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# SHINING SUN TECHNOLOGY

## 明光烁亮 铸造未来

「靠品质赢得信赖  
用精品回报厚爱」



苏州烁日科技有限公司

SUZHOU SHINING SUN TECHNOLOGY CO., LTD



# SHINING SUN

## COMPANY PROFILE:

EVERYTHING IS CUSTOMER-CENTRIC, CREATING VALUE FOR CUSTOMERS

EVERYTHING IS BASED ON STRIVERS, IMPROVING OUR LIVES

EVERYTHING IS PROUD OF DEDICATION, CREATING A BETTER SOCIETY

PEOPLE WITH A FIRM DIRECTION WILL NOT CARE WHETHER THEY WALK FAST OR SLOW

ONLY WHEN YOU WALK STEADILY, THERE WILL BE SCENERY ON BOTH SIDES OF THE ROAD



### CORE VALUES OF THE COMPANY

GOLDEN QUALITY, GOLDEN SERVICE

COMMON GROWTH, COMMON WEALTH



### ENTERPRISE VISION

GLOBAL PROVIDER OF SPECIAL

FUNCTIONAL ALLOY MATERIAL SOLUTIONS



### ENTERPRISE MISSION

EVERYTHING IS CUSTOMER-CENTRIC

CREATING VALUE FOR CUSTOMERS

EVERYTHING IS BASED ON STRIVERS, IMPROVING OUR LIVES

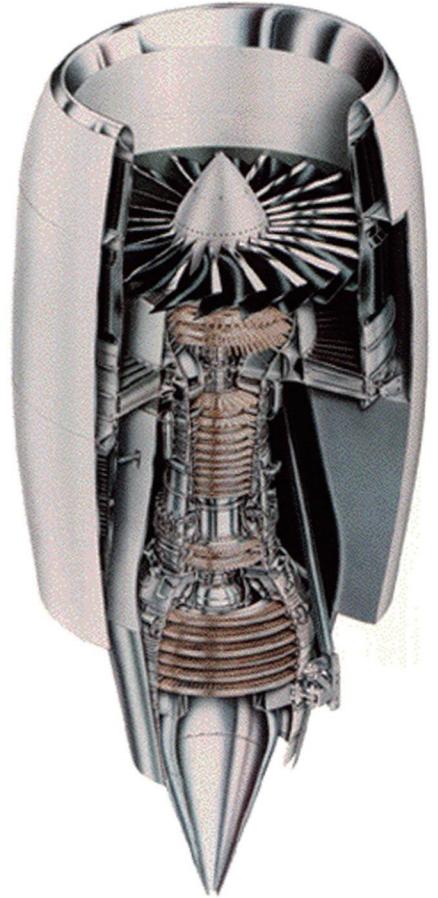
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## VACUUM INDUCTION MELTING TECHNOLOGY

Vacuum induction melting technology is a special metallurgical technology that uses the principle of medium-frequency induction heating to melt and refine metal and alloy raw materials under vacuum conditions. Compared with traditional metallurgical methods, vacuum induction melting technology has gradually developed into one of the important processes for the production of precision alloys, superalloy, corrosion-resistant alloys, special stainless steel materials and other alloys.



## APPLICATIONS:



Aerospace



Electricity



Electronic technology



Petrochemical industry



Medical equipment



Automobile industry



Tool manufacturing

## FINAL PRODUCT FEATURES:



- 1 ► High added value
- 2 ► Difficulties in melting and production processes
- 3 ► High alloying grade
- 4 ► Special product application areas
- 5 ► High process stability requirements

## ACCORDING TO DIFFERENT USAGES AND ARRANGEMENTS THE TECHNIQUES ARE LISTED AS BELOW:



Vacuum Induction Melting furnace (VIM)



Vacuum Induction Degassing and Pouring furnace (VIDP)



Vacuum Induction Casting furnace (VIC)



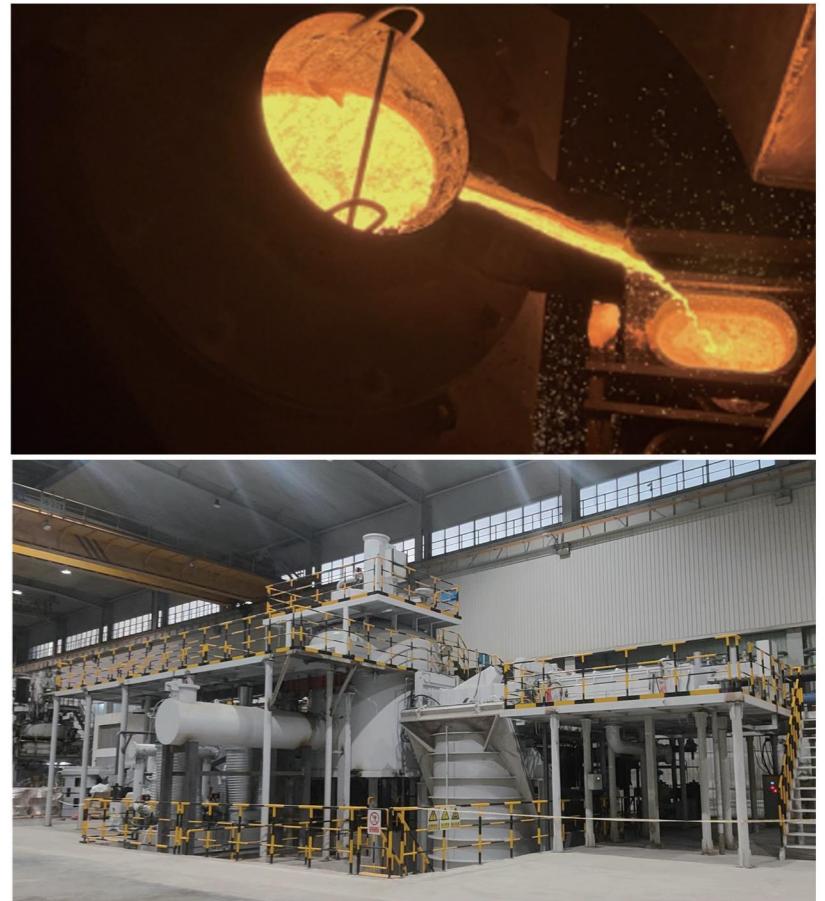
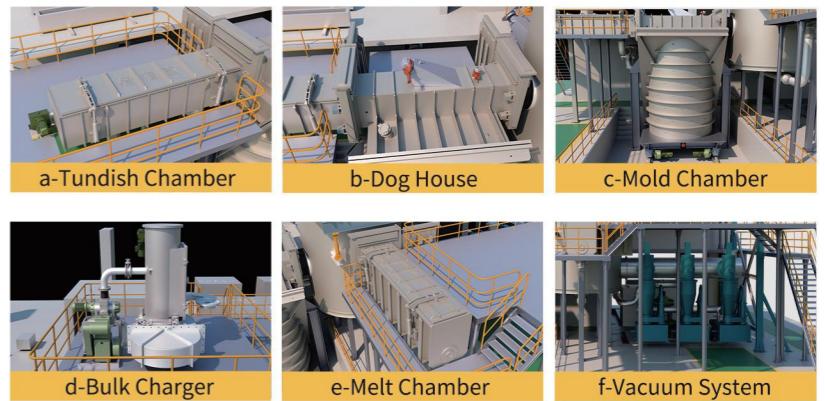
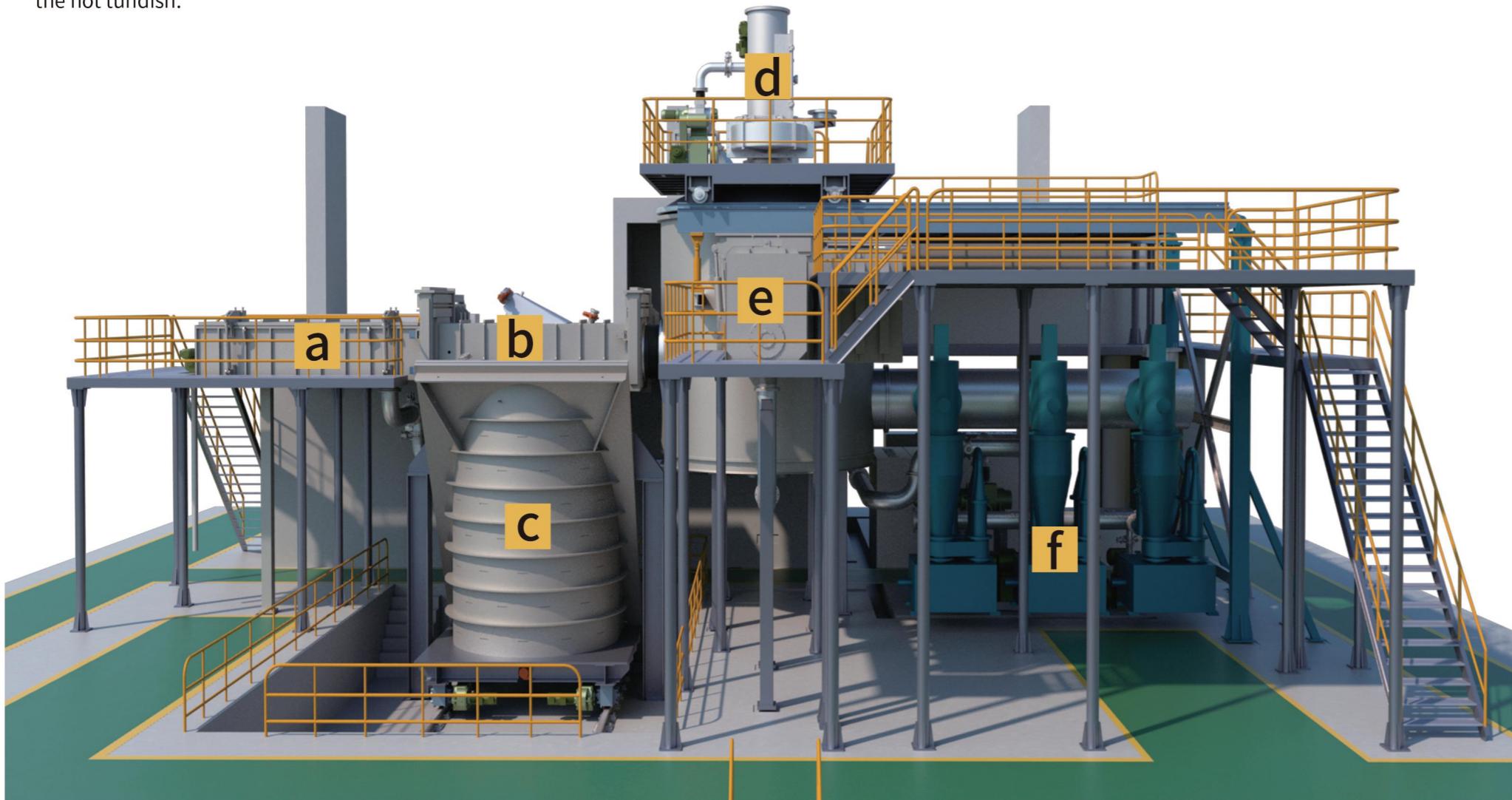
Vacuum Precision Investment Casting furnace (VPIC)

## PRODUCT FEATURES:

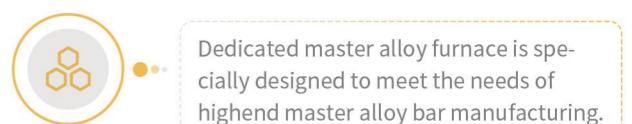
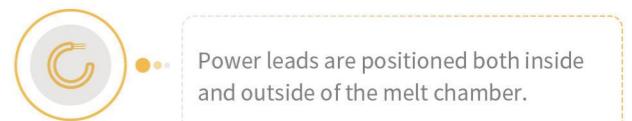
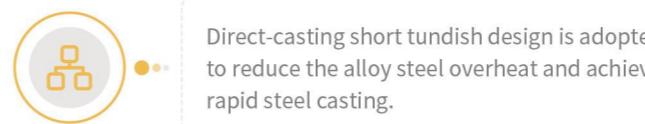
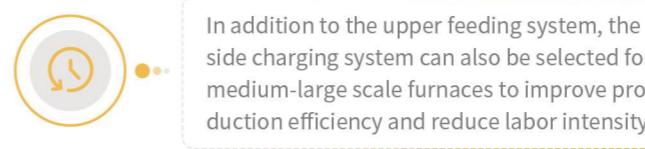
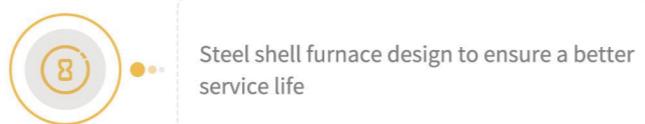
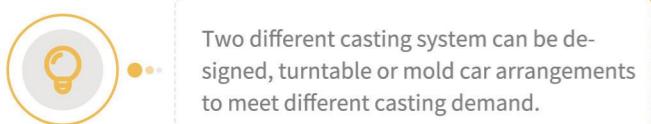
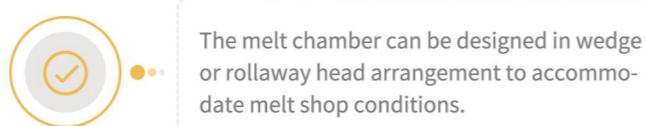
- ◎ By using medium frequency power technique to process the charging, melting, refining, alloying and casting process under vacuum.
- ◎ Different furnace arrangements and power designs can be selected to meet different process requirements in terms of different final applications.
- ◎ The equipment can be designed and operated either in batch or semi-continuous style per customer's demand.
- ◎ Remote control can be achieved through a video surveillance system to ensure the safety of on-site personnel
- ◎ PC+PLC control is used to ensure precise process control
- ◎ Safety is an important consideration in design. Equipment safety and personnel safety are always the first priority.

## VACUUM INDUCTION MELTING FURNACE (VIM)

Vacuum Induction Melting furnace (VIM) is a common vacuum induction furnace arrangement, which is mainly used to produce metal ingot for subsequent remelting or processing. The melting and refining process of metal raw materials is completed in the fixed melting chamber weldments, and the liquid metal is poured out from the steel shell furnace into the positioned ingot mold along the direction of the hot tundish.

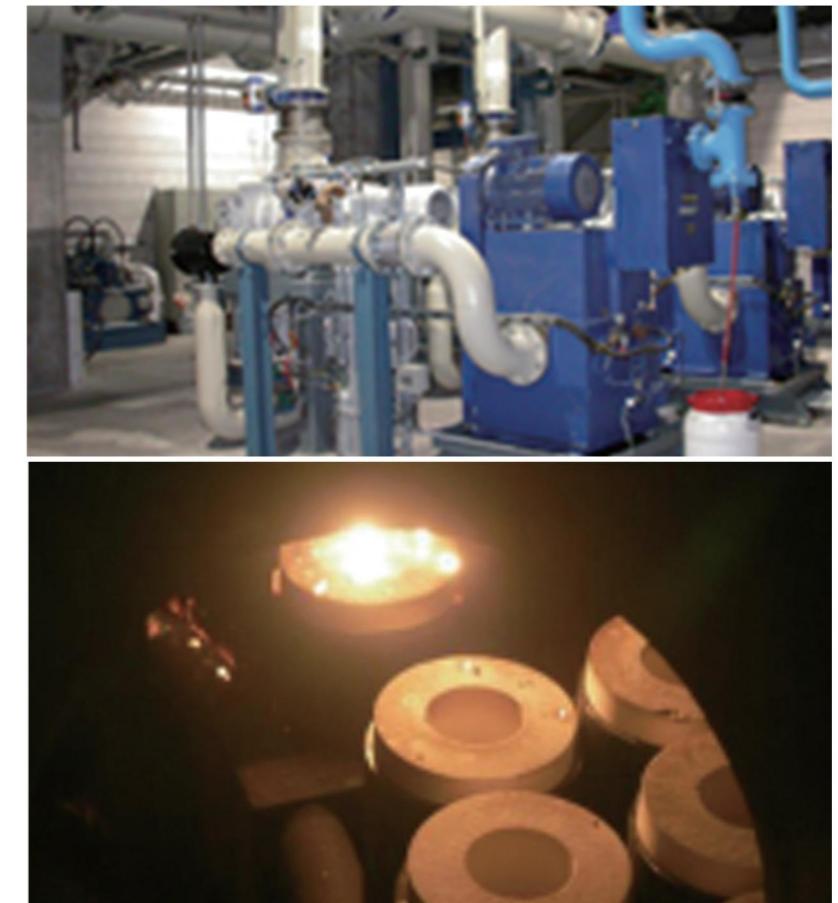
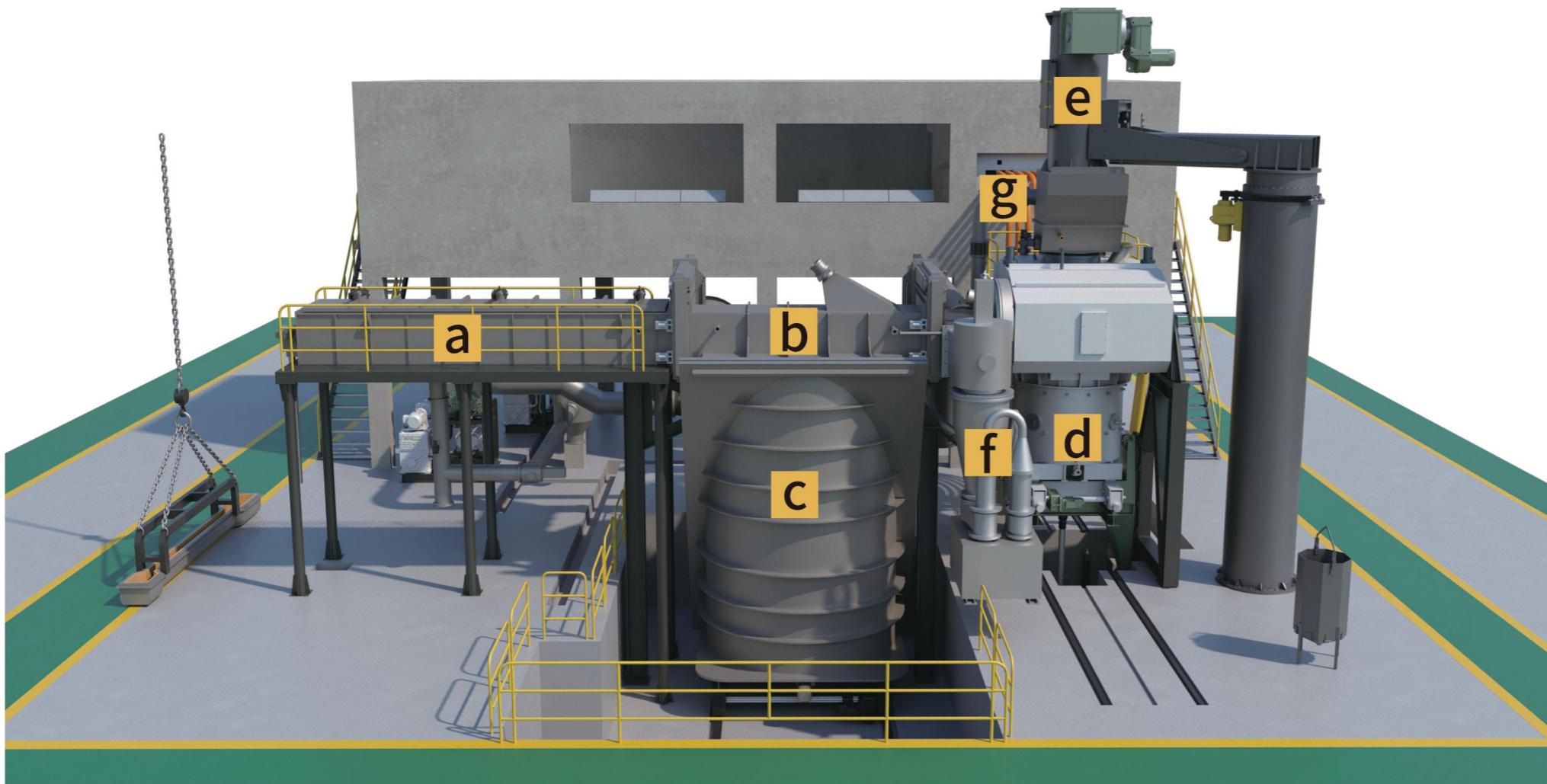


### FEATURES:



## VACUUM INDUCTION MELTING FURNACE (VIDP)

Vacuum Induction Degassing and Pouring furnace (VIDP) is a common type of vacuum induction furnace, which is mainly used to produce metal ingot for subsequent remelting or processing. The melting and refining process of the metal raw materials is completed in the melt chamber, and the molten metal is poured into the launder by tilting the melt chamber, and cast into the pre-placed ingot mold along the launder direction.



### FEATURES:

#### SMALL FURNACE VOLUME

- Small degassing area
- High pump down efficiency, reduced vacuum pumping setup.
- Better vacuum level control
- Lower gas consumption
- Small footprint



#### ADAPTABLE TO A VARIETY OF CASTING METHODS

- In addition to traditional die casting solutions, horizontal continuous casting or powder metallurgy equipment can be adapted according to actual needs
- If necessary, a multi-casting chamber structure can be designed



#### EASY MAINTENANCE

- Power leads and gas piping are located outside the melting chamber to avoid accidents caused by the leak of molten metal
- Simple maintenance of the vacuum system



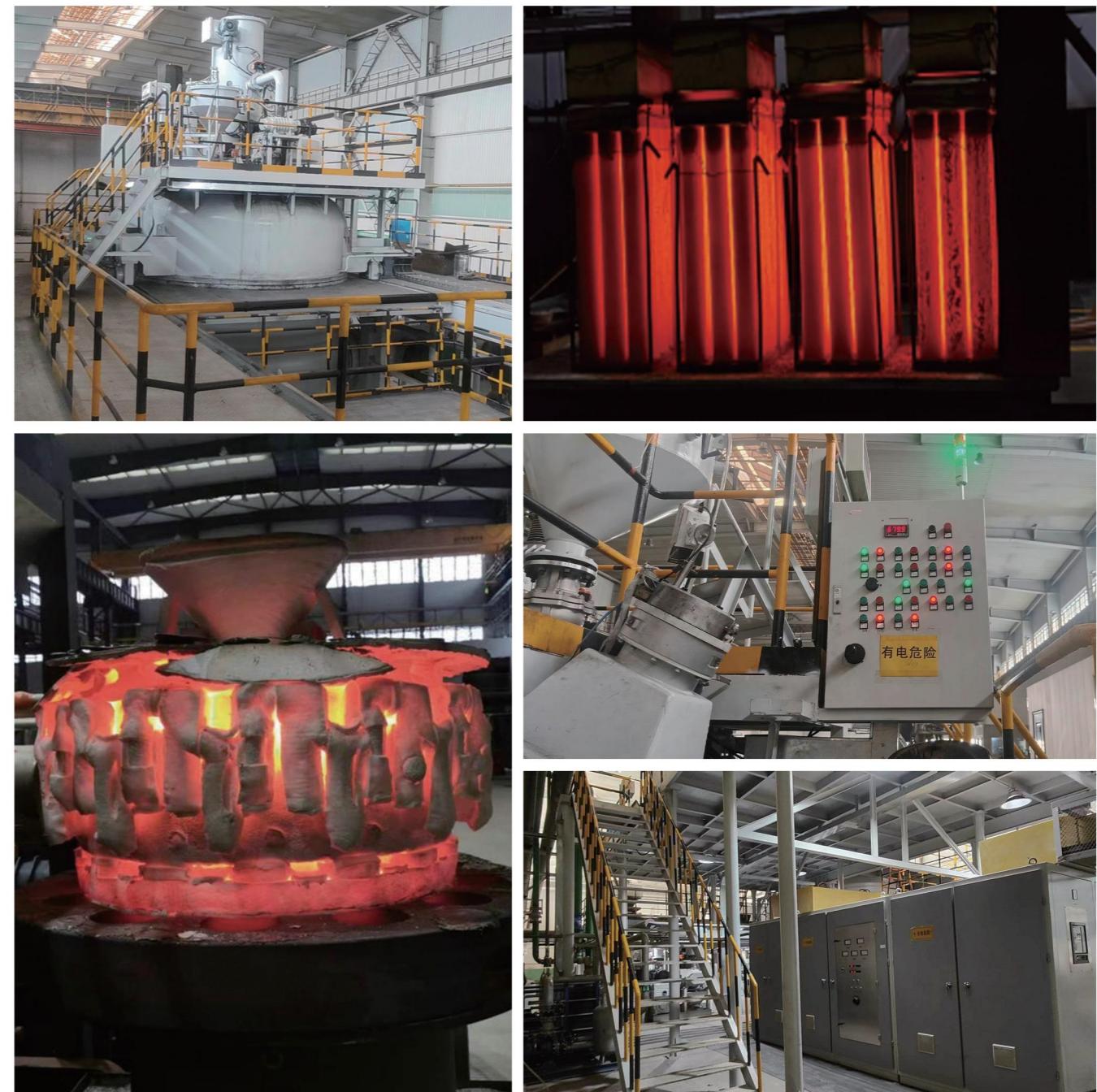
#### FLEXIBLE FURNACE REPLACEMENT

- Flexible furnace replacement, Improve production efficiency



## VACUUM INDUCTION CASTING FURNACE (VIC)

Vacuum Induction Casting furnace (VIC) is a special equipment for producing large precision castings under vacuum, usually with customized design. It is mainly used to produce medium and large alloy castings. The charging, melting and refining process of metal raw materials or master alloys are completed in the melt chamber, and the liquid metal is directly cast into the pre-placed sand box by tilting the steel shell furnace, and solidified in the sand box. In order to ensure the casting speed, it is usually without a tundish by direct casting.



### FEATURES

Semi-continuous multi-chamber arrangement

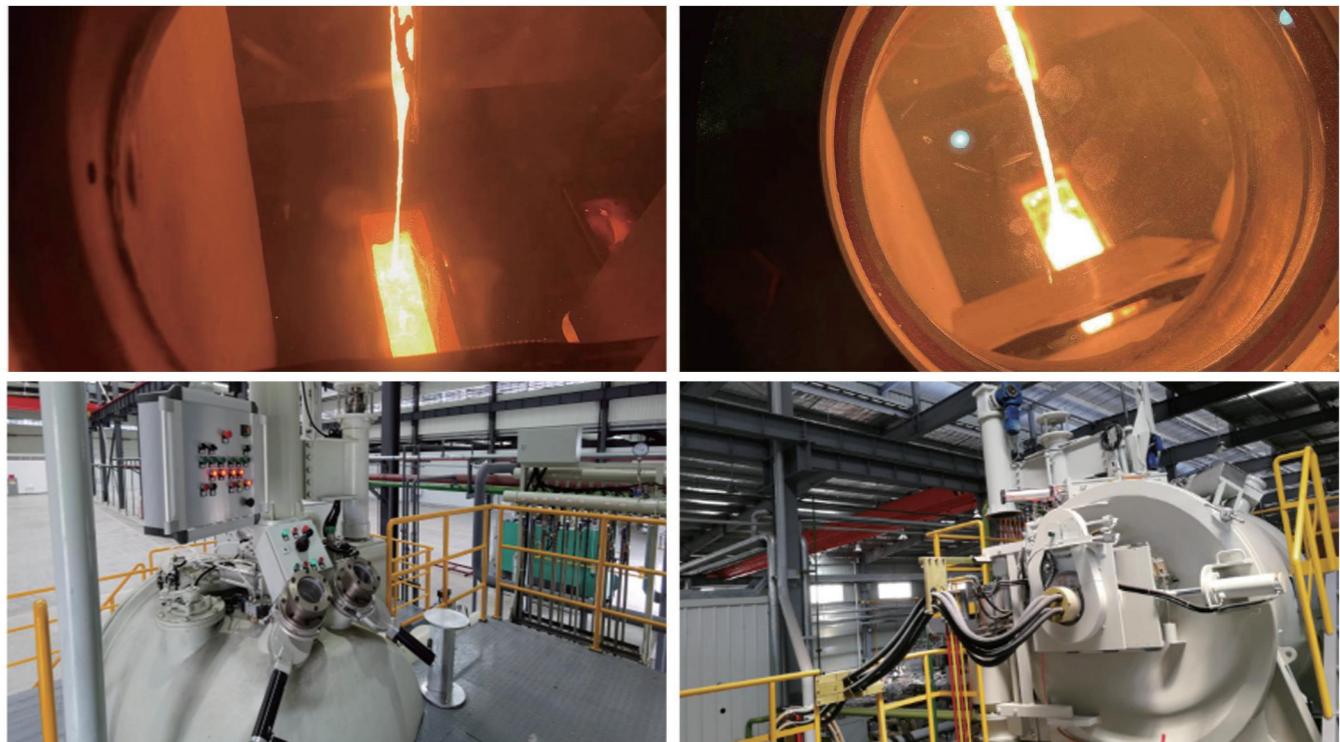
Direct casting design without tundish to ensure fast casting speed

Special vacuum casting designed for large-scale sandbox

Mold car design ensures smooth transportation process and convenience of mass production

## VACUUM PRECISION INVESTMENT CASTING FURNACE (VPIC)

Vacuum Precision Investment Casting furnace (VPIC) is a special equipment for producing small vacuum precision castings, vanes or blades. It is usually divided into single crystal/directional solidification/equiaxed crystal furnace types. Masteralloy bar is fed into the melting coil, then to be melted and casted into the pre-prepared mold shell. For single crystal or directional solidification equipment, an additional mold heater device is equipped to achieve temperature control, and the crystal withdrawal process is achieved by moving the ram extraction mechanism.

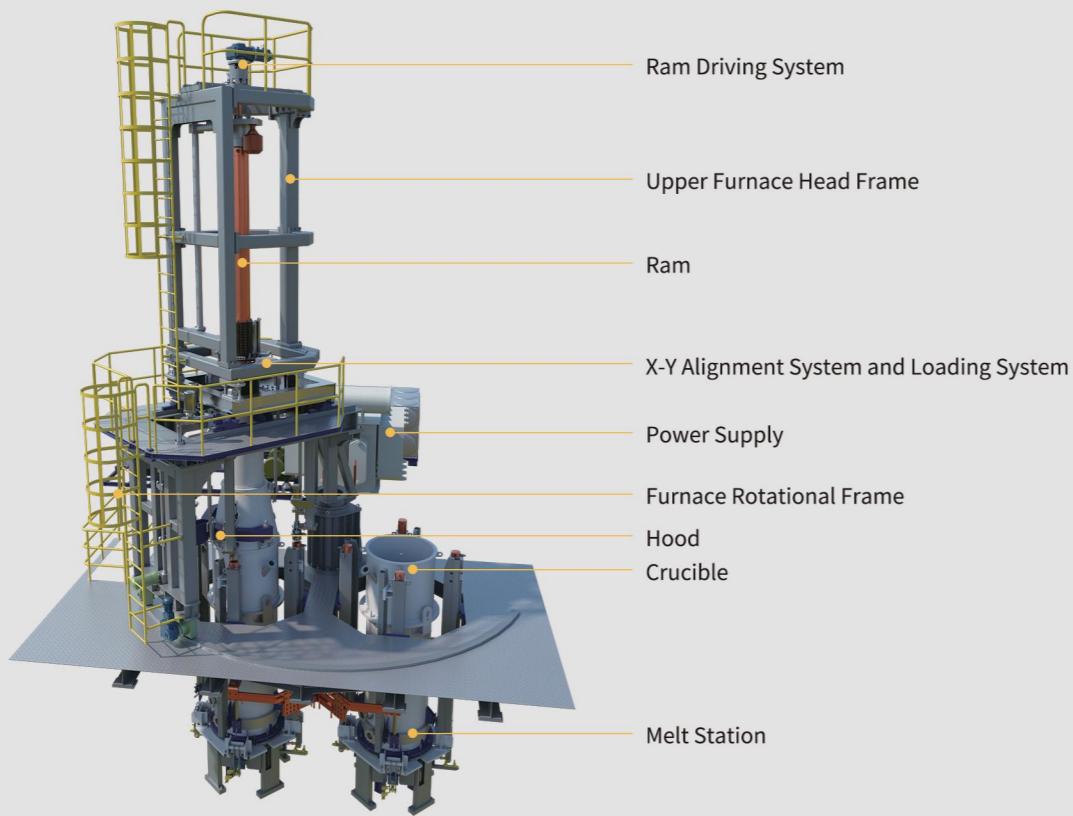


- 1** Semi-continuous multi-chamber arrangement, and a vertical layout is mostly used
- 2** Different vacuum systems are configured according to the production application. Such as oil diffusion pump/oil booster pump, mechanical pump/dry pump, etc.
- 3** Different mold heater meet different process requirements
- 4** The feeding device is structurally designed according to the actual working conditions
- 5** The medium frequency power supply adopts mature technology to meet the strict technical requirements of single crystal production
- 6** The engineering design capability meets the customized production requirements proposed by customers

### ■ 生产过程:



## INERT GAS ELECTRO SLAG REMELTING FURNACE (ESR)



### ELECTRO SLAG REMELTING TECHNOLOGY:

Electro Slag Remelting technology is that the lower end of the electrode is immersed in molten slag. When the AC current passes through the high-resistance slag pool, a large amount of heat is generated, which melts down the end of the electrode immersed in the molten slag. The molten metal drips produced by the melting pass through the slag pool and drip into the molten metal pool, and then are cooled by the water-cooled crucibles and condensed into ingots. In this process, the molten metal drips are fully in contact with the high-temperature and high-basicity slag, which produces a strong metallurgical chemical reaction and refines the metal.

### APPLICATIONS:



### APPLICATION FEATURES:

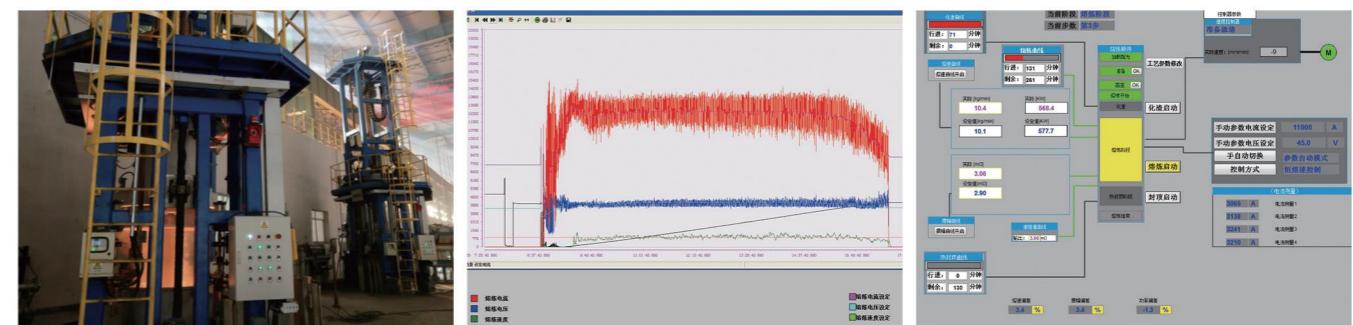
- 01.** Improve homogeneity by controlling the solidification process
- 02.** Reduce alloy segregation
- 03.** Remove some impurities in the metal and improve cleanliness
- 04.** Optimize the mechanical properties of the alloy
- 05.** Improve the surface quality of the ingot, reduce the shrinkage of the ingot and improve the processing yield

### COMMON TYPES OF ALLOY GRADES:

- |                       |                         |
|-----------------------|-------------------------|
| High-speed tool steel | High-end abrasive steel |
| Rolling steel         | Bearing steel           |
| Blade steel           | Anti-corrosion alloy    |
| Superalloy            | Special Stainless Steel |

### ARRANGEMENT FEATURES:

- ◎ · The single furnace head and double-station structure improves production efficiency
- ◎ · The double furnace head and three-station exchange electrode method can also be designed to produce largesized ESR ingots
- ◎ · The independent gantry structure provides a stable structural design
- ◎ · The full coaxial design avoids the influence of the current magnetic field on the solidification of the alloy and reduces the risk of undesired micro-segregation
- ◎ · The advanced weighing system is used to achieve full-automatic melt rate control function
- ◎ · The preset process profile is used to achieve more accurate automatic process control through the PC+PLC system to ensure the repeatability and consistency of the melting process
- ◎ · The protective atmosphere control system can ensure a slightly positive pressure environment in the hood, isolating the nitrogen and oxygen in the air from affecting the melting atmosphere in the furnace
- ◎ · The single servo motor control system ensures the precise operation of the ram movement

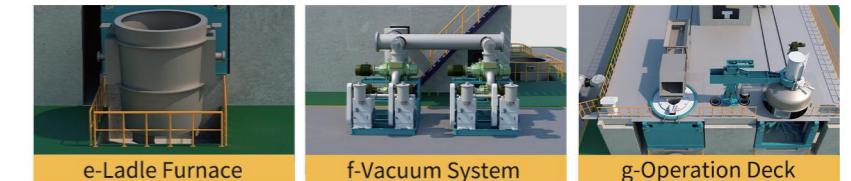
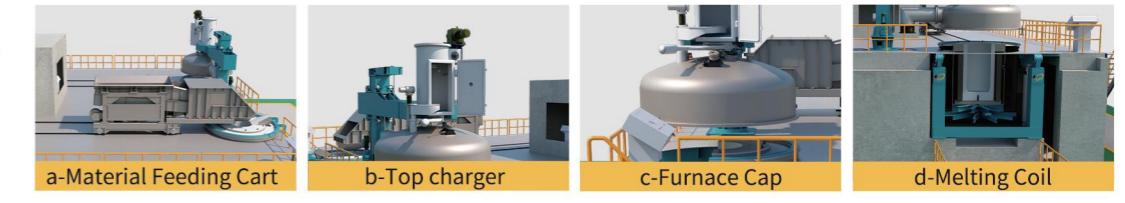


## VACUUM CAP FURNACE (VCAP)



### VACUUM CAP TECHNOLOGY:

Vacuum CAP technology is a special metallurgical technology based on traditional medium frequency induction furnace technology. In order to optimize the mechanical properties of materials, the atmosphere in the furnace (vacuum/protective atmosphere) is controlled to achieve product melting and refining. Usually, the material is charged and melted in the air, and alloying is fed under vacuum/protective atmosphere after purification. Then, the furnace is tilted in the air to cast the liquid metal into a ladle furnace or ingot mold.



### FINAL APPLICATION:



Petrochemical industry

Automobile industry

Tool and die industry

High-speed rail transportation



Nonferrous metal industry



Foundry industry



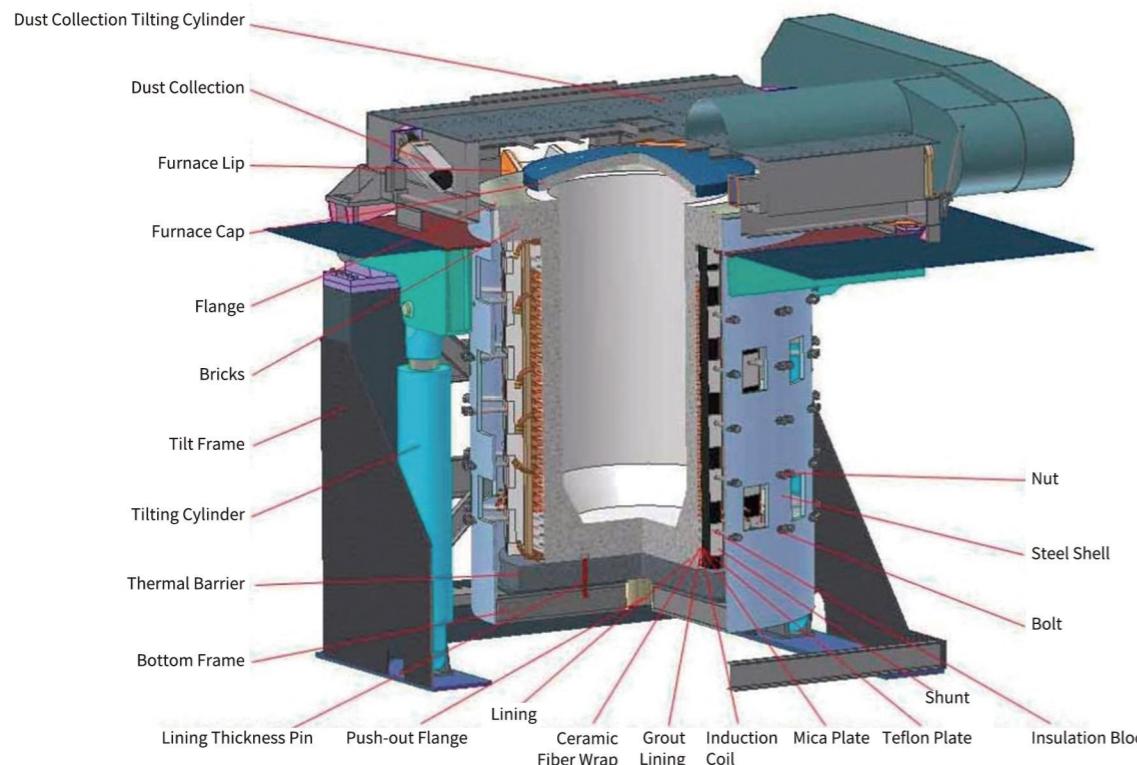
Special stainless steel industry

### FEATURES:

- ① With a fully sealed design the equipment can be used in the air, under vacuum or protective atmosphere
- ② Can be used together with the traditional medium frequency furnace to achieve a tandem function
- ③ Equipped with a specially designed vacuum unit and filtration system to ensure reliable system operation during smelting and degassing
- ④ According to the actual process requirements of customers different power supplies and coil designs are configured to meet production efficiency requirements
- ⑤ Through vacuum environment, carbon-oxygen reaction and other methods the gas content in the alloy is effectively reduced to meet the mechanical properties of the product
- ⑥ The refined molten steel can be poured into the ingot mold through the tundish or directly cast into the ladle furnace
- ⑦ Bottom blowing function can be selected

## INDUCTION MELTING FURNACE(IMF)

Induction Melting Furnace (IMF) is widely used and has incomparable advantages in casting, metallurgy and other fields. The medium frequency induction melting furnace can effectively control and adjust the alloy composition during the melting process to produce high-performance metal and alloy materials. The unique electromagnetic stirring function of the medium frequency melting furnace can effectively avoid the phenomenon of element segregation during alloy melting, and the metal can be cast into high-quality castings after melting.



### FEATURES:

- 01** High electrical and thermal efficiency
- 02** Short melt down time and power saving
- 03** Small footprint and low investment
- 04** Easy to automate the process and have production flexibility
- 05** More suitable for short-process production

## POWER SUPPLY (PS)

Since its invention, medium frequency power supply has gone through decades of development. At present, the mainstream medium frequency power supply design is divided into: inverter parallel resonant medium frequency power supply and inverter series resonant medium frequency power supply. Our company has a mature design team and can independently design and manufacture the above two types of power supplies according to customer needs.

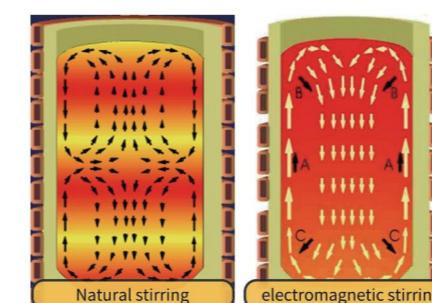


### INVERTER PARALLEL RESONANCE MEDIUM FREQUENCY FURNACE:

The medium frequency power supply LC resonant circuit adopts a pure parallel circuit, and there is no need to increase the voltage at both ends of the induction coil through a series boost capacitor, avoiding the disadvantage of the instability of the slot bypass inductance that must be installed due to the series boost capacitor. The whole set of equipment is mature, stable and reliable. The medium frequency power supply with power  $\geq 35000\text{kW}$  adopts a 1350V incoming line voltage. The current of the equipment is small during operation, which reduces the requirements for thyristors. Moreover, the voltage at both ends of the induction coil reaches more than 5000V, thereby achieving energy-saving effects. It is suitable for alloying melting furnaces and short-process melting of scrap steel.

### INVERTER SERIES RESONANCE MEDIUM FREQUENCY FURNACE:

Dual power supply variable frequency power supply: One power supply can supply power to two furnaces at the same time (dual power supply variable frequency power supply adopts series inverter circuit, commonly known as "tandem"), one furnace is melting, and the other furnace can control the required temperature for casting or heat preservation (two furnaces can also be melted at the same time), and the power can be arbitrarily allocated according to user needs. Based on the dual power supply variable frequency power supply, multi-power supply variable frequency power supply (commonly known as "one to three" and "one to four") was successfully launched. The power supply realizes free, smooth and arbitrary power output. When uninterrupted melting is required, heating, heat preservation, quenching and tempering can be carried out at a precise temperature to maximize the amount of iron and molten steel. It is suitable for automated casting production lines that continuously provide molten iron, greatly improving productivity.



### STIRRING TECHNIQUE:

With the continuous development of the use of medium frequency furnaces and the increasing demand for new vacuum furnaces, electromagnetic stirring technology is also evolving. Electromagnetic stirring technology is an auxiliary refining technology that meets different process purposes under different working conditions, such as providing alloy composition uniformity, improving degassing effect, accelerating melting reaction, and promoting the melting of refractory metals.