ADVANCED PRESS™

WITH PATENTED PROGRAMS FOR PROCESSING
LITHIUM-DISILICATE CERAMICS.

VARIO PRESS® 300.e

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EN

Lithium Disilicate

Lithium disilicate ceramics are an increasingly popular material for fabricating restorations in dental laboratories. They are characterized by their high strength and can be processed not only by CAD/CAM but also by a pressing technique similar to the one used with traditional pressable ceramics.

However, the resulting quality of pressing Lthium Disilicate has varied greatly. Due to it's sensitivity to temperature while in contact with phosphate-bonded compounds common among investments.

Excerpt from a competitor's patent specification US 6,303,059 B1

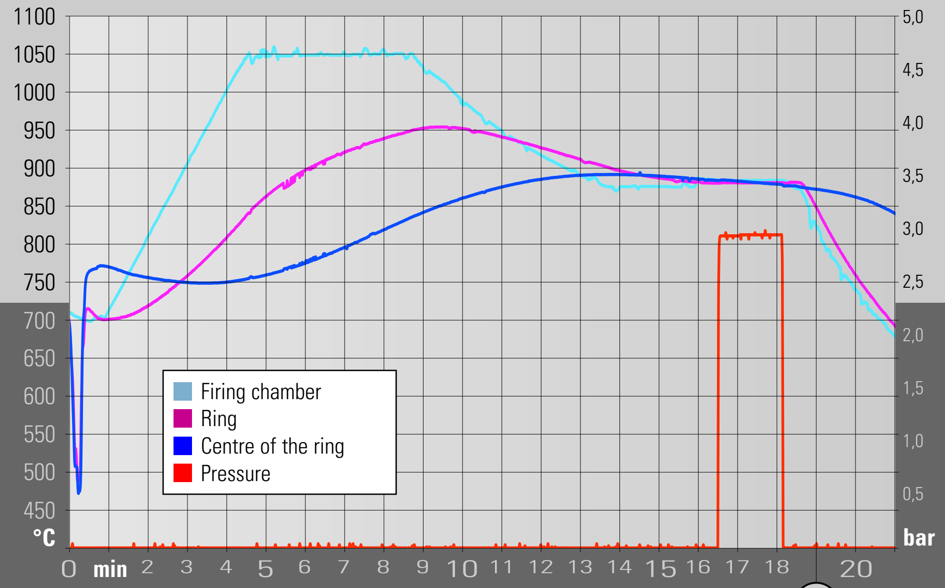
…..Therefore, a low temperature and as short a molding time as possible would be ideal, …

… It is particularly expedient pursuant to the present invention to keep the reaction time between the possibly finely branched tooth replacement components and the matrix material as short as possible. In this way, …for example phosphate-containing matrix materials that are suitable for the high temperature processing, can also be used for new dental ceramics, such as lithium disilicate glass ceramics.

… It is furthermore particularly expedient pursuant to the present invention to avoid as much as possible the reaction of the matrix material with the ceramic during the temperature dependent viscous flowing process. By minimizing the time of the pressing process, at most a very short reaction time takes place, …

… On the other hand, ... the shortened mold cycle does not have a negative impact upon the strength of thematerial. Surprisingly, even an increased spot bending strength of 405 ±40 MPa resulted. It is presumed that with the first and second embodiments the thicker reaction layer weakens the dental material, which would explain the inventive mprovement in the strength.

Advanced Press



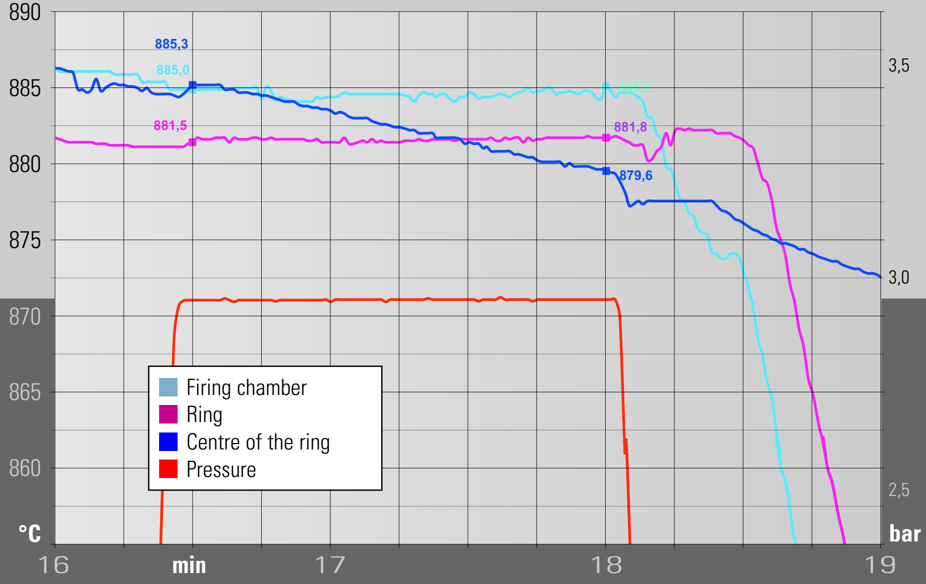
Principle of Advanced Press

Temperature differentials between the inside and outside of rings have always existed when processed in traditional pressing ovens. Differences on the order of 30°C–50°C – depending on the size of the ring and the conductivity of the investment compound – pose an obstacle to consistent pressing outcomes. If more energy is briefly supplied to the ring, however, its outside temperature will rise to beyond the predefined level for ceramic processing, while the object is still exposed to a lower temperature level inside the ring. Once energy has been supplied for a specific (pre-calculated) time, the heating unit of the furnace will shut down. From that point on, the heat from the external aspects of the ring will continue to be transmitted toward its centre.

Patented pressing technology

Patented in 2010, Advanced Press introduces an entirely new approach to programming pressing cycles for dental ceramics. A mathematical analysis of the thermal behaviour of the materials involved in the pressing process has resulted in in the optimal heat curve. That surpasses the capabilities of any currently available pressing furnace.
The principle is simple and easy to understand.

Note: This concept is strictly based on heating the pressing ring to a uniform temperature; it is not intended to overrule the processing temperatures defined by the manufacturer.



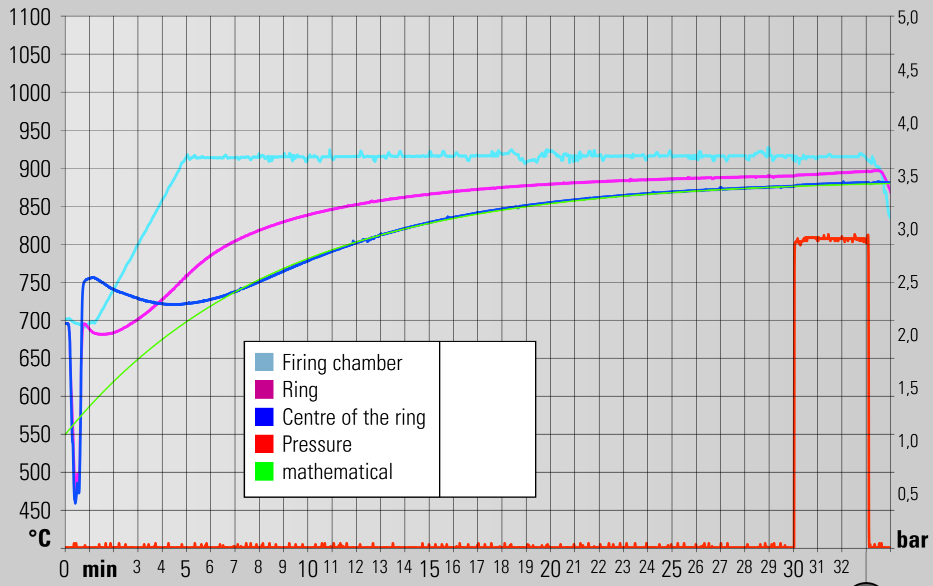
Low pressing temperatures and extremely short pressing cycles

Temperatures will soon be almost uniform throughout the muffle. The only thing to be accomplished at this point is to maintain these conditions throughout the entire pressing cycle. Lithium disilicate ceramics can be pressed at a required temperature of 885°C thanks to this homogeneous temperature distribution inside the muffle. Controlled high-speed heating offers yet another crucial advantage: it reduces the time the ring has to remain in the furnace before the pressing cycle is started – by more than 40%. The pressing time itself is reduced to 120–150 seconds, depending on the size of the object. The entire pressing cycle will take only about 20 minutes. Advanced Press, with it's optimized pressing protocol, requires the use of investment compounds whose thermal conductivity have been verified by the device manufacturer.

Summary

Once the lithium disilicate ceramic object has been pressed using the Advanced Press protocol, all of the quality characteristics claimed by the manufacturer will manifest themselves:

- Diminished reaction between the ceramic material and investment compound at high temperatures.
- Reduced working temperatures thanks to the uniform heat distribution inside the muffle. Minimal reactive layers forming on the lithium disilicate surface that can be easily removed, if necessary, by air-abrading with glass beads.
- Accurate reproduction of restoration margins and anatomical details, including all line angles.
- With its significantly shorter pressing cycles, Advanced Press helps increase the efficiency of the furnace.



Standard pressing

Hardly any differences exist between the program cycles used in different types of furnaces when it comes to pressing ceramics. Laboratory technicians generally assume that the temperatures inside the furnace and in the inner regions of the ring will be the same once a predefined exposure time has elapsed. However, this assumption is incorrect and easily explained.

The thermocouple inside the furnace only captures the temperature in the furnace chamber, which the system attempts to keep constant. Meanwhile, the temperature inside the ring will deviate, sometimes significantly, from the furnace chamber temperature. Similar to the loss of electrical power, heat energy is lost as it travels from the outside to the centre of the firing chamber. However, a uniform temperature inside a ring will not be achieved simply by keeping the chamber temperature constant.

The graph illustrates these temperature differences: 920°C in the firing chamber, 905°C in the outer region (10 mm) of the ring, and 883°C in its centre. In addition to vacuum prevailing inside the furnace chamber, another obstacle to uniform heat propagation is the resistance offered by the investment compound itself. As a result, uniform temperatures cannot be expected even with extended holding times.

What is more, the outcome can be significantly affected by the heat conductivity of the investment compound used (a value not published by manufacturers because it has been considered irrelevant). The manufacturers of pressable ceramics are, of course, perfectly aware that thermal loss occurs as heat penetrates from the outer to the inner regions. They compensate for this by raising the final temperature as given in their pressing instructions, thus ensuring that the viscosity needed to press the ceramic material is attained. This does not, however, compensate for the temperature being higher in the outer regions than in the inner regions.

It is therefore inherent to the process that the ceramic material will be pressed from a cooler inner to a hotter outer region. This drawback adversely affects the quality of sensitive materials such as lithium disilicate, which will respond to high temperatures and the extra exposure time involved by forming a more pronounced reactive layer.

	VARIO PRESS®300	VARIO PRESS®300.e
Ceramic firing furnace	●	●
Ceramic pressing furnace	●	●
Advanced Press Process for lithium-disilicate ceramics	○	●
Preinstalled press-programs for lithium-disilicate ceramics	○	●
Intelligent Press	●	●
Z-Dry System	●	●
Temperature controlled cooling	●	●
PFC (Power Fail Control)	●	●
Programable pressure	●	●
Glass infiltration programs	●	●
CF-Karten technology	●	●
Glas-Touch-Screen	●	●
Calibration free	●	●
2-Years warranty	●	●

VARIO PRESS® 300.e

with patented programs for processing lithium-disilicate ceramics.

Scope of supply

- 1x Power cord
- 1x Operating system CF-card (green)
- 1x Ring tong
- 1x Firing tray
- 1x Pressing tray incl. press insert
- 1x Compressed air hose 2m (blue)
- 1x Pressure reducer (water strainer) with fixing bracket
- 1x Long tweezer
- 1x Inline filter for vacuum hose
- 1x Vacuum hose
- 1x Connecting cord cold instrument plug for P3 vacuum pump
- 1x Spare fuses
- 1x Flex ring system 200 g

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