



9.10 Pump catalogue



大连深蓝泵业有限公司
DALIAN DEEP BLUE PUMP CO.,LTD

RCG 系列罐内泵

RCG Series In-Tank Pump



了解深蓝/ About Us

您理想的合作伙伴 / Your Ideal Cooperative Partner

大连深蓝泵业有限公司于1988年创立，作为拥有行业内领先技术的工业离心泵制造商，专注石油天然气、石化、化工、煤化工、管线输送、LNG、纸浆造纸、清洁能源、食品等多个工业领域应用，集产品研发、设备制造、工程/技术支持、售后服务于一体。

Dalian Deep Blue Pump was founded in 1988, as a leading technology manufacturer of industrial centrifugal pump, we focus on oil and gas, petrochemical, chemical, coal chemical, pipeline, LNG, pulp and paper, clean energy, food as well as various industrial application, integrated of R&D, manufacturing, engineering/technical support and after sales service etc.

深蓝以先进的技术、优质的产品、完善的服务、持续提升的质量水准，期待成为您理想的合作伙伴。DEEP BLUE, with advanced technology, high-quality products, perfect services and continuously improved quality standard, is expecting to be your ideal cooperative partner.

优势/ Advantage

专业 / Expertise

- 我们在多个领域深耕建立一套“正向设计”的精益研发体系，帮助我们持续突破技术壁垒，提供优质解决方案
- 深蓝在关键装置核心泵产品研制、节能改造、逆向工程、产品安装调试、现场疑难问题处理环节，均能提供可靠技术服务
- 深蓝产品研发与创新的勇气，大量关键装置首台套成功应用的经验积累和沉淀，使得我们在石油化工领域始终处于行业前沿
- We are deeply engaged in multiple industrial fields and have established a “forward design” lean R&D system that help us continuously break through technical barriers and provide quality solutions.
- Deep Blue can provide reliable technical services for all important processes e.g. design and manufacturing the core pump of key services, energy saving transformation, reverse engineering, pump installation and commissioning, onsite troubleshooting, etc.
- The courage of product and technology research and innovation, and their more and more successful experiences in many key services, supported Deep Blue always stand in the forefront of the industries.



可靠性 / Reliability

- 深蓝通过将可靠性设计理念与仿真计算有效结合，确保产品稳定运行
- 可靠的设计和制造工艺是深蓝产品在现场稳定运行的保障
- 对于核心关键技术的反复验证和可靠性加速试验，使我们更有信心为客户提供更优质可靠的服务
- Deep Blue ensures stable operation products by combining reliability design concept with simulation calculation.
- Reliable design and manufacturing process guarantee the stable operation of Deep Blue products at site.
- Repeated certification and reliability acceleration tests of core technologies make us more confident to provide customers with better and reliable services.

研究与创新/

Research and Innovation

- 深蓝不断地优化自己的核心产品；同时也在密切关注泵产品在新能源行业的应用
- 深蓝长期以来在基础技术研究领域持续投资，已经在新一代BB5泵、新一代LNG潜液泵中得到显著体现，新一代OH泵即将享受最新的技术研究成果
- 同样由于基础技术研究的持续投入，深蓝能够快速满足客户的各种需求，形成定制化的解决方案
- 试验能力，使我们更有信心为客户提供更优质可靠产品
- Deep Blue is constantly optimizing its core product, at the same time, we are paying close attention to the application of the new energy industry.
- Deep Blue long-term investment in basic technology research has been evident in the new generation BB5 pump and the new generation LNG pump. The new generation OH pump is going to be benefited from the latest technology research results.
- Supported by the continuous investment in basic technology research, Deep Blue is able to quickly meet the various needs of customers and form customized solutions.
- The testing capacities make us more confident to provide customers with better quality and reliable products.

主要工业和应用

Main applications

RCG系列罐内泵是一种泵和电机共轴，整体浸没在低温介质中的立式离心泵，由钢丝绳悬吊安装在储罐的泵井底部的底阀上。其作用为将储罐中的低温介质增压后输送到下游工艺装置。该系列产品无动密封，可实现零泄漏、安全可靠。主要应用于：

- LNG接收站
- LNG调峰站
- LNG发电厂

也广泛应用于：

- 丙烷脱氢装置
- 乙烯装置
- 轻烃装置

RCG Series in-tank pump is a kind of vertical centrifugal pump which is common shaft between pump and motor, the whole pump is submerged in cryogenic medium. And installed on the foot valve which in the bottom of the pump column of the storage tank by steel wire rope. Its function is to pressurize the cryogenic medium in the storage tank and transport it to the downstream process device. This products without dynamic seal, can achieve zero leakage, high safety and reliability. Be mainly applied to:

- LNG Terminal
- LNG Peak Station
- LNG Power Plant

Also widely applied to:

- Propane Dehydrogenation Unit
- Ethylene Unit
- Hydrocarbon Unit

我们的产品使用的液体示例如下：

Examples of the liquids our products operate in are:

- LNG Methane (-162°C, -258°F)
- LN2 Liquid Nitrogen (-196°C, -320°F)
- 乙烷 Ethane (-89°C, -128°F)
- 乙烯 Ethylene (-104°C, -155°F)
- LPG Propane (-42°C, -44°F)
- 丙烯 Propylene (-48°C, -54°F)
- 丁烷 Butane (-3°C, +27°F)



特征及优点

-6大组件

1 顶板组件

- 安装在泵井顶部，对泵井和大气侧进行密封，电缆穿线管与顶板组焊为一体，穿线管端采用法兰形式与贯穿接头进行连接，顶板顶部设置起吊组件及填料组件，在泵头安装、调整底阀开度的同时起到密封作用

2 电气组件

- 其主要作用为电力传输、密封可燃介质防止外漏，保证装置安全可靠运行
- 包含电气贯穿接头、常温动力线缆、接线箱

3 仪表组件

- 其主要作用为振动信号传输、密封可燃介质防止外漏，保证装置安全可靠运行
- 仪表组件包含仪表贯穿接头、常温仪表线缆、接线箱

Features and benefits

-6 Assembly

1 Headplate Assembly

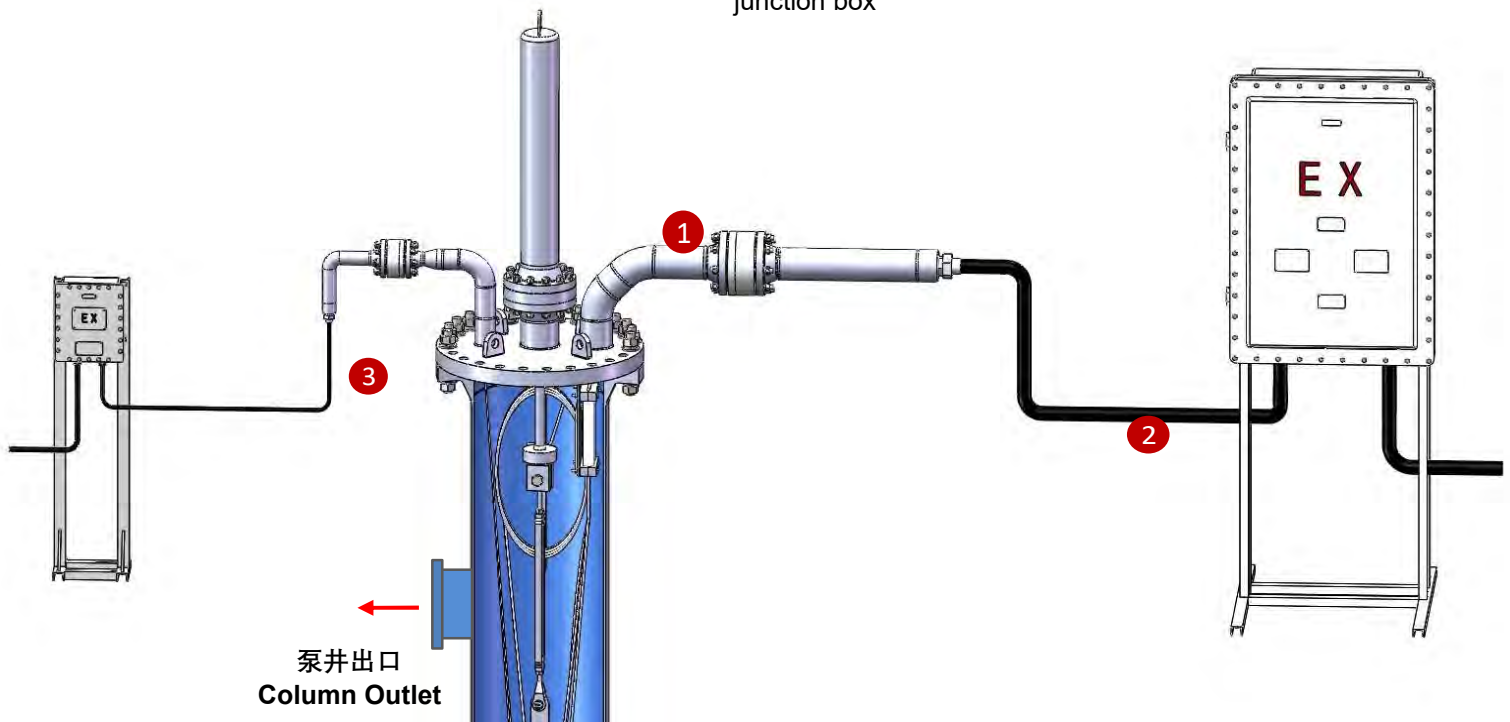
- Installed on the top of the column, sealing the pump column and the air side, cable threading pipe and headplate welding as a whole, threading pipe end using flange form and through joint connection, headplate top set lifting assembly and packing assembly, pump installation, adjust the opening of the bottom valve at the same time play a sealing role

2 Electrical Assembly

- The main function of the electrical assembly is power transmission, sealing flammable medium to prevent leakage, to ensure the safe and reliable operation of the device
- Include electrical terminal header, power cable, and junction box

3 Instrument Assembly

- The main function of the instrument assembly is vibration signal transmission, sealing flammable medium to prevent leakage, to ensure the safe and reliable operation of the device
- Include instrument terminal header, instrument cable, and junction box



4 泵头组件 Pump Assembly

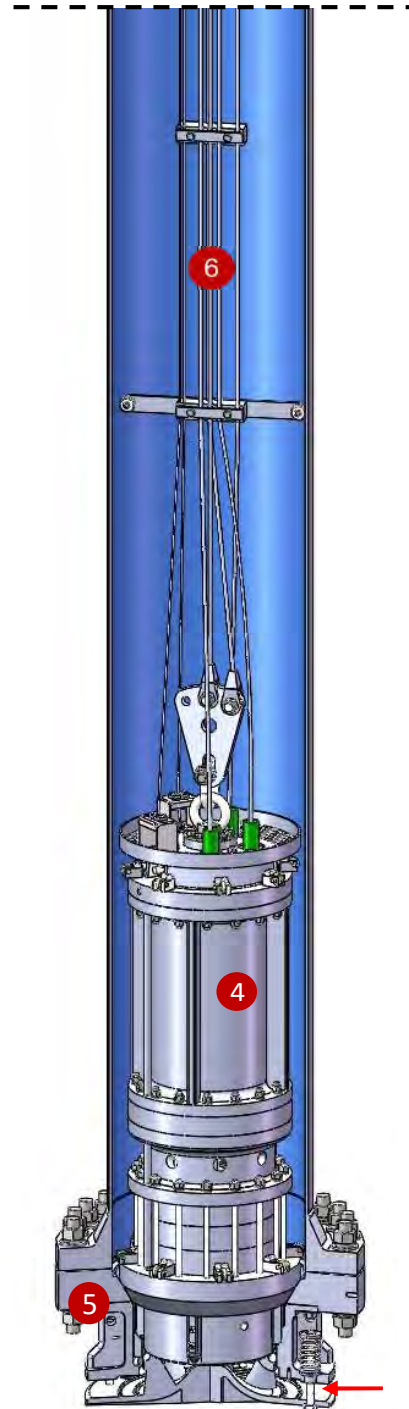
- 径向剖分，立式单级或多级潜液离心泵，泵与电机共轴，整体浸没在低温介质中
- Radial split, vertical single stage or multistage submersible centrifugal pump, common shaft between pump and motor, the whole submerged in cryogenic medium

5 底阀组件 Foot Valve Assembly

- 安装在泵井底部，隔离泵的进出口，泵头坐落在底阀上，通过泵头重量控制底阀的开启及关闭
- Installed at the bottom of the column, isolating the inlet and outlet of the pump, the pump on the foot valve, the weight of the pump controls the opening and closing of the foot valve
- 锥面底阀为标准配置，平面底阀为可选配置
- Conical foot valves are standard, flat foot valves are optional

6 线缆组件 Cable Assembly

- 贯穿安装在泵井中，顶部与顶板连接，底部与泵头连接，包括钢丝绳、低温动力电缆、低温仪表电缆以及线缆夹紧及导向组件
- Installed through the column, the top is connected with the headplate, the bottom is connected with the pump, including wire rope, low temperature power cable, low temperature instrument cable and cable clamping and guiding assembly
- 每隔一段距离设置一组夹紧组件，在两组夹紧组件之间增加一个导向块组件
- Set a set of clamping Assembly every fixed distance, and add a guide block component between two clamping components



泵井入口
Column Inlet

特征及优点

—泵头组件

1 泵与电机共轴 Common shaft between pump and motor

- 采用泵送介质进行冷却
- Use pumping medium for cooling

2 低温潜液电机 Cryogenic Submerged Motor

- 采用低温潜液电机，无氧环境，无防爆要求，安全可靠
- no oxygen environment, no explosion-proof requirements, safe and reliable

3 转子支撑 Rotor support

- 滚动轴承三点支撑
- Three-point support for rolling bearings
- 非金属摩擦副多点辅助支撑
- Multi-point support for non-metallic friction pairs

4 平衡机构 Balancing Mechanism

- 采用大平衡鼓+小平衡盘结合的轴向力平衡机构
- Combination of large balance drum and small balance disk is adopted as axial force balancing mechanism
- 动态、高灵敏度平衡盘，自动平衡轴向力，保证轴承在零推力负荷下运行
- Dynamic, high sensitivity balance disk, automatically balance axial force, ensure bearing operation under zero thrust load.

5 水力部件 Hydraulic Components

- 采用径向导叶，效率高，满足泵井尺寸同时降低泵高度
- Radial diffuser, high efficiency, meet pump column size and reduce pump height
- 首级叶轮前设有诱导轮，提高泵的抗汽蚀性能
- Inducer is set in front of the first impeller to improve the anti-cavitation performance of the pump
- 螺旋型诱导轮,采用数控加工，满足全流量工作区汽蚀要求
- Spiral type inducer, CNC machining, to meet the requirements of cavitation in the full flow zone

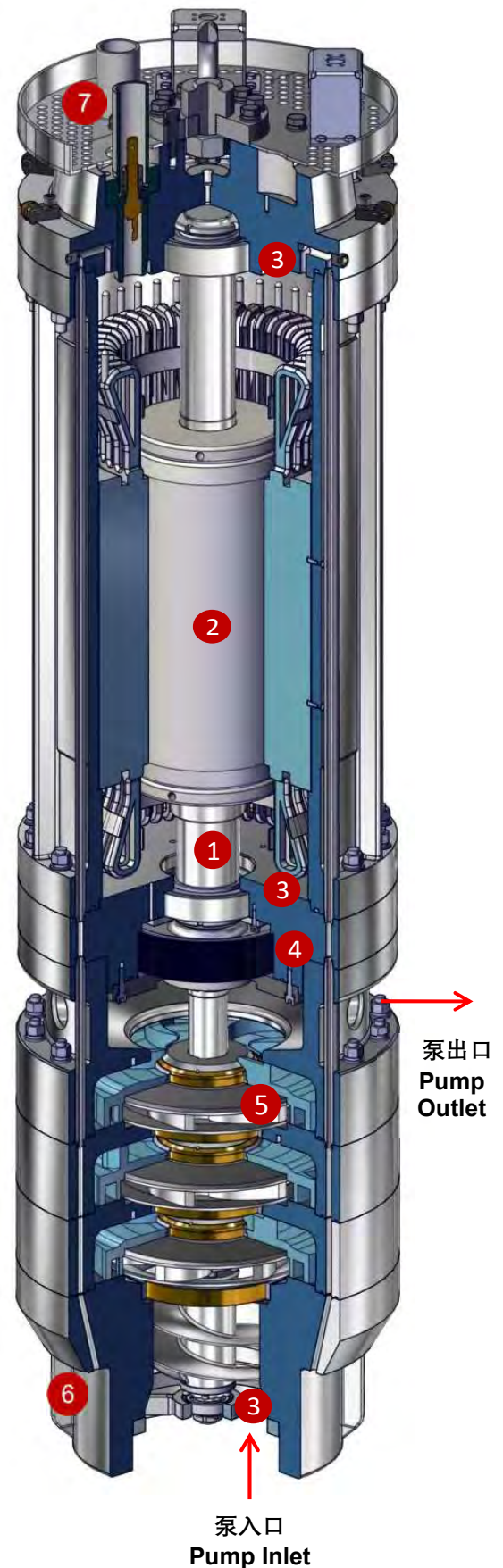
6 吸入段 Suction Section

- 与底阀采用金属面密封，实现泵进出口的隔离
- Seal with the metal surface of the foot valve to realize the isolation of pump inlet and outlet

7 安全防护 Safety protection

- 采用带折边的安全盘，防止异物掉入泵井
- Safety plate is folded edge type, to prevent foreign matter falling into the pump column

Features and benefits



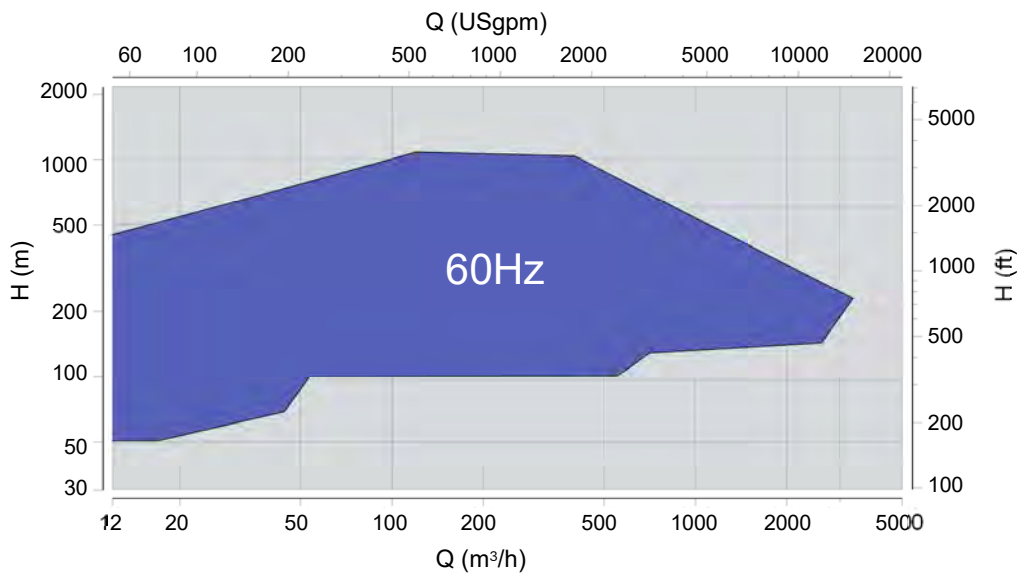
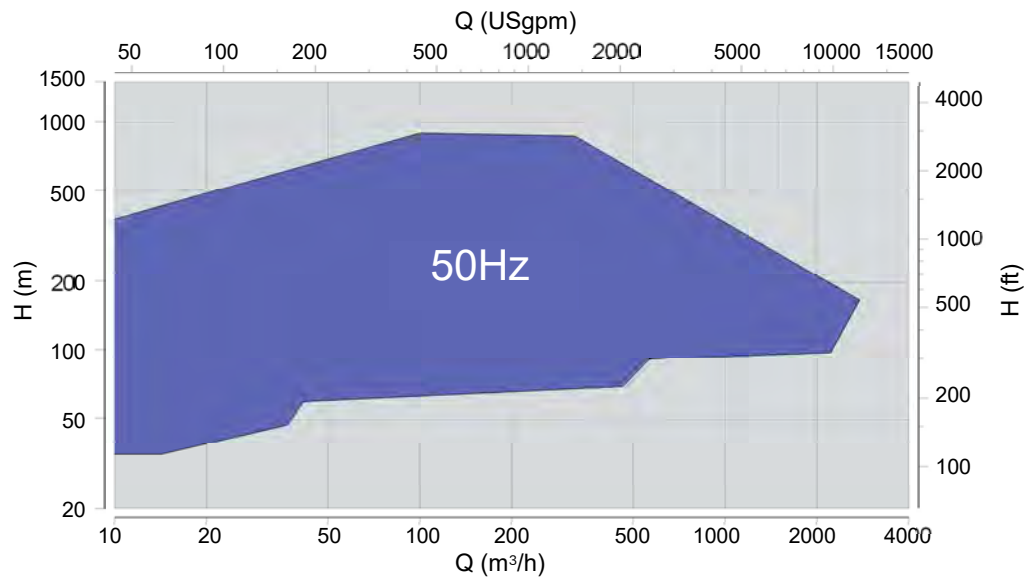
材料 / Materials

零件属性 Parts Properties	零件名称 Parts Name	成型方式 Forming Method	材料牌号 Material Mark
承压壳体 Pressure Casing	吸入段 Suction Section	锻造 Forging	B247 6061-T6
	中段 Middle Casing	锻造 Forging	B247 6061-T6
	中间轴承支架 Bearing Support(Middle)	锻造 Forging	B247 6061-T6
	电机壳体 Motor Housing	铸造 Casting	B26 A356.0-T6
	电机端盖 Motor End Cover	锻造 Forging	B247 6061-T6
非承压壳体 Non Pressure Casing	出口段 Discharge Section	锻造 Forging	B247 6061-T6
水力部件 Hydraulic Parts	诱导轮 Inducer	锻造 Forging	B247 6061-T6
	叶轮 Impeller	铸造 Casting	B26 A356.0-T6
	导叶 Diffuser	铸造 Casting	B26 A356.0-T6
轴 Shaft	轴 Shaft	锻造 Forging	A705 XM-12
摩擦副 Friction Pair	叶轮口环 Impeller Wear Ring	铸造 Casting	B584 C90500
	壳体口环 Casing Wear Ring	锻造 Forging	A182 F304
	导叶口环 Diffuser Wear Ring	锻造 Forging	A182 F304
	平衡套 Balance Bushing	铸造 Casting	B584 C90500
	平衡盘 Balance Disk	锻造 Forging	A182 F304
	平衡鼓 Balance Drum	锻造 Forging	A182 F304
	轴承衬套 Bearing Bushing	锻造 Forging	A479 S21800
紧固件 Fastener	穿杠 Tie Bolt	棒料 Bar	A564 630
	螺柱 Studs	棒料 Bar	A193 B8
	螺母 Nuts	棒料 Bar	A194 8
顶板 Headplate	顶板 Headplate	组焊 Welding	304/304L/316/316L
底阀 Foot valve	阀体 (上) Valve Body(top)	锻造 Forging	A182 F304
	阀体 (下) Valve Body(bottom)	铸造 Forging	B26 A356.0-T6
	阀板 Valve Plate	铸造 Casting	B26 A356.0-T6

运行数据 / Operating data

50Hz	泵规格 / Pump size	60Hz
50 to 500 mm		50 to 500 mm
10 to 2800 m³/h	流量 / Capacity	12 to 3360 m³/h
up to 810 m	扬程 / Head	up to 900 m
up to 65 bar	压力 / Pressure	up to 70 bar
-196 to +60°C	温度 / Temperature	-196 to +60°C

性能范围 / Performance rang



生命周期成本

Life Cycle Cost

通常，泵设备90%成本是在设备初始采购和安装后积累的。深蓝泵业利用自身优势和成熟经验，为用户提供完善的生命周期成本解决方案，涵盖：

Typically, 90% of the total life cycle cost of pump is accumulated after the equipment is purchased and installed. Deep Blue draws on its strengths and mature experience, provide users with complete life cycle cost solutions, including:

初始成本

- 购买
- 安装调试

二次成本

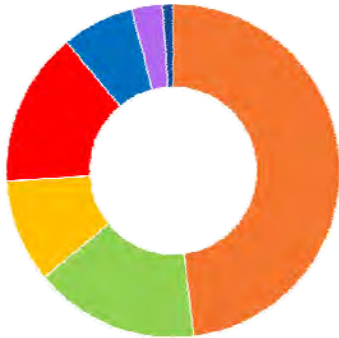
- 能耗
- 设备维护
- 生产损失
- 停机
- 运行和改造
- 环境

Initial cost

- Initial purchase
- Installation

Running cost

- Energy consumption
- Maintenance
- Production loss
- Down time
- Operating
- Environment

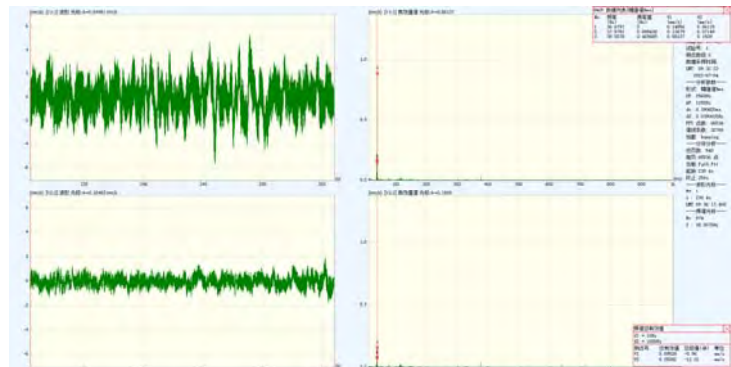


- 能耗 Energy consumption
- 设备维护 Maintenance
- 生产损耗 Production loss
- 初始购买和安装 Initial purchase and Installation
- 运行和改造 Operating and transform
- 停机 Down time
- 环境 Environment

产品测试及运行保证

Product test and operation assurance

深蓝泵业拥有世界第三座、国内唯一一座大型低温泵试验装置，通过对水力性能指标、振动和噪声指标的测量和分析，确保每一台产品均满足用户运行要求。



通过现场频谱采集对设备运行状态监测，根据设备运行状态，制定维修计划。

Deep Blue pump has the third large-scale cryogenic pump test device in the world and the only one in China. Through the measurement and analysis of hydraulic performance indicators, vibration and noise indicators, to ensure that each product can meet the operating requirements of users.

The equipment operation status is monitored through on-site spectrum acquisition, and make maintenance plan according to the equipment operation status.



大连深蓝泵业有限公司 低温泵试验装置
为世界第三座、国内唯一一座低温泵试验装置

深蓝：全球泵设备 供应商、服务商和管理商

深蓝泵业在全世界建立了多个生产工厂、维修基地、销售公司，与众多国际用户建立了长期合作关系，产品销往东南亚、中东、非洲、南美等40多个国家和地区，能够给全球用户提供及时的服务和支持。

Deep Blue : Global pump equipment supplier, service and management provider

Deep Blue set up multiple factories, maintenance bases and sales companies. Established long-term cooperative relations with many international customer, products are exported to southeast Asia, the Middle East, Africa, South America and so on more than 40 countries and regions, to provide timely service and support to global users.



深蓝泵业近十五年重要历程

- 2008 • 乙烯设备国产化做出突出贡献
- 2008 • 大型炼油装置用“渣油加氢能量回收透平机组”开车成功
- 2009 • 国内首台空分装置液氧泵运行
- 2010 • 长输管线“主输泵实现国产化
- 2010 • 国内首台尿素装置高压甲铵泵和高压液氨泵运行
- 2011 • 立式多级液氧泵荣获科技进步三等奖
- 2014 • 自主研发全球最大的3550Kw油品合成贫液装置泵
- 2014 • 国产首台LNG潜液泵/透平运行
- 2015 • 投建并应用国际领先的低温测试台
- 2016 • 首台LNG罐内泵工业应用并通过国家鉴定
- 2017 • 5种核二/三级离心泵国家鉴定
- 2018 • 大庆急冷油泵国产化首台套
- 2019 • 大型LNG储罐内潜液泵获科技进步一等奖
- 2020 • 首台LNG高压泵工业化应用并通过国家鉴定
- 2021 • 首台LNG装船泵通过国家级鉴定

The important milestones of Deep Blue recent 15 years

- Outstanding contribution for localization of ethylene equipment
- "Residual Oil Hydrogenation Energy Recovery Turbine Unit" for Large-scale Refinery Units Started Successfully
- First liquid oxygen pump for domestic air separation unit
- Localization of "main transfer pump for long-distance pipelines
- The first domestic high-pressure ammonium carbamate pump and high-pressure liquid ammonia pump for urea plant
- Vertical multistage liquid oxygen pump won the third prize of scientific and technological progress
- Independently developed the world largest 3550Kw lean solution pump for coal-chemical industry
- The first domestic LNG submersible pump/turbine
- Invest and build the world leading cryogenic test platform
- National certification of the first in-tank pump
- National certification of 5 nuclear second/third stage centrifugal pumps
- CNPC Daqing quench oil pump domestic first set
- Large LNG in-tank pump won the first prize of scientific and technological progress
- National certification of the first LNG high pressure pump
- National certification of LNG cargo loading pump



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