Frequently Asked Questions
I have cracks in my metal-porcelain after I steam-cleaned the structure. What went wrong? There are several possibilities:

- Incorrect design of the frame structure (sharp edges of metal-frame, unequal thicknesses of porcelain, connectors between different elements of bridge too small).
- Incorrect preparation of the alloy (overheating of alloy, wrong burs, pollution of alloy).
- Cooling or non-cooling stage according to the Coefficient of Thermal Expansion (CTE) of the metal has not been respected.
- Ceramics are under-fired and ceramics which have been under-fired have a different CTE and there is a build up of stress in the ceramics. This stress is released by means of cracks when the structure is put under an extreme temperature condition.

**Solution:** increase firing temperatures until the desired effect is achieved.

What is the CTE value on which GC Initial MC/LF can be fired? With GC Initial MC/LF we are able to fire on all dental alloys with a CTE between 13,8 and 14,9 (25°C - 500°C).

**Non-precious alloys:** Why must the firing temperature of the first opaque firing (wash brand) by non-precious alloys be increased by 20°C?

Non-precious alloys are poor heat conductors. The temperature must be increased by 20°C to enable good physical properties and correct bonding to be achieved.

Can I re-wet the powder opaques of GC Initial MC? Which liquid can we use for this? MC-powder opaques can be re-wet when dry with normal distilled water.

Should the new powder opaques of GC Initial MC also be fired 20°C higher on non-precious metals?

Yes, as non-precious metals are poor heat-conductors, they should also be fired at 20°C higher temperature.

What should a good first paste-opaque look like after being fired?

Shiny.

Can I dilute the GC Initial MC paste opaques?

Yes, this can be done using the new GC Initial MC paste opaque thinner. An important rule with this liquid is to avoid using too much. Put a drop of the past opaque thinner aside and simply pass the top of a brush through it. Then mix the paste opaque using the opaque brush until you get a nice homogeneous consistency.

The more the paste opaque is diluted, the longer the pre-drying and drying stages have to be programmed - up to 8-10 minutes pre-drying is needed to avoid cracks.
**Paste opaque**: After firing, there are air bubbles in the opaque. What went wrong?
Make sure that no water is mixed with the opaque. Drying time, pre-heating time and heating rate (80°C/min) must be respected. Otherwise the opaque, which contains glycerine, will boil. Make sure that the alloy is not contaminated. Zn-containing alloys can also have problems. The treatment of the surface of those Zn-containing alloys is very important. Carefully follow the alloy manufacturer’s IFU.

**What is the purpose of an oxidation firing?**
To create a chemical bond between the metal and opaque by means of oxygen ions. An oxidation is also a good visual control to see if the alloy is clean. The alloy is well-prepared and clean if there are no spots on the alloy after the oxidation firing.

**How do you do a proper oxidation?**
Refer to the alloy manufacturer’s instructions.

**Can we use GC Initial MC on a refractory die model?**
Yes, GC Initial MC can be used on a refractory die model. Just increase the firing temperatures of the build up powders by 20°C.

**Using GC Initial MC when making veneers or inlays on a refractory die model, do I have to increase the firing temperatures?**
We advise increasing all temperatures by 20°C because the refractory die absorbs heat.

**Is there a way to fix the colors internally in the ceramics?**
Yes, this can be done by customizing the fired body with the stains (mixed with stain liquid) and fixing these colors using a glaze firing at a temperature that is 50°C below that of the first dentine firing of GC Initial MC. Afterward the crown can be finished using a normal dentine firing over these colors with, for example, GC Initial CL-F.

**Can I make a correction to GC Initial MC using GC Initial LF?**
There is no problem using this method as the CTE’s of both ceramic lines are perfectly compatible. When the surface of the GC Initial LF needs to be glazed, use the GC Initial INVivo/INSTitu stains for MC/LF and use a glaze-firing program for GC Initial Low Fusing. Take into consideration that the GC Initial MC will not be glazed at the LF glaze temperature!

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**GC INITIAL LF**

**To avoid discoloration with GC Initial LF, is there a limitation in percent Ag for alloys?**
Use of certain alloys which contain more than 5 percent Ag could lead to discoloration, although this is not the general rule. This has nothing to do with the GC Initial ceramic, as such, but is more a general rule for all LF ceramics. Certain Ag-containing alloys show no discoloration even with a higher percentage of silver.
Is it possible to fire GC Initial LF ceramics on GC Initial MC paste opaque?
Yes, there are no problems concerning the compatibility.

Can I make a correction with GC Initial LF on GC Initial MC?
There is no problem using this method, as the CTE’s of both ceramic lines are perfectly compatible. When the surface of the GC Initial LF needs to be glazed, use the GC Initial INvivo/INsitu stains. For GC Initial MC/LF and use a glaze-firing program for GC Initial Low Fusing. Take into consideration the fact that the GC Initial MC will not be glazed at the GC Initial LF glaze temperature!

Non-precious alloys: Why must the firing temperature of the GC Initial LF first opaque (wash brand) on non-precious alloys be increased by 20°C?
Non-precious alloys are poor heat conductors. The temperature must be increased by 20°C to enable good physical properties and correct bonding.

What should the first powder-opaque look like after being fired?
Shiny.

What is the use of an oxidation firing?
To create a chemical bond between the metal and opaque by means of oxygen ions. Oxidation is also a good visual control to see if the alloy is clean. The alloy is well-prepared and clean if there are no spots on the alloy after the oxidation firing.

How do you do a proper oxidation?
Refer to the alloy manufacturer’s instructions.

Is it possible to use GC Initial LF to build up on Ivoclar “Empress 1 or 2?”
No, because the CTE of these press ingots is +/- 17, which is too high for the GC Initial LF (11.6). The GC Initial PC press ingots are perfectly adapted to be used in with GC Initial LF. On the other hand, the GC PressINvest is ideal for pressing the Ivoclar Empress ingots.

Can I use GC Initial LF on a refractory die model?
Yes, GC Initial can be used on a refractory die model. The firing temperatures must be increased by 20°C.

When making veneers or inlays on a refractory die model when using GC Initial LF, do I have to increase the firing temperatures?
We advise increasing all temperatures by 20°C, as the refractory die absorbs heat.

Why is the start temperature on GC Initial LF lower than on GC Initial MC?
Because the glass transformation point is lower on GC Initial LF. If you were to start at a higher temperature, the ceramic structure would already have changed before the vacuum starts.
**GC INITIAL TI**

At which temperature is the negative Alpha layer created on Titanium?
The Alpha layer on GC Initial Ti is created at approximately 840°C. All of the GC Initial Ti firing temperatures are below this temperature so there should not be a problem.

On what kind of titanium can GC Initial Ti be fired?
GC Initial Ti can be fired on pure milled titanium, cast titanium and titanium alloys.

Is it possible to re-wet the GC Initial Ti-bonder powder with the special liquid?
No, once dried, you must prepare new Ti-bonding.

How does a good first opaque look?
Shiny.

Is it possible to re-wet the Titanium powder opaque when it is too dry?
Dry titanium-powder opaque mixture can only be re-wet with distilled water. You should not re-wet the opaque repeatedly as this will change the modeling qualities of the opaque.

Do you need to do an oxidation on Titan?
No, because you should avoid any heat treatment that is not necessary.

How should the GC Initial Ti-bonder look after being fired on a Ti-coping?
The Ti-bonder should look shiny/glossy on a black Titanium coping.

According to GC Initial Ti’s technical manual, sandblasting with “noble corundum” must be done before the GC Initial Ti bonder application. Can we also use Aluminum Oxide?
Yes, you can, as long as you are only using new, pure abrasive sandblasting material of 120 to 150μm, as mentioned in the technical manual. Do not use sandblasting material that has already been used.

**GC INITIAL AL**

With which kind of ceramic do I have to work on Spinell?
We recommend using GC Initial AL porcelain, as the CTE of Spinell is ca. 7,7 (20-500°C).

What might be the reason for cracks in a glass infiltrated GC Initial AL-coping?
One of the main reasons might be that there is still excessive glass in the glass infiltrate GC Initial AL copings. Normally glass is removed by doing several glass control firings. After the control firing, the excess glass comes to the surface and must be sandblasted. Repeat control firings until no more glass comes to the surface of the coping.
Why aren’t there shade guide tabs for GC Initial AL liners on the shade guide?  
GC Initial AL liners (6 shades) are not included on the shade guide because they are only used as a wash bake on the frame structure. This layer is too thin to be compared, color wise, with the shade pellet on the shade guide, which is +/- 1 mm thick. This means that the shade on the shade guide cannot correspond to the much thinner wash bake layer. If a more intense color is required, the liners can be mixed with the fluorescent GC Initial INvivo stains.

With which liquid can we re-wet the dried GC Initial AL-porcelain?  
You can only re-wet the dried AL porcelain by using distilled water.

With which liquid can I mix the GC Initial AL liner?  
You must mix the GC Initial AL liners with the normal GC Initial AL modeling liquid. When re-wetting the dried AL liners, only use distilled water.

GC INITIAL ZR

Is it possible to use GC Initial Zr for Cercon system from Dequedent?  
Yes, Cercon is also a Zirconium oxide ceramic frame material. GC Initial Zr can be used for the layering technique on this system to achieve highly esthetic results.

Metal ceramics: If I fire 6-8 times, I get cracks in the ceramics. Do you have that problem with GC Initial Zr?  
It is not so much an issue of which base structure you are working on, but more the ceramic itself and in particular the leucite content of these ceramics. Leucite is the component that changes the CTE. After multiple firings, the CTE will become higher and, at a certain point, no longer be compatible with the metal frame. Logically, it will happen more with alloys with a lower CTE. This multiple firing is not as sensitive for Zr structures is because GC Initial Zr does not contain any leucite. Therefore, ythere are no changes in the CTE and no cracking. Because the Zr coping is a poor heat conductor compared to metal, you must be careful about cooling time.

With which liquid can we mix GC Initial Zr frame modifiers?  
You must mix the frame modifiers with the normal Zr modeling liquid. When re-wetting the dried frame modifiers, only use distilled water.

If the frame modifier does not cover the GC Initial Zr frame structure well after the first firing, can I fire the frame modifier a second time and at what temperature?  
Yes, you can fire the frame modifiers several times in order to cover the frame, by always firing the frame modifiers at the same temperature. In other words, starting temperature of 450°C, 4 minutes preheating, increase the temperature 55°C, vacuum yes, final temperature of 800°C, holding time 1 minute. The appearance of the frame modifier should be slightly glossy. To intensify the GC Initial Zr frame modifiers, fluorescent GC Initial INvivo stains can be mixed with the GC Initial Zr frame modifiers.
GC Initial Zr shoulder ceramic needs a higher firing temperature than the Zr frame modifier. Is that correct? Yes, in-house tests have shown that 830°C gives optimal firing results for the GC Initial Zr shoulder porcelain, GC Initial Zr frame modifiers are fired at 800°C. Because of this, shoulder firings should be done before frame modifier firing.

Why aren’t there shade guide tabs for GC Initial Zr frame modifier on the GC Initial Zr shade guide? GC Initial Zr frame modifiers (3 shades) are not included on the shade guide because they are only used as a wash bake on the frame structure. This layer is too thin to be compared, color wise, with the shade pellet on the shade guide, which is +/- 1 mm thick. This means that the shade on the shade guide cannot correspond to the much thinner wash bake layer.

Can you modify and customize a Zirconium cap before applying the frame modifier on the cap? You cannot stain directly onto the Zirconium-cap. There are, however, two methods to modify the frame modifier. This can be done by firing the GC Initial INvivo/INsitu stains mixed with stain liquid on top of the already-fired frame modifier using a firing temperature of 800°C. Another way is by mixing pure GC Initial INvivo/INsitu powders (no stain liquid) under the frame modifier using the normal GC Initial Zr modeling liquid.

Creation Zi has a higher liner firing temperature (900°C) compared to GC Initial Zr (800°C). It has also been reported that Creation Zi has a higher bonding strength (Teamwork Special, 1/2004, pg. 56). Is this correct? No, this is not correct. The reason for the higher temperature is that Creation Zi liner is based on the Creation In Nova stains, which require such a high firing temperature. The bonding of the Creation Zi liner to the Zr frame structure is surely not higher than the bonding strength of GC Initial frame modifiers. GC Initial Zr frame modifiers are much weaker in color, but can be intensified by using GC Initial INvivo/INsitu, offering a wider range of possibilities compared to Creation Zr.

**GC INITIAL PC**

What is the ideal thickness of a ceramic pressed facing? The ideal thickness, to avoid deformation, is 0,8 mm. If the coping is thinner and the layer of GC Initial LF is too thick, there will be a deformation at the margins. The thickness of a pressed facing can be from 0,5 mm to 1,5 mm in the incisal area.

Is it possible to make full ceramic bridges when using the GC Initial PC press pellets? No, we recommend making only single units including molars. However, an injection of PC ceramics on a supporting 3-unit metal frame is not a problem. Note that the metal frame should be opaqued.

How long does a GC Initial PC invest cylinder have to be in the pre-heated furnace before injecting ceramics? 60 minutes at 850°C. For each additional cylinder the holding time should be extended by 10 minutes.
How do the GC Initial PC crowns have to be positioned on the base former?
The wax sprues on the wax crowns should be ca. 0.5-0.6 mm in length (3.0 - 3.5 mm diameter) and should be positioned on the small cylinder from the ring base former. The wax crowns should be positioned apart and at an angle of 45° away from the thermal centre with a distance between the individual objects of at least 3mm.

What is the ideal layering for a GC Initial PC crown?
When using the layering technique, the ideal amount of GC Initial PC ceramics should be more than 2/3 of the total crown. There should be less than 1/3 of GC Initial LF fired on the GC Initial PC base.

How much pressure (bar) do you need to produce a good pressed coping? (For Press furnaces; EP 500, Touch Press, Shenpaz Press,...)
The minimum pressure is 4.5 bar. Ideally 5 bar. However, the Touch and Press, where a maximum pressure of only 2.8 bar can be reached, also provides good results.

How can I choose the press pellets for the staining technique?
The choice of press pellets for staining technique is determined by the desired color and by the desired degree of opacity. First choose the desired degree of opacity depending on the indication. Then determine the color choice of press pellet by the desired V-shade; yellowish and reddish are more appropriate for Vita Z and B shades; greyish more for C-shades. Try to choose a press pellet that matches the color of the incisal zone of the natural teeth as the body of the facing or inlay will be stained with the INover’s to get the correct V-shade.

GC INITIAL INVIVO/INSITU MC/F/PC

Can I use the GC Initial INvivo/INsitu MC/LF/PC stains internally when using the GC Initial MC powders?
Yes, the GC Initial INvivo/INsitu MC/LF/PC stains can be used internally with MC powders in one of two ways:
1. Use the GC Initial INvivo/INsitu stains internally by mixing pure GC Initial INvivo/INsitu stains under the normal GC Initial MC powders using the normal GC Initial MC modeling liquid, then firing with a normal dentine firing program.
2. Use the stains ready-mixed with stain liquid and characterize internally the GC Initial MC powders also using a normal dentine-firing. When using the stains pre-mixed with the stain liquid, be sure to have a longer drying stage than normal dentine firing and make sure that you do not use too much stain-liquid.
Frequently Asked Questions

Is it possible to use the two GC Initial INvivo/INsitu kits for all ceramic systems?
There are two GC Initial INvivo/INsitu sets in the GC Initial ceramic line available: GC Initial INvivo/INsitu for AL, Zr, Ti and another for the ceramic group MC, LF, PC. The two systems are grouped according to the CTE of the referenced ceramic line.
1. GC Initial INvivo/INsitu for AL, Zr and Ti: used for GC Initial AL-aluminum oxide, GC Initial Xr - Zirconium oxide, GC Initial Ti - Titanium restorations.
2. GC Initial INvivo/INsitu for MC, LF and PC: used for GC Initial MC-metal ceramic, GC Initial LF - low fusing ceramic, GC Initial PC - pressable ceramic.

Is it possible to use GC Initial INvivo/INsitu for internal and for external characterizations at the same time?
GC Initial INvivo/INsitu is used for natural, individual staining and characterization of GC Initial ceramic line. GC Initial INvivo: fluorescent shades for internal and external characterization. GC Initial INsitu: fluorescent shades only for external characterization.

INVIVO/INSITU AL/ZR/TI

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GC INITIAL CERAMIC LINE

Do all GC Initial ceramic powders contain fluo-particles?
Nearly all powders contain fluo-particles except the opaques and the three GC Initial Insitu's, that have been developed to create certain opaques effects. All other GC Initial powders contain fluo particles but certain powders contain more fluo than others. The amount of fluo depends on the color and the opacity of the ceramic.

What might be the reason for bubbles in the opaque on non-precious metals?
- Pollution of metal by using incorrect burs or by using burs which have been used for other metals.
- Bad condition of metal structure (e.g. Porosities caused by a too-high casting temperature, hollow spaces in frame structure due to overlapping of metal during finishing of frame structure).
- Opaque dried incorrectly (drying time too short).
- First opaque applied too thick.
- Rate of increase of temperature per minute too high.
How do I know the exact firing temperature in the porcelain furnace?
Before you start, it is important to calibrate your furnace, to ensure that the temperature on the display is the same as in the firing chamber.

Enamel cracks: What might be the reason for cracking of the enamel firing on top of the dentine base?
Either the enamel porcelain powder of another porcelain system has been mistakenly taken, or the dentin porcelain mixture has been built up too dryly when enamel has been applied.

Most manufacturers of non-precious metals prescribe use of a long cooling stage when firing ceramics. Do I have to follow this as an GC Initial user?
For GC Initial MC and LF we must follow the instructions from the alloy manufacturers even when the CTE of the alloy is very low and normally is not necessary for our ceramics.

Is it necessary to trim the ceramic surface between the firings?
No, but it improves bonding, especially when large amounts of material are needed for the next layer.

May we re-mix the porcelain mixtures on the glass plate with GC Initial liquids?
New, fresh porcelain powder must be mixed with GC Initial liquids. When these mixtures are dried out they may only be re-wetted with distilled water.

Can you exchange modelling liquids from the different GC Initial components?
No, basically they contain more or less the same chemicals but are different in ratios, besides the fact that the GC Initial MC liquids would not burn completely with GC Initial LF.

Do we have to rewet the refractory die before firing ceramics on it?
Yes, this can be done by putting the refractory die a glass of water for 1 minute. In this way the refractory die has the same humidity as the ceramic and this avoids the soaking up of the ceramic modelling liquid by the refractory material. In this way it is easier to apply the ceramics onto the refractory die.

What is the use of the connector paste?
The connector paste has been developed in order to work more easily on a refractory die model. It will be the first layer of porcelain on the refractory die so the fit on the die of the inlay or facing will be perfect. The connector paste has also been developed in order to avoid the drying out of the ceramic mixtures on the refractory die during building up.

Is one layer connector paste sufficient to start firing on a refractory die?
Normally the refractory die should look nice and shiny because of connector paste. If not after one layer connector paste, a second layer connector paste can be applied and fired until the desired shiny effect is obtained.
What is the use of the INcisio?
INcisio is a violet coloured stain that can be used as a ceramic powder mixed with modelling liquid to create internally an effect of depth. It can be applied in the incissal zone between the mamilons to create this effect. The INcisio can also be used as a pure stain mixed with stain liquid to create also an effect of depth but is than stained on the surface.

Can the type of firing tray influence the porcelain?
Yes, some heavy body firing trays will take up much heat and this will decrease the temperature in the firing chamber. As a result of this the ceramic can be under fired. On the other hand light trays will soak up much less heat. As a result of this we recommend you to do the silver-calibration of the furnace on the firing tray that is used for the daily work.