

The System

With the growing popularity of Alumina Oxide (Al₂O₃) based substructures in aesthetic dentistry, it is only fitting the SNF PressCeram™ has grown to include a system that is able to press and/or layer to Alumina (Al₂O₃). Swiss NF Metals is proud to introduce SNF PressCeram™ - AL.



SNF PressCeram™ - AL porcelain pressing ingots enable the reconstruction of natural looking teeth when pressed to Alumina (Al₂O₃) crowns and frameworks.

SNF PressCeram™ - AL layering ceramic is a low fusing (780°C) dental ceramic material, used for the production of crowns and bridges using Alumina (Al₂O₃) based frameworks. The layering ceramic can be used either with the pressing technique, or independently and directly on the Alumina (Al₂O₃) substructure.

The Material

SNF PressCeram™ - AL Ingots

- The ingots have a high density and low wear to opposing dentition.
- The ingots can be used when utilizing the 'Stain & Glaze Technique', the 'Cut-back & Layering Technique', or both.
- The ingots are fluorescent and opalescent.
- The ingots are available in many shading systems: Vitapan Classical A-D shades, CT1-CT4 shade ranges for the veneering and inlay/onlay technique, Monocast Staining Shades and Various Bleach Shades.
- The ingots are available in 2g and will also be available in 5g sizes.

SNF PressCeram™ - AL Dentins

The following shades are available in 10g jars: A0, A1, A2, A3, A3.5, A4, B0, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4

SNF PressCeram™ - AL Opaceous Dentins

The following shades are available in 10g jars: A0, A1, A2, A3, A3.5, A4, B0, B1, B2, B3, B4, C1, C2, C3, C4, D2, D3, D4

SNF PRESSCERAM™ - AL INSTRUCTIONS FOR USE

SNF PressCeram™ - AL Incisals

The following shades are available in 10g jars: Incisal 1, Incisal 2, Incisal 3, Incisal 4, Neutral, Clear, Pearl

SNF PressCeram™ - AL Transluents

The following shades are available in 10g jars: TL Apricot, TL Yellow, TL Orange, TL Pink, TL Light Blue, TL Blue, TL Grey, TL White

SNF PressCeram™ - AL Opals

The following shades are available in 10g jars: Opal, Opal Light, Opal Medium, Opal Strong

SNF PressCeram™ - AL Correction Powder

The correction powder is available in a universal shade and is packaged in 10g jars.

SNF PressCeram™ - ATZ Fluorescing Stains

The following shades are available in 3g jars: Shade A, Shade B, Shade C, Shade D, Yellow, Brown, Violet, Black, White, Blue, Orange, Dark Orange, Grey, Khaki

SNF PressCeram™ - AL Liner

The following shade is available in a 10g jar: OP1

SNF PressCeram™ - AL Glaze & Liquids

Glaze Powder (5g), Universal Glaze Liquid (20ml), Modelling Liquid-SL (50ml)

Indications

SNF PressCeram™ - AL is indicated for use with any Alumina (Al₂O₃) framework/substructure (e.g. Procera®, In-Ceram®, Wol-Ceram® or any Alumina milling blocks) where superior fit of the margin is desired.



Contraindications: The press and layering material are NOT to be used as an independent sustaining framework. The material must be used WITH an Alumina framework. Also, SNF PressCeram™ - AL ingots are only compatible with the low-fusing SNF PressCeram™ - AL layering ceramic.

Tooth Preparation Guidelines

Refer to the Alumina manufacturer's recommendations for tooth preparation guidelines of Alumina restorations. When modelling the Alumina coping/framework, be sure not to create any sharp angles in the design. When modelling and reconstructing the Alumina framework, it is essential to meet the minimum thickness given by the manufacturer. If the frameworks are too thin, cracks may occur during the pressing procedure.

Full Contour Wax-up

****Weigh the Alumina Framework Before Waxing****

Wax directly over the Alumina framework using an ash-free wax. Waxing-up to full contour is recommended. If desired, cutback 10% of the wax pattern for porcelain application. Wax thickness should be no less than 0.8mm for successful pressing and avoid waxing thin areas.



Note: The stabilization bar on the bridge in the diagram is for retention of the frame in the investment when pressing.

Sprue Design

Sprue Considerations for Single Restorations:

- Attach an 8-gauge (2.5-3mm) diameter wax sprue to the wax pattern. (Avoid using plastic sprues). The length of the sprue will vary depending on the size of the unit. It is recommended that the sprue length be 3mm.
- Single posterior units should be sprued at the thickest waxed area. For larger posterior units, it is recommended that you create a secondary sprued area to ensure a complete press. Single anterior units should be sprued on the incisal edge.
- **IMPORTANT: Weigh the sprued wax pattern before attaching the unit to the sprue former. Record the weight to determine the ingot requirements. See, "Ingot Requirements" in the following section.**
- Make sure there is a 45-60° angle when attaching the sprue to the sprue former. Be sure that the unit is NOT sprued on a 90° angle.
- Be sure that there is excellent, uniform directional flow when attaching the coping to the sprue former. The ceramic should be able to flow easily when pressing, with no sharp/abrupt directional changes.
- For posterior units, the occlusal surface should be facing inwards with the gingival surface pointing outwards. For anterior teeth the labial surface should be facing inwards with the lingual surface pointing outwards.
- For multiple units, be sure that the units are no closer than 3mm apart from each other.
- Before investing, be sure that the sprued unit is at least 10mm from the ring former walls and 10mm from the top of the ring former.



Sprue Considerations for Bridges:

- Attach 6 gauge diameter sprues to the incisal/occlusal surface of the waxed framework. Refrain from using plastic sprues.
- Sprue each abutment and each pontic individually having a running bar with half moon design.

Ingot Requirements

Take the recorded weight of the waxed-up Alumina framework with sprues and subtract the recorded weight of the Alumina framework before wax-up. The difference in weight establishes the total weight of the wax that is required for pressing. This will in turn determine the number of ingots required for a successful pressing.

Wax Weight	Number Of Ingots	Ingot Size
0.1 – 0.5 g*	1	2 g ingot
0.6 – 1.4 g	2	2 g ingots

* For wax patterns that weigh 0.25g or less, it is suggested that a phantom sprue be used.

Ring Former Selection

It is recommended that you use a Re-usable Plastic Ring Former. However, paper ring formers can also be used. Determine the proper ring former size as follows:

The **100g Ring** takes up to 1 x 2g ingot. Typically, with a 100g ring you can press, 1-2 crowns or 2 small veneers.

The **200g Ring** takes up to 2 x 2g ingots. Use this ring for pressing bridges and multiple single units.

The standard size ALOX plungers or the standard size disposable plungers are recommended when pressing.

Investing Wax-up

Use an investment that is suitable for pressing to Alumina. **Follow the manufacturer's instructions exactly.**

Burnout Method

Bench set the invested ring following the Investment Manufacturer's instructions. After bench setting the ring, place the ring (with the ALOX plunger) in the CLEAN burnout furnace using the following directions:

Ring Size	Temperature	Soak Time*
100g	850°C / 1600°F	30-40 minutes
200g	850°C / 1600°F	40-50 minutes

* Add 10 – 15 minutes for each additional ring place in the burnout furnace

Note: Make sure that the ring is lying down on a 45° angle when in the burnout furnace. This will assure a clean burnout process.

Pressing Procedure

Once the burnout stage is complete, place the room temperature ingots(s) into the ring.

IMPORTANT: DO NOT PREHEAT THE INGOTS.

The ring will begin to cool down immediately after removing it from the burnout furnace. As quickly as possible, transfer the ring from the burnout oven to the pressing furnace to avoid a failed press. Start the pressing cycle using the following Pressing Guidelines:

	100g Ring	200g Ring
Base Temp.	700°C	700°C
Rate of Climb	60° / min	60° / min
Press End Temp.	920°C	930°C
Hold	20 – 25 min.	20 – 25 min.
Press Time	9+ min.	12+ min.
Vacuum Start	700°C (Full)	700°C (Full)
Vacuum End	920°C	930°C
Air Pressure	4.5 bars	4.5 bars

* These are only guidelines. Temperatures will vary with the furnace used.

Note: When attempting to press any type of restoration, it is imperative that the pressing furnace being used is calibrated for accuracy. This will ensure accurate, consistent results when using any material. It is recommended that frequent furnace calibrations be scheduled not only for pressing furnaces, but also for standard ceramic furnaces. It is also recommended that all pressing furnaces (especially combination press-conventional furnaces) be cleaned/purged on a regular basis. This will eliminate any chance of ceramic contamination.

Divesting

1. All rings must be cooled to room temperature before divesting. Do NOT quench the ring to cool down faster.
2. Mark the length of the plunger with a pencil on the outside of the ring.
3. Separate the Investment ring using a Separating disc.
4. This predetermined breaking point enables separation of the plunger.
5. Break the Investment ring at the cutting area.
6. Rough removal of Investment is carried out using 110micron glass beads at 4-bar pressure.
7. For final removal of investment at the ceramic level use glass beads at 2-bar pressure or 30 psi. Do not blast against Porcelain margins.
8. ALOX plungers must be thoroughly cleaned before reusing.
9. Remove sprue using a fine diamond disc at LOW speed with WATER.



Stain & Glaze Technique

1. Completely finish the surface with a diamond instrument for contouring.
2. Clean thoroughly using a steam cleaner or 10 minutes in an ultrasonic cleaner.
3. Apply SNF PressCeram™ - ATZ stains to achieve proper shading and fire according to the *Firing Guidelines Chart*.
4. Once the correct shade has been achieved, apply the Glaze Paste over the restoration and fire according to the *Firing Guidelines Chart*.



Cutback & Layering Technique

Before starting to use a new porcelain system, it is advisable to do a few test bakes in order to find the EXACT temperature needed for specific furnaces to achieve desired results.

Cutback:

- To cut back for incisal on a full-anatomy pressing, it is recommended to use burs or stones indicated for shaping ceramics.
- Avoid over-heating by wet grinding at a slow speed.
- Be sure not to cutback more than 40% and no less than 0.8mm from the core material.
- Clean the pressed coping/framework using a steam cleaner or ultrasonic cleaner for 10 minutes.

Layering:

Only use the SNF PressCeram™ - AL layering porcelain with the SNF PressCeram™ - AL pressing ingots. It is contraindicated to use another system's layering porcelain with the SNF PressCeram™ - AL ingots and vice-versa.

1. Please refer to the *Shade Combination Table* for possible material combinations for easy shade matching.
2. Mix the ceramic powder (dentin/incisal) with Modelling Liquid-SL to a creamy consistency.
3. Apply mixed dentin or incisal ceramic in the cervical and inter-proximal area in small portions and compact by light vibration and blot out excess moisture.
4. Bake Dentin/Incisal according to the *Firing Guidelines Chart*. Only use very thin metal pins or pillow trays to hold the restoration.
5. Following the 1ST bake, the porcelain should have a shiny appearance. If not, the temperature may be too low. Increase temperature by 5-10°C increments until achieving the shiny appearance.
6. Apply 2nd Dentin/Incisal layer and bake according to *Firing Guidelines Chart*.
7. Create surface textures by contouring with the appropriate diamond abrasives.
8. If a correction bake is required, use the SNF PressCeram™ - AL Correction Material and fire according to the *Firing Guidelines Chart*.
9. Stain and glaze contoured restoration following the *Firing Guidelines Chart*.

Shade Combination Table

To achieve the correct shade of the restoration, please refer to the following table:

SHADE	A1	A2	A3	A3.5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
Opaque	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
Incisal	1	2	2	4	4	1	2	3	4	2	2	3	4	1	2	3

Combinations are only recommended. Experimenting with different shaded porcelains is suggested.



Firing Guidelines*

	Dry Time	Start Temp.	Finish Temp.	Heat Rate	Start Vacuum	Release Vacuum	Hold Time
	Min	°C	°C	°C/min	°C	°C	Min
Liner	4	400	1040	60	450	1039	1**
1 st Dentin / Incisal	4	400	780	45	450	779	1
2 nd Dentin / Incisal	4	400	770	45	450	769	1
1 st Stain & Glaze Technique	4	400	780	45	450	779	1
2 nd Stain & Glaze Technique	4	400	770	45	450	769	1
Natural Glaze***	4	400	760	45	None	None	1
Glaze with Glaze Material	4	400	750	45	450	749	1
Correction / Add-on	4	400	740	45	450	739	1

*The given temperatures are approximate values. Depending on the furnace, corrections of the firing temperatures may be required.

** Without Vacuum

*** Natural Glaze indicated temperatures are specified when using the layering technique.

Cementation Recommendations

Refer to the Alumina manufacturer's recommendations for cementation of Alumina restorations.

OPTIONAL: The Liner

The Liner is NOT necessary. It is only optional when pressing. Due to the high opacity level of the Alumina sub-structure, the Liner will help to block-out / reduce the white effect when pressing highly translucent ingots. Use the following technique to apply the Liner:

1. It is recommended to sandblast (with 2-3 bar aluminium oxide) and then steam clean the Alumina framework in order to obtain an optimal bond between the Liner and the framework.
2. Mix the Liner powder and the Modelling Liquid-SL to a creamy consistency.
3. Apply the Liner onto the clean framework with a brush until an optimal coverage of the framework has been attained.
4. After the Liner application, place the framework on a firing tray and fire according to the Firing Guidelines Chart.
5. This process can be repeated should the Alumina framework surface not be entirely covered.



Layering Without Pressing

SNF PressCeram™ - AL layering porcelains can also be used on an Alumina substructure without using the Pressing technique. The layering porcelain is used with the same principles as Porcelain-Fused-to-Metal.

Troubleshooting Guide

As frequently stated, the temperatures and times recommended within the manual may have to be adjusted depending on different environmental and equipment factors that are present in the lab. The following are some solutions to issues that have arisen from certain such factors. Please take your time to read through the troubleshooting guide.

Pressed Core Is Too Grey (Low Value):

Pressing temperature may be too high or the furnace may be firing too high.

Start by decreasing the temperature by 10°C; if the value is still too low, reduce the temperature by 10°C increments until the value is corrected.

Not using an ash-free wax will cause low value in the pressed core as well.

Porosity in the Pressed Core:

The pressing temperature may be too high. Decrease temperatures by 10°C increments until achieving a smooth surface press.

The investment ring may have been contaminated in the burnout stage. When an investment ring with SNF PressCeram™ is placed the furnace, be sure that there are no other rings with different materials present in the same furnace.

The wax used may not be suitable. The wax may have been left in the melting pot too long. Use fresh/clean ash-free wax. Clean burnout furnace *including burnout chimney) on a regular basis. This will avoid any contamination.

Mis-press / Short-press:

Sprue gauge may be too small. Use a 6-8 gauge sprue size. Do not use a 10 gauge sprue or smaller.

The sprue connection may have been tapered/pinched at the connection of the restoration. Make the connection as parallel as possible to ensure a smooth path of flow for the ceramic.

The sprue connection was made to a thin part of the restoration. Make sure the sprue is attached to the thickest part of the restoration (especially posteriors).

The incorrect ingot amount may have been used. Be sure to read 'Ingot Requirements' to determine the correct size and number of ingots required for a successful press.

The pressing temperature may not be high enough. Increase the pressing temperature in increments of 10°C until a successful press is achieved.

Burnout method may need to be adjusted. Temperature and soak time may not have been high and long enough. Increase both by small increments until a successful press has been achieved.

The furnace may not be pressing long enough. Increase press time by increments of 1 minute until a successful press has been achieved.

Investment Cracks Before Pressing:

The investment ring was introduced to the burnout furnace too soon. Bench set the investment ring for the exact amount of time that is recommended by the manufacturer. (Use a timer)

Burnout temperature may be too high. Reduce the temperature of the burnout furnace.

There may be too much water in the investment mixing bowl before investment. Wipe the investment bowl with a paper towel before introducing the liquid/water mixture. Too much liquid can weaken the investment.

Investment Cracks During Pressing:

Follow the guidelines above in 'Investment Cracks Before Pressing'.

Too much ceramic used for the size of the pattern. To be assured that there have not been too many ingots used, please follow 'Ingot Requirements'. However, if the wax pattern weighs less than 0.25 grams or less, use a phantom sprue to release excess porcelain pressure.

The pressure regulator may be set too high on the pressing furnace. Check the gauge. There should be no more than 4.5 bars of pressure.

Two ingots were pressed in a 100g ring. Use a 200g ring when pressing two ingots.

May be trying to press a bridge in the 100g ring. Regardless of the bridge size, always use at least a 200g ring for pressing bridges.

Bottom of the investment ring may not have been parallel. Make sure the ring sits flat before placing the ring in the burnout furnace. Do not use a wet or dry belt sander. Level the ring using a plaster knife only.

The plunger may have been placed in the ring incorrectly. Be sure that the clean plunger is upright and perpendicular when sitting in the ring.

The restorations have been sprued too close to the walls. Be sure to leave a minimum of 10mm space between the restoration and the walls of the investment ring.

The sprue may have been attached on the sprue former incorrectly. Be sure that the sprue has NOT been attached to the corner edge of the sprue former. Be sure that it is attached on top of the sprue former.

Investment Cracks After Pressing:

The ring may be cooling too fast. After pressing, place the ring on a non-conductive surface and let bench cool. Do not quench the ring or place the ring on a metal sink.

Pressing temperature may be too high. Decrease the pressing temperature by 10°C increments until a successful press has been achieved.

Sprue gauge may be too thin. Use a 6-8 gauge sprue whenever possible. Never use a 10 gauge sprue or smaller.

The sprue may have been too long or short. The sprue must be no shorter than 3mm and no longer than 5mm.

The sprue connection may have been tapered/pinched at the connection of the restoration. Make the connection as parallel as possible to ensure a smooth path of flow for the ceramic.

The sprue connection may have been made to a thin part of the restoration. Make sure the sprue is attached to the thickest part of the restoration (especially posteriors).

Pressure may have been too high on the sandblasting unit. You can use 60-70psi of glass beads before you see the restoration. Once you see the interface of your restoration, use 20-30psi of glass beads.

There may have been a 'sharp' decrease in thickness within the wax pattern design. For example, if the thickness of a restoration sharply decreases from 1.5mm to 0.5mm and then increases back to 1.5mm, it is likely that a crack will occur. It is important to keep a uniform thickness.

May have removed sprue or finishing restoration without wet grinding or at too high of a speed. Always wet grind and set hand piece at a low speed to avoid excessive heat.

Wax-up may have been too thin. It is important to keep the thinnest part of the restoration at a minimum of 0.8mm.

Crack in Restoration During Build-up:

The porcelain overlay may be thicker than the core. The overlay porcelain thickness must not exceed the thickness of the pressed core.

The pressed core may have been designed too thin. Be sure to maintain a uniform minimum thickness of 0.8mm.

May have used an inappropriate firing peg and or tray. Use a honeycomb tray with a soft pillow or thin metal pegs (Eg. ortho wire 0.5 or 0.6mm). Do not use traditional sagger trays, ceramic pegs, or thick metal pegs.

May be firing the porcelain too high. Refer to the *Firing Guidelines Chart*.

Porcelain Pulling Away from the Core:

Surface of the core may not have been sandblasted. Be sure to sandblast and steam clean the surface where the porcelain will be layered.

May have too much condensing. The SNF PressCeram™ porcelain is a fine-grained porcelain. It does not need condensing as some porcelains do.

Dry time may be too long. If you are just applying a small amount of porcelain, use only 2-3 minutes dry time. Keep powder moist.

Previous bake may have been over-baked. Decrease temperatures accordingly.

Build-up may be too dry or the dry time too long or the crown sat out too long before being fired. Fire the porcelain while it is still moist.

Distortion of the Restoration:

The investment ratio may be incorrect. Be sure to follow the manufacturer's instructions exactly.

Small bubbles may have been created inside the restoration. Be sure to inspect the inside if the restoration very carefully.

Grind away any bubbles that may have formed when pouring investment into the ring former.

The wax-up may have been distorted when it was taken off the model. Be careful!

There may have been too much porcelain over the core. The overlay porcelain must not be as thick as the core thickness.

The core may have been too thin. Maintain a minimum wax-up thickness of 0.8mm.

The firing temperature may be too high. Refer to the *Firing Guidelines Chart*.

Incisal Is Too White/Cloudy:

Porcelain may have been under-fired. Increase temperature in increments of 5-10°C until the incisal becomes clearer.

Incorrect build-up liquid may have been used. Make sure that only distilled water or SNF PressCeram™ Liquid-SL is used.

Vacuum may not be working properly. To ensure a strong vacuum, check all hoses to ensure proper connection. Increase vacuum setting on the furnace. Make sure to clean out the vacuum pump filter on a regular basis.

Vacuum was released too soon. Refer to the *Firing Guidelines Chart* for the correct vacuum release temperature.

Start Temperature may be too high. Lower the insertion temperature by increments of 5-10°C until a successful firing is achieved.

Heat rate may be too high. Decrease the heat rate until a successful firing is achieved.

Dry Time may be too short. Increase accordingly.

Restoration may not have been cleaned before build-up. Clean with a steam cleaner or an ultrasonic bath with distilled water.

Safety Notes

Use the Provincial Guide (OSHA or similar) when grinding and polishing dental prosthesis'. Use safety cautions such as well-ventilated rooms, suction devices, facemasks and safety glasses. Swiss NF Metals, Inc. is committed to safety and quality and is registered as an ISO 13485:1996 company.

Acknowledgments

Pictures & technical consulting have been supplied by Shannon Davidson from Dental South, Inc., Gainesville, GA, U.S.A., Kerstin Beine from Prodent, ENR, La Presentation, QC & Reinhold Mair, Calgary, AB.