



VACUUM AND PRESSURE CASTING MACHINE
WITH INDUCTION HEATING

Cascom SE Casting Manual

Ver.1.1 August 2013

KDF Technology Center

This casting manual is provided to help users utilize the Cascom SE unit to its maximum capabilities by listing the various technical information and suggestions for successful dental castings. Please read the manual fully prior to using the unit.

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1. From fabrication of wax patterns to investing

We recommend you to use the KDF casting rings and base formers.

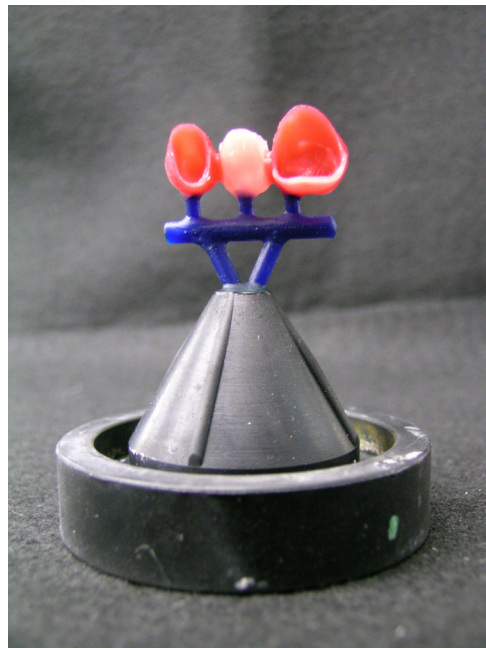
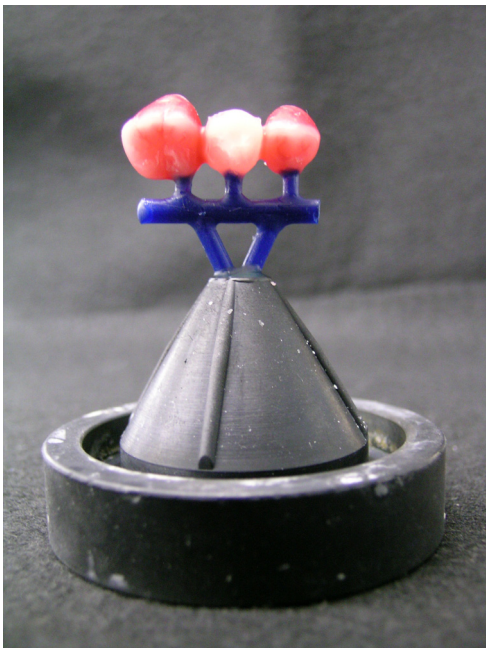
Casting rings from dia.34mmXheight 50mm to dia.90mmXheight 70mm are available for casting.

● Wax Patterns and Spruing

✧ **General Spruing Suggestions**

Each case has the following points in common that apply to all castings.

- Former and wax pattern should be sprued as thick and in short distance as possible.
- Runner Bar 3.0 ~ 3.5mm diameter
- Gate Sprue 2.0 ~ 2.5mm diameter, 3/16"(5mm) in length, to be sprued with each neighboring crown and bridge pattern.
- Main Sprue 6.0 ~ 8.0mm diameter up to 3/8"(10mm) in length max.
- To facilitate flow of melted alloy, the joint areas of each sprue should be given a slight arch.
- When embedding wax pattern, we recommend you to have a space of 5mm between the top of wax pattern and the top surface of casting ring and a space of 5mm between wax pattern and ring liner. In case of ringless casting, leave more leeway in these minimum distance guidelines.

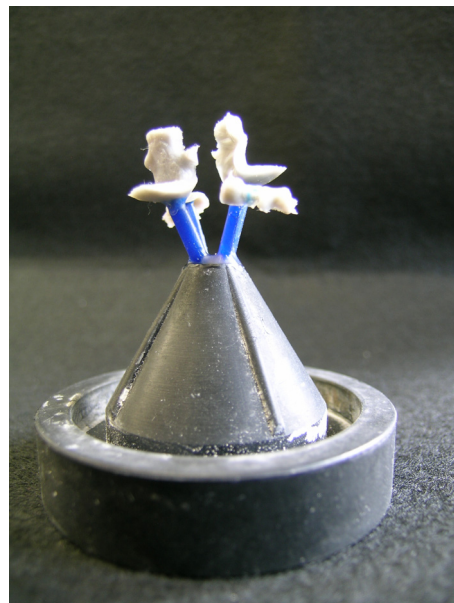


✧ **Inlay , Post and core**

The use of sprue in 1.5mm diameter and up is recommendable. When you invest multiple patterns, try to center the sprues possibly to one place for funneling of melted alloy. With inlay pattern, if casting ring is insufficiently heated, one of the patterns will act as an air vent to result in terrible mis-casts. Sufficient heating of casting ring is recommended.



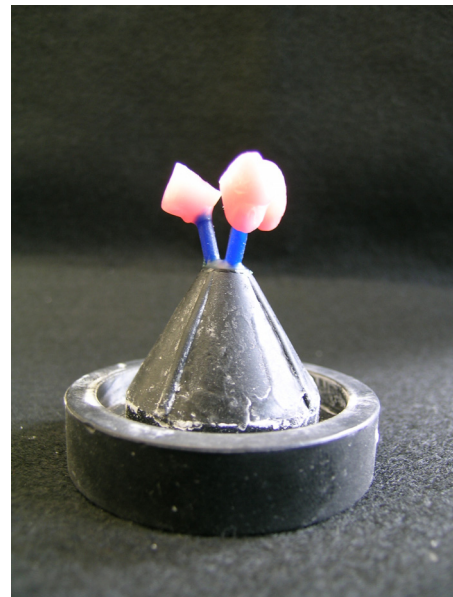
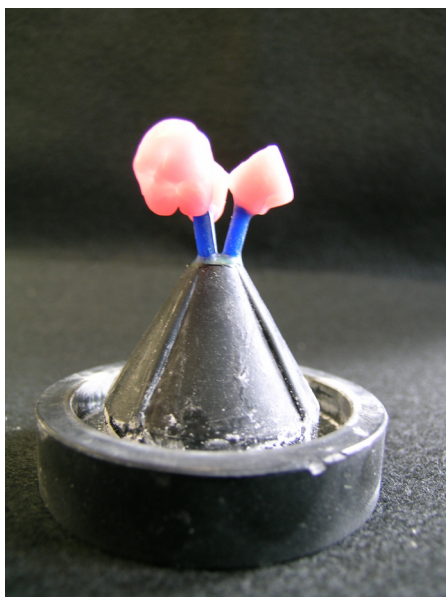
Post and core



Inlay

✧ **Crown**

The use of sprue 2.5mm diameter and up is recommendable. Multiple patterns are recommended to be sprued possibly to one place as shown in the sketch.



Crown

✧ **Bridge**

We recommend you to attach a runner-bar directly on the top of main sprue and connect all patterns including pontics with gate sprues. Even in case of long span bridge, positioning of patterns and sprue cone possibly at a short distance is recommended.



Bridge

✧ **Clasp , Bar**

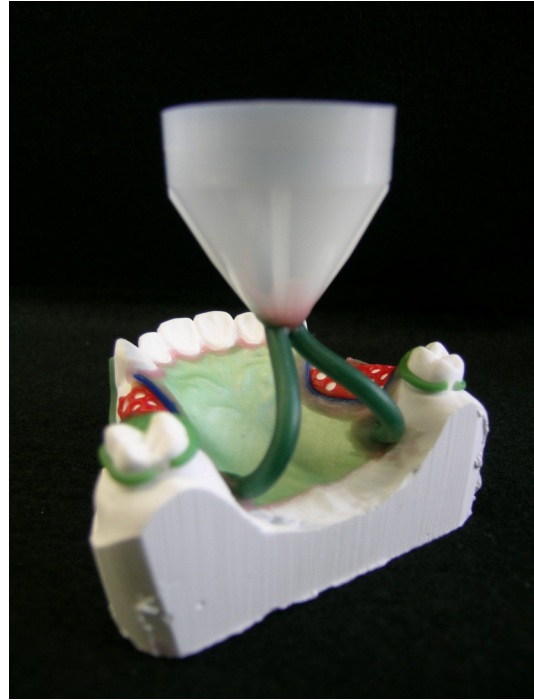
We recommend you to attach patterns on the top of former. Insufficient burnout of casting ring may cause mis-casts. Sufficient burnout of casting ring is recommended.



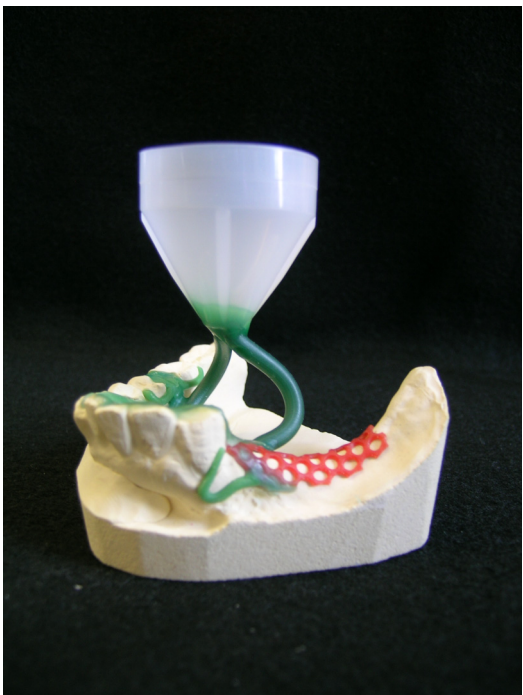
Clasp , Bar

✧ **Denture**

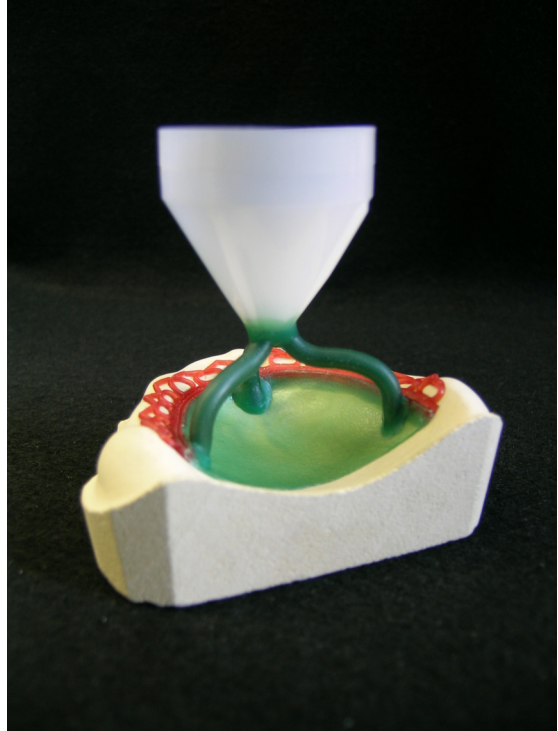
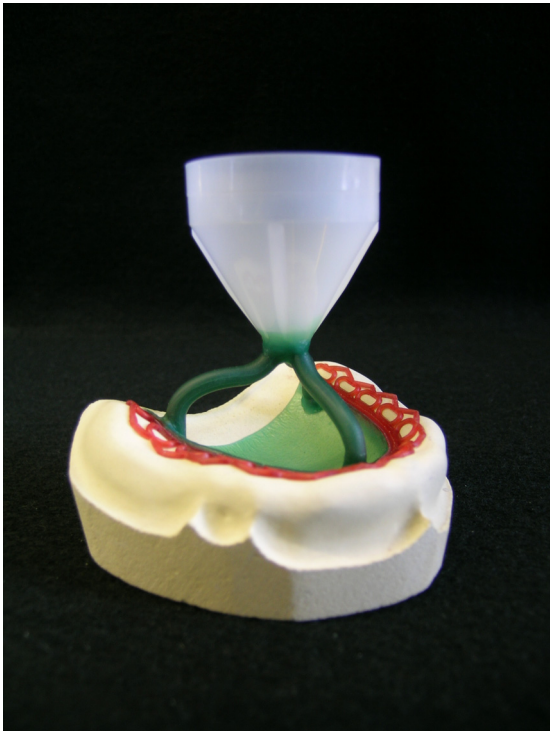
In case of partial dentures, both maxilla and mandible, attach a line sprue to each distal edge to combine the two sprues into one sprue at the top of a crucible former. In case of full plate denture, in addition to the two sprues, we recommend you to attach a supplemental line sprue from the top of crucible former to the near midline of denture. The use of each line sprue 3.0mm diameter and up is recommended.



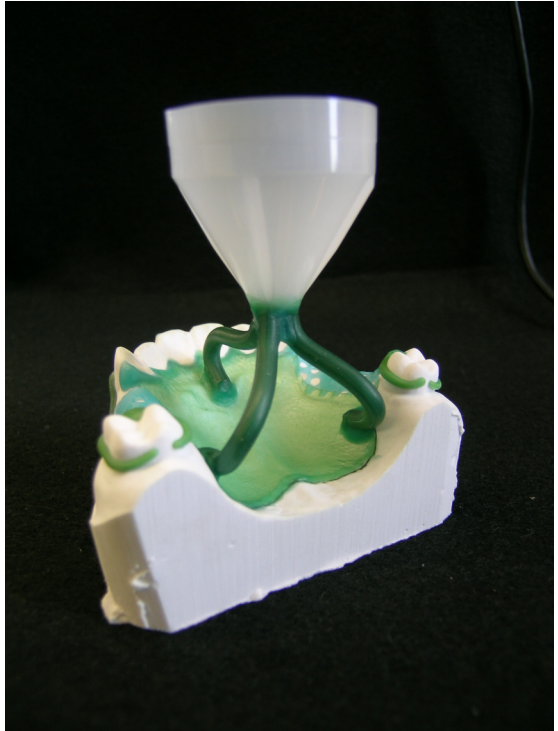
Maxilla Partial



Mandible Partial



Maxilla Plate



Maxilla Partial with three sprues.

- **Precaution of Casting Ring**
Casting rings will get deformed or damaged against continuous uses. The uses of such inadequate rings will cause machine malfunction. As described in the instruction manual, we do not recommend to use such deformed or damaged rings.

2. Castable Alloys by Cascom SE

◇ The Cascom SE can cast the following dental alloys.

Alloys	Melting Quantity
Silver Alloys	10~120g 10cc
Gold Alloys	10~120g 10cc
Platinum Alloys	10~120g 10cc
Silver, Gold and Palladium Alloys	10~120g 10cc
Porcelain Bonding Precious Alloys	10~120g 10cc
Porcelain Bonding Semi-Precious Alloys	10~120g 10cc
Porcelain Palladium Alloys	10~60g
Ni-Cr Alloys for crown & bridge, clasp and porcelain bonding	10~60g
Co-Cr Alloys for metal based denture and porcelain bonding	10~60g

We recommend you to use alloy more than 10g to prevent insufficient melting.

● Alloy and Crucible

According to the type of alloy, user should choose a crucible type as shown in the chart below.

Alloys	Crucible
Silver Alloys	Carbon
Gold Alloys	Carbon
Platinum Alloys	Carbon
Silver, Gold and Palladium Alloys	Carbon
Porcelain Bonding Precious Alloy	Carbon
Porcelain Bonding Semi-Precious Alloy (Pd contained less than 30%)	Carbon
Porcelain Bonding Semi-Precious Alloy (Pd contained over 30%)	Ceramic
Porcelain Bonding Palladium Alloys	Ceramic
Ni-Cr Alloys for crown & bridge, clasp and porcelain bonding	Ceramic
Co-Cr Alloys for metal based denture and porcelain bonding	Ceramic

3. Investment

We recommend you to use the investment for dental casting on the markets. The Cascom SE unit, being a vacuum and pressure casting type, investing material of non-porous and fine quality is recommendable. Phosphate investment that contains carbon or the investment that requires high-speed heatup may cause mis-cast by the gas generated inside casting mold. We recommend you to heat up 30 minutes further longer than the instructed heating time by the manufacturer. You have no problem with high-speed christobalite type of investment.

In regards to mold heatup program, we recommend you to follow each manufacturer's instruction. However, we recommend you to program the final stage temperature for investing material as follows.

Christobalite 720 °C (1328°F)

Phosphate 850 °C (1562°F)

Phosphate for Non-Precious Metal 950 °C (1742°F) and up

Each investment should have the hold time of over one hour. Depending on each manufacturer's burnout furnace, the heat on display and muffle heat will not necessarily coincide due to the deviations of heat distributions in muffle and measuring gauges equipped.

4. Casting for Precious Metal and Semi Precious (PALLADIUM LESS THAN 30%)

① Crucible (Carbon crucible, Ceramic crucible)

Place a Carbon crucible inside of Ceramic crucible. Then place the melting outlet of crucible as well.

② Vacuum level set L / M / H

Set the vacuum level to H. Vacuum level of H is 100% (continuously vacuuming), the vacuum level of M is 70%, the vacuum level of L is 40%.

③ Pressure timing set 1 / 2 / 3

Set the pressure timing to 2. This is the start point of casting pressure after the chamber is inverted.

④ Alloy Putting

It is required that each alloy ingot should be 3g over so that high frequency power can effectively work. Put the alloy carefully with the provided tweezers. In case of melting small alloy ingots, gather them at the crucible bottom.

⑤ Standby Melting

Close the chamber lid and lock the lever. Press the [Stand by] button to melt the alloy. Then the unit will vacuum the chamber.

⑥ Retention Stage

When the melting alloy becomes a mass, press the [Retention] button to keep the melting states.

⑦ Casting ring set

Unlock the lever and the vacuum will release when opening the chamber lid (takes approx 5 seconds). Set a burned-out casting ring without gap between melting outlet and the casting ring. Close the chamber lid and lock the lever. The unit will vacuum the chamber again.

- ⑧ Final melting
After locking the lever and vacuum is complete, press the [Final] button to complete the melting of alloy.
- ⑨ Casting
After the alloy is fully melted (the surface of melting alloy should shine), press the [Casting] button. The chamber will invert and the unit pressurizes the chamber. Leave the pressurized state to cool the casting ring until the display shows 1.0 to 3.0 (0.1=10 seconds of cooling time).
- ⑩ Finish
After cooling time finished, press the [Finish] button to revert the chamber to the original position. Open the chamber lid and take out the casting ring.

5. **Casting for Non-Precious Metal (PALLADIUM MORE THAN 30%)**

- ① Crucible
Place a Ceramic crucible. Then place the melting outlet of crucible as well.
- ② Vacuum level set L / M / H
Set the vacuum level to M. Vacuum level of H is 100% (continuously vacuuming), the vacuum level of M is 70%, the vacuum level of L is 40%. Level of L is for Silver alloy.
- ③ Pressure timing set 1 / 2 / 3
Set the pressure timing to 1 for Co-Cr alloy and 2 for Ni-Cr alloy. This is the start point of casting pressure after the chamber is inverted.
- ④ Alloy Putting
It is required that each alloy ingot should be 3g over so that high frequency power can effectively work. Put the alloy carefully with the provided tweezers. In case of melting small alloy ingots, gather them at the crucible bottom.
- ⑤ Casting Ring set
Set a burned-out casting ring without gap between melting outlet and the casting ring. Close the chamber lid and lock the lever.
- ⑥ Argon Injection
Press the [Ar] button to repeat twice to create a vacuum and inject an argon gas pressure inside the muffle chamber (vacuum-argoninjection-vacuum-argoninjection, takes approx. 70 sec). THE PRESSURE GAUGE MUST BE AT LEAST AT 0.03 BEFORE ⑦

⑦ Final melting

After Argon substitution is completed, press the [Final] button to melt the alloy.

⑧ Vacuum stage

When the casting timing nearly comes, press the [Ar] button again to vacuum in the muffle chamber.

⑨ Casting

Press the [Casting] button. The chamber will invert and the unit pressurizes the chamber. Leave the pressurized state to cool the casting ring until the display shows 1.0 to 3.0 (0.1=10 seconds of cooling time).

⑩ Finish

After cooling time finished, press the [Finish] button to revert the chamber to the original position. Open the chamber lid and take out the casting ring.