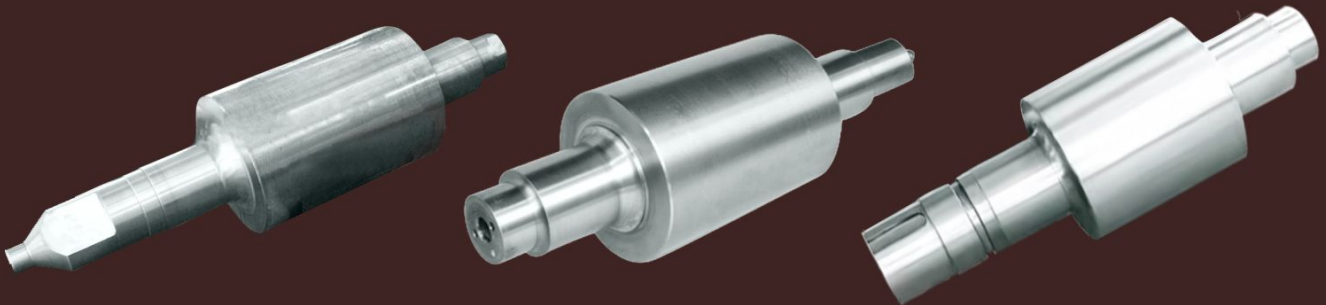


# MAKKAH GROUP

Technology & Solution

AN ISO 9001 : 2015 CERTIFIED COMPANY



Manufacturers, Importers & Exporters of :

**SPECIALIST IN :**

**COMPLETE HOUSE OF HSS Rolls, Tungsten  
Carbide Rings & All Types of Rolls**



## *About US*

The company is involved in the roll manufacturing industry with a high starting point. Compared with traditional ductile iron rolls, the wear resistance is significantly improved, and it is not easy to fall off or crack. Our company is the first choice for rolling companies to improve the surface quality of rolled materials, stabilize the rolling process, and reduce costs and increase efficiency. The new High-Speed Steel Rolls produced by the company have been widely used in more than 200 Domestic & International Rolling production lines since 2000. A large professional manufacturer of high-speed steel rolls.

The company currently has nearly 200 employees, including 15 senior technical talents. It has more than 100 intermediate frequency furnaces, centrifuges, heat treatment furnaces, and machining equipment. It also has a physical and chemical analysis centre equipped with various advanced inspection and testing equipment such as direct-reading spectrometers.

We sincerely hope that our products will make greater contributions in improving user product quality and economic benefits. We are determined to become a loyal partner of users in the steel industry.

### *Mission*

Firmly Stick To The Material and Spiritual Happiness of All Partners, and Make Unremitting Efforts To Continuously Create Green Steel, Healthy Food and Promote Human and Social Development.

### *Vision*

Set an example for the steel and food industry, create a world-class brand, and become a happy home for strugglers to learn and grow.

### *Values*

Gratitude, Humility, Passion, Dreams

### *Spirit*

Integrity, Professionalism, Collaboration, Innovation



*Message  
From The  
Director*



**Mr. Mohammed Rashid Sheikh**

//

With the advent of new millennium, the whole world is getting closer, today the world order is economic cooperation and a platform is being formed where all the countries will have level playing field. In the new scenario India is emerging as a big player. The use of new technologies is making India stand at part with most of the nations. Manufacturing sector All Types of Rolling Mill Rolls & Tungsten Carbide Rings is the base of India and we as "Makkah Group" Manufacturer contributing in our own small way to the nation, by providing best quality Rolls for All Type of Rolling Mills in the Industrial market. Our Endeavor is to produce world class Rolls and provide the same to our dealers and customers. Our quality Rolls of high standard and reput have been acclaimed as the best for production, fine finish and good workmanship.

We pledge our selves to opt for the upto date technology to make "Makkah Group" products more reliable & dependable so as to increase the confidence of our valued customers which has always been our object. We solicit their support in the times to come. We declare that we are well-experience and quality producer with more than 30 years of expert in this field.

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## QUALITY CONTROL

### Raw Material

- Only Work With 2-3 Qualified Long-term Suppliers
- Each Batch of Raw Material Has Quality Certificate
- Acceptance Test on Receipt by our Own Laboratory
- Annual Audit Evaluation to all Suppliers

### Test & Inspection

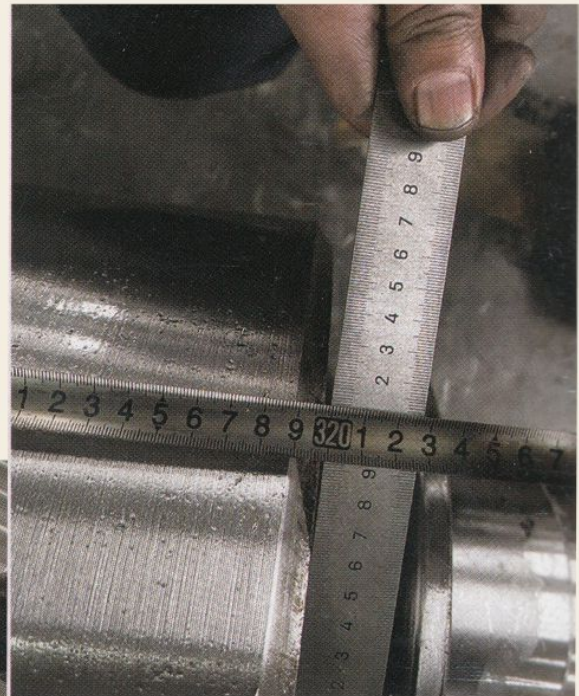
- Advanced and mature process as shown previously
- Technical confirmation during heat Treatment process
- Most of equipments are computer-controlled
- Traceable operation records

### Manufacturing Process

- Advanced and mature process as shown previously
- Technical confirmation during heat treatment process
- Most of equipments are computer-controlled
- Standard operation guided by specified process cards
- Traceable operation records

### Quality Staff

- Well-trained and certified
- Main technical Staff and key workers are with over 20 years experience in roll industry





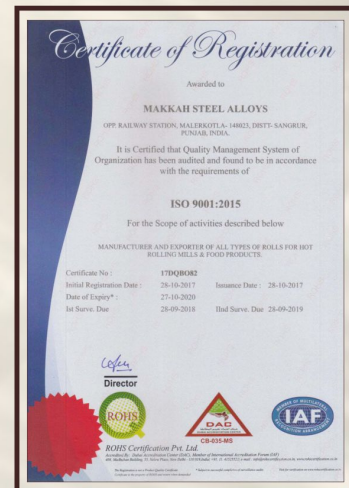
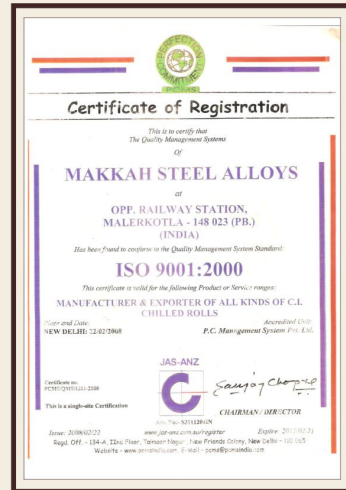


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# ISO 9001 : 2015

## INTERNATIONAL QUALITY CERTIFICATION

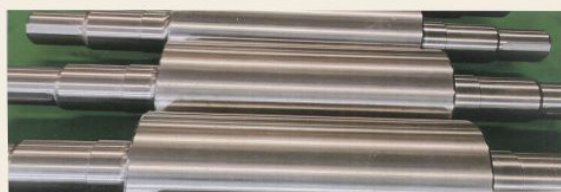
### PROVIDE PERFECT TECHNICAL SUPPORT AND AFTER-SALES SERVICE





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## INFRASTRUCTURE







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## HIGH- SPEED STEEL ROLLS

### Chemical Analysis

Designation of Rolls	Material Code	C	Si	Mn	Ni	Cr	Mo	V	W
HSS	HSS	1.50-2.20	0.30-1.00	0.40-1.20	0.00-1.50	3.00-8.00	2.00-8.00	2.00-9.00	0.00-2.00
S-HSS	S-HSS	0.60-1.20	0.80-1.50	0.50-1.00	0.20-1.20	2.00-5.00	2.00-5.00	0.40-3.00	0.00-3.00

### Physical Properties

Designation of Rolls	Material Code	Barrel Hardness (HSD)	Roll Neck Strength (Mpa)	Tensile Strength (Mpa)
HSS	HSS	75-85	30-45	400-500
S-HSS	S-HSS	75-88	30-45	400-500

### Microstructure

A small amount of tempered martensite + carbide + carbon

### Application

Designation of Rolls	Material Code	Application
HSS	HSS	Rolled strip, bar finishing roller, high speed wire pre-finishing, steel roller universal rolling mill, wide plate mill work roll
S-HSS	S-HSS	Rough rolling hot strip mill work roll, cold rolled strip steel work roll, intermediate roll

	Specification	Material	Product Code	Barrel Hardness (HSD)
Finished Frame Mill Roll Prefinished Frame Mill Roll	280-550	High-performance High Speed Steel	MG01	82-88
Cutting Frame Mill Roll	280-550	High-performance Segmentation High Speed Steel	MG02	75-78
Pre-Cutting Frame Mill Roll	280-550	High-performance Segmentation High Speed Steel	MG03	78-81





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## DIMENSIONS & PRECISION OF FINISHED CARBIDE ROLL RINGS

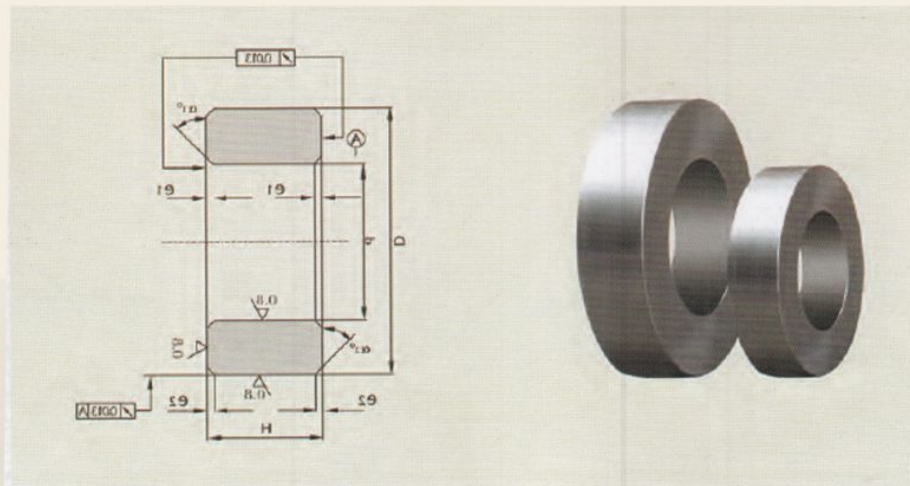
Dimension Range of Finished Rolls

External Diameter (mm)	Inner Diameter (mm)	Height (mm)
100-500	50-380	20-250

Tolerances allowable for the O.D., I and height of roll rings

Designation of Rolls	External diameter $\leq 200$ mm		External diameter $\leq 200$ mm		Special Requirements
	Better	Ordinary	Better	Ordinary	
Out diameter	$\pm 0.02$	$\pm 0.05$	$\pm 0.03$	$\pm 0.05$	
Inner diameter	$+0.02$	$+0.025$	$+0.035$	$+0.055$	
Height	0	0	0	0	
	$\pm 0.025$	$\pm 0.05$	$\pm 0.05$	$\pm 0.05$	

Note : we can supply them according to the drawings provided bu customers.



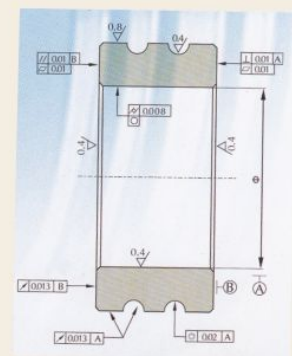
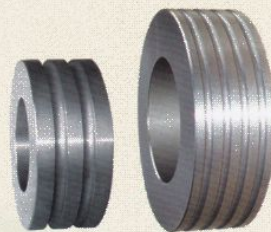
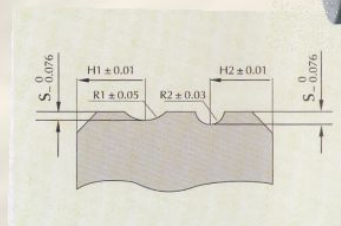
## TECHNICAL SPECIFICATIONS OF FINISHED CARBIDE ROLL RINGS

### The Allowable Deviation of Carbide Roll Rings

Radial runout of groove  $\leq 0.013$ mm  
Radial runout of periphery  $\leq 0.013$ mm  
End face runout  $\leq 0.02$ mm  
End face planeness  $\leq 0.01$ mm  
End face parallelism  $\leq 0.01$ mm  
Inner hole cylindricity  $\leq 0.01$ mm

### Roughness of Carbide Roll

Inner hole roughness  $0.4 \mu\text{m}$   
Periphery roughness  $0.8 \mu\text{m}$   
End Face roughness  $0.4 \mu\text{m}$







The technical drawing illustrates a mechanical assembly. On the left, two views of a component are shown: a perspective view and a side view. The component is a cylindrical ring with a central bore and a flange. The right side of the drawing is a detailed cross-section of the assembly, showing the component in relation to a housing. The housing has a central bore and a flange. The component is shown with a central bore and a flange. The drawing includes various dimensions and tolerances, such as  $\phi 340$ ,  $\phi 295 \pm 0.5$ ,  $\phi 250$ ,  $\phi 217 \pm 0.05$ ,  $\phi 165 \pm 0.17$ ,  $\phi 80$ ,  $154 \pm 0.2$ ,  $109$ ,  $100$ ,  $34.5 \pm 0.05$ , and  $34.5 \pm 0.05$ . Surface finish symbols (1.6) are also present.

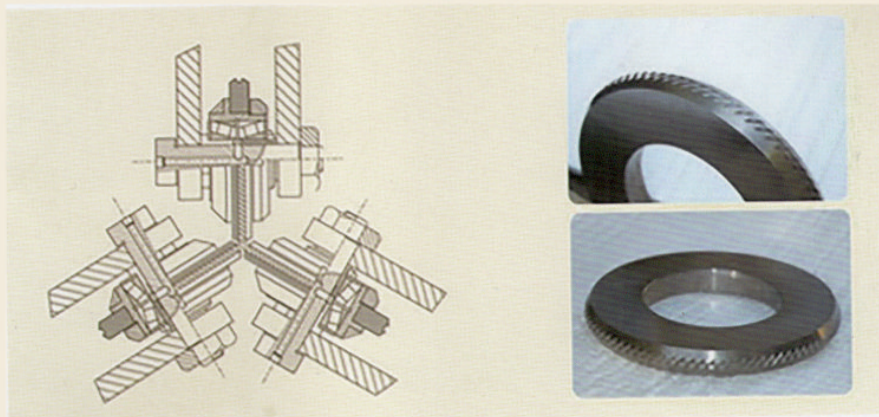


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## THREE DIMENSIONAL CARBIDE ROLLS FOR COLD ROLLING OF RIBBED STEEL BARS

### The Allowable Deviation of Carbide Roll Rings

The Steel Reinforcement Rolled by Three Dimensional Carbide Rolls has Fine Appearance Surface High Precision In Dimension and Clear Ribbed Mark. Those Improved The Comprehensive Properties of Ribbed Steel Reinforcements. The Primary Rolling Tonnage are 600-2000 Tons, Which Is 20-30 Times More Than That of Common Tool Steel Rolls. Because Cemented Carbide Rolls Can be Reground and used again, The Production Cost is Reduced Greatly. That Markedly Improved Efficiency and Profit.



## CEMENTED CARBIDE COMPOSITE ROLL

The Cemented Carbide Composite Rolls Mainly Used on The Finishing Mill to Bar, Deformed Steel Bar and Common Wire. In this Way, We Can Greatly Reduce the Frequency of Changing Groove and Roll, thus to Reduce the Labor Intensity and Improve The Work Efficiency. The Surface Quality and Yield Shall Be Improved to a Maximum Degree, Which Leads to a Adopts a Special Grade of Cemented. By Means of Hydraulic Lock Nut, The Cemented Carbide Roll Rings is Fastened to The Axle With The Axle Pressure Of 200 Mpa From Hydraulic Oil. Under The Protection of Prestress, The Cement Carbide Composite Roll Shall Work More Effectively.

### Grades And Related Parameters Of Cemented Carbide Combined Rolls

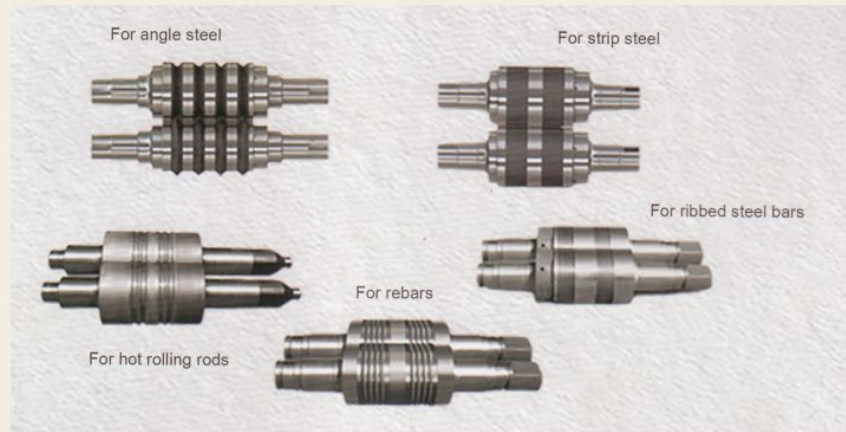
Grades	Chemical Composition		Physical Mechanical Properties		
	Wc	Co/Ni/Cr	Density ( $\pm 0.15$ ) g/cm <sup>3</sup>	Hardness ( $\pm 0.5$ ) HRA	Bending Strength $\geq$ N/ mm <sup>2</sup>
MG20F	80	20	13.5	82.5	2650
MG22F	78	22	13.3	82.0	2600
MG25F	75	25	13.1	80.5	2550
MG30F	70	30	12.6	79.5	2450
MG32F	68	32	12.5	79.0	2400

Note : The Allowable deviation in external diameter, internal diameter and height is to be determined based on customers' needs.





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## ROLLING TECHNOLOGY FOR HOT-ROLLED BAR AND DEFORMED STEEL BAR

In accordance with the production line and rolling technology of customers, our products are designed to match one-strand rolling, two-slitting rolling and three-slitting rolling, and four slitting rolling, the cemented carbide composite roll includes K1 finished roller, K2 leader roller, K4 pre-slitting roller, K3 slitting roller with high-speed steel as material. the rolling varieties include wire, bar and deformed steel bar.

we can effectively reduce the frequency of changing rollers and increase the yield after using cemented carbide composite roll. The rolling products possess the features of good surface quality, small deformation, negative tolerance and high yield.

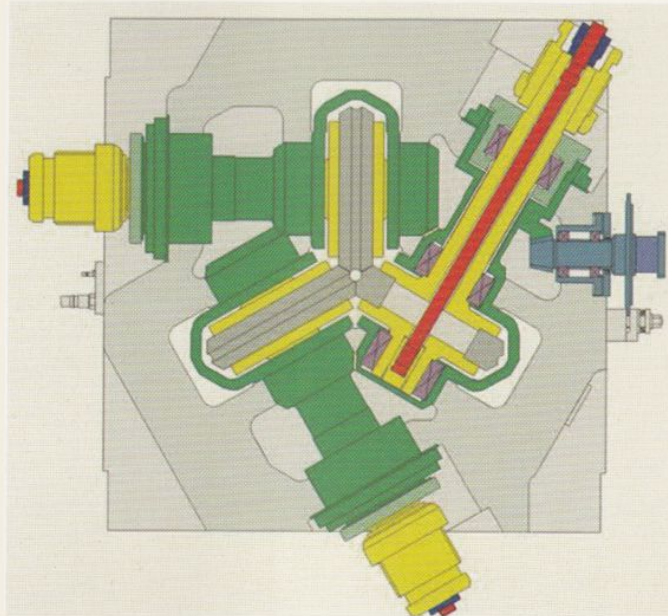
Name	Single rolling	2 slit rolling	3 slit rolling	4 slit rolling
K4 Group				
K3 Group				
K2 Group				
K1 Group				



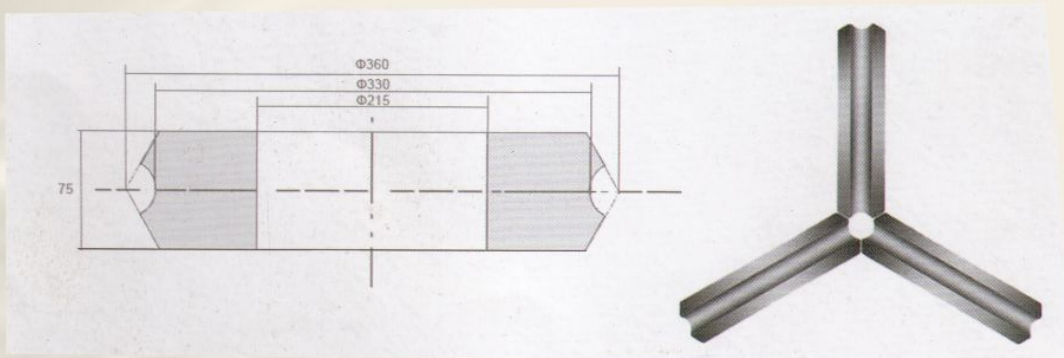
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## KOCKS CEMENTED CARBIDE ROLL RINGS

### KOCKS ROLLING MILL STRUCTURAL MAP



KOCKS Cemented Carbide Roll Rings for KOCKS three-roll mill to Replace the original ball-milling of cast iron roll ring. mainly the production of bearing Steel, Alloy Steel and other Special Steel, Steel Surface and Tolerance Controls are clearly better than cast iron Roll Ring and Wear-resistant is good, life is about 10 times Compared with Cast iron Roll Ring.







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## ALLOY INDEFINITE CHILLED CAST IRON ROLLS

### Chemical Analysis

Designation of Rolls	Material Code	C	Si	Mn	Ni	Cr	Mo
CrMo Indefinite Chilled Cast Iron Roll	IC	3.1-3.4	0.6-0.9	0.5-1.0		0.7-1.1	0.2-0.6
NiCrMo Indefinite Chilled Cast Iron Roll (I)	IC I	3.1-3.4	0.6-0.9	0.5-1.0	0.6-0.8	0.7-1.1	0.2-0.6
NiCrMo Indefinite Chilled Cast Iron Roll (II)	IC II	3.1-3.4	0.6-1.0	0.5-1.0	2.2-2.8	0.7-1.1	0.2-0.6
NiCrMo Indefinite Chilled Cast Iron Roll (III)	IC III	3.1-3.4	0.6-1.0	0.5-1.0	2.2-2.8	0.8-1.3	0.2-1.0
NiCrMo Indefinite Chilled Cast Iron Roll (IV)	IC IV	3.1-3.4	0.6-1.0	0.5-1.0	3.1-4.3	1.0-1.3	0.2-1.0
NiCrMo Indefinite Chilled Cast Iron Roll (V)	IC V	3.1-3.4	0.8-1.2	0.5-1.0	3.8-4.5	1.4-2.0	0.2-1.2

### Physical Properties

Designation of Rolls	Material Code	C	Ni	Mo
CrMo Indefinite Chilled Cast Iron Roll	IC	50-70	35-55	> 160
NiCrMo Indefinite Chilled Cast Iron Roll (I)	IC I	55-72	35-55	> 160
NiCrMo Indefinite Chilled Cast Iron Roll (II)	IC II	55-72	35-55	> 160
NiCrMo Indefinite Chilled Cast Iron Roll (III)	IC III	65-78	35-55	> 350
NiCrMo Indefinite Chilled Cast Iron Roll (IV)	IC IV	70-83	35-55	> 350
NiCrMo Indefinite Chilled Cast Iron Roll (V)	IC V	77-82	35-55	> 350

### Microstructure

Designation of Rolls	Material Code	Microstructure
CrMo Indefinite Chilled Cast Iron Roll	IC	Pearlite + Cementite + Small Percentage Graphite
NiCrMo Indefinite Chilled Cast Iron Roll (I)	IC I	Pearlite + Cementite + Small Percentage Graphite
NiCrMo Indefinite Chilled Cast Iron Roll (II)	IC II	Fine Pearlite + Cementite + Small Percentage Graphite
NiCrMo Indefinite Chilled Cast Iron Roll (III)	IC III	Sorbite + Cementite + Small Percentage Graphite
NiCrMo Indefinite Chilled Cast Iron Roll (IV)	IC IV	Sorbite Tempered Bainite + Carbide + Graphite + A Small amount of Martensite or Bainite Carbide + Graphite
NiCrMo Indefinite Chilled Cast Iron Roll (V)	IC V	Sorbite Tempered Bainite + Carbide + Graphite + A Small amount of Martensite or Bainite Carbide + Graphite

### Application

Designation of Rolls	Material Code	Microstructure
CrMo Indefinite Chilled Cast Iron Roll	IC	Section Mill, Bar Mill, Intermediate and Finishing Stands of Wire-rod mill
NiCrMo Indefinite Chilled Cast Iron Roll (I)	IC I	Section Mill, Bar Mill, Intermediate and Finishing Stands of Wire-rod mill
NiCrMo Indefinite Chilled Cast Iron Roll (II)	IC II	Section Mill, Bar Mill, Intermediate and Finishing Stands of Wire-rod mill
NiCrMo Indefinite Chilled Cast Iron Roll (III)	IC III	Section Mill, Bar Mill, Intermediate and Finishing Stands of Wire-rod mill
NiCrMo Indefinite Chilled Cast Iron Roll (IV)	IC IV	Profile, Rod and Wire, Narrow Strip mill finishing Stand, Plate, Flat Rack, Strip Finishing,
NiCrMo Indefinite Chilled Cast Iron Roll (V)	IC V	Plate, Flat Rack, Strip Finishing





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## ALLOY CHILLED CAST IRON ROLLS

### Chemical Analysis

Designation of Rolls	Material Code	C	Si	Mn	Ni	Cr	Mo
NiCrMo Chilled Cast Iron Rolls (I)	CC I	3.00-3.40	0.30-0.80	0.20-1.00	0.50-1.00	0.20-0.60	0.20-0.60
NiCrMo Chilled Cast Iron Rolls (II)	CC II	3.00-3.40	0.30-0.80	0.20-1.00	1.10-2.00	0.30-1.20	0.20-0.60
NiCrMo Chilled Cast Iron Rolls (III)	CC III	3.00-3.40	0.30-0.80	0.20-1.00	2.10-3.00	0.50-1.50	0.20-0.60
NiCrMo Chilled Cast Iron Rolls (IV)	CC IV	3.00-3.40	0.30-0.80	0.20-1.00	3.10-4.00	0.50-1.70	0.20-0.60

### Physical Properties

Designation of Rolls	Material Code	Barrel hardness (HSD)	Neck hardness (HSD)	Tensile Strength (Mpa)
NiCrMo Chilled Cast Iron Roll (I)	CC I	60-70	32-50	> 150
NiCrMo Chilled Cast Iron Roll (II)	CC II	62-75	35-52	> 150
NiCrMo Chilled Cast Iron Roll (III)	CC III	65-80	32-45	> 350
NiCrMo Chilled Cast Iron Roll (IV)	CC IV	70-85	32-45	> 350

### Microstructure

Designation of Rolls	Material Code	Microstructure
NiCrMo Chilled Cast Iron Roll (I)	IC I	Pearlite + Cementite
NiCrMo Chilled Cast Iron Roll (II)	IC II	Fine Pearlite + Cementite
NiCrMo Chilled Cast Iron Roll (III)	IC III	Fine Pearlite + Cementite
NiCrMo Chilled Cast Iron Roll (IV)	IC IV	Sorbite + Cementite

### Application

Designation of Rolls	Material Code	Microstructure
NiCrMo Chilled Cast Iron Roll (I)	IC I	Section Mill, Bar Mill, Wire-rod mill Narrow Strip Mill, Finishing Stand
NiCrMo Chilled Cast Iron Roll (II)	IC II	Section Mill, Bar Mill, Wire-rod mill Narrow Strip Mill, Finishing Stand
NiCrMo Chilled Cast Iron Roll (III)	IC III	Section Mill, Bar Mill, Wire-rod mill Narrow Strip Mill, Finishing Stand
NiCrMo Chilled Cast Iron Roll (IV)	IC IV	Section Mill, Bar Mill, Wire-rod mill Narrow Strip Mill, Finishing Stand







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## ALLOY SG ROLLS

### Chemical Analysis

Designation of Rolls	Material Code	C	Si	Mn	Ni	Cr	Mo	Mg
CrMo Indefinite chilled SG cast iron rolls	SG II	3.00-3.40	1.40-1.90	0.20-0.80		0.20-0.60	0.20-0.60	≥ 0.04
NiCrMo Indefinite chilled SG cast iron rolls (I)	SG IV	3.00-3.40	1.40-1.90	0.40-0.80	0.50-1.00	0.20-0.60	0.20-0.60	≥ 0.04
NiCrMo Indefinite chilled SG cast iron rolls (II)	SG V	3.00-3.40	1.40-1.90	0.40-0.80	1.10-2.00	0.30-1.00	0.20-0.60	≥ 0.04

### Physical Properties

Designation of Rolls	Material Code	Barrel Hardness (HSD)	Neck Hardness (HSD)	Tensile Strength (Mpa)
CrMo Indefinite chilled SG cast iron rolls	SG II	50-70	35-55	> 320
NiCrMo Indefinite chilled SG cast iron rolls (I)	SG IV	55-70	35-55	> 320
NiCrMo Indefinite chilled SG cast iron rolls (II)	SG V	60-70	35-55	> 320

### Microstructure

Designation of Rolls	Material Code	Microstructure
CrMo Indefinite SG Cast Iron Rolls	SG II	Pearlite + Cementite + Small Graphite
NiCrMo Indefinite Chilled SG Cast Iron Rolls (I)	SG IV	Pearlite + Cementite + Small Graphite
NiCrMo Indefinite Chilled Cast Iron Rolls (II)	SG V	Fine Pearlite + Cementite + Small Graphite

### Application

Designation of Rolls	Material Code	Application
CrMo Indefinite Chilled SG Cast Iron Rolls	SG II	Profile, rod, Wire and Narrow Strip Mill Thick in the Rolling Mill Stand
NiCrMo Indefinite Chilled SG Cast Iron Rolls (I)	SG IV	Profile, rod, Wire and Narrow Strip Mill Thick in the Rolling Mill Stand
NiCrMo Indefinite Chilled SG Cast Iron Rolls (II)	SG V	Profile, rod, Wire and Narrow Strip Mill Thick in the Rolling Mill Stand





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## ALLOY CAST STEEL ROLLS

### Chemical Analysis

Designation of Rolls	Material Code	C	Si	Mn	Ni	Cr	Mo
Zu60CMoMn	AS60	0.55-0.65	0.20-0.40	0.90-1.20		0.80-1.20	0.20-0.45
Zu60CrMoMnNi	AS60 I	0.55-0.65	0.20-0.60	0.50-1.00	0.20-1.50	0.80-1.20	0.20-0.60
Zu65CrNiMo	AS65 I	0.60-0.70	0.20-0.60	0.50-0.80	0.20-0.50	0.80-1.50	0.20-0.45
Zu7oMn	AS70	0.65-0.75	0.20-0.45	0.80-1.40			
Zu7oMn2	AS70 I	0.65-0.75	0.20-0.45	1.40-1.80			
Zu7oMn2Mo	AS70 II	0.65-0.75	0.20-0.45	1.40-1.80			0.20-0.45
Zu75CrMo	AS75	0.70-0.80	0.20-0.45	0.60-0.90		0.75-1.00	0.20-0.45
Zu75CrNiMnMo	AS75 I	0.70-0.80	0.20-0.70	0.70-1.10	≥ 0.20	0.80-1.50	0.20-0.60

Designation of Rolls	Material Code	Barrel hardness (HSD)	Neck hardness (HSD)	Tensile Strength (Mpa)
Zu60CMoMn	As60	32-50	≤ 45	> 650
Zu60CrMoMnNi	AS60 I	35-45	≤ 45	> 750
Zu65CrNiMo	AS65 I	32-45	≤ 45	> 750
Zu7oMn	AS70	32-42	≤ 45	> 650
Zu7oMn2	AS70 I	32-45	≤ 45	> 680
Zu7oMn2Mo	AS70 II	32-45	≤ 45	> 700
Zu75CrMo	AS75	32-50	≤ 45	> 700
Zu75CrNiMnMo	AS75 I	32-50	≤ 45	> 800

### Microstructure

Microstructure of working layer in the barrel : Pearlite or tempered sorbite

### Application

Designation of Rolls	Material Code	Microstructure
Zu60CMoMn	As60	Bar, Wire, Strip, Steel Roughing
Zu60CrMoMnNi	AS60 I	Bar, Wire, Strip, Steel Roughing
Zu65CrNiMo	AS65 I	Bar, Wire, Strip, Steel Roughing
Zu7oMn	AS70	Bar, Wire, Strip, Steel Roughing
Zu7oMn2	AS70 I	Bar, Wire, Strip, Steel Roughing
Zu7oMn2Mo	AS70 II	Bar, Wire, Strip, Steel Roughing
Zu75CrMo	AS75	Bar, Wire, Strip, Steel Rough Rolling, Narrow Steel Support Roller
Zu75CrNiMnMo	AS75 I	Bar, Wire, Strip, Steel Rough Rolling, Narrow Steel Support Roller







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## GRAPHITE STEEL ROLLS

### Chemical Analysis

Designation of Rolls	Material Code	C	Si	Mn	Ni	Cr	Mo
ZuS140CrNiMo	GS140	1.30-1.50	1.30-1.60	0.50-0.80		0.40-0.70	0.20-0.50
ZuS160CrNiMo	GS160	0.80-1.50	0.80-1.50	0.60-1.00	0.20-1.00	0.50-1.50	0.20-0.80
ZuS190CrNiMo	GS190	0.80-1.50	0.80-1.50	0.60-1.00	0.60-1.00	0.50-2.00	0.20-0.80

### Physical Properties

Designation of Rolls	Material Code	Barrel Hardness (HSD)	Neck Hardness (HSD)	Tensile Strength (Mpa)
ZuS140CrNiMo	GS140	36-46	≤ 46	≥ 540
ZuS160CrNiMo	GS160	45-55	≤ 50	≥ 500
ZuS190CrNiMo	GS190	50-65	≤ 50	≥ 450

### Microstructure

Pearlite + Spherical graphite + Carbide
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### Application

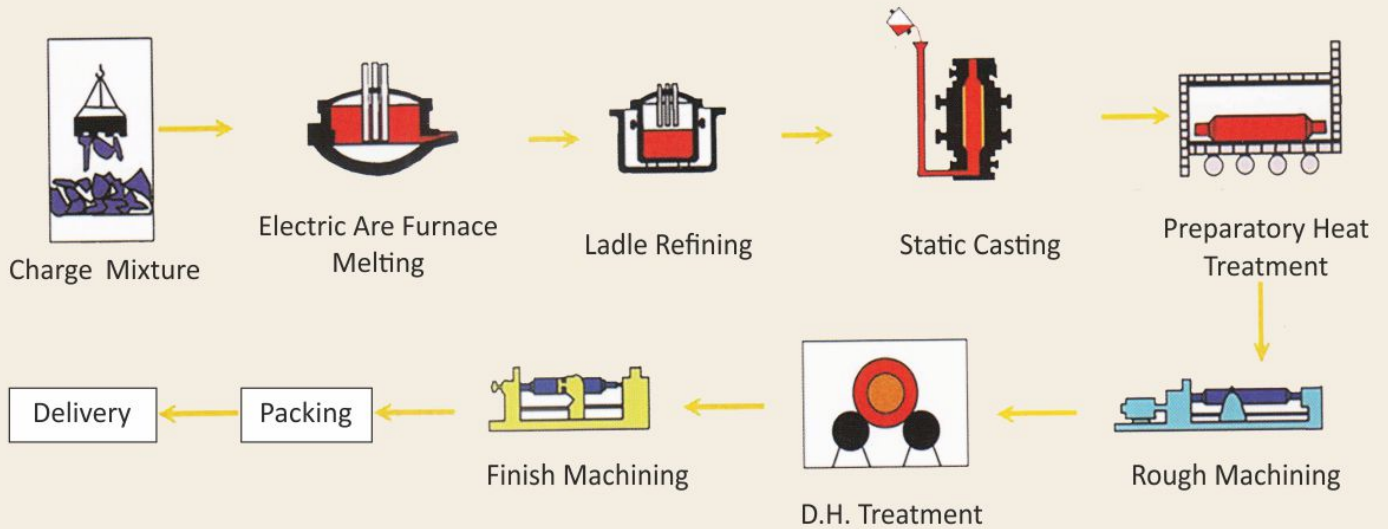
Designation of Rolls	Material Code	Application
ZuS140CrNiMo	GS140	Small and medium Steel, Thick Wire Rod Mill, Hot Strip Rough Roll, Roller Universal Rolling Mill
ZuS160CrNiMo	GS160	Small and medium Steel, Thick Wire Rod Mill, Hot Strip Rough Roll, Roller Universal Rolling Mill
ZuS190CrNiMo	GS190	Small and medium Steel, Thick Wire Rod Mill, Hot Strip Rough Roll, Roller Universal Rolling Mill



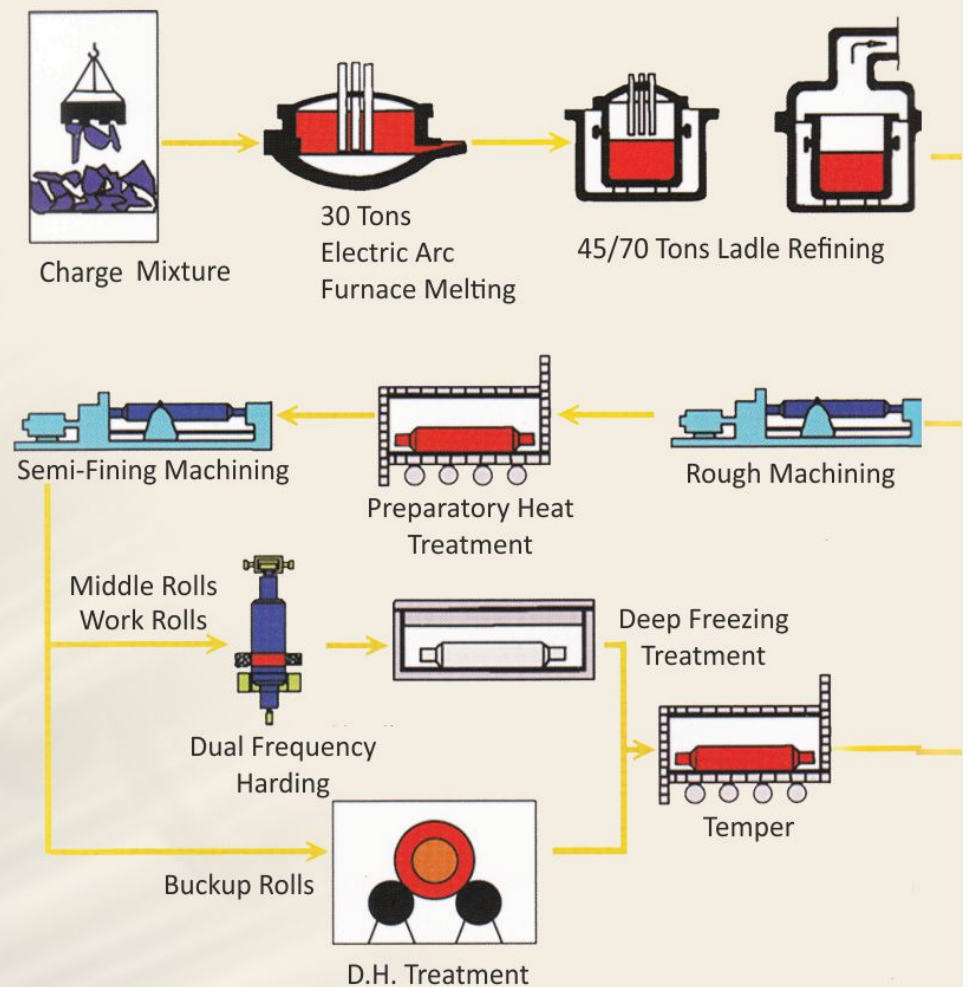


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## STATIC CAST ROLLS



## FORGED ROLLS

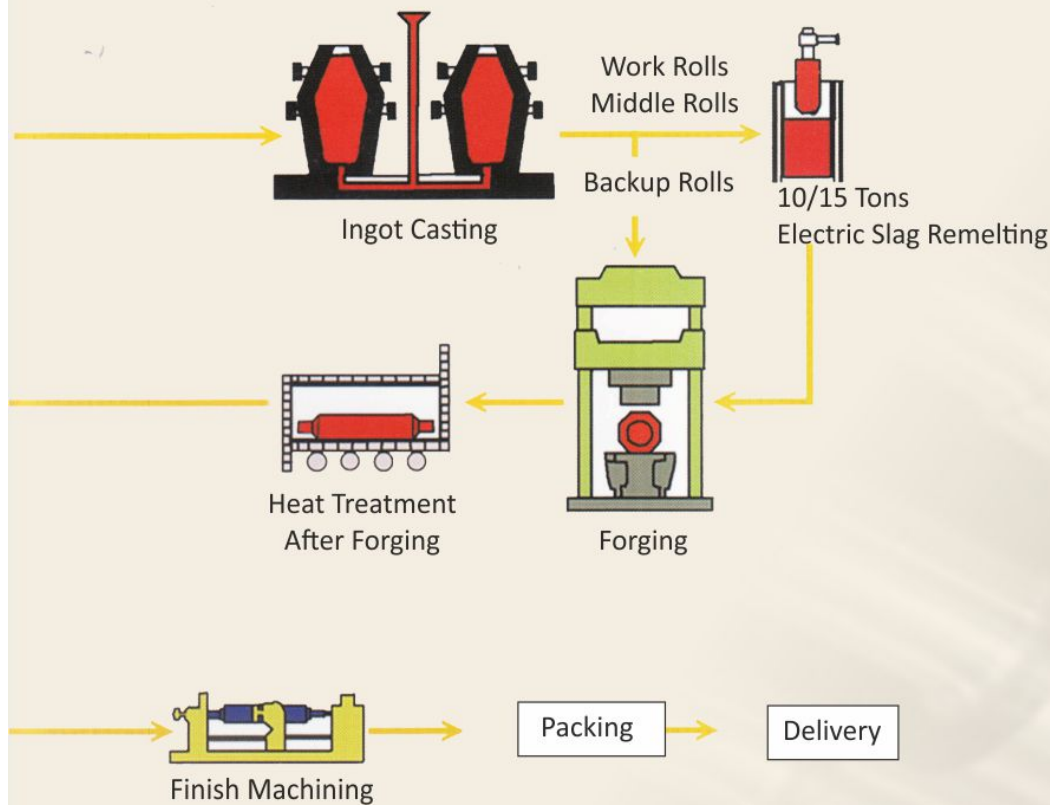
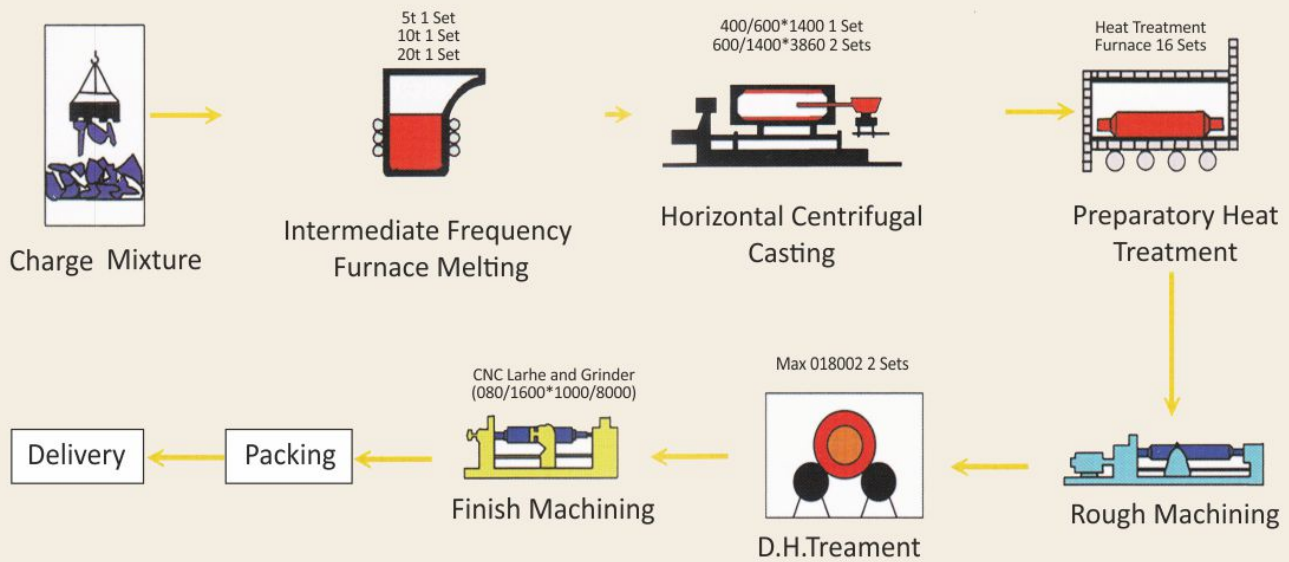






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## CENTRIFUGAL CAST ROLLS





## MAKKAH GROUP

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## ALLIED CONCERN

- Makkah Steel Alloys • Makkah Exports • Deem Hi Tech Rolls