up Opacious Dentine in a little bigger size than coping. Opacious Dentine is used for increasing the value.

1. On the cervical area.

OD is used to avoid a strong reflection of opaque in OD on the surface of the opaque layer over the entire crown gradually from the cervical region toward the incisal.

2. On the interdental proximal area

OD is used to avoid dark shadow caused by light reflection.










	1 Build-up of Cervical
	2 Build-up of Opacious Dentine

3. On the pontic base area

Increase the higher value of cervical area to harmonize with the adjacent teeth.

4. On the labial surface

In order to achieve true-to-nature shade effects even if space is limited.

1 Build-up of Dentine	 A diagram showing the initial build-up of dentine on the lingual side of the incisor, represented by a pink layer.
2 Build-up of Translucent -1	 A diagram showing the first layer of translucent material (pink) being built up on the lingual side of the incisor.
3 Build-up of Enamel	 A diagram showing the first layer of enamel (blue) being built up on the lingual side of the incisor.
4 Build-up of Translucent -2	 A diagram showing the second layer of translucent material (pink) being built up on the lingual side of the incisor.
5 Build-up of Translucent -3	 A diagram showing the third layer of translucent material (pink) being built up on the lingual side of the incisor.
A view of lingual side	 A diagram showing the lingual side of the incisor with the build-up material (pink) applied.
6 Cut-back of Incisal parts	 A diagram showing the incisal edge of the incisor being cut back with a dental bur.
7 2nd Build-up of Enamel & Translucent	 A diagram showing the second build-up of enamel (blue) and translucent (pink) material on the lingual side of the incisor.
A view of lingual side	 A diagram showing the lingual side of the incisor with the final build-up material (pink) applied.

Body build-up : Multi-layering Technique

Build-up of Dentine

Build-up Dentine powder to make the final teeth shape and cut-back to shape mamelon.

Build-up of Translucent -1

Build-up the mixture of TCL and Enamel on the incisal part.

Build-up of Enamel

Build-up Enamel and several Translucent powder alternately.

Build-up of Translucent -2

Build-up Translucent, specially apply the mixture of TCL TMI for Opal effect.

Build-up of Translucent -3

Build-up Translucent powder to be 10% bigger than the final size.

Cut-back of Incisal part

Cut-back the lingual side of the incisal part.

2nd Build-up of Enamel & Translucent

2nd build-up Enamel and Translucent with 1 mm thickness on the edge of the incisal part for Halo effect.

Firing & Contouring

Fire the build-up body according to the firing schedule.
Complete the form of teeth by grinding after Body Firing.



Glazing & Stain

Mixing Glaze powder with Glazing liquid in the ratio of 1 to 10.

To complete the characteristics of your restorations, you can use the Inner Stain Technique with CERAMAX Stain.



Troubleshooting & Notice

CHERAMAX
PORCELAIN FOR PFM

AL 834-23, DAEJA, DEOKYANG,
GOYANG, GYEONGGI, KOREA
ALPHADENT 412-480 www.alphadent.co.kr
REF UM 11 CTE (25-500°C) $13.1 \times 10^{-6}/^{\circ}\text{C}$ at 500°C
T_g 510°C (552°C for opaque) Net Wt. 10g
 DONGBANG ACUPRIME Gater House
Gater Lane, Palace Gate, Exeter, EX1 1JL, UK
 Keep dry. Do not inhale powder.
Federal law restricts this device to
sale by or on the order of a dentist. **FDCE** 1120 **10g**

Crack & Cleavage

Crack or Cleavage after firing porcelain

Too big difference of the thermal expansion of metal with porcelain. - Choose a dental casting alloy which CTE is compatible with porcelain.

Wrong design of metal framework - Remove a sharp edge of metal framework, and grind metal surface smoothly in one direction.

Over-firing of porcelain - Do not fire a porcelain at higher temperature than recommended. Follow the firing schedule of CERAMAX.

Thermal-shock - Cooling down a porcelain slowly after firing. Do not hold a hot porcelain-body with a cold instrument.

Crack occurred on the surface of porcelain

Inadequate Build-up - Avoid too much shock or pressure when build-up.

Too fast dry - Dry porcelain fully in moderate rate.

Insufficient condensation - Remove water sufficiently by condensation, brushing and tissue.

Crack occurred on the side of pontic base

Too thick the porcelain layer. - Design the metal substrate in consideration of porcelain layer. Too thick porcelain layer, induce compression on the surface and tension on the inner part during the cooling, and then crack occurs in the porcelain due to increase stress.

Too high firing temperature of the 2nd Opaque - Do not fire the 2nd Opaque at too high temperature. Follow the firing schedule of CERAMAX.

Induce crack or separate opaque porcelain from metal frame due to a gas released out of metal.

- In case of cap trimming of precious alloys, use diamond bur, alumina point or carbide bur. Do not use carborundum point, etc.

Color Change

Greening or Whitening after body-firing

GREETING: From a contaminated grinding instruments. Contaminated with dust or debris of instruments, amalgam and alloys.

- Devide the instruments for alloy and for porcelain. Be careful of not contaminating porcelain with dust or debris of instruments, amalgam and alloys.

Fire at too high temperature or build-up Enamel porcelain excessively.

- Follow the recommended firing temperature. and apply Enamel on the 1/3 part of Incisal.

Not enough gloss after firing

Insufficient the 1st firing. - Fire porcelain up to getting glossy at the 1st firing

In case of repeated firing. - Do not fire many times if possible

Not enough translucency after glazing

The start temperature is too high. - Follow strictly the recommended firing schedule.

In case of washing porcelain with a contaminated solution after contouring.- Use always a fresh cleaning solution. If use a contaminated solutions as alcohol or acetone, porcelain will be changed color turbidly after glazing by a foreign matters which attached on the porcelain surface.

Greyish after staining

Organic ingredients was deteriorated since stain is left alone for a long time after mixing with liquid

- Use a glaze mixed with liquid just as needed amounts, and store liquid bottle at room temperature and keep away from light.

Bubble of Porcelain

Bubbling after opaque-firing

Gas existed in a cast alloy, or a contaminated cast alloy. - Carry out degassing according to the manufacturer's instruction. Eliminate all gases in alloy before working opaque porcelain.

In case of using inadequate grinder for cap trimming - Use a diamond bur, alumina point or carbide bur to treat a precious alloy. There are liable to release gas from silicon carbide for using carborundum point.

Bubbling on the surface after body-firing

Insufficient Condensation or excess water

- Mix powder with water to be creamy state without excess water. Condense and vibrate smoothly after build up porcelain, and be careful of water not concentrating at the parts of incisal or cervical. Remove excess water with tissue at lingual surface.

In case of gas expansion - Do not heat rapidly to dry porcelain after build-up.

In case of Gaze-firing in vacuum - Fire Glaze surly at the atmosperic pressure.

Q&A for using Paste Opaque

Q. Is it possible to place Paste Opaque open in air?

A. Be sure to keep the cover after taking as needed amounts.

Q. Is it possible to mix Paste Opaque with water?

A. Use only Paste Opaque Liquid always to control the viscosity of Paste Opaque.

Q. How is moisture on the surface of metal frame on applying Paste Opaque?

A. Apply Paste Opaque on fully dried metal frame since moisture deteriorate the property of Paste Opaque.

Q. Is it needed condensing process for Paste Opaque?

A. Condensing is not needed for Paste Opaque, but it must paint Paste Opaque thin and evenly with brush.

Q. Is it possible to dry Paste Opaque with a hair-dryer?

A. Do not use a dryer since it may bubble up by gas on heeting quickly.

Q. How is Wash Opaque for Paste Opaque?

A. Apply 1st Opaque with thickness to cover metal in the degree of 70~80%.

Q. Is it possible to re-use the remained Paste Opaque after using?

A. The Liquid for Paste Opaque is organic solution, and so it is affected by temperature and moisture. Use Paste Opaque as needed amounts and do not use the remains.

Q. Is it possible to use Paste Opaque mixed with Powder Opaque?

A. Generally do not mix with Powder Opaque.

However it can be use Paste Opaque mixed with Powder Opaque less than 20% to control the viscosity and increase masking metal color.









Warnings

- For Dental Use Only
- If accidental contact with eyes or prolonged contact with inhalation of oral tissues occurs, flush immediately with large amounts of water.
- Protective device for the respiratory tract is highly recommended during using.
- Consulting with a doctor in case of toothache, allergy and crack on prosthesis are strongly recommended.

Storage

- Do store at proper temperature or keep out of the intense light.
- Don't keep with humidity.

Symbols Found in Labeling

Charting	Detail	Charting	Detail
Type I	Classification According to ISO6872		Date of Manufacturing
CTE	Coefficient of Thermal Expansion		EU Representative
Tg	Glass Transition Temperature		Keep Dry
	Lot Number	REF	Article Number
	Manufacturer		See User's Manual

Manufacturer



F104, F101-10, F101-5 Prod. Center 333,
Cheomdan Gwagi-ro, Buk-gu, Gwangju, Korea.

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<http://www.alphadent.co.kr>



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