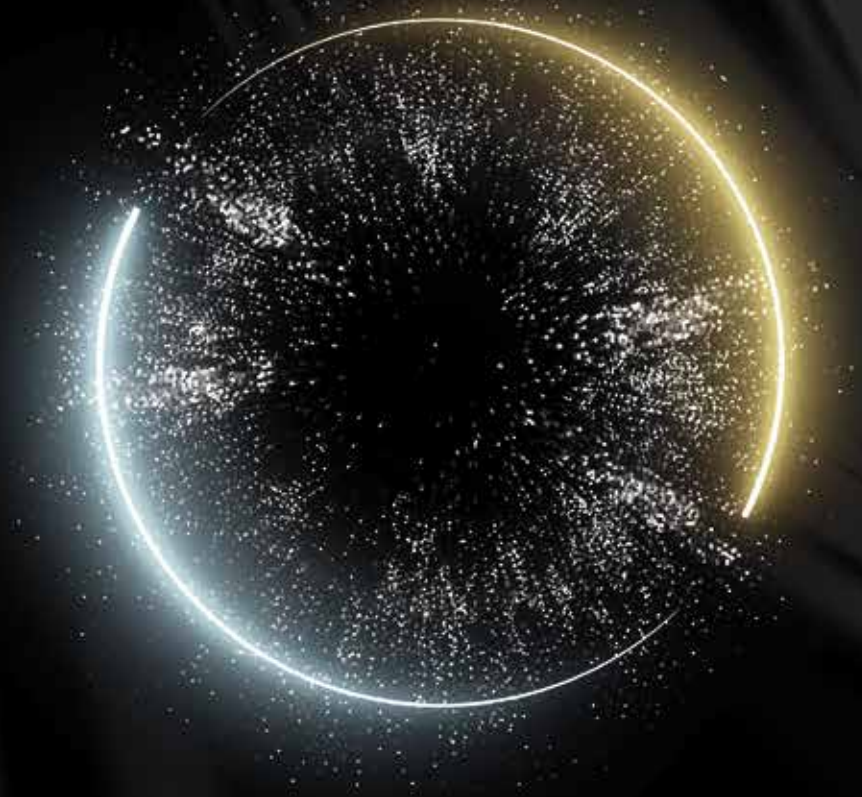
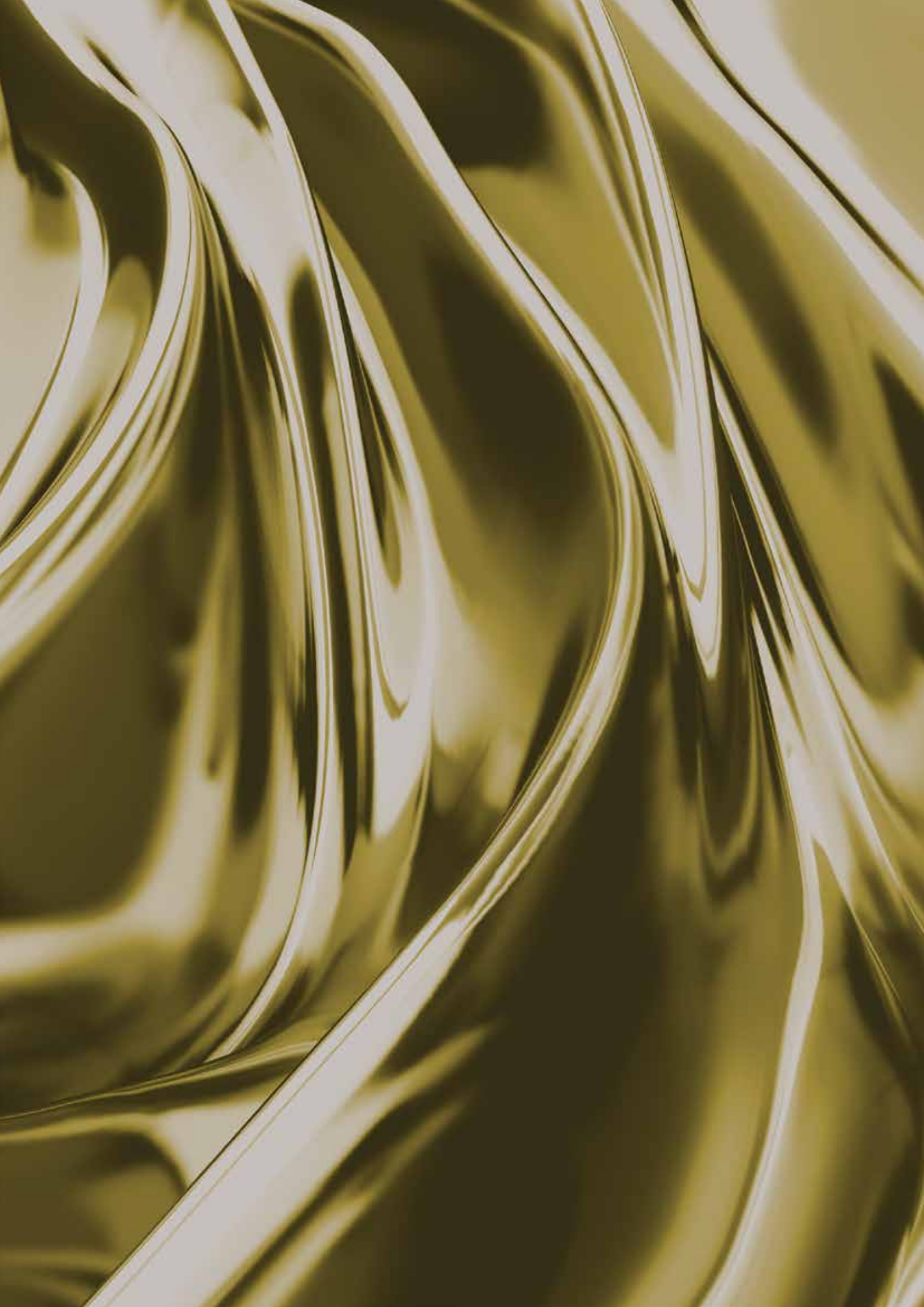
PRODUCT CATALOGUE

Vacuum induction furnaces for precious metals



Topcast Engineering



Topcast is a company specialised in vacuum induction furnaces design and manufacturing

Competences developed in casting and powder metallurgy, thermal processes, induction heating and power electronics set TOPCAST as an ideal partner for standard and custom applications.

A group of qualified engineers and designers, constantly updated and oriented to the research of enhanced technical solutions, grants a product range definitely at the state of the art. Equipment range includes: VIM, Gas & Water Atomizers for Metal Powders, Vacuum Casting Furnaces, Vacuum Continuous Casting Machines, Metal Granulators and general purpose Induction Furnaces.

Product versatility to meet different production needs, quality design, post-sales assistance and technical consultancy to satisfy particular needs make TOPCAST the best partner to count on in a global competition scenery.

Vacuum Casting of Metallic Components

Vacuum investment casting is the process used in lost-wax technique to get a metal part as a copy of a wax or resin pattern. The pattern is designed and then manufactured in wax or resin materials by different equipment as CNC, 3D printers, wax injection in rubber or metal molds or even carving manually the wax part. Molten metal can be poured in vacuum either in shell, investment block mold or solid permanent molds. Furnaces and complete foundries setup for casting can be supplied for any application. In detail, TOPCAST offers the following systems:

- Double Chamber Pressure over Vacuum Casting Machines TVCd, designed to meet the more severe needs in lost wax casting of precious and nonferrous alloys
- Vacuum Centrifugal Casting Machines TCE, robust and versatile machines especially suited for sharp and thin parts with large surfaces, thanks to the high injection rate, or for lost wax casting production of Pt, Pd, Steel and Titanium
- Vacuum Induction Melting furnaces TVM, for pouring in high vacuum and for large batch capacity

Vacuum Casting of Semi-finished products

Many different equipment are available for obtaining semi-finished products like sheets, rods or tubes.
In detail, TOPCAST offers the following systems:

- **Vacuum Continuous Casting Machines TCC,** designed with the most up-to-date technologies to produce semi-finished products with the best quality and in the shortest time; our TCC machines have the unique feature of working under vacuum or in protective atmosphere which prevents the oxidation of the metal during melting
- **Vacuum Furnaces TVCd-L and TCE-L**, used to manufacture high quality semi-finished products, like sheets or rods with difficult profiles, achieved with a fast mold filling and cooling rate
- **TIP furnaces** designed to manufacture any size of ingots, from 1 ounce to 400 ounces either in gold or silver. Ingots are obtained by melting pre-weighted grains directly in a graphite mold placed inside a vacuum melting chamber.

Induction Melting

A large choice of induction melting furnaces for many different uses is offered, from smelting to sampling, from granulation to ingots production. TMF-R equipment are available with capacities up to 1000 kg for Silver or Gold and up to 60 kg Pt with different tilting systems, from electrical to hydraulic. Today, hundreds of TOPCAST induction furnaces are proudly installed worldwide.

Metal Powder Atomizing & Granulation

TOPCAST manufactures a family of gas and water atomization plants designed to deliver optimized solutions for the most demanding needs in powder metallurgy. In particular, depending from the final application of the powder, the following different systems are available:

- **Vacuum Gas Atomizers TMA-g** for Additive Manufacturing using SLM (Selective Laser Melting) or EBM (Electron Beam Melting) for precious and nonferrous alloys
- **VIGA** (Vacuum Gas Atomizers), also under ATEX regulations, for Aluminum, Stainless Steel, Ni-based, MoCrCo powders and more
- **EIGA** (Vacuum Gas Atomizers) under ATEX regulation for Refractory and Reactive metals such as Titanium and more
- **Water Atomizers TMA-w** for Refining, Soldering Powder, MIM and Sintering applications

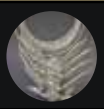
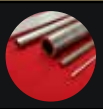
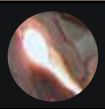
Moreover, induction plants to produce precious or non-ferrous metal grains, either in air (TMF-G) or in a protective atmosphere (TVCd-G) are produced, either for refinery or master alloy production.
Plants are usually sold key-in-hands, including equipment for grains drying, sieving, dosing, weighting and final packaging. The high level of automation minimizes the operator work and ensures reliability and safety in precious metal handling and storing.









Alloys VS Machines	TVCd	TCE	TVM	TCC	TIP	TMF-R	TMF	TMA	TMF-G TVCd-G
Application									
Steel, Cast Iron		●	●			●	●	●	
Inconel, Ni, Co, Cr, Mo alloys		●	●					●	
Ti, TiAl, Zr and Amorphous alloys		●	●					●	
Magnesium	●	●	●						
Platinum, Palladium and PGM alloys		●	●	○		●		●	●
Au, Ag, Cu, Brass and Bronze	●	○	●	●	●	●	●	●	●
Al, Si, Zn alloys	●	○	●	●		●	●	●	●

Suggested ● / Possible ○

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TVCd | Double chamber pressure over vacuum casting machine

Watch how it work

TVCd is the pressure over vacuum casting machine designed to meet the more severe needs in lost wax casting production.

This machine works with a new, revolutionary double chamber concept. This innovative system gives several advantages compared with the traditional single chamber suction system currently available in the market. In TVCd melting chamber and flask chamber are completely independent and at the moment of casting the machine controls the metal injection into the mold by applying a differential pressure during pouring.

This leads to a faster injection compared to the simply gravity pouring with the benefit to cast items at lower temperature. The result is a better surface finishing of the cast parts.

The casting cycle takes only few minutes and, while the previous cycle is at the cooling stage, the next charge can be loaded into the crucible and melted, thus overlapping two cycles for an increase of productivity.

The machine is fully automatic having also a PC based monitoring system for process variable acquisition and production data management with easy editing of casting programs suitable for many kind of alloy (optional).

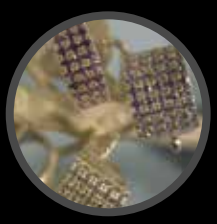
This revolutionary machine is the synthesis of the most advanced engineering and 20 years of experience in casting that only TOPCAST can bring inside your factory.

Model
TVC3d

Model
TVC12d

Model
TVC25d

Examples



Technology, features, technical data

Gas Wash Procedure

- Crucible loading operation introduces oxygen
- The Gas Wash Purge procedure removes the oxygen (1) in a very fast and efficient way and then refills back the chambers with Argon or Nitrogen gas (2)
- Compared with the traditional crucible protection by dilution, the consumption of gas is dramatically reduced and the alloys oxidation is minimized; moreover the crucible life is increased

Melting

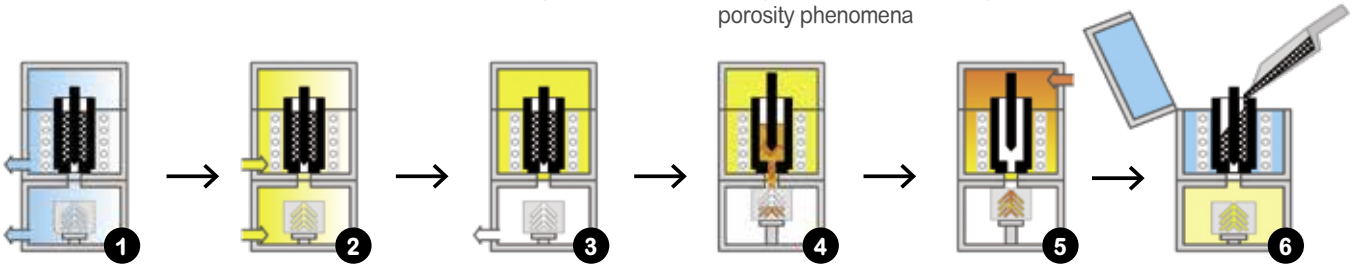
- Advanced Self Tuning thermoregulation (AST™) with exact temperature control of the melted alloys
- Two Set-Points available: Homogenization and Casting Temperature
- Set-up with multiple thermocouples available on request
- Medium frequency induction heating stirs the melted alloy and leads to a perfect homogeneity
- Pulse Stirring Management (PSM™) for an extremely low frequency stirring

Injection and Compression

- When the stopper rod lifts up. it is very important to control the injection rate to avoid turbulences
- TVC has the unique feature to have the injection rate controllable and programmable (IRC™)
- The metal enters smoothly inside the mold (4). Then, after filling and during the solidification phase, a strong compression takes place on the tree (5)
- No turbulences in filling and high compression rate lead to a large reduction of shrinkage porosity phenomena

Tree protection after casting

- Thanks to the double chamber concept, after the solidification phase, the flask cools down in a protective atmosphere while at the same time you can load your alloy in the melting chamber for the next melting.
- This operation will allows an overlapping of the casting cycles which will give you the ability to protect longer the tree before removing it without loosing time and productivity



AIR VACUUM GAS

Model	TVC3d	TVC5d	TVC10d	TVC12d	TVC25d
Crucible volume	50cc	100cc	280cc	500cc	2 liters
Crucible working capacity	200g Bronze 250g Silver 500g Gold	200g Aluminum 400g Bronze 500g Silver 1 kg Gold	500g Aluminum 1.5 kg Bronze 1.5 kg Silver 3 kg Gold	750g Aluminum 2.3 kg Bronze 2.5 kg Silver 5 kg Gold	3 kg Aluminum 10 kg Bronze 8.5 kg Steel 2 kg Magnesium
Flask max. diameter (mm)	90	● 150 / ○ 200	● 150 / ○ 200	● 150 / ○ 200	● 350 / ○ 400
Flask max. height (mm)	120	● 300 / ○ 400	● 300 / ○ 400	● 300 / ○ 400	● 600
Induction heating power	2.5 kW	4.9 kW	10 kW	12 kW	20 kW
Vacuum pump	Ext.	Internal	Internal	Internal	Internal
Pressure over vacuum	3 bar	3 bar	3 bar	3 bar	1 bar
Max. temperature	1250°C	● 1250 °C / ○ 1600 °C	● 1250 °C / ○ 1600 °C	● 1250 °C / ○ 1600 °C	● 1250 °C / ○ 1600 °C
Granulation unit	-	○	○	○	○
Industry 4.0	-	○	○	○	○
Automatic feeder for crucible replenishing	-	-	-	●	●
Autotest with data report	●	●	●	●	●
Monitoring system for data acquisition	○	○	○	○	●
Flask check before casting	●	●	●	●	●
Vacuum leakage detector	●	●	●	●	●
Oxygen Analyzer	-	○	○	○	○
RS232 remote interface	-	○	○	○	○
Main alloys	● Gold (Au), Silver (Ag), Copper (Cu), Brass, Bronze, Aluminium (Al) and their alloys, ○ Magnesium				
Provided ● / ○ Available on request					

TCE | Vacuum centrifugal casting machine

Watch how it work

Model
TCE10

Class A
TCE12-TI

Class A
TCE40-HD-TI

TCE are consistent, robust and easy to use vacuum centrifugal casting machines designed for small and medium casting laboratories. They can be manufactured in Class A or B.

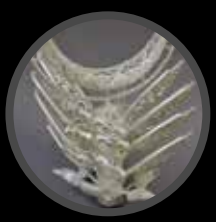
TCE in Class B are particularly suited for Platinum, Palladium and Steel while TCE in Class A has been especially designed to cast Titanium, Inconel and amorphous metals. All models can also melt nonferrous and precious metals.

The main difference between TCE in Class A and TCE in Class B is the degree of vacuum, leak-back rate and ppm of oxygen that are admitted during the process, that makes the TCE in Class A the best solution for casting Titanium-based alloys and intermetallic alloys.

Also the choice of the vacuum pumps station and the induction power generator is different and it is chosen to get the maximum result in Titanium cast parts. Hence, TCE machines conceived in Class A are suitable for fields that require high quality control and low interstitial pick-up on the cast parts, like Aerospace, Medical and Automotive.

TCE in Class B can instead be used where the price of the machines is an important factor and where no particular restraints of oxygen content are involved.

Examples



Class B technical data

Model	TCE**5**	TCE**10**	TCE**50-Pt**
Crucible working capacity	500 g Pt | 250 g Steel	1500 g Pt | 1000 g Steel	10 kg Pt
Flask maximum diameter (mm)	Ø10	Ø30	Ø50
Flask maximum height (mm)	120	180	380
Induction power	8 kW	10 kW	50 kW
Max. spinning speed	500 rpm	450 rpm	300 rpm
Vacuum pump	External	External	External
Max. temperature	2000 °C	2000 °C	2000 °C
Monitoring system for data acquisition			●
Vacuum leakage detector	●	●	●
Oxygen Analyzer			●
Optical pyrometer	●	●	●
Rotating Thermocouple	○	○	○
Main alloys	Pt, Pd, CrCo, Stainless Steel		
Provided ● / ○ Available on request			

Class A technical data

Model	TCE**8-Ti**	TCE**12-Ti**	TCE**40-HD-Ti**
Applications	Laboratory Machine		Production Machine
Crucible working capacity	100 g Ti	400 g Ti	400 g Ti
Flask maximum diameter (mm)	Ø10	Ø30	Ø200
Flask maximum height (mm)	120	200	220
Induction power	8 kW	12 kW	40 kW
Max. spinning speed	500 rpm	350 rpm	600 rpm
Vacuum pump	External	External	External
Max. temperature	2000 °C	2000 °C	2000 °C
Fully water-cooled 24/7			●
Monitoring system for data acquisition	●	●	●
Vacuum leakage detector	●	●	●
Oxygen Analyzer	○	○	●
Industry 4.0 / Remote interface	●	●	●
Optical pyrometer	●	●	●
Rotating Thermocouple	○	○	○
Automatic Arm Home Position for Robot Load/Unload operations	○	○	●
Automatic Spin Trigger Algorithm	○	○	●
Main alloys	Pt, Pd, CrCo, Stainless Steel, Ti, Black Ti, Zr		
Provided ● / ○ Available on request			

TVM | Vacuum induction melting machine

Watch how it work

Topcast TVM are VIM furnaces conceived in a closed environment designed to melt and pour any kind of alloys under high level of vacuum.

In particular, TVM is the right choice when large batches or mass production is required.

A 20 kg Pt crucible capacity for high quality sheets aimed to produce Pt and Pd ingots is the most common application in precious metals.

TOPCAST develops this class of furnaces under customized specifications for what concerns crucible capacity, mold size and vacuum level.

In case you are interested in getting a quotation do not hesitate to send us your technical specifications.

Model
TVM30

TVM furnace is conceptually divided into 5 sub-systems:

01.

Vacuum Melting Chamber with optional alloy feeding chamber and sampling probe

02.

Induction Generator

03.

Tilting Coil and Crucible Assembly

04.

Casting Mold in Graphite, Ceramic or Metal, also water cooled

05.

Vacuum Pumping Station

TVM technical data

Model	TVM**15**	TVM**30**	TVM**50**
Crucible Volume	up to 500 cc	up to 1500 cc	up to 3000 cc
Induction Power	15kW	30kW	50kW
Ultimate vacuum level	Down to 5x10-5 mbar	Down to 5x10-5 mbar	Down to 5x10-5 mbar
Max. temperature	Up to 2000 °C	Up to 2000 °C	Up to 2000 °C
Industry 4.0 / Remote Interface	○	○	○
Fully water-cooled 24/7	●	●	●
Main alloys	Ni-based alloys, Reactive metals		
○ Available on request			

TIP | Vacuum furnaces for ingots

Watch how it work

TIP furnaces are designed to manufacture any size of ingots, from 100 g to kilo-bar either in gold or silver. Ingots are obtained by melting pre-weighted grains in a graphite mould placed inside the vacuum chamber and then by cooling appropriately the ingot during the solidification phase.

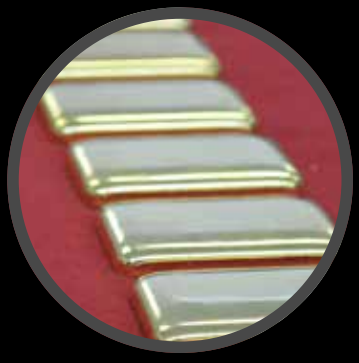
The machine is fully automatic having more than 100 programs for different ingot sizes. The operator only has to load the graphite mould with pre-weighted grains into the holding disk, close the loading chamber and press the START button to launch the automatic cycle. At the end of the cycle the furnace will return the gold or silver bar ready for the market stamp.

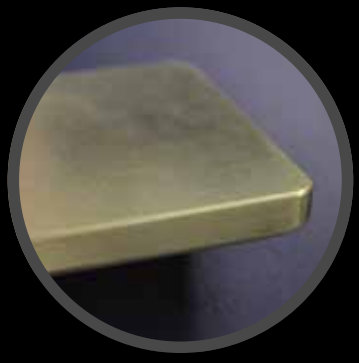
In order to increase productivity, the system has been conceived with 2 loading chambers and one melting chamber. This configuration allows for melting the next ingot while the previous one is cooling. This overlapped working mode is also important to decrease the running cost of the process because they are mainly related to the graphite mould consumption. A colder graphite mould in output increases the life of the same.

The heart of the machine is the induction generator and its coil, designed to maximize the heat transfer during the cycle. After loading the graphite mould, a pneumatic jack will lift the part smoothly into the center of the magnetic field and the melting step will begin.

All melting and cooling process occur in a closed chamber in which vacuum and inert gas protect metal and graphite from oxidation. Gas can be chosen between Argon or Nitrogen.

Model
TIP12





TIP technical data

Model	TIP12	TIP40	TIP100
Max ingot weight	500g Silver 1000g Gold	500g Silver 1000g Gold	400 oz Gold
Max ingot footprint	115,5 x 52,5 mm	115,5 x 52,5 mm	200 x 80 x 45 mm
Productivity	6 kilo-bars 24kt gold per hour or 24 x 100g ingots per hour	12 kilo-bars 24kt gold per hour or 48 x 100g ingots per hour	6 x 400 oz gold ingot per hour
Induction power	12 kW	40 kW	100 kW
Max. temperature	1200 °C	1200 °C	1200 °C

TCC | Vacuum continuous casting machine

Watch how it work

TCC Vacuum Continuous Casting machines have been design with the most up-to-date technologies to give you semi-finished products with the best quality and in the shortest time.
With only one machine, you will be able to obtain the semi-finished product you desire, such as wires, sheets or tubes.

TCC machines are equipped with Gas Wash Purge procedure which removes oxygen with the vacuum pump and fills back the melting chamber with inert gas, preventing the oxidation of the alloy in a very fast and efficient way.

Medium frequency induction heating stirs the melted alloy and leads to a perfect homogeneity, while the temperature is constantly monitored by a number of independent temperature controls.

As on option, it is possible to have an additional vacuum loading chamber, positioned on top of the cover with automatic crucible feeding mechanism, for continuous production.

During drawing, the temperature of the die is constantly monitored to obtain always the best density and quality in the semi-finished products. In addition, there is an independent temperature control for preventing liquid metal leakage, by using an optical pyrometer aiming directly on the bar coming out from the die. The drawing unit can also be equipped with an extra induction generator, which allows to restart the cycle after the production shutdown.

Pulling unit is equipped with devices for automatic detection of slippage phenomena between the roller and the semi-finished product. Another specific device will also detects the end of the cycle, when the bar reaches its end.

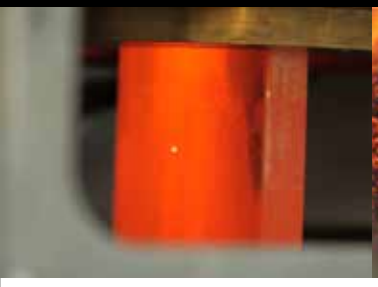
To reduce the risk of oxidation during drawing, the semi-finished products are under a constant inert gas flushing as they come out from the die.

In addition, when a quicker cooling is required for harness control, semi-finished products can be cooled down by a series of water sprinkles aiming on their profile.

Hydraulic shears or sawing cutting on the run is available on request, with automatic and programmable measurement of the profile length.

Model
TCC12

Model
TCC15




TCC technical data

	small			medium			large	
Model	TCC10 280cc	TCC12 380cc	TCC12 500cc	TCC15 1000cc	TCC15 1400cc	TCC20 2000cc	TCC35 4000cc	TCC45 7000cc
Induction power	10 kW	12 kW	12 kW	15 kW	15 kW	20 kW	35 kW	45 kW
Number of casting programs	100	100	100	unlimited	unlimited	unlimited	unlimited	unlimited
Crucible working capacity	1,5 kg Ag 1,4 kg Cu 3 kg Au	2 kg Ag 1,9 kg Cu 4 kg Au	3 kg Ag 2,5 kg Cu 5,5 kg Au	6 kg Ag 4,5 kg Cu 12 kg Au	8,5 kg Ag 7 kg Cu 16 kg Au	12 kg Ag 10 kg Cu 23 kg Au	25 kg Ag 20 kg Cu 46 kg Au	44 kg Ag 36 kg Cu 81 kg Au
Speed of the pulling unit	min. 10 mm/min max 999 mm/min			min. 10 mm/min max 999 mm/min			min. 10 mm/min max 999 mm/min	
Wire diameter*	min 3 - max 15 mm Ø			min 4 - max 30 mm Ø			min 5 - max 40 mm Ø	
Simultaneous wire casting*	max 2 wires			max 3 wires			max 6 wires	
Sheet size (LxW)*	max 60 x 8 mm			max 100 x 10 mm			max 130 x 20 mm	
Tube diameter*	min 10 - max 45 mm Ø			min 10 - max 85 mm Ø			min 12 - max 85 mm Ø	
Profile protection with protective gas flushing	●	●	●	●	●	●	●	●
Automatic crucible feeding unit	○	○	○	○	○	○	○	○
Extra induction generator				○	○	○	○	○
4 wheels pulling unit	●	●	●	●	●	●	●	●
Bending Unit	○	○	○	○	○	○	○	○
Cooling system by water sprinkles	●	●	●	○	○	○	○	○
Cutting unit on the run	○	○	○	○	○	○	○	○
Vacuum Pump	Built-in 4 m^3/h			Built-in 25 m^3/h			Built-in 25 m^3/h	
Max. Temperature	1500°C			1500°C			1500°C	
Double thermocouple on crucible				○	○	○	○	○
Autotest with data report	●	●	●	●	●	●	●	●
Monitoring system for data acquisition	○	○	○	○	○	○	●	●
Vacuum leakage detector	●	●	●	●	●	●	●	●
Oxygen analyzer							○	○
Industry 4.0 / Remote interface	●	●	●	●	●	●	●	●
Main alloys	● Copper (Cu), Brass, Bronze, Aluminium (Al), Gold (Au), Silver (Ag) and their alloys / ○ PGM							
Provided ● / ○ Available on request								
* according to the alloy or process conditions, limits can be extended								

TMA-G Vacuum/Gas Metal Atomizer

Watch how it work

TOPCAST produces a family of gas-atomizers in a closed-coupled nozzle configuration, designed to produce metal powders in spherical and regular shape. They find applications in many fields like industrial, chemical, electronics and Additive Manufacturing with SLM (Selective Laser Melting) or EBM (Electron Beam Melting) technics.

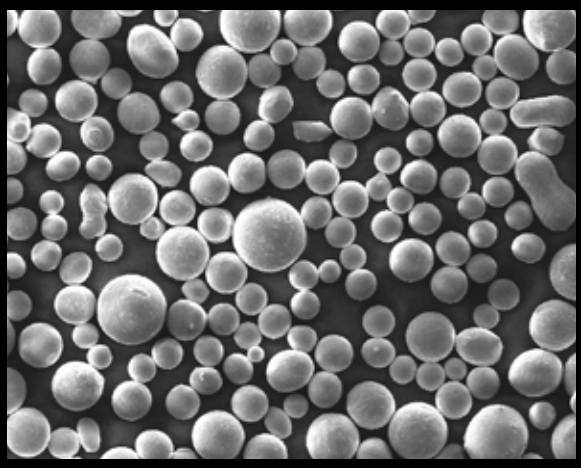
A gas-atomizer equipment complexity and related cost are very sensitive to the target alloy compositions.
The basic and simplest gas-atomizer configuration is the one used in the model TMA20g and TMA40g
In front of a limited investment budget, they present some limitations on the list of alloys they can produce, namely Au, Ag, Cu, Bi and Sn alloys.
In case there is interest in producing Aluminium powders, an increase of complexity is needed, and the plant has to be built compliant with ATEX regulations.
This implies that the vacuum performance, leak-back rate, valves, filters and many other parts of the plant must be improved to meet demanding safety regulations.

These plant modifications generate the atomizer model T- VIGA with higher features and higher price respect to the model TMAg.
Thanks to these improved features, T-VIGA configuration allows also to produce stainless steel, Ni-based or MoCrCo powders, just to mention few examples.
On the other hand, if Pt, Pd, Refractory or Reactive metal powder, like Titanium, needs to be produced, we have to leave the T-VIGA configuration because of the ceramic and oxygen pick-up from the crucible and introducing the T-EIGA system.

T-EIGA uses a rod as a feed-stock with calibrated diameter and length, that is gradually fed into an induction coil at a controlled speed for metal melting and liquid dropping into the atomization chamber, where the stream will impact the high-pressure gas coming from the close-coupled nozzle. This way, there won't be contact zone between the feedstock and any crucible, and the purity of the powder will meet the best standards. Also in this case, the T-EIGA atomizer for PGM and reactive alloys must be conceived compliant with ATEX regulations.

It is finally possible to build a wide alloys range gas-atomizer, by assembling the T-VIGA and T-EIGA in a twin configuration, in which both share the same atomization tower, pipes, cyclone, heat-exchanger, filters and suction unit.

This complete configuration gives access to all the main alloys we can imagine for industrial, medical, automotive and aerospace applications.



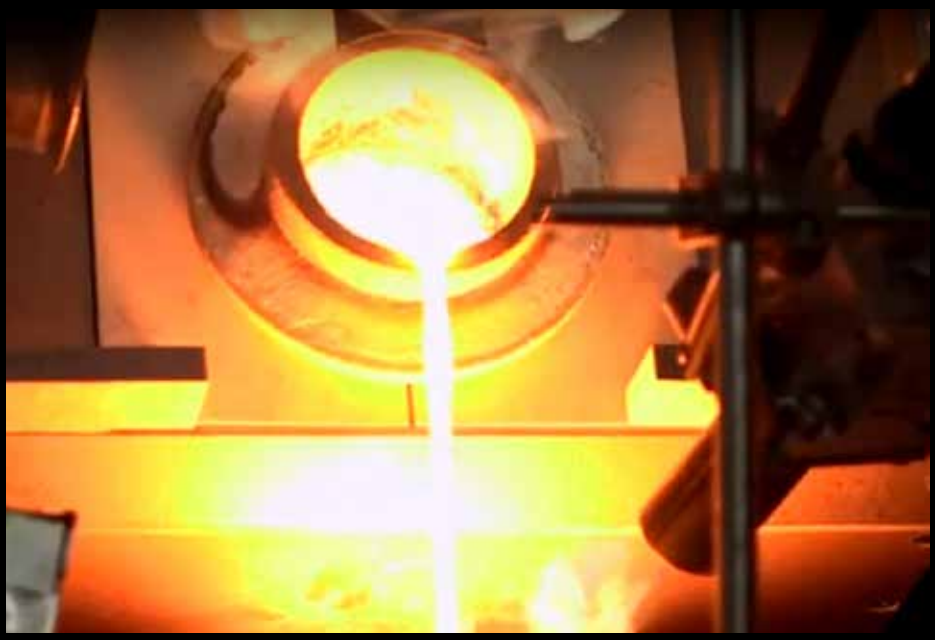
TMA-G technical data

Model	TMA20g	TMA40g	T-VIGA-4.5	T-EIGA50-1000
Crucible working capacity	7,5 kg Bronze 9 kg Silver 17 kg Gold	35 kg Bronze 50 kg Silver	22 kg Steel 12 kg Aluminium	feedstock dimensions: Ø50 x 1000 mm
Atomizing gas	Nitrogen or Argon			
Crucible volume	1500 cc	7000 cc	4500 cc @ Steel 7000 cc @ Al	n.a.
Induction power	20 kW	40 kW	60 kW	60 kW
Atomizer Composition	Vacuum Melting Chamber, Vacuum Pump, Induction Unit, Atomization Chamber, Piping, Cyclone, Heat-Exchanger, Suction Unit, Exhaust			
Particle Size	Adjustable according to customer specifications			
Max. temperature	1550 °C	1550 °C	1750 °C	2500 °C
Process time	30 minutes	50 minutes	25 minutes	25 minutes
Autotest with data report	●	●	●	●
Monitoring system for data acquisition	●	●	●	●
Vacuum leakage detector	●	●	●	●
Oxygen Analyzer	○	○	○	○
Remote assistance	●	●	●	●
Main alloys	Au, Ag, Cu, Sn, Bi and their alloys		Al, Steel and Ni-based alloys	Pt, Pd, Ti and Refractory alloys
Provided ● / ○ Available on request				

TMA-W | Water Metal Atomizer

Watch how it work

TMA-W is a family of water atomizers designed to produce metal powders of irregular shape, to be used in industrial, chemical, refining, soldering paste, resin filters, MIM and sintering applications.
In precious metal industry, TOPCAST has supplied large water atomizers for PGM and Gold in order to boost the productivity and selectivity of the aqua regia refining plants.



The atomizer is based on an induction furnace, working in a closed chamber under protective atmosphere, where the molten metal is poured and hit by a jet of high pressure water, producing fine and deoxidized powders.

Induction heating ensures a very good homogenization of the melt thanks to the action of magnetic stirring during the molten phase.

The tundish is equipped with an extra induction generator, which allows to restart the cycle in case of cycle interruption.

Following the steps of melting and homogenization, the metal is poured through the tundish positioned on top of the atomization chamber.

Multiple streams of high pressure water are aimed and focused on the metal beam in order to ensure a fast alloy solidification in the form of fine powder.

Real-time process variables such as temperature, gas pressure, induction power, oxygen ppm content in the chamber and many others, are displayed in both numerical and graphical format on a monitoring system for an intuitive understanding of the working cycle.

The system can be operated manually or in fully automatic mode, thanks to the programmability of the entire set of the process parameters via a user-friendly touch-screen interface.

The monitoring system can be easily connected via Ethernet to the factory network.

Real-time process variables such as temperature, water pressure, induction power, and many others, are displayed in both numerical and graphical format on a monitoring system for an intuitive understanding of the working cycle.

The system can be operated manually or in fully automatic mode, thanks to the programmability of the entire set of the process parameters via a user-friendly touch-screen interface.The monitoring system can be easily connected via Ethernet to the factory network.

Metals and Field of Application
Atomized Metals: Ferrous, Non-ferrous, Precious alloys and PGM.

Field of Applications: PGM refinery industry, soldering paste, resin filters and sintering applications.

TMA-W technical data

Model	TMA20g	TMA40g
Crucible working capacity	up to 7,5 kg Bronze 9 kg Silver 17 kg Gold	up to 40 kg Bronze 50 kg Silver 90 kg Gold
Atomizing media	water	water
Crucible volume	up to 1500 cc	up to 7000 cc
Induction power	20 kW	40 kW
Maximum Pressure	up to 300 bar	up to 300 bar
Max. temperature	1600 °C	1600 °C
Process time	30 minutes	50 minutes
Autotest with data report	●	●
Monitoring system for data acquisition	○	○
Industry 4.0 / Remote interface	●	●
Main alloys	Pt, Pd, Gold (Au), Silver (Ag), Copper (Cu), Brass, Bronze, Aluminium (Al) and their alloys	
Provided ● / ○ Available on request		

Watch how it work

TMF-G
Open system metal granulator

Topcast TMF-G induction melting plants are made for metal grains production. The tilting crucible pours the metal in a multi-hole tundish which acts like a flow-breaker and from which the metal droplets fall into a water tank. All this is done with protection from oxidation by means of gas burners.

Additional modules perform the grains removal, drying, weighing and packing.

TOPCAST develops ovens of this class under customer specifications, in particular as regards the type of metal, the capacity of the crucible, the required productivity.

Model

TMF60-RH3-G

In this page, please find main details of some of our standard models; in case you're interested in receiving a dedicated quote, please send us your technical specifications.

TMF-G technical data

Model	TMF25-RH2-G	TMF60-RH3-G	TMF200-RI4-G
Crucible volume	up to 4 liters	up to 15 liters	up to 31 liters
Induction Power	25 kW	60 kW	200 kW
Industry 4.0 / Remote Interface	○	○	○
Main alloys	Steel, Cast Iron, Al, Bronze, Brass, PGM, Precious Metals according to the set-up		
○ Available on request			

TVCd-G | Closed system metal granulator

Watch how it work

Topcast TVCd-G furnaces are used to produce oxygen free and homogenous precious alloy grains, starting from raw material molten by induction heating in a protective atmosphere, obtained by inert gas purging cycles, and then poured into a water / alcohol tank passing through a multi-hollowed crucible that acts as flow breaker.
Melting and pouring phases are protected by inert gas, which can be chosen between Argon, Nitrogen or Forming Gas.

The induction generator is designed to allow the homogenization of the alloy thanks to the stirring effect of the magnetic field which works while the metal is being melted in the crucible.

Water in the tank is continuously circulating and it is cooled by a powerful chiller to keep the process variables under control and obtaining consistency and quality in the produced grains.
The granulator is provided with a heat-exchanger, filters and water pump to separate the process water from the cooling water.

After granulation, a two valves interlock system allows for grains recovery while the process water remains in the process chamber.
This avoids transferring the process water to a back-up tank after pouring for then re-transfer back the same to the process tank after filtering the water from the grains, resulting in no losses.

In the TVCd-GI series instead, the recovery of the grains is simplified and takes place through a metallic filter present in the granulation chamber.

A highly automated plant can be provided for granulation, including automatic drying, sieving, dosing, weighting and grains packaging in a key-in-hands philosophy commissioning.

Model
TVC35d-G

TVCd-G technical data

Model	TVC12d-G	TVC20d-G	TVC25d-G	TVC35d-G	TVC45d-G	TVC20d-GI	TVC40d-GI
Crucible volume	500 cc	1.5 liters	2-3 liters	4 liters	7 liters	3 liters	7 liters
Crucible working capacity	3 kg Silver 7 kg Gold	9 kg Silver 17 kg Gold	18 kg Silver 30 kg Gold	24 kg Silver 56 kg Gold	42 kg Silver 100 kg Gold	18 kg Silver 30 kg Gold	42 kg Silver 100 kg Gold
Induction Power	12 kW	20 kW	25 kW	35 kW	45 kW	20 kW	40 kW
Inert Gas (Ar, N2, N2/H2 - forming gas)	●	●	●	●	●	●	●
Maximum temperature	● 1250°C / ○ 1600°C						
Autotest with data report	●	●	●	●	●	○	○
Monitoring system	●	●	●	●	●	○	○
Water tank check before pouring	●	●	●	●	●	●	●
Oxygen Analyzer	○	○	○	○	○	○	○
Industry 4.0 / Remote interface	●	●	●	●	●	○	○
Main alloys	Based on Gold (Au), Silver (Ag), Copper (Cu); Brass, Bronze						
Provided ● / ○ Available on request							

TMF-R Induction tilting furnaces

Watch how it work

Model
TMF10-RH1

Model
TMF15-RE2

Model
TMF200-RI4

Topcast TMF-R are coreless induction melting furnaces capable of melting ferrous, non-ferrous and precious metals.

The crucible can be tilted, and the drive can be electrical, hydraulic or handwheel.
The frequency converter design approach uses a parallel resonant typology adopting the latest and most advanced IGBTs modules available worldwide.

Galvanic insulation between coil and power mains gives the maximum safety for the user, while digital technology makes our furnaces soundless, versatile and reliable.

Fiber optics connections give the highest immunity to electrical noise also in harsh environment.

An accurate study of the coil guarantees a very high heating efficiency while medium frequency magnetic field stirs the molten metal and leads to high homogeneity of the alloys

Temperature control can be chosen between IR optical pyrometer and thermocouple while the electronic board implements an advanced self-tuning thermoregulation algorithm with exact temperature control.

Melting plants can be provided with one or more melting stations using a power switch to drive one station or the other. Optionally we offer a master-slave configuration featuring contemporary power-sharing between two or more power stations.

Maintenance of the furnace is very easy. If the furnace is crucible-based it allows rapid changing of the crucible and the safety refractory shell.
Bigger coreless furnaces use a ramming-mass approach.
Inert gas or gas-flames are foreseen to protect the melt from oxidation.
A touch screen display is provided for a fast and user-friendly interface.
A water-cooling plant is needed to cool the induction heating coils and the power supply.

for more information and customized solutions please contact us.

Tilting unit VS. Metal Working Capacity (kg)

Model	RH1	RE1	RH2	RE2	RH3	RE3	RI4
Platinum	6		22		40		60
Steel	5		8		20		200
Brass	9		27		95		530
Silver	11		33		115		650
Gold	20		60		200		1200
RH = Hand-wheel tilting / RE = Electro-mechanical tilting / RI = Hydraulic tilting							
Industry 4.0 / Remote interface upon request							

Induction power from 5 kW to 300 kW

Contact us for the best solution for you needs, like for example:
TMF60-RE3 = 60 kW induction power, 95 kg Brass capacity, electro-mechanical tilting with joystick control

TMF | Manual Extraction Induction Furnace

Topcast TMF are induction furnaces of small size capable of melting any type of metal: ferrous, non-ferrous metals, precious.

The crucible is extractable by means of special clamps, so the capacity is limited and the use is intended for small workshops.

The frequency converter design approach uses parallel resonant typology adopting the latest and most advanced IGBTs modules available worldwide.

Induction coil is electrically insulated from AC power mains, in order to ensure maximum safety to the user, while digital technology makes these furnaces soundless, versatile and reliable.

Fibre optics connections give the highest immunity to electrical noise also in harsh environment.

An accurate study of the coil guarantees a very high heating efficiency while medium frequency magnetic field stirs the molten metal and leads to high homogeneity of the alloys

Temperature control can be chosen between IR optical pyrometer and thermocouple while the electronic board implements an advanced self-tuning thermoregulation algorithm with exact temperature control.

Maintenance of the furnace is very easy. The furnace is crucible-based and allows rapid changing of the crucible and the safety refractory shell.

Inert gas or gas-flame are foreseen to protect the melt from oxidation.

Touch screen display in provided for a fast and user-friendly interface.

A water cooling plant is needed to cool the induction heating coils and the power supply.

Model
TMF12

TGEN technical data

Model	TMF5	TMF7	TMF10	TMF12	TMF10P	TMF12P
Crucible capacity	6 kg Gold 3 kg Silver 2.4 kg Brass	8.5 kg Gold 4.2 kg Silver 3.4 kg Brass	13.5 kg Gold 7.7 kg Silver 5.4 kg Brass	17 kg Gold 8.5 kg Silver 6.8 kg Brass	1 kg Steel	3 kg Steel
Power	5 kW	7 kW	10 kW	12 kW	10 kW	12 kW
Max. temperature	1350°C	1350°C	1400°C	1450°C	1800°C	1800°C
Melting time	15 min	15 min	15 min	20 min	4 min	10 min

FCC Electric furnaces

The burnout ovens series FCC are used to heat and fire the refractory investment and to melt and evacuate the wax or resin in the lost-wax casting technics.

The oven is evenly heated by electrical resistors and insulated by special ceramic panel with low thermal inertia and high thermal resistance.

The structure can be easily removed for heating elements replacement and a special steel basin for wax collection is placed under the flask.

Cooling of the chamber is fast thanks to the absence of refractory bricks.

A cycle programmer easy to use allows various burnout programs for different needs.

The flask loading door is on the top and an extraction trolley allows easy handling for the flask through a crane (for model FCC-TE32 and FCC-TE50 only).

Model
FCC-T6

Model
FCC-TE32

FCC technical data

Model	FCC-T6	FCC-T10	FCC-T13	FCC-T22	FCC-T32	FCC-T50
Muffle internal dimensions (mm)	400x400x600H	450x450x620H	500x650x750H	600x850x950H	800x1340x950H	800x2080x1200H
Power	6 kW	10 kW	13 kW	22 kW	32 kW	50 kW
Max. temperature	1080°C					
Extraction trolley	O	O	O	O	●	●
Industry 4.0 / remote interface	O	O	O	O	O	O

Provided ● / O Available on request

atlantidecdv

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