UPT-Series UltraCast

Product Models:

UltraCast D (0UFX-769-100-01) - Pressure Casting Machine, Dental, 1ph 230VAC

UltraCast J (0UFX-769-100-03) - Pressure Casting Machine, Jewelry, 1ph 230VAC

Operation Manual

UltraCast D

UltraCast J

Version 2.6
www.ultraflexpower.com

PRECAUTIONS

READ THIS MANUAL BEFORE CONNECTING TO MAINS OR INSTALLATION OF THE ULTRA CAST!!!

BEFORE TURNING ON THE MACHINE FOR THE FIRST TIME - READ THE FOLLOWNG TEXT AND FILL THE TANK WITH DISTILLED WATER!

DO NOT OPERATE THE MACHINE BEFORE THE INTEGRATED WATER TANK IS FILLED ACCORDING THIS MANUAL!!!

DO NOT OPERATE THE UNIT IF THE FRONT DOOR AND/OR CAST COMPARTMENT COMPONENTS AND/OR INDUCTOR APPEAR TO BE DAMAGED.

DO NOT OPEN THE UNIT'S COVERS WHILE IT IS CONNECTED TO THE MAINS! MAKE SURE THAT NO ELECTRIC POWER IS SUPPLIED TO THE MACHINE AND THE POWER CORD IS DISCONNECTED FROM THE MAINS!!!

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SPECIFICATIONS TABLE

UltraCast Specification Table

TECHNICAL PRODUCT SPECIFICATION			
Product Models:			Revision
UltraCast D	0UPT 769-100-01	Dental Casting Machine, 3kW, Vacuum	A00
UltraCast J	0UPT 769-100-03	Jewelry Casting Machine, 4kW, Vacuum	A00
TECHNICAL DATA			
SPECIFICATION	**DESCRIPTION**		**CONDITION**
	UltraCast D	**UltraCast J**	
Absorbed Power (kW, max)			
INPUT			
AC Voltage range	230 VAC ± 10%	230 VAC ± 10%	
Line Phases	1	1	single phase
Line Frequency	50 / 60 Hz	50 / 60 Hz	
Input Current maximum	22A (RMS)	28A (RMS)	
Input Power maximum	4.4 kVA	5.8 kVA	
OUTPUT			
Output Power maximum	3.0 kW	4.0 kW	@ 230 VAC Input (nominal)
Output Frequency	74 kHz	74 kHz	
Timer Resolution	2 min/step	2 min/step	
PROTECTION			
Over-current	30 A (RMS)	30 A (RMS)	Output current - inverter
MISCELLANEOUS			
Temperature Ranges	32˚F (0°C) to + 104˚F (40°C)	32˚F (0°C) to + 104˚F (40°C)	Operating
	-4˚F (-20°C) to + 150˚F (65°C)	-4˚F (-20°C) to + 150˚F (65°C)	Storage
Humidity range	0 to 95%	0 to 95%	RH Non-condensing Operating & Storage

PHYSICAL			
Cooling system	Water cooled	Water cooled	Water-Internal
Gas supply	Pressurized air	Argon	
Module Dimensions W x D x H in/(cm)	23.2” x 20.1”x 24.8” (59 x 51 x 63mm)	23.2” x 20.1”x 24.8” (59 x 51 x 63mm)	Overall dimensions
Weight Lb (kg)	123.5 (56)	123.5 (56)	Net weight
Packaged dimension W x D x H in/(cm)			
Packaged weight Lb (kg)	176.4 (80kg)	176.4 (80kg)	Brutto weight
Max Melting T°	2000°C	2000°C	
Crucible Capacity	80g Cr/Co, 80g Ni/Cr, 40g Ti	80g Cr/Co, 80g Ni/Cr, 40g Ti	

1: SAFETY INSTRUCTIONS

1. This manual is valid only for the Model and the associated Revision number(s) specified in the cover sheet of this manual. A Change Page may be included at the end of the manual. All applicable changes are documented with reference to the equipment Revision and Serial number. Before using this Instruction Manual, check your equipment nameplate to identify your Model and Revision number. If in doubt, contact your nearest Ultraflex Representative;

2. This document contains information proprietary to Ultraflex. All rights are reserved. No part of this document may be reproduced, transmitted, processed or recorded by any means or form, electronic, mechanical, photographic or otherwise, nor be released to any third party without the express written consent of Ultraflex;

3. Data subject to change without notice;

4. All Information contained in this manual is the latest information available at the time of printing. The right is reserved to make changes at anytime without notice. Ultraflex makes no warranty of any kind with regard to this material and assumes no responsibility for any errors that may occur in this manual;

5. Safety First!

YOU AND NOT THIS MANUAL ARE REPONSIBLE FOR ALL SAFETY PRECAUTIONS

This manual is for reference purposes only. Personnel should be trained on proper operation of this equipment before using. Only authorized personnel may perform any troubleshooting or repair on any Ultraflex manufactured equipment. Failure to comply will void warranty.

Please, contact the Ultraflex Service Department before servicing any Ultraflex equipment.

Lethal voltages may be present in equipment surrounding and/or connected to this equipment. Read the following warnings carefully and study this entire manual before operating the system. Failure to observe warnings may result in equipment damage, serious personal injury, or death.

If the equipment is used in a manner not specified by this manual, the protection provided by the equipment may be compromised and damage to the unit may occur.

Only qualified persons who have been trained in the operation of this equipment and are familiar with the technology should be permitted to operate the system;

1. Installation, assembly, inspection maintenance and servicing are to be performed by authorized personnel only;

2. Always have the Power Supply completely powered OFF and locked out before performing any service, inspection or maintenance;

3. Even with the Power Supply OFF, live voltages still exist within the cabinet. Always power OFF and lock out the external power source to ensure no one can accidentally energize it;

4. Ensure that all external wiring conforms to applicable codes;

5. Obey all warnings and use good common sense;

1.1: ELECTRICAL SHOCK HAZARDS

This manual is written for personnel familiar with the technology pertaining to the operation of induction heating equipment. Such personnel should be thoroughly familiar with the hazards associated with this equipment and electrical equipment in general, and they should have received proper safety procedure training.

Hazardous voltages are present within this product during normal operation. The product should never be operated with the cover removed unless equivalent protection of the operator from accidental contact with hazardous internal voltages is provided. Operators must be trained in its use and exercise caution as well as common sense during use to prevent accidental shock.

	THERE ARE NO OPERATOR SERVICEABLE PARTS OR ADJUSTMENTS WITHIN THE PRODUCT ENCLOSURE. REFER ALL SERVICING TO TRAINED SERVICE TECHNICIAN.
	SOURCE POWER MUST BE REMOVED FROM THE PRODUCT PRIOR TO PERFORMING ANY SERVICING.
	THIS PRODUCT IS DESIGNED FOR USE WITH NOMINAL A-C MAINS VOLTAGES INDICATED ON THE RATING NAMEPLATE.

1.2: GROUNDING

This product is a Class 1 device which utilizes protective grounding to earth to ensure operator's safety.

	PROTECTIVE EARTHING CONDUCTOR TERMINAL -This symbol indicates the point on the product to which the protective grounding conductor must be attached.
	EARTH (GROUND) TERMINAL -This symbol is used to indicate a point which is connected to the PROTECTIVE EARTHING TERMINAL. The component installer/assembler must ensure that this point is connected to the PROTECTIVE EARTHING TERMINAL.
	CHASSIS TERMINAL -This symbol indicates frame (chassis) connection, which is supplied as a point of convenience for performance purposes. This is not to be confused with the protective grounding point, and may not be used in place of it.

1.3: Magnetic Field

WARNING: MAGNETIC FIELD!
CAN BE HARMFUL TO PACEMAKER WEARERS AND PEOPLE WITH METALLIC IMPLANTS!
PACEMAKER AND METALLIC IMPLANTS WEARERS STAY BACK 30sm (12in)!

1.4: SAFETY AND PRECAUTION SUMBOLS USED IN THS MANUAL

A WARNING symbol alerts you to a hazard that may result in equipment damage, personal injury, or death. Carefully read the instructions provided WARNING and follow all safety precautions.

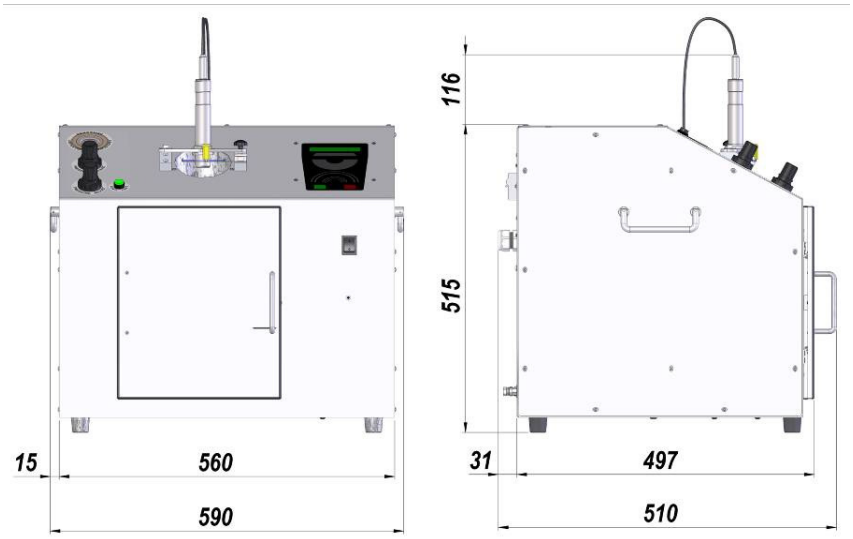
A CAUTION symbol alerts you that the system may not operate as expected if instructions are not followed.

2: TECHNICAL DATA AND CONTROLS

2.1: OVERVIEW

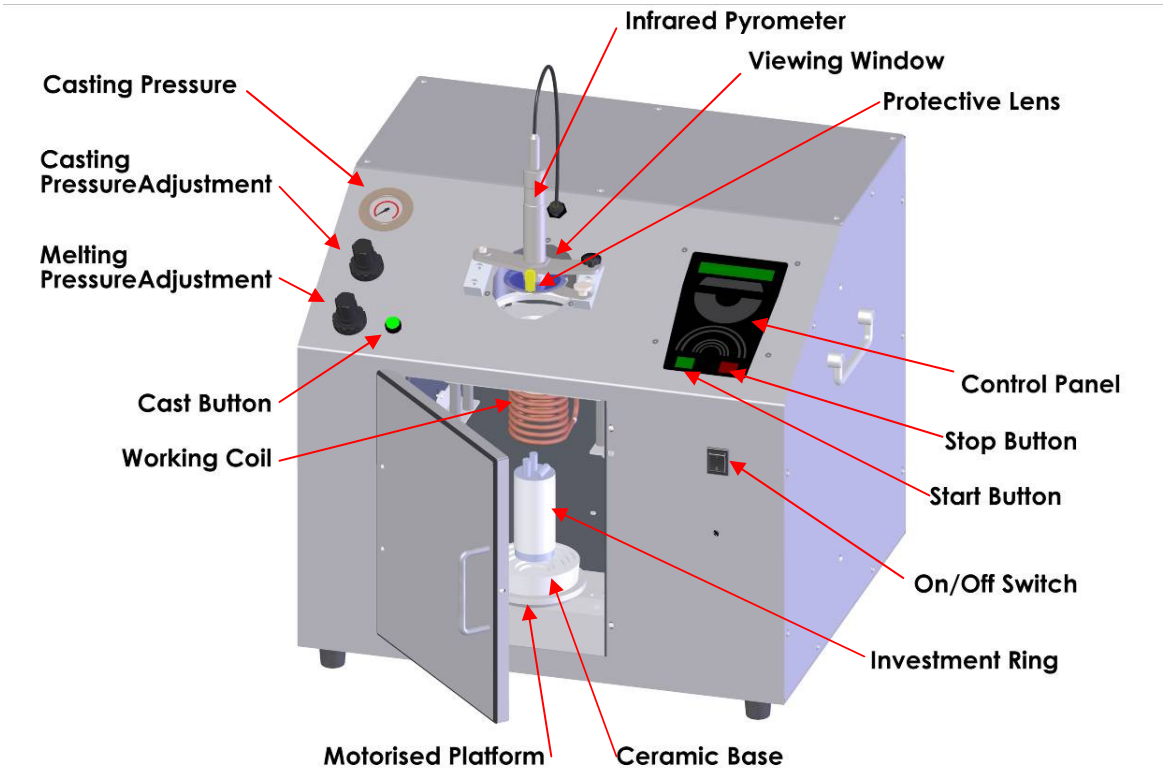
UltraCast is an advanced yet simple dental/jewelry casting machine. The unique design eliminates the need for crucibles by incorporating the crucible's function into the invested ring. The heating is done quickly and safely via high power induction heating. The UltraCast can heat all metals. UltraCast has an integrated cooling system that allows as many as 15 sequential casts to be done at 100% (full power). After such number of jobs performed a working cycle break is needed for the unit, so the cooling water in the tank to reach room temperature.

2.2: OVERALL DIMENSIONS



2.3: CONTROLS

The following diagram shows the main controls of the UltraCast:



3: INSTALLATION AND STARTUP

POWER AND GROUND/EARTH CONNECTIONS MUST BE MADE LAST. FAILURE TO DO SO WILL CREATE A HAZARDOUS CONDITION THAT MAY RESULT IN EQUIPMENT DAMAGE, PERSONAL INJURY, OR DEATH.

NOTE: Ultraflex has a staff of field engineers who are available to supervise the installation of the equipment. If installation service is required, contact our Technical Service Department for additional information.
Provisions for facility electrical power service are customer furnished. Requesting field engineering assistance before customer furnished provisions are installed at the equipment site could delay equipment installation and cause unnecessary expense.

3.1: UNPACKING AND INSPECTION

This equipment has been thoroughly inspected and tested prior to packing and is ready for operation. After careful unpacking, visually inspect for shipping damage **BEFORE** attempting to operate. If any indication of damage is found, file an immediate claim with the responsible transport service and advise your sales representative.

INSPECT EQUIPMENT BEFORE INSTALLING. DAMAGED EQUIPMENT MAY RESULT IN IMPROPER OPERATION AND CREATE A HAZARDOUS CONDITION RESULTING IN PERSONAL INJURY OR DEATH.

THE CARRIER IS RESPONSIBLE FOR ALL DAMAGE CAUSED IN SHIPMENT INCLUDING CONCEALED DAMAGE.

3.2: SELECTING THE DEVICE SITE

Consider the following when choosing a location for the device:

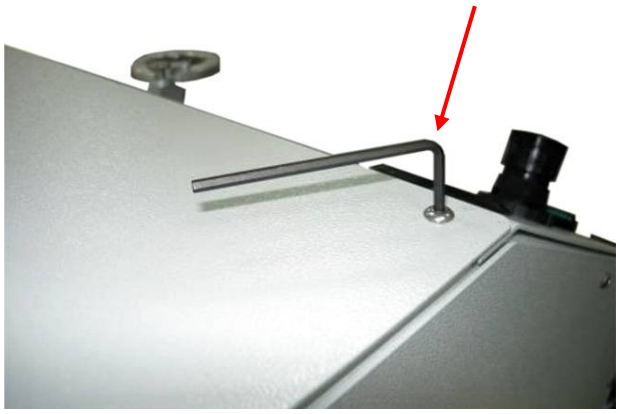
- Make sure the system is installed in a debris free zone;
- The device has to be connected to a power source and cooling water;
- Make sure the device is easily accessible by the operator;
- Device has to be seated on a mechanically secure surface.

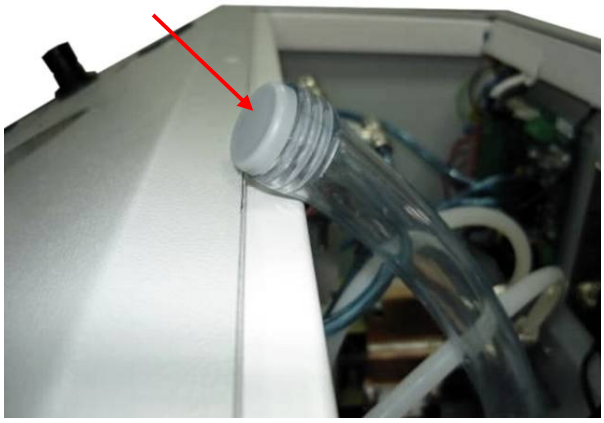
3.3: WATER FILLING

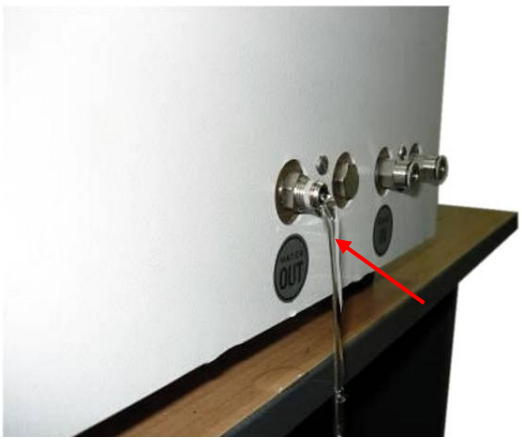
UltraCast is delivered with empty cooling water tank. It must be filled before operating:

Source power must be removed from the product prior water filling!

1. Remove the top cover using the manufacturer provided tool to unscrew the fasteners.
2. Remove the cap at the end of the tank filling hose.
3. Connect the manufacturer provided funnel with the tank filling hose.
4. Carefully pour approximately 13-15 Liters (3.5-4 Gallons) of distilled water
5. Fill tank until water flows from the Water over Flow port.
6. Replace hose end cap and screw the top cover in its place.







	If water spills into the electronic circuitry do NOT connect the unit to the mains for 24 hours. Leave the unit with the cover removed for 24 hours in a dry, well-ventilated to make sure the locations affected are dry. Only then continue with the rest of the instructions.

	The water tank should be topped up monthly! The water should be replaced every 6 months!

3.4: GAS INPUT CONNECTION

1. Connect the GAS connection to an Argon tank using 6mm Tubing.

2. The Argon pressure should be regulated to 80-90 PSI (5.5 – 6.2 bar).

⚠	DO NOT USE OTHER GASES, SUCH AS PRESURIZED AIR OR NITROGENIUM IF YOU MELT TITANIUM! TITANIUM MUST BE MELT AND CAST ONLY IN NEUTRAL (INERT) GAS ENVIRONMENT TO AVOID SERIOUS DAMAGES OF THE UNIT AND PERSONAL INJURY!

3.5: AC INPUT CONNECTION

The UltraCast connects to the power network through a 6 ft (1.80m), power cord (supplied). Additional fuse or circuit breaker and residual current circuit breaker on that power branch is a good choice since it will provide extra protection in addition to the unit's internal protection. A mechanical switch is also recommended within the operator's range and vision and possibly closer to the Power Supply.

Only trained personnel should open the unit cover and operate the breakers.

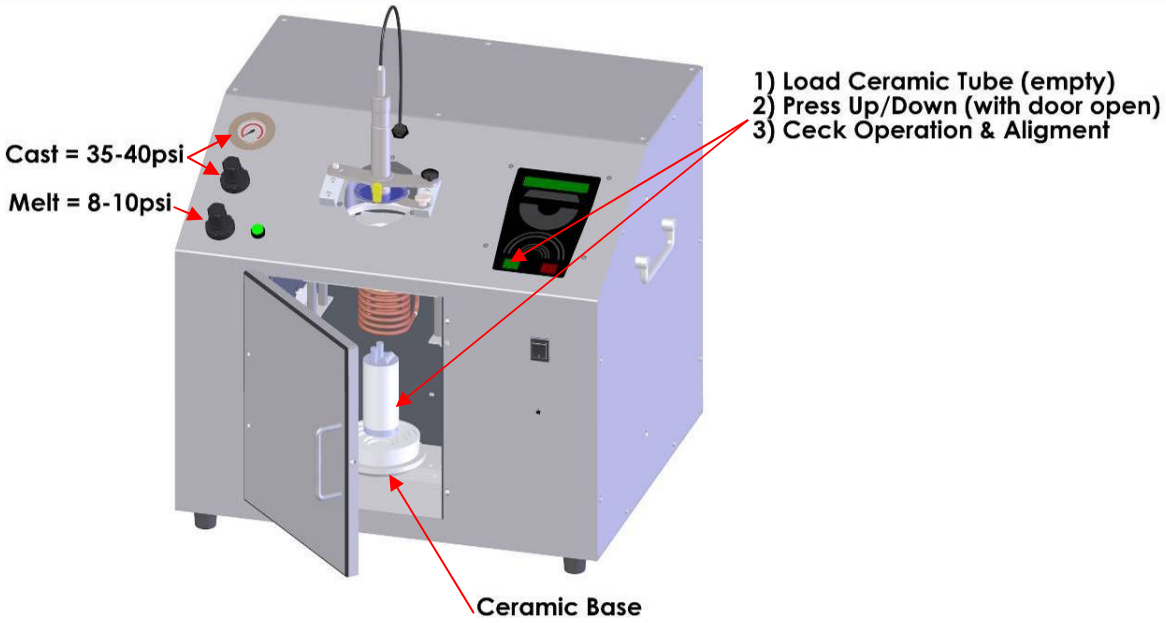
Table 1.1: Wiring Color Code

Color	1-Phase Connection
Brown	Phase A
Blue	Neutral
Green/Yellow	Protective Earth

⚠	***NOTE*: LOCAL CODES MAY HAVE STRINGENT REQUIREMENTS. IT IS THE CUSTOMER'S RESPONSIBILITY TO BE FAMILIAR WITH AND TO COMPLY WITH ALL APPLICABLE CODES CONCERNING CONDUCTOR RATINGS AND WIRING PROCEDURES. AN ELECTRICIAN FAMILIAR WITH THE LOCAL REGULATIONS SHOULD DETERMINE PROPER WIRING CONNECTIONS.**

4: CONTROLS AND OPERATION

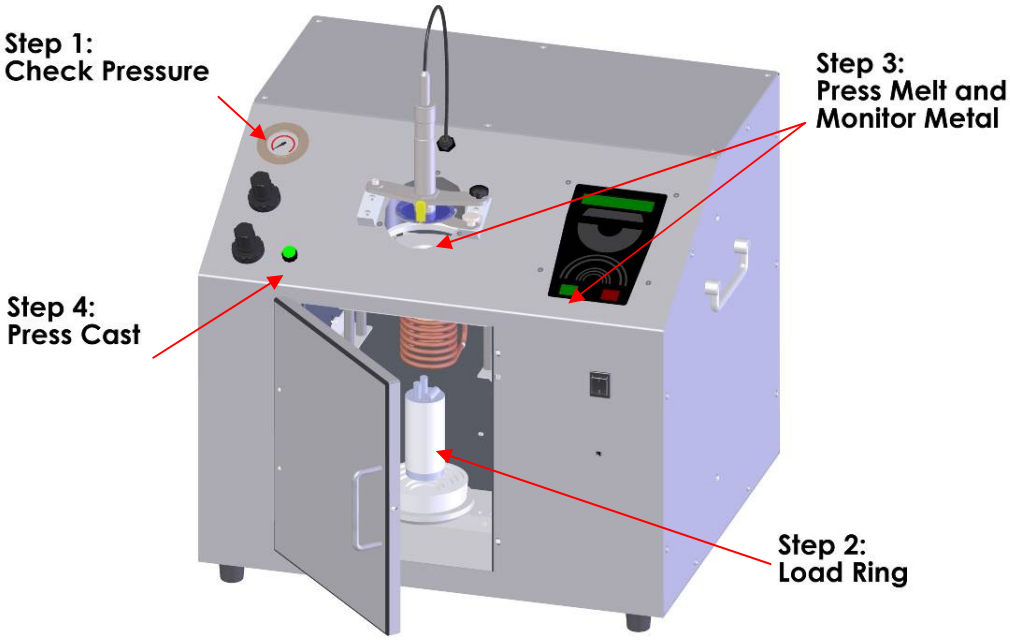
4.1: CHECK OPERATION



4.2: OPERATION

Turn on the Circuit Breaker, the Power Switch.

1. Adjust Pressure:
    a. Adjust Melting Pressure to 8-10 psi.
    b. Adjust Casting Pressure to 35-40 PSI.
2. Load:
    a. Load the hot investment ring with raw metal.
    b. Place the investment ring on the Ceramic Base.
    c. Close the door.
3. Melt:
    a. Press the Melt Button.
    b. Monitor the heating through the viewing window via protective lens.
4. Cast:
    a. Press the Cast button when the metal liquefies.
    b. The UltraCast will automatically cast using Argon pressure.
    c. When the cast is complete, the platform will lower and the investment can be removed.



4.3: CONTROLS

Alignment Check:

- Place a Ceramic Flask on the Ceramic Base.
- Press the Up Arrow to enter Alignment Check.
- Press the Up / Down Arrows to check Alignment:
  - Platform will raise and lower.
  - Ceramic Flask will pass into coil.
  - Ceramic Flask will make connection with air camber.
  - Will operate with door open (DO NOT PLACE HANDS INSIDE UNIT).
- Press the MENU button to exit.

Controls - Press and hold Melt button for 5 seconds:

- POWER = XXX% Recommended 100%
  - Press the Up and Down arrows to change.
  - Press the Right Arrow to continue.
- Cast Time = XX Seconds Recommended 40 Seconds
  - Press the Up and Down arrows to change.
  - Press the Right Arrow to continue.
- Water Flow Good Recommended> 0.3 GPM
  - Not Adjustable
  - Press the Right Arrow to continue.
- Platform = XX.X PSI Recommended 40 – 50 psi
  - Open left side of UltraCast to adjust (knot - pull to adjust, push to lock).

  - Press the Right Arrow to continue.
- Cast = XX.X PSI Recommended 35 – 40 psi
  - Use knob on front panel to change (pull to adjust, push to lock).
  - Press the Right Arrow to continue.
- Melt = XX.X PSI Recommended 7 – 11 psi
  - Use knob on front panel to change (pull to adjust, push to lock).
  - Press the Right Arrow to continue.
- Vacuum Recommended < - 500mBar
  - Place “test” investment ring on Ceramic Base for test.
  - Press MENU to TEST.
  - Press the Right Arrow to continue.
- Simple Software
  - Consult factory for extended or custom Software Options.
  - Press the Right Arrow to EXIT.

4.4: ALARMS

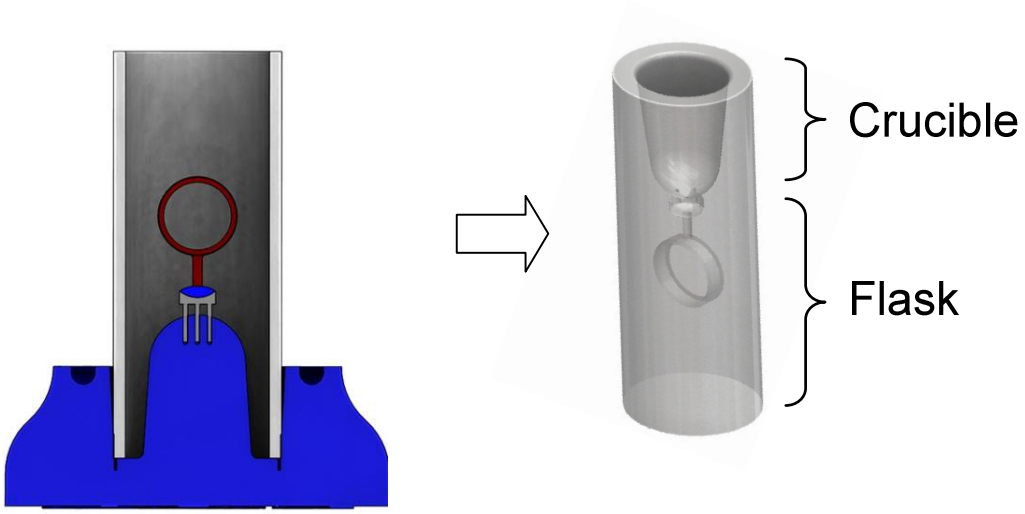
The following is a list of Alarms and possible causes/solutions.

Alarm Messages Table

Displayed Message	Fault Description or Condition	Cause	Advice
Phase Fault	Primary V & I out of phase	Can't find resonant frequency	Check resonant loop parameters and adjust if needed - load coil inductance, tank capacitors values, transformer taps
Current Fault	I primary > I Max	Output current exceeds the limit	Possible FET/IGBT failure in the Power supply. Contact our Service department
Frequency Fault	F < F min or F > F max	Frequency goes out of the pre-programmed range during Heat On	Check resonant loop values, tank capacitors or control board. Check load coil for shorted turns.
Temperature Fault	T° heat sink >65°C	The heat sink of the power supply exceeds the max allowed T°	Check fans, blockages of the vents or fan filters, cooling water temperature or water filters.
Auto Tune Fault	The resonant frequency is not found	The unit could not find resonant frequency during auto sweep	Check resonant loop parameters and adjust if needed - load coil inductance, tank capacitors values, transformer taps
Chamber Door Open	Front door is open	Protective door of the chambers is open	Close tight the front door
Communication Fault	Communication Error Between Panel and Control Board	No acknowledgement is received after the last command	Check cables and RS connectors between boards
AC Line Fault	AC line is interrupted for over 100mS	AC line has interrupts	Check AC line and supply cables
Int Board Fault	Communication Error Between Panel and Interface Board	No acknowledgement is received after the last command	Check cables and RS connectors between boards
Temperature Fault	$T_{HS} > 70^0C$ $T_{TC} > 70^0C$	Inverter heat sink or tank capacitor battery is overheated.	Check cooling system of the machine. Change warmed water in internal water tank.
Water Fault	$WF_{HSI1} < 1.5$ l/min	Cooling loop has insufficient water flow.	Check cooling loop for leakages. Flow sensor indicator must be green.
Unsupported CB	Unsupported control board (wrong SW or control board)		Change control board
Wrong Crucible Pos.	Crucible hits the inductor protective table	Crucible is not place in right position (vertical or horizontal)	Remove crucible. Check ceramic base and put crucible again.
Unsupported IB	Unsupported interface board (wrong SW or interface board)		Change interface board

4.5: THEORY OF OPERATION

The UltraCast uses a novel approach to Vacuum Casting. The approach combines the conventional Flask and Crucible into one “Investment Ring”:



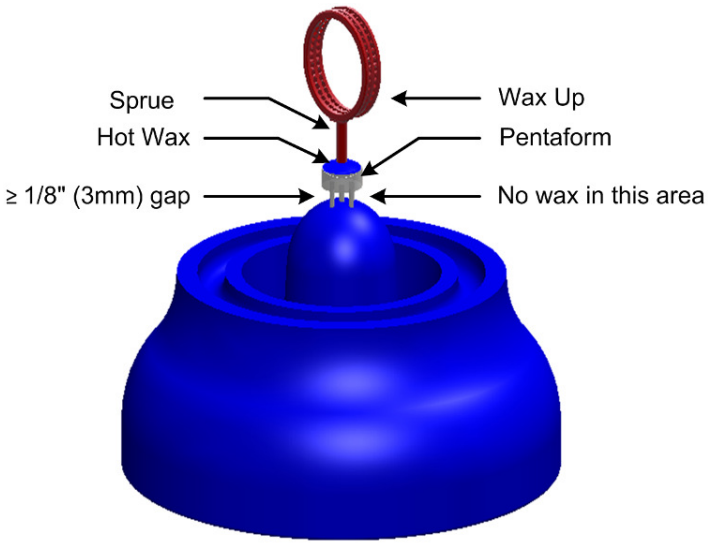
- Sprue:
  - The process for the UltraCast is no different than spruing for all other casting systems – with one exception: All sprues must be attached to a “Pentaform” wax sprue button.
- Invest:
  - As pre manufacturer’s instructions.
- Burnout:
  - As pre manufacturer’s instructions.
- Cast:
  - Hot Investment Ring is placed.
  - Melt button is pressed:
    - Platform raises the Investment Ring into the coil.
    - The top (crucible sanction) of Investment Ring is aligned with a Vacuum/Pressure Chamber.
    - The Chamber runs a series of vacuum / argon cycles to replace ambient air with Argon.
    - The Melt starts with an argon atmosphere ~ 8-10 psi. This helps prevent. Premature dripping of the molten metal. Note – Ambient atmosphere is ~ 14 psi.
  - Cast (once all metal is molten):
    - High Pressure (30-40 psi) forces the molten metal into the bottom (flask section) of the Investment Ring.
- Quench: Air Quench.

5: CASTING INSTRUCTIONS

5.1: SPRUING

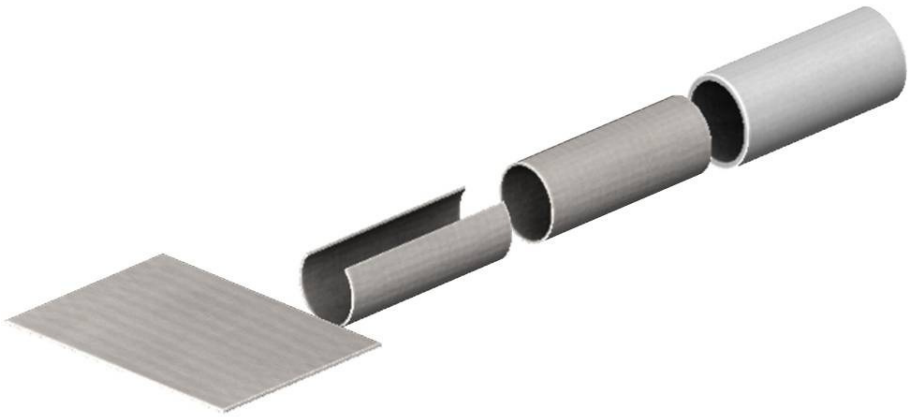
Spruing for the UltraCast is no different than spruing for all other casting systems – with one exception:
All sprues must be attached to a "Pentaform" wax sprue button.

1. Rubber Base – Prepare base ensuring clean surfaces.
2. Place a Pentaform on the rubber base.
3. Attach Sprue(s) and Wax Up(s) to the Pentaform.



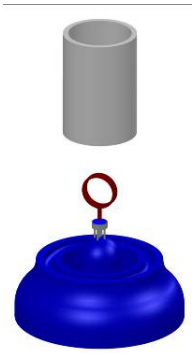
5.2: CERAMIC FLASK:

Cut Ceramic Paper to size and insert into ceramic flask.



Apply a thin film of Vaseline to entire inside surface of ceramic paper.

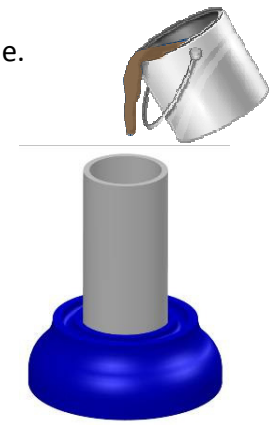
Firmly seat Ceramic Flask into Rubber Base:



5.3: INVESTING

- Prepare investment material as per manufacturer's instructions.
- It may be necessary to apply investment material between Pentaform legs and base.

- Pour with Investment Ring on a vibration table.



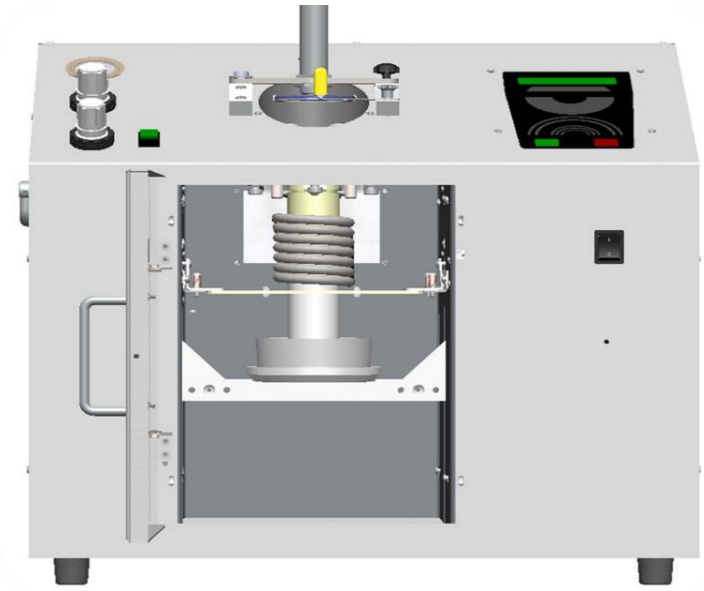
5.4: BURNOUT

- Burn-out as per investment manufacturer's instructions.

You are now ready to cast

5.5: CASTING

- Adjust Cast Pressure to ~ 35÷40 psi.
- Adjust the Melt Pressure to ~ 8÷10 psi.
- Insert Metal Ingot into the Crucible section of the Preheated Investment Ring.
- Place the Preheated Investment Ring into UltraCast.
- Press MELT.
- Monitor Metal.
- When molten, press CAST.



5.6: QUENCHING

Air Quench Investment Ring:

***DO NOT QUENCH IN WATER - Rapid quench will cause ceramic to crack ***

6: MAINTENANCE

6.1: SCHEDULING

UltraCast is designed for continuous service and minimum maintenance requirements. The frequency of any maintenance program is a function of environment, degree of equipment use, and product experience.

6.2: PERSONNEL

Qualified personnel must perform inspection and maintenance procedures only. Personnel must read and be thoroughly familiar with all safety precautions discussed in this manual.

6.3: INSPECTION AND MAINTENANCE PROCEDURE

Note: Always follow approved lock - out / tag - out procedures before performing any service, inspection or maintenance.

The following describes inspection procedures to be performed on a daily, weekly, and monthly basis.

Daily/Weekly Inspection: It is good practice to do a quick visual inspection of the unit, wiring and connections on a daily and/or weekly basis. Report any apparent changes in performance to responsible personnel so that potential problems can be investigated.

Monthly Inspection:

Perform the following on a monthly basis:

1. Ensure all wiring connections are secure. Visually inspect for any wear on cabling;
2. Verify that none of the enclosure's hardware has become loose;
3. Check the water (coolant) for mechanical debris or impurities. The water should be kept clean and replaced as needed.
4. Wipe the Control Panel with a damp cloth to remove any dirt, prints or smudges;
5. Wipe the enclosure down with a damp cloth or paint friendly cleaner, if desired;

7: SERVICE

7.1: GENERAL

If for some reason the unit fails in the field it is advisable that the unit be serviced by the manufacturer or its authorized service representative. Should that happen, please contact us immediately (see contact information in Section 7.2). Please have the following information about your unit available upon calling:

1. Unit Model and Revision (located on the label on the back of the unit);
2. Unit's Serial Number (located on the label on the back of the unit);
3. Line Voltage and frequency;
4. Detailed description of the problem encountered including – load, ambient temperature at the time of the failure;
5. Detailed description of the actions taken;
6. Approximate time in service.

If our technical staff is unable to help you over the phone, then a repair authorization number (RA#) will be issued for you. With this number enclosed in you return package you can ship the unit back for repair or request a service engineer to repair the unit on site.

7.2: SERVICE CONTACT INFORMATION

For technical service questions, please call:
Europe and Asia: + 359 2 480 1900
USA and Canada: + 1 631 467 6814

You may also fax your questions or request:
Europe and Asia: + 359 2 480 1910
USA and Canada: + 1 631980 4065

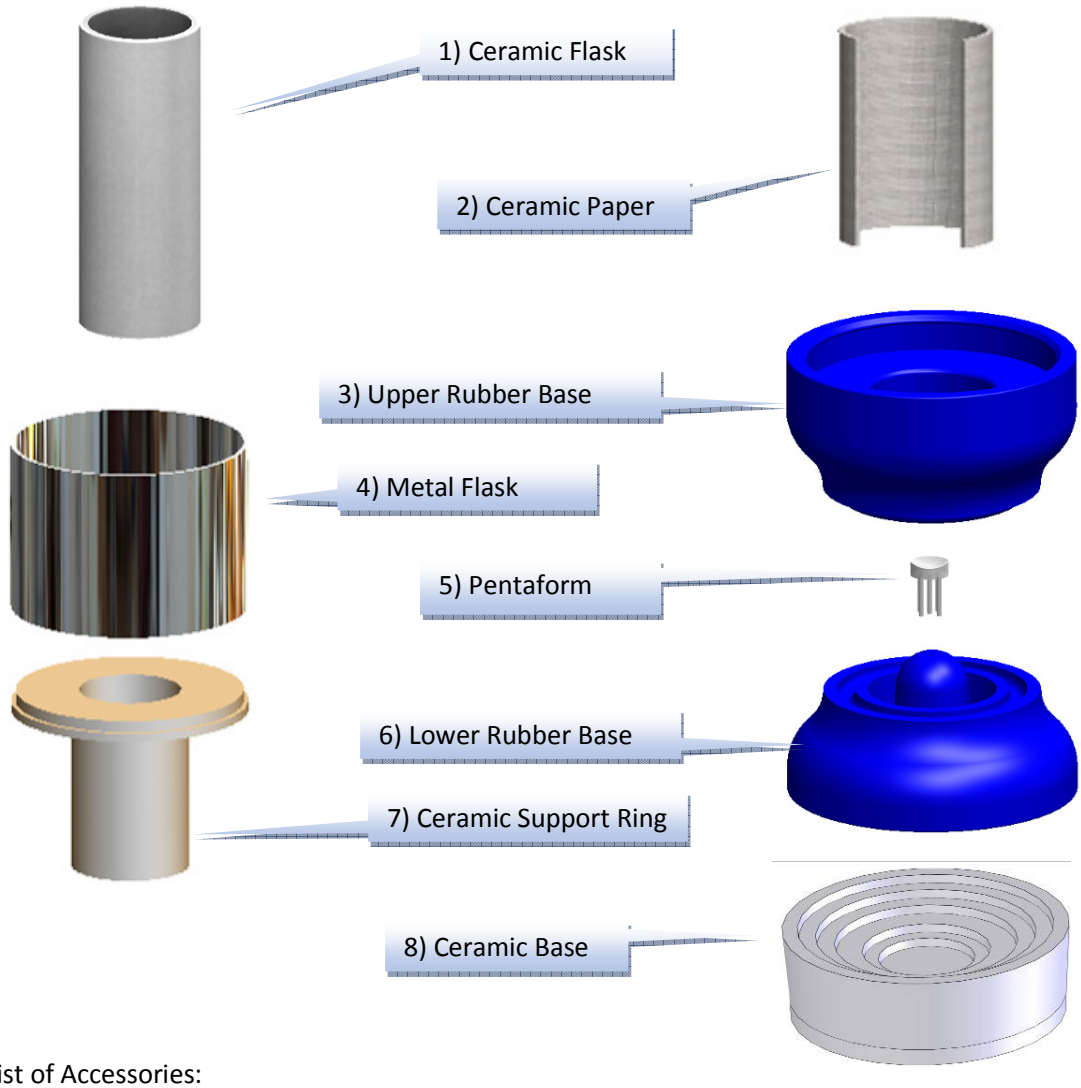
Or e-mail us at: support@ultraflexpower.com

You can also send you request through our web site.

Note: Please, include your contact information so that you can be easily reached if necessary.

8: ACCESSORIES

The UltraCast comes with all accessories to begin casting Small and Large Investments:



List of Accessories:

№	Accessories supplied with the machine	Part Number	Rev	Qty
1	Ceramic Flask 1.75” OD x 4.25” Long	2DET-769-000-ME	A00	2
2	Ceramic Paper 11”x 6”x 0.060” (pkg of 10)	6VCC-000-129-00	A00	10
3	Upper Rubber Base	2DET-769-000-KF	A00	1
4	Metal Flask 3.5”O.D. X 3” Long	2DET-769-000-MI	A00	1
5	Pentaform (pkg of 50)	2DET-769-000-OA	A00	50
6	Lower Rubber Base	2DET-769-000-KE	A00	1
7	Ceramic Support Ring	2DET-769-000-MH	A00	1
8	Ceramic Base	2DET-769-000-NA	A02	1

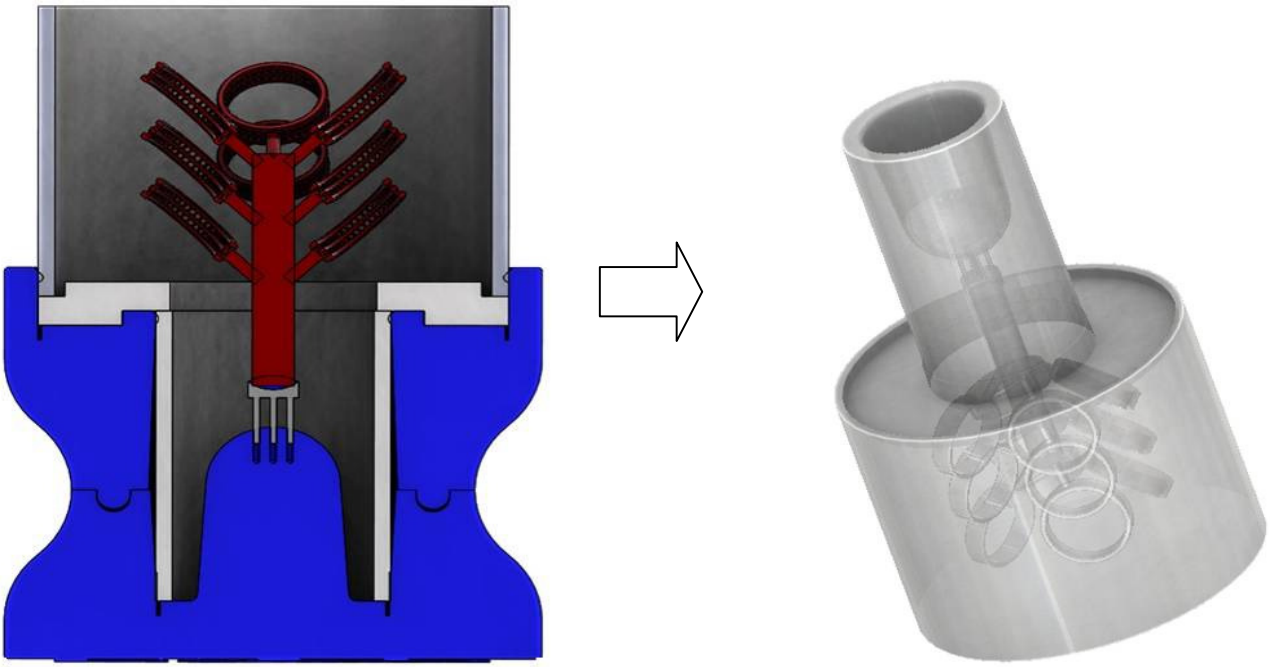
Options:

	Options available	Part Number	Rev	
	IR Pyrometer Assembly	1ACC-769-110-00	A00	1

Appendix A: UltraCast Tree/Partials (Dental) Casting Instructions

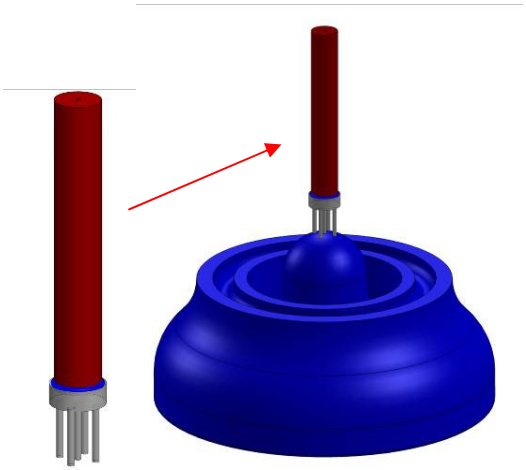
A1: CONCEPT

- The UltraCast Tree Casting uses the same approach as above with slightly different parts.
- The process for casting trees using the UltraCast is no different than standard casting.
- Requires a larger lower (Flask) section and a shorter upper (crucible) section.

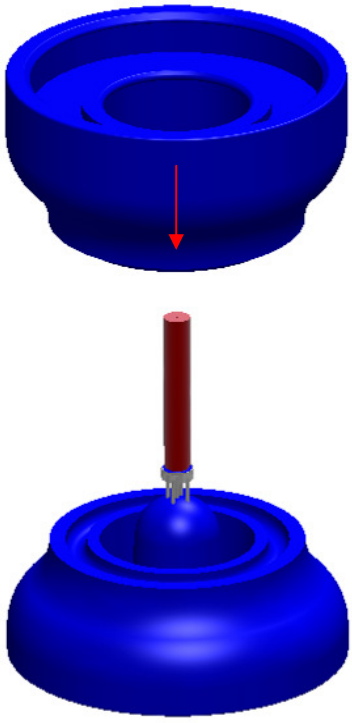


A2: INSTRUCTIONS

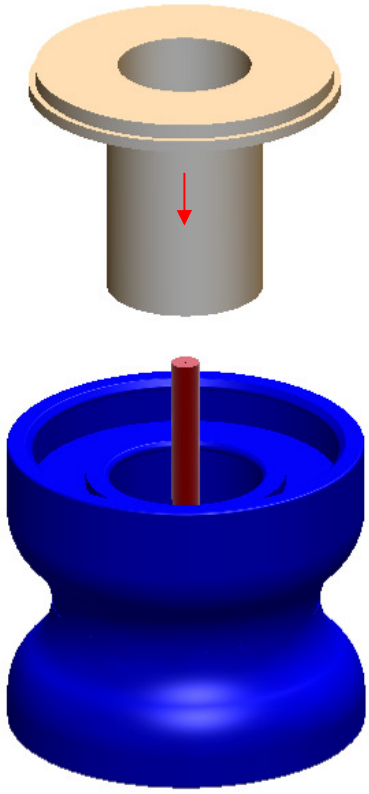
1. Install Pentaform and Main Tree Sprue to Lower Rubber Base (supplied with UltraCast Accessories).



2. Install upper rubber base on to the Lower Rubber Base:

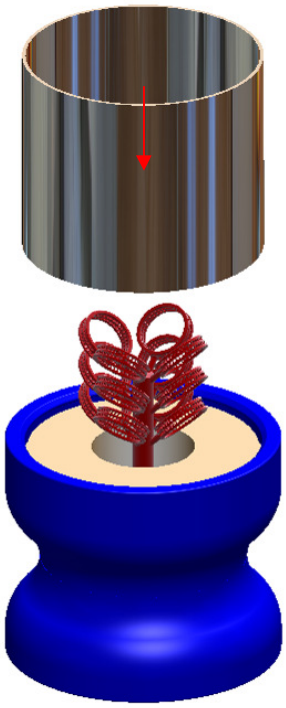


3. Firmly insert ceramic support ring into lower rubber base (line the Ceramic Ring with ceramic paper and Vaseline as needed – NOT SHOWN):

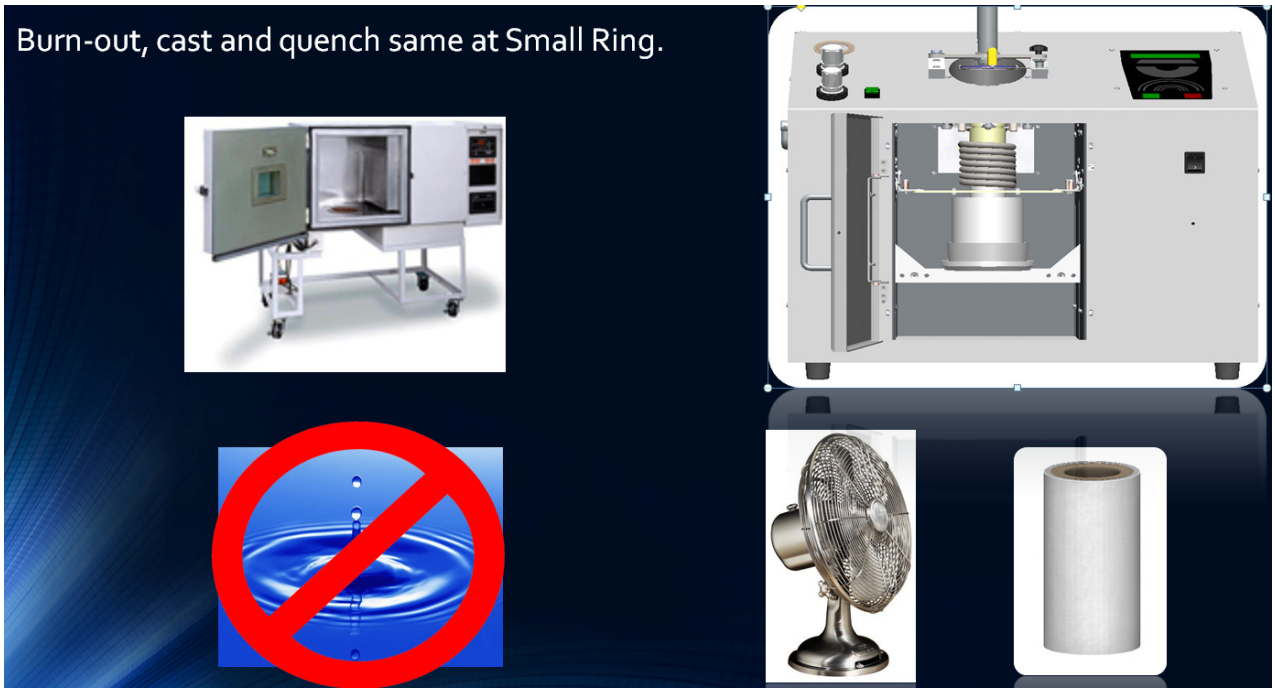


4. Build Tree:

5. Install 3.5” OD x 2.5” Long steel flask (line the Ceramic Ring with ceramic paper and Vaseline as needed – NOT SHOWN):



6. Invest, Burnout, Cast and Quench same as the Standard Process (Section 5).



Appendix B: TITANIUM CASTING

B1: MATERIALS

The UltraCast can work with any type of investment material. However we have made successful titanium castings with the following materials:

- Investment material: Sheratitan Easy.
- Mixing liquid: 80% Sheraliquid extra and 20% Shera liquid.
- Zirconium Oxide paint: Z-O paint, Gesswein.

B2: WAX MODELS

Preparation of the wax models is ***extremely*** important for the quality of your castings. When preparing the wax model make sure that you use enough compensators to allow the gas to be evacuated from the model during casting. Also the volume of the spruing system must be enough to allow even and complete filling of the model.

B3: FLASK

To prepare the flask as in defined in section B.2!

B4: MAKING THE FLASK

CAREFULLY FOLLOW THE INSTRUCTIONS PROVIDED BY THE MANUFACTURER OF THE INVESTMENT MATERIAL AND THE MIXING LIQUID!

1. Mix the investment material following as per the manufacturer instructions (Fig.B.1).
   - Do not use the same measuring flask and stirrer for other investment materials!

Fig.B.1

Fig.B.2

- Use vacuum mixer to avoid bubbles in the investment.

2. Fill the mold with the investment material (Fig.B.2).

3. Allow 10-15 minutes for the flask to cure.

⚠	***NOTE – THE MOLD WILL GET HOT DURING THE CURING CYCLE.***

4. Paint the inside of the "crucible" with 2-3 thick layers of Zirconium paint (allow time for each layer to dry). This keeps the titanium from reacting with the oxygen in the investment material during melting and improves the quality of your castings (Fig.B.3).
The flask is now ready to be placed in a burnout oven.
When burning the flask follow the manufacturer's instructions carefully (Fig.B.4).

Fig. B.3

Fig.B.4

For Sheratitan Easy: Heat the oven to 950°C. Put the flask inside and burn for at least 1 hour. Add 5 minutes for each additional flask. When complete, remove flask and leave at room temperature for 45 minutes or until the temperature is around 150°C.

B5: CASTING

1. Use ONLY ONE Titanium ingot! Additional ingots will create areas that are overheated and other areas that are under heated (Fig.B.5).

NEVER ATTEMPT TO HEAT "USED" TITANIUM.
TITANIUM CAN NOT BE RE-MELTED.

Fig.B.5

Fig.B.6

Fig.B.7

Fig.B.8

2. Use 99.750% (or better) pure Titanium Ingots. The melting point is approximately 1670 °C (Fig.B.6). Push the cast button when you see the 98% of the Titanium ingot is melted.

3. When the casting process is complete, immediately place Flask in a large amount of water to stop the Alpha Case production (Fig.B.7).

4. Remove the remaining investment around the casting using sandblaster (Fig.B.8). Use aluminum oxide, grain size 125-250 µm. Your titanium casting is ready!

PLEASE NOTE THAT TITANIUM IS A DIFFICULT METAL TO CAST AND TO ACHIEVE GOOD RESULTS YOU NEED EXPERIENCE.

THIS PROCEDURE WILL GIVE YOU THE BASIC TIPS BUT TO MAKE THE PERFECT CASTING YOU WILL NEED TO PRACTICE.

Version history:

№	Ver.	Date	Create/Change by:
1	2.5	10.2014	L.Mihova
2	2.6	12.2014	L.Mihova