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PETROLEUM TECHNOLOGY SERVICES

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公司介绍
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1.公司简介 Company Profile

淄博孚瑞特热能科技有限公司位于中国山东省淄博市，成立于1964年，占地面积245000平方米。公司一直致力于石油专用管及相关技术的研究与生产，是国内最早研究和生产隔热油管的厂家之一（始于1988年），是国内石油系统内第一家生产油管和套管的企业，具有悠久的历史和丰富的隔热油管及石油专用管生产经验。

ZIBO FREET THERMAL TECH CO., LTD is located in Zibo City, Shandong Province, China, it was founded in 1964, covers an area of 245000 square meters.The company has always been committed to the research and innovation of OCTG and related technologies, it is one of the earliest manufacturers to research and produce insulated tubing in China(began in 1988), as well as the first to manufacture tubing and casing within the domestic petroleum system,with a long history and rich experience in the production of insulated tubing and OCTG.

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2.企业资质 Enterprise Qualifications

美国石油学会API会标使用权和质量体系Q1认证

API Spec 5CT Product Certification and Q1 Quality System Certification

荷兰壳牌中国区唯一隔热油管产品认证。

The insulated tubing is the only one certified by Dutch Shell in China

ASME美国机械工程协会认证

ASME American Society of Mechanical Engineers certification

ISO 9001质量管理体系认证

ISO9001 Quality Management System Certification

ISO 14001环境管理体系认证

ISO14001 Environmental Management System Certification

ISO 45001职业健康安全管理体系认证

ISO 45001 Occupational Health and Safety Management System Certification

隔热管行业标准SY/T5324《预应力隔热油管》的主要起草单位

Main industry standard setter of SY/T5324 《Insulated tubing》

3.科研与专利 Research and Patent

公司始终致力于隔热油套管和非API系列石油套管的研发与生产，拥有30多项隔热管及石油专用管相关专利，其中包括5项发明专利；研发水平及生产能力处于国际先进、国内领先地位，创造多项行业第一。

最早生产高真空隔热油管的厂家之一

第一个生产隔热套管的厂家

第一个生产直连型隔热管的厂家

第一个生产气凝胶隔热油管的厂家

第一个生产隔热接箍的厂家

第一个生产全程无热点隔热管柱的厂家

The company focus on the development of insulated tubing&casing and non-API series OCTG.It has more than 30 patents for insulated tubing and OCTG, including 5 invention patents.Its research and production capabilities are leading domestically and at the international advanced level,it reates multiple industry firsts.

One of the earliest manufacturers of vacuum insulated tubing

The first to produce insulated casing

The first to produce flush insulated tubing

The first to produce aerogel insulated tubing

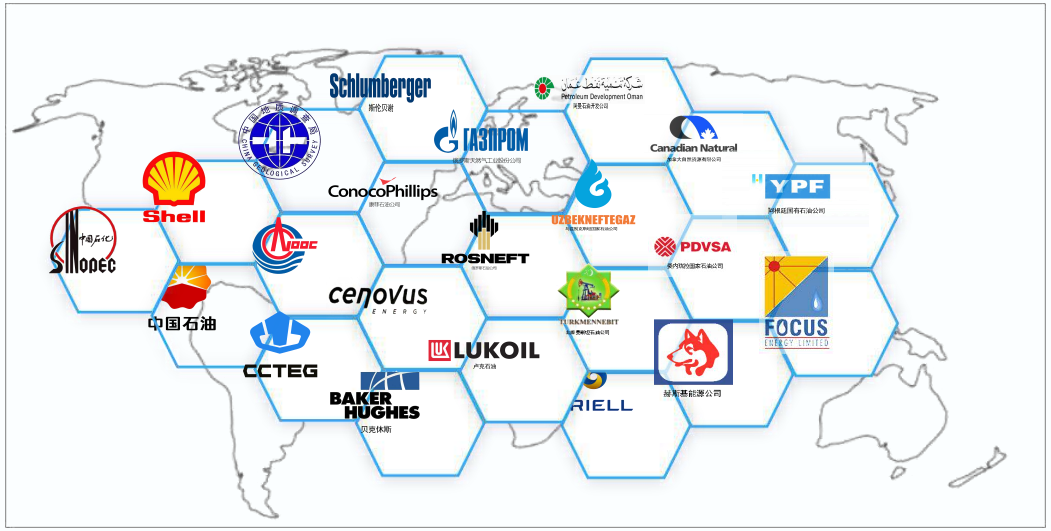
The first to produce insulated couplings

The first to produce “No hot point insulated tubing”

4.产品与市场 Products and Markets

公司是高新技术企业，可生产隔热油套管、API标准全系列油套管、非API系列油套管（特殊螺纹油套管、热采套管、耐蚀油套管等）、内涂层油管、内衬油管等多种产品，产品畅销国内各大油田、中深层地热能开发以及配套客户，国际市场远销30多个国家和地区。其中，隔热油套管是公司的主力产品，是国内领先、国际先进水平的隔热油管生产基地，年生产能力100万米/年，主要出口阿曼（阿曼PDO 100%隔热管市场份额）、加拿大等稠油资源丰富的国家。

The company is a high-tech enterprise that can produce insulated tubing&casing, full series of API standard tubing&casing, non-API tubing&casing (premium connections, thermal recovery casing, corrosion-resistant tubing&casing, etc.), inner coated tubing, inner lined tubing and other products. The products are sold well in major oil fields, mid to deep geothermal energy development and supporting customers in China, and are exported to more than 30 countries and regions in the international market.Among them, insulated tubing&casing is the main product of the company, which is a leading domestic and internationally advanced production base for insulated tubing&casing, with an annual production capacity of 1 million meters,mainly exported to countries with heavy oil resources such as Oman (with 100% market share of PDO) and Canada,etc.



02

主要产品介绍
Main Products Introduction

- 生产能力
- Manufacturing Capacity

- 主要产品
- Main Products

- 隔热油套管
- Insulated Tubing&Casing

- 特殊螺纹油套管
- Premium Tubing&Casing

1.生产能力 Manufacturing Capacity

生产线Production lines

生产线 Production line	数量 Quantity	规格范围 Specification range	年加工能力 Annual capacity
隔热油管/隔热套管VIT&VIC	2	Φ73-Φ245mm	1,000,000 meters
油管 Tubing	4	Φ48.3-Φ114.3mm	120,000 tons
套管 Casing	5	Φ114.3-Φ508mm	200,000 tons
接箍 Coupling	3	Φ48.3-Φ508mm	1,500,000 pcs
热处理 Heat treatment	2	Φ48.3-Φ273mm	150,000 tons
墩粗 Pipe end upsetting	4	Φ48.3-Φ114.3mm	60,000 tons
内涂层/内衬 Internal anti-corrosion and wear-resistant	1	Φ48.3-Φ114.3mm	1,000,000 meters





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2.主要产品 Main products

隔热油套管
Insulated tubing&casing

- 高真空隔热油套管
- VIT&VIC
- 气凝胶隔热油套管
- AIT&AIC
- 无热点隔热油套管
- No hot point insulated tubing&casing
- 降粘保温油管
- Viscosity reducing insulated tubing
- 地热保温管
- Geothermal insulated tubing

油套管
Tubing&casing

- API 5CT标准油套管及接箍
- API Spec 5CT tubing&casing&coupling
- 俄标Gost油套管及接箍
- Gost standard tubing&casing&coupling
- 内衬油管
- Inner lined tubing（UHMWPE）
- 内涂层油套管
- Internal coating tubing&casing
- 应变设计热采套管
- Strain design thermal recovery casing

特殊螺纹油套管
Premium connections

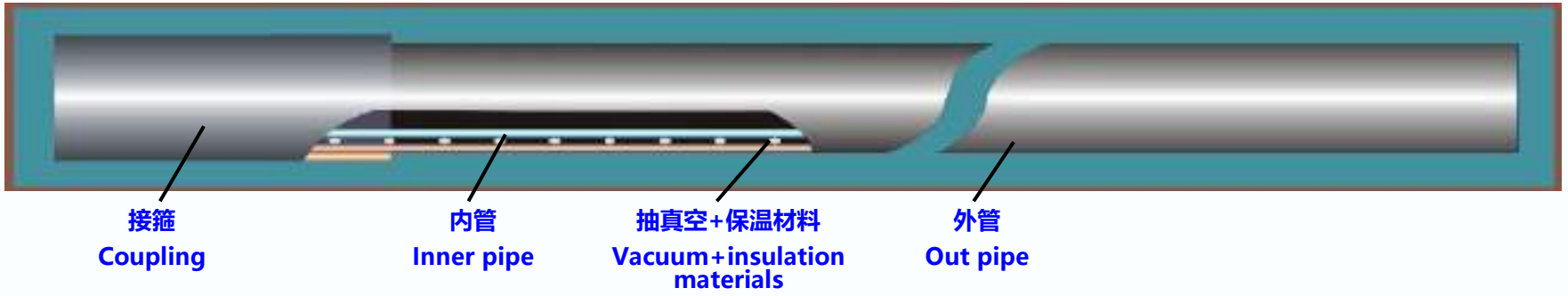
- 接箍式 Coupling Joint
  STJ-SN、STJ-ST、STJ-BS、SLF-HT、JIP，etc.
- 直连式 Flush Joint
  SLF-NF1、SLF-FJ、SLF-SFJ，etc.

3.隔热油套管 Insulated Tubing&Casing

（1）概述 Overview

隔热油套管为双层同心管柱，一般由内管、外管、隔热层、连接螺纹等组成。内管和外管之间的环形空间通过充填多层隔热材料、抽真空等隔热技术形成隔热层，综合应用了抽真空、热反射、热对流阻断三大隔热技术，使隔热油套管具有优越的隔热保温性能。公司自1988年开始研发生产隔热油套管，是国内最早生产隔热油套管的厂家，经过多年的研发积累，形成了高真空隔热油套管、气凝胶隔热油套管、地热专用隔热保温管、油田采油用降粘保温油管以及全程无热点隔热管柱等隔热保温产品系列；广泛应用于稠油开采的“蒸汽驱”、“蒸汽吞吐”、“注采一体化”和地热能源开发的“干热岩”、“中深层同井换热”以及油田“保温采油及输送”等领域。

The insulated tubing&casing is a double-layer concentric structure, generally composed of inner pipe,outer pipe,insulation layer,connecting thread, etc.The annular space between the inner and outer pipes is formed by filling multiple layers of insulation materials and using insulation techniques such as vacuum to create an insulation layer. The comprehensive application of three insulation techniques, vacuum, heat reflection, and heat convection blocking, enables the insulated tubing&casing to have superior insulation performance. Since 1988, the company has begun to produce and develop thermal insulation oil casing, which is the first manufacturer of insulated tubing&casing in China. After years of research and development, the company has formed a series of thermal insulation products, such as high vacuum insulated tubing&casing, aerogel insulated tubing&casing, geothermal insulated pipe, oil recovery insulated tubing, and no-hotspot insulaed tubing.The products are widely used in the fields of "Steam Assisted Gravity Drainage,(SAGD)"、"Steam Huff and Puff" and "Injection Production Integration" for heavy oil recovery, "Hot Dry Rock Geothermal Energy" 、 "Mid-deep Geothermal Well Coaxial Heat Exchange"for geothermal energy development,and "Oil Extraction and Transportation" etc.



3.隔热油套管 Insulated Tubing&Casing

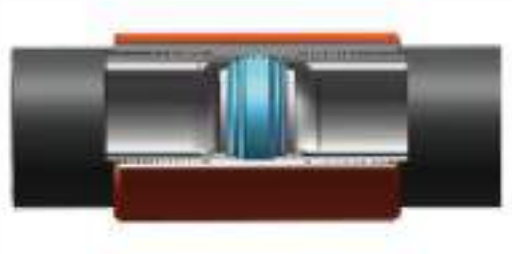
（2）隔热接箍及无热点隔热管 Insulaed Coupling&No-Hotspot Insulaed Tubing

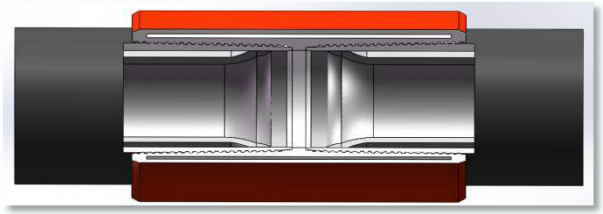
隔热油管一般通过接箍连接在一起，接箍的长度与隔热管的长度相比要小得多，接箍的热损失往往被忽略，但研究表明，接箍连接处的热损失是整个隔热油管管柱热损失的主要部分，且接箍连接处的热损失占管柱热损失的比例随着隔热管隔热等级的提高而增大，当隔热管隔热等级由A级提高到E级时，接箍处散热比例占总管柱热损失由13%增加至74%左右。

因此，公司对传统接箍的结构进行技术改进，研发了一种隔热效果好、施工方便且可靠耐用的隔热接箍，并在此基础上，进一步开发了基于隔热接箍连接的“无热点损失的隔热管柱”，降低了接箍连接处的热损失，提高了整个管管柱的隔热性能。

Generally,insulated pipes are connected by couplings,the length of the coupling is much smaller than the insulated pipe,the heat loss of the coupling is often ignored,however, many studies show that,the heat loss of the couplings is the main heat loss of the whole insulated tubing string,and the proportion increases with the improvement of insulation level,When the insulation grade of the insulated pipe is increased from A to E, the proportion of heat dissipation at the couplings to the heat loss of the whole insulated tubing string increases from 13% to about 74%.

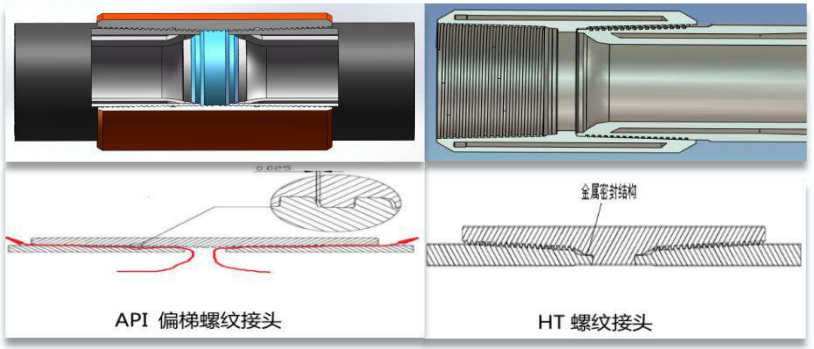
Therefore,the company has made technological improvements on the basis of traditional couplings,and developed the insulated coupling, which has the characteristics of good insulation,easy operation,durable and stable.And further developed the"No hotspot Insulaed Pipes",which is based on the insulated coupling,to reduce the heat loss at the coupling connection and improving the insulation performance of the insulated tubing string.





3.隔热油套管 Insulated Tubing&Casing

（2）隔热接箍及无热点隔热管 Insulaed Coupling&No-Hotspot Insulaed Tubing



无热点隔热管柱的特点：

隔热管的螺纹连接段以及连接接箍均采用双层结构+隔热层设计，使管柱连接段的隔热层与管柱的隔热层重叠，从而实现管柱的全程隔热保温；同时，管柱采用气密封螺纹连接，彻底解决了API 螺纹密封性能差、使用聚四氟材料辅助密封的可靠性差等问题，提高了管柱连接的便利性和可靠性，延长了管柱的使用寿命。

Characteristics:

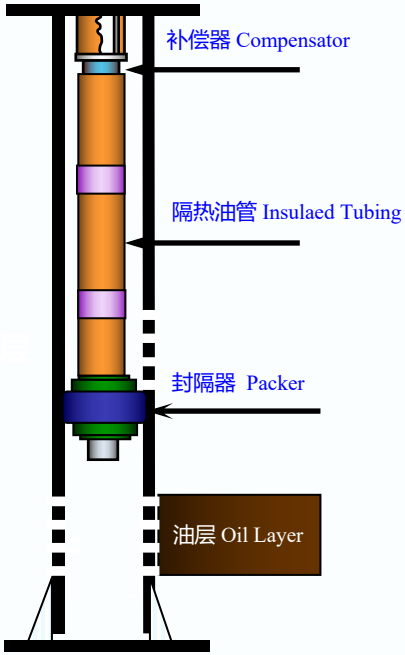
The connection section or couplings of the insulated tubing are designed with a double-layer structure and insulation layer, so that the insulation layer of the connection section overlaps with the insulation layer of the pipes, thereby achieving full insulation and heat preservation of the tubing.At the same time, the tubing adopts premium connection, which completely solves the problems of poor sealing performance of API threads and poor reliability, improves the convenience and reliability of tubing, and extends the service life of the tubing.

常规隔热管与无热点隔热管的隔热性能对比
Comparison of insulated performance between Conventional insulated tubing No-Hotspot Insulaed Tubing

产品类型 Product Type	内部温度℃ Internal Temperature	油管外壁最高温度℃ Max.Temperature of the Outer Wall of Tubing	接箍外壁最高温度 ℃ Max.Temperature of the Outer Wall of Coupling	加热功率w Power	油管导热系数 W/（m.℃） Conductivity of Tubing	接箍导热系数 W/（m.℃） Conductivity of Coupling
常规隔热管 Conventional insulated tubing	349.9	53.8	150	130.2	0.0112	0.381
无热点隔热管 No-Hotspot Insulaed Tubing	349.8	36.9	56.2	78.4	0.0064	0.0168

3.隔热油套管 Insulated Tubing&Casing

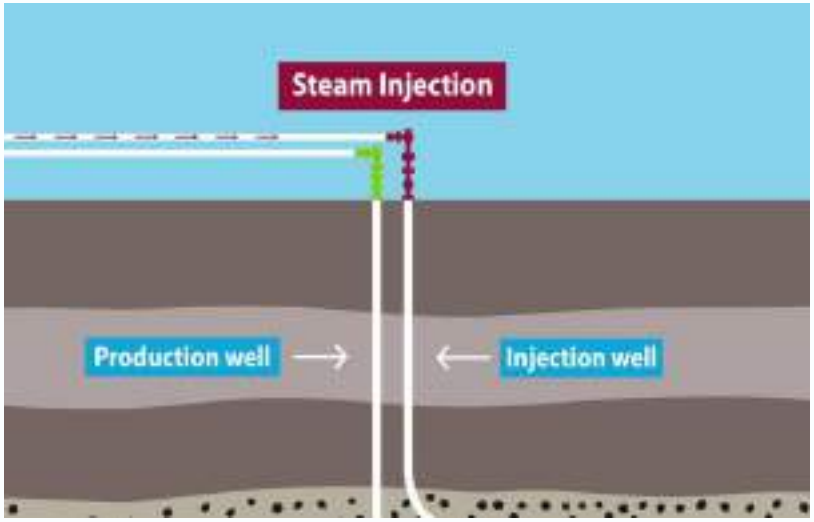
（3）典型应用- Typical Applications

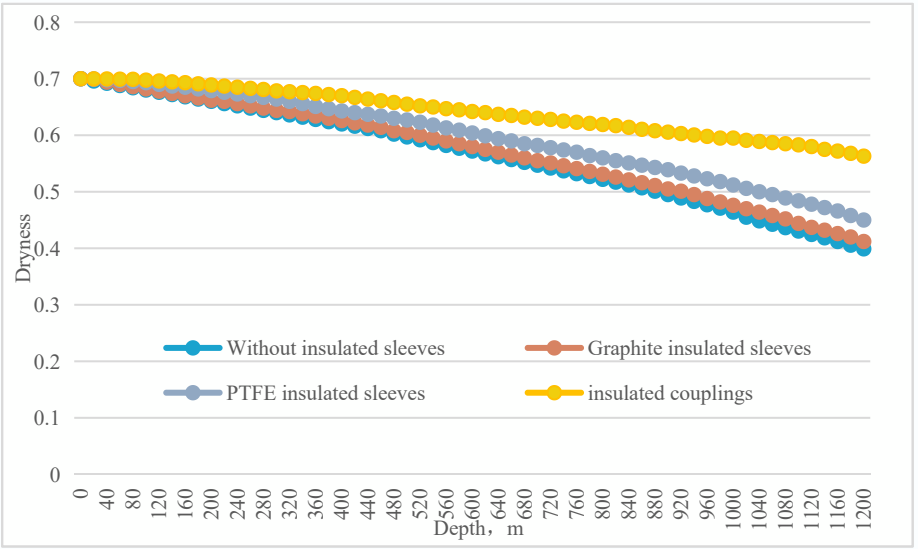


➢ 稠油热采- Heavy Oil Thermal Recovery

稠油注汽开采工艺是将高温高压蒸汽注入到稠油储层中，通过蒸汽的热量和压力作用，降低原油的粘度，使之能够顺利流动，从而增加原油产量。隔热油管是影响注汽热效率和开发效益的主要因素，公司的隔热油套管及无热点隔热管在中石化、中石油、中海油以及加拿大、阿曼等稠油区块获得广泛应用，年需求量超过50万米，现场应用表明，公司的无热点隔热管是目前隔热性能最好的隔热管产品。

The heavy oil steam injection process is to inject high-temperature and high-pressure steam into the heavy oil reservoir, and through the heat and pressure of the steam, reduce the viscosity of the oil, allowing it to flow smoothly, thereby increasing crude oil production.Insulated tubing is the main factor affecting the thermal efficiency and development benefits of steam injection.The non hot spot insulated tubing has been widely used in heavy oil blocks such as Sinopec, PetroChina, CNOOC, Canada, and Oman, with an annual demand of over 500,000 meters.Field applications have shown that the non hot spot insulated tubing is currently the best insulated product.





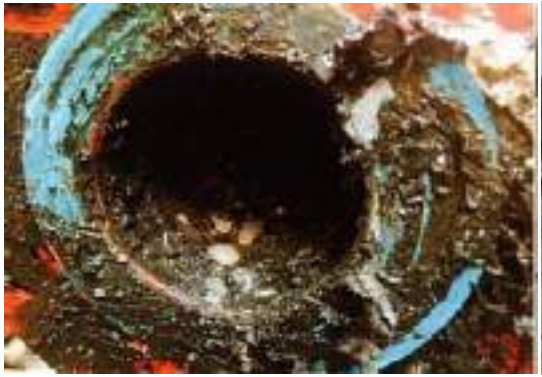
3.隔热油套管 Insulated Tubing&Casing

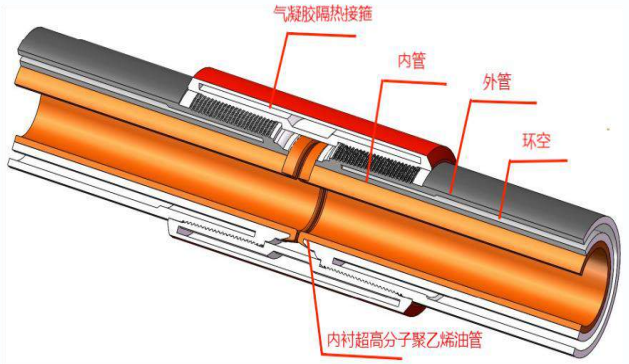
（3）典型应用- Typical Applications

➢ 保温采油 Thermal insulation oil recovery

原油流动性对温度敏感，当原油温度降低时,粘度急剧增加，原油的井筒流动性和集输流动性差，造成井筒结蜡、沉积堵塞等问题，直接影响井筒举升系统、地面集输系统的高效工作。公司利用自身技术及产品优势，研发了油田采油用保温管，可实现井筒的全程保温，提高举升过程中的原油温度，减少工艺措施投入和修井作业次数，保证原油生产与输送、降低能耗和生产成本。

The fluidity of oil is sensitive to temperature,when the temperature decreases,the viscosity increases sharply,resulting in poor wellbore and gathering fluidity of oil,causing problems such as wax deposition and blockage in the wellbore directly affecting the efficient operation of the wellbore lifting system and surface gathering system.The company has utilized its own technological and product advantages to develop insulated tubing for oil field production,which can achieve full insulation of the wellbore,increase the temperature of the crude oil during the lifting process,reduce the investment in process measures and the number of well repair operations,ensure the production and transportation of oil,and reduce energy consumption and production costs.

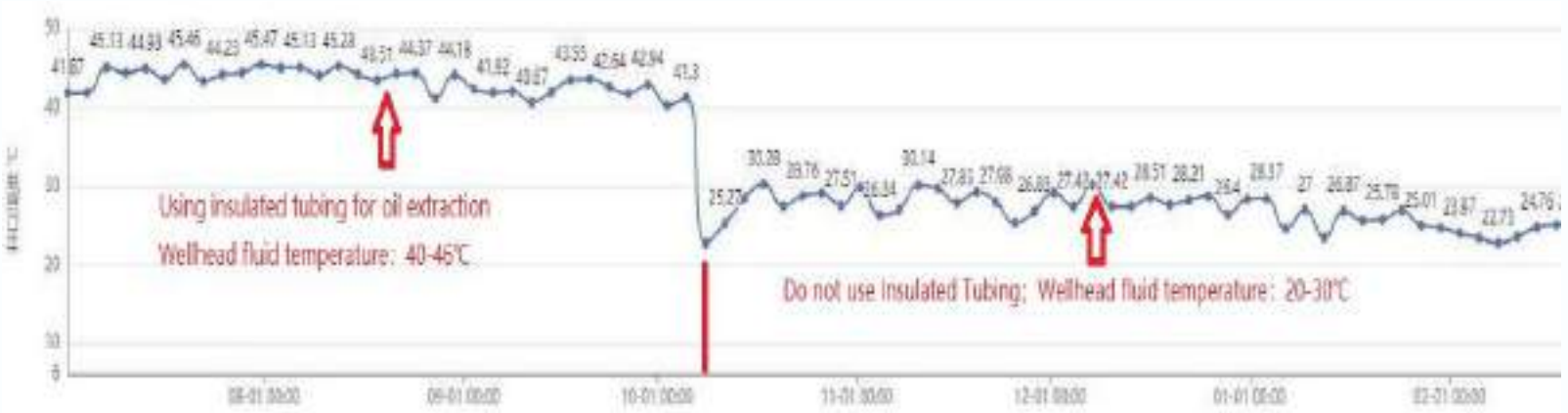




3.隔热油套管 Insulated Tubing&Casing

（3）典型应用- Typical Applications

➢ 保温采油的效果 Display of the effect of insulation oil recovery



Well No.	Specification	Depth	Daily production	Proportion of water	Reservoir temperature	Wellhead temperature
	mm	m	t/d	%	℃	℃
LQ9-P7	Do not use Insulated Tubing		20	97.5	47.97	33.6
	95×62	949.5	15.8	60.7	46.11	41.37
X132-X510	Do not use Insulated Tubing		28.8	95.59	103.1	16
	95×62	1850	15.2	80.9	96.4	70.7

3.隔热油套管 Insulated Tubing&Casing

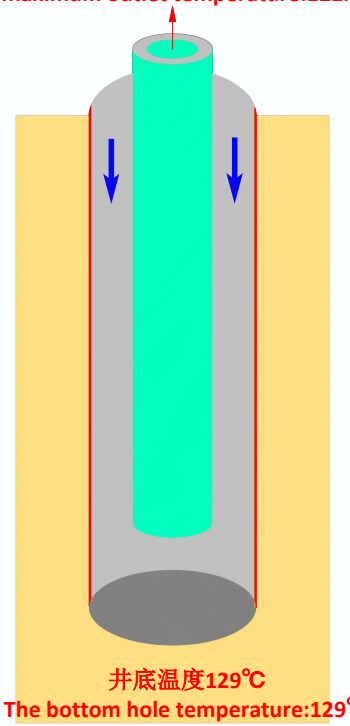
（3）典型应用- Typical Applications

➢ 中深层地热 Mid-deep Geothermal Energy

常规的“采水取热回灌”地热开发技术会引发地下水位的下降和地面沉降，存在回灌困难、地下水污染等问题，因此，零污染、零排放的“取热不取水”技术成为中深层地热能开发的主流模式。地热能从井底输送到地表过程中，管道内的流体不断向周围散热，热能利用效率低；公司针对“取热不取水”的实际需求开发了地热专用无热点隔热保温管，可显著降低管柱沿程的热量散失，大幅度提高地热井的出口温度和热能利用率；公司与中煤科工集团西安研究院、中科院广州能源研究所以及国内知名地热开发利用企业建立了战略合作关系，在陕西、山西、河北、贵州等地热开发的热点地区推广应用地热隔热保温管，每年应用超过50口井。

Conventional geothermal development technology of "water extraction and recharge" can cause a decrease in groundwater level and ground subsidence,resulting in difficulties in reinjection and groundwater pollution. Therefore,the zero pollution and zero emission "heat extraction without water extraction" technology has become the mainstream model for the geothermal energy.During the process circulating from the bottom to the surface,the fluid in the wellhole continuously dissipates heat to the surrounding, resulting in low thermal energy utilization efficiency.The company has developed a geothermal specific non hot spot insulated pipe to meet the actual demand of "heat extraction without water extraction",which can significantly reduce the heat loss along the pipe string and greatly improve the outlet temperature and thermal energy utilization rate.The company has established strategic cooperation relations with China Coal Technology Engineering Group Xi'an Research Institute,Guangzhou Energy Research Institute of Chinese Academy of Sciences and well-known domestic geothermal development enterprises, and has promoted the application of geothermal heat insulated pipes in Shaanxi,Shanxi,Hebei,Guizhou,etc. with more than 50 wells applied every year.

出口最高温度121.5℃
The maximum outlet temperature:121.5℃



井底温度129℃
The bottom hole temperature:129℃

单井同轴换热
Single-Well Well Coaxial Heat Exchange

单口地热井取热功率Extraction capacity of single well：860~1000kW

延米换热功率Exchange power per meter of depth：280~300W/m

单井供暖面积Heating area supplied by single well：2.7~3.0万m²

3.隔热油套管 Insulated Tubing&Casing

（3）典型应用- Typical Applications

➢ 干热岩地热 Dry Hot Rock Geothermal Energy

干热岩资源一般是指埋藏于距地表超过3km、温度180～650℃、内部不含或含较少流体、具有开发价值的异常高温岩体，是一种新兴战略能源。目前，开发干热岩资源的主要手段是：通过深井将高压水注入地下的人工储层内，使其通过渗透循环而吸收热能；再通过开采井将高温水、汽通过生产井抽出地表用于发电和综合利用；冷却后的水再次注入地下热交换系统循环使用，实现零排放、零污染、循环可持续性开发。公司的隔热管产品成功应用于青海共和盆地干热岩实验基地、河北唐山等干热岩试验井，进一步巩固了公司在国内隔热管市场的领先地位。

Dry hot rock (HDR) resources typically refer to the strategic and emerging energy source characterized by anomalously high-temperature rock formations buried at depths more than 3 kilometers below the Earth's surface, with temperatures ranging from 180 to 650°C, and containing little to no fluids, yet holding significant development value Currently, the primary method for exploiting HDR resources involves injecting high-pressure water into artificially created reservoirs deep underground via deep wells, allowing the water to circulate and absorb geothermal heat through permeation. Subsequently, the heated water and steam are extracted to the surface through production wells for power generation and comprehensive utilization. The cooled water is then reinjected into the underground heat exchange system for reuse, achieving a zero-emission, zero-pollution, and sustainable cycle of development. The company's thermal insulation tubing products have been successfully applied in the HDR experimental base in the Gonghe Basin of Qinghai Province and in experimental HDR wells in Tangshan, Hebei Province, further solidifying the company's leading position in the domestic insulated tubing market.

PASCAL®
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4.特殊螺纹油套管 Premium Tubing&Casing

公司根据市场需求和行业发展趋势，开发了一系列高性能的特殊螺纹油套管油套管产品，包括：STJ、JIP、HT、SLF等系列。产能达到10万吨/年，还具有丰富的耐腐蚀油套管生产经验，可生产钛合金、镍基合金等高端油井管，在石油专用管业内具有较高知名度。

The company has gradually formed its own unique series of special thread tubing&casing products through various development models, with a production capacity of 100000 tons per year. has rich experience in the production of corrosion-resistant tubing&casing, and has the production capacity of high-end oil well pipes such as titanium alloys and nickel based alloys. enjoy a high reputation inthe OCTG industry.

STJ-SN

- 2-3/8" ~13-5/8"
- 接强度高；抗粘扣能力强
- 锥面-锥面密封
- 性能与NEW VAM等效
- 应用于一般及复杂条件下的井，中深井，热采井等

- 2-3/8" ~13-5/8"
- High strength and good anti thread gluing ability
- Cone type metal to metal sealing
- Equivalent to NEW VAM
- General&complex conditions,medium deep wells, thermal recovery wells, etc

STJ-ST

- 2-3/8" ~13-5/8"
- 改进负角度偏梯形螺纹；
- 锥面-锥面密封
- 性能与VAM TOP等效
- 应用于深井/超深井，大位移井，高温高压井、腐蚀环境等

- 2-3/8" ~13-5/8"
- Modify hook thread
- Cone type metal to metal sealing
- Equivalent to VAM TOP
- Deep/Ultra deep wells, extended reach wells, high-temperature&pressure wells，corrosive environments, etc

JIP

- 2-3/8" ~13-5/8"
- 改进负角度偏梯形螺纹；
- 多重密封结构
- 抗复合载荷能力强
- 深井/超深井，高压气井、水平井、热采井等

- 2-3/8" ~13-5/8"
- Modify hook thread
- Multiple sealing structures
- Deep wells, ultra deep wells, high-pressure gas wells, horizontal wells, thermal recovery wells, etc

SLF-HT

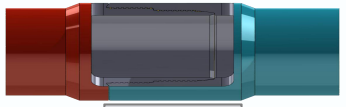
- 4-1/2" ~20"
- 偏梯形螺纹，可与与API BC螺纹互换
- 锥面-锥面密封结构
- 抗过扭能力强
- 应用于热采井、中深井、低压气井等

- 4-1/2" ~20"
- Buttress thread,interchanged with API BC thread
- Cone type metal to metal sealing
- Excellent over torsion resistance
- Thermal recovery wells，medium deep wells，low-pressure gas wells, etc

SLF-FJ

- 2-3/8" ~13-3/8"
- 无接箍连接，管端不加厚；
- 改进偏梯形螺纹，螺纹密封
- 应用于特殊井眼，尾管、小井眼、低压气井、套管修复等

- 2-3/8" ~13-3/8"
- Flush joint without upset
- Modify buttress thread and gas tight
- Tail pipe, Small-sized wellbore, Low-pressure gas well, Casing repair, etc



SLF-NF1

- 2-3/8" ~4-1/2"
- 无接箍连接，管端加厚；
- 双级同步螺纹；
- 内外双金属密封结构
- 高抗扭作业油管、水平井、腐蚀性环境等

- 2-3/8" ~4-1/2"
- Flush joint with upset
- Two step synchronous thread&Two step sealing
- High torque workstring,horizontal wells,corrosive environment, etc

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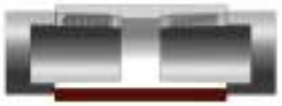
4.特殊螺纹油套管 Premium Tubing&Casing



SLF-YT

- 4-1/2″ ~9-5/8″
- 改进偏梯形螺纹;
- 内外双金属密封结构
- 抗弯曲、抗压缩和抗过扭等复合载荷能力强
- 应用于稠油井、水平井、大位移井、页岩油气井等

- 4-1/2″ ~9-5/8″
- Two step metal to metal sealing
- Excellent bending、compression and over torsion resistance
- Thermal recovery wells,horizontal wells,extended reach wells, shales

SLF-SFJ

- 4-1/2″ ~13-3/8″
- 无接箍连接，管端不加厚;
- 改进偏梯形螺纹；螺纹密封
- 内外扭矩台肩
- 应用于特殊间隙井/气井

- 4-1/2″ ~13-3/8″
- Flush joint without upset
- Modify buttress thread
- Two step shoulders
- Special clearance wells/gas wells, etc

SLF-UT

- 2-3/8″ ~5″
- 无接箍连接，管端加厚;
- 改进负角度偏梯形螺纹;
- 内外双金属密封结构
- 应用于特殊间隙井以及较高气密封和连接强度要求的井

- 4-1/2″ ~5″
- Flush joint with upset
- Modify hook thread
- Two step metal to metal sealing
- Special clearance wellss，higher requirements for gas seal and connection strength, etc

The company can design and develop customized premium thread products according to customer needs.

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2025

THANKS