北京宏榫科技有限公司
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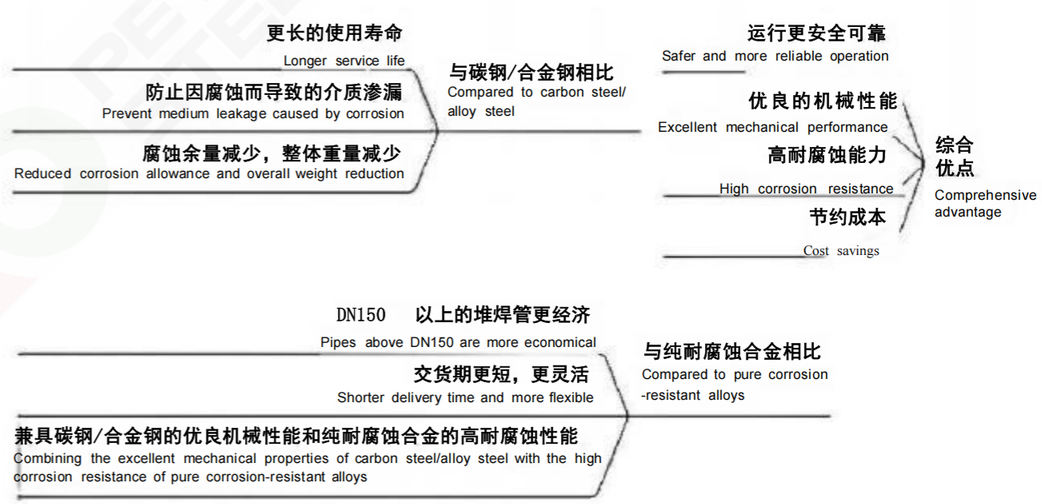


堆焊工艺 WELDING PROCESS

堆焊是指在耐腐蚀或者耐磨损等性能较差的金属材料表面熔敷一层耐腐蚀或耐磨损等性能优异的金属材料的焊接工艺。例如在碳锰钢或者低合金钢母材上堆焊不锈钢或镍基合金，使之具备碳锰钢或者低合金钢优良的机械性能和耐腐蚀合金优良的耐腐蚀性能，同时相比全部采用不锈钢或镍基合金的成本大为降低。PESCO使用全自动堆焊设备，焊接方法为热丝TIG焊（也称为钨电极惰性气体保护焊（ GTAW)), 焊接工艺符合ASME IX,NACE MR0175,API 6A及API 5LD的相关要求，可满足不同客户对于不同Fe稀释率的要求。

Weld overlay refers to the welding process of depositing a layer of metal material with excellent corrosion resistance or wear resistance on the surface of metal materials with poor corrosion resistance or wear resistance.For example,welding stainless steel or nickel based-alloys onto carbon manganese steel or low-alloy steel base materials to achieve excellent mechanical properties and corrosion resistance of carbon manganese steel or low-alloy steel,while significantly reducing the cost compared to using only stainless steel or nickel based alloys. PESCO usefully automatic weld overlay cladding equipment,and the welding method is hot wire TIG welding (also known as tungsten inert gas welding(GTAW).The welding process complies with the relevant requirements of ASMEIX, NACE MR0175, AP16A, DNV-0S-F101 and API 5LD, which can meet the requirements of different customers for different Fe dilution rates.

技术特点 TECHNICAL FEATURES



堆焊产品介绍 INTRODUCTION TO WELD OVERLAY PRODUCTS

PESCO 以成熟的工艺和先进的装备可为客户提供多种合金、苛刻工况下使用寿命更长、耐腐蚀及耐磨损可靠性更高、成本有效降低的全套堆焊解决方案，主要堆焊产品如下：

PESCO, with mature technology and advanced equipment,can provide customers with complete welding solutions for various alloys,longer service ife under harsh working conditions,higher corrosion and wear resistance reliabilty and effective cost reduction.The main welding products are as follows:



堆焊管道

最小壁厚：6mm　最小内径：40mm

长度范围：6-12M 基管类型：无缝或焊接

执行标准：API 5LD,SY/T 6623

CLAD PIPE

Minimum wall thickness:6mm Minimum inner diameter:40mm

Length range:6-12 meters Base pipe type:seamless or welded

Execution standards:API 5LD,SY/T 6623



堆焊管件

产品种类：弯头、三通、异径管、锻件等

最小外径：60.3mm　最小壁厚：7mm

执行标准：ASME B16.9

WELD OVERLAY PIPE FITTINGS

Product types:elbow,tee,reducer,forging,etc

Minimum outer diameter:60.3mm Minimum wall thickness:7mm

Execution standard:ASME B16.9



堆焊弯管

最小壁厚：7mm　最小内径：88.9mm

弯曲半径：**R≥3D** 基管类型：无缝管

执行标准：**API5LD** 弯制类型：冷弯、热弯

标准：API5LD，**ANSI**B16.49.IS015590-1

CLAD BEND

Minimum wall thickness:7mm Minimum inner diameter:88.9mm

Bending radius:R≥3D Base pipe type:seamless pipe or welded

Execution standard:API5LD Bending type:cold bending,hot bending

Standard:API5LDANSIB16.49ISO15590-1



堆焊法兰

最小内径：**40mm**

最小壁厚：**7mm**

执行标准：ASME B16.5、**ASMEB**16.47、API6A、API17D

WELD OVERLAY FLANGE

Minimum inner diameter:40mm

Minimum wall thickness:7mm

Execution standards:ASME B16.5 ASMEB16.47、API6A、AP117D

产品制造能力

PRODUCT MANUFACTURING CAPABILITY

公司建设有装备齐全的专业化堆焊车间，目前拥有卧式堆焊机、立式堆焊机等各种型号智能化设备50余台，可承接各种型号、壁厚的直管、弯管、弯头、三通及异形件的一次性堆焊成型。此外，公司还建设有30000平米的生产车间，拥有型号齐全的中频液压弯管机组、中频液压弯头机组，系列压力机，大型整套热处理炉，高等级双环氧粉末防腐生产线，1500多套成型模具和先进的生产辅助设备。

PESCO has a fully equipped specialized welding overlay workshop. Currently the workshop has more than 50 types of intelligent equipment such as horizontal and vertical welding machines,and can undertake one-time welding forming of various types and wall thicknesses of pipes, bends,elbows,tees,and irregular parts. In addition,the company also has a production workshop of 30000 square meters,equipped with a complete range of hot induction bending equipment, intermediate frequency hydraulic bending equipment, a series of press machines,a large complete set of heat treatment furnaces, a high-grade double epoxy powder anti corrosion production line,more than 1500 sets of fitting molds,

and advanced production auxiliary equipment.



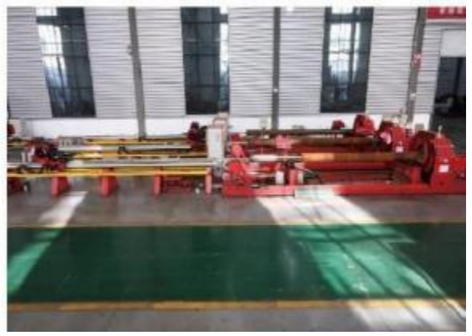
堆焊车间
Weld overlay workshop



智能化立式堆焊装备
Intelligent vertical welding equipment



智能化卧式堆焊装备
Intelligent horizontal welding equipment

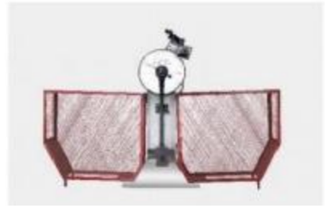


智能化直管堆焊装备
Intelligent pipe welding overlay equipment

PETROL STEEL CO.,LTD. (PESCO) is a national high-tech enterprise enterprise dedicated to the research and development, manufacturing, storage and transportation,service,and international trade of high-end pressure pipeline core components. PESCO's special steel pipes, fittings, flanges, clad pipes, fittings, and flanges, clad piping spools, and steel insulation pipe fittings are widely used in industries such as petroleum, petrochemicals, natural gas, heating, and water conservancy. PetroChina, Sinopec, CNOOC, National Pipeline Network Group, provincial energy groups, arge urban centralized heating and urban water supply construction groups are key customer groups for our company's service cooperation. After 15 years of unremitting efforts, it has finally been at the forefront of industry development with strong comprehensive strength.



布维硬度计
Bouvet hardness tester



冲击试验机
Impact testing machine



电动拉床
Electric Pulling Bed

缺口投影仪
Gap projector



WAW-1000液压万能试验机
WAW-1000 Hydraulic Universal Testing Machine



明暗场电子显微镜
Bright dark field electron microscope



火花直读光谱仪
Spark direct reading spectrometer



WEW-600A 液压万能试验机
WEW-600A Hydraulic UniversalTesting Machine



电子万能试验机
Electronic universaltesting machine



摆锤冲击试验机
Pendulum impact testing machine

质量保障
QUALITY ASSURANCE

检测能力：公司拥有独立的实验检测中心，具备国家级的CNAS实验室和独立第三方检测机构（ CMA） 资质，拥有100余台（套）各类检测设备和20多位持证的试验检验人员，能够独立承揽金属材料及制品化学成分、力学性能、金相、晶间腐蚀、点蚀、SCC、SSC、HIC等腐蚀试验，可按照相关要求独立、客观、准确开展试验和检验工作并出具报告。

Testing capability: PESCO has an independent experimental testing center,with CNAS laboratory and independent third-party testing organization (CMA) qualifications.It has more than 100 sets of various testing equipment and more than 20 certified testing and inspection personnel.t can independently undertake corrosion tests for metal materials,including chemical composition,mechanical properties, metallography, inter-granular corrosion,pitting corrosion,SCC,SSC,HIC,etc.It can independently,objectively,and accurately carry out testing and inspection work according to relevant requirements and issue reports.


检 测 报 告


检 测 报 告



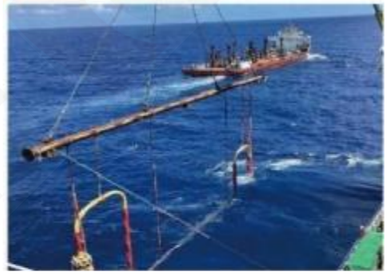
参与国家重大工程项目

PARTICIPATE IN MAJOR NATIONAL ENGINEERING PROJECTS

国家首个重大超深水油气开发工程
“深海一号”陵水17-2深海气田开发工程项目

The CHINA first major deepwater gas field development project:Deep Sea No.1 LS17-2 Deepwater Gas Field Development Project









陵水17-2气田开发工程项目是中海油加大国内油气勘探开发力度，保障国家能源安全的重点项目，探明地质储量超千亿立方米，该气田开发工程项目总投资238.15亿元，是我国首个水深超过1500米的深海油气开发项目。PESCO于2019年中标该项目 水下PLET、PLR和JUMPER所有的碳钢管、碳钢弯管、碳钢锻件/法 兰以及堆焊复合管、堆焊复合弯管、堆焊锻件/法兰等产品，并于2021年1月份成功交付所有物资，为项目海管铺设争取了时间，得到了业主的一致好评。该项目于2021年6月投产，依托海上天然气管网大动脉每年为粤港琼等地供应30亿立方米深海天然气，可以满足大湾区四分之一的民生用气需求，助力粤港澳大湾区、海南自贸港建设，是我国整合全球优质资源，首次自主完成设计、建造和安装的大型深水项目，在我国深海工程发展史上具有里程碑式的意义。

The LS 17-2 gas field development project is a key project for CNOOC to increase domestic oil and gas exploration and development efforts and ensure national energy security.The proven geological reserves exceed 100 billion cubic meters.The total investment of this gas field development projectis 23.815 billion yuan,making it the frst deepwater oil and gas development project in China with a water depth exceeding 1500 meters. PESCO won the bid in 2019 for all carbon steel pipes,carbon steel bends,carbon steel forgings/flanges,as well as clad pipes,clad bends,clad forgings/flanges for the Subsea PLET,PLR,and JUMPER.In January 2021,all materials were successfully delivered,which bought time for the installation of the project's submarine pipeline and received unanimous praise from the owner.The projectwas put into operation in June 2021,relying on the main artery of the offshore natural gas pipeline network to supply 3 billion cubic meters of deep-sea natural gas to Guangdong,Hong Kong, Hainan and other places every year.It can meet a quater of the gas demand for peope's livelihoods in the Greater Bay Area and assist in the construction of the Guangdong Hong Kong Macao Greater Bay Area and Hainan Free Trade Port.It isthe first large-scale deepwater project n China to integrate high-quality global resources and complete design,construction and installation independently.

中国石油首个自主开发的特高含硫气田
铁山坡气田项目

CNPC first independently developed ultra-high sulfur gas field-Tieshanpo Gas Field Development Project.







铁山坡气田位于达州宣汉县及万源市境内，硫化氢最高含量16.59%，属于特高含硫气藏，是目前国内已投产硫化氢含量最高的整装气田。由于高含硫气藏地质成因及流体相态变化规律复杂、天然气具有强腐蚀性和剧毒性等特殊性，导致酸性气藏开发技术难度大，安全条件要求非常高，如何保障酸性气藏安全高效勘探开发，是当前国内外关注的重大技术难题。特高含硫气田地面集输系统材料的选材及整体腐蚀控制，是全球“卡脖子”技术难题，铁山坡气田首次大规模使用耐蚀合金双金属复合材料，腐蚀控制方面形成整体腐蚀控制新产品、新技术、新工艺并实现工程化，进一步提升了我国在特高含硫气田腐蚀防护领域的行业话语权。PESCO于2022 年4月份中标该项目DN150~DN300 **堆**焊复合弯管和堆焊法兰，并于2023年1月高质量如期交付所有物资，获得业主高度赞扬。该项目于2023年6月份在四川达州全面达产， 日产天然气**400万**立方米，并进入国家天然气管网源源不断输往长江经济带，将惠及2亿居民家庭，这标志着我国特高含硫气田开发关键核心技术实现新突破，开启了我国特高含硫气田跨越式发展的崭新里程碑。

The Tieshanpo gas field is located in xuanhan County and wanyuan City of Dazhou,with a maximum hydrogen sulfide content of 16.59%.It belongs to a very high sufur gas reservoir and is curently the most complete gas field with the highest hydrogen sulfide content in operation in China.Due to the complex geological origins and fluid phase changes of high sulfurgas reservoirs,as wellasthe strong corrosiveness and toxicity of natural gas,the development technology of acidicgas reservoirsis ificult and requires veryhigh safety conditions.Howto ensure the safe and efficient exploration and development of acidic gas reservoirs is a major technical challenge that is currently of concern both domestically and internationally.The selection of materials and overall corosion control for the surface gathering and transportation system ofultra-high sulfur gas fields is aglobal "bottleneck"technical problem.For thefirs ime,the Tieshanpo gasfield has extensively used corrosion-resistant alloy bimetalic composite materials,forming new products,technologies,and processes for overall corosion control and achieving engineering,further enhancing China's industry discourse power in the field of corrosion protection for ultra-high sulfur gas fields. PESCO won thee bid for the DN150~DN300 overlay composite bend pipe and overlayflange project in April2022,and deliveredall materials with high quality and on schedule in January 2023,receiving high praise from the owner.The projectwill reach full production in Dazhou,Sichuan in june 2023,witha daily output of 4 milion cubic meters of natural gas,and wil be continuously transported to the Yangtze River Economic Belt through the national natural gas pipeline network,benefiting 200 milion households.This marks a new breakthrough in key core technologies for the development of China's ultra-high sulfur gas fields.

主要客户
MAIN CUSTOMERS

中国石油 | Sinopec | CNOOC

British Petroleum P.L.C. BP Public limited company | Shell | Technip

Chevron | HNEC | CHEMCHINA

Mobil美孚 | BAKER HUGHES | KNPC

主要业绩
MAIN ACHIEVEMENTS

客户名称cuSTOMER NAME	项目PROJECT	产品PRODUCT
中国石油化工股份有限公司 Sinopec	普光气田 Puguang gas field	复合管、复合弯头、复合三通 Q245R+UNSN08825、L360QS+UNSN0882 Clad pipe,clad elbow,clad tee Q245R+UNSN08825、L360QS+UNSN0882
中国石化物资装备华东有限公司 Sinopec Materials &Equipments (East China)Co.,Ltd	普光分水岭项目 Pu Guang fenshuiling Project	堆焊复合管、堆焊复合弯管 L360QS+UNSN06625 Clad pipe,Clad bend L360QS+UNSN06625
海洋石油工程股份有限公司 COOEC	陵水17-2气田开发工程项目 Lingshui 17-2gas field development project	堆焊复合管、复合弯管、堆焊 Bulkhead、管件等 X65QO+UNSN06625、F65+UNSN06625 Clad pipe、Clad bend、Clad Bulkhead、Clad pipefitings,etc X65QO+UNSN06625、F65+UNSN06625
深圳海油工程水下技术有限公司 COOEC SUBSEA	流花29-2气田开发项目水下设施总包工程 Liuhua 29-2 gas field developmentt project	堆焊复合管、管件、冶金弯管、弯头、三通 、管帽 、法兰 、管座 、锚固件等 DNVGL 450FD+UNSN06625、F65+UNSN06625 Clad pipes,Clad fittings,Clad bends,Clad elbows,Clad tee,Clad caps,weld overlay flanges,weld overlay olets,weld overlay bulkhead DNVGL 450FD+UNSN06625、F65+UNSN06625
中石油塔里木分公司 PetroChina Tarim Branch	吐 孜 洛 克 气 田 Tuzilok gas field	复合管件L360+316L Clad fittings L360+316L
中国石油天然气第六建设公司制造厂 China Petroleum Natural Gas Sixth Construction Company Manufacturing Factory	荔湾3-1气田 Liwan 3-1 gas fileld	锻管、管道、管件16MnIII+316L20#+316L Weld overlay forging、pipes、fittings 16MNIII+316L20#+316L
中石化西北局 Northwest Bureau of Sinopec	中石油塔河油田 PetroChina Tahe Oifield	管件L360+316L Clad fitings L360+316L
甘肃蓝科高新装备股份有限公司 Gansu Lanke High-tech Equipment C.,Ltd.	精馏塔 Distille tower	复合 弯头20#+308L CLAD Elbow 20#+308L
上海石化机械制造有限公司 Shanghai Petrochemical Machinery Manufacturing Co.,Ltd.	俄气 Gazprom	法兰，盲板，管板SA-336F11C12+304L SA-105N+Monel 400 Flange,blind flange,tube sheets SA-336 F11 CL2+304L SA-105N+MONEL 400
美钻石油钻采系统(上海)有限公司 MSP(Shanghai)	中海油流花项目 CNOOC Liuhua projects	堆焊阀门部件4130+INCONEL625 Weld overlay Valve Parts 4130+inconel625
新加坡井河原株式会社 IGAWARA	巴油P-68 FPSO Petrobras P-68 FPSO	复合弯管、管道、法兰X65+UNSN06625 CLAD Bend,pipe,flange X65/F65+UNSN06625
四川石油物资实业发展有限公司 CNPC	MIS项 目 MIS Oil Field Resumption Project	复合管X65+UNSNO6625 Clad pipe X65+UNSN06625