

Jun Cheng International Corp. Ltd.

Rolls for long steel and plain steel

Juncheng Corporation was found in 2011 at Changde city, China. We are committed to making and supplying rolls for plain steel and long steel both hot and cold rolling mills 12 years.



Steel and iron rolls production capacity: 100,000 Tons/year;

Rolls max size: 8m long, 1.6 m dia. ,barrel length 2.6m and max weight 55 tons .

Hot rolling wire, rebar , rod, section	Materials and grade
Beakdown, Rough	Adamite steel , Nodular cast iron SGP,
Intermediate	Adamite steel,Nodular cast iron SGP,
Pre-finish and finish	HSS, Indefinite chilled IV, Bainitic cast iron SGA,
Universal ,H Section mill	Centrifugal cast high carbon steel adamite ring
High speed wire mill Pre-finish	Indefinite chilled, HSS ,Enhanced indefinite chilled

Hot rolled coil and strip mill	Materials and grade
Rough, edging roll	Adamite steel, Nodular cast iron rolls , High Chrome (Cr) steel
Finish work roll	Indefinite Chilled (ICDP), High Chrome(Cr) cast iron, HSS
Cold rolled coil and strip mill	
Work roll and intermediate roll	Cr3 and Cr5 (forged steel)
Sendzimir rolls	Tool steel, Mould steel , HSS
Back-up roll	Cr4 alloy steel, 70Cr3Mo(forged steel)

Clients reference list:

Within world steel top 50 (2022 datas), we have 12 clients : 1. China Baowu Steel, 2.ArcelorMittal Group, 3. An Steel, 5. Shagang Group, 6. HBIS Group, 8. Jianlong Group. 12. Delong steel, 15.JSW Group, 17. Fangda steel, 24. Rizhao steel, 29.Baotou steel, 34. Gerdau steel, 45. Donghai special steel, 49. Jinxin steel. Some other big steel group clients: Sinobross Brazil, Moon Iron & Steel Oman, Star wire India, Kamachi group India, CAP Chile etc.

Some steel plants which have millions tons production, they only buy rolls from our company, we contract all their lines, like Tangshan Reafon steel(4.5 million tons hot strip/year, 75 th in world steel top100); Jianlong steel group(8 th in world steel top 50, 36 million tons steel/year).

Production schedule introduce:

1. Engineer review the sales contracts and make the production technology process, arrange the production time.
2. Smelt iron and analyse the chemical composition by spectral detector to ; Inspect the liquid iron temperture and control the melting time.



We use China best quality pig iron as main raw materials, not use scrap steel materials.

We have 10 sets of intermediate frequency furnace ,capacity from 2 tons to 10 tons. Checking Iron water temperture is necessary.



Use Germany brand : SPECTROLAB spectral detector to make sure iron liquid of correct chemical position.

3. Casting the rolls



We can do both static cast and centrifugal cast way, depends on the rolls type and size.
15pcs centrifugal cast machine.

4. Rolls for rough machining



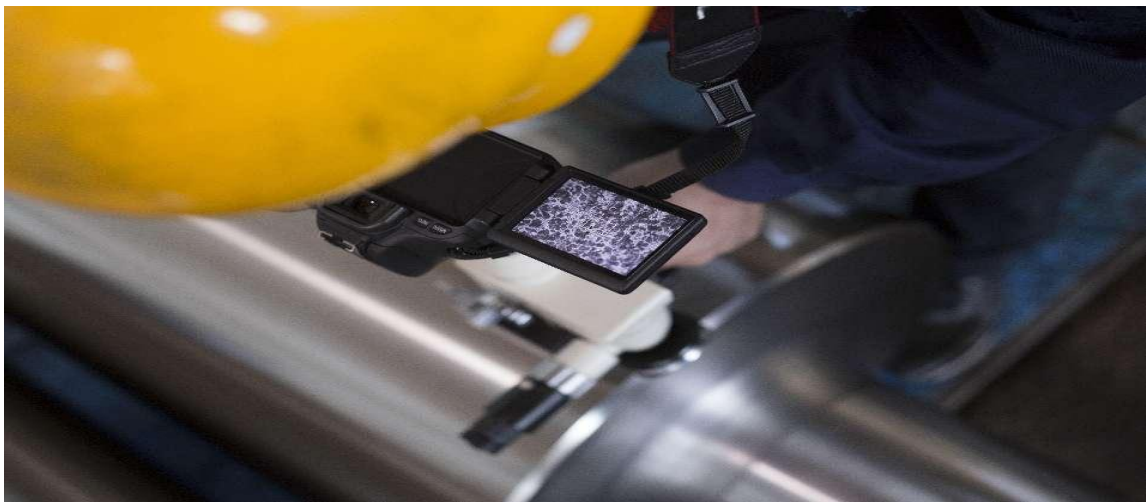
After rough machining, we inspect the hardness, tensile strength, ultrasonic flaw detection.

5. Heat treatment



we have 20 sets heat treatment furnace.

After heat treatment, we inspect the metallographic structure and hardness.



6. Finish machining



Turning the oxide layer, and grinding to the need tolerance.



We have more than 80 sets CNC machine for processing rolls.

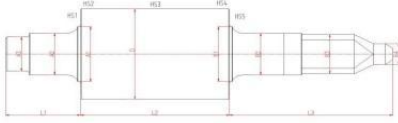


We meet the roll drawings requirements by inspection all size and details, do the ultrasonic test and issue the inspection report to client.

JUN CHENG INTERNATIONAL CORPORATION LIMITED

INSPECTION REPORT

客户/CUSTOMER:	UAE	订单号/ORDER NO.:	PI-20221010
规格/SPECIFICATION:	D345 x L500X1310	图纸号/DRAWING NO.:	P-040841
材质/MATERIAL:	5GA	硬度/HARDNESS:	HSC70-75
数量/QTY:	4PCS	单重/WEIGHT:	470KGS



编号/ ROLL NO.:	尺寸/DIMENSIONS (mm)										
	A1	A2	A3	D	B1	B2	B3	B4	L1	L2	L3
	210+0.017 +0.046	180+0.04 3+0.008	130-0.0 85/0.11	345+2/-1 7+0.046	210+0.01 7+0.046	160+0.04 3+0.008	150-0.01 4/-0.039	80-0.01/-0.029	261	500-0.1/-0.1	649
D2N04-668	+0.03	+0.005	-0.11	+1.92	+0.04	+0.005	-0.02	-0.01	+0	-0.1	+0
D2N04-764	+0.04	+0.005	-0.11	+1.78	+0.045	+0.005	-0.02	-0.015	+0	-0.1	+0
D2N04-564	+0.03	+0.005	-0.10	+1.89	+0.045	+0.005	-0.03	-0.01	+0	+0	+0
D2N04-636	+0.03	+0.005	-0.105	+2	+0.045	+0.005	-0.02	-0.02	+0	-0.1	+0

Measures of other places are also satisfied with the dimension of the dwg.

编号/ ROLL NO.:	合金成分/CHEMICAL COMPOSITION(%)							
	C	Si	Mn	P	S	Ni	Cr	Mo
	2.9/0.8	1.0/2.0	0.3/1.0	≤0.1	≤0.03	3.0/14.5	0.5/1.2	0.5/1.0
D2N04-668	3.19	1.38	0.54	0.035	0.013	3.51	1.06	0.5
D2N04-764	3.14	1.34	0.53	0.045	0.01	3.59	1.04	0.52
D2N04-564	3.19	1.38	0.54	0.035	0.013	3.50	1.06	0.5
D2N04-636	3.16	1.36	0.53	0.035	0.013	3.51	1.05	0.51

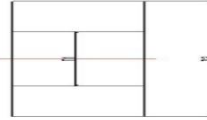
编号/ ROLL NO.:	超声波 UT	抗拉强度 TS (Mpa)	硬度 HARDNESS (HSC)				
			HS-1	HS-2	HS-3	HS-4	HS-5
D2N04-668	Qualified	≥450	38	75	74	75	38
D2N04-764	Qualified	≥450	36	75	75	74	38
D2N04-564	Qualified	≥450	37	74	75	75	37
D2N04-636	Qualified	≥450	36	74	75	75	36

INSPECTED BY: 签字 李玉环 APPROVED BY: 赵程娟 DATE:2023-05-29

Juncheng International Corporation Limited

INSPECTION CERTIFICATE OF High Carbon Adamite Ring

规格/SPECIFICATION:	D316x L215	图纸号/DRAWING NO.:	
材质/MATERIAL:	High Carbon Adamite Ring	硬度/HARDNESS:	HSD60-67
数量/QTY:	4PCS	单重/WEIGHT:	940KGS



编号/ ROLL NO.:	尺寸/DIMENSIONS (mm)	
	D1450	D2950
	0/-2	+3/+5
LRS16331-01	-1.4	+4.2
LRS16331-02	-1.5	+4.5
LRS16331-03	-1	+4.4
LRS16331-04	-1	+4.0

Measures of other places are also satisfied with the dimension of the dwg.

编号/ ROLL NO.:	合金成分/CHEMICAL COMPOSITION(%)							
	C	Si	Mn	P	S	Ni	Cr	Mo
	1.7/1.9	0.3/0.6	0.7/1.1	≤0.035	≤0.03	0.8/1.7	1.0/1.7	0.3/0.5
LRS16331-01	1.75	0.52	0.96	0.031	0.018	1.54	1.56	0.42
LRS16331-02	1.75	0.52	0.96	0.031	0.018	1.54	1.56	0.42
LRS16331-03	1.90	0.48	0.97	0.035	0.018	1.44	1.58	0.42
LRS16331-04	1.75	0.52	0.96	0.031	0.018	1.54	1.56	0.42

编号/ ROLL NO.:	超声波 UT (Mpa)	抗拉强度 TS (Mpa)	硬度 HARDNESS (HS0)				
			HS-1	HS-2	HS-3	HS-4	HS-5
LRS16331-01	Qualified	65	64	66			
LRS16331-02	Qualified	65	64	63			
LRS16331-03	Qualified	64	65	64			
LRS16331-04	Qualified	64	65	64			

7. Packing

Paint the high viscosity rust protection grease, use plastic film cover the rolls , and then use blue color hard polyester plate outside, final use Steel belt and iron stand to fix rolls.





Materials and grade for rolls


1. Centrifugal and static cast adamite steel :

Grade properties: The matrix structure is pearlite or bainite, respectively. Chromium is a stable element of carbides, molybdenum can improve high-temperature performance, and adding nickel can strengthen the matrix. Half steel rolls have the characteristics of small hardness drop, good wear resistance, good high-temperature performance, and can withstand large loads.

Chemical

Grade	C	Si	Mn	Cr	Ni	Mo
ZB140CrNiMo	1.3-1.5	0.3-0.6	0.7-1.1	0.5-1.2	0.8-1.2	0.2-0.6
ZuB160CrNiMo	1.5-1.7	0.3-0.6	0.8-1.3	≥ 0.2	0.8-2.0	0.2-0.6

Mechanical

Hardness	Centrifugal	Static	 Mag X 100
Shell	HSD40-60	HSD40-60	
Core	HSD35-50	HSD40-55	
Core TRS	≥ 450 Mpa	≥ 490 Mpa	

Application for long steel:

Breakdown stands and rough stand for long steel wire, rod and rebar rolling mill.

Application for plain steel:

For steel sheet and coil rough stand roll and edging roll (vertical roll) .



2. Centrifugal and static nodular cast iron rolls (SGA , SGP)

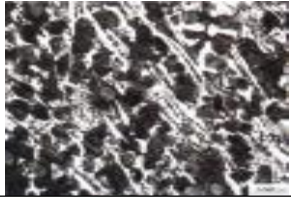
Grade properties: Adding more Ni and Mo alloys to ductile iron can obtain excellent pearlite, bainite, and martensite matrix structures, while graphite is spherical in shape, has good thermal conductivity, and has high tensile strength. By changing the structure to Bainite The chemical composition and heat treatment process of solid, martensite and acicular ductile iron can obtain very dense network of primary cementite to improve wear resistance.

Chemical : Pearlitic SGP ; Bainitic SGA

Hardness

Grade	C	Si	Mn	Cr	Ni	Mo	Mg	HSD	LD
SGP I	2.9-3.6	1.4-2.2	0.4-1.0	0.1-0.6	1.5-2.0	0.2-0.8	≥0.04	45-55	
SGP II		1.2-2.0	0.4-1.0	0.2-1.0	2.0-2.5	0.2-0.8		55-65	
SGP III		1.0-2.0	0.4-1.0	0.2-1.2	2.5-3.0	0.2-0.8		62-72	
SGA I		1.2-2.2	0.2-0.8	0.2-1.0	3.0-3.5	0.5-1.0		55-78	
SGA II		1.0-2.0	0.2-0.8	0.3-1.5	3.5-4.5	0.5-1.0		60-80	

Mechanical

Hardness	Centrifugal	Static	
Shell	HSD50-80	HSD45-70	
Core	HSD35-48	HSD35-55	
Core TRS	≥ 450 Mpa	≥ 300 Mpa	Mag X 100

Application for long steel:

Intermediate, splitting and finish stands for long steel wire, rod and rebar rolling mill.
Intermediate(SGP), splitting(SGP II, III,SGA) ,finish(SGA)

Application for plain steel:

Hot rolling steel sheet and coil edging roll(vertical roll)



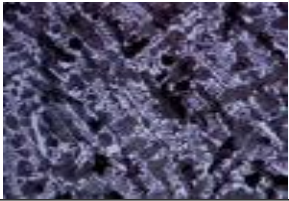
3. Centrifugal and static alloy indefinite chilled cast iron rolls (Indefinite):

Grade properties: The outer layer has fairly high metallurgical properties. The amount of graphite in the working layer of the roll body has almost no change in the depth direction because the hardness difference of the working layer is very small. The hardness of the roll mainly depends on the type of matrix structure, namely sorbite, bainite or martensite.

Chemical:

Grade	HSD	C	Si	Mn	Ni	Cr	Mo
Indefinite I	60/70	3.0/3.5	0.5/1.0	0.5/1.0	0.5/1.0	0.5/1.0	0.2/0.6
Indefinite II	62/72	3.0/3.5	0.5/1.0	0.5/1.0	1.0/2.0	0.5/1.0	0.2/0.6
Indefinite III	65/75	3.0/3.5	0.5/1.0	0.5/1.0	2.0/3.0	0.7/1.2	0.2/0.6
Indefinite IV	70/85	3.0/3.5	0.5/1.0	0.5/1.0	3.0/5.0	1.0/2.0	0.2/0.6

Mechanical

Hardness	Centrifugal	
Shell	HSD60-80	
Core	HSD35-48	
Core TRS	≥ 450 Mpa	Mag X 100

Application for long steel:

For the finishing stands of continuous rolling mill of bar, the pre-finishing stands of high speed wire, the intermediate and the front of finishing stands of small section.

Application for plain steel:

Rough and finish stands work rolls for hot rolling steel sheet and coil.




4. Centrifugal cast high speed steel (HSS)

Grade properties: The outer layer is high-carbon alloy steel containing Cr, Mo, W, V, and Nb. The complex carbide structure is embedded in the tempered martensite structure. The carbon content and comprehensive heat treatment are controlled to optimize wear resistance and resistance to corrosion. Thermal fatigue. The oxide film structure on the surface maintains a low residual stress value.

Chemical:

Grade	C	Si	Mn	Cr	Mo	V	W	Nb
HSS	1.6-2.3	0.3-0.9	0.2-0.8	3.0-6.0	3.0-6.0	2.0-6.0	1.0-4.0	1.0/3.0

Mechanical

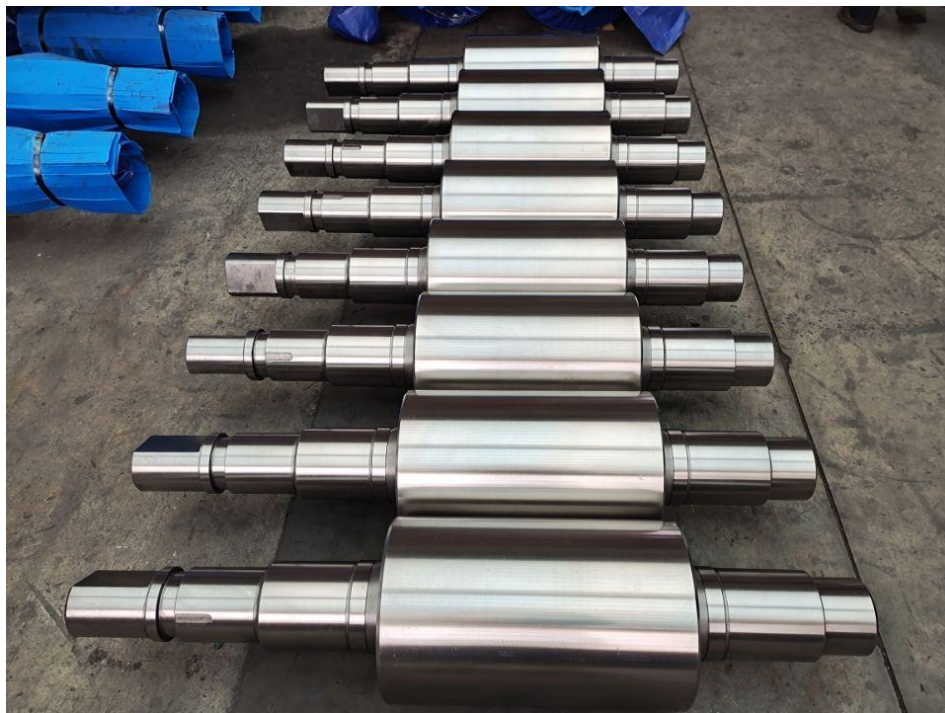
Hardness	Centrifugal	
Shell	HSD75-90	
Core	HSD35-48	
Core TRS	≥ 450 Mpa	Mag X 100

Application for long steel:

Pre-finishing stands for high speed wire mill and finish stands for bar mill.

Application for plain steel:

Hot rolling strip steel work rolls.




5. Centrifugal cast high carbon steel adamite ring

In order to improve the wear-resistance, the content of carbon is controlled nearly the same as iron. The microstructure of the shell of high-carbon steel base adamite ring consists of matrix and carbides. It features the tiny hardness fall in the working layer and even wear-resistance, ensuring the consistency in dimension when rolling large-section pieces. Graphite steel is used as the core material due to its high strength meeting the requirements of big rolling force.

Chemical

Grade	C	Si	Mn	Ni	Cr	Mo
AD180	1.7/1.9	0.3/0.8	0.6/1.1	0.5/2.0	0.8/1.5	0.2/0.6
AD190	1.8/2.0	0.3/0.8	0.8/1.2	1.0/2.0	1.5/3.5	0.2/0.6
AD200	1.9/2.1	0.3/0.8	0.8/1.2	0.6/2.5	0.6/2.0	0.3/0.8

Mechanical

Hardness	Centrifugal	
Shell	HSD50-65	
Core	HSD38-48	
Core TRS	≥ 450 Mpa	Mag X 100

Application:

Universal mill and H Section mill vertical rings and horizontal sleeves.



6.Enhanced indefinite chilled cast iron

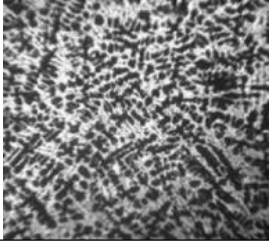


Nb, V, W and other alloy element are added on that basi of a common infinite chilled cast iron roll. As practice has shown,The wear resistance, thermal conductivity, thermal shock resistance and spalling resistance of the improved roller are significantly improved.

Chemical

Grade	C	Si	Mn	Ni	Cr	Mo	V+Nb+W
AD180	3.0/3.5	0.5/1.0	0.5/1.0	3.4/4.5	1.0/1.2	0.2/0.5	0.2/2.0

Mechanical

Hardness	Centrifugal	
Shell	HSD70-85	
Core	HSD35-45	
Core TRS	≥ 450 Mpa	Mag X 100

Application for long steel:

High speed wire pre-finish rolling, rebar and rod finish rolling.

Application for plain steel:

Hot rolling strip and coil finish stands.


7. Centrifugal and static cast high Chrome(Cr) cast iron roll:

Grade properties: The eutectic carbide (M7C3 type) in the structure accounts for 20%-30% and is in the form of intermittent network, so the roll has high wear resistance. The matrix structure is composed of tempered martensite and sorbite, with fine and dispersed secondary carbides (M23C6 type) distributed on it, thus increasing the wear resistance of the roll. The Cr203-rich film covering the surface of the roll has high-temperature oxidation strength and plastic deformation resistance, making this type of roll particularly suitable for hot rolling of steel.

Chemical:

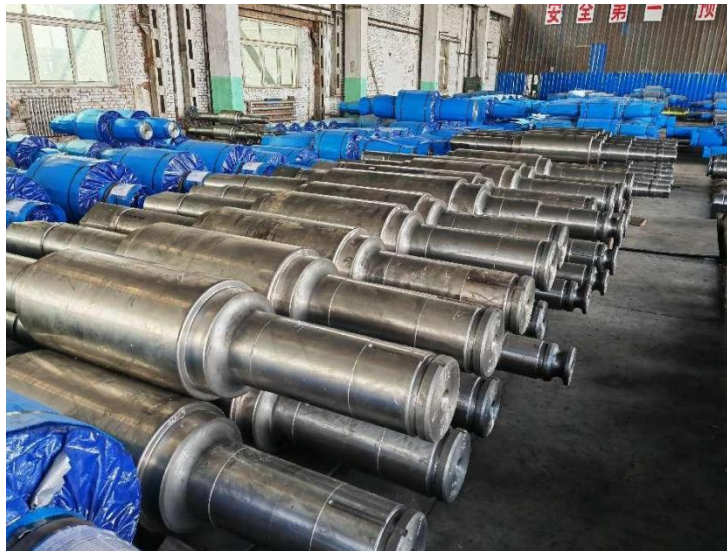
Grade	HSD	C	Si	Mn	Ni	Cr	Mo
High Chrome	40/60	1.3/2.3	0.3/0.6	0.6/1.2	≥0.2	0.8/1.6	0.2/0.6

Mechanical

Hardness	Centrifugal	Static	
Shell	HSD40-60	HSD40-60	
Core	HSD35-50	HSD40-55	
Core TRS	≥450 Mpa	≥490 Mpa	Mag X 100

Application:

Hot rolling steel sheet and coil finish rolls



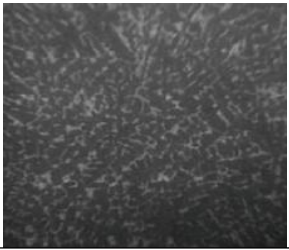
8. Centrifugal cast High-Chromium steel (improved)

The outer layer of the improved high-chromium steel centrifugal composite roller has higher chromium alloy content, and niobium, vanadium, tungsten and other strong carbide elements are added to carry out multi-element alloying; after the roller is subjected to spray quenching and twice tempering heat treatment, The outer layer is composed of tempered martensite and compound granular carbides (M₇C₃+ MC + M₂C + M₆C), which can improve the wear resistance of the roll significantly. The core is made of high strength ductile iron, which has excellent comprehensive performance.

Chemical

C	Si	Mn	Ni	Cr	Mo	V+Nb+W
1.0/1.5	0.4/0.8	0.5/1.0	0.6/1.5	8/15	1.5/2.0	0.2/2.0

Mechanical

Hardness	Centrifugal	
Shell	HSD70-85	
Core	HSD35-45	
Core TRS	>=450 Mpa	Mag X 100

Application

Hot rolling strip rough stand and vertical roll, universal mill rolls



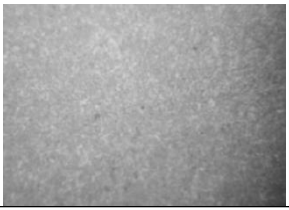
4. Centrifugal cast Cr4 alloy steel roll :

Roll performance: The outer layer composition has lower carbon content and higher chromium alloy content. After the roller is quenched and tempered multiple times, the outer layer structure is tempered bainite + carbide, and the strength and impact toughness are significantly improved. , the core is made of high-strength ductile iron, and its overall performance is significantly better than other cast steel support rollers.

Chemical

Grade	C	Si	Mn	Ni	Cr	Mo	V
Cr4 alloy steel	0.4/0.6	0.4/0.7	0.5/1.0	0.3/0.8	3.0/5.0	0.3/0.8	0.1/1.0

Mechanical

Hardness	Centrifugal	
Shell	HSD55-70	
Core	HSD35-45	
Core TRS	≥ 500 Mpa	Mag X 100

Application:

Hot rolling steel sheet and coil back-up roll.



10. Forged steel rolls for hot and cold rolling coil and sheet

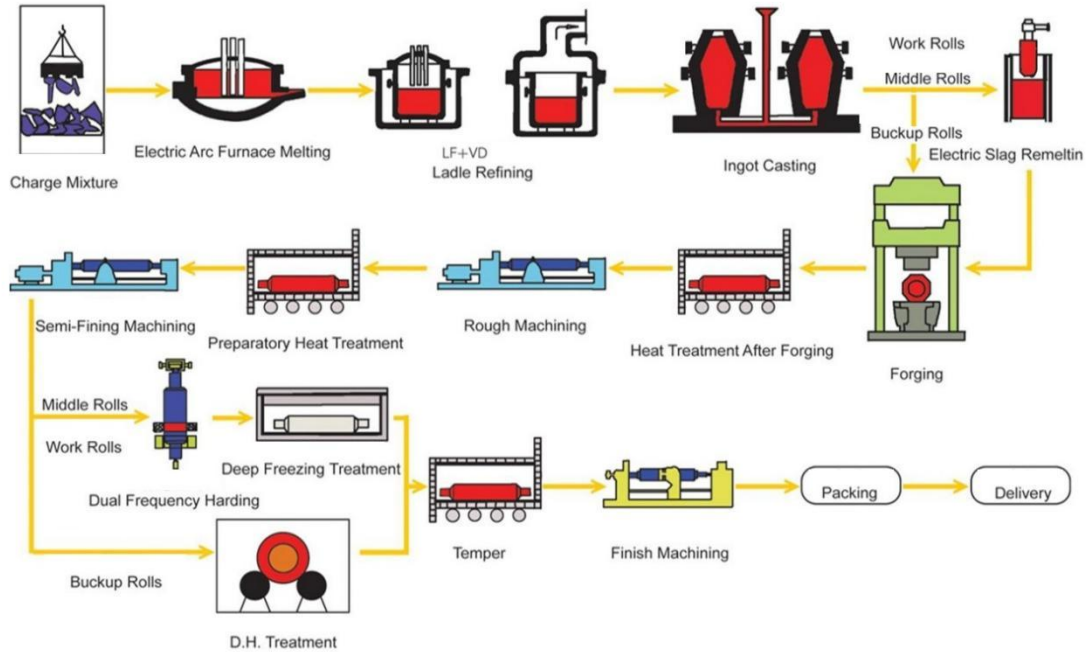
Main dimension of rolls ,Max dia. of roll : 1400mm Max length of roll :6000mm

Worklayer hardness : 60- 100HSC

Neck hardness : 40 - 88HSC

Worklayer thickness: 20 - 140mm

Main production procedures :



Forged Steel Work Roll



*Forged Steel Intermediate Roll



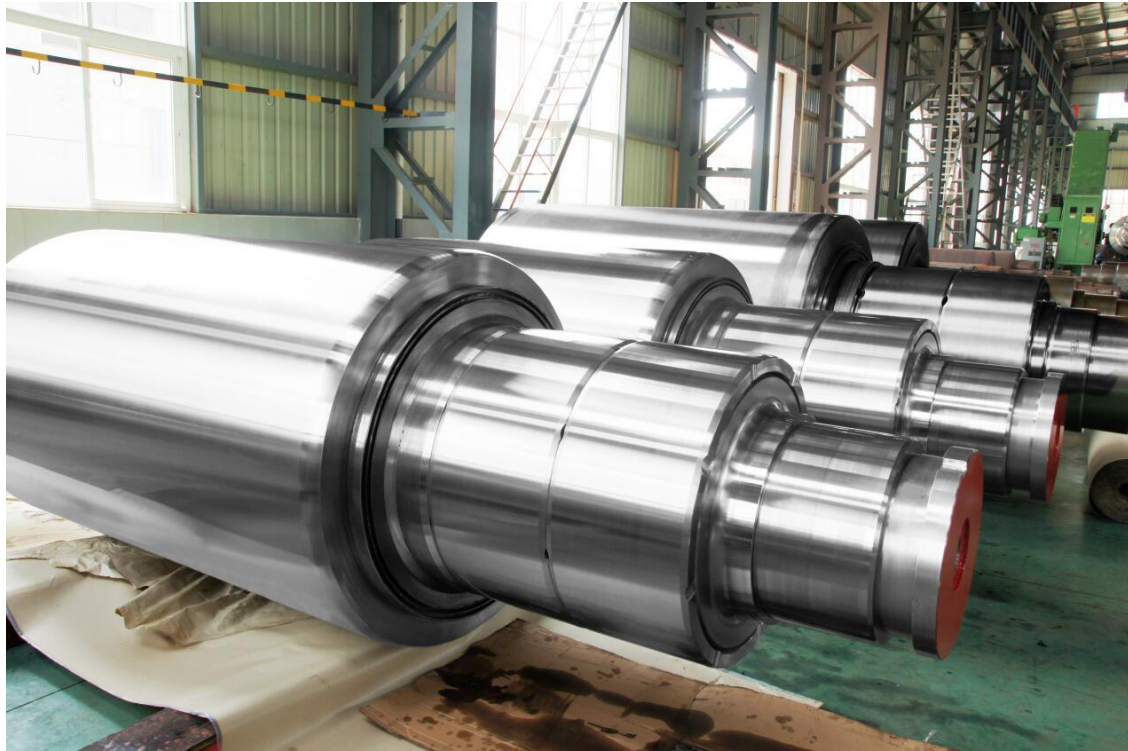
It applies to high precision 6-Hi(as well as a few 8 Hi)mills,named from working roll location between working roll and back-up roll,mainly used to control the shape of strip.Materoals of 2%Cr,3%Cr,5%Cr and semi-high speed steel (SSH) can be used according to different requirements of hardness depth.

* Forged Steel Sendzimir and Cluster Mill Roll



It is favored high technology customers who are making very thin strip and difficult deformation silicon steel, stainless steel, The materials of Sendzimir rolls are inclusive tool steel, die steel and high-speed steel. The rolls are manufactured under quenching and tempering processes of high temperature. During the tempering process, secondary hardening is used to reach hardness of 55-60 HRC, 60-63 HRC, 61-64 HRC, 63-66 HRC etc, for different hardness requests.

***Forged Steel Back-up-Roll**



It is mainly used in 4 Hi and 6 Hi mills, The diameter of roll barrel can be 350mm-1600mm.

Grade	C	Si	Mn	Cr	Ni	Mo	V	P	S
Cr3	0.82-0.9	0.6-0.9	0.2-0.45	2.8-3.2	0.6-0.8	0.4-0.6	0.05-0.15	≤0.015	≤0.02
Cr5	0.8-0.9	0.3-0.55	0.2-0.5	4.8-5.4	0.3-0.5	0.2-0.4	0.05-0.12	≤0.015	≤0.02
70Cr3Mo	0.6-0.75	0.4-0.7	0.5-0.9	2.0-3.5	≤0.6	0.25-0.6	-----	≤0.03	≤0.03
45Cr5NiMoV	0.48-0.55	0.3-0.55	0.2-0.5	4.9-5.4	0.3-0.5	0.3-0.5	0.1-0.2	≤0.015	≤0.02

Grade	Application	Depth of hardness -mm
Cr3	Work roll and intermediate roll	20
Cr5	Work roll and intermediate roll	25
70Cr3Mo	Hot work roll and back-up roll	50
45Cr5NiMoV	Back-up roll	75

Parts of forged steel rolls production equipments photos

Movable tank truck type LF-VD



Forging heat furnace



45MN hydraulic hammer press



Quenching machine



Liquid nitrogen cryogenic tank



CNC Turning Lathe



CNC Grinding machine





Inspect the metallographic structure



Ultrasonic inspection

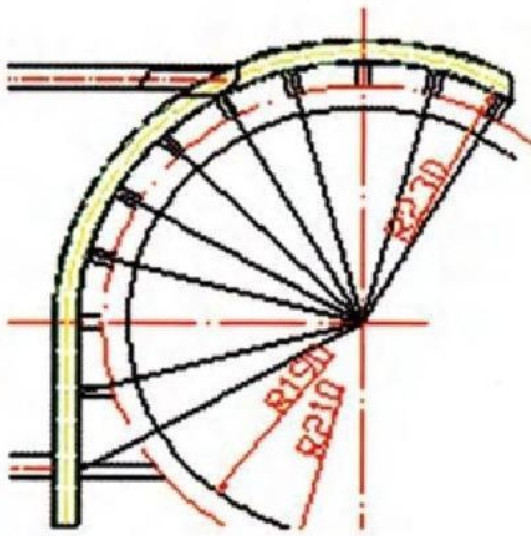


Rolls instruction for hot rolling finishing stands of rod and intermediate stands of wire

1. **Ensure cooling conditions.** Effective cooling of the roll is the key to preventing cracks, collapse, and loss of wear resistance at the bottom of the groove. The cooling water flow rate Small, low pressure, high temperature ($\geq 40^{\circ}\text{C}$), cooling system problems, Cooling effect is poor. When the cooling water of the roll is insufficient or the cooling is uneven, thermal cracking of the roll surface will occur due to thermal fatigue.

Cooling condition requirements: cooling water pressure 0.3-0.6Mpa, water volume 15-25m³/h. Single tank, especially for bar finishing rolling runs, a special arc-shaped cooling water pipe should be used (the attached picture is a schematic diagram of a cooling water pipe in a steel plant), cooling The range is about 1/2 of the circumference, and the cooling water pipe is installed at the rolling groove at the tap hole to strengthen the cooling of the rolling groove at the tap hole. Among these nozzles, the nozzle near the exit guide should be the main nozzle (the nozzle close to the rolled piece). The amount of water sprayed from this nozzle is 30% of the total water amount in the entire rolling groove, and the spray angle is 20~30°. It is the angle between

the sprayed water column and the line connecting the nozzle to the center of the roll. The distance between the nozzle mouth and the roll surface is 50-80mm. The roll pass in the roughing and intermediate rolling passes is wider, and the nozzle at this time should be a flat nozzle, or directly on the arc tube and perpendicular to the arc. Cut out shaped tubes with a width of 3-5mm, a spacing of 50-80mm, and a length to allow cold It is advisable to cover the incision of the rolling groove with water to increase the cooling area and make the roll Get effective cooling.



Description of the drawings: The inner hole diameter of the main nozzle is 12-15mm, the inner hole diameter of the remaining nozzles is 9mm, and the length is 10-20mm. The cooling range is about 1/2 of the circumference. The single-line nozzle spacing is 50-80 mm, and they are located in the same plane and aligned. Roll groove. Make sure it is firm during installation and try to connect it with the outlet guide. When changing slots, the cooling water pipe moves with the guide at the same time. During the rolling process, especially when changing grooves, you must carefully check and calibrate the water spray position of the water pipe to ensure that it is aligned with the rolling groove.

2. Reasonably determine the width of the roller ring. The basic parameters of the roller ring are the roller ring height and the roller ring width. The height of the roll ring is the depth of the rolling groove. When designing the pass shape, it is not only necessary to make full use of the length of the roll surface, increase the number of rolling grooves, and improve the utilization rate of the roll, but also consider the width and strength of the roll ring to ensure the safety and reliability of the rolling groove. The width of the roller ring should ensure that it can withstand the lateral pressure generated by a certain width of the blank and facilitate the installation and adjustment of the guide device. Practice has proved that when the width/height of the cast iron roll ring is 1.2~2.0, it is conducive to normal rolling. Especially when rolling medium-high alloys, hard materials or low-temperature rolling, the rolling force increases at this time, and attention should be paid to appropriately increasing the roll ring width. The width of the roll ring is too small, which reduces

the strength and weakens the resistance to the widening of the blank, which can easily cause the roll ring to crack. Therefore, the width of the roll ring is closely related to the cracking of the groove.

3. Scientifically design the hole pattern. Improper pass design and irregular shape of incoming materials lead to over-filling or under-filling of the pass, increasing the spread pressure or uneven pressure, causing the guide position to be incorrect, affecting the quality of the finished material, and easily causing rolling accidents; Pass type Sharp corners inside will cause stress concentration. Low temperature of the rolled material, rolling force exceeding the allowable stress of the roll material, insufficient processing accuracy of the crescent grooves of the ribbed steel bars and marks, etc. will all cause the flesh to fall off the bottom of the groove, the roller shoulders to peel off, and the grooves to collapse. ACCIDENT.

4. Install correctly and check the guide position in time. As the name suggests, the guide position plays a role in guiding and positioning. It also plays a key role in ensuring smoothness during the rolling process. Therefore, it is necessary to check carefully during installation to ensure that the inlet guide position, hole pattern, and exit guide position are in a straight line, and the installation is firm. Check frequently to prevent deviation due to vibration during rolling, causing the incoming material to be "fed" incorrectly. The hole shape may enter the small roller ring, causing accidents such as steel stacking, steel jamming, cracking of the small roller ring, and uneven wear of the groove bottom.

5. Establish a scientific roll replacement cycle system and formulate reasonable heavy-duty and grinding process parameters. After the roll is used, cracks will occur on the surface of the roll due to thermal fatigue. If the roll replacement system is not strict, and the roll is used beyond the plan and overloaded, the roll will produce a deep thermal fatigue layer (generally 2~5mm). When repairing, cutting or grinding this type of roll, the minimum cutting amount and grinding amount for each process should ensure that the thermal fatigue layer is eradicated, otherwise the cracks will extend and cause groove collapse. Under normal circumstances, the thermal fatigue layer on the surface of the roll will gradually deepen or even become serious after the roll is used twice.

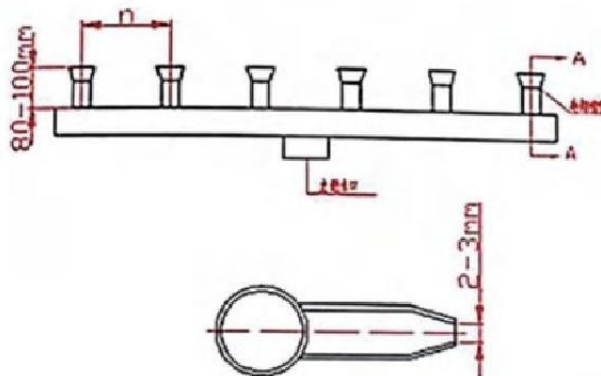
Rolls use instruction for hot rolling steel sheet and strip

Finishing stand rolls use instruction

The finishing work rolls of hot-rolled strip steel finishing stands are in contact with high-temperature steel plates during the rolling process. The spalling of the working layer structure is the main failure form of such rolls. From the perspective of use, the spalling of the structure is mainly caused by improper control of thermal fatigue cracks. Caused. therefore It is very important to establish a scientific use, maintenance and grinding system.

Requirements during use:

1. Ensure continuous and sufficient cooling water to cool the roll. During normal rolling operation, the surface temperature of the work roll should be strictly controlled. If the roll temperature is too high (generally no more than 60°C), the roll must be replaced immediately to prevent premature thermal fatigue cracks on the roll; the cooling water nozzle should be in a flat shape. The cooling water sprayed from all water nozzles forms a water curtain to increase the cooling area. The minimum water volume should be maintained at 400-600m³/h; the water pressure should be maintained at 0.3-0.6Mp, and the width of the water surface should be 20-30mm beyond the strip width on both sides; the water temperature should be less than 35°C, the water quality should be neutral, and the circulating water should be filtered Or precipitation treatment to reduce the wear of small particles such as iron oxide scale on the roll.



Description of the drawings: The distance between adjacent water nozzles is determined to ensure that the water surfaces ejected from the two water nozzles can be connected or partially intersect, and are evenly distributed. The inner diameter of the round pipe part of the faucet is 10mm, and the overall water surface width must ensure that both sides exceed the strip width. 20-30mm.

2. Strictly implement the roll replacement system and reasonably control the amount of rolled material. During the rolling process, the rolls are affected by thermal fatigue or contact fatigue and the material of the rolled material, and are prone to cracks, which is the most harmful to the normal use of the rolls. Since roll cracks form relatively slowly in the early stages of rolling, they will not cause serious harm to the roll.

However, when the cracks form to a certain extent and continue to be used, the cracks will rapidly expand in depth and length. First, the amount of grinding will increase and the amount of material rolled by the roller will be reduced; second, if it is more serious, it will cause the roller to peel off and even cause large pieces to fall off. Therefore, it is necessary to strictly control the roll replacement system and reasonably control the amount of rolled material. It is recommended that the finished product rolls should have a rolling material volume of 500-1,000 tons each time they are put into service. At the same time, it is recommended to calibrate according to the number of rolling kilometers, and replace the rolls every 40-50 kilometers of rolling; excessive rolling will cause excessive wear of the rolls and deepening of micro-cracks, and increase the amount of secondary grinding. The increase in roller consumption is not conducive to the economical and rational use of rollers, and the quality of the plate will also be seriously reduced.

3. Eliminate surface defects and ensure surface quality. When the cooling water system fails or a rolling accident occurs during the rolling process, damage to the roll is inevitable, mainly the formation of cracks. Therefore, defects (mainly cracks) on the roll surface must be removed before each roll is put on the machine. Even if there are no defects visible to the naked eye, the fatigue layer on the roll surface must be removed to avoid the formation of deep cracks. In addition, once rolling accidents such as steel stacking and steel jamming occur and the rolls are burned, the rolling mill should be opened as soon as possible to reduce water flow. The roll must be removed from the machine for inspection, and the cracks and cracks must be completely ground away and the burnt layer must be removed before it can be used on the machine. Even if the appearance is unclear If cracks appear, the same process is required. Otherwise, if the machine is rolled again, the residual cracks will expand rapidly, causing large spalling.

4. Strict rolling process and scientific and reasonable roller matching. The work roll configuration of the hot strip mill should be an upper pressure rolling configuration, that is, the large diameter roll is on the top and the small diameter roll is on the bottom. The diameter difference between the upper and lower rolls is preferably 0.05~0.15mm. The rolling service of the rolls in this state can effectively overcome and reduce the problem of excessive instantaneous impact force on the rolls when the rolled pieces enter the rolling mill, thus protecting the roll surface from damage. When matching the rollers of the medium plate rolling mill, the rollers should be rolled with downward pressure, that is, the big roller is on the bottom and the small roller is on the top. The diameter difference between the two rollers is 3~8mm. The roller is used on the machine. The roller surface is curved, convex in the middle and concave on both sides. The curve crown (+0.05 ~ -0.10) changes excessively, and a 30 ~ 50 mm wide guide edge must be ensured around the roller every time it is repaired. -0.2~-0.3mm to increase the strength of the roller side.

5. Ensure temperature transition and strictly prohibit chilling and heating. The rolls of the lower rolling mill should first be stored in the slow cooling pit (or cooling device) to slowly cool down, and then grinded after the rolls are completely cooled to normal temperature, otherwise the ground roll curve will be unrealistic. Before putting the roll on the machine, it is best to preheat it. The preheating temperature is 25~35°C and the preheating time is 2~4 hours. In severe cold weather, the work site is not well insulated, especially is important. 6. Improve information management and improve traceability. Establish a complete roll quality card, record the roll number, roll matching position, upper and lower machine wear, grinding technical data, rolled material volume, roll surface and other usage information, and archive the original records. Perform statistical analysis of roll usage information at a certain stage. It can effectively comprehensively evaluate the performance of the roll.

Back-up roll rolls use instruction

At present, the back-up rollers of hot-rolled strip finishing mills are mostly made of alloy cast steel or semi-steel. This material has good wear resistance and spalling resistance. However, in actual production and use, due to heavy load or fatigue use during the steel rolling process, the wear of the work roll is large in the middle and small at both ends, resulting in a U-shape, which causes local contact pressure peaks at both ends of the back-up roll body. The increase of the alternating shear stress at both ends can easily cause fatigue cracks at both ends of the roll, which will expand in the circumferential direction and cause block or large flaking in the width. The back-up roll peeling mainly occurs in the upstream frame, which is a small piece of peeling, resulting in pits or ellipsoid-shaped pits on the surface of the roll, distributed at both ends of the roll body. In order to prevent and reduce the end peeling of the support roller, establish scientific use, maintenance and grinding Institutions are very important.

Requirements during use: 1. Ensure the effective contact area between the backup roller and the work roller. The length of the non-steel surface at both ends of the roll should be greater than 100mm to reduce the rolling load at both ends of the support roll body during the steel rolling process. In some steel mills, the length of the roll body is designed to be short, and the rolling bandwidth exceeds the design capacity, resulting in a small supporting area of the backup roll, which can easily cause the end of the backup roll to fall off and peel off.

5. Replace the rollers regularly to avoid fatigue use. Develop a reasonable roll replacement cycle for the back-up roll, and it is best to replace it together with the work roll to prevent subcutaneous fatigue cracks and local chipping and spalling caused by a long roll replacement cycle. When the roll is removed from the machine for grinding, the amount of grinding should be appropriately increased to remove cracks and at the

same time eliminate the rolling hardened layer to prevent crack expansion and peeling when the roll is put on the machine again.

3. Enhance shoulder strength and reduce the chance of accidents. Bevels or large rounded corners of appropriate width should be left at both ends of the roller body. This is required to be strictly implemented when the new machine is installed and every time it is repaired, so as to maintain the original end shape and avoid or reduce the roller deformation caused by the deformation of the support roller. The sharp corners of the body end are in contact with each other to reduce the chance of large pieces peeling off at the end of the support roller.

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