NKMZ
Central Europe

PRODUCTS

CATALOGUE

Mill Rolls

About Us

NKMZ

Our company NKMZ Central Europe s.r.o. founded in the Czech Republic in 2015 as an official representative of NKMZ, Ukraine.

Over the past time, our company has established itself as a reliable partner and supplier of rolls, as well as parts of metallurgical equipment for European metallurgical plants and corporations.

We have established strong partnerships with companies such as: ArcelorMittal, Liberty Steel, Salzgitter, VAI, NLMK Europe, Aleris and many others.

Today NKMZ Central Europe s.r.o. successfully develops and presents to your attention a new project for the complete manufacture and supply of rolling rolls and parts of metallurgical equipment, based on the effective use of design and technological knowledge, as well as manufacturing experience gained at NKMZ over 80 years of creating of these products.

Within the framework of this project, our company employs the best design and engineering personnel responsible for the performance of products and their full compliance with customer requirements.

To ensure the whole production, of NKMZ Central Europe s.r.o. uses the manufacturing sites of our partners in China, the Czech Republic, Romania and Bulgaria.

A significant part of the operations is performed out at our own production facilities located in Germany and equipped with the most recent industrial machinery, including CNC equipment.

The process of manufacturing and compliance with the necessary technology at all stages of production takes place under the direct and constant monitoring of highly qualified technical specialists of NKMZ Central Europe s.r.o.

The final quality control of products is carried out without fail by independent inspection companies with a worldwide reputation. Quality control results are provided directly to the customer.In general, NKMZ Central Europe s.r.o. possesses the unique know-how in the field of manufacturing, organization of quality control and after sales service of our state of the art heavy products.

We are sure that in this catalog you will find useful information about the presented products, the technology of their production and the organization of quality control.

We are open to dialogue and ready to answer all your questions.

MILL ROLLS

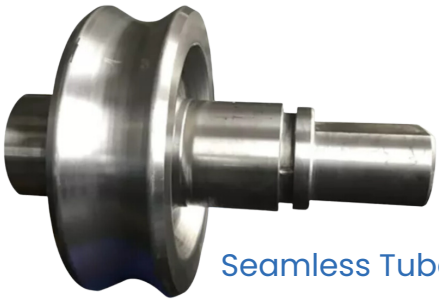
Today, we have expanded our capabilities and are ready to provide manufacturing, supply and service for the following types of rolls:

Cast Mill Rolls

Section Mill Rolls

Plate Mill Rolls

Hot Strip Mill Rolls



Seamless Tube Mill Rolls

Bar and Wire Rod Mill Rolls

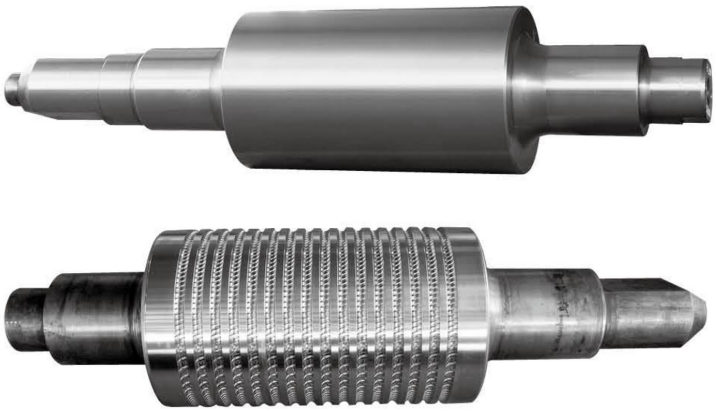
This catalog details our capabilities in the production of cast rolls of all types.

CAST STEEL ROLLS

HIGH SPEED STEEL ROLLS

High-speed steel rolls, produced by the horizontal centrifugal casting process, are all complound rolls with high-speed steel as the work layer and nodular iron as the core. The material of HSS contains plenty of alloyed elements such as Mo, V, W, Cr, etc. The highly hardened electric carbides & second carbides, such as MC, M2C, and M6C evenly distributed in tempered martensitic matrix, make the wear and thermal cracking resistance very excellent. Besides, the resistance to surface roughing is also good. In the condition of hot rolling, the contact points between the steel strip and the work rolls can form a thin adherent oxide film on the roll surface, which plays a good role in the wear features and the quality of the strip surface.

HSS rolls are mainly used as the work rolls in the hot strip mills anf the finishing stands of bar mills; rings of the universal section mills and finishing stands of the high speed bar mills.

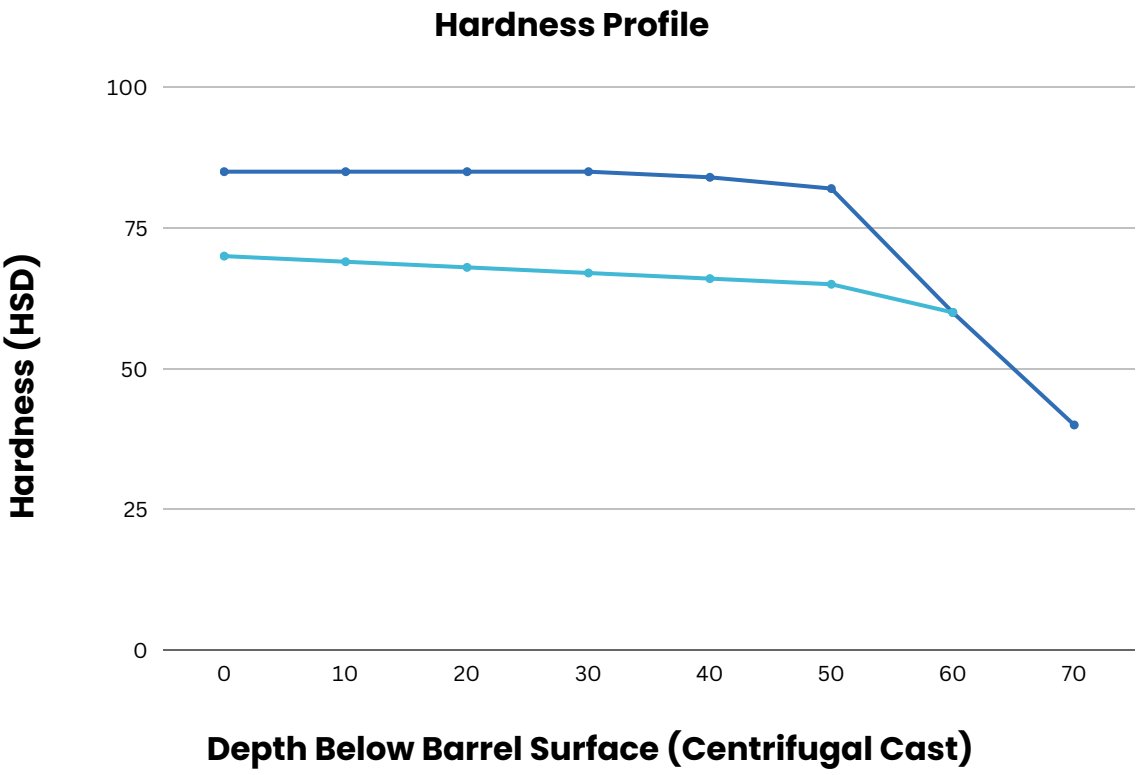


Chemical Composition

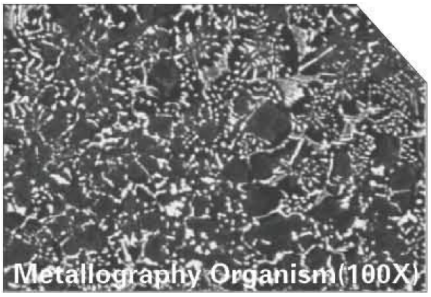
	Grade	C	Si	Mn	P	S	Cr	Ni	Mo	V	W	Nb
Centrifugal	HSS	1.50 - 2.20	0.30 - 1.00	0.40 - 1.20	<0.03	<0.25	3.00 - 8.00	0.00 - 1.50	2.00 - 8.00	2.00 - 9.00	0.00 - 8.00	1.00 - 3.00
	CORE	2.90 - 3.70	1.20 - 2.60	0.50 - 1.0	<0.15	<0.03	<0.08	<0.15	<0.05			

CAST STEEL ROLLS

HIGH SPEED STEEL ROLLS



Mechanical Properties



Tensile Strength (kg/mm2)	500-800
Bending Strength (kg/mm2)	650-1000
Elongation (%)	0.2-0.6

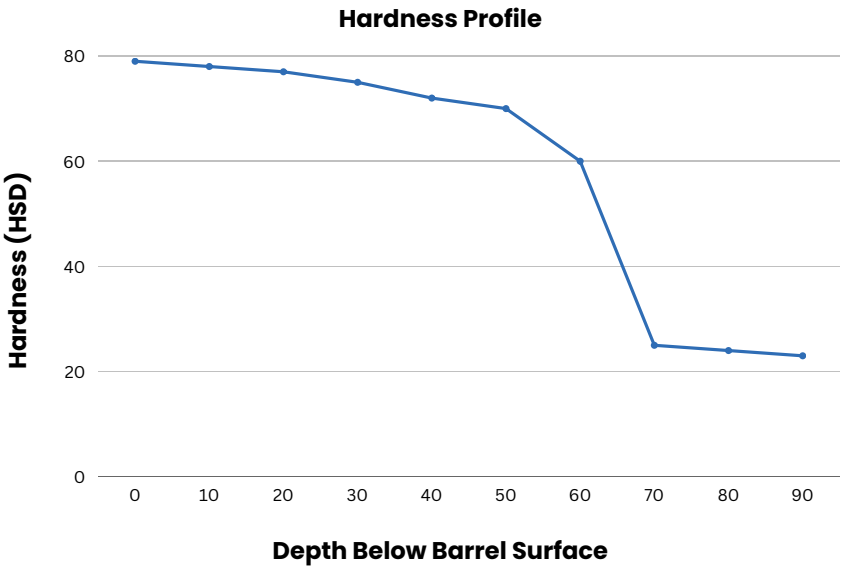
CAST STEEL ROLLS

HIGH SPEED STEEL ROLLS

Hi-Cr Steel Rolls are mainly used for rough stands (R1 & R2) of hot strip plate rolling mills and universal section rolling mills. We make this kind of rolls by centrifugal cast, and the matrial of core is strength nodular iron. The working layer is Cr, Mo, Ni, V and other alloy element. The matix stucture is tempered martensite+carbide+ a little austenite. Because the microhardness of carbide is high, good wear resistance, and isolated blick distribution of M7C3 type. By temperature-differential treatment, the rollers will be more wear resistance, thermal cracking resistance and high temperatur performance.

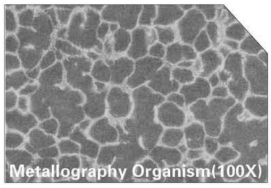
Chemical Composition

Grade	C	Si	Mn	P	S	Cr	Ni	Mo
Hi Cr Steel	1.00 - 1.80	0.40 - 1.00	0.50 - 1.00	<0.03	<0.025	8.00 - 15.0	0.50 - 1.50	1.50 - 4.50



Mechanical Properties

Tensile Strength (N/mm2)	>350
Neck Hardness (HSD)	35-45



CAST STEEL ROLLS

ADAMITE ROLLS

According to different requirements, the carbide contents of the adamite rolls vary. When wears resistance is required content of the carbide must be higher, but when strength is the main factor, it is necessary to select the lower content of the carbide. The heat treatment is normalized and tempered. A soft anneal will transform the pearlite to nodular from when the hardness is lower, while the strength relief anneals has no influence on the structure mbe adopted when higher. The lower hardness rolls have better strength properties and better resistance to fire cracking.

The Adamite rolls are widely used in the roughing stands of various rolling mills.

In most case, we make this type of toll by static cast. Its microstructure consists of little graphite, pearlite and fine carbide. With proper heat treatment, we can make this roll have a wear resistance close to iron rolls as well as strength & toughness close to steel rolls. while, the low hardness drop from the body makes it workable with deep groovw in the billet mills, universal mills and heavy section mills.

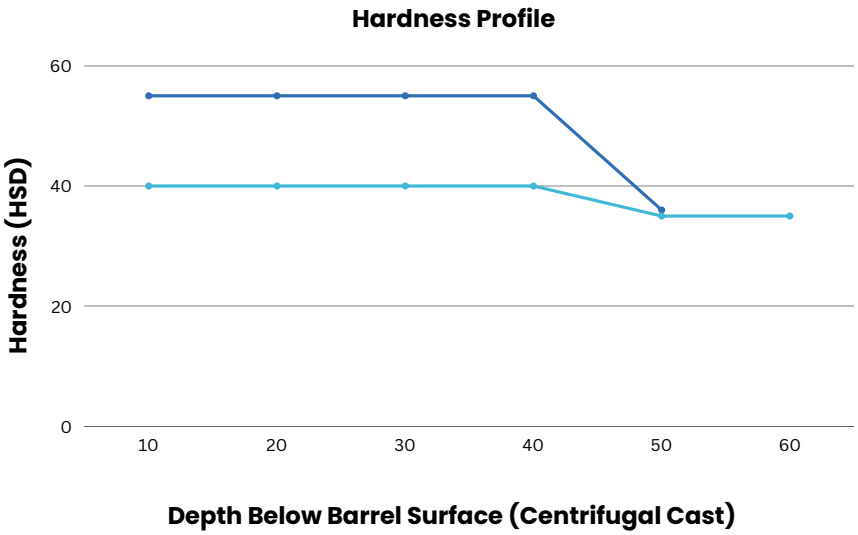
Somtimes, when it works as back-up rolls on a narrow strip mills, we make it by centrifugal cast double pured a core of nodular iron.

Chemical Composition

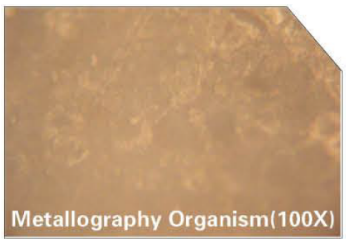
Grade	C	Si	Mn	P	S	Cr	Ni	Mo
AD 140	1.30-1.50	0.30-0.60	0.70-1.10	<0.035	<0.03	0.80-1.20	0.50-1.20	0.20-0.60
AD 160	1.50-1.70	0.30-0.60	0.80-1.30	<0.035	<0.03	0.80-2.00	>0.20	0.20-0.60
AD 180	1.70-1.90	0.30-0.80	0.60-1.10	<0.035	<0.03	0.80-1.50	0.50-2.00	0.20-0.60
AD 190	1.80-2.00	0.30-0.80	0.60-1.20	<0.035	<0.03	1.50-3.50	1.00-2.00	0.20-0.60

CAST STEEL ROLLS

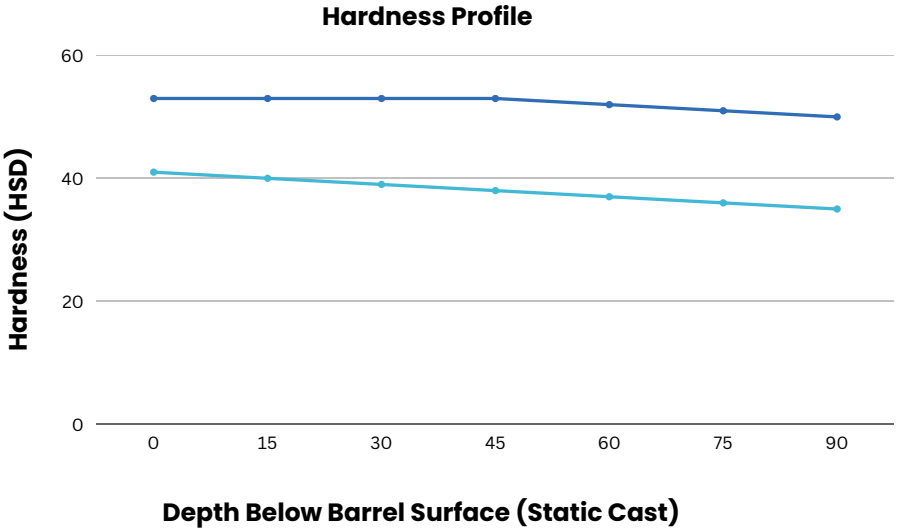
ADAMITE ROLLS



Mechanical Properties



Tensile Strength (kg/mm2)	550-700
Bending Strength (kg/mm2)	750-1000
Elogation (%)	0.4-2.0



CAST STEEL ROLLS

ALLOY STEEL ROLLS

Alloy cast steel rolls are manufactured with high quality steel molten by arc furnance, due to the advanced casting and treatment technique, such rolls is of very high intensity. Owing to its excellent performances of anti-heat crack, tenacity ad wear-resistance, it is appropriate to be used for rough and intermediate stands of selection rolling mill, used as back-up rolls of hot strip rolling mill. Its metallographic structure is made of pearlite or temper sorbite.

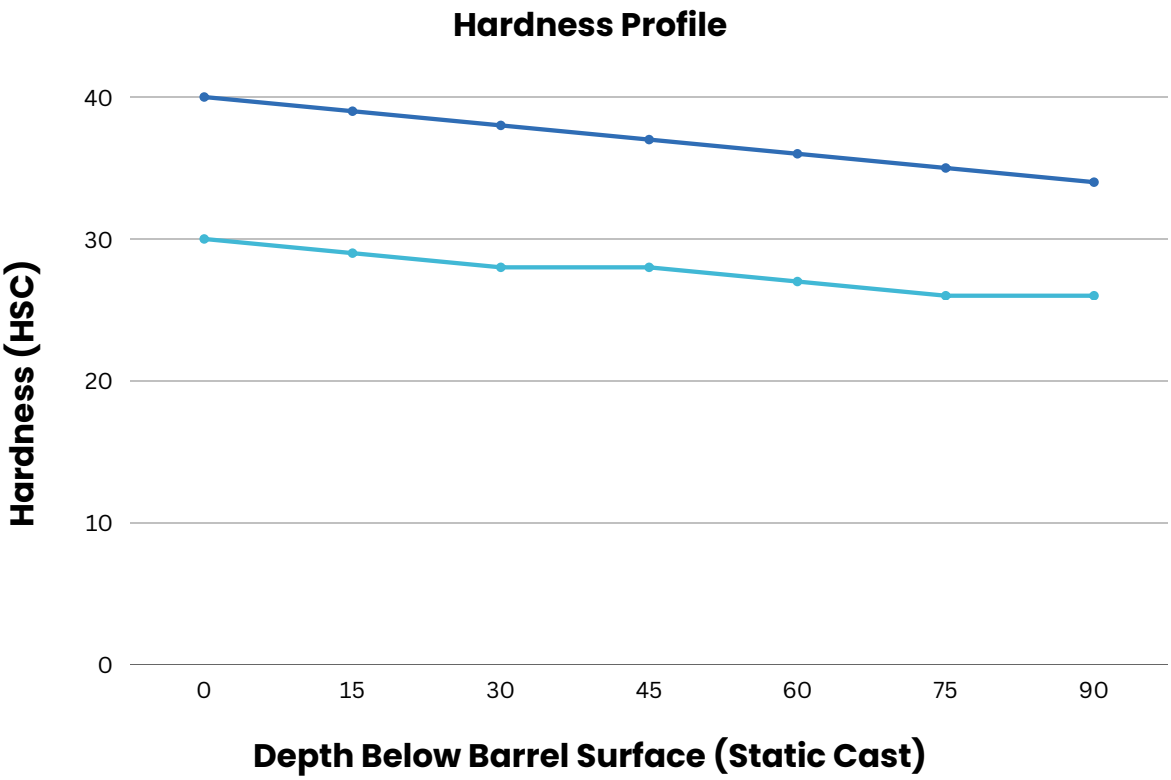
The alloy steel tolls are widely used in the BD mill and roughing stands of heavy section mills, universal mils and rail & beam mills. This type of roll often has deep grooves in the roll body, so we make it by static cast. Due to the low carbon in the chemistry, we can hardly see graphite and carbide in the microstructure. The matrix is perlite & ferrite and little tempered sorbite. Based on high strength and tougss, it can work at a very tough condition, even with little ot without cooling water. So, it is welcomed while rolling stainless steel, titanium and other high alloy products, or worked on the billet mills, BD mills against massive hit.

Chemical Composition

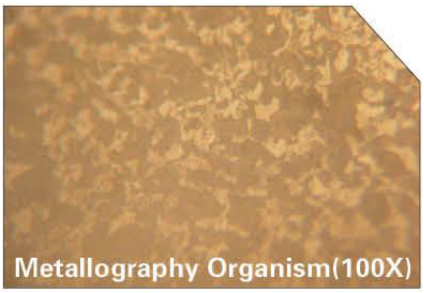
Grade	C	Si	Mn	P	S	Cr	Ni	Mo	V
AS 40	0.35-0.45	0.20-0.60	0.60-1.20	<0.035	<0.03	2.80-3.50	0.00-0.80	0.30-0.70	0.05-0.15
AS 50	0.45-0.65	0.20-0.60	0.60-1.20	<0.035	<0.03	1.00-3.50	0.30-1.00	0.30-0.70	0.05-0.15
AS 60	0.55-0.65	0.20-0.60	0.50-1.00	<0.035	<0.03	0.80-1.20	0.20-1.50	0.20-0.60	
AS 65	0.60-0.70	0.20-0.60	0.50-0.80	<0.035	<0.03	0.80-1.20	0.20-0.50	0.20-0.45	
AS 75	0.70-0.80	0.20-0.70	0.70-1.10	<0.035	<0.03	0.90-1.50	>0.20	0.20-0.60	

CAST STEEL ROLLS

ALLOY STEEL ROLLS



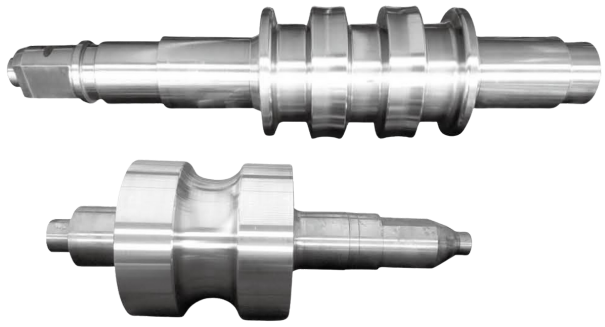
Mechanical Properties



Tensile Strength (kg/mm2)	550-700
Bending Strength (kg/mm2)	750-1000
Elogation (%)	0.4-2.0

CAST STEEL ROLLS

GRAPHITIC CAST STEEL ROLLS



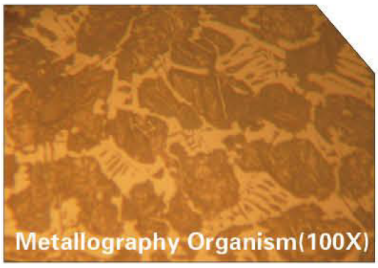
The graphitic steel rolls have a metallographic structure consisting of carbides and a small ammount of graphites in the pearlitic matrix. The rolls of this material has better tensile strength and better resistance to thermal cracking than adamite rolls of the same hardness, and the wear resistance of which is better than the cast steel rolls.

Graphitic steel rolls are mainly used in the BD mill and roughing stand of hot rillong mills; sections mills, tube mills, bar mills and wire mills.

Chemical Composition

Grade	C	Si	Mn	P	S	Cr	Ni	Mo
GS 140	1.30-1.50	1.30-1.60	0.50-1.00	<0.035	<0.03	0.40-1.00		0.20-0.60
GS 150	1.40-1.60	1.00-1.70	0.60-1.00	<0.035	<0.03	0.60-1.00	0.20-1.00	0.30-0.70
GS 160	1.50-1.70	0.80-1.50	0.60-1.00	<0.035	<0.03	0.50-1.50	0.20-1.00	0.20-0.60

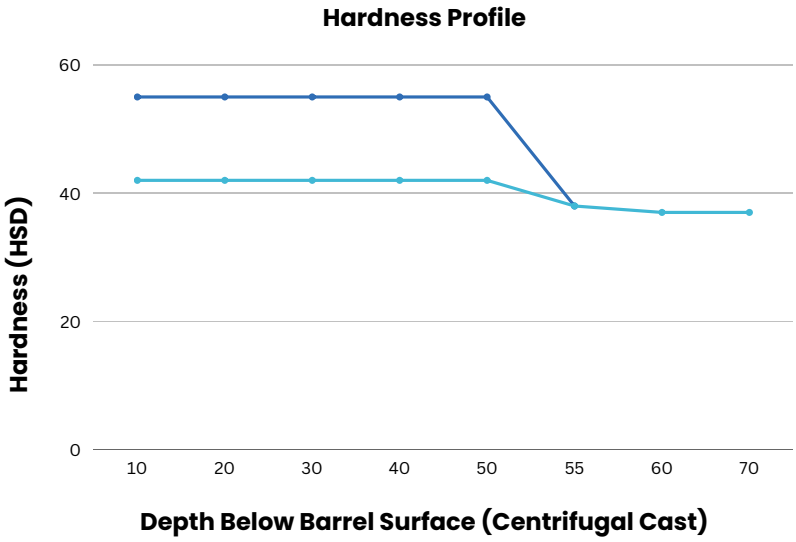
Mechanical Properties

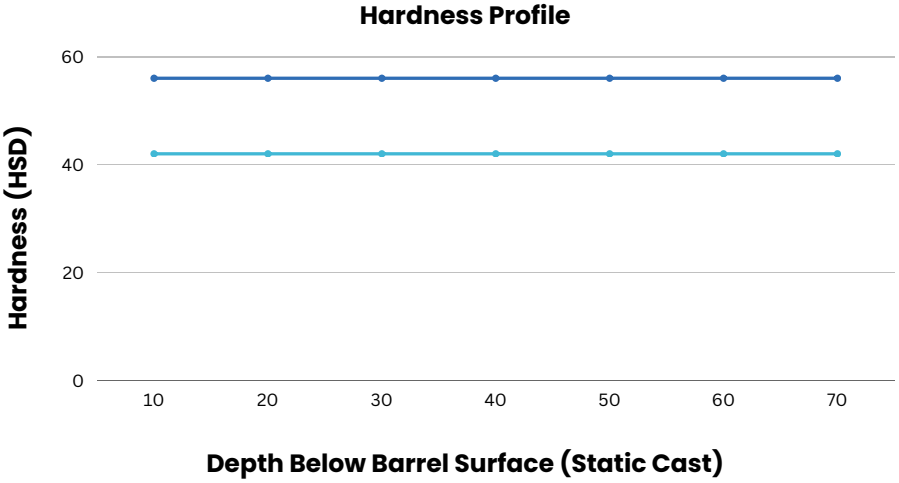


Tensile Strength (kg/mm2)	500-800
Bending Strength (kg/mm2)	650-1000
Elogation (%)	0.2-0.6

CAST STEEL ROLLS

GRAPHITIC CAST STEEL ROLLS





CAST IRON ROLLS

SPHEROIDAL GRAPHITE PEARLITIC ROLLS

The shell material of pearlitic nodular cast iron rolls consists of spherical graphite and carbides in a pearlitic matrix. We can obtain Chromium alloyed pearlitic nodular iron rolls if we control suitable Chromium content.

Rolls of this type which are alloyed with Chromium to achieve deeper penetration of carbides belongs to pearlitinc nodular iron rolls. This kind of rolls has a lower hardnessdrop than the standard nodular iron rolls which result in better wear resistance, espcially for rolls with deep grooves.

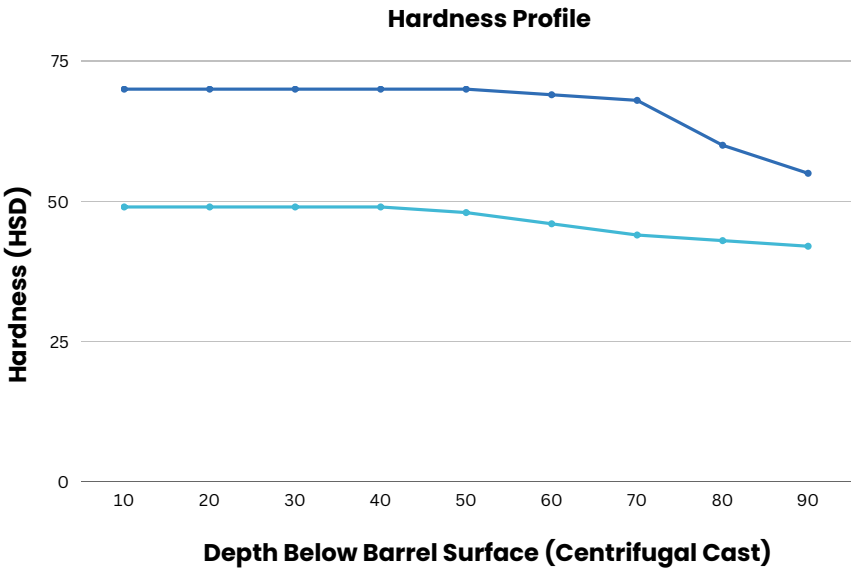
SGP rolls are widely used in the roughing stands and intermediate stands of various rolling mills. Usually, we make this type of roll by static cast and centrifugal cast. We recommend using centrifugal cast rolls for better performance when the groove in the roll body is not too deep. With more alloy added in, we can get a microstructure consisting of spherical graphite, pearlite and primary carbide type M3C up to 30%. Meanwhile, the core of the roll still keeps very strong with a great amount of spheroidal graphite in the matrix of femite. When the groove in the roll body is very deep, we recommend using rolls static cast with groove to achieve a low hardness drop between the body surface and bottom of the groove.

Chemical Composition

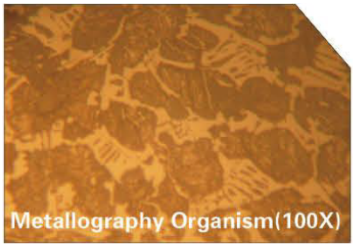
		Grade	C	Si	Mn	P	S	Cr	Ni	Mo	V
Centrifugal	Static	SGP I	2.90 - 3.60	1.40 - 2.00	0.40 - 1.00	<0.15	<0.030	0.10 - 0.60	1.50 - 2.00	0.20 - 0.80	>0.04
		SGP II	2.90 - 3.60	1.40 - 2.00	0.40 - 1.00	<0.15	<0.030	0.20 - 1.00	2.01 - 2.50	0.20- 0.80	>0.04
		SGP III	2.90 - 3.60	1.40 - 2.00	0.40 - 1.00	<0.15	<0.030	0.20 - 1.20	2.51 - 3.00	0.20 - 0.80	>0.04
		CORE	2.90 - 3.70	1.20 - 2.00	0.50 - 1.00	<0.15	<0.030	<0.08	<0.15	0.50	>0.04

CAST IRON ROLLS

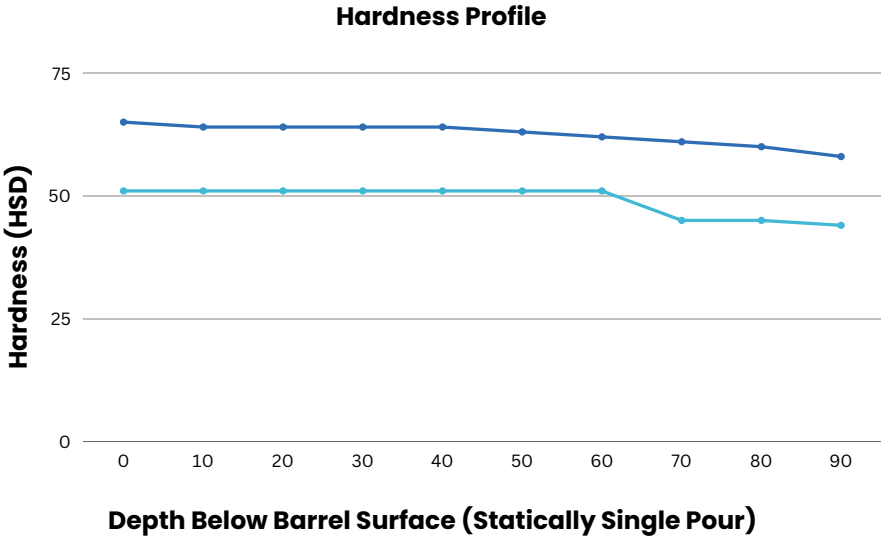
SPHEROIDAL GRAPHITE PEARLITIC ROLLS



Mechanical Properties



Tensile Strength (kg/mm2)	450-600
Bending Strength (kg/mm2)	800-1000
Elogation (%)	0.2-0.5



CAST IRON ROLLS

HIGH STRENGTH NODULAR IRON ROLLS

It is used in the roughing stands of bars and sections, especially the BD2 mills for rail & beams. Compared with other nodular iron rolls, NC rolls have unique materials and heat treatment processes ensuring they are good enough to replace the traditional cast steel rolls but with a better life.

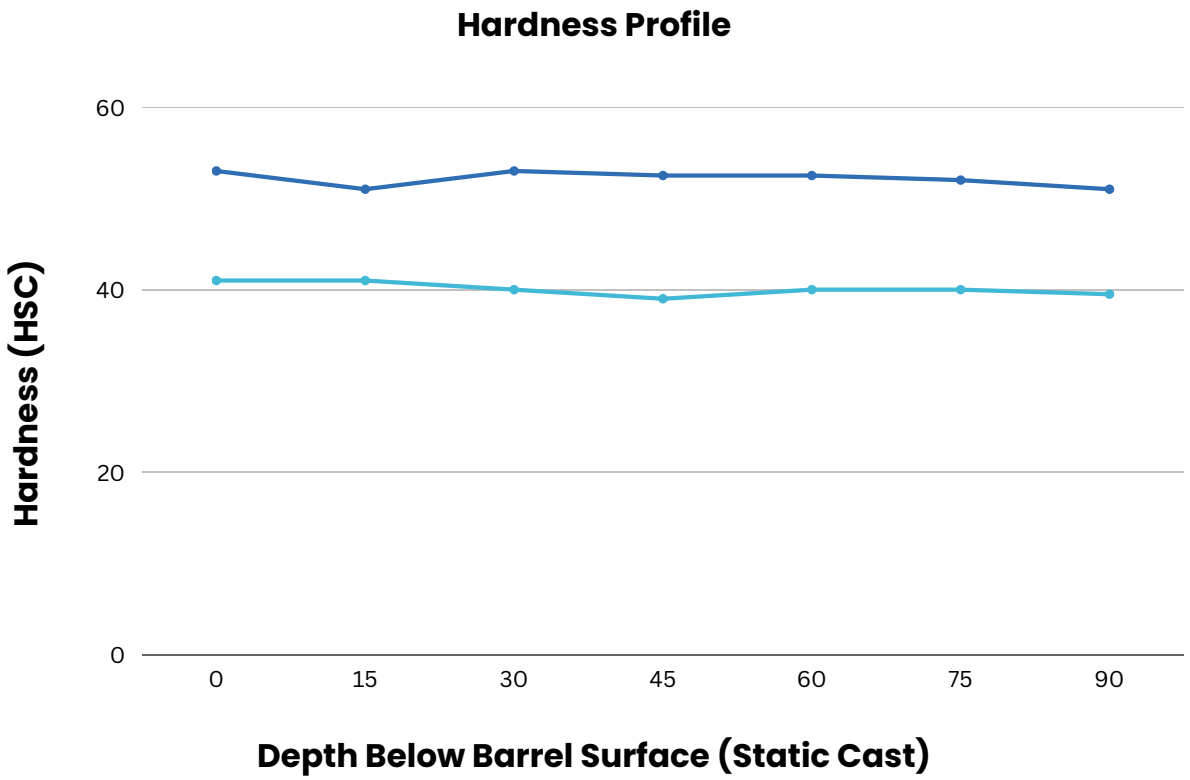
We control the carbide at a very low level (less than 5%) by reducing the chrome down to 0.3%, raising the silicon, and applying isothermal quenching to make the carbide solid solution into the matrix. Meanwhile, we can achieve a matrix of tempered sorbite/bainite by applying heat treatment and increasing nickel. This type of matrix has much better performance than perlite on the resistance of wear, fire crack, and impact, especially the excellent red hardness thanks to the molybdenum.

Chemical Composition

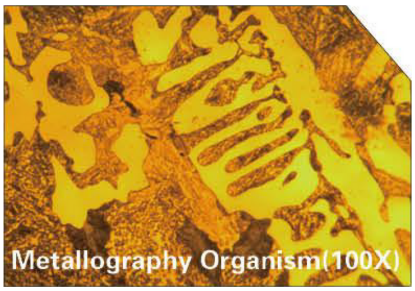
Grade	C	Si	Mn	P	S	Cr	Ni	Mo
NCC I	3.00-3.40	2.00-2.50	0.80-1.00	<0.10	<0.03	<0.15	2.00 - 3.00	0.40-0.70
NCC II	3.00-3.40	1.50-2.00	0.00-1.00	<0.10	<0.03	<0.15	2.50-4.50	0.50-1.00

CAST IRON ROLLS

INDEFINITE CHILL CAST IRON ROLLS



Mechanical Properties



Tensile Strength (kg/mm2)	>500
Bending Strength (kg/mm2)	970-1380
Elogation (%)	0.2-0.5

CAST IRON ROLLS

SPHEROIDAL GRAPHITE ACICULAR ROLLS

The shell material of pearlitic nodular cast iron rolls consists of nodular graphite and carbides in an acicular bainitic matrix. cicular roll material is more highly alloy than the pearlitic roll material. Acicular nodular iron rolls are more wea resistant than pearlitic nodular iron rolls of the same hardness. But pearlitic nodular iron rolls have superior resistance to thermal cracking.

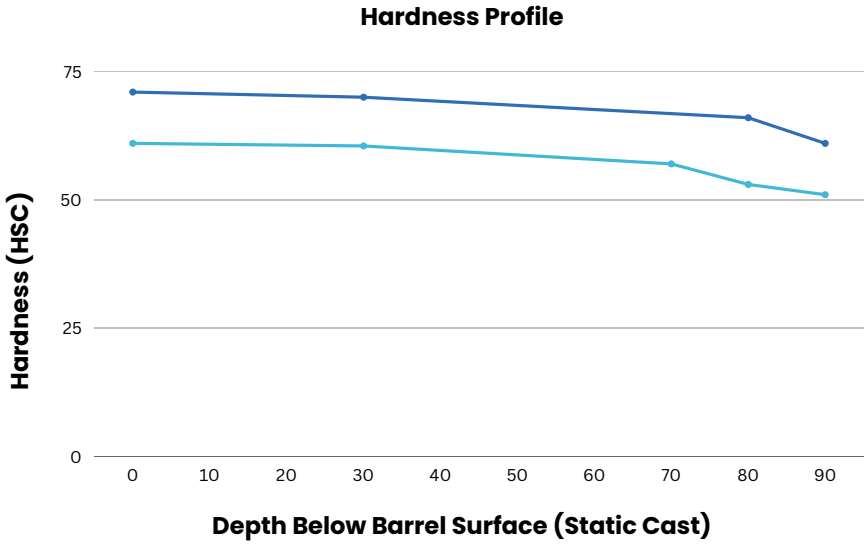
It is widely used in the intermediate stands and finishing stands of bar mills and small section mills. This type of roll is often made by centrifugal cast unless the roll has a very deep groove in the body. Its microstructure consists of bainite & pearlite, spheroidal graphite its cutting properties and eliminate the hard spots. When the groove in the roll body is very deep, we rocommend using rolls static cast with groovw th achieve a low hardness drop between the body surface and botto, of the groove.

Chemical Composition

		Grade	C	Si	Mn	P	S	Cr	Ni	Mo	Mg
Centrifugal	Static	SGA I	2.90 - 3.60	1.00 - 2.20	0.20 - 0.80	<0.10	<0.030	0.20 - 1.00	3.01 - 3.50	0.50 - 1.00	>0.04
		SGA II	2.90 - 3.60	1.00 - 2.00	0.20 - 0.80	<0.10	<0.030	0.30 - 1.50	3.51 - 4.50	0.50- 1.00	>0.04
		CORE	2.90 - 3.70	1.20 - 2.60	0.50 - 1.00	<0.15	<0.030	<0.08	<0.15	<0.05	>0.04

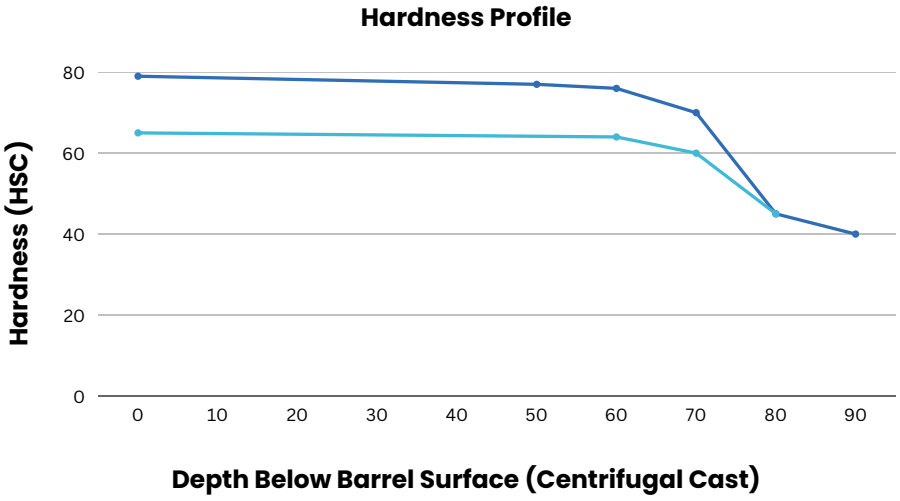
CAST IRON ROLLS

SPHEROIDAL GRAPHITE ACICULAR ROLLS



Mechanical Properties

Tensile Strength (kg/mm2)	450-600
Bending Strength (kg/mm2)	800-1110
Elogation (%)	0.2-0.5



CAST IRON ROLLS

HIGH-CR IRON ROLLS

The high-Cr cast iron rolls are made by centrifugal casting process, the work layer contains 12-22% Chromium. Through rational chemical compasition allocations and different heat treatment, the matrix can be controlled as sorbide, troostite, bainite or martensite and certain kinds of carbides, such as Cr7C3 eutectic carbides, Cr23C6 second carbides, Mi2C carbides etc. Accirding to different purposes of use, the material of the core could be nodular iron or grey iron.

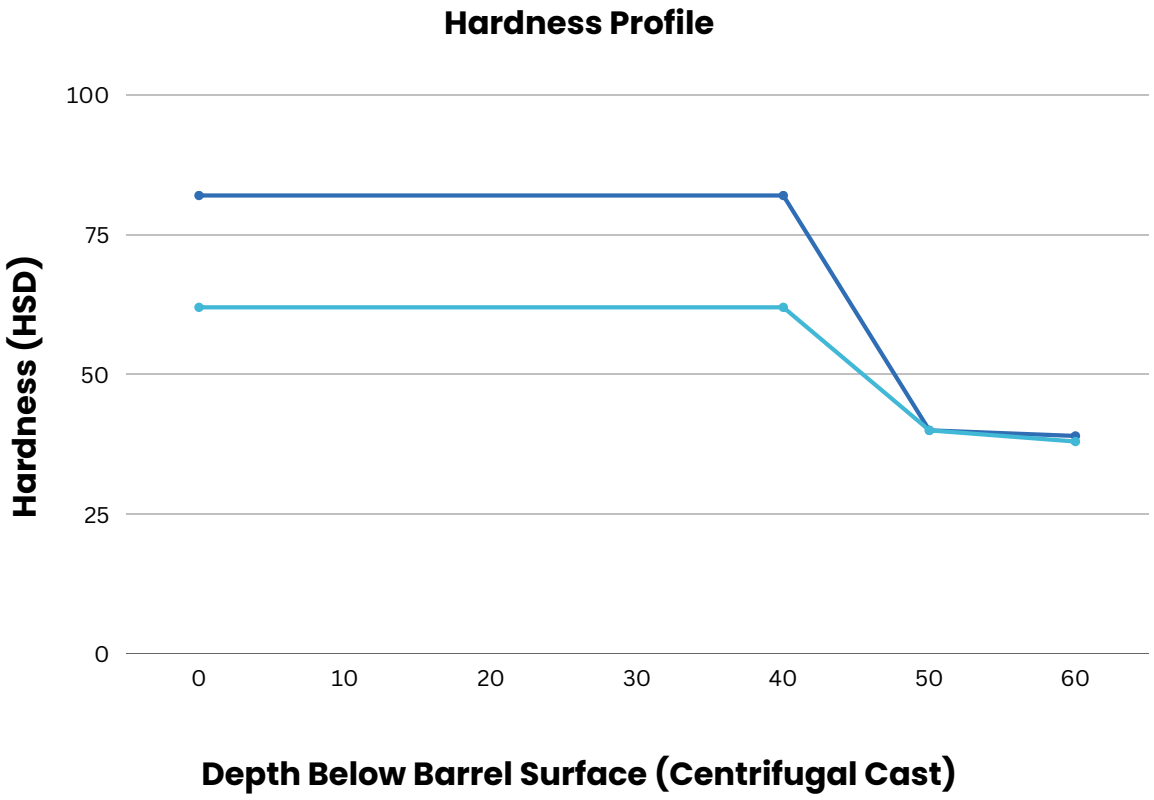
We make this type of rolls by centrifugal cast double poured. In this case, we can achieve an excellent wear resistance in the shell with flake graphite, bainite & martensite and primary carbide type M7C3 + secondary carbide in the microstructure. Besides the excellent wear resistance, it is also good against fire cracking thanks to the oxide film Cr2O3 formed on the body surface while rolling. At the same time, the core is strong enough to assure the roll can work safely.

The hi-Cr iron rolls are mainly used as works rolls in the roughing & previous - finishing stands of hot strip continuous rolling mills; wor rolls in the roughing & finishing stands of the plate mills; work rolls in temper mills and cold strip mills; rings in the large universal mills; work rolls in the finishing stands of small section mills and bar mills.

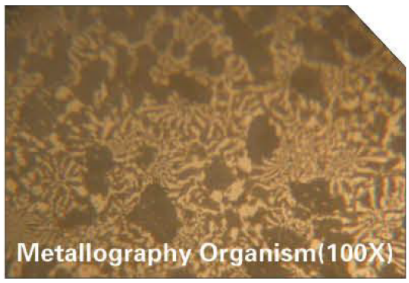
	Grade	C	Si	Mn	P	S	Cr	Ni	Mo	V
Centrifugal	HCr I	2.30 - 3.30	0.30 - 1.00	0.50 - 1.20	<0.10	<0.05	12.00 - 15.00	0.70 - 1.70	0.70 - 1.50	0.00 - 0.60
	HCr II	2.30 - 3.30	0.30 - 1.00	0.50 - 1.20	<0.10	<0.05	15.01 - 18.00	0.70 - 1.70	0.70-1.50	0.00 - 0.60
	HCr III	2.30 - 3.30	0.30 - 1.00	0.50 - 1.20	<0.10	<0.05	18.01 - 22.00	0.70 - 1.70	1.51 - 3.00	0.00 - 0.60
	CORE	2.90 - 3.70	1.20 - 2.60	0.50 - 1.00	<0.15	<0.03	<0.08	<0.15	<0.05	>0.04

CAST IRON ROLLS

HIGH-CR IRON ROLLS



Mechanical Properties



Tensile Strength (kg/mm2)	400-700
Bending Strength (kg/mm2)	650-1000
Elogation (%)	0.2-0.6

CAST IRON ROLLS

INDEFINITE CHILL CAST IRON ROLLS

Indefinite chill cast iron is a material between chill cast iron and grey cast iron. The working layer of this material consists of flake graphites, while the depth below the barrel surface increases, the number of graphites will increase too, but the hardness will decrease.

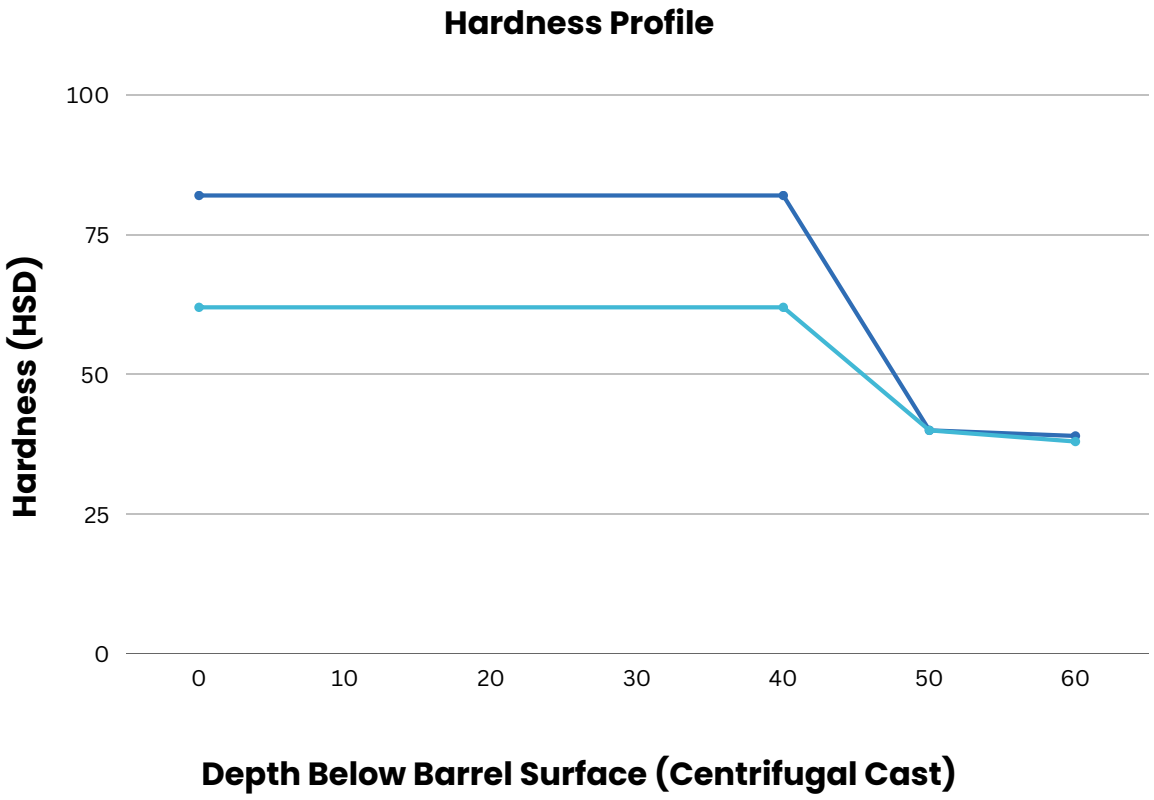
According to different rolling conditions, the matrix of the rolls could be controlled as perlite, bainite, martensite, or tempered sorbite by adjusting the chemical composition. The rolls of this material possess excellent wear resistance, thermal cracking resistance, spall resistance, and biting properties. ICDP rolls are primarily used in the section, wire, rod, strip mills, and the rolls of ICIV, ICV could be used in the hot strip mills, intermediate stands of tempered mills.

Chemical Composition

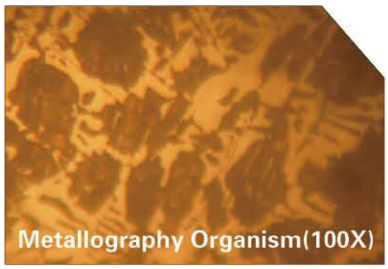
	Grade	C	Si	Mn	P	S	Cr	Ni	Mo	V	W	Nb
Centrifugal	IC III	2.90 - 3.60	0.60 - 1.20	0.40 - 1.20	<0.25	<0.05	0.70 - 1.20	2.01 - 3.00	0.20 - 1.00			
	IC IV	2.90 - 3.60	0.60 - 1.50	0.40 - 1.20	<0.10	<0.05	1.00 - 2.00	3.01 - 4.00	0.20 - 1.00			
	IC V	2.90 - 3.60	0.60 - 1.50	0.40 - 1.20	<0.10	<0.05	1.00 - 2.00	3.01 - 4.80	0.20 - 2.00	0.20 - 2.00	0.00 - 2.00	0.00 - 2.00
	CORE	2.90 - 3.70	1.20 - 2.60	0.50 - 1.00	<0.15	<0.03	<0.08	<0.15	<0.05			

CAST IRON ROLLS

INDEFINITE CHILL CAST IRON ROLLS



Mechanical Properties

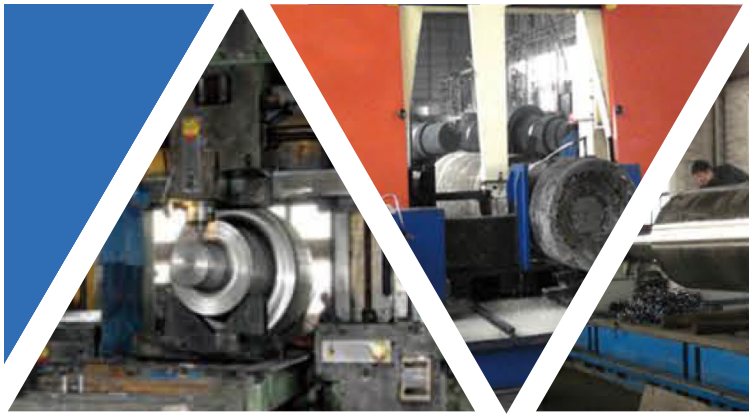


Tensile Strength (kg/mm2)	400-500
Bending Strength (kg/mm2)	700-1000
Elogation (%)	0.2-0.5

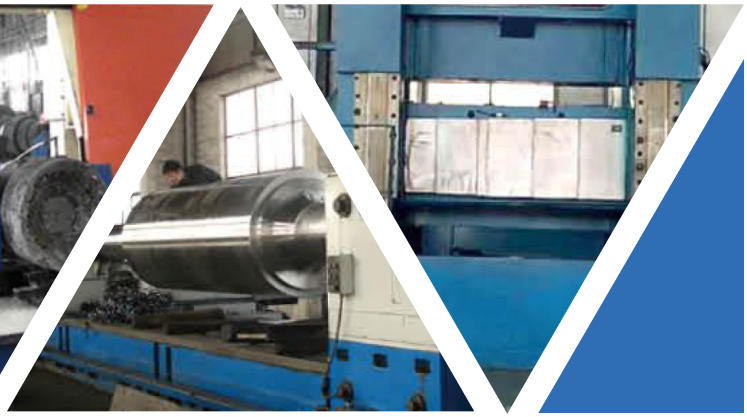
HEAT TREATMENT FURNANCE

MACHINING EQUIPMENT

Sawing Machine



Vertical Turning Lathe



Gantry Milling Machine

CNC Turning Lathe

We have advanced machining equipment and can precisely machine all the details of mill rolls and roll rings. When CNC lathe and CNC grinding machine are applied, every dimension can be controlled strictly under the range of tolerance. When turning different material, it is important to choose appropriate machining tools and turning speed to achieve a better performance. And we can provide any suggestion on machining according to the customer's requirements.

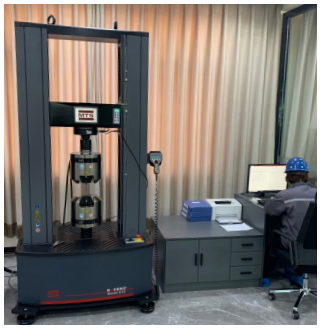
CNC Grinding Machine

Milling Machine

QUALITY CONTROL

The whole process from melting, casting, forging, heat treatment to final machining and packing is under control of our quality system.






Large magnetic particle detector and ultrasonic flaw detector, ultrasonic wall thickness meter and inner scope, guarantee 360 degree inspection of each product to meet customer's demand.

According to the physical and chemical laboratory construction, we can meet:

- the tensile test
- minus 80 degrees Celsius temperature impact
- chemical composition analysis
- metallographic analysis
- non-metallic inclusion analysis
- gas content analysis
- gain size analysis an magnetic induction intensity
- no magnet magnetic induction gradient
- intergranular corrosion test

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