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**融合通达 追求卓越**  
**ACCESS TO THE WORLD STRIVE FOR EXCELLENCE**

**Qingdao Xinghe Keer Machinery Technology Co., Ltd.**

Qingdao . China 2025

## COMPANY INTRODUCTION

**融合通达 追求卓越**  
**ACCESS TO THE WORLD STRIVE FOR EXCELLENCE**



Located in the beautiful West Coast New Area of Qingdao, Qingdao Xinghe Keer Machinery Technology Co., Ltd. (formerly known as Qingdao Yanhai Machinery Manufacturing Co., Ltd.) is such a modern machinery and equipment manufacturing enterprise that integrates scientific research design, manufacturing, installation and consulting services.

Our company owns experienced technical personnel and professional workers. With strong technical force, advanced production equipment and perfect detection means, we are mainly engaged in welding of corrosion-resistant pipeline products including pipe fittings, flanges, forgings, valve parts and special-shaped parts, as well as the wear-resistant treatment of wear-resistant parts including cutting gear, middle groove, bucket tooth tip, tooth base, guard plate, wear-resistant plate (lining plate, knife plate, silo, etc.), crushing teeth, stirring blades, sugarcane hammer, sugarcane blade, steel mill roll and hydraulic prop etc.

As the latest technology, it has solved the problem of high wear resistance, corrosion resistance and impact resistance of metal surface. We have developed high-power and high-stability plasma cladding special numerical control equipment with comprehensive economic and technical indexes better than laser cladding. The technology and equipment has filled a gap, being a major innovation in the field of plasma beam surface metallurgy, while the overall technical level has reached the international leading level. It enjoys high technical and product evaluation at home and abroad, and has made outstanding contributions to large-scale mines, metallurgy, electric power, steel mills and construction machinery etc.

With scientific, rigorous and efficient work style, we provide our users with the best technical solutions according to specific requirements. Delivery on schedule, product quality has achieved the whole process monitoring. Enterprise product market share has been increasing year by year, and has been sold in more than 30 provinces and autonomous regions and overseas markets.





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## High Speed Laser Cladding Equipment

In 2018, China launched the first high-speed laser cladding equipment, breaking the monopoly of Europe and the United States in the first time.

High-speed laser cladding: Using a small circular spot, the powder is melted on the molten pool and combined with matrix metallurgy.

High-speed laser cladding is the improvement and enhancement of ordinary laser cladding, high-speed cladding instead of ordinary cladding will be the inevitable result of technological development.

High speed laser cladding also has some substitution advantages for surfacing welding, thermal spraying and plasma cladding.

### Speciality & Advancement of High Speed Cladding

#### Worldwide Exclusive Ownership

- Central powder-feeding/wire-feeding high-speed laser cladding technology
- Remote diagnosis cloud service technology
- Up to 15000 Watts high-speed laser cladding technology for inner and outer walls

#### The Most Comprehensive Technology in the Industry

independent research and development: A complete set of technologies including fiber laser, high-speed laser cladding head, powder feeder, wire feeder, control system and cladding technology, including a complete set of technologies.

#### Inner Hole / Outer Wall High Speed Laser Cladding

- Paraxial powder feeding power: 3000W, 6000W
- Central feeding power: 8000W, 12000W, 15000W
- Minimum hole diameter: 80mm
- The cladding head has stable performance, long life, and can work continuously for 24 hours

A complete set of high-speed laser cladding equipment includes: high-speed cladding fiber laser, cladding head, water cooler, voltage regulator, powder feeder, machine tool and integrated control system.

#### Independent Four Core Components



## High Speed Cladding Fiber Laser (Inner Hole, Outer Wall)



### Main Technical Indicators and Parameters

Item Name	Parameters	Item Name	Parameters
Output power	3000/6000/8000/12000/15000W	Rated Input Voltage	AC380V50Hz
Power stability	≤3%	Power consumption	9000/17000/24000/35000/45000W
Central wavelength	1080nm	Control mode	Remote & Local (Remote control)
Polarization mode	Random	Cooling Mode	Water Cooling
Working mode	Continuous	Power adjustable range	10-100%
Fiber output mode	QCS	Telecommunication diagnosis	Real Time
Dimensions	700*1000*900/700*1200*900/850*1000*1300		

### Product features:

- Special structural design, high powder flow stability
- Multiple silos can feed powder individually or simultaneously
- Powder feed quantity, protection gas and powder feed gas flow can be continuously adjusted digitally
- Industrial touch screen and controller, stable and reliable performance
- Intelligent design: when the air pressure is too low or too high, the system automatically alarms, automatically cuts off the laser, safe and reliable
- Achieve integrated control with processing equipment (such as lasers, machine tools, robots)

## Non-stop Automatic Powder Feeder

### Product features:

When processing for a long time, the amount of powder is large, and the automatic powder feeder can realize automatic powder adding without stopping the machine, and avoid the interruption of the cladding process.



## Powder Feeder for High Speed Cladding



## High Speed Laser Cladding Head (Outer Wall Cladding and Inner Wall Cladding)

Outer Wall High Speed Laser Cladding Head (As shown in the following picture)



3000-6000 W  
Paraxial Feeding  
Powder Cladding Head



8000-15000W  
Central Feeding  
Powder Cladding Head

### Product characteristics:

- Central feeding powder (laser beam outside and powder flow inside) design, single channel powder feeding, single channel powder output, high powder utilization rate.
- Cladding copper head, simple structure, good cooling effect, long service life, long-term stable work.
- Special wear-resistant layer design, powder flow on the powder nozzle wear slow, long life of the cladding copper head
- Intelligent protection function, when the protection mirror is polluted, the system automatically alarms.

*High Powder Utilization   Long Service Life   High Power Resistance   High Equipment Stability*

### Outer Wall High Speed Laser Cladding Head Technical Parameters

Item Name	KEER-T31/61	KEER-Z1
Applicable power	3000W, 6000W	8000W, 12000W, 15000W
Optical fiber connector	QCS	
Powder feeding method	Paraxial feeding powder	Central feeding powder
Cooling mode	Water cooling	
Gas for powder delivery	Nitrogen/Argon	
Spot size	1.5 - 5	

### Inner Wall High Speed Laser Cladding Head



3000 - 6000W Paraxial Feeding Powder Inner Hole Cladding Head



7000-10000W Central Feeding Power Inner Hole Cladding Head

### Product features:

- Scientific structure design has improved the safety of reflector; The reflector adopts imported quartz material and high energy coating technology, high power resistance;
- Large light and powder exit Angle greatly reduces the probability of sticking powder on the cladding head.

### Internal Wall High Speed Laser Cladding Head Technical Parameters

Item Name	XHKE-NT31/61	XHKE-NZ1
Applicable power	3000W/6000W	8000W/12000W
Optical fiber connector	QCS	
Minimum cladding diameter	80mm / 180mm	220mm
Cooling mode	Water cooling	
Gas for powder delivery	Nitrogen/Argon	
Powder feeding method	Paraxial feeding powder	Central feeding powder

### High speed cladding motion machine

(divided into large enveloping machine tool and platform-type machine tool)

### Enveloping Machine Tool



### Product features:

KEER-JCXX high precision four-axis high speed machine tool to pursue high speed, high precision, high stability and high efficiency as the goal, according to the high-speed precision spindle design and manufacturing technology and CNC servo optimization technology design and production of high-speed processing equipment. The equipment has wide use and flexible operation, and is suitable for laser processing of various shafts and plates.

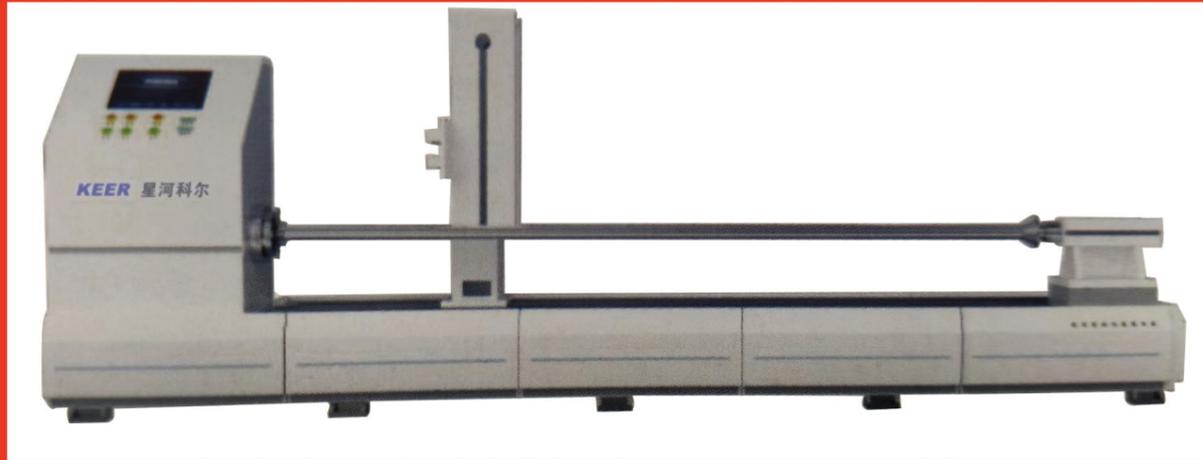
### Technical parameter:

Control system: CNC Spindle speed: 0-150 r/min

### Product advantages:

- Integral casting bed, good structural stability, high precision, strong seismic ability, not easy to deformation.
- Spindle motor adopts servo drive, high control precision, suitable for high-precision machining needs.
- The machine tool adopts well-known brand electrical components.
- Large enveloping protection design, closed operation, reduce dust pollution, reduce light radiation, improve operation safety.

## Platform-type Machine Tool



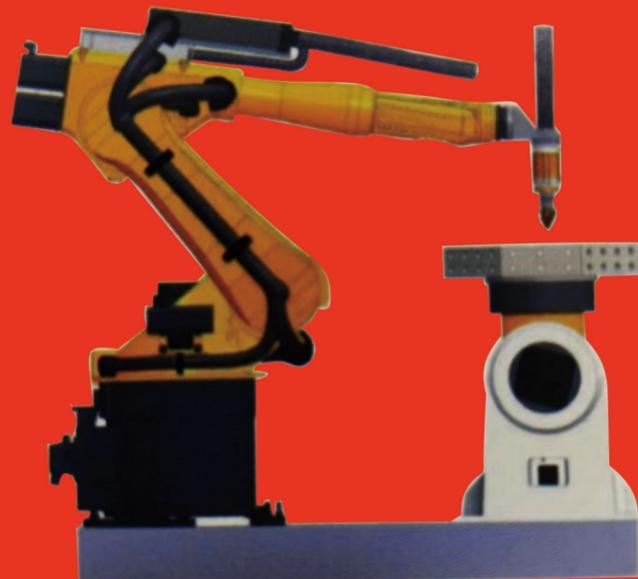
### Product characteristics

KEER-JCXX four-axis high-speed cladding machine has the advantages of covering small area, convenient loading and unloading parts, high precision and so on.

### Technical parameter

Control system: CNC Spindle speed: 0-150 r/min

## Mechanical Arm + Positioner



### Product features:

The system can not only process common shaft and plate parts, but also be used for surface repair of special-shaped curved parts.

## Three-dimensional Platform Machine Tool



### Product features:

KEER 3D platform is designed for universities to develop lightweight equipment, more suitable for teaching and research use. System includes X axis, Y axis, Z axis, working stroke can be customized according to requirements.

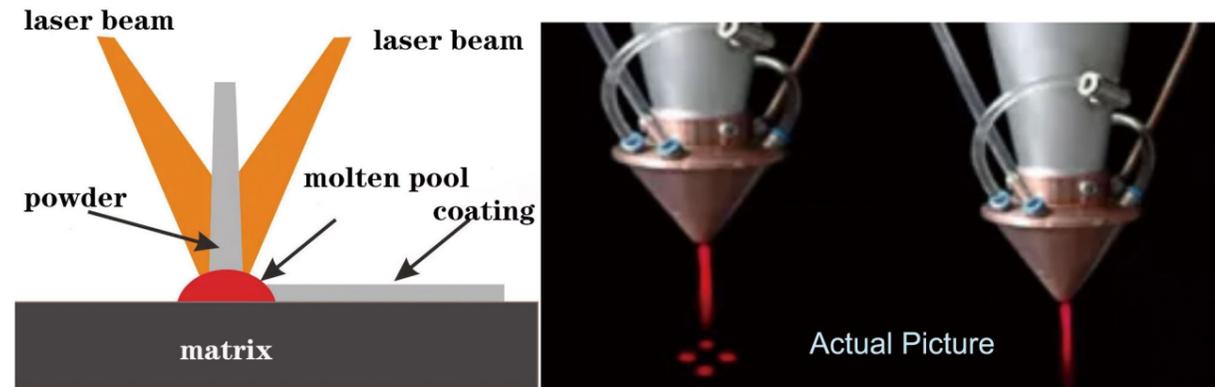
### Systematic, intelligent system design

- All components constitute an "organism", through a control system to achieve unified command and security protection of the equipment system. The safety and reliability of the whole set of equipment are higher.
- A set of control system for all components (laser, powder feeder, cladding head, machine tool, water cooler) centralized intelligent operation management.
- Supervisors can view the working status of the device online through the mobile phone.

## Key Technical Parameters of High Speed Laser Cladding

Type	Spot Size	Cladding Line Speed	Overlap Rate
High-speed Cladding	1-5mm	3-30m/min	70%-80%
Thickness of Single Layer	Nonferrous Metals	Dilution Rate	Thermal Effect
0.3-4.0mm	Yes	1-3%	Low heat input

High-speed Cladding: Coating Surface Ra 5-10um



High Speed Laser Cladding Principle: Central Powder Feeding

Technical Feature	With laser beam outside and powder stream inside
Powder utilization rate	Constant, Unchanging
Laser Power	Multiple Laser Beam 3000-20000w
Copper Head Lifetime	Wear-resistant pipeline, long service life
Powder blocking condition	Feed powder, one channel in and one channel out, not easy to block powder
Sticky powder condition	Copper head simple structure, good cooling effect, not easy to deform, not easy to stick powder

The wearing parts of high speed laser cladding equipment own long service life and long warranty period.

Wearing Parts of High Speed Laser Cladding Equipment		Warranty Period
Laser Integrated design, highly integrated, avoid dust pollution caused by disassembly.	Laser output head (including 15 m optical cable)	2 Years
	Laser collimator	2 Years
	Laser focus lens	2 Years
Cladding Head	The copper head nozzle determines the reliability of the cladding equipment, process stability, comprehensive powder utilization, etc.. It can work continuously for 24 hours a day, with 2 to 3 years of service life.	



One listed company in China has purchased in total 13 sets of high speed laser cladding equipment (7 sets of 10000 W high speed).

### Typical Cases





## Cladding Technology

Xinghe Keer uses fully automatic cladding equipment for surfacing cladding of pipe fittings, flanges, forgings, valve parts and special-shaped parts. Our welding method is called hot wire TIG welding, also known as Gas Tungsten Arc Welding (GTAW). The welding process meets the relevant requirements of ASME IX, NACE, MR0175, API 6A, and API 5LD, also meets different customers' different requirements for Fe dilution rates.

### PRODUCTS AND SERVICES

Cladding Pipe	Standard	NPS	Max. Length
	API 5LD, SY/T 6623	NPS≥2"	12.5 Meters
Cladding Bend	Standard		Hot Bending After Cladding
	API 5LD, ANSI B16.49, ISO15590-1		R≥3D
Cladding Flange	Various Flanges In The Pipeline Process		
	API 6A, API 17D, ASME B16.5		
Cladding Pipe Fittings	Elbow, Tee, Reduced Pipe, Forged Pipe		
Cladding Valves	Valve Body, Bonnet, Ball		
PWHT	Post-welding Heat Treatment		
Machining After Cladding			

### QUALITY ASSURANCE

After completing the test, Xinghe Keer will issue the final inspection documents, including the classification details and acceptance criteria of the inspection method.

#### • Positive Material Identification - PMI

The Oxford Mobile Direct-reading PMI MASTER PRO and Portable Alloy Analyzer American Niton XL2 is used to recheck the chemical composition of the base material and the cladding layer, and the report is stored directly on computer of PMI device for keeping on file and its trace-ability. Materials Research Institute and imported material standards ensure the accuracy of PMI.

#### • Ultrasonic Test -UT

The world's most advanced S-wave and standing wave detectors are used to detect the integrity of the cladding layer and the matrix material to ensure the quality of surfacing. We strictly measure the cladding thickness according to customer's requirements.

#### • Penetration Test - PT

PT must be done on every position ready to be cladded and every location post cladding. Remote video detection and inspection technology test should be adopted on the inner diameter test of the pipeline. Usually the test length could reach to 6.5M inside of the pipe.

#### • Magnetic Particle Test - MT

Fluorescence or visual inspection techniques are used to test the external surface of the ferromagnetic component after all manufacturing stages have been completed.

#### • Visual Inspection - VT

Fiber optic long-distance video detection and inspection technology are adopted, and the treatment screen displays the appearance of surfacing and records appearance inspection process. The VT process video will be delivered to the customer as the part of the warranty document.

#### • Surface thickness inspection

Innovative equipment was used to test the thickness of corrosion resistant alloy cladding layers, such as cladding Inconel 625 on carbon steel and low alloy steel. Constantly inspect the cladding layer of steel pipes or elbows to ensure cladding thickness meet customers' requirements.

#### • Radio-graphic Inspection - RT

Outsourced to professional third-party ray inspection companies for surfacing layer RT testing, butt welding butt welding RT testing. They have rich experience in filming and evaluating films for dual metal composite pipe butt welding RT.

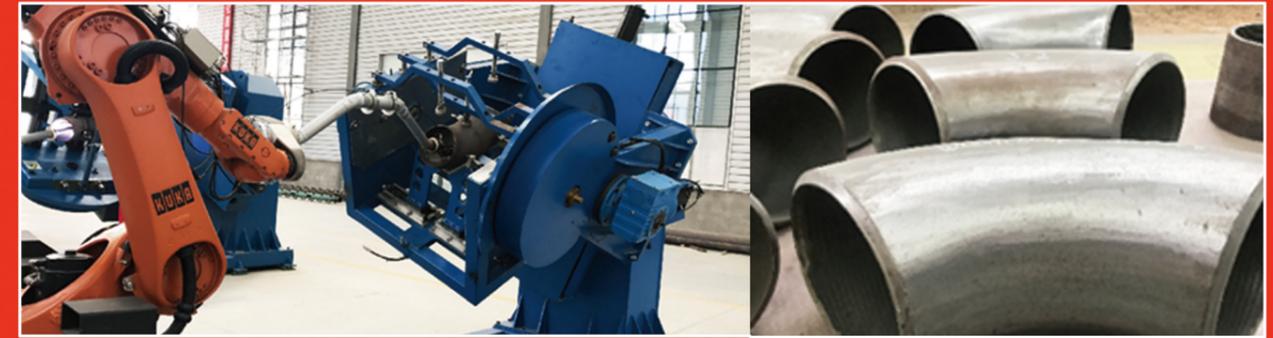
#### • Hydraulic Test

The hydraulic pressure test of the cladding pipe is outsourced to the steel pipe manufacturer, and the dedicated hydraulic equipment is used for rapid, accurate and efficient testing. The pressure can reach to 200 Mpa. And the hydraulic pressure test of the cladding bend is done after completion of butt welding by our professional welders, the overall water pressure test pressure up to 200Mpa.





Automatic Elbow Cladding Equipment



1.5D 90 degree Elbow, Minimum Size: 2 inch ID

Cladding Elbow



Cladding Tube Sheet

Cladding Flange

Cladding Pipe

## Cladding Equipment and Products



12M/6M Pipe Cladding System



Hot Induction Bend Equipment



Cladding Reducer

Cladding Reducer

Cladding Ring



6000T Presser Machine and Heat Treatment Equipment



Cladding Elbow



Explosion Cladding Products

Cladding Pipe Fitting

## NDT (Non Destructive Testing)

1. Visual Test-VT
2. Cladding Thickness Inspection
3. Dye Penetrant Inspection - PT
4. Magnetic Particle Testing - MT
5. Ultrasonic Testing - UT
6. Positive Material Identification - PMI
7. Radiographic Testing-RT
8. Ferritic Content Test

### Quality Control

Inspection Stages	Description	Check Item
Pre-cladding	Raw Material Factory Inspection	Delivery Order, Mill Certificates, Reference Standards, GRN
	Dimensional Inspection	Thickness and Overall Dimensions
Cladding	Process Control	In accordance with the WPS (Welding Procedure Specification)
Post Cladding	Dimensional Inspection after Cladding	Thickness of workpiece (with the cladding thickness) and overall dimensions (shrinkage, distortion), chemical component analysis, dilution rate of Ferrite
	Liquid Penetrant Testing	Surface Defect
	Ultrasonic Testing	Internal Defect



## CRA (Corrosion-resisting Alloy) Material



- Alloy 625
- Alloy 825
- Alloy 276
- Cu-Ni Alloy
- 3 Series Stainless Steel
- 4 Series Stainless Steel
- Duplex Stainless
- Super Duplex Stainless
- Stellite Alloy 6、21

Petroleum pipeline, valve, flange and bonnet cladding adopts INCONEL 625.

### Technical Strengths

1. Longer working life, more reliable and safer;
2. Avoiding the medium leakage caused by corrosion;
3. Combine the high strength of Carbon Steel and high corrosion resistant of Nickel Alloy;
4. Binding strength above 400Mpa;
5. Excellent high corrosion resistance;
6. Excellent mechanical properties;
7. Low cost.

### Test and Inspection



Spectrum Analyzer (Chemical Analysis)



Hir-944d Infrared Carbon and Sulfur Analyzer



Ferrite Measuring Instrument

Xt-50 Impact Specimen Gap Projector



Thickness Gauge

Portable X-ray Detector

Semi Automatic Impact Testing Machine



Hydraulic Universal Testing Machine  
(Bend and Tensile)



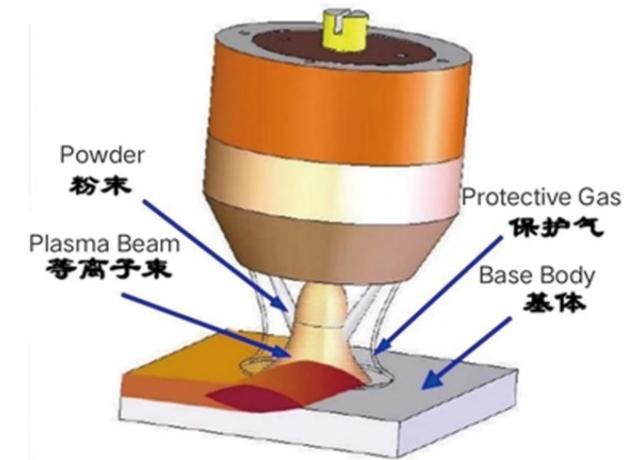
Micro Hardness Testing Machine



Handheld Spectrometer

Metallurgical Microscope

## Plasma Cladding Technology



Schematic Diagram of Synchronous Injection of Powder and Plasma Beam

### Key Technology

Form annular negative pressure plasma beam, reduce the velocity difference of the powder material in the plasma jet, and reduce the powder loss.  
The pressure equalizing ring groove is around the plasma generator nozzle to obtain flexible plasma beam, reduce scouring force, prevent alloy oxidation, and stabilize arc column.

### Basic Principle:

Under the action of high temperature plasma beam, the alloy powder and the workpiece surface are rapidly heated and melted together, mixing, diffusion, reaction, solidification; self-cooling after the plasma beam leaves, the high hardness wear-resisting layer is formed over the surface, so as to realize the surface strengthening and hardening, and enhance the wear resistance of the workpiece. The wear-resisting layer of plasma cladding not only has high hardness, but also will not fall off under impact load, due to metallurgical bonding between the wear-resisting layer and the workpiece matrix.

## Plasma Cladding Wear-resistant Treatment Equipment and Products

### KEER-41 Plasma Cladding Wear-resistant Treatment Equipment



### Function:

The CNC equipment can achieve the high wear and corrosion resistant cladding layer of metallurgical combination over metal parts surface, enhance the wear and corrosion resistance of metal parts, and greatly improve the service life of parts. The equipment is especially suitable for cladding large steel components, featuring stable and reliable operation, strong anti-interference ability, advanced automation, high production efficiency and excellent cladding quality etc., suitable for large-scale promotion.

### Features:

1. Reliable arc initiation, precise control of cladding, and powder feeding and breaking function of synchronous arc initiation and arc extinguishing;
2. The control system can automatically cut off the power supply and stop the powder and air supply when the arc is extinguished in the cladding process;
3. Using advanced and reliable numerical control technology, the cladding process is automatically completed after program setting.

4. The plasma torch can be stable and continuous cladding and welding molding operations;
5. High production efficiency, suitable for large-scale industrial production;
6. High heat conversion efficiency and low energy consumption.

### Main Technical Indicators and Parameters

Power	Inverter Plasma Power Supply	Working Voltage	50VDC
Input Voltage	380±10%	Cladding Speed Adjustment Range	100~1000mm/min
Rated Input Capacity	30KVA	Route	1700×1000mm
Rated Load Sustained Rate	100% (20°C)	Argon Consumption	2m <sup>3</sup> /h
Rated Cladding Current	300 Amperes	Floor Area	2600×1800×2700mm
No-load Voltage	140VDC	Machine Weight	About 3 Tons

### KEER-49 Plasma Cladding Wear-resistant Treatment Equipment



### Function:

In addition to the function of DRF-2 plasma cladding equipment, DRF-5B equipment can be used for plasma cladding on the sealing plate of large middle trough and the inner wall of pipeline to improve its wear resistance.

### Main Technical Indicators and Parameters

Power	Inverter Plasma Power Supply	Working Voltage	50VDC
Input Voltage	380±10%	Cladding Speed Adjustment Range	100~1000mm/min
Rated Input Capacity	30KVA	Route	1300×1700×700mm
Rated Load Sustained Rate	100% (20°C)	Argon Consumption	1.5m <sup>3</sup> /h
Rated Cladding Current	300 Amperes	Floor Area	3000×2100×2500mm
No-load Voltage	140VDC		

## DRF-S Handheld Plasma Cladding Wear-resistant Treatment Equipment



### Function:

The equipment can be used for plasma cladding strengthening towards the sprocket of the scraper conveyor, the drum of the tunnel boring machine and the shearer, the bucket teeth of the excavator and other parts with irregular shape, as well as the parts with limited operating space such as the central groove side steel, so as to improve its wear resistance and prolong its service life. The equipment can be widely used in mining, steel, cement and other industries that urgently need to greatly improve the wear resistance of parts.

### Main Technical Indicators and Parameters

Power	Inverter Plasma Power Supply	Working Voltage	40VDC
Input Voltage	380±10%	Cladding Speed Adjustment Range	---
Rated Input Capacity	15KVA	Route	---
Rated Load Sustained Rate	100% (20°C)	Argon Consumption	1.5m <sup>3</sup> /h
Rated Cladding Current	220 Amperes	Floor Area	1600×900×1100mm
No-load Voltage	140VDC	Machine Weight	About 330 KG

## Plasma Cladding Wear-resistant Cutting Pick Production Complete Equipment

### I DRF-3 Cutting Pick Plasma Cladding Equipment



The equipment can achieve certain thickness of PTA alloy wear-resisting layer over the head of the cutting pick, and the hardness can reach more than 60-65HRC, effectively improving the wear resistance of the cutting pick head, protecting the alloy cutting head from premature fall off, and extending its service life. The operating voltage of the equipment is 380V, the power is about 25KW, and the area is about 1400mm\*3500mm.

### II Cutting Pick Top Hole CNC Lathe

The equipment is to strictly ensure that the size and shape of the cutting pick's top hole is strictly matched with the hard alloy bottom's shape and size, so that brazing the carbide to the cutting pick body has achieved the highest cutting strength. The lathe is proposed to be modified or customized according to the parameters set by our company.

### III Cutting Pick Cleaning Equipment

The equipment can be used to clean the cutter pick efficiently. The operating voltage of the equipment is 380V, the power is 40KW, and the area is about 5000mm\*1500mm.

### IV DPB-1 Double Station Brazing and Quenching Integration Equipment



The equipment is used for brazing the cutter pick body and alloy head, and after brazing, quenching treatment, so that the hardness of the cutter pick body can meet the international standard. The whole brazing and quenching process is controlled automatically by numerical control system with high efficiency and stable quality. In addition, by integrating brazing and quenching, the equipment can reduce the adverse effects of secondary heating on the microstructure properties of the matrix materials, the quality of the weld after brazing and the mechanical properties, and reduce the consumption of electric energy. The equipment uses voltage of 380V, power of 100KW, covers an area of about 3000\*4500mm. Because the equipment is divided into three parts, the area will be different depending on the layout.

### V Cutting Pick Tempering Heat Treatment Equipment



The equipment performs tempering towards the brazed and quenched cutting pick to improve the plasticity and toughness of the matrix, reduce its brittleness and reduce or eliminate the residual internal stress in the cutting pick. The power supply of the equipment is 380V, the power is 45KW, and the floor area is about 7000\*2000mm.

### VI Cutting Pick Shot Blasting Machine

The equipment is to knock off the oxide skin on the surface of the cutting pick through the high-speed flying steel ball, which can improve the appearance of the cutting pick and upgrade the product grade. The voltage of the equipment is 380V, the power is 13KW, and the floor area is 4000\*2000mm

### VII Cutting Pick Automatic Marking Machine

The equipment is to print marks at the tail of the cutting pick, marking the production date, batch number, etc., which can more effectively identify our own products in the market, and carry out quality tracking analysis. The voltage is 220V, the power is about 1KW, and it covers an area of 2200\*600mm.

### VIII Cutting Pick Automatic Clipper Loading Machine



The equipment can realize automatic clamping spring on the cutting pick, improve the clamping efficiency and quality. The equipment uses compressed air, does not need electricity, and covers an area of 800\*800mm.

### IX DRF-3 Cutting Pick Plasma Special CNC Equipment



### X Shearer Cutting Pick Complete Production Line

## Plasma Cladding Wear-resistant Scraper Conveyor



After the wear-resisting treatment of the scraper conveyor by plasma cladding strengthening technology, the wear-resisting life of the conveyor head, tail and the middle groove will be greatly extended. Meanwhile, the cladding strengthening scraper conveyor also has the following characteristics:

I The easy wear parts of the scraper conveyor, such as the head frame, tail frame, middle groove, sprocket and scraper, adopt wear-resistant treatment to prolong the wear-resistant life of the scraper conveyor.

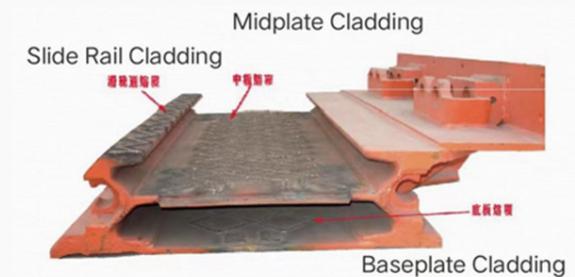
II Due to the existence of the cladding alloy ceramic layer, the direct contact wear between the scraper, chain and the middle groove is the wear between the scraper, chain and the cladding layer, which protects the middle groove and prolonging the service life of the middle groove.

III The cladding layer is cermet, the friction coefficient is very low, the operation resistance is reduced, the coal powder remaining between the cladding layer can also play the role of lubricant to further reduce the operation resistance, save power consumption, prolong the service life of the motor and the reducer.

IV The friction resistance is reduced, greatly reducing the occurrence of extrusion, broken chain accidents, improve the safety of production.

## Wear-resistant Treatment of Large Scraper Conveyor

For the scraper conveyor purchased by coal mine, according to the coal reserves, coal hardness and geological conditions of the working face, the material, cladding thickness, cladding density and other parameters are designed, so that after mining a working face, only the cladding layer is worn, and the middle groove, conveyor head, tail and matrix are not worn. When the next working face is mined, the parameters are redesigned according to the wear condition of the cladding layer and cladding treatment is carried out. In this way, the middle groove can be used repeatedly.



The plasma cladding technology is used to carry out wear-resistant treatment towards the groove side, the middle plate and the sealing bottom plate of the middle groove.

## Wear-resistant Treatment of Large Scraper Conveyor

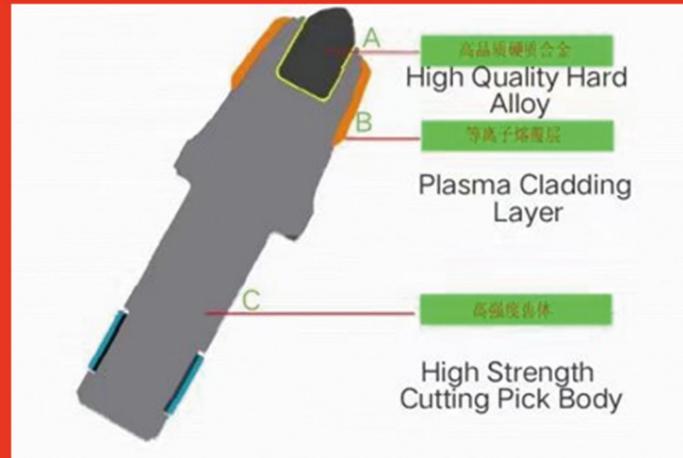
### Cutting Pick



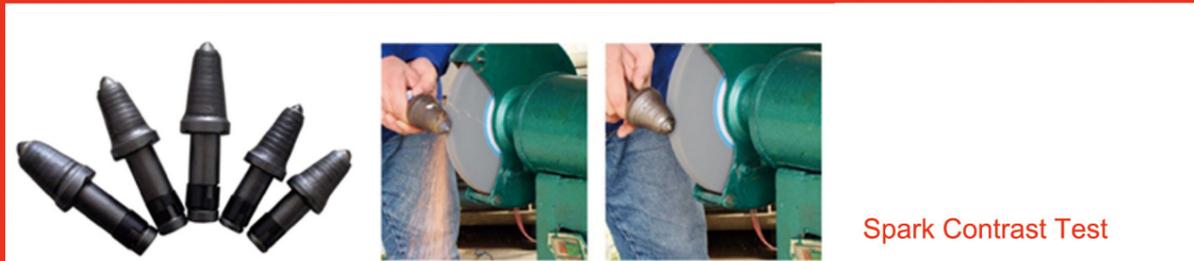
After brazing and heating treatments of high toughness tungsten carbide, PTAW tungsten carbide overlay can greatly enhance wear resistance and impact resistance of cutting pick, and make its service life up to 2 to 3 times.



## CUTAWAY VIEW OF CUTTING PICK



- The brazing filling rate can reach 96.3%, which ensures the brazing part has high shear strength.
- The high hardness cladding layer prolongs the wear life of the cutting pick, and does not produce sparks during use, improving the safety performance.
- Advanced processing equipment and heat treatment technology are used to ensure the high strength and toughness of the cutting pick.
- The cutting pick with super wear-resistant new material and new plasma cladding technology is especially suitable for sandstone and other harsh environment.



Plasma cladding layer does not generate spark when cutting rock or encountering coal nodules, which improves the safety performance of coal production. Plasma cladding layer does not generate spark when cutting rock or encountering coal nodules, which improves the safety performance of coal production.

## Bucket Tooth



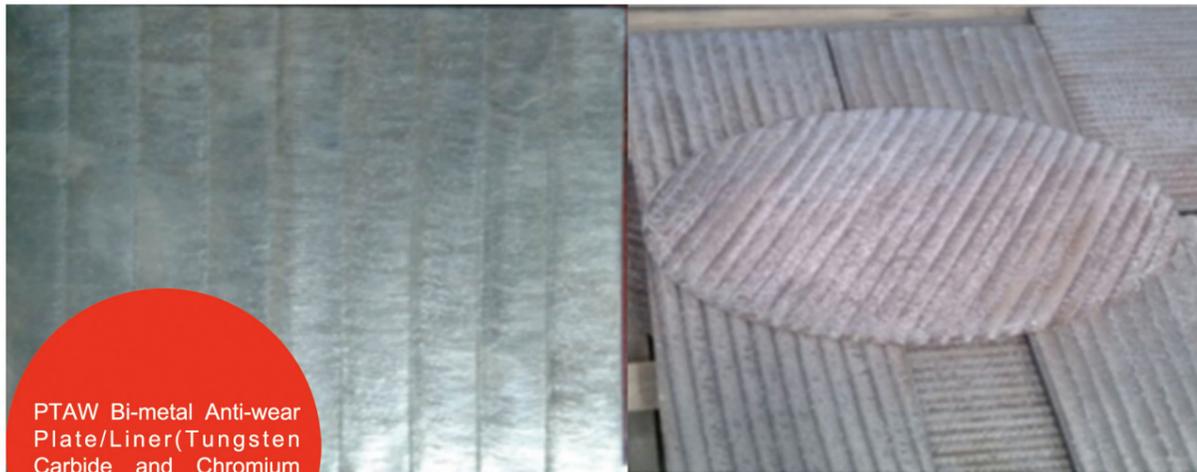
PTAW overlay (Ni/WC) on the lip of bucket tooth can increase its working life 1 to 3 times longer based on open pit application onsite.

## Shrouds



PTAW overlay (Ni/WC,CrC) on shrouds (protection plates on buckets of mining application) can increase working life up to 5-10 times longer based on application onsite.

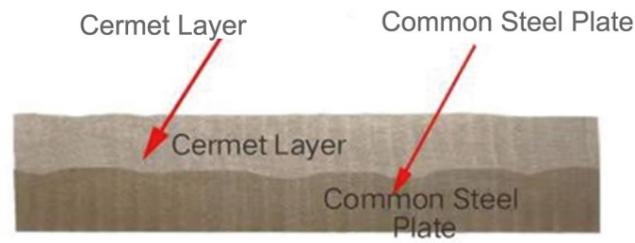




PTAW Bi-metal Anti-wear Plate/Liner (Tungsten Carbide and Chromium Carbide Overlay)

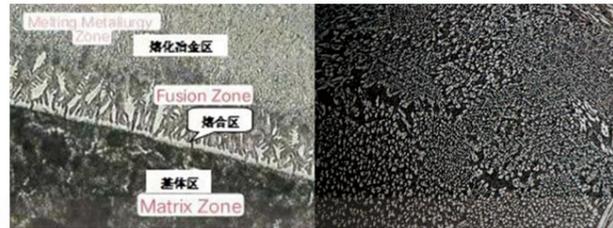
**PTAW Bi-metal Anti-wear Plate/Liner (Tungsten Carbide and Chromium Carbide Overlay)**

With PTAW overlay and special plasma cladding procedure technology as well as equipment, the high-end wear-resistant composite steel plate can meet the requirements of severe abrasion application and impact resistance that other wear-resistant composite plates can not achieve.

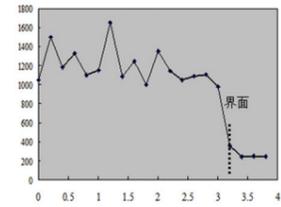


Profile of Plasma Cladding Wear-resistant Composite Steel Plate

The wear-resisting layer of composite plate and substrate are bonded by metallurgy, and the hard phase is dispersed.



**Hardness Distribution Curve of Composite Plate Wear-resisting Layer at Different Depths**



Macro-hardness of Wear-resistant Plate: 62-67HRC  
 Mean Micro-hardness: 1180Hv0.2  
 Maximum Micro-hardness: 1650Hv0.2  
 Cr<sub>7</sub>C<sub>3</sub> Micro-hardness: 1300-1800Hv0.2

Base Plate Thickness	Overlay Thickness	Size per One
5mm, 6mm	3-4mm	2 Square Meters
	4-5mm	2 Square Meters
	6-7mm	1 Square Meters
	7-8mm	1 Square Meters
8mm, 10mm, 12mm, 16mm, 18mm, 20mm, 24mm, 26mm, 28mm, 30mm	3-4mm	3 Square Meters
	5-6mm	2 Square Meters
	7-8mm	2 Square Meters
	9-10mm	2 Square Meters
	11-12mm	2 Square Meters
	13-14mm	2 Square Meters
	15-16mm	1 Square Meters
	17-18mm	1 Square Meters
19-20mm	1 Square Meters	

**Note:**  
 All size here showed the single plate we can achieve the max size, we can also supply customer-made size plate if less than the size noted here. If there are some irregular parts need PTAW, please confirm with Xinghe Keer ahead of time, such as cutting pick, adaptor, shroud, bucket tooth, cutting blade, etc





Plasma-cladding Wear-resistant Shovel Teeth

Plasma Cladding Railway Tamping Pick

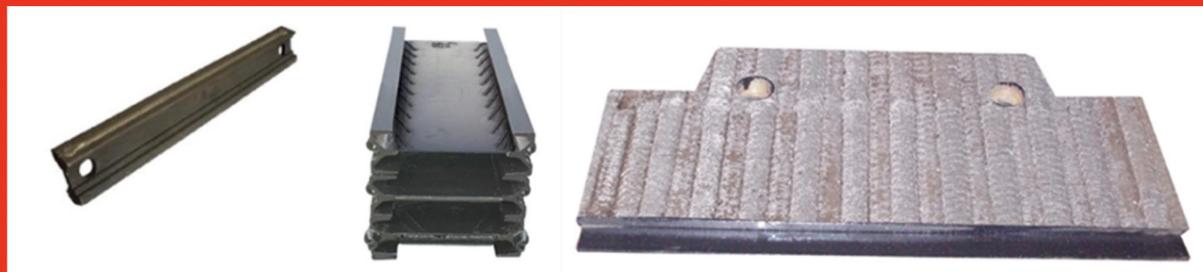
Plasma Cladding Wear-resistant Crusher Press Roll Machine impeller



Plasma Cladding Enhanced Shot Blasting

Slotted Side Steel

Chain Breaker



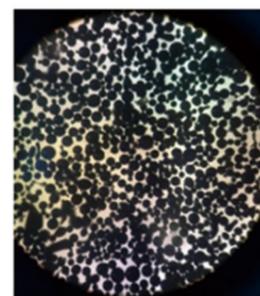
Scraper

Middle Trough

Plasma Cladding Wear-resistant Tongue Plate

### Hardness Distribution Curve of Composite Plate Wear-resisting Layer at Different Depths

We have high pressure water atomized alloy powders production line and powder performance laboratory, developed a variety of alloy powders that market needs, including C/W/Cr/Ni/Nb/Mo/B etc elements.



Microscope photo of alloy powders

### Analysis Equipment

There are lots of analysis equipment in our company. Such as EPMA test /SEM test/XRD test /Micro-hardness test/Rockwell hardness/ Impact test/ Powder particle size analyzer/Chemical element analysis/Carbon, Sulfur analysis/ The Dry Sand Abrasion measuring.



Carbon, Sulfur Analysis Equipment



EPMA and SEM



Dry Sand Abrasion Measuring

Micro-hardness Test (HV)



XRD



