Pure Aluminum Rod
LLZ-15-1600 Electric
Aluminum Rod
Continuous Casting and
Rolling line

Technical Specification

Foshan Metech Aluminum Technology CO., LTD

Office address: 2nd Floor, E1 building, Jiulong hardware & stainless steel trade centre, Dali town, Nanhai district, Foshan, Guangdong, China

Factory address: Matang magnetic industry park, Yueyang, Hunan, China

Main products: Aluminum Melting Furnaces, Aluminum Holding Furnaces, industrial furnaces, continuous casting and rolling machines, permanent magnetic stirrer, coal gas generator, aluminum dross processing machines etc. aluminum industry equipments

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1. **Equipment description**

1.1 **Function of the equipment**

This equipment adopts new type four-wheel continuous casting machine and continuous casting and rolling technics to manufacture the ￠9.5mm, ￠12mm, ￠14mm aluminum rod. ￠14mm aluminum rod with 11 rolling stands, ￠12mm aluminum rod with 13 rolling stands, ￠9.5mm aluminum rod with 15 rolling stands. The continuous rolling machine can feed and rod-pack inititatively; There equip with a set of water-blowing device at the outlet of the rod collecting tube, which is used to dry-up the water on the aluminum alloy rod surface. At the same time, there installed drawing device to ensure the alloy rod leading-out smoothly. The arc deflection tube adopts wheel-oriented structure, which can stop the aluminum rod surface from bruising. Rod-winding adopts centrifugal shaking mode, which can guarantee the take-up system operate continuously.

1.2 **Brief manufacturing process flow**

Aluminum Melting Furnace→ Holding Furnace→ Four wheels continuous casting machine→ Pulling capstan→ Rolling Shearer→ Drawing-in → Continuous rolling Machine→ Twin-coiler→ Aluminum Rod

2. **Detail technical parameter:**

3.1 **Four rings continuous casting machine**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter of the casting ring:</td>
<td>￠1600mm</td>
</tr>
<tr>
<td>Casting bar section:</td>
<td>2400mm²</td>
</tr>
<tr>
<td>Casting bar speed:</td>
<td>7.6-15m/min</td>
</tr>
<tr>
<td>Rotating speed of the casting ring:</td>
<td>1.66—3.3r/min</td>
</tr>
<tr>
<td>Casting machine motor power:</td>
<td>4Kw Frequency control</td>
</tr>
<tr>
<td>Cooling water pressure of the casting ring:</td>
<td>0.2-0.5Mpa</td>
</tr>
<tr>
<td>Cooling water consumption:</td>
<td>100t/h ( inner: 40t/h, outside: 30 t/h, side: 30t/h)</td>
</tr>
<tr>
<td>Cooling water temperature</td>
<td>15~45°C</td>
</tr>
<tr>
<td>Water demand:</td>
<td>PH7-8, CaO content: 20-50 PPM</td>
</tr>
<tr>
<td></td>
<td>Impurity grain size: below 0.8mm, content mg/e</td>
</tr>
<tr>
<td></td>
<td>Meet the demand of GB1576</td>
</tr>
</tbody>
</table>

NOTED: The buyer should offer the above cooling water

3.2 **Front Pulling Capstan 5.5kw**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>5.5Kw Frequency control</td>
</tr>
<tr>
<td>Reducer gear box</td>
<td>1 pc</td>
</tr>
<tr>
<td>Wheel box</td>
<td>1 pc</td>
</tr>
<tr>
<td>Air cylinder</td>
<td>1 pc</td>
</tr>
<tr>
<td>Pedestal</td>
<td>1 pc</td>
</tr>
</tbody>
</table>

3.3 **Rolling Shearer**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>11Kw</td>
</tr>
<tr>
<td>Reducer gear box</td>
<td>1 pc</td>
</tr>
<tr>
<td>Wheel box</td>
<td>1 pc</td>
</tr>
</tbody>
</table>

TEL: 86-757-81020128  FAX:86-757-81020129
Air cylinder: 1 pc
Pedestal: 1 pc
Hydraulic baking rod pusher: 1 pc

3.4 Carrier roller  2 sets

3.5 Continuous Rolling Machine
Rolling rod diameter:  9.5mm; 12mm
Quantity of rolling stand: 15
Diameter of the roller: 255mm
Drive ratio of the adjacent stand: 1:1.25
Max finished rolling speed: V=6.2m/s
Center height: 1635mm
Main motor: 280Kw (DC)
Capacity of the gear lubrication oil box: 4m³

3.6 Twin-coiler
Rod diameter: 9.5
Moving motor: 3Kw
Coil’s size: 2000×1400mm
Swivel motor: 1.1Kw (2 pcs)
Laying head motor: 2.2Kw  Frequency control
Collecting basket: 2000×1400mm
Coils’ weight: 1.5-2.5 T

4. Structure features
4.1 Four rings casting machine
The four-rings casting machine is made up of up and down casting ladle, gravity flow-adjusting device, casting ring and driving device, pressing ring device, steel strip oiling device, bridge approaching device, tight device, ingot-picking device, cooling device and steel strip etc.

The aluminum liquid would flow into the up ladle via the launder, the floating plug that controlled by the gravity control the aluminum liquid flow of flowing into the down ladle. Then the aluminum liquid would horizontally cast into the mold chamber that combined by the casting ring and closed steel strip. The casting ring section is “H” type, cooling form all sides, which can guarantee the cast ingots compacted and uniform. Inside, outside and side cooling device can be conveniently pulled out from the casting mold, which is very convenient to adjust and maintain. All the spray heads are stainless steel. The cooling water pressure and flow can be displayed, the steel strip take-up is pneumatic (can be adjusted). There equipped cooling device on the supporting shaft of the casting ring, after flow through the 0.2-0.5 MPa cooling water. The cooling water will spray on the casting ring’s surface via spray head. There are three cooling areas, which can make the aluminum liquid cool gradually and get into the aluminum billets.

The aluminum congeal on the casting ring would be picked out by the picking
and then be sent out along the approach bridge. The compressing device press the steel strip tightly on the casting ring, to avoid the aluminum liquid leaking out which may change the direction of the steel strip. The tension of the steel strip can be adjusted by the take-up device. In order to de-mold easily, there equipped with steel strip oiling device. The whole process is continuous, which can get big long casting billets.

4.2 Front Pulling Capstan
The motor of the front pulling capstan is frequency control, which can be operated in stand-alone or linkage modes. The front pulling capstan is made up of motor, reducer box, wheel box and roller wheels (up and down). It is used to lead the rod materials to the rolling shear. So the rolling shear can cut the unqualified materials. It can be linked with the rolling machine, once there is something wrong with the rolling machine, the up roller wheel of the pulling capstan would press down, clipping the rod materials, and then lead it to the rolling shear for shearing, and then transferring away by the trolley.

4.3 Rolling shear
The motor will drive the reducer to drive the up and down cutter head which has two pieces of cutting knife. The cutting speed is approx to the casting billets moving speed. When the quality of the casting billets is not good, the rolling shear would cut them into short materials; if the casting billets meet the rolling requirement, the shear would stop working, the casting billets would be sent to the rolling machine to roll. During the process of rolling, if there is something wrong with the rolling mac rod-collector, the rolling shear would be power-on automatically, cutting the into short materials and send them to the billets car.
4.4 Carrier Roller
The carrier roller is used to lead the rod sent by the Pulling capstan to the Drawing-in device, then to the rolling machine.

4.5 Continuous Rolling machine
It consists of 15 pieces of rolling stands, is 3-high mould rolling stand. The diameter of the roller is 255mm.

The system:
- Oil pump (2 pcs): KCB300—18m³/0.36 (one for reserve)
- Max flow: 18m³/h
- Operating pressure: 0.35 Mpa
- Motor model: Y132M2-6  5.5Kw
Oil temperature: ≤45°C
Oil storage tank: V=4m³
The stand is lubricated and cooled by emulsion. The emulsion system:
Emulsion pump (2 pcs): ISW100-250B (one for reserve)
Max flow: 87m³/h
Operating pressure: 0.3-0.5 Mpa
Motor model: Y180M-2 22Kw
Emulsion temperature: 15-45°C
The Seller would equip with a TDL filter to ensure there in no impurity in the emulsion.
To our advice, better using WD-6 aluminum continuous casting and rolling emulsion.
The flow of the emulsion can be adjusted by the switch on the valves.

4.6 Continuous water cooling device
The continuous water cooling device would cool the high temperature aluminum rod that comes from the continuous rolling machine to a certain technics temperature of the user (Adjusting the water flow of the cooling water spraying drum)
4.7 Basket down coiler
It consists of coil down frame and wire basket truckle:
The coil down frame would lead the rod wire through the guiding pipe with pulley to
the arc pulley frame, then fall into the collecting basket via the rod laying device.
Adjusting the rotate speed of the laying head motor could get the different diameters
coils in the collecting basket. The pulley could reduce the resistance that between the
rod wire and guiding pipe, stop the rod wire from damage.
The wire basket truckle has two same size wire basket (the wire basket can be rotated
via frequency control). There equipped with moving motor under the truckle, when
one of the wire baskets is filled with rod wire, then driving the empty wire basket to
the place.

4.8 Electric control device  1 set
Power of the electric system   Three phase four wire system ,400v,50Hz
Total power of the equipment   ~380 Kw

4.8.1 Electric drive control
The electric drive control consists of DC box of the rolling machine, operation
platform of the continuous casting and rolling, rod-collecting operating board etc.

4.8.2 Main electric device of the system:
Frequency control device (SIEMENS) of the continuous casting machine:  1 pc
Frequency control device (SIEMENS) of the pulling capstan:  1 pc
Frequency control device (SIEMENS) of the rolling shear:  1 pc
Frequency control device (SIEMENS) of the coiler:  1 pc
Frequency control device (SIEMENS) of the continuous rolling machine:  1 pc
SIEMENS PLC controller:  1 pc
SIEMENS touch screen:  1 pc
Other electric device all adopts SIEMENS brand products

4.8.3 Explanation of the electric drive control:
The PLC would exchange the date in two-way, to inspect and control the system via programme control of the PLC
The motor speed of the rolling machine can be adjusted by the “speed lift and down” button. The casting and coiling speed are both controlled by the potential device. The system can control and inspect the below operations:
Power on/off of the all the equipment; Speed of all the equipment; working conditions and alarm of all the speed-adjusting devices; operating conditions and alarm of all the auxiliary machinery, operation of the system etc.
Electric current and rotary speed display of the rolling machine;
The good electric control system can make the aluminum rod much more tidy and dense.

4.8.4 Dimension of the electric control devices:
DC control cabinet: 1000*800*1800 mm
Continuous casting operating platform: 1000*620*1000 mm
Continuous rolling operating platform: 1000*620*1000 mm
Coiling operating board: 500*400*1000 mm

4.8.5 Electric technical documents:
Circuit diagram: 1 set
Electric connect graph 1 set
Operating instruction manual of the equipment: 1 copy
Operating instruction manual of the DC speed regulating device: 1 copy
Operating instruction manual of the frequency control device: 1 copy
**Goods supplying scope:**
The aluminum rod continuous casting and rolling line is mainly made up of four-wheel continuous casting machine, rolling shear, front pulling machine, continuous rolling machine, twin-coiler, lubrication and emulsion oil supplying device, electric control device etc.
Below is the detail:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Four rings continuous casting machine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. pedestal</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>2. tight ring</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>3. casting ring</td>
<td>1 pc</td>
<td></td>
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<tr>
<td>4. air cylinder</td>
<td>1 pc</td>
<td></td>
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<tr>
<td>5. Pressing ring device</td>
<td>1 set</td>
<td></td>
</tr>
<tr>
<td>6. casting ladle</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>7. bridge bracket</td>
<td>1 set</td>
<td></td>
</tr>
<tr>
<td>8. flow-adjusting device</td>
<td>1 set</td>
<td></td>
</tr>
<tr>
<td><strong>II. Front pulling machine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. reduction gearbox</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>2. wheel box</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>3. air cylinder</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>4. pedestal</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td><strong>III. Rolling shear</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. pedestal</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>2. reduction gear box</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>3. wheel box</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>4. Hydraulic rod pusher</td>
<td>1 pc</td>
<td></td>
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<tr>
<td>5. blade</td>
<td>4 pcs</td>
<td></td>
</tr>
<tr>
<td>6. Convey guide track</td>
<td>2 sets</td>
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</tr>
<tr>
<td><strong>iv. Continuous rolling machine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. gear box</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>2. safety coupling</td>
<td>15 sets</td>
<td></td>
</tr>
<tr>
<td>3. Y255 rolling stand</td>
<td>15 pcs</td>
<td></td>
</tr>
<tr>
<td>4. Rolling stand base plate</td>
<td>15 pcs</td>
<td></td>
</tr>
<tr>
<td>5. Gear box base plate</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>6. Drawing-in/feeding device</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td>7. Motor coupling</td>
<td>1 set</td>
<td></td>
</tr>
<tr>
<td>8. Emulsion shunt valve</td>
<td>1 pc</td>
<td></td>
</tr>
<tr>
<td><strong>v. Twin-coiler</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Arc pulley bracket</td>
<td>1 set</td>
<td></td>
</tr>
<tr>
<td>2. Rolling pipe</td>
<td>1 set</td>
<td></td>
</tr>
</tbody>
</table>
3. Coiling device 1 set
4. Collecting basket 2 pcs
5. Take-up car 1 pc

### vi. Electric control system
1. DC speed regulating cabinet 1 set
2. Operating box 3 pcs
3. DC speed regulating motor of the continuous rolling machine: 280 kw 1 pc
4. Continuous casting motor: 4 kw 1 pc
5. Pulling machine motor: 5.5kw 1 pc
6. Rolling shear motor: 11 kw 1 pc
7. Emulsion pump motor: 22 kw 2 pcs
8. Oil pump motor: 5.5 Kw 2 pcs
9. Coiling motor: 1.1 kw 2 pcs
10. Trolley moving motor: 3 Kw 1 pc
11. Rod laying motor: 2.2 Kw 1 pc

### vii. Cooling and lubrication
1. Emulsion pump (ISW100-250B) 2 pcs One for reserve
2. Oil pump (KCB300) 2 pcs One for reserve
3. Water pipe joint 80 pcs
4. Valve( 1/2“) 80 pcs
5. Flange 5” 1 set
6. Plastic pipe 6” 30 meters
7. Plastic pipe 4” 40 meters

### viii. Others
1. Pass plug gauge 1 set
2. snap- gauge 1 pc
3. Oil tank 4 cub meter 1 pc
4. Tail screw M27 17 pcs

### ix. Component
1. Outlet pipe (Bakelite) 1 set
2. Gasket ring 85*120*12 2 pcs
3. Gasket ring 140*170*16 5 pcs
4. Gasket ring 180*220*18 5 pcs
5. Gasket ring 180*150*16 2 pcs
6. Safe shear pin 10 pcs

### Responsibility of the Buyer:
1. Public accommodation of the water, electricity, air supplying
2. Foundation of the equipment, including all the embedded parts
3. Sizing block for installation and installation materials covering board
4. Tools for installing and commissioning, maintaining and manufacturing
5. Lubrication and emulsion oil
6. Electric cable, water pump, air pump connecting