



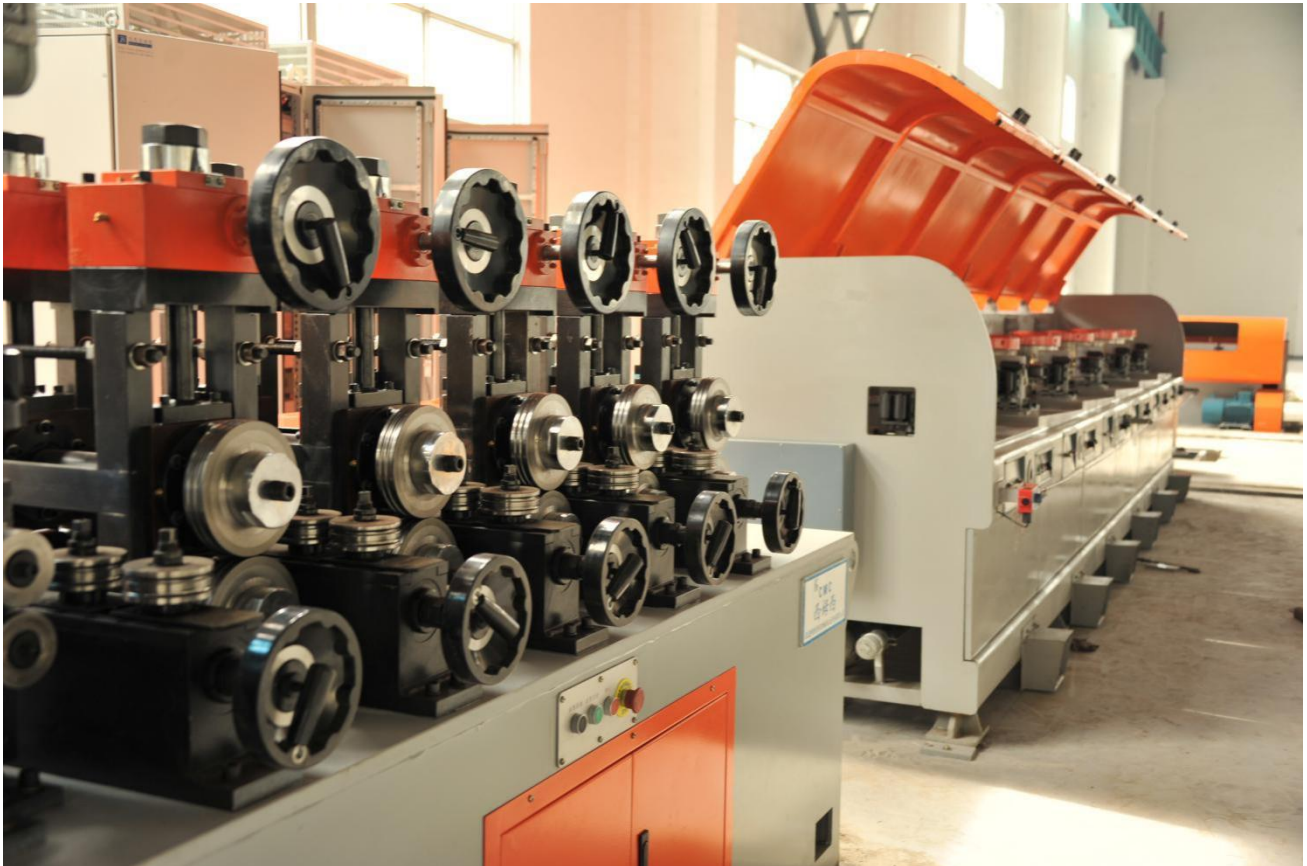
天津三水进出口有限公司

Tianjin Three Water Import & Export Co.,Ltd

Add: No.10 Fengning Road, Shuangyuan Science and Technology Area, Beichen District, Tianjin China
TEL: 0086-22-23346916 FAX: 0086-22-23346338 Email: liuxin058@163.com Website:www.eqet.com

Equipment Configuration and Quotation

2.5-4.0mm Flux Cored Wire Line st12



(1) Basic parameters and performance of program process design

A. Product Outline

1. Design production line for forming a flux cored welding wire 2.5mm-4.0mm
2. 24-hour working system
3. Raw material: 15 * 0.4mm-0.7mm mild steel strip; Flux Material: st12.
4. Main product specifications: $\phi 2.5$ - $\phi 4.0$ mm (stainless steel)
5. Forming section shape: O-shaped overlap
6. Fill rate: 2.5mm 25%

B. Main equipment production capacity

Flux cored welding wire forming drawing production line capacity: about 250kg/h



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C. Main equipment composition and configuration

Steel strip slit unit → Steel strip rewinding unit → Forming and drawing unit → Layer winding unit(bobbin)/Stem up take up machine

(2) Process and main technical parameters of flux cored welding wire production line

This project adopts the steel strip forming process combined with rolling and drawing to produce flux cored welding wires.

The key points of the production process of the strip forming method are: rolling a 15mm wide steel strip into a "U" shaped groove, filling it with powder, rolling and folding it into an "O" shaped tube blank, and then further drawing it into ϕ 2.5mm-4.0mm finished welding wire.

(3) Brief technical description of main equipment

A. Forming and drawing unit

Φ 800 mild steel strip unwinding machine+vertical tension device+ultrasonic steel strip cleaning unit +8 head 160 forming machine+6 head 560 wire drawing unit+ Φ 800 finished 2.5mm-4.0mm wire winding machine.

1. Mild steel strip unwinding method: Φ 800 I-shaped wheels actively release the steel strip. Frequency motor power 11kW.
2. Constant tension adjustment device for steel strip release: adopts pneumatic anti tension tuning.
3. Steel strip cleaning: heating+high-pressure water flushing+drying.
4. The forming machine adopts a 3+5=8 head forming machine (front three, back five)
5. Roll size: Φ 160mm
6. Powder adding method: servo driven belt powder adding.
7. Maximum feeding speed: 60m/min,



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8. Feed strip size:

Width $B=15\text{mm} \pm 0.05\text{mm}$

thick $\delta=0.7\text{mm} \pm 0.01\text{mm}$

9. Filling rate error: $(x \pm 1)\%$

10. Forming machine power: $7 * 4 + 0.75 = 28.75\text{kW}$

11. Wire drawing machine: 6/560 straight forward wire drawing machine is used. Each drum has a power of 15kW.

12. Maximum inlet diameter: $\Phi 5.0\text{mm}$

13. Minimum outlet diameter: $\Phi 2.5\text{mm}$

14. Drawing mold box: closed pressure water cooling

15. Wire collection method: I-shaped wheel wire collection machine. Frequency motor power 22kW.

16. PLC: Siemens S7-1500 series

(4) Machine specification in detail

A. Strip slit unit



Strip slit unit specifications:



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Maximum cutting width: $B_{max}=300\text{mm}$

Shear thickness: $\delta=0.3\text{—}1.0\text{mm}$

Maximum number of sheared strips: $N_{max}=16$ strips (when shear thickness $\leq 1.0\text{mm}$)

Maximum unwinding weight: 1,000Kg

Inner diameter of raw material roll: $\Phi 400\text{mm}$

Shearing average speed: 30m/min

$V_{max}=50\text{m/min}$ (winding speed when the rewinding separation disc is close to full reel)

$V_{min}=10\text{m/min}$ (winding speed when the separator is empty)

The size and material requirements of the supply shearing steel belt:

Steel strip specification: $0.4\text{mm}-0.7\text{mm}\times 16\times C$

Steel strip material: low carbon steel

Cutter Diameter: $\Phi 140\text{mm}$

Material: Cr 12

Cutter shaft diameter: $\Phi 70\text{mm}$ Material: 45# steel

Diameter of rewinding separator: $\Phi 1,000\text{mm}$

Total power of equipment: 14kw

Ø Motor specifications

Motor adopts: AC 5 KW variable frequency motor

Rewinder: AC 11KW frequency conversion motor

The material of the dividing plate is 65Mn steel, and the hardness of the working surface is above HRC60. The smoothness is less than or equal to 0.4Ra.

Water pressure $\geq 0.2\text{Mpa}$

Air pressure $\geq 0.4\text{Mpa}$

Drive form

Pay-off frame with mechanically adjustable damping before incoming wire

Production capacity: The production capacity is related to the thickness, width and auxiliary working time of machine stop for coil changing. When cutting 15 Nos.



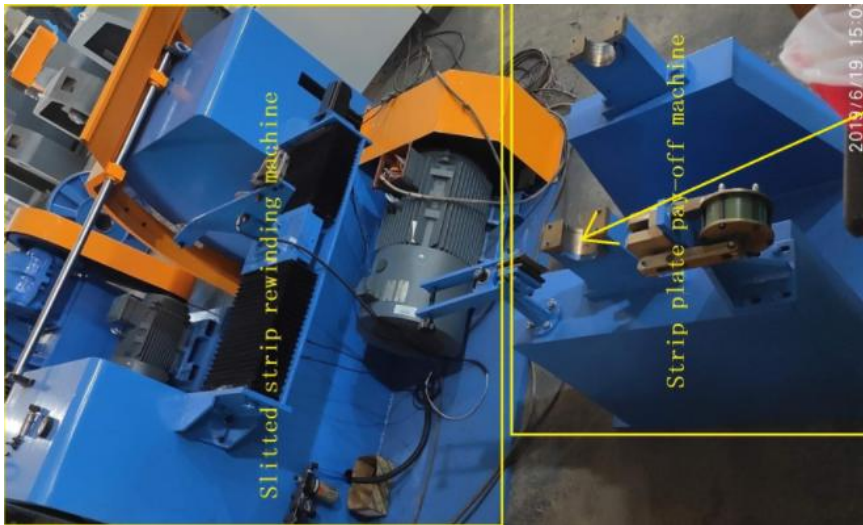
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0.9mm×14mm steel strips at a time, the actual production capacity is about 8t/shift, 24t/d. When there are three shifts per day and 300d/y per year, the annual production capacity is 6,000-8,000t/Y.

B. Steel strip layer winding machine



(This machine is used to wind the slit steel strip from the strip slitting machine disc onto $\Phi 800$ bobbin)

Equipment technical performance parameters

Maximum layer winding speed: $\leq 200\text{m/min}$

Suitable for steel strip size: $0.8 \times 15 \times C$ $0.35 \times 10 \times C$

Layer winding $\Phi 800$ bobbin: $\Phi 800 \times \Phi 600 \times 400\text{mm}$ (or customized according to user requirements) Outer diameter×inner shaft diameter×width

Power: 15kw

The weight of each coil of steel strip: $\leq 1000\text{kg}$ (if there are special requirements, it can be designed according to the requirements)

Strip pay-off mode: Directly pay-off by using the strip separator disc. Strip release control: Passive traction damping strip release system.

Drive form

It adopts variable frequency stepless speed regulation, the pay-off frame with



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mechanical adjustable damping and pneumatic brakes.

Control method:

The electrical control system is equipped with an emergency stop device after the steel strip is broken, and a meter counting device (add electrical parameters)

The steel strip take-up machine is equipped with bobbin pneumatic jacking device.

C. Mild steel strip pay off machine



Steel strip release method: I-shaped wheel active steel strip release

I-shaped wheel size: Φ 800mm

I-shaped wheel support: double cone (shaftless)

I-shaped wheel clamping: pneumatic

Braking method: pneumatic disc brake

Door board (left and right movement)

Body: welded from steel plates and profiles. Bottom plate and back plate 16mm; Side panels and other 10mm. It consists of two boxes, the right (transmission box) and the left (moveable top box), and a base, forming an integral welded box, which is sturdy and durable.



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Safety device: The safety door is manually opened, and can only be opened when the winding machine is stopped. All rotating parts are closed. The operation button is on the right side.

Standing on the operating surface: the motor direction is on the right, making it a backpack like structure.

Transmission: The variable frequency motor is driven by a first stage strong narrow V-belt.

Maximum unwinding speed: 100M/Min

Motor power: 11kW.

D. Constant strip tension adjustment device



Constant tension adjustment device: adopts pneumatic anti tension tuning, with adjustable tension; The sensor outputs a signal to control the speed of adjacent devices to form a control loop.

Machine body: welded from steel plates into an integral welded box, sturdy and durable.

Safety device: The safety door adopts a visible and transparent design, and all rotating parts are closed. Good safety.



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Diameter of tension wheel for inlet and outlet belt: \varnothing 300mm; Diameter of movable pulley: \varnothing 350mm

E. Forming & drawing unit



1. Machine configuration

- (1) Mild strip release machine: I-shaped wheel steel strip release machine
- (2) Tension device
- (3) Flux cored wire forming system
- (4) LZ6/560 straight wire drawing machine
- (5) Wire winding machine: I-shaped wheel wire winding machine
- (6) Human machine interface operation display screen
- (7) Complete electrical control cabinet

2. Detailed specification

Forming machine



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The molding machine adopts a 3+5=8-head forming machine (front three, back five)

Roll size: Φ 160mm

Powder adding method: servo driven belt powder adding.

Maximum feeding speed: 60m/min

Feed steel strip size: Width $B=15\text{mm} \pm 0.05\text{mm}$, thick $\delta=0.7\text{mm} \pm 0.01\text{mm}$

Filling rate error: (Example $25 \pm 1.0\%$)

Cross section shape of welding wire: overlap joint

Forming machine power: $7 * 4+0.75=28.75\text{kW}$

Drawing machine



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Wire drawing machine: adopts a 6-head LZ560 straight forward wire drawing machine.

Power 6 * 15kW

Maximum inlet diameter: Φ 5.0mm

Minimum outlet diameter: Φ 2.5mm

Maximum incoming strength: \leq 300MPa

Maximum total compression rate: <75%

Average compression rate: <12.5%

Design maximum finished product line speed < 4.5m/s

Drawing method: straight wire drawing machine (vertical inclined drum)

Speed regulation method: AC variable frequency speed regulation

Tuning method: pneumatic anti tension tuning; Contactless sensor

Braking method: pneumatic braking

Transmission form: Adopting two-stage strong narrow V-belt transmission or one-stage belt reducer transmission. Adopting European standard dynamic balance pulley. Smooth



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operation.

Maximum design speed for rough drawing: 4.5m/s

Drawing mold box: indirect water cooling;

The main drive is a variable frequency motor, which transmits power to the block through a narrow V-belt and a bridge device.

The blocks, tuning roller and guide roller are steel castings, the working surface is ground by spraying WC carbide, the surface is smooth and does not scratch the wire, the surface hardness is HRC56-HRC60, and the wear resistance is good. (Material: No. 45 cast steel, the surface of the block is sprayed with tungsten carbide, the spraying height is $\geq 50\text{mm}$)

The wire drawing die box has sufficient strength to ensure reliable drawing, easy installation of the die, reliable lubrication and sealing, and reasonable matching with the tuning roller. The upper and lower water use 6" ball valve, the die box is added with plexiglass cover.

Flux feeding device





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Using a servo motor to drive the steel strip to lower the powder, servo motor power: 0.75kW. Powder feeding belt: using a seamless powder feeding belt with a width of 150mm. For the accuracy and stability of the filling rate, the system software has the function of correcting the powder feeding servo motor based on the actual feeding speed. The powder adding device has a three-level hopper for powder addition, to ensure powder adding accuracy and convenient feeding;

At the same time, in this high-precision powder feeder control system, we added the filling rate distortion compensation function at startup, which effectively solved the problem that the filling rate was higher than when the production line reached normal production speed when the production line was started, and reduced consumption. Quality is guaranteed fundamentally.

Using the most advanced far-infrared technology, it has the characteristics of stable performance, excellent technology and strong anti-interference.

F. Finished wire take-up machine



Wire winding method: I-wheel wire winding machine, with a frequency motor power of 22kW;



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Take-up method: I-shaped wheel take-up

I-shaped wheel size: Φ 800mm

I-shaped wheel support: double cone (shaftless)

I-shaped wheel clamping: pneumatic top

Braking method: pneumatic disc brake

Door board (left and right movement)

Machine body: The body is made of welded steel plates and profiles. Bottom plate and back plate 16mm; Side panels and other 10mm. It consists of two boxes, the right (transmission box) and the left, and a base, forming an integral welded box, which is sturdy and durable.

Safety device: The safety door is manually opened, and can only be opened when the winding machine is stopped. All rotating parts are closed. Upper opening safety door; The operation button is on the right side.

Standing on the operating surface: the motor direction is on the right, making it a backpack structure.

Transmission: The variable frequency motor is driven by a first stage strong narrow V-belt.

Maximum take-up speed: 4.5M/min

Motor power: 22kW

Cable arrangement method: 0.75kW servo motor synchronous steel strip arrangement.

(5) Others

A. Machine stop time

1. Normal stop: within 20 seconds;
2. Fast stop: stop within 10 seconds;
3. Emergency stop: stop within 3 seconds.

B. Safety protection

1. Protective cover: It adopts a fully sealed form, made by welding cold rolled square



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pipes and cold rolled steel plates, with powder adding holes and fixed organic glass observation windows on it. It can observe the operation of the drum when starting normally, and is a reversible safety cover; Equipped with self-locking protection (i.e. the protective cover is opened and the equipment is in a jogging state).

2. Emergency pull rope switch: convenient and fast for rapid stop.
3. Set up a wire breakage stop device: wire breakage detection and automatic stop .
4. Braking device: Adopting pneumatic braking device, safe and reliable.
5. Emergency stop switch: The take-up machine operation panel and main control console should be equipped with emergency stop mushroom buttons.

C. Electrical System

The PLCs, Inverters, Touch screens of drawing machine and forming machine is famous brand.

The tuning sensor is a non-contact displacement sensor, which is set on the second tension arm to achieve automatic tracking and adjustment of wire tension.

The electric control is equipped with broken wire stop and jog functions, the safety shield is equipped with a safety travel switch, and there is a pull rope emergency stop device in front of the machine, which is complete and reliable.

Equipped with a touch screen man-machine interface, it can monitor and display the operation system data, status, fault information and wire drawing die diameter at any time, and realize the function of man-machine dialogue.

Equipped speed meter device to display the speed of the finished wire in real time, and can also decelerate and stop the finished wire at a fixed length.

Low-voltage electrical appliances use Schneider products to ensure quality and reliable performance.

D. Control method

1: Operational control

Using a touch screen for human-machine dialogue



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On site management uses a 10 inch color touch screen to set and manage the current unit's drawing parameters, operating frequency, operating speed, mold formula, length and weight calculation, and fault conditions.

All real-time control functions (I/O logic, PID calculation, fault management) are completed by PLC, and the touch screen and upper computer only monitor, input parameters, and manage data.

2: Process control

Each drum driver adopts a vector type frequency converter to ensure stable and reliable high-speed and low-speed rotation. The driver and controller adopt PROFIBUS-DP or PROFINET bus control mode, which has advantages such as accuracy, real-time, strong anti-interference ability, and simple control circuit compared to traditional analog control speed regulation.

3. Control plan

a: Wire drawing machine

This system includes two control schemes. One method is the conventional input line diameter method, and the other method is the self tuning mode. The combination of the two is applied in equipment.

Compared to the conventional method, the self tuning mode has the following advantages: it eliminates the need to input the wire diameter on the touch screen, saving time and operator workload. More stable operation. When wire expansion occurs, the wire diameter method requires adjusting the touch screen wire diameter or replacing the grinding tool, otherwise it is easy to cause loose or broken wires. The self tuning mode avoids this trouble, and the system will adjust the speed matching between the two machines based on their operating status. When replacing the grinding tool, the wire diameter can be omitted. The operation is simpler.

b: Powder addition control

The powder adding system is controlled by a PLC sub station, and the operating speed



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of the servo controller is controlled by an encoder at the feeding point of the molding machine equipment, achieving precise follow-up effect,

At the same time, the measurement speed of the encoder is displayed on the touch screen. PLC establishes a mathematical model for the servo controller through programming, and further optimizes the servo speed in segments to achieve stable filling rate during acceleration, deceleration, and normal operation.

4: Electrical functions

The process of jogging, starting, and stopping runs smoothly. Cut the drum at any position and combine it freely. Calculate the display compression ratio. Any reel jog, any front and rear linkage function

Calculate the current length and weight, automatically decelerate and stop at a fixed weight, and give an alarm prompt. Having operation permission management can effectively prevent misoperation. Dynamic processing and display of various fault information and production information. Dynamic display of various levels of speed, current, and other parameters

The winding machine has the function of stopping the machine when it is empty or full, and at the same time, the three color alarm light displays an alarm.

E. Control method

The touch screen display, setting, and query functions include: speed setting; Jog speed setting; Setting the meter length; Setting the meter factor; Speed setting; Full scale indication;

Frequency converter fault indication; Fault inquiry; Display of power, current, linear speed, and tuning roller sensor positions; Production management data, etc

The operation functions of the console buttons include:

Start; stop ; Emergency stop; Meter reset; Fault reset; Speed up, speed down, etc. The operation console is equipped with three color lights for alarm, fault, and operation indication. There are two foot pedals on the device, start button, stop button, single linkage



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selection completion start, stop, reset, front linkage, rear linkage, front start, rear start, positive and negative operation, etc.:

Other technical indicators not mentioned are designed and manufactured according to the JB/T7910-99 "Wire Drawing Machine" standard.

F. Quotation Sheet

No.	Description	Quantity	Scope of supply	Pirce in USD
1	Strip slit unit	1	Raw steel strip pay-off machine	43,800
			Strip slit machine (with cutter)	
			Slit strip coiling machine	
			Operating console	
2	Strip rewinding unit	1	Strip disk pay-off machine	23,500
			800 I wheel strip rewinding machine	
			Electric control cabinet	
3	Wire forming & drawing unit	1	Strip pay off machine	199,350
			Tensioner	
			Ultrasonic ss strip cleaning machine	
			Wire forming machine	
			Wire drawing machine(double rotating die box)	
			Wire cleaning machine	
			800 I wheel finished wire rewinding machine	
Electric control cabinet				
4	Stem take up		Stem take up machine	13,500
5	Strip welding	1	Argon arc strip welding machine with annealing function	4,200
Total FOB Xingang, China price in USD				284,350
Remarks: Drawings of rollers are provided with the machine.				
Payment terms: down payment 30% by TT after contract, 70% after buyer's acceptance checking at seller's place before shipment.				

Remarks:

1. Warranty Period: 1 year



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The seller will maintain and provide spare parts and equipment for free because of the breakdown caused by Seller's design and manufacture fault. If the breakdown is caused because of the improper packing then the seller is obliged to maintain and provide the spare parts for free.

The breakdown that caused by buyer's improper installation and maintenance, user's mistakes, abuse and misuse are not covered by the warranty. Then the buyer should pay the repair cost and compensate the spare parts. In such a case the Seller is obliged to provide spare parts and technical support to the Buyer at the time of breakdown, and the buyer shall bear the extra cost correspondingly.

2. Commissioning and Installation:

Buyer will provide steel strips (Low carbon steel strip), flux and other auxiliary material (such as lubricant and detergent) for trial at seller's plant and seller will assist buyer for test running.

Seller will assign 3 personals for installation and debugging including one electric engineer, one mechanical engineer and one interpreter. The cost of seller personal including round ticket, accommodation and meal and local traffic will be born by buyer, and hotel to stay will be no less than 3 star levels. Seller is to guide buyer to install machine, and when the buyer's conditions are available for installation, the installation period is normally 15 days. Buyer will bear the cost of USD 150 per person per day.

Quotation date: 2023.12

Price valid time: 6 months

Lead time: 90 calendar days after receiving down payment.

Total pages: 18.