



与时俱进 精益求精

产品样本

PRODUCT SAMPLE



苏州振吴电炉有限公司
SUZHOU ZHENWU ELECTRIC FURNACE CO.,LTD

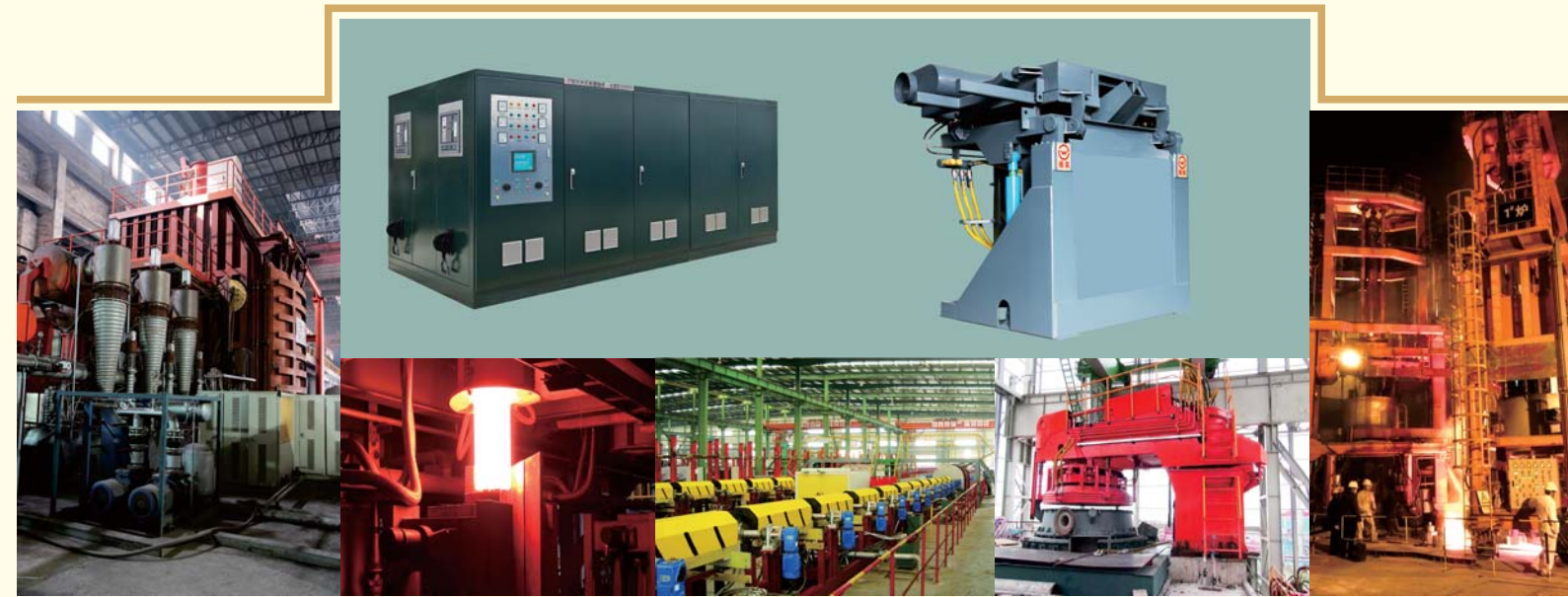
苏州振湖电炉有限公司
SUZHOU ZHENHU ELECTRIC FURNACE CO.,LTD

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公司简介

苏州振吴（振湖）电炉有限公司创建于1988年8月，座落于美丽富饶的历史文化名城——苏州，是专业从事电磁冶金技术研发和装备制造的国家重点高新技术企业、中国专利优秀企业、全国铸造装备排头兵十二强企业、全国工业电热设备标准化技术委员会副主任委员企业和江苏省创新型企业。占地面积45000平方米，建筑面积52000平方米，员工近400人，其中研发技术人员100余人。

公司技术力量雄厚，聘请了包括1位中国工程院院士在内的多位著名专家，汇集了一批以电力电子变频技术为核心和由机械、铸造、冶金、自动化和软件等技术领域的一流人才组成的研发团队，并和钢铁研究总院、北京科技大学、东南大学、苏州大学等科研院所、高等学校产学研合作，跟踪国际前沿技术，研究开发国家产业导向和市场急需的铸造、冶金、热处理行业的技术和装备，成为国内外有重大影响力的感应电炉企业。从2000年起连续多次通过ISO9001质量体系认证和复审；从2003年起连续多次被认定为高新技术企业。现公司研发机构被批准认定为“江苏省企业技术中心”、“江苏省电磁冶金技术及装备工程技术研究中心”和“苏州市绿色电冶金重点实验室”。

公司实施知识产权战略，已申请专利150多件，已获授权专利104件，其中发明专利35件。主持和参予制定国家标准10多项，其中3项已由国家标准化管理委员会正式批准 布实施。主导产品荣获国家重点新产品、江苏省首（台）套重大装备产品、江苏名牌产品和江苏省著名商标等品牌称号，公司还出版发行《电磁冶金技术及装备》重要专著3部。公司已承担国家火炬计划项目、国家科技支撑计划项目（子课题）、江苏省科技成果转化专项资金项目10多项；主导产品荣获全国工商联科技进步一等奖、中国机械工业科技进步一等奖、二等奖等部、省、市科技奖8项；专利特别金奖1项，金奖4项。

公司经历多年的发展，已形成金属熔炼和非金属熔炼两大类、四大品种和上百个规格的熔炼装置，已向宝钢、武钢、一重、中信重机，北京、大连机床厂等国内用户和日本、印尼、泰国、马来西亚、越南以及欧洲、非洲推广应用共千余套，成为国内外电炉装备品种最多、设计制造能力最强、产品应用面最广的电炉专业厂家之一。

“与时俱进、精益求精”，永远是我们苏州振吴人追求的目标。

INTRODUCTION

Suzhou Zhenwu (Zhenhu) Electric Furnace Co., Ltd., founded in Suzhou----a beautiful, historical and cultural city in August 1988, is the Key National High-tech Enterprise specialized in research and development of electromagnetic metallurgy technologies and equipment manufacturing, and also is the China's Outstanding Enterprise on Patent, one of the Top 12 China's Foundry Equipment Vanguards, the deputy director unit of the China National Standardization Technical Committee on Industrial Electroheating Installations (SAC/TC121) and Innovative Enterprise of Jiangsu Province. It has site area of 45000m² and building area of 52000m², near 400 employees including over 100 R&D engineers and technicians.

Our company is famous for its ample technical forces, has engaged many top experts including one academician of the Chinese Academy of Engineering, and has an R&D team collecting a group of first-class talents in the fields of power electronic frequency conversion technology (core technology), machinery, foundry, metallurgy, automation and software etc. We have been cooperating with research institutes and universities such as CISRI(China Iron & Steel Research Institute), University of Science and Technology Beijing, Southeast University, Soochow University and so on. Aiming at and tracing the latest international tendency to develop the technologies and equipment for foundry, metallurgy and heat treatment, which are led by state and eagerly requested by market, we have become a induction furnace manufacturer with significant influence at home and abroad. We have passed ISO9001 certification and reexamination many times since 2000, and identified as the High-tech Enterprise several times from 2003. Our R&D center has been approved as “Jiangsu Enterprise Technological Center”, “Jiangsu Engineering Research Center for Electromagnetic Metallurgy Technologies and Equipment” and “Suzhou Key Laboratory for Green Electrometallurgy”.

Our company executes intellectual property strategy and has applied for 150 patents; 104 of them have been approved, and 35 are invention patents. We preside over and participate in the drafting of over 10 national standards, 3 of them were approved and published by SAC(Standardization Administration of the People's Republic of China). Our products were awarded the National Key New Product, the First Set of Major Equipment Product of Jiangsu, Famous Brand Product of Jiangsu and Famous Trademark of Jiangsu. We also published 3 important technical books, one is Technologies and Equipment of EPM. Our company has undertaken more than 10 projects in China Torch Program, State Science & Technology Supporting Plan Project (branch item) and Jiangsu Scientific & Technological Achievement Transformation Projects etc. In addition, our products have won 8 awards including the first prize of the Scientific and Technological Progress of All China Federation of Industry and Commerce, the first and second prizes of the Scientific and Technological Progress of the China Machinery Industry, and other ministry, province and city prizes; as well as 1 Grand Gold Award of Patent and 4 Gold Award of Patent.

Having rapidly developed for many years, our company has developed 2 categories, 4 types and more than 100 specifications of metal and nonmetal melting installations, provided more than 1000 sets of installations to domestic customers like Bao Steel, WISCO, China First Heavy Industry, CITIC CHMC, Beijing Machine Tool Factory and Dalian Machine Tool Factory etc. and to foreign customers in Japan, Indonesia, Thailand, Malaysia, Vietnam, Europe, Africa and so on, and become one of the electric furnace manufacturers which have the most types and varieties, the strongest design and manufacture abilities and the widest application fields.

“Progress with Time, Continuous Improving” is the goal for us to pursue forever.

主营业务

BUSINESS DIVISION

我公司主营业务由感应熔炼装置、特钢及铁合金冶炼装置、感应加热装置、电磁感应熔炼非金属材料装置和工程总承包服务五大部分组成。

感应熔炼装置主要用于汽车零部件、船舶螺旋桨、轧辊等的铸造。我公司生产的双供电（一拖二）和多供电（一拖三、一拖四）中频电源设备可提高设备利用率、节约投资，所以获得了广泛的使用。主要用户为宝钢、武钢、鞍钢、首钢、太钢、一重、武汉471、中信重机、奇瑞汽车、比亚迪汽车、邢台轧辊、北京机床厂等国有大中型钢铁企业以及各类铸造企业。

特钢冶炼装置主要用于高速钢、轴承钢、模具钢和合金钢等特殊钢以及高温合金的冶炼，为生产大飞机精密铸件、核电站转子、大型船舶低速柴油机轴承、大无缝合金钢管等采用。

Suzhou Zhenwu Electric Furnace Co., Ltd. has five business divisions, i.e. induction melting installations, special steel and ferroalloy smelting installations, induction heating installations, electromagnetic induction melting installations for non-metal materials and EPC(Engineering Procurement Construction).

Induction melting installations are mainly used for casting automotive parts, marine propeller and roller etc. The multi-output medium frequency power supplier produced by our company (e.g. dual-output, triple-output and quad-output ones), can improve equipment utilization and reduce investment, so they are widely used. Main customers are Bao Steel, WISCO, An Steel, Shougang, TISCO, CFHI, Wuhan 471, CITIC CHMC, Cherry, BYD, Xingtai Roller, Beijing Machine Tool Factory and other large and medium-sized steel companies and casting enterprises.

Special steel melting installations are mainly used for melting high speed steel, bearing steel, module steel and alloy steel etc. and then for producing precision castings of large airplanes, rotors of nuclear power plants, bearings of low-speed diesel engine for vessels and large seamless alloy steel pipes etc.

Induction heating installations are used for the through-heating, hardening, tempering, normalizing etc. of metal materials and parts and to form highly efficient, energy-saving and environment friendly automated process lines, to

感应加热装置用于各类金属材料和零件的透热、淬火、回火、正火等并组成高效、节能和环保的自动生产线，替代国内传统的“燃气炉”、“燃油炉”和“电阻炉”等高能耗、高污染且质量不稳定的整体加热法。已为西姆莱斯、北京钢铁研究总院新冶工程技术中心有限公司及其他油田公司等用户提供了几十套热处理自动生产线。

电磁感应熔炼非金属材料装置用于感应加热的新应用领域。我公司新近开发的电磁感应高炉渣熔炼炉和电磁感应太阳能级硅熔炼和提纯炉等为利用炉渣和太阳能，发展循环经济和清洁能源的关键工艺装备。

工程总承包服务根据用户的需求提供特定的研发、设计、制造、安装。我公司具备钢厂设计建设、钢铁及有色金属冶炼工艺技术、装置制造安装和环保除尘设施等工程总承包能力，已为印尼、泰国、马来西亚、越南等国援建年产50万吨至200万吨多家钢铁厂。

replace the traditional fuel-fired and resistance furnaces which have high energy consumption, high pollution and unstable quality. Our company has provided dozens of sets of heat treatment automatic production lines for Wuxi Seamless, the New Smelting Engineering Technology Center Co., Ltd. of Beijing Iron & Steel General Institute and other oilfield companies etc.

Electromagnetic induction melting installations for non-metal materials are used in the new application field of induction heating. The electromagnetic induction melting furnaces for blast furnace slag, and electromagnetic induction melting and purifying furnace for solar grade silicon, recently developed by our company, are the key technological equipment for utilizing furnace slag and solar energy to develop recycling economy as well as new and clean energy sources.

EPC services provides specific R&D, design, manufacture and installation according to the customers' requirements. We have strong abilities in EPC projects about the design and construction of steel mills; the melting technologies of iron, steel and non-ferrous metals; the manufacture and installation of equipment as well as environmental protection and de-dusting facilities. Up to now, we have helped building many steel mills with annual output from 500.000 tons to 2.000.000 tons in Indonesia, Thailand, Malaysia, Vietnam and other countries.

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DX系列多供电变频电源 (串联电路)

DX Series Multiple Output Frequency Conversion Power Supply (Series Circuit)



DX 系列双供电变频电源（串联电路），一拖二
DX Series Dual Output Frequency Conversion Power Supply (Series Circuit)



DX 系列双供电变频电源采用串联逆变电路，一台电源可同时向两台电炉供电（俗称“一拖二”），一台电炉熔炼，另一台电炉可控制所需温度进行浇铸或保温（也可两台同时熔化），而且功率按用户需要可以任意分配。2006年我公司在双供电变频电源的基础上，成功推出了国内首创的多供电变频电源（俗称“一拖三”、“一拖四”）。电源实现自由、平滑、任何比例的功率输出。在需要不间断

DX series dual output frequency conversion power supply (series circuit) adopts series inverting circuit, one power supply is able to apply power to two furnaces simultaneously (known as “one for two”), one furnace is used for melting, the other may control the desired temperature to pour and hold, or two furnaces are used for melting simultaneously. The power can be distributed arbitrarily according to customers' request. In 2006, we successfully developed the multi-output ones first in China based on dual output frequency conversion power supply (known as “one for three”,

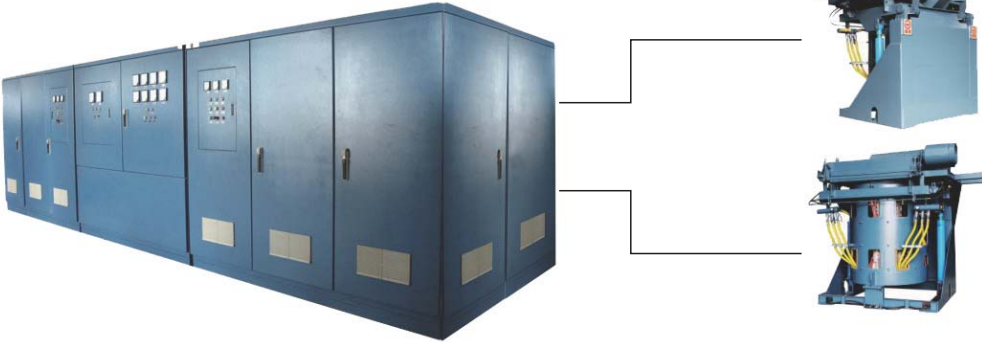


熔炼时，可在准确温度下进行升温、保温、调质等，最大限度提高出铁、钢水量。它适用于需要连续提供铁水的自动化浇铸生产线，将大幅提高生产率。我公司所提供的大容量、高功率的感应电炉额定容量从1~100t；所配用的变频电源额定功率则在500~30000kW范围内。

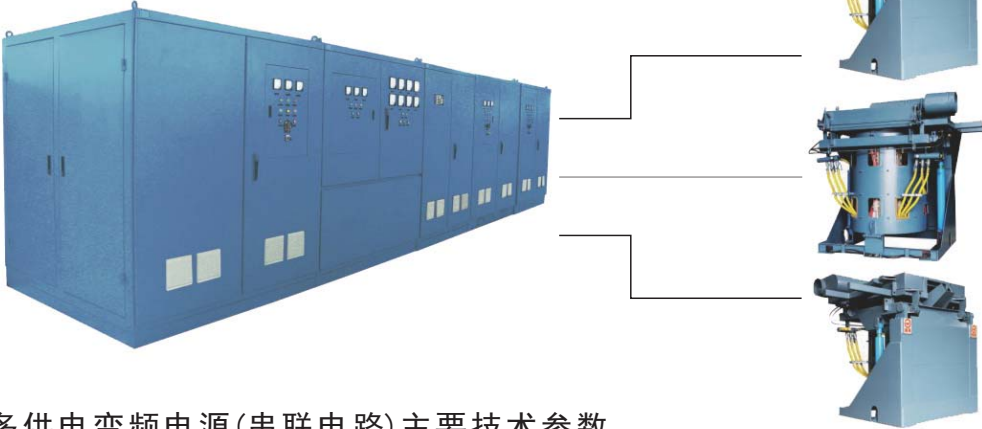
“one for four”). The output of power can be free and smooth at any ratio. When need continuous melting, you can heat up, hold and composition-adjust etc. at precise temperature, and increase considerably molten iron or steel output. It is applicable to the automatic casting production line which needs continuous supply of molten iron, and improves productivity drastically. We can supply induction furnaces with the rated capacity of 1~100t and the rated power of equipped power supply of 500~30000kW.

感应电炉变频电源（500kW~3000kW）Induction Furnace Frequency Conversion Power Supply

DX系列双供电变频电源（24脉，串联电路）（一拖二）
DX Series Dual Output Frequency Conversion Power Supply (24 Pulses, Series Circuit) (One for Two)



DX系列三供电变频电源（24脉，串联电路）（一拖三）
DX Series Triple Output Frequency Conversion Power Supply (24 Pulses, Series Circuit) (One for Three)



DX 系列多供电变频电源(串联电路)主要技术参数

Main Technical Parameters of DX Series Multiple Output Frequency Conversion Power Supply (Series Circuit)

型号 Model	进线电压 Input Voltage	进线电流 Input Current	直流电压 DC Voltage	直流电流 DC Current	中频电压 MF Voltage	中频频率 MF Frequency	中频功率 MF Power
KGPS-DX-500kW	380V/3相	816A	500V	1000A	1200 ± 10%V	100Hz~8000Hz	500kW
KGPS-DX-800kW	380V/3相	1305A	500V	1600A	1200 ± 10%V	100Hz~8000Hz	800kW
KGPS-DX-1000kW	380V/6相	816A	1000V	1000A	2400 ± 10%V	100Hz~3000Hz	1000kW
KGPS-DX-1500kW	380V/6相	1220A	1000V	1500A	2400 ± 10%V	100Hz~3000Hz	1500kW
KGPS-DX-2000kW	380V/6相	1630A	1000V	2000A	2400 ± 10%V	100Hz~3000Hz	2000kW
KGPS-DX-2500kW	480V/6相	1630A	1250V	2000A	2900 ± 10%V	100Hz~1000Hz	2500kW
KGPS-DX-3000kW	480V/6相	1960A	1250V	2400A	2900 ± 10%V	100Hz~1000Hz	3000kW
KGPS-DX-3500kW	480V/6相	2280A	1250V	2800A	2900 ± 10%V	100Hz~1000Hz	3500kW
KGPS-DX-4000kW	480V/6相	2610A	1250V	3200A	2900 ± 10%V	100Hz~1000Hz	4000kW
KGPS-DX-4500kW	575V/6相	2440A	1500V	3000A	3600 ± 10%V	100Hz~500Hz	4500kW
KGPS-DX-5000kW	575V/6相	2720A	1500V	3330A	3600 ± 10%V	100Hz~500Hz	5000kW
KGPS-DX-6000kW	575V/6相	3260A	1500V	4000A	3600 ± 10%V	100Hz~500Hz	6000kW
KGPS-DX-8000kW	575V/6相	4350A	1500V	5400A	3600 ± 10%V	100Hz~500Hz	8000kW
KGPS-DX-10000kW	575V/12相	5430A	1500V	6660A	3600 ± 10%V	100Hz~200Hz	10000kW
KGPS-DX-15000kW	575V/12相	8160A	1500V	10060A	3600 ± 10%V	100Hz~200Hz	15000kW
KGPS-DX-20000kW	600V/12相	10200A	1600V	12500A	3800 ± 10%V	80Hz~150Hz	20000kW
KGPS-DX-25000kW	600V/12相	12750A	1600V	15625A	3800 ± 10%V	80Hz~120Hz	25000kW
KGPS-DX-30000kW	600V/12相	15300A	1600V	18750A	3800 ± 10%V	80Hz~120Hz	30000kW

KGPS系列变频电源（并联电路）

KGPS Series Frequency Conversion Power Supply (Parallel Circuit)



KGPS系列变频电源（并联电路）

KGPS Series Frequency Conversion Power Supply (Parallel Circuit)

采用零电压数字扫描式自启动电路，保证设备在空载、轻载、重载或者冻炉的情况下可靠启动，对电网无冲击，一旦启动成功可自动升功率到设定值，因此整机操作十分简单。变频电源在加热、熔炼的全过程，采用自适应调节方式，始终保证全功

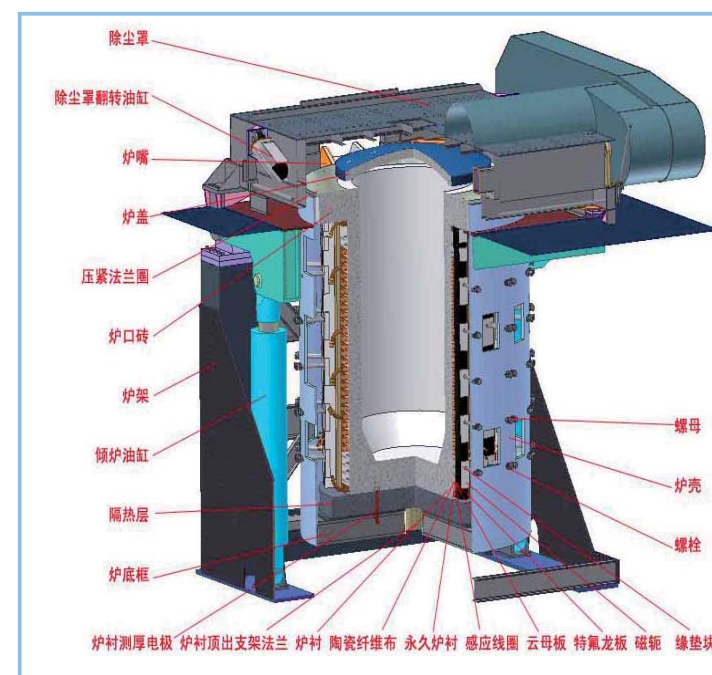
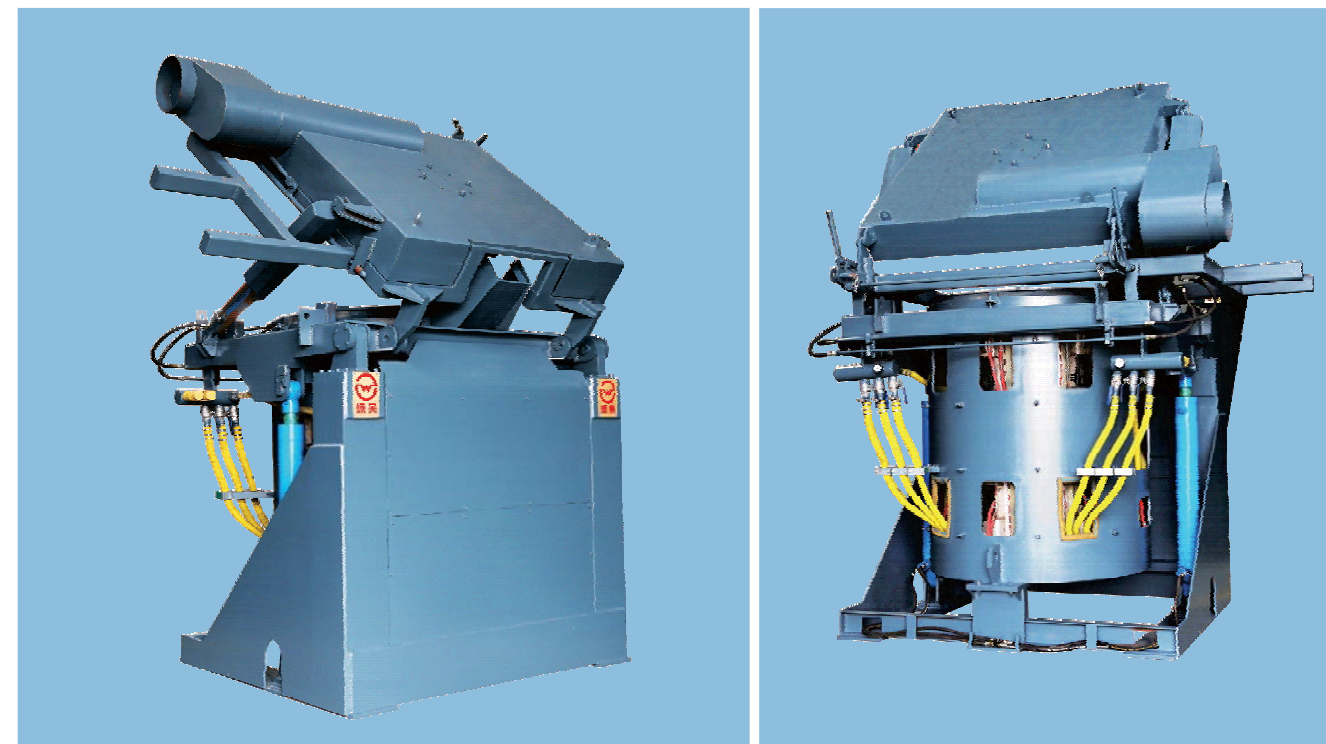
The digital scanning type self starting circuit from zero voltage is adopted to ensure the furnace can start reliably in the conditions of no load, light load, heavy load or frozen load, with no impact to grid. Once the furnace starts successfully, the power will automatically rise to the set value, so the whole operation is very simple. During the whole heating and melting process, a self-adaptive control way is used to make the power

率输出，频率自动跟踪，自动调节功率因数，保证设备稳定、可靠地运行。变频保护采用先进的双保险反馈自锁电路，保护速度快，而且在设备后设有双向重复保护措施。

supply work in the conditions of full power output, automatic frequency tracing and self-regulation of power factor and ensure the equipment operate steadily and reliably. The protection system uses the advanced self-locking circuit with dual fail-safe feedback, and has faster reaction. In addition, the bidirectional repeated protections are set in the input and output terminals of the equipment.

GW 系列感应炉

GW Series Induction Furnace





电气车间
Electrical Workshop



总装车间
Assembly Workshop

采用优质厚钢板卷制焊接而成的鼠笼式框架结构，窗口有可拆式盖板，框架底板采用优质厚钢板制作。炉壳下部有炉衬顶出机构的固定支架。炉壳内配有仿形磁轭。该磁轭可以减小漏磁，防止炉体结构件发热，提高电能效率，同时支撑感应圈，提高强度。在磁轭不取走情况下可以方便地拆装线圈和对线圈进行维修、观察、散热。炉盖采用液压（或机械手动）升降及旋开、旋回，炉盖顶部设有观察孔，可方便测温 and 补加合金材料。盖上炉盖可减少热损失，降低电能消耗，减少生产成本。

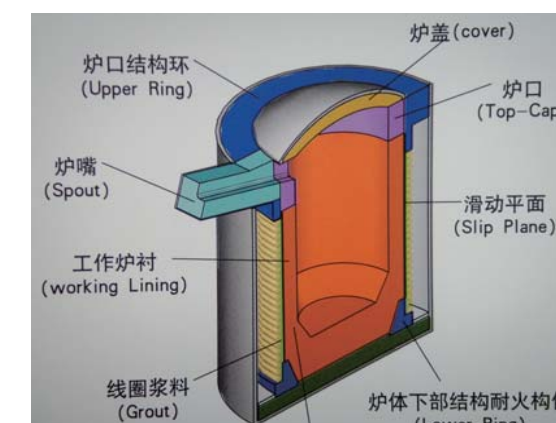
The furnace body adopts the squirrel-cage type frame structure of high quality steel plates fabricated by rolling and welding, with removable covers on its windows and high-quality thick steel plates at bottom. There is a supporting bracket of lining pushing mechanism on the lower part of furnace shell. There are profiling magnetic yokes inside furnace shell which can reduce magnetic leakage, prevent the frame structure from heating, increase electrical efficiency, support induction coils and enhance their strength. Without taking the yokes away, the assembly, disassembly, maintenance, observation and heat dissipation of induction coils can be conveniently carried out. The furnace cover is lifted and swung by hydraulic or manual system. There is an inspection hole on the top of furnace cover, through which temperature measurement and supplement of alloy materials can be carried out conveniently. The use of furnace cover can reduce heat losses, power consumption and production cost.



用户现场
User Site

炉衬材料

Refractory Materials

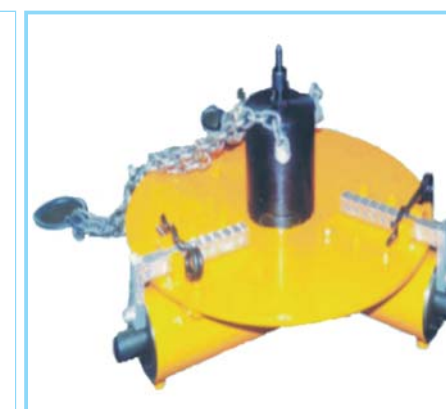


我公司为更好的服务用户，提供与中频感应炉、真空炉等配套的高端炉衬耐火材料。经客户使用，相关产品使用效果完全可替代进口。同时对采用我公司炉衬材料的用户电炉进行免费维修。

To better serve our customers, we provide matching refractory materials for our induction furnaces and vacuum induction furnaces. The quality of our refractory materials is so excellent that can replace imported materials completely by user experiences, meantime we also provide free maintenance to the customers using our refractory materials.

1. 炉盖用SZJ-1浇注料
2. SZAJ96线圈胶泥
3. SZJDLS-1可塑修补料
4. 熔化和保温铁水的SZS416石英酸性材料及SZS416DR电熔石英酸性炉衬材料
5. SZAM88-900为氧化铝基材料专门设计用于熔化各种铝合金及熔化和保温铜合金的SZS416DRCU电熔石英酸性炉衬材料
6. SZAM90中性干捣料和SZM97碱性干捣料用于熔化和保温各种钢水
7. SZ2000及Bosch电动筑炉机
8. SZ650型气动振动筑炉机
9. ZW-MICA云母纸背衬
10. ZW-1陶瓷纤维布

1. Castable for furnace cover
2. SZAJ96 coil grout
3. SZJDLS-1 plastic patching
4. SZS416 silica based and SZS416DR fused silica based acid refractory for melting and holding cast iron
5. SZAM88-900 alumina based refractory for melting aluminum alloy and SZS416DRCU fused silica based acid refractory for melting and holding copper alloy
6. SZAM90 neutral dry ramming materials and SZM97 basic dry ramming materials for melting and holding steel
7. SZ2000 and Bosch electric furnace building machine
8. SZ650 pneumatic vibrator
9. ZW-MICA mica paper for slip plane
10. ZW-1 ceramic fiber cloth



ZG系列中频真空感应熔炼炉

ZG Series MF Vacuum Induction Melting Furnace



13吨真空感应熔炼炉
13t Vacuum Induction Melting Furnace



2.5吨真空感应熔炼炉
2.5t Vacuum Induction Melting Furnace

500公斤真空精密铸造炉
500kg Vacuum Fine Casting Furnace

1.35吨真空感应熔炼炉
1.35t Vacuum Induction Melting Furnace

本公司生产的ZG系列中频真空感应熔炼炉主要供特殊钢、高温合金和精密合金、无氧铜及铜合金在真空或保护气氛下进行熔炼和铸锭之用，亦可供零件的真空精密铸造。

ZG系列中频真空感应熔炼炉在炉型上分立式和卧式，

ZG series VIM (Vacuum Induction Melting) furnaces are mainly used for special steel, high-temperature alloy and precision alloy, oxygen free copper and copper alloy melting or casting ingots in vacuum or protective atmosphere, and also for casting fine parts in vacuum.

ZG series furnaces can be classified into vertical type and

在操作使用上有周期式和半连续式，以半连续式居多。中频真空感应熔炼炉主要由炉体、真空系统、晶闸管中频电源、控制系统、工作平台、炉盖、传动机构、水冷系统等组成。型号从ZG-25 (25kg) 至ZG-13000 (13t) 的真空感应熔炼炉均可生产制造。

horizontal type according to the shape; and into batch type and semi-continuous type according to the operating manner, while more are semi-continuous type. The furnaces consist mainly of furnace body, vacuum system, thyristor medium frequency (MF) power supply, control system, working platform, furnace cover, driving mechanism, water cooling system etc. All the products from ZG-25(25kg) to ZG-13000(13t) can be provided.



500kg VIM

1t+300kg VIM

1t+300kg VIM



1t VIM

1t VIM

1t VIM



100kg VIM

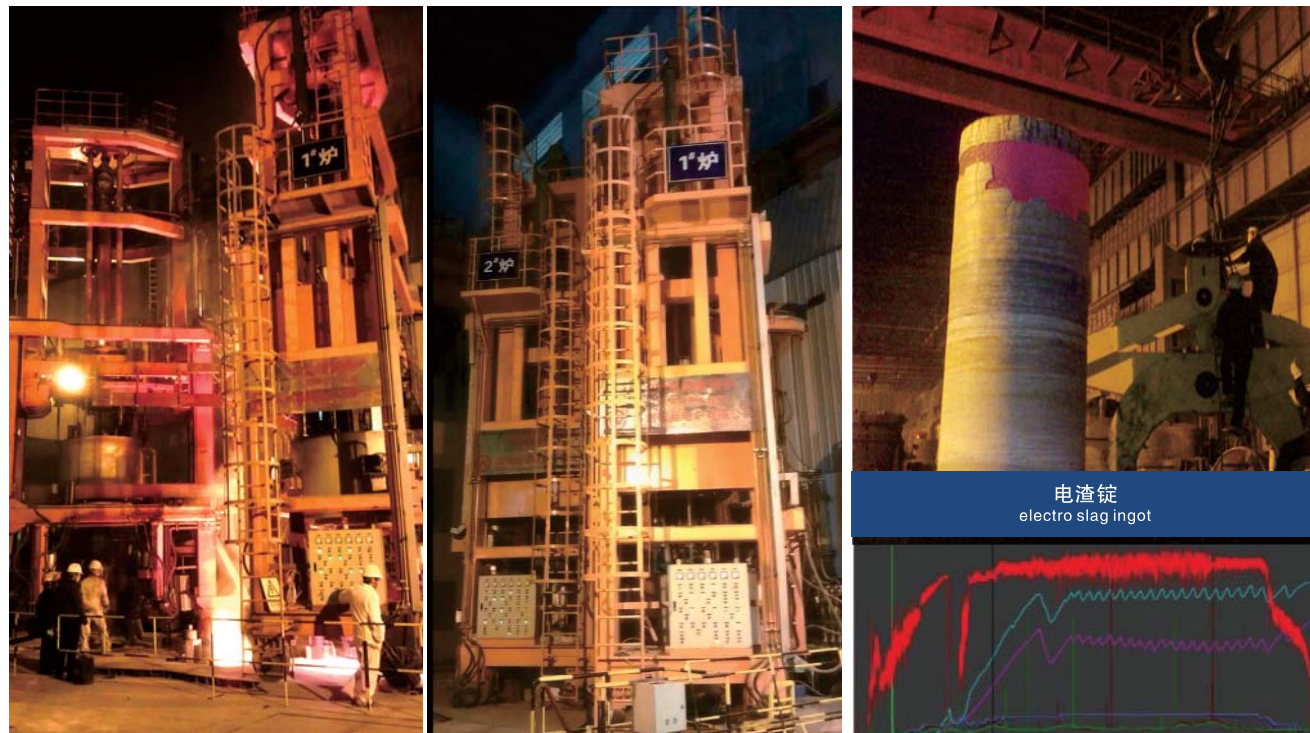
1t VIM

1t VIM

6t Furnace

DZ系列电渣重熔炉

DZ Series Electro Slag Remelting Furnace



电渣锭
electro slag ingot

60吨双炉头保护气氛电渣炉
60t dual furnace head ESR furnace with protective atmosphere

恒熔速控制曲线
control curve of constant melting rate

- | | |
|----------------------------------|-------------------------------------|
| 1. 高效双工位
dual stations | 5. 全自动控制
automatic control |
| 2. 同轴承馈电
coaxial power feed | 6. 三相平衡
three-phase equilibrium |
| 3. 气氛保护
gas protection | 7. 功率因数高
high power factor |
| 4. 熔速恒定
constant melting rate | 8. 谐波畸变低
low harmonic distortion |



3吨保护气氛电渣炉

3t ESR furnace with protective atmosphere

15吨保护气氛电渣炉

15t ESR furnace with protective atmosphere

1吨保护气氛电渣炉

1t ESR furnace with protective atmosphere

15吨双臂交替电渣炉

15t ESR furnace with alternative dual arms

电渣重熔炉利用电流流过熔渣产生的电阻热熔化插入渣池的自耗电极，然后在金属熔滴通过熔渣得到去杂和精炼后在水冷结晶器中结晶成锭子的一种特殊熔炼装置。由于熔渣的去夹杂作用和良好的结晶条件，电渣重熔金属具有良好的纯净度，铸态组织细致均匀，无白点及年轮状偏析，硫含量极低，夹杂物细小弥散等优良性能。因此，电渣重熔在大中型锻件和模块毛坯（包括大型钢管和冷轧扎辊等）生产中处于垄断地位，在镍基合金、优质工模具钢、马氏体时效钢等生产中占绝对优势，电渣熔铸异形件也具有独特之处，国内电渣钢年产量已达几十万吨。因此，电渣炉是特殊钢厂必不可少的生产设备。

公司开发的DZ系列双工位高效电渣重熔炉主要具有以下优点：

1. 电渣重熔炉结构为井式框架，整体刚性好，使得可靠地使用高精度的电子秤测量系统来控制熔速成为可能。
2. 电渣重熔炉结构采用单极单相、双炉座、结晶器和底水箱一体脱模方式，可在两个熔炼站中任一重熔钢锭。

ESR(Electro Slag Remelting) furnace is a special melting installation in which the consumable electrode immersed into molten slag pool is melted by the Joule heat produced when electric current flows through the molten slag, then the melted metal drops are purified and refined when they go through the molten slag and at last are crystallized into an ingot in the water-cooled crystallizer. Due to the impurity-removing function of molten slag and better crystallizing conditions, the ESR metal has good properties, such as high purity, fine and uniform structure, no white point and annual-ring segregation, ultra low sulphur content as well as small and diffusible impurity etc. Therefore, ESR is at an important position in the production of medium and large forgings and billets (including big steel pipe and roller etc.), Ni-based alloy, high quality tool and mold steel, maraging steel and castings of abnormal shapes. The output of electro-slag steel per year has reached several hundred thousands tons in China. The ESR furnaces has become necessary equipment for special steel plants.

The DZ series ESR furnaces with dual working positions and high efficiency developed by our company have following advantages:

1. The ESR furnace adopts pit type frame structure and has good rigid as a whole, to make it possible to control remelting speed reliably by the use of high accuracy electronic weight measuring system;
2. The furnace adopts single electrode, single

这样可实现当一工位在进行重熔冶炼时，另一工位可同时进行熔炼的准备或熔炼后取锭的工作。如此，两工位可交替进行相应工作，效率增。

3. 使用高精度的电子秤测量系统，可以快速计算自耗电电极熔化速率，并实现熔化速率控制冶炼。最终满足最佳均匀结晶的要求。特别是在冶炼合金含量大或电渣锭直径大的产品时，能可靠得到优质的产品。

4. 变压器二次侧短网采用平行布线和逆向密排（同轴导电）模式，电极升降杆与短网的连接采用电刷组件完成，减短了水冷电缆的长度，感抗低，电损耗小。

5. 自动化控制采用熔化率控制和渣阻控制，使熔炼过程稳定。同时，熔炼可通过人机界面菜单进行设置，使工艺优化等操作简易、可靠。

6. 在结晶器口设置有能有效密封的惰性气体保护罩，从而可冶炼出高优质的产品。

电渣重熔炉主要包括：可转动炉头部分、固定熔炼站部分和电气系统三部分。

phase, dual furnace positions and the integral disassembly of the mold consisting of crystallizer and bottom water box. In this case, when remelting is carried out in one furnace position, the preparation before remelting and the removing of ingot after remelting can be carried out in another furnace position at the same time, and then the efficiency is doubled.

3. The use of electronic weight measuring system with high accuracy may calculate quickly and then control the melting rate of consumable electrode to obtain optimal uniform crystallization. The high quality products can be obtained specially in remelting high alloy steel or electro-slag ingot of large diameter;

4. The heavy current line on the secondary side adopts parallel arrangement as well as reversal and close arrangement (coaxial conducting). The connection between electrode lifting mast and heavy current line is realized by electric brush units, to reduce the length of water-cooled cable, inductance and power consumption;

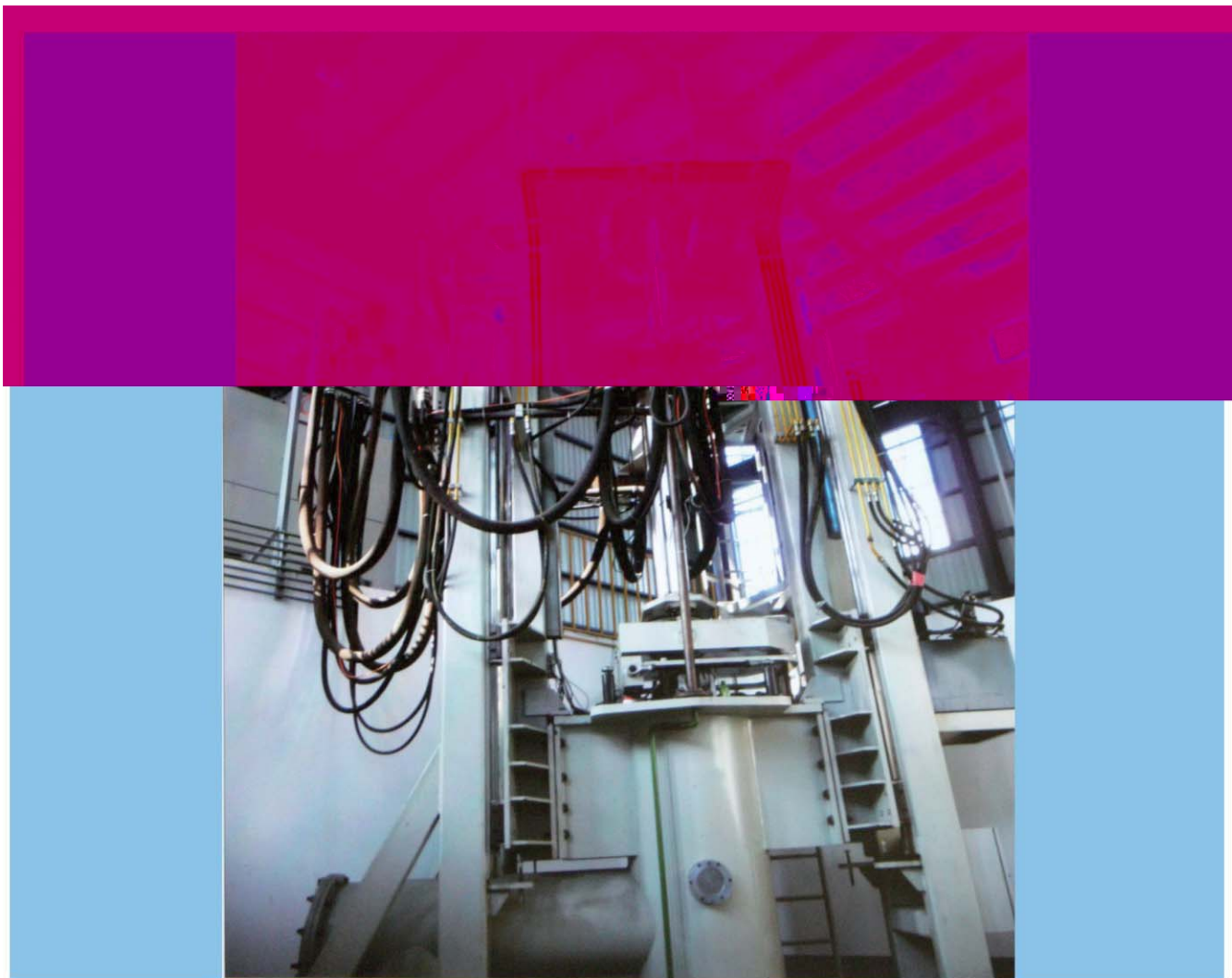
5. The melting rate and slag resistance are auto-controlled, to make remelting process stable. The melting rate may be set by menu to make process optimization easy and reliable;

6. The efficiently-sealed inert gas protection hood is equipped at the port of crystallizer to ensure high quality products.

The ESR furnace consists of three main parts: rotatable furnace head, fixed melting station and electrical system.

真空自耗电弧炉

Vacuum Arc Remelting Furnace



真空自耗电弧炉是在真空中利用电弧的能量来熔炼金属的一种电炉，简称自耗炉。自耗电极是由被熔炼材料（即炉料）本身制成的。在熔炼过程中自耗电电极逐渐消耗，熔化后滴进到结晶器中冷凝成锭子。

真空自耗电弧炉主要用来熔炼钛、锆、钼等活泼金属和难熔金属，也用来熔炼耐热钢、不锈钢、工具钢、轴承钢等合金钢。

随着世界经济的快速发展，航空、航天、石化及核工业等对稀有金属产品，如钛、锆、钼等产品的需求愈加广泛，

Vacuum Arc Remelting Furnace is an electric furnace that melts metal by the use of arc energy, and VAR furnace is for short. Consumable electrode is made of melted materials (charge). During the melting process, consumable electrode is consumed gradually, then drip into crystallizer and condensed into ingots afterwards.

This kind of furnace is mainly used for melting active and refractory metals such as Ti, Zr, Mo etc, also for melting alloy steels such as heat-resisting steel, stainless steel, tool steel, bearing steel, etc..

With the rapid development of world economy, demands to rare metal products such as Ti, Zr, Mo etc. in air service, aerospace, petrochemicals and nuclear industries are more and more wide, with

泛，因而对稀有金属产品的产量、质量也就有了更高的要求，真空自耗电弧炉的应用也日趋广泛。

我公司开发的真空自耗电弧炉，容量0.5吨至15吨，其炉体设有两套位置固定的结晶器，炉体可以旋转，以便于交替作业，这样可充分利用电源设备，提高生产率。

真空自耗电弧炉包括：炉体、电极杆、电极升降装置、结晶器及组件、滑轨导向连接体、真空系统、气动系统、水冷系统、电源及电控系统、光学监视系统、电极称重系统、控制系统、安全报警系统。

more requirements for both production and quality. Therefore VAR furnaces will be used more broadly.

The VAR furnaces developed by our company have capacities from 0.5t to 15t. Furnace body is equipped with two crystallizers at fixed positions and can be rotated for easier alternative operation, so that power supply is fully utilized and productivity is raised.

A VAR furnace includes: furnace body, electrode stem, electrode lifter, crystallizer and its components, slide guide connection, vacuum system, pneumatic system, water cooling system, power supply and its controller, optical monitoring system, electrode weighing system, control system and safety alarm system.

HX系列交流电弧炉

HX Series AC Electric Arc Furnace



60吨交流电弧炉
60t AC Electric Arc Furnace



20吨交流电弧炉
20t AC Electric Arc Furnace

HX系列三相交流电弧炉按功率匹配分为普通功率、高功率、超高功率电弧炉；其操作形式可分为左操作和右操作两种以及炉盖旋开顶加料式。电弧炉是由炉体、倾动机构、水冷系统、液压系统、电炉变压器、短网系统、高压电系统和电气自动化系统等组成。全套设计合理、运行可靠、性能

HX series three phase AC EAF(Electric Arc Furnace) are classified into types of normal power, high power and ultra high power according to matched power, also into types of left operation, right operation, and the roof swing and top-charging according to its operating manner. The furnace consists of furnace body, tilting mechanism, water cooling system, hydraulic system, furnace transformer, heavy current system, HV system

优越。HX系列三相炼钢电弧炉常用于熔炼各种优质碳素钢和合金钢。其容量从0.5到100吨。设备根据工艺要求可装有供氧系统。

and electrical auto-control system etc. The whole installation is designed reasonably, operates reliably and has advanced performances. The furnaces are used for melting alloy steel and high quality carbon steel, with capacities of 0.5t-100t. Oxygen supply system may be equipped according to technological requirements.

真空脱气炉

VID(Vacuum Induction Degassing) Furnace



对于有些材料，如特钢，耐热钢，耐蚀钢，仅需要在真空下保温、脱气(也可精炼)，而不必在真空下浇注，由此出现了一种结合感应熔炼和真空脱气于一体的钟罩式真空脱气炉（VID），在黑色和有色金属工业中都可应用。真空脱气炉首先在大气环境下感应熔化金属，然后在真空状态下进行脱气精炼，最后在大气下或惰性气体保护下进行浇铸。在浇铸过程中，感应炉继续保温，以补偿丧失的温度。所有重要的二次冶金处理步骤真空熔炼，脱碳，脱硫，脱氧，去除不必要的气体氢气和氮，精确调整化学成分，合金搅拌均匀都在一个设备里完成。对于小型生产企业，无须很大的厂房空间和昂贵的设备投资，也能生产出类似大型企业使用传统的体积庞大的LF/VD/VOD炉型所获得的高品质产品。VID代表了一种灵活机动的小容量炉子的二次冶金的概念。

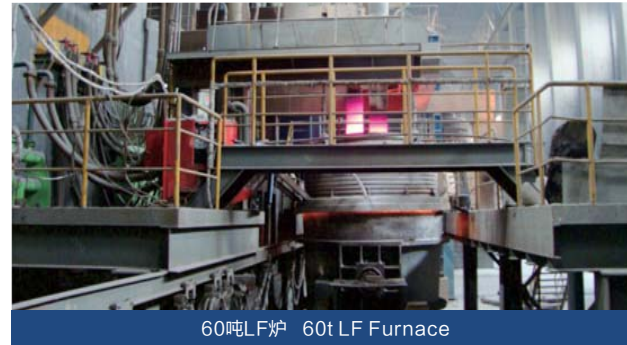


For some materials, such as some special steel, heat-resistant steel, corrosion resistant steel, only need to be held and degassing (can also be refined) in vacuum, without having to be cast in vacuum, so the VID (Vacuum Induction Degassing) furnace appears, in the shape of a bell cap on a induction furnace, combining induction melting and vacuum degassing in one unit, and applied in the ferrous and non-ferrous metal industry. VID first melts metal through induction heat at air and then does degassing and refining under the vacuum state, finally casts in the air or inert gas protection. In the casting process, the induction furnace continues heating to compensate the temperature loss. All the important secondary metallurgy treatment steps - vacuum melting, decarbonization and desulphurization, deoxidation, removal of undesired gases like hydrogen and nitrogen, precise adjustment of the chemical composition and alloy stirring uniformly are done in one single equipment. Smaller steel shops and foundries, without large space and expensive equipment investment, also can produce high quality vacuum treated steels, whereas larger shops have to realize these qualities employing a conventional bulky LF/VD/VOD production line. VID represents a new flexible secondary metallurgy for small capacity furnaces.



LF钢包精炼炉

LF Ladle Refining Furnace



LF钢包精炼炉可供初炼炉（如中频熔炼炉）钢水精炼之用，由钢包、钢包车及拖缆、炉盖、电极升降机构、短网、水冷系统、液压系统、氩气系统、电炉变压器、高压系统及电气自动化系统组成，是用于连铸、连轧的重要冶金设备。它在常压下采用电弧加热使钢液升温；全程底吹氩气搅拌，均匀钢水温度、成分，使钢液纯净；微调合金成分，缓冲、调节冶炼与连铸的节拍，以利连续生产。

主要特点：

1. 采用水冷炉盖，配有可调节烟气出口度大小的除尘接口，使炉内保持微正压、还原性气氛。
2. 采用铜钢复合导电横臂，缩小电极分布圆直径，提高炉衬使用寿命。
3. 配有自动或手动测温取样装置，准确测量钢水温度。
4. 大电流系统采用大截面水冷电缆、补偿器、铜钢复合导电横臂，减小主回路的阻抗。
5. 采用合金和渣料加入装置，准确计量加入包内的合金和渣料。
6. 配有PLC控制系统及冶炼模型。

AOD精炼炉

AOD Refining Furnace



AOD是氩氧脱碳法的简称，它是在大气压力下向钢水吹氧的同时，吹入惰性气体（氩、氮），实现脱碳保铬目的的重要精炼不锈钢的方法。AOD炉由炉体、托圈、倾动机构、气体控制系统、操作机构、供气系统、炉衬、基础和除尘系统组成。

AOD炉气体控制系统采用先进的检测技术和运行可靠的检测控制设备，故障率低，数显仪表直读，操作方便。

LF ladle refining furnace is used for refining molten steel (e.g. from MF induction furnace). It consists of ladle, ladle car and towing cable, furnace cover, electrode lifting mechanism, heavy current line, water cooling system, hydraulic system, argon-blowing system, furnace transformer, high voltage system and electrical auto-control system, and is an important metallurgical equipment for continuous casting and rolling. The furnace raises the temperature of molten steel under normal pressure through arc heating; blows Ar from bottom for stirring molten steel during the whole process to make its temperature and composition uniform, and also purify molten steel; finely regulates alloy composition as well as snubs and adjusts the speed of melting and casting to facilitate continuous production.

Main features:

1. Adopt water-cooled furnace cover and equipped with the fume-extracting connection port which can regulate its opening degree to maintain ultra-low positive pressure and reductive atmosphere inside furnace;
2. Adopt copper-steel composite electrode arm to decrease the diameter of electrode pitch circle and lengthen the life of lining;
3. Equipped with automatic or manual temperature measuring and sampling devices to accurately measure the temperature of molten steel;
4. Heavy current line adopts water-cooled cables, compensator and copper-steel composite electrode arm with large sections to reduce the impedance of power circuit;
5. Have an alloy and slag adding equipment with accurate counting;
6. Equipped with PLC control system and smelting model.

AOD炉自动控制系统：根据用户所需冶炼的不同钢种和精炼工艺要求，编制完整的数据库，操作者只需选择钢种编号，就能自动完成整个精炼过程。

AOD is an important method for refining stainless steel and the abbreviation of "Argon Oxygen Decarbonization", by which oxygen is blown into molten steel under the atmospheric pressure, together with inert gases (argon, nitrogen) blown in at the same time, in order to realize the decarbonizing and holding chromium. AOD refining furnace is composed of furnace body, trunnion ring, tilting mechanism, gas control system, operating mechanism, gas supply system, lining, furnace base and dust-extracting system etc.

The gas control system adopts advanced inspection technologies and reliable measuring and controlling devices, with less fault, digital display and convenient operation.

As a complete data bank is compiled according to the different kinds of steels to be melted and refining technologies, the whole refining process is automated after the operator simply selects the number of steel type.

VD/VOD 钢包精炼炉

VD/VOD Ladle Refining Furnace



30吨VOD炉 30t VOD Furnace



120吨 真空浇注炉 120t Vacuum Casting Furnace

VD型钢包精炼炉具有真空脱气功能；VOD型钢包精炼炉具有脱碳、脱氧、脱气、脱硫及合金化等功能。

VOD型钢包精炼炉由固定真空罐或车载罐、真空罐盖、真空加料装置、吹氧装置、电气自动化系统、真空管道、除尘装置及真空泵等组成，可以生产各种不锈钢或超低碳合金钢。

主要功能：

1. 生产优质的低合金钢、低碳钢、轴承钢、合金材料、不锈钢、模具钢、工具钢、超低碳素钢等，对钢水中气体、夹杂物、化学成份有严格的要求的钢种
2. 具有真空加料，合金成分微调
3. 真空脱气
4. 真空吹氧脱碳
5. 喂丝
6. 底吹氩搅拌

VD ladle refining furnace has degassing-function under vacuum; VOD ladle refining furnace has the functions of decarburizing, deoxidizing, degassing, desulfurization and alloying etc.

VOD ladle refining furnace consists of fixed vacuum tank or car-carried vacuum tank, cover of vacuum tank, charger in vacuum, oxygen lance, automatic control system, vacuum ducts, fume extraction system and vacuum pumps, and are used for melting all kinds of stainless steel or alloy steel with ultra- low carbon.

Main features:

1. Producing high quality products, e.g. low-alloy steel, low carbon steel, bearing steel, bearing steel, alloy steel, stainless steel, module steel, tool steel, ultra-low carbon steel, and the steels with strict requirements on gas, impurities, chemical composition in molten steel.
2. Vacuum charging and fine tuning alloy composition.
3. Vacuum degassing.
4. Vacuum blowing oxygen and decarburizing.
5. Feeding wire.
6. Blowing argon from bottom for stirring.

矿热电炉

Submerged Arc Furnace (SAF)



矿热炉一般是以碳作为还原剂，主要生产铁合金、金属硅、电石、刚玉、黄磷、生铁等。矿热炉运行时炉料加入炉内并将电极插埋于炉料中，依靠电弧热和电流通过炉料而产生的电阻热进行埋弧还原操作，通常被还原熔化的产品和炉渣集聚在炉底并通过出口定时排出，生产过程是连续的。用此方法生产的铁合金产品有：硅铁、硅钙、硅钡、金属硅、高碳锰铁、锰硅合金、高碳铬铁、硅铬合

SAF(Submerged arc furnace) is mainly used for producing ferroalloy, metallic silicon, calcium carbide, corundum, phosphor and pig iron etc, generally using carbon as reducing agent. When the furnace works, charge is put into it and electrodes are submerged into the charge, the reduction process with submerged arc is carried out by arc heat and the resistance heat produced when current flows through the charge. Generally, the reduced and melted products and furnace slag are collected on the furnace bottom and tapped through outlet regularly, the production process is continuous. The ferroalloy

金、硅铝、硅铝合金等硅系列复合铁合金。最近推出的节能、环保型矿热炉更受到国内外客户的欢迎。2006年与韩国浦项钢铁公司配套生产的27000kVA镍、铬资源再生矿热炉，深得用户好评。我公司生产的矿热炉声誉卓绝，产品还远销印度尼西亚、韩国、越南、伊朗等。

products produced by the process are: ferrosilicon, silicocalcium, silicobarium, ferromanganese with high carbon, silicomanganese, ferrochrome with high carbon, silicochrome, silicoaluminium etc. Our recently developed energy-saving, environmental friendly SAF are well received by domestic and foreign customers e.g. the 27000kVA nickel, chrome renewable SAF for South Korea's Pohang Iron and Steel Company in 2006. Our products are exported to Indonesia, Korea, Vietnam and Iran etc and won extraordinary reputation.



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GR系列石油专用管热处理自动线

GR Series Heat Treatment OCTG Automation Process Line



力学性能达到美国石油学会API标准

Mechanical properties have reached the API(America Petroleum Institute) Standards

GT系列圆钢透热自动线

GT Series Induction Through-heating Automation Process Line for Steel Rods



www.zwcn.com

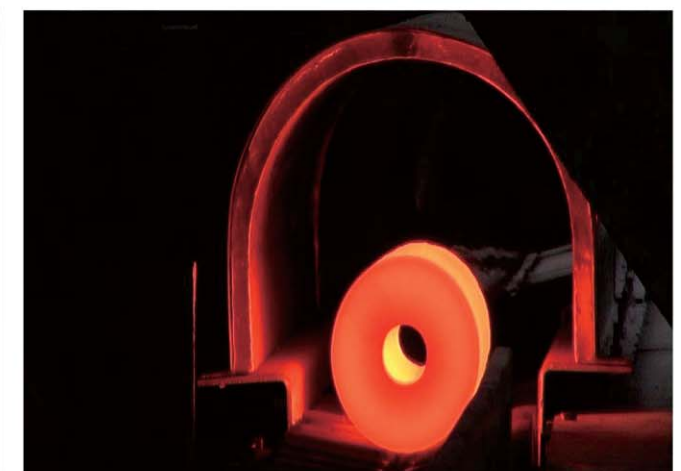


钢管挤压生产线感应加热系统

Induction Heating System for Pipe Extruding Production Line

钢坯、连铸钢坯感应加热自动线

Induction Heating Automation Process Line for Steel Billets

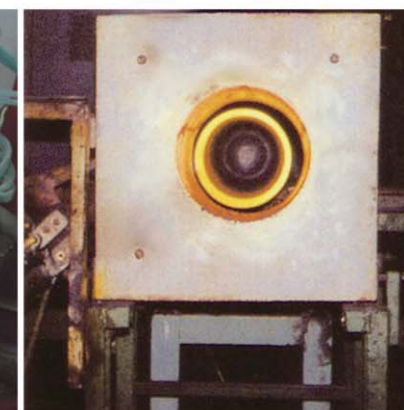


ZWKGPS系列中频感应加热、淬火设备

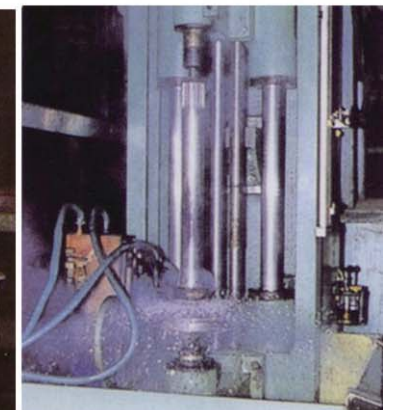
ZWKGPS Series MF Induction Heating, Hardening Equipment



轧辊双频淬火
Dual Frequency Hardening for Roller



氧气瓶封口透热
Through-heating the Sealing Port of
Oxygen Cylinder



齿轮轴淬火
Hardening for Gear Shaft



ZWIG/ZWMOS系列高频感应加热装置

ZWIG/ZWMOS Series HF Induction Heating Installation

我公司开发的感应透热和热处理生产线主要用于坯料锻造、挤压和轧制等热成形前的透热和工件的淬火、回火和退火等热处理，与传统的燃料加热和电阻加热相比具有高效、节能、环保和产品质量稳定等优点。

我公司在原有感应加热技术和装置的基础上，为马鞍山钢铁股份有限公司承担的国家863项目“高速列车合金钢车轮的研究和开发”，成功地开发了非标DX-600kW/GW-1高速列车合金钢车轮感应热处理装置。目前我公司正在进一步开发适用于大型和异形铸锻件的感应热处理技术和装备，旨在找出规律解决异型工件的特殊热处理问题。

公司先后为下列国内外企业定制专用设备：江苏凡力

The induction through-heating and heat-treatment process lines developed by our company, are mainly used for the through-heating of billets before their hot forming (e.g. forging, extruding and rolling etc.) and the heat treatment of workpieces (e.g. hardening, tempering and annealing etc.), and are of the advantages of high efficiency, energy-saving, environment protection and stable product quality, compared with fuel heating and resistance heating.

Based on the available induction heating technologies and installations, we have successfully developed non-standard DX-600kW/GW-1 "Induction heat treatment installation for the alloy steel wheel of high speed train", for the 863 state project "Research and development on the alloy steel wheel of high speed train" undertaken by the Maanshan Iron & Steel Co., Ltd. At present, our company is advancing the development of the induction heat treatment technologies and equipment for large and abnormal-shape forgings and castings in order to find idea solutions for their special heat treatment problems.

The main customized installations made by our company for users at home and abroad are: 4 GR series OCTG(Oil Country Tubular Goods)

与以往采用燃气加热和燃油加热相比，采用中频感应加热对石油专用管进行热处理有如下优点：

1. 可快速、方便地开机和停机，炉衬热容量小，开机后可立即投入运行。
2. 加热速度快：感应加热利用电磁感应效应在工件内部产生涡流加热工件，属于金属内部直接加热，升温速度很快，加热时间仅2-3分钟，而燃气、燃油炉是靠炉内温度传导、辐射从工件外表传到工件内部，所以升温速度很慢，在炉内加热要一个多小时。
3. 温度容易控制，工件温度均匀度好：振吴公司的感应加热热处理自动线，采用双色红外测温仪并反馈给中频电源自动调节中频电源功率，组成闭环温控系统，工件横截面心表间温差和纵向温差小。
4. 加热效率高：由于加热速度快、辐射散热损失少、

For OCTG heat-treatment, MF induction heating has following advantages, compared with traditionary gas heating and oil heating:

1. Rapid and convenient starting and stopping, lining with small heat capacity, immediate operation after start;
2. Quick heating: induction heating using electromagnetic induction effects generates eddy current inside workpiece, direct and fast heating within 2-3 minutes, while gas and oil heating heats workpieces from outside through conduction and radiation, very slow in more than 1 hour;
3. Easy to control temperature and better temperature uniformity of heated workpiece, smaller core-surface temperature difference in the cross-section and smaller longitudinal temperature difference;

钢管有限公司、无锡西姆莱斯石油专用管制造有限公司以及辽阳西姆莱斯石油专用管制造有限公司的4条GR系列石油专用管热处理自动线；大庆油田益朗斯特石油专用管制造有限公司的多条Φ139.7mm钢管调质线及API油管端部加热、圆钢连续加热穿孔设备；常熟华新金属工业品有限公司400系列不锈钢36MN挤压生产线感应加热系统；上述马钢的“高速列车合金钢车轮”的热处理技术和设备；北京钢铁研究总院新冶高科集团有限公司的2条圆钢调质线；印尼PC钢棒热处理生产线。

公司的变频感应加热系统采用双色红外测温仪监测工件温度，可自动调节电源功率，组成闭环控制系统，可将工件温度控制在工艺允许的误差范围内。

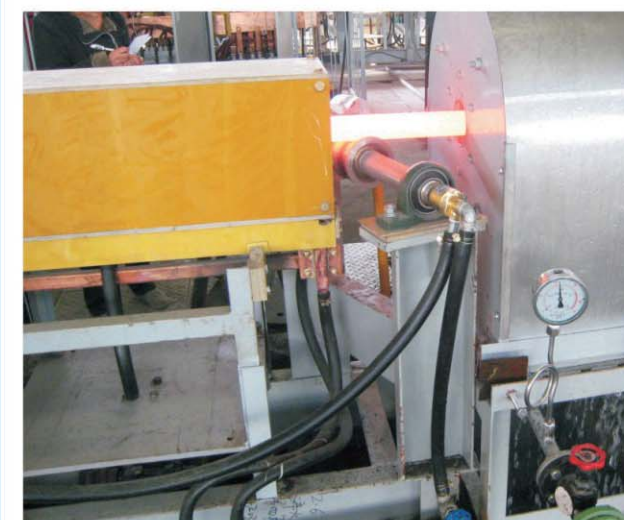
induction heat treatment automatic process lines for Jiangsu Fanli Steel Pipe Co., Ltd., Wuxi Seamless Oil Pipe Co., Ltd. and Liaoyang Seamless Oil Pipe Co., Ltd.; the induction quenching and tempering automatic process lines for Φ139.7mm steel pipes and the installations for heating and thickening the end of API petroleum pipe and for heating and boring steel rod, for the Daqing Yilang Site OCTG Co., Ltd.; the induction heating system for the 36MN extruding production line of 400 series stainless steel, for the Changshu Walsin Metal Industrial Products Co., Ltd.; the heat treatment technologies and equipment for the above-mentioned Ma Steel's high speed train alloy steel wheel; 2 induction quenching and tempering lines for round steel, for the New Metallurgy High Tech Group Co., Ltd. of the Beijing Iron & Steel Research Institute; the PC steel rod heat treatment production line for Indonesia.

In our induction heating systems, two color infrared thermodector is adopted for monitoring workpiece temperature and power can be automatically regulated in the form of closed-loop control model, and then the workpiece temperature may be controlled within technological tolerance.

可随时开机和关机，热量损失很少，能耗低，属节能加热。

5. 表面质量好，成本低：感应加热速度快，产品氧化皮很少，表面质量好。根据现场实测，圆钢在斜底燃气炉内加热氧化皮损耗≥2%，而采用感应加热却不到0.2%。
6. 质量稳定，变形小：由于快速加热、加热时间短，使晶粒细化并让小颗粒碳化物均匀分布在细晶粒索氏体中，这有利于提高工件的抗腐蚀性和韧性。这种加热方法能消除热轧中夹杂物引起的带状组织，使纵向横向性能一致，工件变形很小，可节省矫直机。
7. 环保：燃气加热有大量的CO₂气体排放，造成环境温室效应，工作时有大量辐射热，操作工劳动强度大；感应加热无有害气体排放，工作环境安静、清洁。

4. Higher heating efficiency, less heat loss, lower energy consumption;
5. Better surface quality, lower cost, scale losses ≥ 2% for gas heating but ≤ 0.2% for induction heating
6. Stable quality and less deformation, tinier grain, fine carbide particles evenly distributed in sorbite, improve the corrosion resistance and toughness, consistent performance in the vertical and horizontal directions;
7. Environment protection, no harmful gas emission, quiet and clean working environment for induction heating; but a lot of CO₂ emission, strong heat radiation and hard work for gas heating.



我公司生产的采用IGBT和MOSFET的高频电源设备有下列特点：

1. 采用成熟的串并联拓扑，可靠性、稳定性见长；
2. 全数字可编程控制线路，防干扰性好；
3. 用户可选数据记录与异地联网功能；

The IGBT/MOSEET high frequency power supplies made by our company have following features:

1. Adopt sophisticated series/parallel topology and have good reliability and stability;
2. The fully digital programmable control circuit with strong anti-interference ability;

4. 可选用WINCC7的画面风格；
5. 主要部件全部采用INFINEON和IR原装器件；
6. 较低价格和良好的售后服务。

3. User selectable data logging and remote networking functions;
4. Optional WINCC7 style interface;
5. Major parts all use original INFINEON and IR components;
6. Low price and great service.

电磁感应炉渣熔炼炉

Electromagnetic Induction Slag Melting Furnace



电磁感应炉渣熔炼炉是高效利用高炉、矿热炉等的熔渣显热，一步法生产岩棉工艺的理想熔炼炉。我公司最近开发的双热渣电磁感应高炉渣熔炼炉组是与采用该生产工艺的，年产量为10000~80000t/y岩棉生产线配套的关键设备。

炉料以1200℃高炉渣为主（约占50%~90%），配以10%~50%的玄武石、白云石和萤石等矿石料。炉料在炉内经加热、熔化、成分调整、搅拌和保温后获得温度恒定（如1550℃）、成分均匀且符合规定要求的熔渣，供出炉制成岩棉。

该熔炼炉由采用感应加热的炉体、基架、立柱、可升降旋转炉盖、感应体组、旋转搅拌装置、超高功率变频电源、控制系统和闭式水冷系统等组成。控制系统采用工控机和PLC等。

The electromagnetic induction slag melting furnace is an ideal melting furnace for efficiently utilizing the sensible heat of molten slag from blast furnace and submerged arc furnace etc., to produce rock wool by "One step process". The dual-hot-slag electromagnetic induction melting furnace set for blast furnace slag, recently developed by our company, are key equipment matching 10000~80000t/y rock wool production line by the use of the technology.

About 50%~90% charge is 1200℃ molten slag from blast furnace and others are ores such as basalt, dolomite, fluorspar and so on. In the melting furnace, the charge is heated, melted, composition-regulated, stirred and held, and then the molten slag with constant temperature (e.g. 1550℃) and specified composition is tapped to make rock wool.

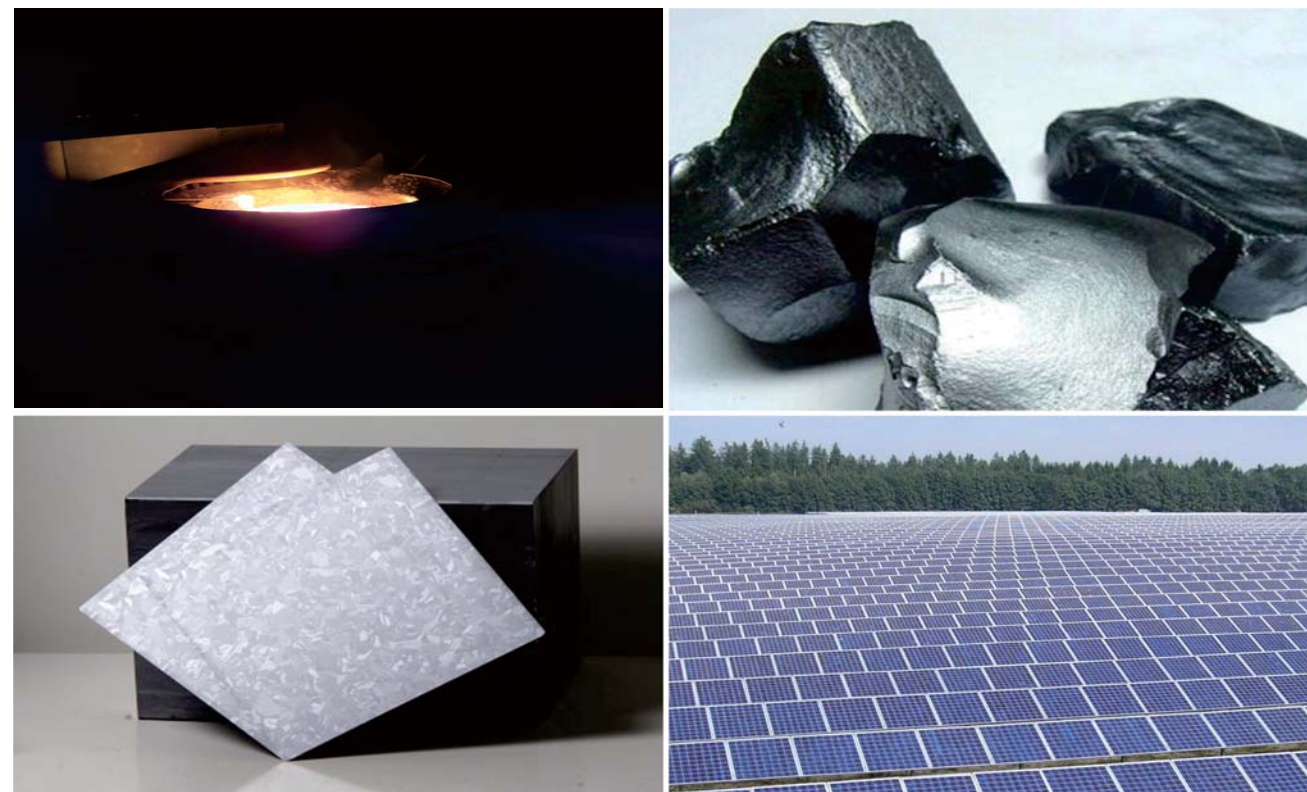
The melting furnace consists of furnace body using induction heating, base frame, mast, furnace cover and its lifting and rotary mechanism, induced bodies, rotary stirrer, ultra high power frequency conversion power supply, control system and closed water-cooling system etc. The control system adopts IPC and PLC.

该熔炼炉的特点：

- 1.热效率高、能耗低，与冲天炉岩棉生产工艺相比，每吨可节能60%以上；
- 2.采用大功率感应加热，升温速度快，生产率高；
- 3.炉料适应面广，熔渣的成分和温度可根据需要方便调整，渣池温度上限可达1700℃；
- 4.熔渣质量高，机械和电磁搅拌确保熔渣成分均匀，采用感应加热无焦炭炉灰等杂质污染；
- 5.特殊的底漏出渣口设计确保流量准确、启闭方便，不浪费熔渣，生产过程中废渣量少；
- 6.综合生产成本低，对环境污染少。

The features of the melting furnace:

- 1.Higher thermal efficiency, lower energy consumption, save more than 60% energy each ton, compared with the rock wool production process by cupola;
- 2.Adopt high power induction heating, fast temperature rising, high productivity;
- 3.Wider choices of applicable charge, easy to regulate the composition and temperature of molten slag as required, the maximum temperature of slag bath can reach 1700℃;
- 4.High molten slag quality, mechanical and electromagnetic stirring make the molten slag composition more uniform, there is no impurity contamination such as furnace ash from coke by using induction heating;
- 5.Special design for molten slag bottom taphole ensures the accuracy of flow rate, easy opening and closing, and no molten slag losses, and there is less waste slag during the whole production period.
- 6.Lower comprehensive production cost and less pollution to environment.



中频电磁感应熔硅炉

MF Electromagnetic Induction Silicon Melting Furnace

我公司开发的额定容量达1t~8t的多功能中频熔硅炉是采用冶金法和感应加热将工业硅进行熔化和提纯以生产太阳能级多晶硅的关键工艺装备。该炉的炉体结构和机电附属设备类似中频无芯感应熔炼炉。

该炉由额定频率为250~1000Hz，额定功率为300~3000kW的变频电源供电，与采用电阻加热、电子

束加热和等离子体加热的相应熔硅炉相比具有下列特点：

1. 多晶硅产品质量好，较少受污染；
2. 产量大，生产率高；
3. 感应加热技术和变频电源较成熟；
4. 设备较电子束熔炉和等离子体熔炉简单。

The MF multi-function silicon melting furnaces with 1t~8t rated capacity, is a key technological equipment in which industrial silicon is melted and purified by metallurgical method and induction heating, to produce solar grade polycrystalline silicon. Its furnace body and mechanical/electrical auxiliaries are similar to MF coreless induction melting furnace.

The furnaces are powered by the frequency conversion power supplies with rated frequency of 250~1000Hz and rated power

of 300~3000kW and are of following features compared with the silicon melting furnaces using resistance heating, electron beam heating or plasma heating:

1. Good product quality, less polluted;
2. Large output and higher productivity;
3. Induction heating technology and frequency conversion power supply are maturer;
4. Equipment is simpler than the silicon melting furnaces using electron beam heating and plasma heating.