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Table of Contents

I

Company Overview

I

Main Products and Industry
Application Examples

III

Manufacturing Capability and
Process Flow



I

Company Overview



1. Company Profile



About Us

Company Location: No. 1458, Wenchang East Road, Yangzhou City

Company Type: Privately-owned Limited Liability Company

Company registered capital: 8219.65 Ten thousand yuan

Current company employees: 278 people, including technical personnel 42 people, technicians 98 people.

The company has the following subsidiaries:

Oil Cylinder Division: Specializing in the production of small and medium-sized oil cylinders: 25-400, maximum test pressure 145MPa

Hydraulic Complete Set Division: Large hydraulic cylinders: cylinder diameter 400-1400,

Maximum length 16000mm, hydraulic pump stations, hydraulic complete set equipment, etc.

Water Equipment Subsidiary: Specializing in the production of various hydraulic metal structures

Make the best products, provide the best service, and achieve the best reputation



2. Honors and Qualifications



National High-Tech Enterprise

21 Years National-Level Specialized and New 'Little Giant' Enterprise

Director Unit of China Hydraulic Pneumatic and Seals Industry Association

Member of China Hydraulic Pneumatic and Seals Standardization Committee

National Intellectual Property Advantage Enterprise

Consecutive 20 Years 3A Credit Rating Enterprise

Jiangsu Province Quality Credit AAA Grade Enterprise

Three Provincial and Ministerial Science and Technology

Third Prizes, One Yangzhou City Science and Technology

First Prize, One Third Prize

Gold Supplier of China State Shipbuilding Corporation

AA Credit Rating Water Conservancy Machinery

Manufacturing Enterprise

Large and Medium-Sized Enterprises in Yangzhou City, Key Industrial

Enterprises in Jiangdu District





2. Honors and Qualifications



Jiangsu Province Quality Credit AAA Enterprise



Gold Supplier of China State Shipbuilding Corporation



Jiangsu Province Technology Entrepreneur



Second Prize for Mechanical Design and Product
Innovation in Jiangsu Province



National Intellectual Property Advantage Enterprise



Model Enterprise for Trade Secret Protection



2. Honors and Qualifications



Quality Management System
Certification



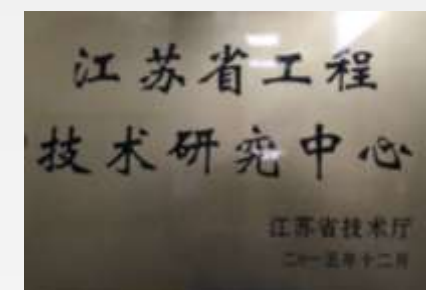
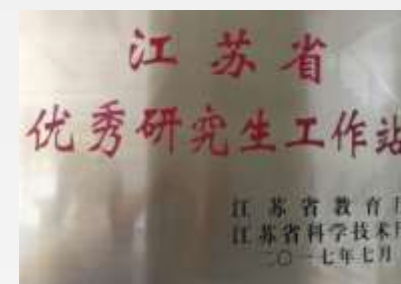
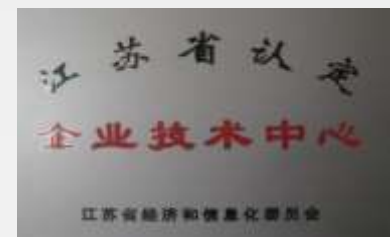
Occupational Health and Safety
Management System Certification



Environmental Management
System Certification



3. Research and Innovation



The company currently has a total of 42 product R&D and design personnel, including 1 Senior Engineer, 5 Senior Engineers, and 25 Engineers; The company has established provincial-level R&D platforms such as the Jiangsu Provincial Engineering Technology Research Center, Jiangsu Provincial Enterprise Technology Center, and Jiangsu Provincial Graduate Workstation. It has also established long-term industry-university-research cooperation relationships with many universities and research institutes, including Nanjing University of Science and Technology and CSSC 704 Research Institute, laying a foundation for the company's R&D capabilities.

Undertook 2 provincial and ministerial-level science and technology projects

6 Jiangsu Province key promoted new products and new technologies

Holds 16 valid authorized invention patents and 37 utility model patents

Received 3 provincial science and technology awards and 2 municipal science and technology awards.



3. Research and Innovation



Invention Patent



Science and Technology Award



4, Human Resources



The company's employee team is stable and mature. Currently, employees with more than 20 years of service account for 25%, setting a good example for the younger generation.

We have established long-term employee training programs and improve the overall quality of employees through various competitions. For example: Our company's welder Gu Wuhui won first place in the welding competition in Yangzhou City, and quality inspector Han Yongmei won the first prize in the vernier caliper measurement skills competition.

In the joint graduate training program with Nanjing University of Science and Technology, graduates are stationed at the factory for long-term teaching, creating a good research environment for students and guiding the company in the application of new software and cutting-edge technologies .





Main Products and Industry Application Examples



1, Product Display —— Hydraulic Cylinder



Large Hydraulic Cylinder



φ700 Marine Hydraulic Cylinder



Crane Hydraulic Cylinder



Mining Support Leg Oil Cylinder



Offshore Platform Lifting Hydraulic Oil Cylinder



Multi-stage Hydraulic Cylinder



1, Product Display —— Hydraulic Cylinder



Large

Cylinder Diameter Range: 20 ~ 1400mm
Maximum Length: 16000mm
Maximum Weight: 60t
Maximum Test Pressure: 145MPa

Precision

Low-speed Hydraulic Cylinder: $\leq 1\text{mm/s}$
high speed hydraulic cylinder: $\geq 6000\text{mm/s}$
Proportional Servo Hydraulic Cylinder: 20Hz

Special

Special Functions:
Multi-stage Cylinder, Multi-stage Double-acting Cylinder,
Multi-stage Equal Thrust Cylinder
Rack and Pinion Cylinder
Wave Compensation Cylinder
Pneumatic-Hydraulic Damping Cylinder
AGC, AWC Oil Cylinder
Cylinder with Various Sensors and Functional Valves

Special

Special Application Environments:
Temperature Environment: $-50 \sim 200\text{ }^{\circ}\text{C}$
Marine Environment: Under Seawater 300 meters
High Dust Environment: Foundry, Coking, Cement
Radiation Environment: Nuclear Facilities
Vibration Environment: Vehicle-mounted, Hammering
Explosion-proof environment:

Special

Piston rod targeted special Surface treatment:
Surface quenching
Surface electroplating hard chrome, double-layer chrome
Surface electroplating Nickel + Chrome
Surface Spraying Plasma ceramic
Surface spraying high-velocity ceramic
Surface stainless steel laser cladding



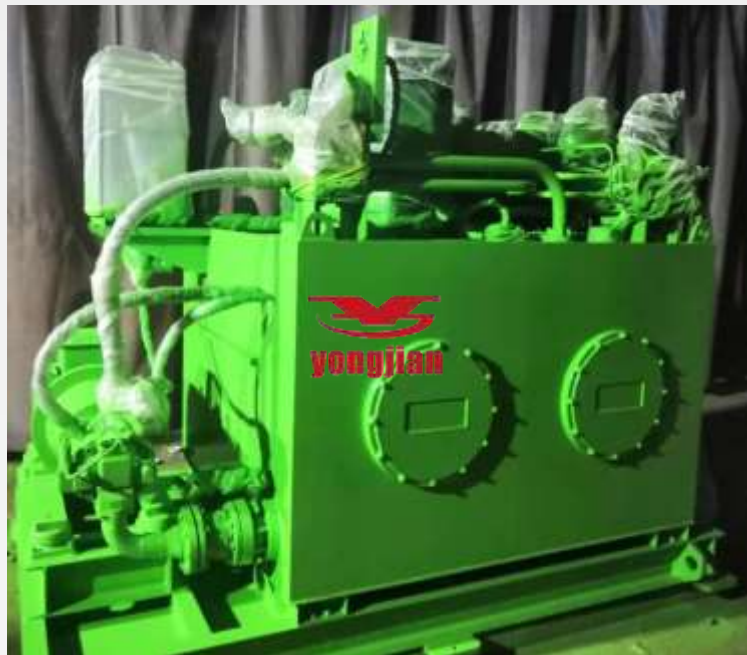
2, Product Display — Hydraulic System



Applied in marine and offshore engineering, metallurgical heavy industry, water conservancy and hydropower, vehicle-mounted mobile and JG matching various hydraulic oil sources, functional valve groups, complete hydraulic systems, with a maximum power of up to 800Kw,



2, Product Display — Hydraulic System





2, Product Display — Hydraulic System



For the first time, a century-old German company has delivered a hydraulic system to a company outside Europe for manufacturing, delivery and acceptance in progress





2, Product Display — Hydraulic System



For the first time, a century-old German company has delivered a hydraulic system to a company outside Europe for manufacturing, delivery and acceptance in progress





3. Product Display — Hydraulic Complete Equipment



Transfer Boat Trolley



Processing, Installation, and Retrofit of Experimental Equipment and Supporting Air Chamber



Rockburst Testing Machine at Wuhan Branch of Chinese Academy of Sciences



Anti-Rolling Fin



Product Application Fields	Application Equipment	Provided Products	Main Clients
Engineering Vessel Support	Dredger	Mud Gate, Hanger Hydraulic Cylinder for Split Hopper Barge	Shanghai Dredging Company Tianjin Dredging Company Netherlands
Offshore Wind Power Equipment	Hydraulic Jack-up Platform	Hydraulic Lifting Device	China Shipbuilding Industry Corporation Hantong Group Changfei Offshore Engineering
	Stabilizing Pile Platform	Hydraulic Pile Gripper Device Hydraulic System	CCCC Third Harbor Engineering Hantong Group
	Booster Stations, etc.	Pile Clamps, Hydraulic Cylinders	Honghua
Shipyard Manufacturing Equipment	Ship Transfer Trolley	Hydraulic Systems and Hydraulic Cylinders	GSI Huangpu Shipyard, etc.
	Flip Mechanism	Hydraulic Systems and Hydraulic Cylinders	Hantong Yingji /611 Institute
Anti-Rolling Fin	Retractable and Non-Retractable Electric Drive, etc.	Hydraulic Systems, Hydraulic Cylinders Mechanical Actuators, etc.	CSSC 704 Institute



Complete equipment including mud gates and hangers (both with hydraulic cylinders) provided for the trailing suction hopper dredgers of Shanghai Channel Bureau and Tianjin Channel Bureau





Hydraulic cylinders provided for split hopper barges for companies such as Shanghai Hangjie, Netherlands, and the United States





Project	Vessel Type	Main Specifications and Supply Content	Quantity	Ship Inspection	Supply Period
First Offshore Platform Supporting	Changjiang Channel Dredging Lifting Platform	Φ 300/ Φ 180-1280 Lifting Cylinder	16	CCS	Year 2012
Second Offshore Platform Supporting	Mobile Life Support Lifting Platform	Φ 500/ Φ 280-1280 Hydraulic Cylinder	16	CCS	Year 2015
Third Offshore Platform Support	CCCC Second Harbor Engineering Gravel Pile Operation Lifting Platform	Φ 500/ Φ 280-1700 Hydraulic Cylinder, Hydraulic System, Ring Beam	16	CCS	Year 2015
Fourth Offshore Platform Support	Daqiao Single Pile 4000T Offshore Wind Power Installation Platform	Φ 560/ Φ 360-1600 Lifting Cylinder	32	CCS	Year 2016
Fifth Offshore Platform Support	Sanxia Single Pile 4000T Offshore Wind Power Installation Platform	Φ 560/ Φ 360-1600 Lifting Cylinder	32	CCS	Year 2017
Supporting the sixth offshore platform	450T Special lifting platform	220/100/1050 Hydraulic cylinder, hydraulic system, ring beam	16		Year 2017
Supporting the seventh offshore platform	Huana 2000T Embedded rock wind power lifting platform	600/300-1600 Lifting cylinder	16	ABS	Year 2018
Supporting the eighth offshore platform	2000T Embedded rock wind power lifting platform	600/300-1600 Hydraulic cylinder	16		Year 2018
Supporting the ninth offshore platform	2800T Lifting device hydraulic system	Lifting hydraulic system	4 Sets	CCS	Year 2018
Tenth Offshore Platform Support	Land 2800T Wind Power Lifting Platform	630/360-1600 Lifting Hydraulic Cylinder	16	CCS	Year 2018
Eleventh Offshore Platform Support	Honghua 850T Wind Power Operation and Maintenance Platform	400/200/1300 Hydraulic Cylinder, Hydraulic System, Ring Beam	16	CCS	Year 2018
Twelfth Offshore Platform Support	CSSC 704 Institute 600T Multifunctional Construction Platform	360/180-1300 Hydraulic Cylinder, Hydraulic System, Ring Beam	16	CCS	Year 2018



4, Industry Application — Offshore Platform Application Performance



Project	Vessel Type	Main Specifications and Supply Content	Quantity	Ship Inspection	Supply Period
Thirteenth Offshore Platform Support	Truss-type Dual Step Lifting Platform	680/300-1800 Hydraulic Cylinder	36	LR	Year 2018
Supporting the Fourteenth Offshore Platform	Tongsheng 500T Pile Gripper Lifting Platform	320/160/1050 General Contract for Hydraulic Cylinder, Hydraulic System, Ring Beam and Other Lifting Devices	16		Year 2019
Supporting the Fifteenth Offshore Platform	CSSC 101 Wind Power Installation Platform	Φ 560/ Φ 360-1600 Hydraulic Cylinder and Hydraulic System, etc.	32	CCS	Year 2019
Supporting the Sixteenth Offshore Platform	Yantai Dalao Bureau Double Step Wind Power Installation Platform	Double Step Hydraulic System	4	CCS	Year2020
Supporting the Seventeenth Offshore Platform	Tongsheng 2500T Wind Power Lifting Platform	600/300/1650 Hydraulic Cylinder, Hydraulic System, Ring Beam	16	CCS	Year 2021
Eighteenth Offshore Platform Support	Hengtong Lande 2500T Wind Power Lifting Platform	600/300/1650 Total Contract for Lifting Devices such as Hydraulic Cylinder, Hydraulic System, Ring Beam	16	CCS	Year 2021
Nineteenth Offshore Platform Support	Baosheng Changfei 1200t 4000T Double Step Hydraulic Pin Lifting System	630/290-2150 High Position, Low Position Ring Beam Lifting Cylinder	24	CCS	Year 2022
Twentieth Offshore Platform Support	Hantong HY78 1200T 5040T Double Step Hydraulic Pin Lifting System	540/280-1800 Hydraulic Cylinder, Hydraulic System, Ring Beam, Electrical Control, etc.	1 Set	CCS	Year 2022
21st Offshore Platform Supporting	Hantong HY80 1200T 5040T Double Step Hydraulic Pin Lifting System	540/280-1800 Hydraulic Cylinder, Hydraulic System, Ring Beam, Electrical Control, etc.	1 Set	CCS	Year 2022
22nd Offshore Platform Supporting	Tengdong 1200t 5080t Double Step Hydraulic Pin Lifting System	540/290-2000 Hydraulic Cylinder, Hydraulic System, Ring Beam, etc.	1 Set	CCS	Year 2022



4、 Industry Application —— Offshore Platform



Project Name: Hangongping 2 Lifting Mechanism

Gravel Pile Platform

Shipowner: CCCC Second Harbor Engineering

Shipyard: Jiangsu Dajin Heavy Industry

Lifting Device: CSSC 704 Institute

Single Pile Lifting Capacity: 2000t

Supply Scope: Hydraulic Cylinder, Hydraulic

System, Ring Beam Assembly

Main Parameters of Hydraulic Cylinder: Lifting

Cylinder 500/280-1700

Quantity of Hydraulic Cylinders: 16 pieces

Delivery Time: 2015 Year October





4、 Industry Application —— Offshore Platform



Project Name:

Daqiao Single Pile 4000T Self-elevating Self-propelled
Wind Power Installation Platform

Sanxia Single Pile 4000T Self-elevating Self-propelled
Wind Power Installation Platform

Shipowner: China Railway Fuchuan Marine
Engineering Co., Ltd.

Shipyard: Xiamen Shipbuilding Industry

Lifting Device: Runbang Heavy Industry

Single Pile Lifting Capacity: 4000t

Scope of Supply: Hydraulic Cylinder

Main Parameters of Lifting Hydraulic Cylinder: 560/300-
1600

Quantity of Hydraulic Cylinders: 2*32 pieces

Supply Period: 2016-2017 years





4、 Industry Application —— Offshore Platform

Project Name: 101# Offshore Wind Power

Installation Platform

Shipowner: CSSC Marine Engineering

Shipyard: Shanhaiguan Shipyard

Lifting Device: CSSC 704 Institute

Single Pile Support Capacity: 6000t

Scope of Supply: Hydraulic Cylinder, Hydraulic System

Main parameters of lifting hydraulic cylinder:

560/280-1700

Number of hydraulic cylinders: 32 pieces

Delivery time: 2019 year





4、 Industry Application —— Offshore Platform



Project name: H469 Offshore Platform Lifting

Device

Shipowner: Yantai Dalao Bureau

Shipyard: CIMC Raffles

Lifting Device: CSSC 704 Institute

Scope of supply: Hydraulic System

Delivery time: 2019 year





4、 Industry Application —— Offshore Platform



Project name: Ouyang 001 Offshore Platform

Lifting Device

Shipowner: Zhejiang Ouyang Offshore

Shipyard : Jiangsu Taixing Dayang Marine

Equipment

Lifting device: China Merchants Tian Shi

Scope of supply: Hydraulic System

(In cooperation with EATON

Company)

Delivery Time: 2018 Year





4、 Industry Application —— Offshore Platform



Project Name:

Changsheng 1200 Offshore Wind

Power Installation Platform

Ship Owner: Changfei Marine Engineering

Shipyard: Zhenhua Heavy Industries

Lifting Device: Guangdong Jingyin

Single Pile Lifting Capacity: 5000t, Double
Step

Scope of Supply: Hydraulic Cylinder

Main Parameters of Lifting Hydraulic

Cylinder: 630/280-1700

Number of Hydraulic Cylinders: 48 Pieces

Delivery Time: 2022 Year





Project Name:

HY78, HY80 Hydraulic Pin Jack-up Wind Power

Installation Platform

Ship Owner: Jiangsu Hantong Group (Marine Construction)

Shipyard: Nantong Yingji Heavy Industries

Lifting Device: Yongjian Company

Single Pile Lifting Capacity: 5040t, Double Stepping

Scope of Supply: Hydraulic Cylinders, Hydraulic

Systems, Ring Beam Assemblies, and Other

Complete Equipment

Main Parameters of Lifting Hydraulic Cylinder:

560/300-1600

Number of Hydraulic Cylinders: 2*64 pieces

Delivery Time: 2023-2024 years





4、 Industry Application —— Offshore Platform



Hydraulic Cylinders, Hydraulic Systems, Electrical Control Systems, and Ring Beam Assemblies Before Shipment





Lifting Device During Installation





4, Industry Application —— Offshore Pile Gripper Application Performance



Project	Vessel Type	Shipyard or Shipowner Name	Main Specifications and Supply Content	Supply Period
First Pile Gripper Matching	Pile Gripper Oil Cylinder Without Guide Arm Structure	Jiangsu Ocean Water Construction	200/110-1277, 240/160-2350, 240/160-1500 Hydraulic Cylinders, Hydraulic Systems	2017 Year
Second Pile Gripper Set	Pile Gripper Oil Cylinder Without Guide Arm Structure	Jiangsu Ocean Water Construction	200/110-1277, 240/160-2350, 240/160-1500 Hydraulic Cylinders, Hydraulic Systems	2017 Year
Third Pile Gripper Set	Pile Gripper Oil Cylinder Without Guide Arm Structure	Jiangsu Ocean Water Construction	200/110-1277, 240/160-2350, 240/160-1500 Hydraulic Cylinder, Hydraulic System, Electrical Control System	2018 Year
Fourth Pile Gripper Set	Pile Gripper Oil Cylinder Without Guide Arm Structure	Jiangsu Ocean Water Construction	240/160-2350, 240/160-1500 Hydraulic Cylinder, Hydraulic System, Electrical Control System	2018 Year
Fifth Pile Gripper Set	Pile Gripper Oil Cylinder Without Guide Arm Structure	Jiangsu Ocean Water Construction	320/220-1500, 320/220G-2000 Hydraulic Cylinder, Hydraulic System	2020 Year
Sixth Pile Gripper Set	Pile Gripper Oil Cylinder Without Guide Arm Structure	Jiangsu Ocean Water Construction	320/220-1500, 320/220G-2000 Hydraulic Cylinder, Hydraulic System	2020 Year
Seventh Pile Gripper Set	Pile Gripper Stabilizing Platform	Shanghai Tongsheng	320/160/1050 All Hydraulic Cylinders, Pump Station, System Piping, and Electrical Control Assembly	2019 Year
Eighth Pile Gripper Set	Pile Gripper Hydraulic System Assembly with Non-Guided Arm Structure	Nantong Pengrui Offshore Zhongtian Project	200t*1200 Hydraulic Cylinder, Pump Station, System Piping, and Electrical Control	2019 Year
Ninth Pile Gripper Set	Pile Gripper Device Hydraulic System Assembly with Guided Arm Structure	Sanhang Xiamen Electromechanical Company	160t*1200 Hydraulic Cylinder, Pump Station, System Piping, and Electrical Control	2020 Year
Tenth Pile Gripper Set	Pile Gripper Device Hydraulic System Assembly with Guided Arm Structure	Sanhang Xiamen Electromechanical Company	160t*1200 Hydraulic Cylinder, Pump Station, System Piping, and Electrical Control	2020 Year



4, Industry Application —— Offshore Pile Gripper Application Performance



Project	Vessel Type	Shipyard or Shipowner Name	Main Specifications and Supply Content	Supply Period
Eleventh Pile Gripper Set	Underwater Intelligent Multi-Pile Gripper Device Hydraulic System Assembly	Sanhang Xiamen Company	100t*1200 Hydraulic Cylinder, Pump Station, System Piping, and Electrical Control	Year 2021
Twelfth Pile Gripper Set	Underwater Intelligent Leveling Device Hydraulic System Assembly	Sanhang Xiamen Company	250/200-1800 Hydraulic Cylinder, Pump Station, Leveling Mechanism, System Piping, and Electrical Control	Year 2021
Thirteenth Pile Gripper Set	Pile Gripper Device Hydraulic System Assembly with Guided Arm Structure	Sanhang Ningbo Branch	200t*2850 Hydraulic Cylinder, Pump Station, System Piping, and Electrical Control	Year 2022
Fourteenth Pile Gripper Set	Cangnan Offshore Wind Power Project Pile Gripper Device Hydraulic System Assembly	Sanhang Xiamen Company	320/220-2500, 320/220-2050 Hydraulic Cylinder, Hydraulic System	Year 2022
Fifteenth Pile Gripper Assembly	SPIC Shandong Peninsula South Offshore Wind Power Project Pile Gripper Device Hydraulic System Assembly	CCCC Third Harbor Engineering (Xiamen) Co., Ltd.	200t*1200, 200t*2500, 100t*300 Hydraulic Cylinders, Hydraulic System Power Station and Control Console, Operation Room	Year 2022
Sixteenth Pile Gripper Assembly	Subsea Pile Foundation Leveling and Guiding Device Underwater Piling and Surface Correction System	XCMG Group	450/250-6500 Hydraulic Cylinder, Upper and Lower Ring Beams, Surface Guiding Pile Gripper, Hydraulic System and Electrical Control	Year 2023
Seventeenth Pile Gripper Assembly	TP-001 Pile Stabilizing Platform Hydraulic System	Jiangsu New Hantong Ship Heavy Industry	280/180-1300 Hydraulic Cylinder, Hydraulic Pump Station, Hydraulic Pipeline, and Electrical Control	Year 2023
Article 18 Pile Gripper Support	TP-002 Pile Stabilizing Platform Hydraulic System	Jiangsu New Hantong Ship Heavy Industry	280/180-1300 Hydraulic Cylinder, Hydraulic Pump Station, Hydraulic Pipeline, and Electrical Control	Year 2023
Article 19 Pile Gripper Support	Multifunctional Offshore Wind Power Foundation Piling Platform	Liyang Marine Engineering	320/220-2250 Hydraulic Cylinder, Hydraulic Pump Station, Hydraulic Pipeline, and Electrical Control	Year 2024



4, Industry Application — Offshore Pile Gripper Device



Project Name: Bottom-Supported Single Pile Stabilizing Platform

Shipowner: CCCC Third Harbor Engineering Co., Ltd., Fourth Harbor Engineering Co., Ltd.

Shipyard: Xiamen Shipbuilding Industry, Pingtan Xiongying Shipyard, Zhejiang Yishun Wind Power

Single Pile Diameter: 8 ~ 10.5 meters

Pile Gripper Correction Force: 200t

Scope of Supply: Pile Gripper Device (including Hydraulic Cylinder), Gripper Arm Hydraulic Cylinder, Pin Hydraulic Cylinder, Hydraulic System, Electrical Control System, On-site Piping, and other complete equipment

Pile Gripper Device Stroke: 1500, 2200, 2800, etc.

Supply Time: 2020-2022 year





Zhongtian Offshore Engineering -- Single Pile Gripper Device

Project Name: Bottom-Supported Single Pile

Stabilizing Platform

Shipowner: Zhong Tian Technology

Shipyard: Jiangsu Haili Wind Power

Single Pile Diameter: 8 ~ 10.5 meters

Pile Gripper Correction Force: 200t

Scope of Supply: Pile Gripper Device (including Hydraulic Cylinder), Gripper Arm Hydraulic Cylinder, Pin Hydraulic Cylinder, Hydraulic System, Electrical Control System, On-site Piping, and other complete equipment

Pile Gripper Device Stroke: 1500, 2250, 500

Delivery Time: 2024





4、 Industry Application —— Offshore Pile Gripper Device



Project Name: Bottom-Supported Four-Pile Stabilizing Platform

Ship Owner: Shandong Hongzhou

Shipyard: Nantong Yahua Shipyard

Pile Leg Diameter: 2.6 ~4 meters

Root Opening Distance: 30*30

Scope of Supply: Pile Gripper Device (including Hydraulic Cylinder), Positioning Pile Hydraulic Cylinder, Hydraulic System, Electrical Control System, On-site Piping, and other complete equipment

Delivery Time: 2023

Innovative Features: Pile Positioning Mechanism, Gripper Arm Rotation Mechanism





4、 Industry Application —— Offshore Pile Gripper Device



Project Name: Bottom-Supported Four-Pile

Stabilizing Platform 2 Sets

Ship Owner: Hantong Group Marine Construction

Shipyard: New Hantong Shipyard

Pile Leg Diameter: 2.6 ~ 4 meters

Root Opening Distance: 30*30

Scope of Supply: Pile Gripper Device (including Hydraulic Cylinder), Positioning Pile Lifting Hydraulic Cylinder, Hydraulic System, Electrical Control System, On-site Piping, and other complete equipment

Delivery Time: 2023

Innovative Features: Platform Positioning Pile

Leveling Mechanism





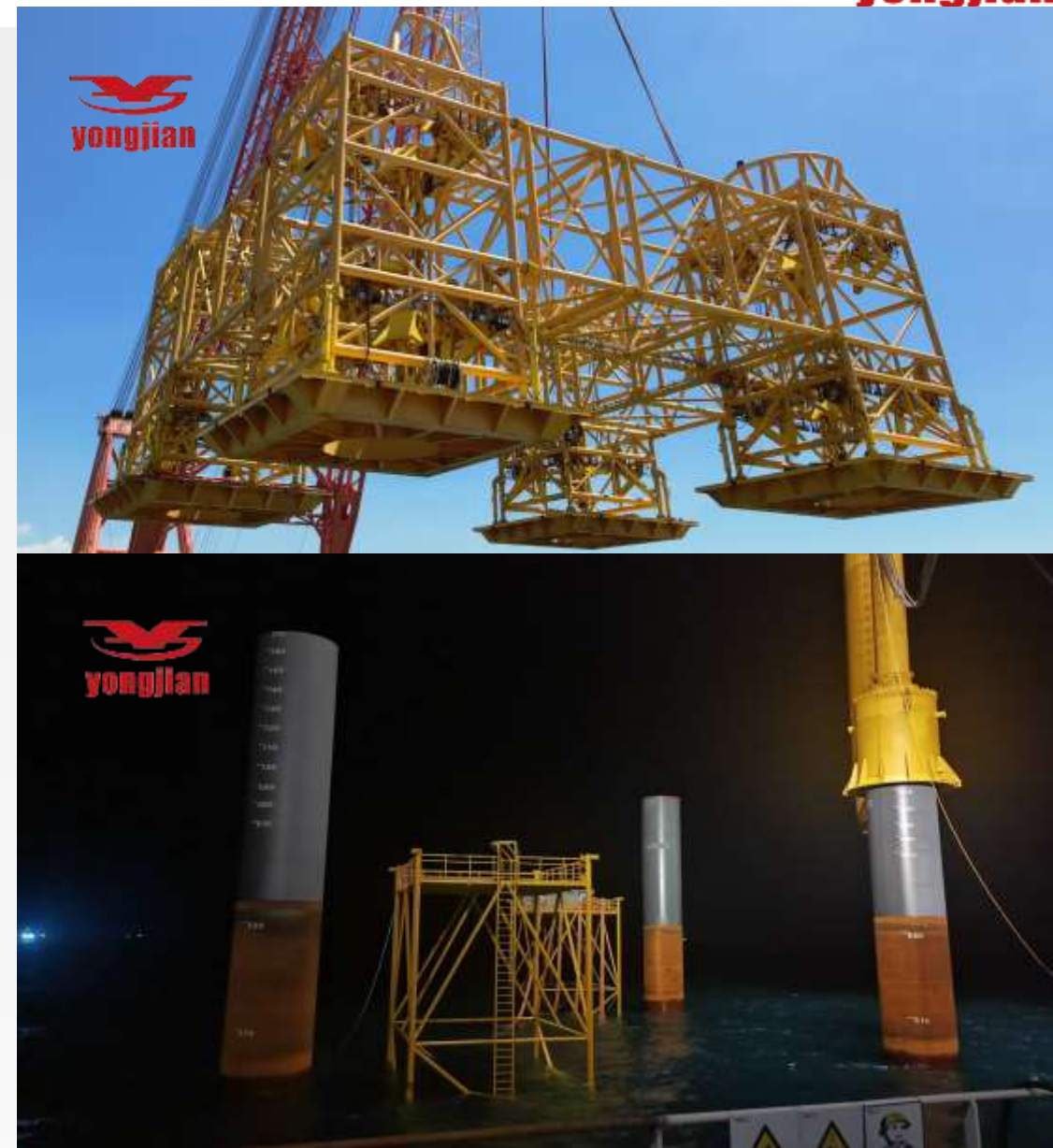
4、 Industry Application —— Offshore Pile Gripper Device



Underwater Intelligent Positioning and Leveling Pile System

The project is applied to the underwater foundation pile driving operation of the four-pile jacket for offshore wind power. The entire equipment is located on the seabed at a depth of 50 meters underwater, and the operators perform operations and inspections on the working vessel, achieving precision in pile driving elevation, spacing, and perpendicularity. The bottom right picture shows a photo taken during the construction process, currently located about 40 meters underwater. Our company owns the intellectual property rights of the equipment, and the accuracy verified by construction far exceeds the equipment accuracy requirements.

Applicable pile diameter range for sinking fc piles	2. 2m~4. 0m
Applicable pile diameter range for sinking piles	2. 2m~4. 0m
Root spacing	30*30 (24 、 27)
Total platform height	18. 82m
Pile gripper correction force	100t
Pile gripper cylinder stroke	1. 2m
Leveling force (per anti-settling plate)	400t
Leveling cylinder stroke	1. 8m
Leveling and correction accuracy	≤0. 3%
Detection method	Sonar, underwater laser, etc.





Project Name: Guanghuo Qingzhou Booster

Station Jacket Pile Clamping Device

Shipyard: Honghua

Delivery Time: April 2021

Main Parameters:

Parameter name	Quantity
Single Pile Locking Force	8000KN
Steel Pipe Pile Diameter	4200mm
Steel Pipe Pile Wall Thickness	60mm
Steel Pipe Pile Material	DH36
Inner Diameter of Pile Shoe	4450mm
Height of Pile Clamping Device	600mm (Adjustable)
Pile Clamping Cylinder Diameter	160
Pile Clamping Cylinder Stroke	280





**YINCHAO JILIAO PROJECT HYDRAULIC
HOIST MACHINE PROJECT**

THE ONLY HYDRAULIC
HOIST PROJECT AT THE
SHANGHAI WORLD
EXPO, THE RELIABILITY
OF ITS OPERATION IS
CRUCIAL TO THE DAILY
DRAINAGE SAFETY OF
THE BAILIANJING
AREA.



**YANGTZE RIVER PROTECTION
PROJECT JIUJIANG
CONSTRUCTION
CONTRACTING DEPARTMENT
SHAYAN ROAD GATE BRIDGE
HYDRAULIC HOIST
PROCUREMENT PROJECT**



6. Industry Application — Metallurgical Heavy Industry



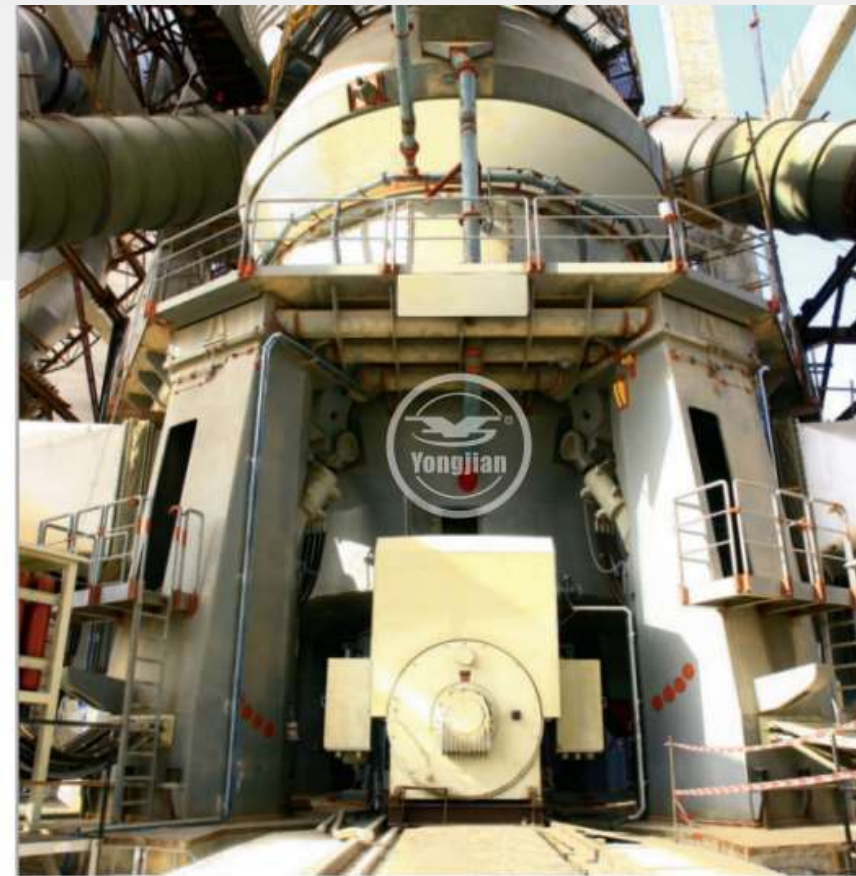
Applied in production lines of the steel industry such as smelting, hot rolling, cold rolling, rail beam, pickling, electroplating, and cooling beds, including all hydraulic cylinders like AGC, AWC, balance cylinders, expansion and contraction cylinders, and balance blocks.



AGC Hydraulic Cylinder:
Cylinder Diameter: $\Phi 800 \sim \Phi 1400\text{mm}$
Frequency Response: $\sim 12\text{HZ}$
Working Pressure: $\sim 31.5\text{MPa}$



Balanced Plunger Cylinder:
Cylinder Diameter: $\sim 650\text{mm}$
Working Pressure: $\sim 35\text{MPa}$



Serving in metal slag, coal powder, and other grinding machine loading oil cylinders, enduring high frequency, fatigue, impact, heavy dust, and continuous operation under harsh conditions, reaching the advanced level of similar international products.



8、 Industry Application —— Construction Machinery Industry



Equipped with the main top oil cylinder, correction oil cylinder, and exit oil cylinder for large rectangular pipe jacking machines



Equipped with the main top oil cylinder, correction oil cylinder, and exit oil cylinder for Zhongyuan 1 rectangular pipe jacking machine



At the construction site of the most advanced hard rock tunnel boring machine in China, equipped with the main top oil cylinder, correction oil cylinder, and screw machine oil cylinder



Manufacturing Capability and Process Flow



Processing of the Cylinder Body



Processing Equipment: Heavy Duty CNC Lathe (CK61160)
Processing Content: Outer Diameter and End Face Machining of Cylinder Body
1, Align with Hole, Finish Turning Outer Diameter and End Face,
2, Synchronize Belt to Both Ends for Threaded Hole Indexing, and Perform Hydraulic Drilling and Tapping.
Quality Requirements:
1, Perpendicularity of Both End Faces to Hole 0.06,
2, M48 Threaded Hole Perpendicular to End Face,
3, M48 Threaded Hole Indexing Accuracy
4. The thread forming is aesthetically pleasing, without defects such as cross-threading or scratches.



Processing Equipment: CNC Deep Hole Boring Machine (FT500*12000)
Processing Content: Precision Machining of the Inner Bore of the Cylinder Body
Equipment Price: 210 million imported from Italy
Processing Range:
Cylinder Diameter: 50-750mm
Length: 1000 - 120,000mm.
Processing Accuracy:
Roughness: Ra:0.2um
Straightness: 0.02mm/1000mm
Roundness: 0.02mm



Large-scale piston rod finishing



Processing Equipment: Heavy Duty CNC Lathe CK61160X18/40

Processing Content:

Single clamping cutting process for outer circle, positioning shoulder, root R angle, sealing groove, and end face forming.

Outer circle, positioning shoulder h8, outer sealing groove dimensional accuracy h9, external thread M320×6-6g

Quality Requirements:

- 1, Ensure groove bottom roughness Ra0.8
- 2, Root R arc roughness Ra1.6
- 2, Perpendicularity of end face and positioning shoulder 0.03
- 3, Coaxiality of groove, thread, and positioning shoulder 0.03



Horizontal Machining Center

High-performance, heavy-duty, large and medium-sized horizontal machining centers imported from Doosan, Korea

Model: NHM6300,

Travel: 1050/850/1000(mm),

It is an advanced model with high performance and high precision standards

Processing hydraulic cylinder end caps, mounting parts

Processing hydraulic system valve blocks and other parts

High precision, high efficiency, good consistency



Numerical Control Floor-type Boring and Milling Machine

The TJK6920 CNC floor-type boring and milling machine from Jiaoda Kunji is a rare piece of equipment among domestic oil cylinder peers.

Mainly used for the milling and precision hole processing of various large-scale, heavy-duty parts (with strong milling capability)

Its X axis travel reaches 10000 mm, Y axis 4000 mm, Z axis 2500 mm, the rotary table can bear 45T, and any three axes can be linked.

Processing of large installation parts and support seats ensures that the hydraulic cylinder can work reliably within the design range for a long time.





Numerical Control Horizontal Milling and Boring Machine

Processing Equipment: Numerical Control Planer-type Horizontal Milling Boring Machine TKP6513

Four-axis Three-linkage

Processing Content: Rear cover of oil cylinder, rod end eye, cylinder body, installation parts, etc.

Milling opposite sides, boring holes, drilling and tapping threads to size

Milling various spherical surfaces, special-shaped structures, threads, etc.

Quality Assurance Capability:

1. Ensure symmetry of opposite sides 0.05
2. Aesthetic thread forming, free from defects such as cross-threading and scratches, especially for milling the end face threaded holes of large cylinder bodies, achieving grade 6 or above, roughness within Ra1.6, perpendicularity to the end face within 0.05, and positional tolerance within 0.05



Welding Robot



Variable Position, Horizontal Rotating Axis;
Vertical Rotating Axis;
Vertical Fixed;
Horizontal Fixed;
Multi-station Continuous Welding Operations.

Circumferential Submerged Arc Welding



Ring Weld Diameter Φ 2000mm, After Welding Evaluation, Weld Seam Depth Can Reach 190mm.
Stable and Reliable Welding Quality, Low Stress, High Welding Efficiency, and Low Cost.

Argon Arc Welding Machine



Automatic Welding for Submerged Arc Welding of Oil Pipelines
Forming Meets Design Requirements
Good Appearance Consistency
High Processing Efficiency



2. Design Selection and Confirmation

(1) Issue Design Task Book, Confirm Customer Requirements

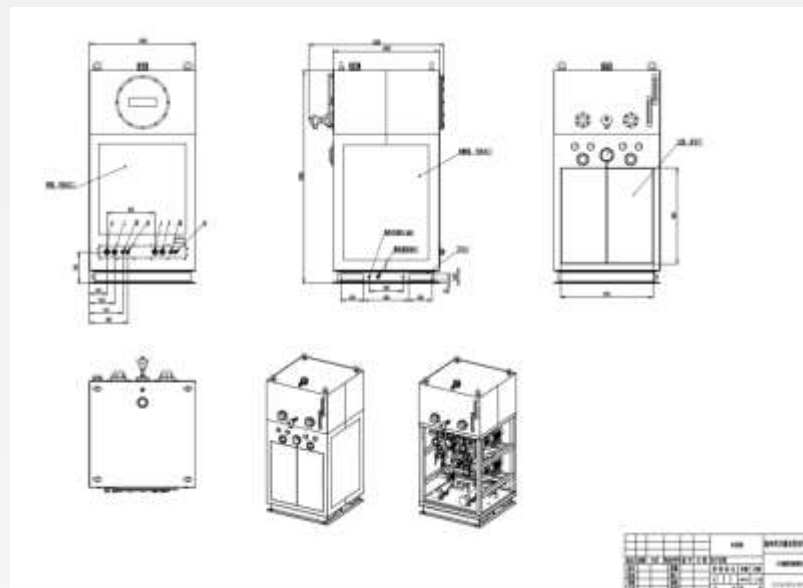
370 磨机润滑柜
设计任务书

文件代号: 917512-00-2-CN-00SR

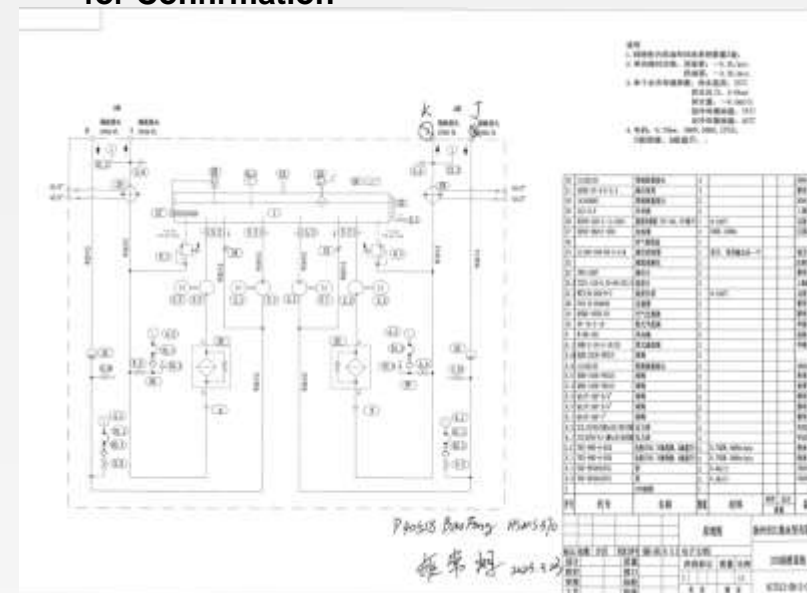
编 制: _____
校 对: _____
会 签: _____
审 核: _____

扬州市江都永坚有限公司
2023 年 3 月

(2) Design 3D Scheme Diagram, Prepare Test Outline



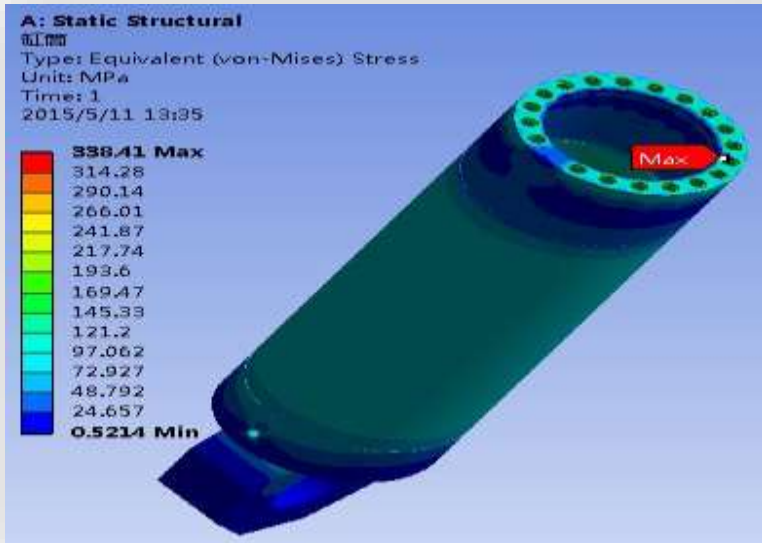
(3) Review 3D Scheme, Confirm Selection of Purchased Parts Brands, Send to Customer for Confirmation



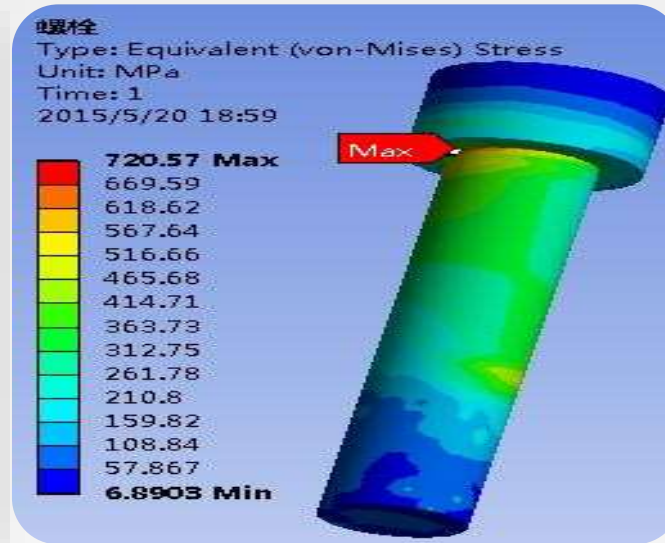


2. Design Selection and Confirmation

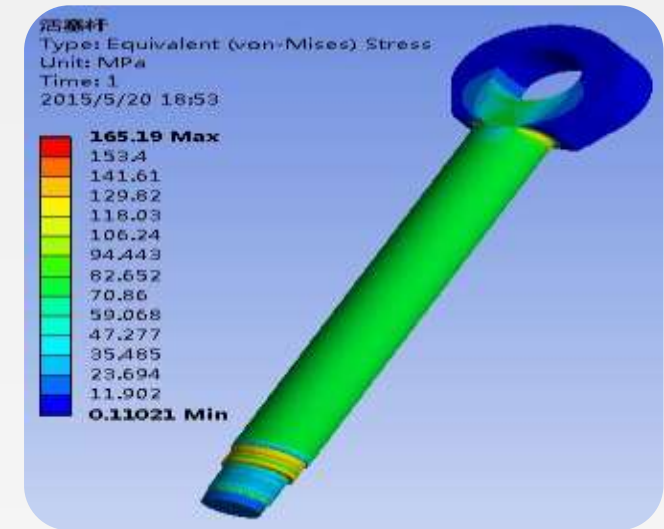
(4) Hydraulic Oil Cylinder Life Calculation



Equivalent Stress Cloud Diagram of Cylinder Barrel



Equivalent Stress Cloud Diagram of Screw



Equivalent Stress Cloud Diagram of Piston Rod

★ All hydraulic cylinder designs comply with the regulations of the classification societies and undergo finite element analysis and life calculation (so far, all domestic and international classification society drawings have been approved in one go)



3.1 Supply Chain Selection and Management

(1) Supplier Evaluation and Re-evaluation

(2) Annual Quality Agreement of Suppliers

(3) 24-Year Qualified Supplier List

(4) Various Supplier Qualification Documents

扬州市江都永坚有限公司

供方/外包方评价表

供方/外包方名称	扬州市江都永坚有限公司	联系人	张永坚
供方/外包方地址	扬州市江都永坚有限公司	联系人姓名	张永坚
联系电话	18251111111	联系人电话	18251111111
供应产品	锻造件		
合格供方/外包方评价	A. 有完善的质量保证体系 (通过 GB/T19001 体系认证) 或经权威机构认证。		
	B. 产品符合本公司标准 (或) 符合产品标准要求。		
	C. 产品在长期使用中评价良好。		
	D. 符合指定的供方/外包方。		
评价人签字	张永坚		
评价日期	2023年11月10日		

锻造件采购质量协议

甲方：扬州市江都永坚有限公司
乙方：江苏一重锻造有限公司

甲方因乙方所采购的锻造件为甲方产品零件件形式之一，其内、外在质量将直接影响甲方产品的可靠性，双方本着“品质第一”原则，经过平等友好协商，就锻造件采购达成如下质量协议：

一、坯件的要求

1. 甲方以合同及采购用图方式，明确所需采购产品的标准、名称、型号、材质、形状尺寸及其它特定要求（如锻造材料等）。

2. 与锻造坯件的相关标准要求

序号	标准名称	技术条件	备注
1	锻件用结构钢牌号和力学性能	GB/T17107-1997	
2	锻造余量		
3	化学成分		
4	无损探伤		

3. 锻造比的要求

1) 锻造时，锻造比

①对非合金结构钢锻造比取 3~4，所选用的锻件重量 10 吨以上，其锻造比 ≥ 4 ，所选用的锻件重量 10 吨以下，其锻造比 ≥ 3 ；

②对合金结构钢，为了促进合金元素均匀化，并使碳化物细化和分散，必须采用较大的锻造比；

2) 用钢材锻造锻件时，因钢材在轧制过程已经过很大的变形，内部组织和力学性能都已得到了改善，一般锻造比取 1.1~1.3。

4. 合同约定进行机械性能复验的，其连续试棒取样段的预置位置及尺寸无产品订货图样的要求。

5. 坯件的交货状态按合同约定要求。

6. 坯件的尺寸、相对位置偏差应满足甲方的产品加工要求。

7. 坯件质量

外观质量——表面无白点、凹陷、皱皮、折叠、开裂及焊补等；

内在质量——不允许有影响气密性及机械性能的缺陷，如气孔、砂眼、夹砂、裂纹、偏析等；对合同约定有无损探伤等级要求的，则按相应等级要求控制。

8. 坯件的质量，按双方确认毛坯重量（其重量必须满足产品订货图样尺寸的要求）。

二、交货要求

1. 产品交货时，乙方必须向甲方提供质量证明记录（如锻坯质保书、炉批号、化学成分报告等）和合同约定的其它记录（如尺寸检查记录、热处理报告、机械性能报告、探伤报告或第三方检验证书等）。

2. 如合同约定，甲方要求进货进行机械性能试验时，乙方必须随锻件提交连续试棒。

三、质量承诺

1. 甲方必须及时向乙方反馈其供货产品的质量状况，以益于乙方的锻造质量提高。

第 1 页 共 2 页

扬州市江都永坚有限公司

合格供方/外包方名单

(2023年度)

编制：吴晋平

审核：_____

批准：_____

2023年11月20日

扬州市江都永坚有限公司

供应商资质文件

(委外特殊工序加工)

2023年11月10日



3. Supplier Management and Procurement



3.2 Procurement

(1) Consistency of Component Procurement List and Technical Documents

370润滑油柜元器清单				
序号	代号	名称	数量	备注
1		370油箱	1	
2.1	YGP-RF206 (V3)	泵	2	6.0ml/r
2.2	YGP-RF204 (V3)	泵	2	4.2ml/r
3.1	YE3-90S-6-B35	电机	2	0.75KW, 1000r/min
3.2			2	
4.1	213.53/63/-0.1-0MPa/G1/4B/CBM	压力表	2	
4.2	213.53/63/1MPa/G1/4B/CBM	压力表	2	
5.1	Q11F-16P-1"	球阀	1	
5.2			2	
5.3	Q11F-16P-3/4"	球阀	2	
5.4			2	
5.5	KHB-16SR-PN315	球阀	2	
5.10	KHB-22LR-PN315	球阀	2	
6.1	DBD-S-10-G-10/25	管式溢流阀	2	
9	W-RD-16S	单向阀	2	
18	DV-16-3-10	管式节流阀	2	
19	QUQ2-10X0.63	空气过滤器	1	
20	PLF-H-160*20	过滤器	2	
21.1	WTZ/Q-280-M-C	温度仪表	1	0-120℃
21.2	T221-120-6.35-60-ZG1/4	温度计	2	
22	YWZ-250T	液位计	2	
23	LC100-450-R-S-G-M	液位控制器	1	常开、常闭触点各一个
27	HRV2-380/1-650	加热器	2	380V, 1000w
28	WZPK-22R-C (L=300)	温度传感器	1	0-120℃
29	GLC-0.8	冷却器	2	

(2) Signed Procurement Contracts

工业品买卖合同

出卖人: 北京华德液压工业集团有限责任公司
合同编号: H0013420001000
签订时间: 2022-09-27
签订地点: 北京市延庆区

买受人: 扬州市江都永聚有限公司

产品名称	规格型号	单位	数量	交货日期	备注	单价	总价
单向阀	WYH-16P-1"	台	1	4-18			
单向阀	WYH-16P-1"	台	1	5-02			
直动式溢流阀	DBD-S-10G-10/25	台	1	4-18			
直动式溢流阀	DBD-S-10G-10/25	台	1	5-02			
手动换向阀	HRV2-380/1-650	台	1	4-18			
手动换向阀	HRV2-380/1-650	台	1	5-02			

合计人民币金额(大写):

1. 产品制造与验收由出卖人负责, 已在签订合同时确认完毕。
2. 产品的使用与安装由买受人负责, 低电压等条件下。
3. 产品应当在本协议签订后 30 日内由出卖人交付给买受人或者买受人指定的承运人, 买受人自行承担运费, 应当在提货之日起由出卖人出具提货单。产品在提货单有效期内实行三包。逾期实行三包服务。质量保证金为从货物所有权转移之日起一年。
4. 标的物所有权由出卖人交付买受人或买受人指定的承运人时转移。
5. 付款方式: 合同签订当日买受人支付 30% 预付款, 当产品具备发货条件时, 买受人支付 30% 预付款, 货到买受人验收合格后买受人指定的承运人签收时, 买受人支付剩余 40% 货款。
6. 提货单以出卖人提供的提货单为准, 提货地点: 基地。
7. 包装标准: 包装物的供应与回收: 按合同约定标准, 一次性使用, 费用由买受人负责。
8. 验收方式:
买受人应当在收货时自行检验, 如果买受人对产品没有异议的, 应当在买受人签收或者其指定承运人签收后 10 日内书面 (以书面形式为准) 向出卖人提出, 逾期视为验收合格。
9. 违约责任:
(1) 如买受人不能交货或未按合同约定的时间交货, 买受人应当及时书面通知出卖人, 在协商实际交货时间前仍无法按时交货的, 由买受人向买受人承担违约责任, 每逾期一天, 按合同总价的 1% 向买受人支付违约金, 直至交货为止, 但违约金总额不得超过合同总价的 20%。

(3) Certificates and Quality Assurance Documents

工业品买卖合同

合同编号: H0013420001000
签订时间: 2022-09-27
签订地点: 北京市延庆区

买受人: 扬州市江都永聚有限公司

产品名称	规格型号	单位	数量	交货日期	备注	单价	总价
单向阀	WYH-16P-1"	台	1	4-18			
单向阀	WYH-16P-1"	台	1	5-02			
直动式溢流阀	DBD-S-10G-10/25	台	1	4-18			
直动式溢流阀	DBD-S-10G-10/25	台	1	5-02			
手动换向阀	HRV2-380/1-650	台	1	4-18			
手动换向阀	HRV2-380/1-650	台	1	5-02			

合计人民币金额(大写):

1. 产品制造与验收由出卖人负责, 已在签订合同时确认完毕。
2. 产品的使用与安装由买受人负责, 低电压等条件下。
3. 产品应当在本协议签订后 30 日内由出卖人交付给买受人或者买受人指定的承运人, 买受人自行承担运费, 应当在提货之日起由出卖人出具提货单。产品在提货单有效期内实行三包。逾期实行三包服务。质量保证金为从货物所有权转移之日起一年。
4. 标的物所有权由出卖人交付买受人或买受人指定的承运人时转移。
5. 付款方式: 合同签订当日买受人支付 30% 预付款, 当产品具备发货条件时, 买受人支付 30% 预付款, 货到买受人验收合格后买受人指定的承运人签收时, 买受人支付剩余 40% 货款。
6. 提货单以出卖人提供的提货单为准, 提货地点: 基地。
7. 包装标准: 包装物的供应与回收: 按合同约定标准, 一次性使用, 费用由买受人负责。
8. 验收方式:
买受人应当在收货时自行检验, 如果买受人对产品没有异议的, 应当在买受人签收或者其指定承运人签收后 10 日内书面 (以书面形式为准) 向出卖人提出, 逾期视为验收合格。
9. 违约责任:
(1) 如买受人不能交货或未按合同约定的时间交货, 买受人应当及时书面通知出卖人, 在协商实际交货时间前仍无法按时交货的, 由买受人向买受人承担违约责任, 每逾期一天, 按合同总价的 1% 向买受人支付违约金, 直至交货为止, 但违约金总额不得超过合同总价的 20%。



(1) Process Operation Card

工 艺 单 件 编 号	ZS-Y0024-00A
图 纸 代 号	第 1 页 共 1 页

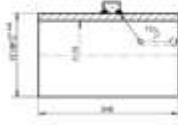
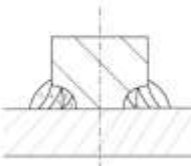
产 品 系 统 代 号	
产 品 代 号	ZB01003720-01-CN-00

零 部 件 装 配 工 艺 卡 片

零、部、组（整）件代号： ZB01003720-01-CN-00

零、部、组（整）件名称： 主振源压机

扬州市江都永坚有限公司

扬州市江都永坚有限公司	焊接工艺卡片	母 材 牌 号 Q345B-Q355B	焊 丝 牌 号 ER50-G	编 号	备 注
接头形式：  		焊接时相关的工艺参数			
		位 置	焊 接 方 式	焊 接 材 料	
		位置	FGAN	HFE-711	$\phi 1.2$
		其余	FGAN	HFE-711	$\phi 1.2$
		性能	焊接电流 / A	焊接电压 / V	焊接速度 mm/min
			280~310	28~31	220~218
		表面反发	280~300	28~31	170~240
			270~290	28~31	280~380

工作內容：

9. 焊缝待焊处两侧10—20mm之内所有油漆杂质等杂物清理干净。用清洁干燥的压缩空气或干纱布擦净打磨表面。清理后的焊缝表面具有明显的金属光泽。
10. 排焊并点焊固定，保证图中要求尺寸。
11. 排焊时焊缝区域预热120℃（Min），采用火焰加热方式。
12. 排焊时分多层多道焊接每层焊后清渣干净，层间温度200℃（Max）。保证每层焊透。
13. 焊缝成形后将焊缝表面清理干净，焊缝外观检查，不得有裂纹、咬边、气孔、折皱及凹坑等缺陷。
14. 焊缝经对焊缝进行磁粉检测和着色探伤。要求焊缝内面光滑无有裂纹、未熔透和夹渣等缺陷。
15. 焊后热处理：放温炉中加热至温度350℃—380℃，高温回火，随炉空冷。

编制人	审核人	审批人	日期	备注

(2) Process Planning Document

FORM: pWPS1816-1/3

焊接工艺计划书(pWPS)

Preliminary Welding Procedure Specification

工作控制号: _____

基本参数
Essential parameters

焊接工艺参数编号 Welding procedure number	1.6mm Φ 80 X 6管 + 1.6mm Φ 60 X 6管 对接焊 / BP1816
--------------------------------------	---

FORM: pWPS1816-3/3

焊接工艺计划书(pWPS) (续)

Preliminary Welding Procedure Specification(continued)

以下请详细填写:
The following is to be filled in by the Surveyor:

上述焊接工艺计划书经审查, 同意按本焊接工艺计划书进行焊接工艺试验 _____ ☐

The above-mentioned pWPS has been reviewed and implementation of WPT in accordance with this pWPS is approved.

上述焊接工艺计划书的审查, 审查意见如下: (请及时回复并与相关船舶联系) _____ ☐

The above-mentioned PWS has been reviewed with comments as follows: (Please reply and contact the attending Surveyor as soon as possible)

签名:
Signature

CCS 验船师
CCS Surveyor

日期
Date

填写说明:
Remarks:



下列缩写可用于表格填写:
The following abbreviation may be used in this form.

焊接方法: Welding process:
手工电弧焊: SMAW, 埋弧焊: SAW, 金属型气体保护焊: GMAW,
药芯焊丝气体保护焊: FCAW, 药芯焊丝气体保护焊: FCAW, 气体保护焊: GMAW,
电阻焊: RW

焊接位置: Welding position
平焊: F 立焊(上行) V(up); 立焊(下行) V(down); 横焊: H 仰焊: O

电流种类和极性: Type of current & Polarity:
交流: AC; 直流正接: DCEN; 直流反接: DCEP; 脉冲电流: Pulsed

(3) Process Approval Test Report and Results

工作控制号: YJ198308
NO. 1

焊接工艺认可试验报告(WPQR) Welding Procedure Qualification Record

标准: 中国船级社《材料与焊接规范》Code

焊接工艺名称及编号
Name and serial number

制造厂名称及地址
Manufacturer's Name and address

材料及焊接工艺 Material and Welding pro
06C379N10 批准焊接工艺

焊接方法: 熔焊及钎焊
Welding process: GTAW

接头形式: 对接接头
Joint type: Butt welding

焊接位置: 平焊
Welding position: F

母材(牌号、厚度、交货状态) Parent material
condition: 06C379N10/δ60°6交货

预热材料(牌号/规格/等级) Filler material (y
E6003 (电2)

焊接方向: 垂直于管柱纵切方向
Weld direction: perpendicular to the roll

管子外径尺寸: δ60 焊后状态: /
Pipe outside diameter

预热及焊后热处理
Preheat and Postweld heat treatment

预热温度
Preheat temperature

多位置
Mn

预热方法:
Preheat method

其它说明:
Other information*

焊接细节 Welding details

焊号 Run	焊接方法 Process	母材直径 Size of filler material (mm)	电流种类 Type of C Polar
1	GTAW	Φ2	DCE
2	GTAW	Φ2	DCE
3	GTAW	Φ2	DCE
焊工姓名 Welder's name			
唐洪 Tang Hong			

焊接工艺认可试验报告(续)

FORM: WPQR1316-3/4

Welding Procedure Qualification Record(continued)

附加试验(规范 3.2.4.3 款要求):

Additional test(s) and result(s)(According to 3.2.4.3 of Rules for Material and Welding)

注:

Remarks:

1. 如焊条/丝状金属大摆动宽度, 焊道清除方式等

1. e.g. Weaving/mov. Width of run, Method of interpass cleaning, etc.

2. 如有必要则

2. If required

☒ 适用 Applicable

☐ 不适用 Inapplicable

下列缩写可用于表格填写:

The following abbreviation may be used in this form.

焊接方法:

Welding process:

手工电弧焊 SMAW, 埋弧焊 SAW, 金属惰性气体保护 GMAW,

气体保护焊 GTAW, 药芯焊丝气体保护焊 FCAW, 气体立焊 ESW

平焊: F, 立焊(上行) V(up), 立焊(下行) V(down), 横焊: H, 仰焊: O

电流种类和极性: Type of current & Polarity:

交流 AC; 直流正接 DCEN; 直流反接 DCEP; 脉冲电流 Pulsed

兹证明本焊接工艺认可过程和试验结果, 符合中国船级社《材料与焊接规范》(2006)及其修改通报的要求。
THIS is certify that the test process and results were found to be in compliance with the relevant
requirements of "Rules for Material and Welding"(2006) and Amendments promulgated by China
Classification Society.

签名:

Signature

制造厂代表

Manufacturer

CCS 验船师

CCS Surveyor

日期

Date

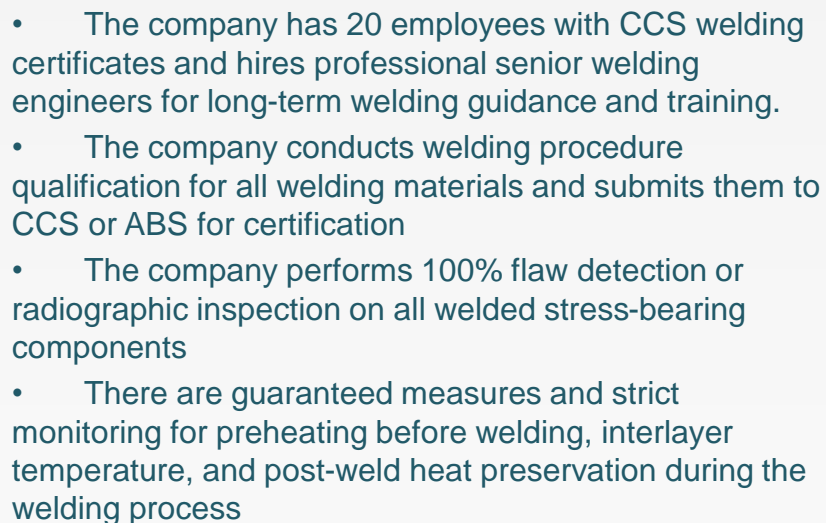
日期

Date



4.2 Quality Control Planning

[illegible]



Ultrasonic Testing Report

超声波检测报告

Contract / 合同

Ultrasonic Testing Report


超声波检测报告

Original Report No:18042409

Issue Date:2019. 4. 24

Contract / 合同:1711002

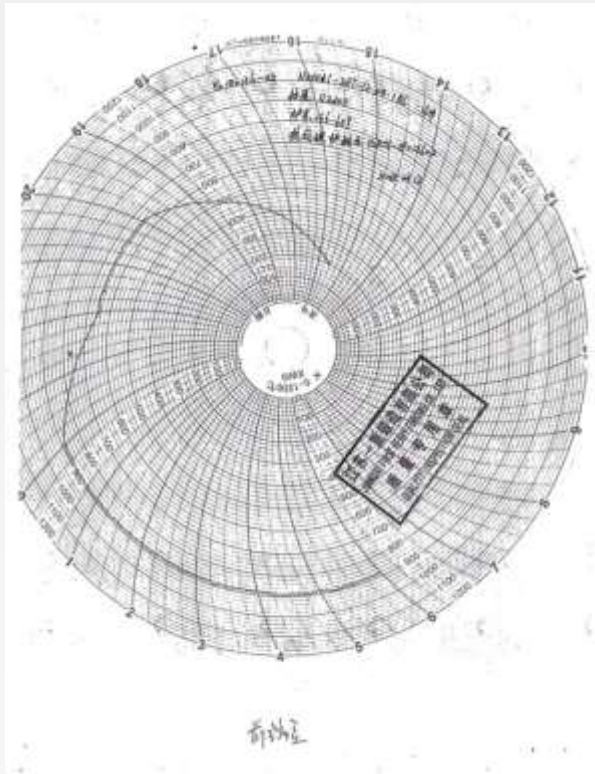
超声波检测报告

委托单位: Entrusting unit:		扬州市江都永顺有限公司 Yangzhou Jiangdu Yongshun Co., Ltd.			
检测工件 / Workpiece Item					
工件名称 Workpiece's Name	连接头	图纸编号 Drawing No.	H3007-207-12-40	规格 (mm) Specification	Φ500×810
使用材料 Material	45	表面状况 surface status	Ra≤6.3um	探伤灵敏度 sensitivity	≥20平毫米
报告仪器号 Test Equipment	CH2990	仪器编号 Apparatus No.	1819	热处理状况 Heat treatment status	/
标准试块 Standard test block	CSE-1A/CB II	扫查调整方式 Sweep line adjustment mode	横置:1:5	检验标准 Inspection Standard	GB/T6402-2008
探头 Probe type	2.5P20	环境温度 Environment Temp. (℃)	6℃	合格判定 Accept Grade	合格
耦合剂 Couplant	机油 oil	报告数量 Quantity	4	检验率 Test Ratio	100%
<p>本批 <u>4</u> 支, 按100%检验 <u>4</u> 支, 经超声检测, 结果符合</p> <p>报告结果 Test Results</p> <p>GB/T6402-2008 B 级要求, 不合格产品 <u>0</u> 支。</p> <p>According to <u>GB/T6402-2008 B</u>, <u>4</u> products have been tested by UT. The quantity of accepted <u>4</u> , rejected <u>0</u>.</p>					
<p>示意图: Sketch For The UT Location</p> 					
<p>检测人(签字):</p> <p>Inspector (Signature):</p>					
检测人(签字):		审核人(签字):		检测专用章	
Inspector (Signature):		Checked by (Name):		Detection of Special seal	



5, Control of Important and Special Processes of Hydraulic Cylinders

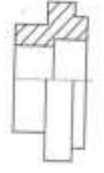
5.2 Heat Treatment



- 1 All heat treatments have process documents and dial temperature curves of the heating process
- 2 All parts after heat treatment are inspected for surface hardness compliance and undergo 100% UT
- 3 Mechanical properties tests, including one tensile and three impact tests, are conducted as required

Ultrasonic Testing Report
超声波检测报告

Contract / 合同: 171460 Original Report No Issue Date:

委托单位/ Entrusting unit:	扬州市江都永坚有限公司 Yangzhou Jiangdu Yongjian Co., Ltd				
被检工件 / Workpiece Item					
工件名称 Workpiece's Name	数量 Quantity	图纸编号 Drawing No.	规格 (mm) Workpiece specification	Φ7	
使用材料 Material	Q345D	表面状况 surface states	Ra 4.0, 3.0	探伤灵敏度 sensitivity	Φ2
探伤仪器号 Test Equipment	CSE2090	仪器编号 Apparatus No.	1313	热处理状况 Heat treatment status	
标准试块 Standard test block	CSE-1A/CSE II	扫描调整方式 Sweep line adjustment mode	深度 1:5	检验标准 Inspection Standard	GB/T64
探头 Probe type	2.5P20	环境温度 Environment Temp. (°C)	18°C	合格级别 Accept Grade	II
耦合剂 Couplant	机油 oil	探伤数量 Quantity	4	检验率 Test Ratio	10
检测结果 Test Results	本批 4 支, 按 100% 检验 4 支, 经超声检测, 结果: GB/T6402-2008 II 级要求, 不合格产品 0 支。 According to GB/T6402-2008 II, 4 products have been tested by UT. The quantity of accepted 4, rejected 0.				
示意图: Sketch For The UT Location					
检测人 (级别): 姜 25	审核人 (级别): 胡 15	检测专用章			
Inspector (Level):	UT-II	Checked by (Level):	UT-II	Detection of Special as	

热 处 理 报 告
Heat treatment report

QR8.2.4-08 No. 18013602

客户名称/Customer 扬州市江都永坚有限公司 日期/Date 2018-04-20

合同号 / Contract No. 171460 熔炼号 / Melting No. 166-559

产品名称/Product Name 材质 / Material Q345D

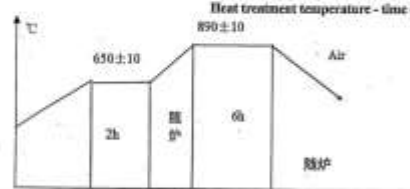
产品编号
Product No. YZ180136-02 图号
Drawing No. H25011-287-12-04-1BL 数量
Quantity 16 热处理炉批号
Heat treatment furnace batch No. YZRL-18013602

热 处 理 工 艺 / Heat treatment process

热处理方式/Heat treatment mode N

入炉温度 Into the furnace temperature (°C)	保温温度 Holding temperature ±10(°C)	保温时间 Holding time ±0.5(h)	冷却方式 Cooling mode	出炉温度 Tapping temperature (°C)
N ≤300	890±10	6	空冷	896

热处理温度-时间曲线
Heat treatment temperature - time curves



硬度检测
HB Test

要求值 Require	实测值 Actual
HB127-180	162, 169, 176

结论
Result 合格/Qualified ☐

检验 / 日期
Inspector/Date 单建/2018-03-12

审核 / 日期
Reviewed/Date 肖龙建/2018-03-12

江苏一重锻造有限公司
Jiangsu Yizhong Forging Co., Ltd.
质量检验部
QUALITY INSPECTION SEI

H25011-287-12-04-1BL



5, Control of Important and Special Processes of Hydraulic Cylinders

5.3 Hydraulic cylinder Piston rod coating salt spray and hardness testing



扬州市江都永坚有限公司

盐雾试验报告

共 5 页 第 1 页

产品图号名称	H2500T-28T-12-03 活塞杆	试样性质	双头螺
试样规格	Φ49*88	镀层厚度	镀锌 0.045mm, 镀铬 0.06mm
NaCl 品质	99.5%分析纯	盐雾试验类型	5%中性盐雾喷雾
试验时间	2018.2.24-2018.4.7	镀层厚度	
试验环境温度℃	35±1	压力桶温度℃	47±1
压缩空气压力	1.00±0.01kg/cm ²	测试数量	1pcs
放入时间	2018-2-24/ 13:00:00	取出时间	2018-04-07/ 8:00
试验总时间	1003h		

周期观察记录表 (H)

时间 (H)	观察结果(试件外观)	PH 值 (6.5-7.2)	盐雾沉降量 (1-2ml/80cm ² /H)
46	无锈渍腐蚀	6.8	1.11
76	无锈渍腐蚀	6.8	1.11
120	无锈渍腐蚀	6.8	1.11
240	无锈渍腐蚀	6.8	1.11
432	无锈渍腐蚀	6.8	1.11
500	无锈渍腐蚀	6.8	1.11
648	无锈渍腐蚀	6.8	1.11
768	无锈渍腐蚀	6.8	1.11
888	无锈渍腐蚀	6.8	1.11
1003	无锈渍腐蚀	6.8	1.11

1. 试样时间要求: ≥1000h. (中性盐雾试验)
2. 试样试验时间: 2018 年 2 月 24 日下午 1 时开始, 2018 年 4 月 7 日早上 8 时结束 (连续试验)
3. 试样试验完毕等级评定: 10 级
4. 试样试验过程附实拍图片, 见附页

测试员	顾清	结果	合格
-----	----	----	----



- 1. Ultrasonic cleaning, temperature set to 45 °C, cleaning time is 3 × 20 minutes
- 2. Cleaning liquid spray rinse: Components automatically transfer from the ultrasonic cleaning machine to the spray rinse area, high-pressure spray rinse for 2 minutes, removing residue from corners
- 3. Hot air drying: Using dry, clean hot air for drying

After all important oil cylinder tests are completed, the residual oil is checked for cleanliness, all reaching NAS8 level or above

Chapter 3: Manufacturing Capability and Process Flow



5.5 Hydraulic cylinder assembly

- 1, All oil cylinder numbers and part numbers correspond one-to-one;
- 2, All screws are pre-tightened three times using a torque wrench to ensure thread fit accuracy and uniform force distribution;
- 3, Specialized tooling, frozen assembly of joint bearings, no jamming or hammering allowed during assembly, and no damage to the inner surface of the bearing installation hole;
- 4, Important assembly nodes are recorded by multimedia.



Permanent identification of product oil cylinder: YJ18060102
corresponding inspection records





5.6 Cleanliness of residual oil in hydraulic cylinder and cross-cut test of paint surface

1. All hydraulic cylinders are pretreated with shot blasting, surface reaches Sa2.5 grade, then coated with anti-rust primer
2. Non-moving mating surfaces are painted, and the paint meets the (ISO12944-2) standard for C5M environmental requirements. The paint film thickness, cross-cut test, and paint adhesion on test panels meet the standard requirements
3. Non-painted surfaces are protected with anti-rust oil



The attached diagram shows the company's shot blasting, painting, drying production line, and an inspector performing a cross-hatch test



6.1 Valve Block Processing

Equipment: Horizontal Machining Center HM63TD

Work Content and Quality Requirements

1. Only two clamping operations are needed to complete the machining of the six working surfaces of the valve block, with the surface roughness of the valve block reaching Ra1.6 or above
2. Good consistency in mass production, with high precision in positional tolerance, parallelism, perpendicularity, and other geometric tolerances
3. Precision machining of oil passage holes, cartridge valve holes, and threaded holes, exceeding the precision requirements of the drawings
4. Marking Engraving Depth Consistent, Clearly Visible, Easy for Permanent Identification





6.2 Oil Tank / Structural Parts Manufacturing

Equipment: Argon Arc Welding Machine ZX7-630S/T

Numerical Control Bending Machine WY68/63

Work Content and Quality Requirements

Sheet metal and welding processing of thin plates for oil tanks, bases, and related structural parts. All oil tanks are welded using argon arc welding, ensuring good forming, minimal deformation, attractive appearance, and guaranteed quality.

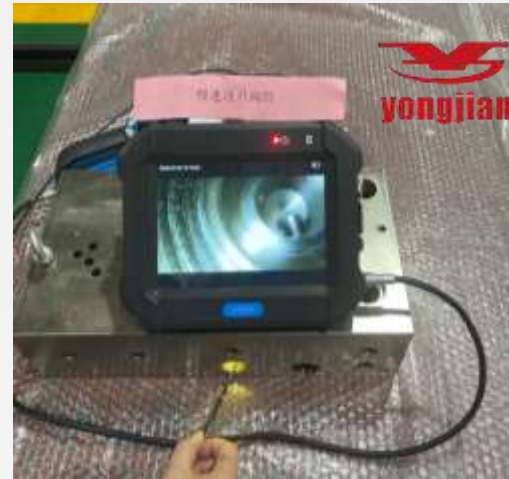


6.3 Valve Block Chemical Nickel Plating Control



All valve blocks undergo chemical nickel plating surface treatment
All valve blocks after electroplating undergo coating thickness and surface quality inspection

6.4 Valve Block and Pipeline Debris Control



Equipment: 20 Times Endoscope

1. Inspect internal intersecting oil passages of valve blocks for burrs, oil stains, rust, etc.
2. Inspect internal surfaces of pipeline weld seams for welding defects, weld beads, welding slag residues, etc.



6.5 Hydraulic System Debris Control

Equipment: Pipeline Filtration Cleaning Device JN400B

Particle Detector LPA-W

1. The pressure oil input from the external pump source is pre-filtered and cleaned for the hydraulic pipeline, valve group, and hydraulic system. Through 8-40 hours of high pressure, pulse, and high flow flushing, the oil cleanliness requirements are met, preventing cross-contamination of finished products such as pumps and valves.

2. After the above cleaning, the cleanliness of the flushed oil must not be lower than NAS 8 level, with a maximum of NAS6 level.



6.6 Pipeline Welding

Equipment: GTX automatic docking welding machine

Work Content:

Welding $\Phi 10 \sim \Phi 80$ mm pipeline

1. Single-sided welding, double-sided forming
2. Radiographic flaw detection sampling qualified
3. Weld seam appearance is full beautiful, with good consistency.





6.7 Hydraulic Valve Incoming Retest

Equipment: Hydraulic Valve Performance Retest Bench

1. With more than two types of media, it can perform performance retesting and calibration of incoming valves
2. Can retain video records throughout the entire retesting process



6.8 Assembly and Testing Process Control



1. An approximately 300 square meter clean assembly room, completely isolated from the outside, with an air supply system ensuring internal pressure higher than the external, guaranteeing internal cleanliness:
- 2, Video cameras control and record the assembly process of various hydraulic systems
- 3, All thread tightening and sealant usage are documented with work instructions and recorded via multimedia to ensure control and traceability

6.9 Coating Process Control



Coating Thickness Gauge and Cross Hatch Cutter

- 1, Measure the paint thickness of the product
- 2, Test the paint adhesion



Welding Process Specification

Welding Procedure Qualification Test Report

CCS Ship Inspection Certification Report

P096: WPS-1/2		工作控制号: T2218A07 Nil.						
焊接工艺规程(WPS) Welding Procedure Specification								
标准: 中国船社《材料与焊接规范》 Code Class Q23								
焊接工艺名称及编号 Name and serial number:		Q690E+Q690E 埋弧焊工艺 (p/WPS-HF2108)						
制造厂家名称及地址 Manufacturer's Name and address:		扬州市江都永有有限公司(扬州江都区文昌东路1458号) No.: 1458 wenchang East Rd.Jiandu District.Yangzhou City Jiangsu Province						
适用板材(钢种)规格/材质: Base material range:		S275N300(Q690E)						
焊接方法: 埋弧自动焊 Welding process : SAW		单道焊 Single pass	单面焊 <input type="checkbox"/>					
接头形式: 开坡口 Joint type: Butt welding		多道焊 Multi pass	双面焊 <input type="checkbox"/>					
焊接位置: 平焊 Welding position: F		组合焊缝 Multi process	双面侧焊 <input type="checkbox"/>					
			背面膜焊 <input type="checkbox"/>					
试验母材厚度/厚度范围: Q690E钢板 Class of base metal not specified/arbitrary condition		焊接类型: 自动焊 Type: AUTOMATIC						
试验母材厚度/Thickness of base metal test sample: 19~30mm		管子外径尺寸/ Pipe outside Dia.:						
非受限; 无 Shop practice: No		气体种类/ Gas type						
接口设计(草图) Test joint details (sketch with dimensions)		焊缝布置和焊缝顺序(草图) Bead sequence detail(sketch)						
备注 Remark:								
1. 装配时要求打坡口, 采用 PCAW 进行打底焊接。When the assembly gap exceeds 1 mm, the PCAW is used for bottom welding.								
2. 终层是手工进行堆焊施工。No carbon planar construction on the end layer side.								
焊接参数 Welding parameters								
焊速 Rate	焊接方法 Process	焊丝直径 Diameter of filler material (mm)	电流种类 Type of current Polarity	焊接电流 Current (A)	电压 Voltage (V)	焊接速度* Travel speed*(in/h)	热输入* Heat input*(kJ/cm)	气保流量 Gas flow rate (L/min)
1	SAW	Φ4	DCEP	450-520	30-38	25-35	2.31-4.74	/
2	SAW	Φ4	DCEP	400-500	30-38	25-35	2.06-4.56	/
3	SAW	Φ4	DCEP	400-500	30-38	25-35	2.06-4.56	/
4, 5	SAW	Φ4	DCEP	400-500	30-38	25-35	2.06-4.56	/
* 如未标注 * If missing								

工件编号: WJ218A07 80.1						
焊接工艺认可试验报告(WPQR) Welding Procedure Qualification Record						
标准: 中国标准						
有证人员姓名/名称 Name and serial no						
制造厂名称/地址 Manufacturer's No						
材料及焊接工艺 Q355B/埋弧焊 I 型						
焊接方法: 埋弧 Welding process: I						
接头形式: 对接 Joint type: Butt						
焊接位置: 平 Welding position:						
母材(品种/厚度): Condition: Q355B						
焊丝材料(型号/规格): C15W-5.10B (φ4)						
焊接方向: Weld direction:						
管子外径(英寸): Pipe outside diameter						
预热及后热 Preheat and Postheat						
预热温度(范围): Preheat temperature						
预热时间: Min.						
预热方法: Preheat method:						
其它说明: Other information						
施焊细节 Welding						
焊道 Run	焊接方法 Process					
1L	SAW					
1T	SAW					
2L	SAW					
2T	SAW					
焊工姓名: Welder's name:						
试验项目及结果 Test items and results						
1. 非金属熔透性试验 Non-destructive examination 射线探伤: 埋弧全熔透 Radiography: Weld full length 超声波探伤: 埋弧全熔透 Ultrasonic: Magnetic particles 渗透探伤: 埋弧全熔透 Liquid penetrant						
2. 破坏性试验 Destructive examination						
拉伸试验 Tensile tests						
试样 Type piece	抗拉强度 Tensile strength (N/mm ²)	屈服强度 Yield point (N/mm ²)	伸长率 Elongation %	断面收缩率 Reduction of area %	冲击功 Impact energy (Joules)	试验结果 Test result (%)
横纹(试样 1) Transverse 1	771	✓	✓	✓	每材 100% 批性 100%	20
横纹(试样 2) Transverse 2	790	✓	✓	✓	每材 100% 批性 100%	20
弯曲试验 Bend tests						
试样 Type piece	热弯 Hot bend	试样 Test piece	热弯 Hot bend	热弯 Hot bend	热弯 Hot bend	试验结果 Test result
横弯 side	40mm/180°	无缺陷 No defect	横弯 side	40mm/180°	无缺陷 No defect	无缺陷 No defect
横弯 side	40mm/180°	无缺陷 No defect	横弯 side	40mm/180°	无缺陷 No defect	无缺陷 No defect
焊接接头宏观组织 Macrostructure						
试样编号 Specimen No.: WJ218A						
						
试验结果: 1. 焊缝组织良好, 熔合线, 熔合线附近无缺陷。 2. 焊缝与母材过渡平滑, 无裂纹或花边等缺陷, 无夹渣缺陷。 3. 无气孔, 无裂纹, 无夹渣, 无未熔透, 无未熔合等缺陷。 (See Results)						
1. The weld metal, heat line, base metal and HAZ are provided clearly. 2. The weld metal transitions to the base metal smoothly. No excessive reinforcement. No spatter. 3. No gas pores, No cracks, No slag inclusion, No incomplete penetration, No lack of fusion etc.						

中国船级社
CHINA CLASSIFICATION SOCIETY
船用产品证书

证书编号/Certificate No.

TZ2JPF50091_10

CERTIFICATE OF MARINE PRODUCT

中国船级社
CHINA CLASSIFICATION SOCIETY
船用产品证书

证书编号/Certificate No.

TZ2JPF50091_10

CERTIFICATE OF MARINE PRODUCT

兹证明下列产品符合本证书所规定的技术条件，且符合下列技术规范的要求。

This is to certify that the following products have been supplied to the satisfaction of the Society and are found to comply with the requirements of the specified standards.

产品名称

液压式顶升吊钩装置

Product

Latch hydraulic jacking-up

制造商

扬州市江都永昌有限公司

制造商

扬州市江都永昌有限公司

Manufacturer

Yangzhou Jintong Yanchang Co., Ltd.

制造商

扬州市江都永昌有限公司

Manufacturer

Yangzhou Jintong Yanchang Co., Ltd.

产品证书号/Certificate No. of Approval

无

批准日期/Approval Date of Issuance

2012.03.01

附加技术条件

无

证书编号

船用产品证书/Ship and Offshore Installations

船用产品证书/Ship and Offshore Installations

产品编号

20120001

产品检验标准/Product Inspection Standard

1 中国船级社《钢质和铝质产品入级规范》(2010)

1 China Classification Society "Rules for Classification of Metals Offshore Units" (2010)

2 中国船级社《船用材料性能试验》(2010) 第 1 部分: 金属材料

2 China Classification Society Rules for Material and Welding (2010) and its Amendment (2011)

3 中华人民共和国海事局《船舶产品证书检验规范》(2010)

3 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

4 中国船级社《船用材料性能试验》(2010)

4 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

5 中国船级社《船用材料性能试验》(2010)

5 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

6 中国船级社《船用材料性能试验》(2010)

6 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

7 中国船级社《船用材料性能试验》(2010)

7 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

8 中国船级社《船用材料性能试验》(2010)

8 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

9 中国船级社《船用材料性能试验》(2010)

9 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

10 中国船级社《船用材料性能试验》(2010)

10 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

11 中国船级社《船用材料性能试验》(2010)

11 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

12 中国船级社《船用材料性能试验》(2010)

12 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

13 中国船级社《船用材料性能试验》(2010)

13 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

14 中国船级社《船用材料性能试验》(2010)

14 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

15 中国船级社《船用材料性能试验》(2010)

15 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

16 中国船级社《船用材料性能试验》(2010)

16 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

17 中国船级社《船用材料性能试验》(2010)

17 Chinese Register of Shipping Survey Rules for Shipboard Products Inspection (2010)

产品名称

液压式顶升吊钩装置

Latch hydraulic jacking-up

产品名称

液压式顶升吊钩装置

Latch hydraulic jacking-up

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产品名称

液压式顶升吊钩装置

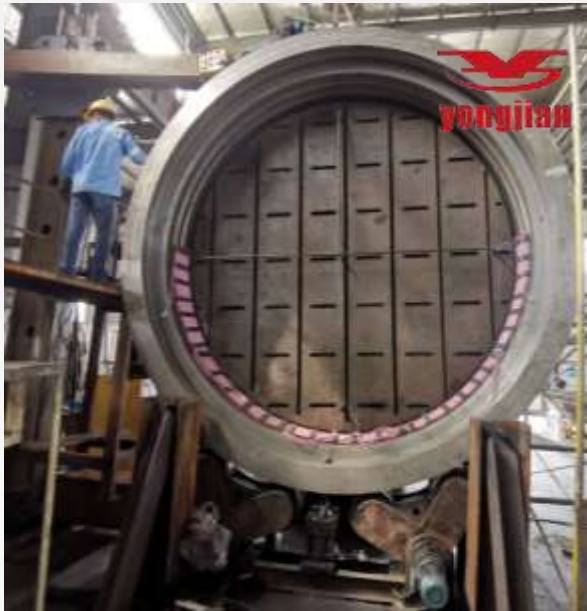
Latch hydraulic jacking-up

产品名称



7.2 Large Structural Component Welding

Q690E** Head Structure Welding
Inner Diameter: 3000mm
Wall Thickness: 90mm
Continuous Welding Time: 74 hours





7, Important and Special Processes for Large Structural Components



7.3 Post-Welding Stress Relief

For stress relief of large components, a complete process plan should be developed, and a third party should be commissioned to evaluate the vibration effect of the welded structures according to the JB/T5926-2005 Vibration Aging Effect Evaluation Method.

中华人民共和国机械行业标准

振动时效效果评定方法

JB/T5926-2005

1 范围

本标准规定了振动时效工艺参数选择及技术要求对振动时效效果的评定方法。
本标准适用于碳素结构钢、低合金钢、不锈钢、铸钢、有色金属（铜、铝、钛及其合金）等材料的铸件、锻件、焊接件、模具、机械加工件的振动时效处理。

2 规范性引用文件

下列文件中的条款通过本标准的引用而成为本标准的条款。凡是注日期的引用文件，其随后所有的修改单（不包括勘误的内容）或修订版均不适用于本标准，然而，鼓励使用本标准的各方研究是否可适用这些文件的最新版本。凡是不注日期的引用文件，其最新版本适用于本标准。
JB/T5926-2005 机械式振动时效装置技术条件

3 术语、符号

3.1

3.2

3.3

3.4

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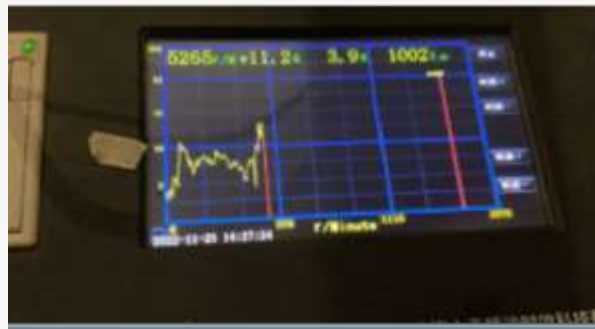
3.20

振动时效报告

TJ (2023) 检测 (工艺) 字第 d23717

委托单位: 扬州市江都永坚有限公司

项目名称: HY78 船自升式风电平台 (下动环梁)



五、振动时效曲线图

5.1 下动环梁

工件名称	下动环梁	顺序号	22020011	型号	250x125-13-1-1-0	材质	焊接件
产品编号	22020011	外形尺寸 (mm)	830x720x1400	自然 状态	装焊完成	重量 (kg)	51180
设备名称 型号	尊智 VS8-70	激励器型号	2000~8000 r/min 2.2m/10s	激励点		构件上部内环	
支撑物	木方	支撑点	均匀 4 点支撑	振动时效时间		主振 25min 发振 25min	
检测位置	侧面	检测点	耳耳吊钩边	激励力 (kN)		6 档	

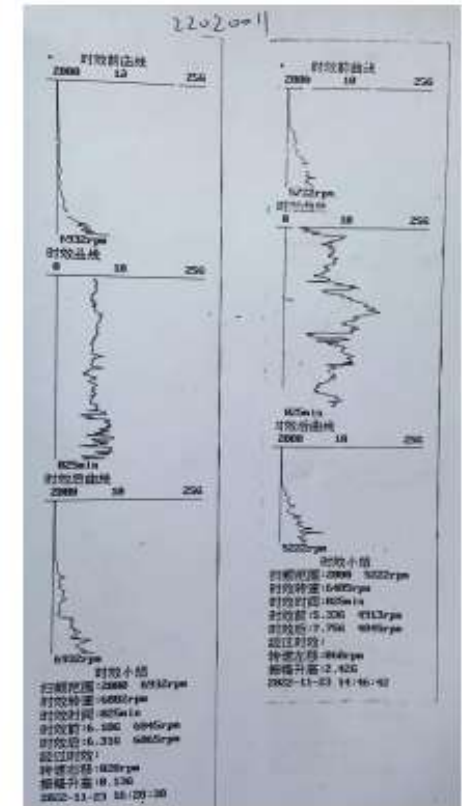
时效曲线图 (由检测数据)

主振时效参数	激励前自由曲线数据		激励后自由曲线数据		激励数据	
	时效频率 (rpm)	振幅 G	时效频率 (rpm)	振幅 G	共振频率变化量	振幅变化量
	4813	6.33	4845	7.78	68rpm	2.45G
发振时效参数	激励前自由曲线数据		激励后自由曲线数据		激励数据	
	时效频率 (rpm)	振幅 G	时效频率 (rpm)	振幅 G	共振频率变化量	振幅变化量
	6045	6.18	6065	6.31	20rpm	0.13G

根据检测数据得出以下结论:
主振激励时效前固有频率为 4813 Hz, 共振频率为 4813 Hz。
主振激励时效后固有频率为 4845 Hz, 共振频率为 4845 Hz。
发振激励时效前固有频率为 6045 Hz, 共振频率为 6045 Hz。
发振激励时效后固有频率为 6065 Hz, 共振频率为 6065 Hz。
以上曲线图分析, G=0.3 曲线数据经过 25 分钟的主振激励时效, 时效后固有频率变化 32 Hz, 变化较大, 振幅变化 2.45G, 有明显变化。经过 25 分钟发振激励时效后固有频率变化 20 Hz, 振幅变化 0.13G, 发振激励时效没有明显变化。主振激励变化明显, 达到时效效果。
上述数据符合中华人民共和国机械行业标准 JB/T5926-2005 中 6.1 条款的规定, 判定本次振动时效效果有效。

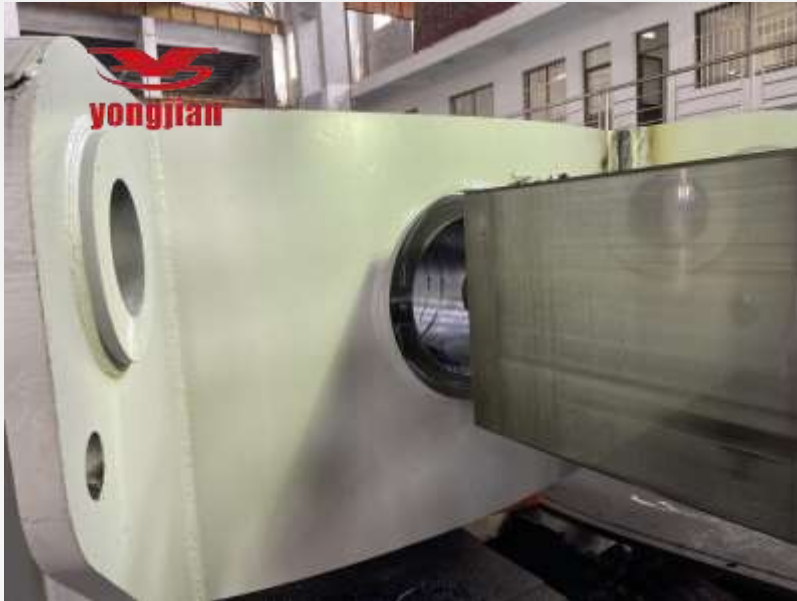
第 6 页

附件 1 5.1 下动环梁振动时效曲线图





7.4 Large Structural Component Machining



Large structural components in floor-type boring and milling machine processing



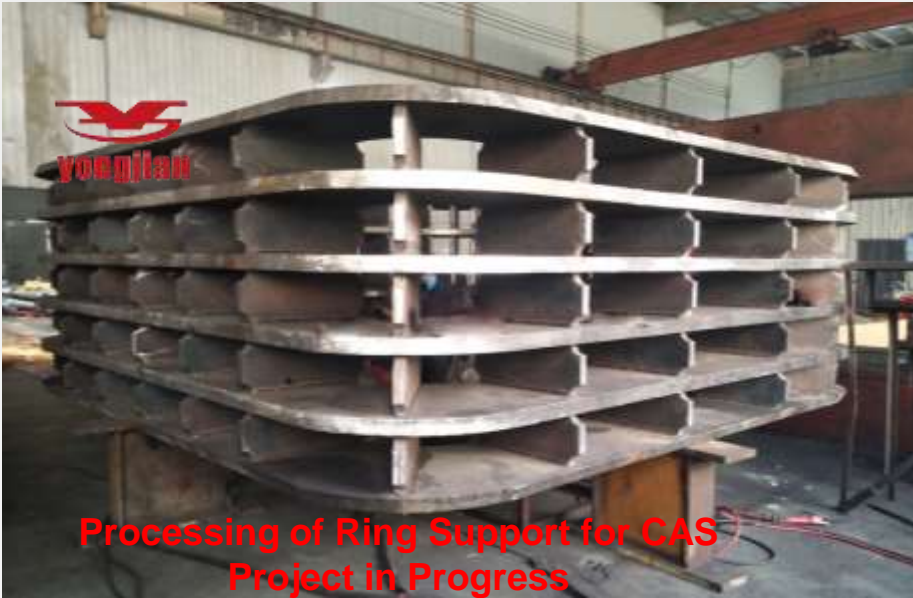
Quality Inspection - Positional and Roundness Inspection in Progress

Quality of Machined Inner Hole and End Face





7, Important and Special Processes for Large Structural Components





7.5 Large-scale Structural Component Transportation

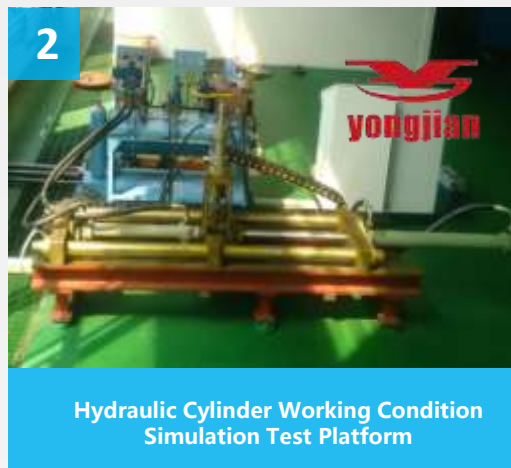
Single Piece Weight Nearly 60t

Width: 6400mm

Crossing the Yangtze River by Ferry

Handled by Professional,
Long-term Partner Transport
Company





Since the establishment of the R&D center, nearly 10 million yuan has been invested, with a research and testing plant area of approximately 1200m² ; Forming a precision measurement platform for component quality, hydraulic cylinders, valve and system condition simulation, and testing platform for hydraulic cylinder force and sealing

Coordinate Measuring Machine Room

Servo Hydraulic Cylinder Simulation Test Platform, Variable Amplitude Hydraulic Cylinder Inertia Load Test Bench, Fatigue Life Test Bench.

Hydraulic Valve Flow, Direction, Pressure Incoming Inspection, Calibration Test Bench.



8.1 Inspection and Testing Equipment



Name: **Coordinate Measuring Machine**
Model: 10128 Type
Origin: Sweden
Measurement Range: 1200*1000*800
Measurement Weight: 2 Tons
Detection accuracy: 0.001mm
Purpose: Testing the dimensions and geometric tolerances of critical and important components



Name: **Germany Mahr Universal Digital Measuring Instrument**
Model: 844T
Origin: Germany
Purpose: For the detection of internal and external threads of piston rods, internal and external tapered threads, internal and external gear profiles/ teeth, with a detection accuracy of 0.0001mm



8, Inspection and Testing



化学分析室 Chemical Analysis Laboratory



机械性能试验 Mechanical performance test



光电分析天平
Photoelectric analytical balance



红外碳硫分析仪
Infrared carbon and sulfur analyzer



油液激光颗粒检测仪
Oil laser particle counter



内窥镜
Endoscope



漆膜划格仪
Paint film scribe



数字式超声波探伤仪
Digital ultrasonic flaw detector



显微硬度计
Micro-hardness tester



涂覆层测厚仪 (德国)
Coating thickness gauge (Germany)



里氏硬度计
Leeb hardness tester



螺纹直径三针测量
Three-needle measurement for thread diameter



深度计 (日本)
Depth gauge (Japan)



沟槽表面粗糙度测量仪
Groove surface roughness measurement instrument



内窥镜
Endoscope



带表内卡规
Dial caliper gauge



液压缸试验台



液压泵站出厂试验台



8, Inspection and Testing



8.2 Qualifications of Inspection Personnel

姓名: 张晋军	性别: 女	职业(工种)及等级: 化学检验员
Name: Zhang Jinjun	Sex: Female	Vocation (Trade) Level: Chemical Inspector
出生日期: 1971 年 2 月 17 日		理论知识和考试成绩: 80.0
Birth Date: 1971-02-17		Knowledge and Exam Score: 80.0
文化程度: 高中		操作技能考试成绩: 88.0
Education Level: High School		Operation Skill Exam Score: 88.0
发证日期: 2012 年 11 月 24 日		评定成绩: 良好
Issue Date: 2012-11-24		Assessment Result: Good

该同志参加计量保证确认内部审核员培训。经考试合格具有从事企业内部审核工作资格。特发此证。	姓名: 韩永妹	
	性别: 女	
	职称(职务):	
	专业:	
	工作单位: 扬州市江都永坚有限公司	

	中国机械工程学会无损检测学会 The Chinese Society for Nondestructive Testing	
特此认证: Heretby Recognition		
姓名: Zhang Yin	身份证号: 320521198704177507	
职位: (Inspector)	扬州市江都永坚有限公司	
The requirements of standard GB/T19001-2015 issued on the following NDT method and product sector		
无损检测: 2. 无损检测: 2. 无损检测: 2.	无损检测: 2. 无损检测: 2. 无损检测: 2.	
证书编号: 320521198704177507	证书有效期: 2024.1.15-2026.1.15	



The company has 17 inspection personnel, among whom 8 have over 20 years of experience and 9 have over 10 years of experience. Each of our quality inspectors is employed after targeted training.

	扬州市江都永坚有限公司
检验员上岗证 (存档)	
姓名: 陈凤琴	
岗位: 装配出厂质检员	
培训时间: 2024.1.15	
培训结果: 合格	

	扬州市江都永坚有限公司
检验员上岗证 (存档)	
姓名: 姚玉兰	
岗位: 成套外协质检员	
培训时间: 2024.1.15	
培训结果: 合格	

	扬州市江都永坚有限公司
检验员上岗证 (存档)	
姓名: 顾青	
岗位: 三坐标质检员	
培训时间: 2024.1.15	
培训结果: 合格	
注意事项: 1、从业人员必须持证上岗, 本证有效期叁年 2、本证涂改、过期、盖章不清无效 3、持证人不得转借、遗失作废	

8.3 Process Inspection

**(1) Chemical analysis of raw materials,
Mechanical properties**

扬州市江都永坚有限公司
金属材料力学试验原始记录

报告编号: 240502

生产单: 山东一

供货单: 山东一

序号: 山东一

1 棒 (C) 5

2 棒 (C) 14

3 棒 (C) 15

4 棒 (C) 1

5 棒 (C) 1

6 棒 (C) 2

7 棒 (C) 2

8 棒 (C) 2

9 棒 (C) 2

10 棒 (C) 2

11 棒 (C) 2

12 棒 (C) 2

13 棒 (C) 2

14 棒 (C) 2

15 棒 (C) 2

16 棒 (C) 2

17 棒 (C) 2

18 棒 (C) 2

19 棒 (C) 2

20 棒 (C) 2

21 棒 (C) 2

22 棒 (C) 2

23 棒 (C) 2

24 棒 (C) 2

25 棒 (C) 2

扬州市江都永坚有限公司 金属材料力学试验原始记录

金属拉伸试验

试验日期	2024-03-07	编号	2024030701
材料	Q345B	尺寸 (mm)	14
原始标距 (mm)	50	原始横截面积 (mm ²)	153.9
最大力 (kN)	86.01	抗拉强度 (MPa)	559.90
下屈服力 (kN)	52.89	下屈服强度 (MPa)	344.50
断后标距 (mm)	69	断后伸长率 (%)	27.14
规定非比例延伸力 (kN)	55.13	规定非比例延伸强度 (MPa)	356.10

炉批号	试样材料	试样状态	2024/03/23 02:24
304219E	Q345B	正火	3024/03/21 00:24
29月15日校核	加工类型	试样数量	
10x10x55	V	数量	
标准: 合格	试验员: 张	审核: 张	

试验人员: 张

(2) Re-inspection of raw material incoming dimensions

[illegible]

(3)Flaw detection of raw materials and welded components

<h1 style="margin: 0;">NDT Report</h1>							
<h2 style="margin: 0;">Ultrasonic Testing / 超声波探伤</h2>							
合同/Contract: 240002		报告编号/Report No.: 24030005					
		发布日期/Issue Date: 2024.3.19					
委托单位: Extending unit:							
Workpiece: 钢板 工件名称: 0							
Material: 原材料:							
Test Equipment: 超声仪器/探头:		合同编号/Report No.: 24031901					
		发布日期/Issue Date: 2024.3.19					
委托单位: Extending unit:		扬州市江都永望有限公司 Yangzhou Jiangdu Yongwang Co., Ltd					
检测工作/Workpiece Item							
Workpiece / 工件名称	检测位置 / 检测部位	检测标准 / 标准	Workpiece type / 工件类型				
Material: 材料	检测材料	检测标准 / 标准	Workpiece type / 工件类型				
Standard: 标准	Probe type: 探头	Standard test block: 标准试块	Standard test block: 标准试块				
Inspection Standard: 检测标准	Accept grade: 合格等级	Defect: 缺陷	Sensitivity: 灵敏度				
Scan/adjustment: 扫描/调整	Depth: 深度	Horizontal: 水平	Waveform: 波形				
Inspection time: 检测时间	After waiting: 等待后	After treatment: 处理后	Condition: 状况				
Type of wave beam: 波束类型	CW: 连续波	LW: 脉冲波	T-type: T型				
Inspection Result / 检测结果							
2. No detectable indication was found. / 未发现可记录缺陷。 3. No detectable indication was found. / 未发现可记录缺陷。(见下表) 4. No detectable indication was found. / 未发现可记录缺陷。(见下表) 5. No detectable indication was found. / 未发现可记录缺陷。(见下表) 6. No detectable indication was found. / 未发现可记录缺陷。(见下表) 7. No detectable indication was found. / 未发现可记录缺陷。(见下表) 8. No detectable indication was found. / 未发现可记录缺陷。(见下表)							
Defects records (if any) / 缺陷记录 (如有)							
No. 序号	Defect No. 缺陷编号	Defect Qty. 缺陷数量	Length 缺陷长度	Depth 缺陷深度	Defect type 缺陷类型	Defect size 缺陷尺寸	Defect location 缺陷位置
1							
2							
3							
4							
5							
6							
7							
8							
备注: Remarks		检测结论: Detection Conclusion		审核: Review		审核: Review	
检测人(签字): Inspected by: 3604		检测日期: 2024.3.19		审核人(签字): 3604		审核日期: 2024.3.19	
检测日期: 2024.3.19		检测地点: 2024.3.19		检测地点: 2024.3.19		检测地点: 2024.3.19	



(4)Component machining dimension inspection report

(5)Re-inspection of valves and small flow pumps upon arrival

(6)Valve block inspection test report

试验项目		液压产品密封性及性能出厂试验表							试验日期	
产品名称		规格	产品材料	技术要求	生产单位	试验设备	生产地点	试验日期		
试验日期		试验地点	试验人员	试验结果	试验结论	试验日期	试验地点	试验日期		
序号	试验项目	试验结果	试验结论	试验日期	试验地点	试验人员	试验设备	试验日期	试验地点	
1	密封性能	密封性能	合格	合格	合格	合格	合格	合格	合格	
		密封性能	合格	合格	合格	合格	合格	合格	合格	
		密封性能	合格	合格	合格	合格	合格	合格	合格	
		密封性能	合格	合格	合格	合格	合格	合格	合格	
2	密封性能	密封性能	合格	合格	合格	合格	合格	合格	合格	
		密封性能	合格	合格	合格	合格	合格	合格	合格	
		密封性能	合格	合格	合格	合格	合格	合格	合格	
		密封性能	合格	合格	合格	合格	合格	合格	合格	



8.4 Hydraulic oil cylinder factory inspection

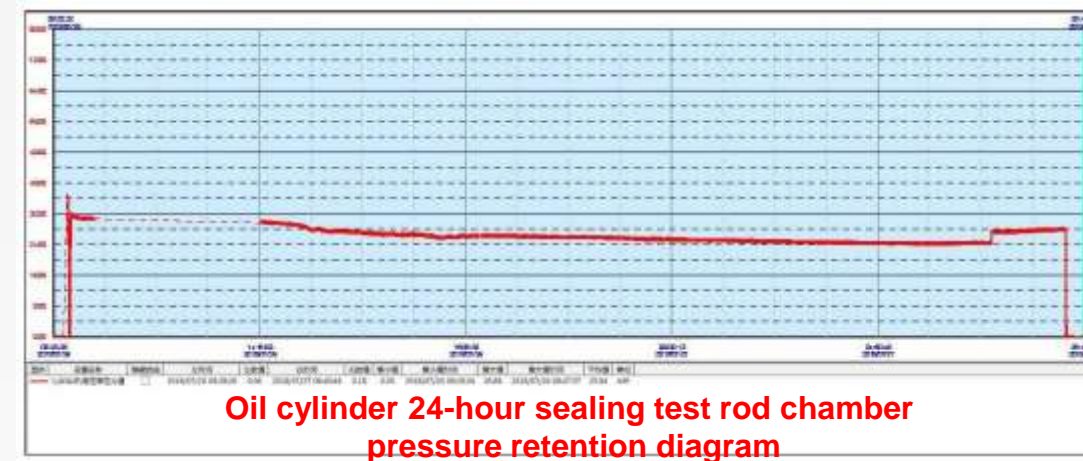
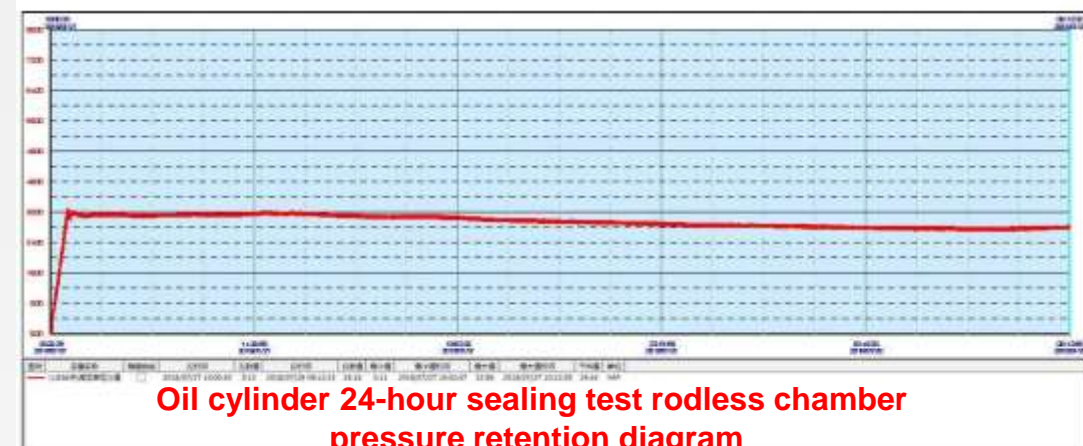
① Pressure Test: The elastic deformation and dimensional recovery of the hydraulic cylinder body diameter under 1.5 times the rated working pressure are tested and verified to ensure that the material strength meets the design requirements.

耐压试验	使被试液压缸活塞分别停在行程的两端（如图示原理）， 分别向工作腔施加 47.5MPa，保压 5min。	缸筒无永久变形，无损坏现象	有杆腔加压	加压前缸筒尺寸	770.48	770.15	770.74	—	
				加压中缸筒尺寸	770.6	770.58	770.6	—	
				加压后缸筒尺寸	770.48	770.15	770.74	—	
		其他零部件应无永久变形，无零件损坏现象，油缸各密封处的无外泄漏现象				合格	合格	合格	合格

② Buffer Test and Pressure Variation: Based on the working conditions of the hydraulic cylinder, we designed the buffer plunger in a stepped manner to gradually increase the impact buffering force; the buffer clearance of the cylinder is paired and assembled. Pressure points are designed for the buffer chambers of all cylinders, recording the maximum pressure of the buffer chambers of all cylinders to ensure that the maximum pressure of all buffer chambers is at a similar level and controlled within a safe range.

缓冲试验	调试验压力, 在测试压力为 2.5MPa 的情况下, 启动试验台双泵使液压缸以最高速度 1.3m/min 运行全行程, 总行程需要运行 74 秒, 此时无杆腔最大流量 367L/Min, 有杆腔最大流量 273L/Min, 检测活塞全行程末端的缓冲情况。	在活塞杆无负载、油缸在启动压力的情况下, 使	活塞运行全行程末端时, 缓冲腔应有缓冲压力	有杆腔缓冲压力	无杆腔缓冲压力
最低缓冲压力				5MPa	3.5MPa
最高缓冲压力				4.3MPa	3.3MPa

③ Oil cylinder 24-hour sealing test pressure curve





8.5 Hydraulic Pump station factory inspection

液压系统 CCS 检验报告 表 1

产品名称: 液压系统 产品型号: 220P01000KG-17 产品编号: 1806003 图纸批准号: BP1800112-01
主系统设计压力: 31.5 MPa 副系统设计压力: 21MPa 副系统排量: 250ml/r 副系统排量: 170ml/r
主电机功率: 132KW 副电机功率: 7.5KW 油箱容积: 6300L 主系统安全阀开启压力: 31.5MPa
副系统安全阀开启压力: 21MPa 现场抽查产品编号: 1806003

序号	检查项目及要求	验收结果	结论
1	液压装置外观质量检验	无明显缺陷, 美观整齐	合格
2	液压管路焊接, 焊缝质量检验	管路横平竖直, 焊接处充实饱满	合格
3	结构件外观及焊缝质量检验	外观无变形, 无夹渣	合格
4	升降回路压力 38.5MPa 升降缸伸缩回路: 保压 5min, 管路焊缝无泄漏, 无永久变形	审核泵压试验报告, 合格	合格
5	定环梁伸缩回路压 31.5MPa 审核泵压试验报告, 合格	合格	合格

液压系统 CCS 检验报告 表 2

序号	检查项目及要求	验收结果	结论
6	油泵流量试验 比例柱塞泵 在空载情况下流量试验, 根据升降油缸的运行速度计算油泵流量, 油泵流量不小于 300L/min, 容积效率大于 95% 柱塞型 在空载情况下流量试验, 根据柱塞油缸的运行速度计算油泵流量, 不小于 100L/min	满足要求 满足要求	合格 合格
7	电机功率试验 油泵流量输入 55% 电信号, 调节泵源控制阀设定回路压力 31.5MPa, 电机工作正常	实测: 50Hz 状态下转速 = 1494r/min; V=675V; I=98A; (电机额定电流 132A)	合格
8	系统压力传感器功能试验	信号正常	合格
9	液位开关功能试验	根据四个液位 开关信号, 发讯正常	合格
10	温度传感器功能试验	信号正常, 温度显示正常	合格
11	建油堵塞功能试验	短接线路模拟建油器压差超标发讯, 报警	合格
12	安全阀开启, 调整试验	安全阀开启压力可调节, 调升系统 30MPa, 抽油系统 25MPa 范围内	合格
13	蓄能器功能试验	停电状态开启, 开启蓄能器开关供压 21MPa 正常	合格

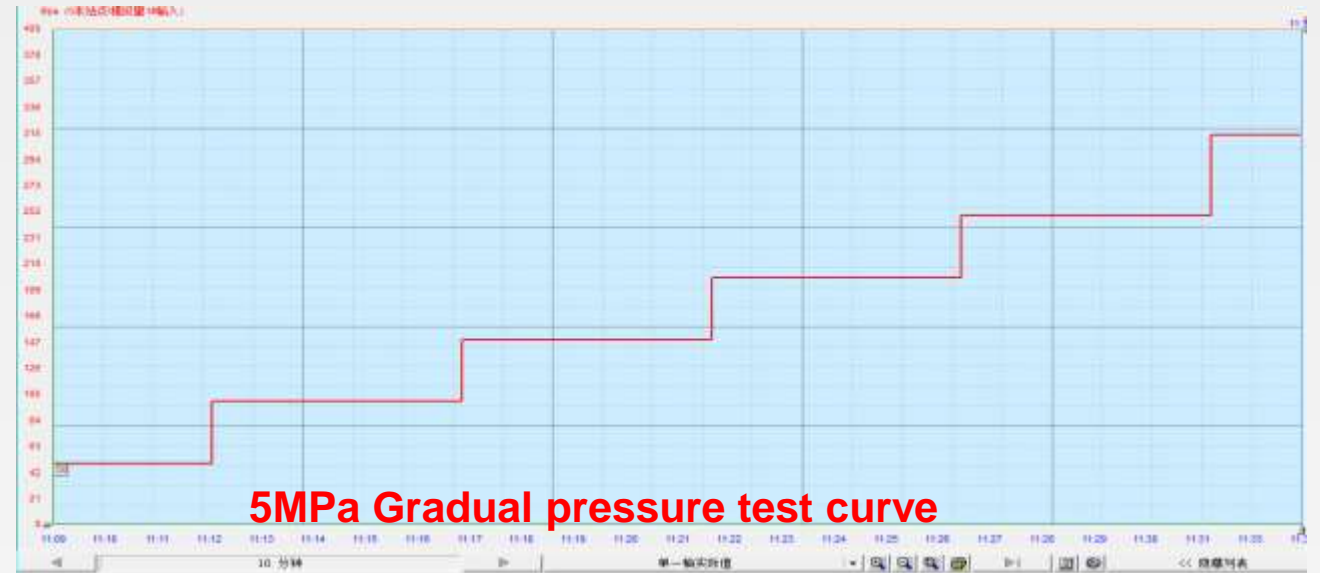
校验用仪器/仪表有效期已核准在有效期内

试验日期: 2018.7.10

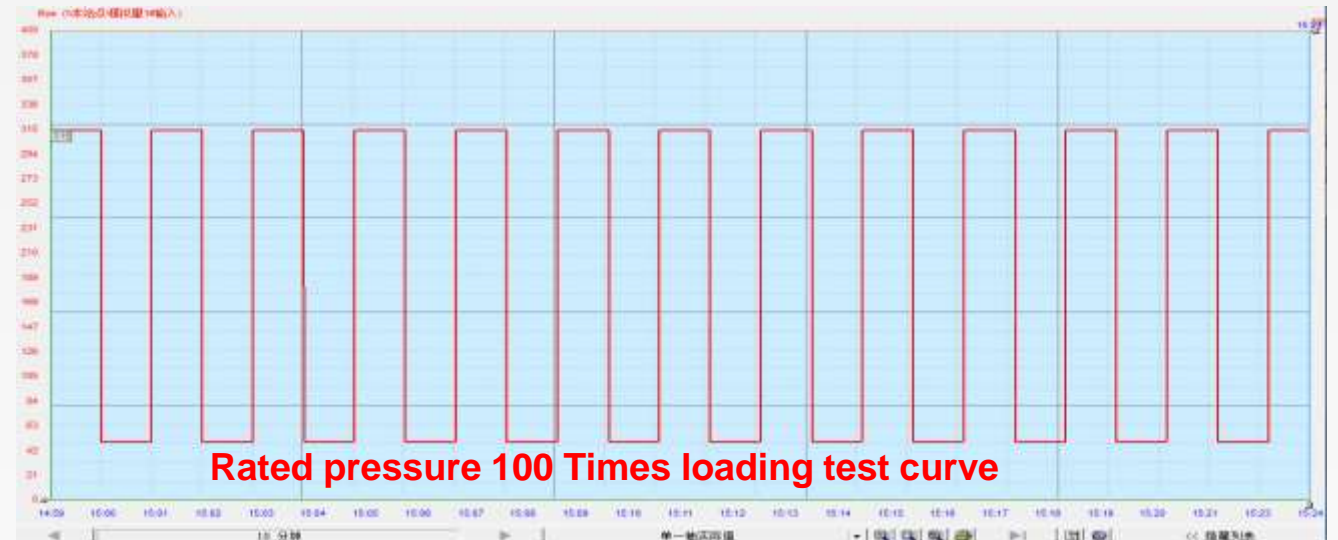
试验员: 何伟

报告审核: 陈永

验收员: 2018.7.10



5MPa Gradual pressure test curve



Rated pressure 100 Times loading test curve



8, Inspection and Testing



8.6 Third-party inspection report, ship inspection report

Test Certificate Hydraulic Cyl	Lloyd's Register Certificate	中国船级社 接受箱	MA 20151001512	MA 20151001512	MA 20151001512
<p>Manufacturer: Jiangsu Yongjian Co., Ltd.</p> <p>Shipped to: Jiangsu Yongjian Co., Ltd.</p> <p>Product description: Hydraulic Cylinder Bore</p> <p>Drawing number & revision: 10-101</p> <p>Declared as intended for: Hydraulic Cylinder Bore</p> <p>Hydraulic Cylinder Bore</p> <p>Hydraulic Test Pressure</p>	<p>Product description: Hydraulic Cylinder Bore</p> <p>Drawing number & revision: 10-101</p> <p>Declared as intended for: Hydraulic Cylinder Bore</p> <p>Hydraulic Cylinder Bore</p> <p>Hydraulic Test Pressure</p>	<p>产品合格证</p> <p>本产品经本公司检验合格</p> <p>特此证明</p> <p>制造厂名: 江苏永健机械有限公司</p> <p>制造厂地址: 江苏省扬州市江都经济开发区</p> <p>产品名称及规格: 油缸</p>	<p>检验</p> <p>(2017) 省检 李</p> <p>产品名称: 油缸</p> <p>受检单位: 扬州市江都永健机械有限公司</p> <p>生产单位: 扬州市江都永健机械有限公司</p> <p>委托单位: 扬州市江都永健机械有限公司</p> <p>检验类别: 委托检验</p>	<p>检验</p> <p>(2016) 省检 李</p> <p>产品名称: 油缸</p> <p>受检单位: 扬州市江都永健机械有限公司</p> <p>生产单位: 扬州市江都永健机械有限公司</p> <p>委托单位: 扬州市江都永健机械有限公司</p> <p>检验类别: 委托检验</p>	<p>检验报告</p> <p>(2016) 省检 李</p> <p>产品名称: 油缸</p> <p>受检单位: 扬州市江都永健机械有限公司</p> <p>生产单位: 扬州市江都永健机械有限公司</p> <p>委托单位: 扬州市江都永健机械有限公司</p> <p>检验类别: 委托检验</p>



THANK YOU
Thank you for watching