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大 连 大 山 集 团

*Dalian Dashan Group*



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## ***INTRODUCTION OF DLDS GROUP***

- DLDS Group is a one of the biggest producers and suppliers of crystallizer located in China. It is a joint venture with KME, the world-renowned German copper manufacture. Founded in early 1990s ,it mainly consists of Dalian Dashan Crystallizer Co., Ltd, Dalian Dashan Heavy Machinery Co., Ltd, Dalian Dashan Surface Treatment Co., Ltd , Dalian Dashan Copper Industry Co..Ltd and Dalian Dashan Metallurgical Engineering Technology Co., Ltd. We have long years' supply experience of crystallizer all over the world. We also manufacture complete set of continuous casting machine and relevant spare parts acting as the main contractor. All production process are led by Quality Management System in accordance with ISO9001:2000 standards. We commit to supply products which comply exactly with customers' specifications and are competitive in terms of delivery, price and service, and we can also give technical guidance to help the customer to reduce the cost and increase productivity. Our specialized know-how, quality control and dedicated service enable us to satisfy the market's changing requirements. We had exported our crystallizer and continuous casting machine to various foreign countries such as Germany, Italy, Greece, Brazil, Venezuela, Ecuador, India, Thailand, Philippine, Turkey, Syria, Pakistan, Egypt, South Africa, West Africa etc in last decade. For more details about our group.
- **welcome to our website: [www.dldsgroup.com](http://www.dldsgroup.com).**



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# *Main Plant Area Of DLDS Group*

*---- Dalian Dashan Crystallizer Co.,Ltd.*







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# *Main Plant Area Of DLDS Group*

*----Dalian Dashan Heavy Machinery Co.,Ltd.*





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## ***INTRODUCTION OF Dalian Dashan Metallurgical Engineering Technology Co.,Ltd.***

- **Dalian Dashan Metallurgical Engineering Technology Co., Ltd. is the subsidiary company of Dalian Dashan Group. The company was founded in May 2008 with construction area of 40,000 square meters. There are 170 employees, of whom 36 are managers ,29 are senior technical staff. Our core business is the production of continuous casting machine, billet ,slab crystallizer and relevant spare parts. The R6m casters and rolling equipment have exported abroad to Kazakhstan, Vietnam, etc.**
- **Dalian Dashan Metallurgical Engineering Technology Co., Ltd. is one of the import and export windows of DLDS Group.**



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# QUALITY CERTIFICATE



## CERTIFICATE

IQNet and CQM  
hereby certify that the organization

Dalian Dashan Metallurgical Engineering  
Technology Co., Ltd.

Domicile: Room 503-2, B Building, No.32, Lixian Street, High-Tech Industrial Park, Dalian City, Liaoning, P.R.China  
Certification Add.: Room 503-2, B Building, No.32, Lixian Street, High-Tech Industrial Park, Dalian City, Liaoning,  
P.R.China

Postcode.: 116021

is in conformity with

ISO 9001:2000 Standard

This certificate is valid to the following product(s)/service:  
Design, development and manufacture of metallurgical equipment

Issued on: 2009-11-13

Validity date: 2012-11-12

Registration Number: CN-00209Q15845R0S



*René Wasmer*

René Wasmer  
President of IQNet

*Zhang Wei*

Zhang Wei  
CEO of CQM



**IQNet Partners\***

AENOR Spain AFNOR Certification France AIB-Vincotte International Belgium ANCE Mexico APCER Portugal CIBQ Italy  
CQC China CQM China CQS Czech Republic Crti Cert Croatia DQS Holding GmbH Germany DZ Denmark ELDT Greece  
FCAI Brazil FONGSINGRAM University FRQSA Hong Kong China FQNTSC Colombia IMC Mexico Inspec Certification Finland  
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Qualiplus Austria RRI Russia SII Israel SIQ Slovenia SIRM QAS International Malaysia SQI Switzerland SRIAC Romania  
TSTB St Petersburg Russia TSC Turkey VQS Serbia

IQNet is represented in the USA by: AFNOR Certification, CIBQ, DQS Holding GmbH and NSAI Inc.

\* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under [www.iqnet-certification.com](http://www.iqnet-certification.com)



## 质量管理体系认证证书

注册号: CQM-24-2009-0068-0001

兹证明

大连大山冶金工程技术有限公司

住所: 辽宁省大连市高新技术产业园区孔贤街32号B座503-2室  
认证地址: 辽宁省大连市高新技术产业园区孔贤街32号B座503-2室  
(116021)

管理体系符合

GB/T 19001-2000 idt ISO 9001:2000标准要求

覆盖的产品及其过程

冶金设备的设计、开发和制造

证书号: 00209Q15845R0S

有效期至: 2012年11月12日

(可盖注册证“确认证书”, 表格背面网络确认本证书的有效性)  
(注: GB/T 19001-2000 idt ISO 9001:2000 标准自发布之日起至 2010年11月14日)

*张 伟*

总经理: 张 伟



二零零九年十一月十三日



GB/T 19001



体系认证  
CNAS C002-Q

方圆标志认证集团

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电话: 010-64411111

0035922





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## Core Product- Continuous Casting Machine (CCM)



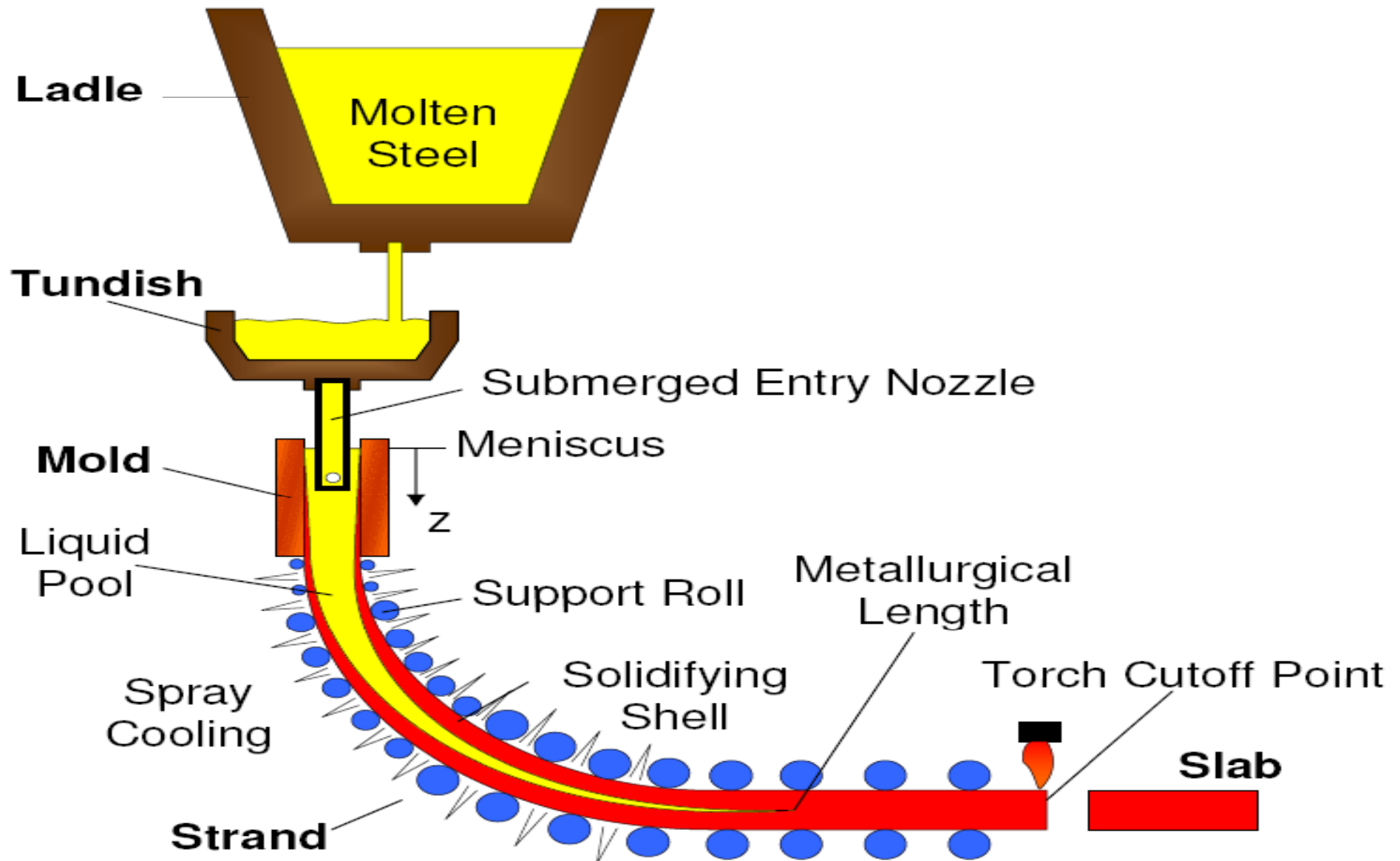
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# Continuous Casting





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## *Main Technical Parameters of High Efficiency CCM*

Description	Unit	Quadrate / Plate billet
Machine type		Whole-arc gradually straighten
Arc radius	m	$\geq 3$
Billet section	mm	$\geq 100 \times 100$ / $\geq 100 \times 1500$
Steel type		Carbon steel, carbon nodule steel, alloy steel, spring steel, stainless steel.
Strand distance	mm	1100 / 1200
Withdrawing speed	m/min	$\leq 4.0$ / $\leq 3.0$
Dummy bar		Steel flexibility (adjustable)
Mold		Spray mouth cooling / high efficiency
Vibration device		Four connecting rod, semi-board spring
Power consumption	Kwh/t	10



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## *Main Parts of CCM*

*Ladle (incl ladleturret)*

*Tundish*

*Mould Assembly*

*Oscillation Device*

*Spray Cooling Assemble*

*Straightening and Withdrawal Machine*

*Bending and Pie Slice Segment*

*Foot-roller and Roller bed*

*Torch Cutting Machine*

*Copper Mould Tube, Copper Mould Plate*

*Mould Cooling Jacket*

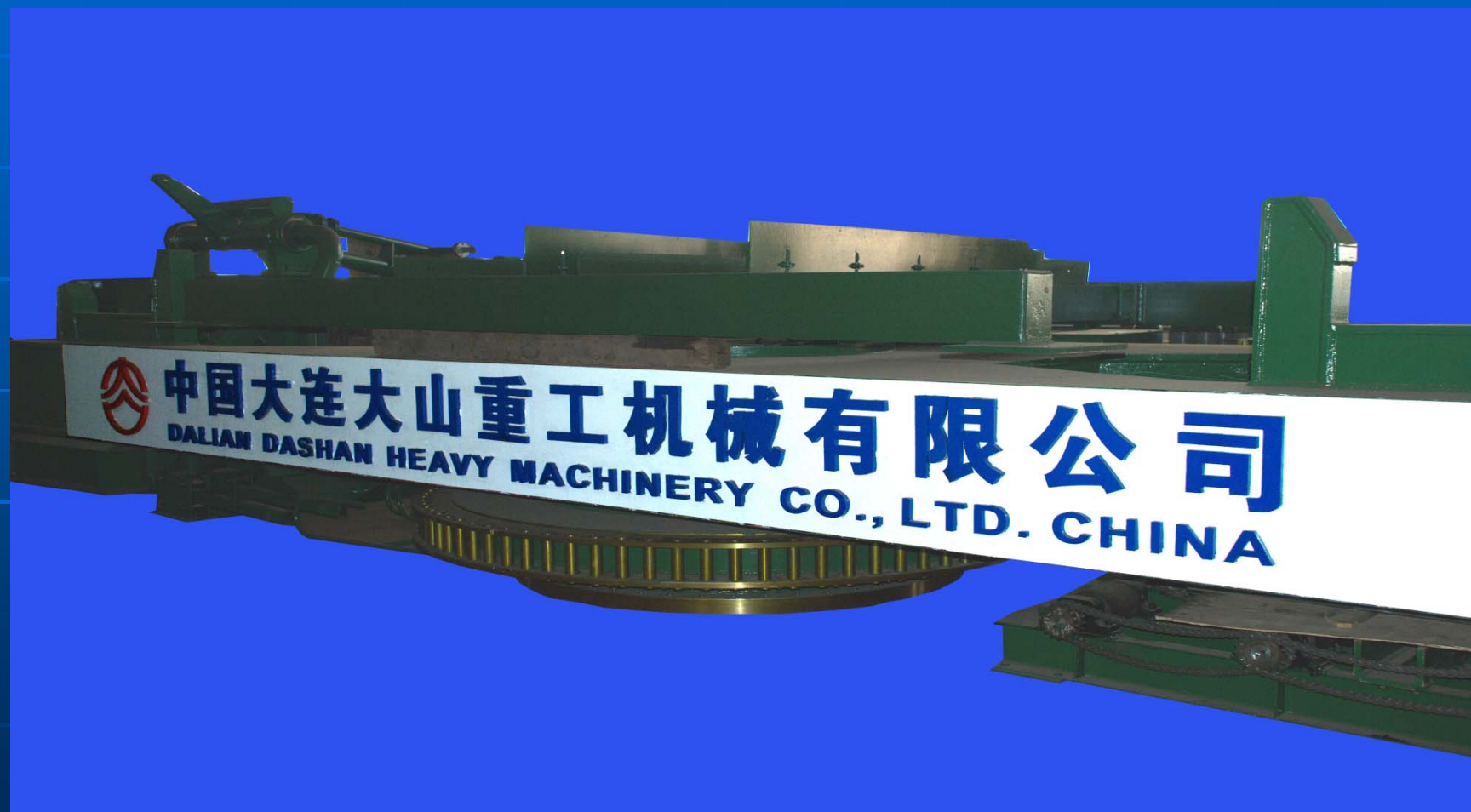
*Level Control System*





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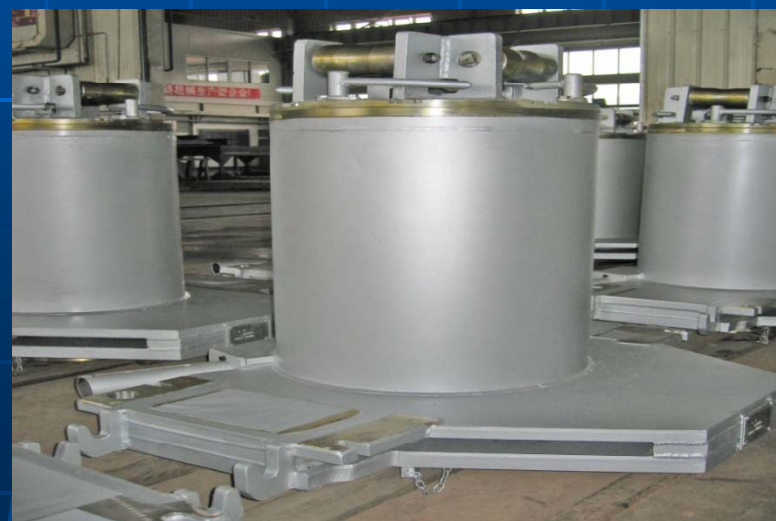
# *Ladleturret*





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# *Mould Assembly*

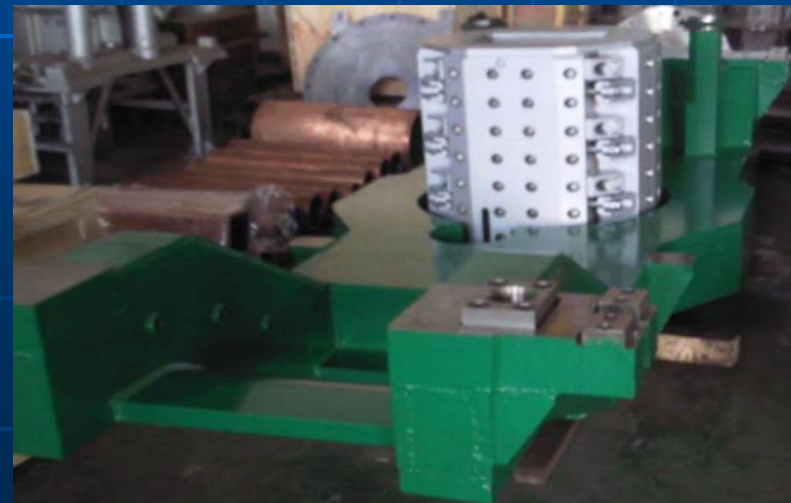
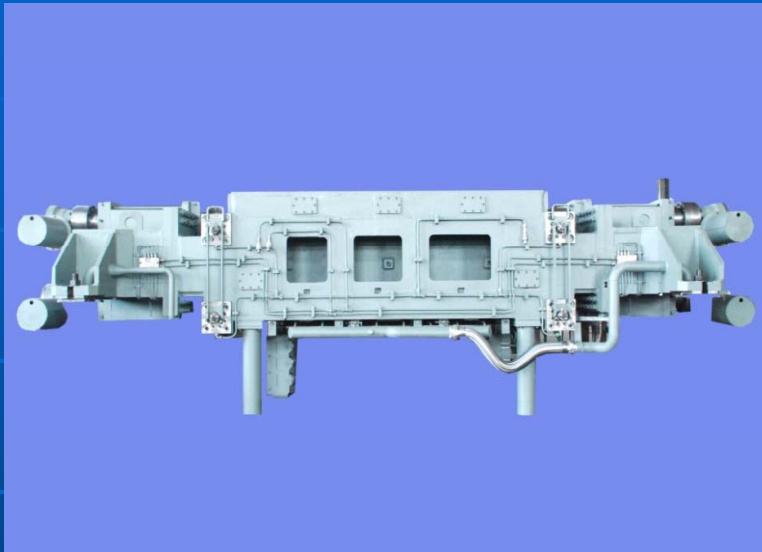






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# *Mould Assembly*







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# *Mould Assembly*

## Main Characteristic

Casting radius: R4000~R12000mm

Billet size:  $60 \times 60 \sim 500 \times 500$   $100 \times 240 \sim 300 \times 500$   $\phi 90 \sim \phi 500$

Cooling jacket: integrated or segmented stainless steel

Water gap: 4mm (it will change as per different copper mould tube design requirement)

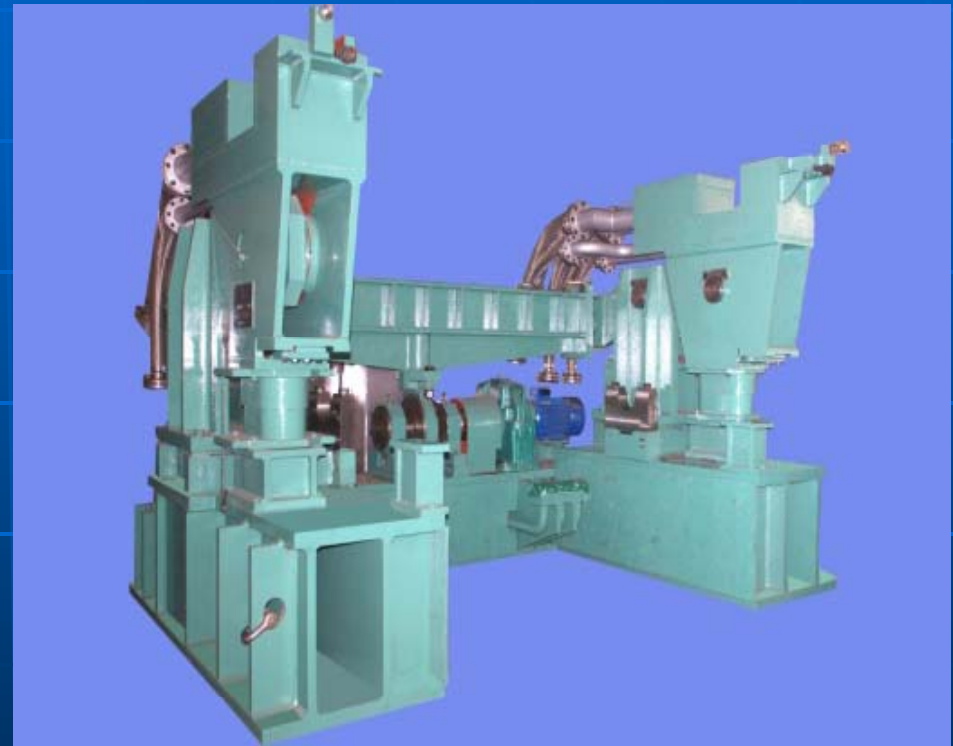
Water pressure: >1.0MP

Speed of the cooling water: 10-12m~16m/S



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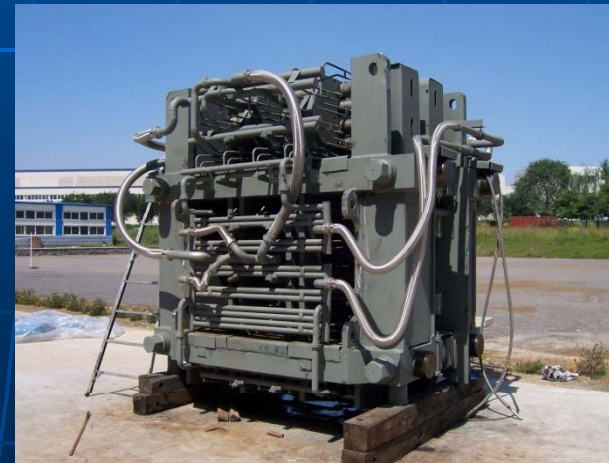
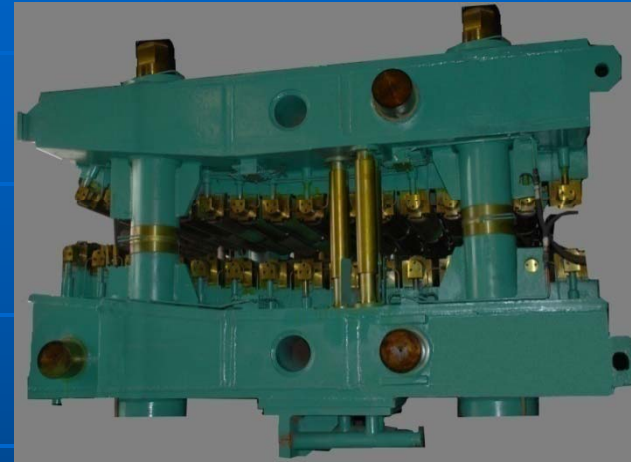
# *Oscillation Device*





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# ***Bending and Pie Slice Segment.***

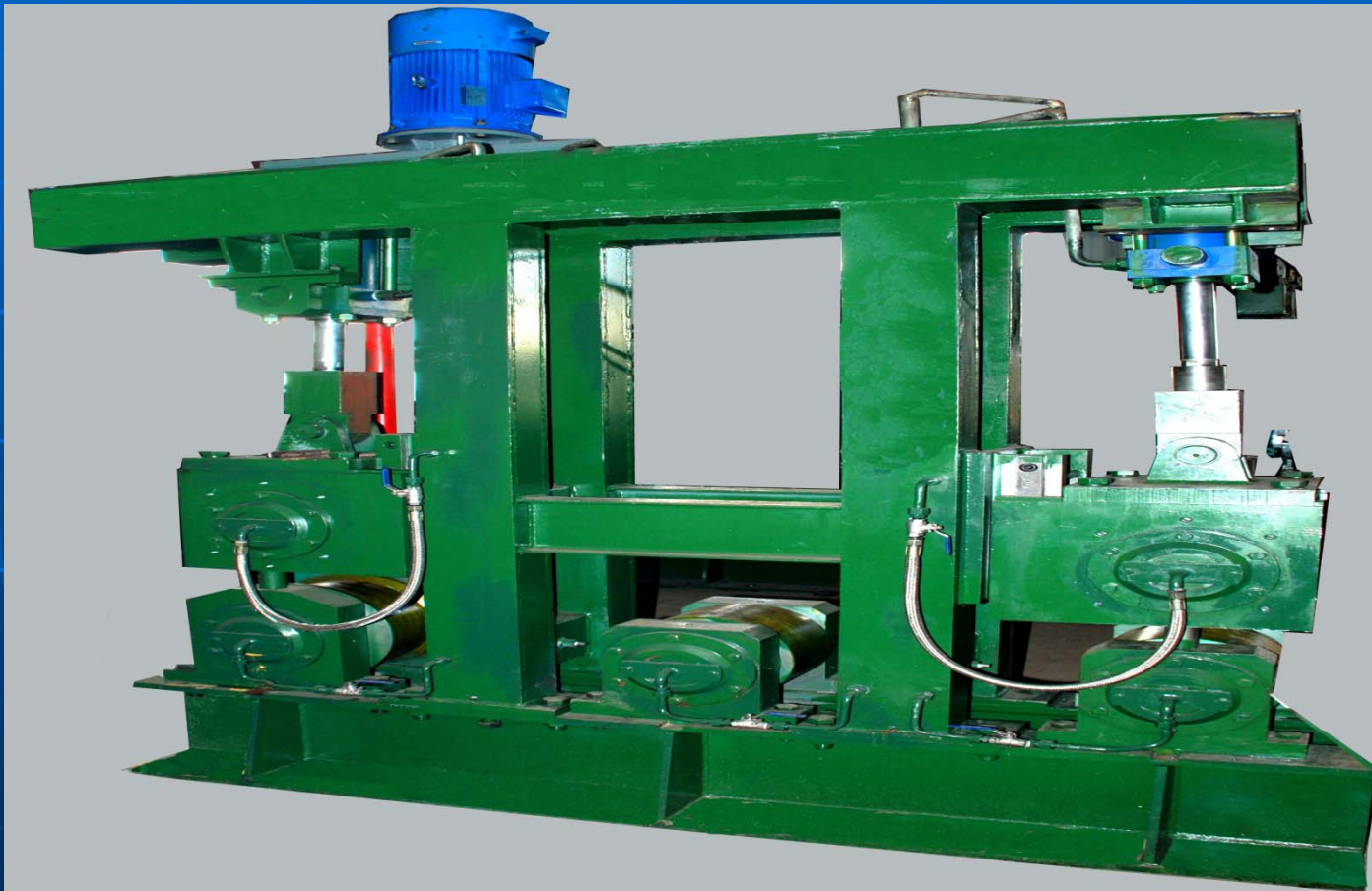






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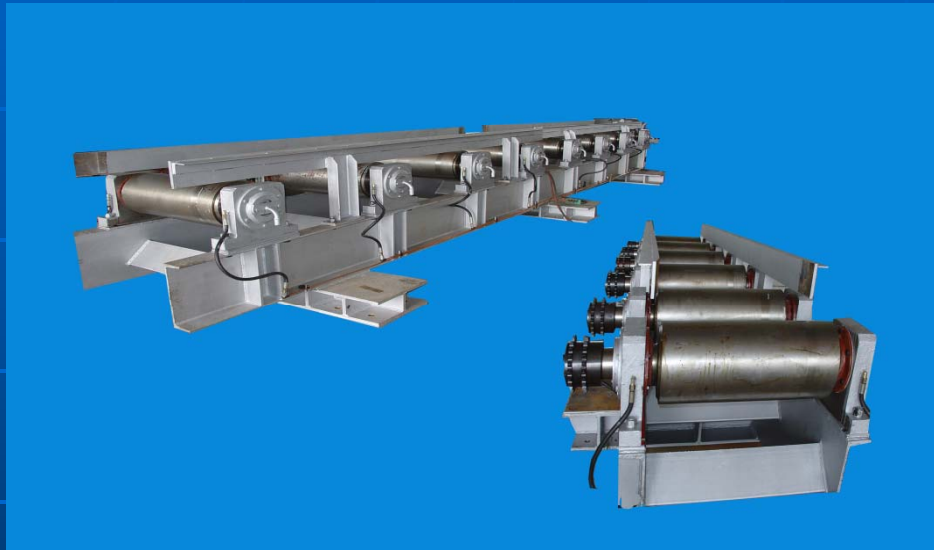
## ***Straightening and Withdrawal Machine***





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## *Foot-roller and roller bed*





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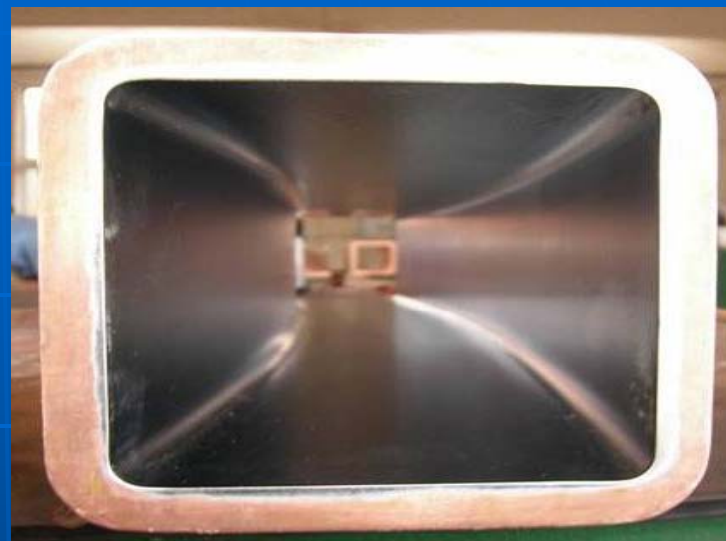
- ***Our hit product--Copper Mould is the heart of continuous casting machine, we particularly introduce it hereinafter.***





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# Copper Mould Tubes





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# Copper Mould Tubes

## Specification of copper mould tube

Section shape	Square	Rectangular	Round	Beam Blank
Item				
Size range	60x60~500x500	100x240~300x500	Φ90~Φ500	
Length	700-1000			
Radius	R4000-R16000			
Internal geometries	Parallel, single tapered, double tapered, multi-tapered, parabolic tapered, diamond tapered, CONVEX			
Material	Cu-DHP (SF-Cu DIN1787) CuAg0.1 Cu-Cr-Zr			
Coating	Cr, Ni-Co-Cr			

**\* We can design as per the customer's specific requirements.**



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# *Copper Mould Tubes*

## **Coating of copper mould tube (Cr-coating)**

Material	Hardness (HV)	Thermal Conductivity (W/m·k)
Cr AMC-HC90 0.08~0.10mm(coating thickness)	950	72



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# *Copper Mould Plates*







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# *Copper Mould Plates*

## Specification of copper mould plates

Copper plate type	Specifications (mm)			Material	Coating
	Length	Width	Thickness		
Beam Blank	700~1016	280~480	80~140	CuCrZr, CuAg	Ni-Co, Ni-Fe
Rectangular	700~1000	300~3800	30~65	CuCrZr, CuAg	Ni-Co, Ni-Fe



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## *Mould Cooling Jacket*

With the aim of helping our customer to make a more efficient use of their Copper Mould tubes, We supply mould cooling jacket, which are specially designed to match its copper mould tubes or as per the customer's specific requirements. Our Mould cooling jacket with very small size tolerance and no distortion in time enables the water gap very uniform, and makes the cooling performance very well, then improves the product quality and increasing mould life.



(Monolithic mould cooling jacket of mould assembly)



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# *Mould Cooling Jacket*

## **Material:**

Stainless steel

Copper (this is not fit for the Mould Assembly with Electromagnetic stirrer)

## **Main feature:**

A single piece without mechanical connection

Very small size tolerance ( $\pm 0.25\text{mm}$ )

Non-deformable over time

One producer for both copper mould tube and mould cooling jacket

## **Our target:**

Improving product quality

Increasing mould life

Reducing risk of breakout



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## *Other auxiliary products we can supply*

- Besides CCM, we can also supply coke furnace equipments:







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## ***QUALITY ASSURANCE FOR COPPER MOULD***

**From raw materials selecting to final inspection, in each manufacturing process, we provide full quality control to our copper mould products and production process according to ISO9001:2000 system.**

- ✧ Raw materials selecting**
- ✧ Tooling preparation**
- ✧ Cold Drawing**
- ✧ Coating**
- ✧ Final finishing**



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## QUALITY ASSURANCE FOR COPPER MOULD

### Raw materials selecting

The elements added into the alloy, a chemical analysis of the molten metal is carried out before casting.

### Typical analysis report of the material used for copper mould tubes

Material	Unit	Cu-DHP	Cu-Ag	CuCrZr
Chemical analysis	%	P 0.015~0.040	Ag 0.08~0.12 P0.004~0.012	Cr 0.30~1.20 Zr 0.03~0.30
<i>Physical properties</i>				
Electric Conductivity	%IACS	83	93	80
Thermal conductivity	w/mk	340	377	330
coefficient of thermal expansion 20-300C	10-6/k	17.7	17.7	18
Temperature for recrystallization	°C	350	370	700
Soften temperature	°C	-	-	500
Flexible modulus	103N/mm2	120	125	128



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# QUALITY ASSURANCE FOR COPPER MOULD

## Raw materials selecting

### Typical analysis report of the material used for copper mould tubes

<i>Mechanical properties</i>				
RP 0.2	N/mm2			
	AT20 °C	285	275	350
	200 °C	250	245	335
	350 °C	195	190	295
Tensile strength	500 °C	30	30	185
	N/mm2			
	AT20 °C	295	285	425
	200 °C	255	245	420
Prolongation rate A5	350 °C	200	195	340
	500 °C	90	90	210
	%			
	AT20 °C	20	17	20
Hardness	200 °C	9	13	18
	350 °C	10	10	19
	500 °C	40	40	20
	HB 20 °C	90-105	85-100	130





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## ***QUALITY ASSURANCE FOR COPPER MOULD***

### **Tooling preparation**

The tooling is prepared with the Computerized Numerical Control Machining center (CNC), the accuracy can reach 0.01mm. The accuracy of the taper and all dimensions of the mould could be guaranteed.



### **Cold Drawing**

After each time of Drawing, inspection will be taken to ensure the size within the required range, also the testing of micro structure of the metal will be carried out at laboratory.





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## QUALITY ASSURANCE FOR COPPER MOULD

**Our plant has equipped with complete set of production facilities and testing equipments**

### PRODUCTION FACILITIES

100-200T Mini-pressing machine: 3 sets  
500T vertical hydraulic press: 1 set  
1000T vertical pressing machine: 1 set  
1500T vertical oil pressing machine: 2 sets  
2000T vertical oil pressing machine: 1 set  
3000T vertical oil pressing machine: 1 set  
400T horizontal oil extrusion machine: 1 set  
500T horizontal oil extrusion machine: 1 set  
600T horizontal oil extrusion machine: 1 set  
1250T horizontal oil extrusion machine: 2 sets  
250T 3000x900 DMG machining center  
Air compressing machine: 15 sets  
Various numerical control milling machines: 22 sets  
Annealing stoves: 8 sets  
Hoisting equipments: 39 sets  
Electric plating bath: 36Nos.  
Plates coating bath: 16 Nos.







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# QUALITY ASSURANCE FOR COPPER MOULD

Some pictures of production facilities





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# QUALITY ASSURANCE FOR COPPER MOULD

## TESTING EQUIPMENTS

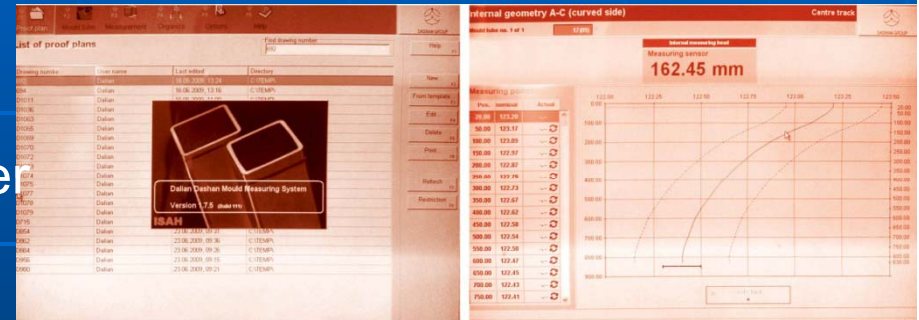
HUD20 type ultrasonic crack detector

TR210 type roughness tester

HS-19GIV type and TH60 type sclerometer

Germany QUANLXR chrome-coating thickness tester

MOD-Z3 computer testing taper meter  
Taper tester



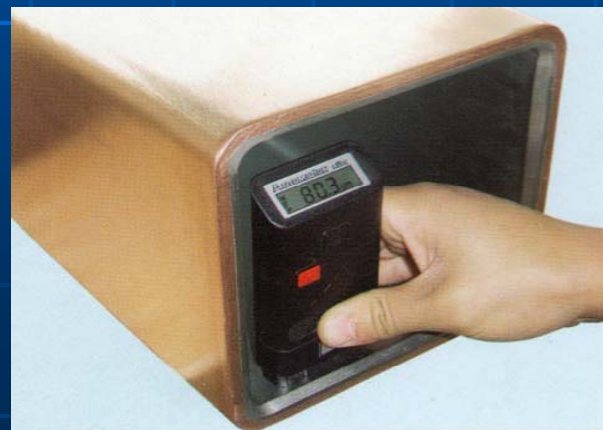




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# QUALITY ASSURANCE FOR COPPER MOULD

## Some pictures of testing equipments





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# *QUALITY ASSURANCE FOR COPPER MOULD*

## Coating

Adopt advanced Germany coating technology. The electrolyte will be checked on daily basis to ensure the chemical content and the foreign substance be maintained within the required level.

The thickness scope of Chrome-coating is normally of 0.06~0.13mm. The inspection of Chrome thickness will be carried out after the coating.

### **Remarks:**

**The harmful elements for coating:** such as F (from casting powder), S ( from molten steel or lubrication oil), Zn & Cd (from molten steel) etc.

**The influence:** harmful temperature + high temperature → act on coating → to permeate basal copper → cause coating spalling → cracks on copper

## Final finishing

Finish polishing to ensure the fine surface, final dimensional inspection will be carried out before packaging.



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## ***OUR TARGET***

- ★ Good quality
- ★ Reasonable price
- ★ Timely delivery
- ★ Excellent after-sales service



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## *Main Achievements of DLDS Group*

*Below excel sheet shows our group's main achievements.*



rectangular  
tube list





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***We prefer to discuss below detailed technical parameters should our CCM be of interest to you.***

**STEEL MELTING SHOP:**

1. Furnace type:
2. Capacity:
3. Tapping weight:
4. Tap to tap time:

**CASTER INFORMATION:**

1. Machine capacity (连铸机生产能力)
2. Casting range (连铸坯尺寸范围)
3. Casting sizes (连铸机坯尺寸)
4. Caster type (连铸机类型)
5. Casting radius (连铸机弧半径)
6. Nos of strands (连铸机流数)
7. Heat size/ Tundish size (中间包容量)
8. Heats/day (炉数/日)
9. Max casting speed (最大连铸速度)
10. Strand distance (流间距)
12. Tundish car type and capacity (中间包类型和容量)
13. Molten steel temperature in Tundish (中间包钢水温度)
14. Shrouding tundish mould (连铸方式)  
submerged entry nozzle(浸入式水口) open(direct)casting (敞开式水口)



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15. -A. Mould type & dimensions(结晶器类型和尺寸)  
-B. Material of copper mould.  
-C. Average lifetime of current copper mould.
16. Secondary cooling (二次冷凝系统)  
-A spray water (水冷), B air-mist spray (汽水冷却), -C computer controlled
17. Cooling water working pressure(水压)
18. Cooling water running speed(水流速)
19. Cooling water PH value (水PH值)
20. Slot between water guide pipe and Cu-tube (水缝间隙)
21. Dummy bar type (引锭杆类型): Rigid(钢性) Flexible (挠性)
22. Lubrication system (润滑系统)
  - 1) rape seed oil (hillet)
  - 2) chemistry of mold flux (plate)
23. Non-oxidation casting (无氧化浇注) Yes ( ) No ( )
24. Automatic level control system for tundish and mould.  
(中间包和结晶器液面自动控制) Yes ( ) No ( )
25. M-EMS and S-EMS (结晶器和电磁搅拌) Yes( ) No( )
26. Mould oscillator (结晶器振动装置)
27. Withdrawal straightening device & speed (拉矫装置)  
single ( ) multiple ( ) speed ( )
28. Steel grades and chemical compositions (钢种和化学成份)



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# CONTACTS

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*Thank you*