



QUALITY



SERVICE



VALUE



**TUNGSTEN CARBIDE**  
S & MILL ROLLS (INDIA) PRIVATE LIMITED

Tungsten Carbide & Mill Rolls (India) Private Limited

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# CARBIDE RINGS & ROLLS

**Tungsten Carbide & Mill Rolls (India) Private Limited**

# ABOUT US



**Tungsten Carbide & Mill Rolls (India) Private Limited (TCR)** is a leading business house engaged in the manufacturing of Tungsten Carbide products for Rolling Mills required in Steel plants. TCR has tie up with a world largest reputed manufacturer with best technology from USA to get Blank Rolls and then make finished products in a state-of-the-art in-house manufacturing facility located in Moudasoli ,Dhalbhumgarh ,Ghatsila , Jamshed-pur, Jharkhand, India-832303 which is in 15 Acres Land.

Using the advanced technology and the finest materials, our skilled workforce of professionals ensures that every product meets our exacting standards for quality and durability.

TCR is an ISO 9001:2015 certified company and registered under MSME ( UDYM-JH-06-0040894 ) & CIN NO:U24105JH2023PTC021729.

## OUR PRODUCTS:

- Tungsten Carbide product for Rolling Mills required in Steel plants –
- Tungsten Carbide Rolls and Rings,
- Tungsten Carbide Composite Rolls,
- Titanium Carbide Guide Roller,
- SG Iron Rolls , HSS Rolls, Cast Iron Rolls, Adamite Rolls,
- Spare Parts for different kind of Bar & Wire Rod Mill, Section Mills, Plate & Strip Mills, Tube Mills.

With excellent management system and rapid developing business, Tungsten Carbide & Mill Rolls has developed into the one of the best professional suppliers devoting in offering cost-effective products and value-added trading service under make in India in the field of metallurgical engineering.

Tungsten Carbide & Mill Rolls believes not only in high quality products, but also the highest-quality support to customers enabling optimization of their investment and economic growth. Tungsten Carbide & Mill Rolls will always do their best to provide you with product that exceed your expectation and earn your trust. Our success is defined by TCR'S dedication to customer service and happiness of you, the customer.

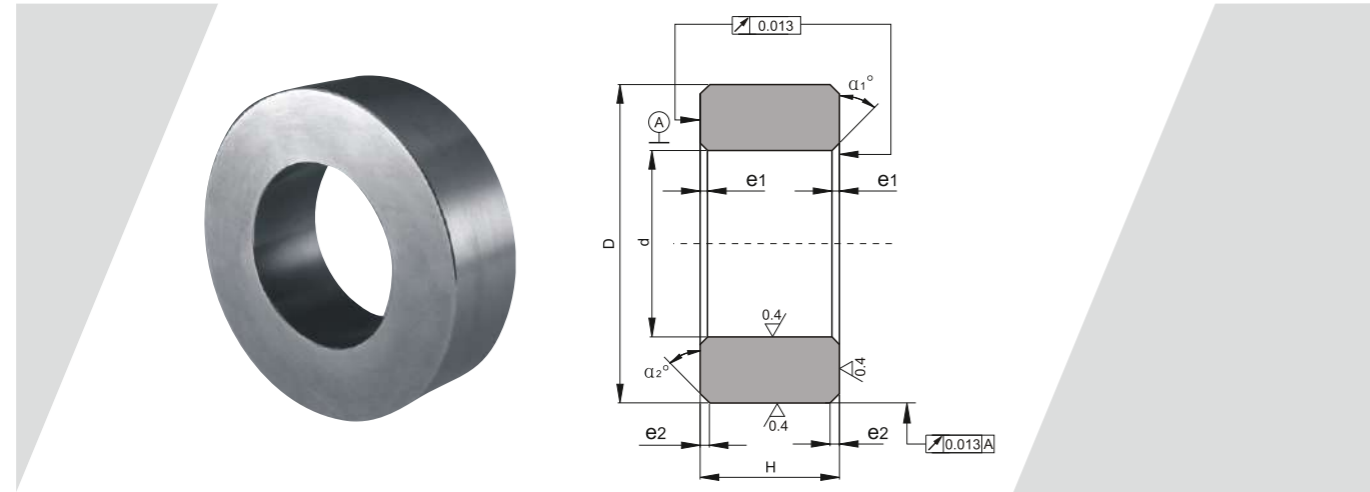
## MAIN GRADE OF CARBIDE ROLL RINGS

Grade	Chemical Composition %	Hardness (HRA)	Density (g/cm3)	Transverse Rupture Strength (MPa)	Compressive Strength (MPa)
<b>Co</b>					
YGH05	6	88.5	14.91	2620	3700
YGH10	8	87.8	14.71	2870	3500
YGH20	10	87	14.47	2710	3500
YGH25	13	86	14.25	2700	3400
YGH30	15	84.8	13.99	2870	3300
YGH40	18	83.8	13.73	2720	3200
YGH45	20	83.6	13.55	2840	3100
YGH55	25	82.1	13.03	2700	3000
YGH60	30	80.8	12.72	2730	3000
<b>Co+Ni+Cr</b>					
YGR20	10	87.2	14.49	2730	3400
YGR25	13	85.6	14.21	2780	3300
YGR30	15	84.2	13.98	2900	3200
YGR40	18	83.3	13.73	2640	3200
YGR45	20	81.7	13.52	2720	3000
YGR55	25	79.5	13.01	2630	2800
YGR60	30	79.1	12.71	2630	2600
<b>Co+Ni+Cr</b>					
PA10	10	86	14.52	2750	3800
PA20	15	84.4	13.95	2910	3700
PA30	20	82	13.47	2760	3300

Note: Physical & mechanical properties are for reference only and their variations are as per national or enterprises standards.



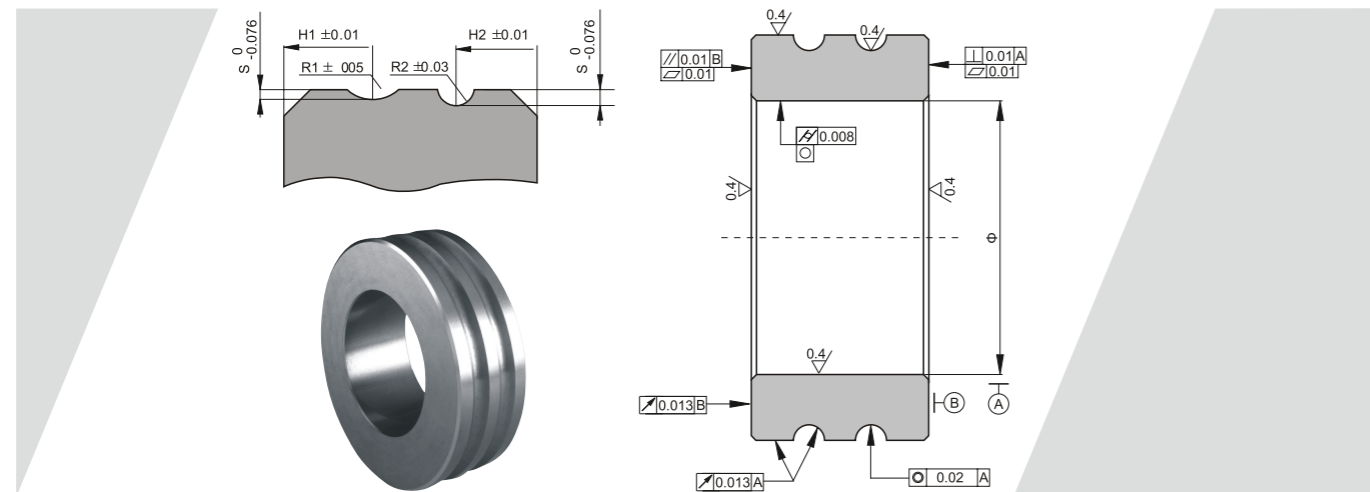
## DIMENSIONS AND PRECISION OF FINISHED CARBIDE ROLL RINGS



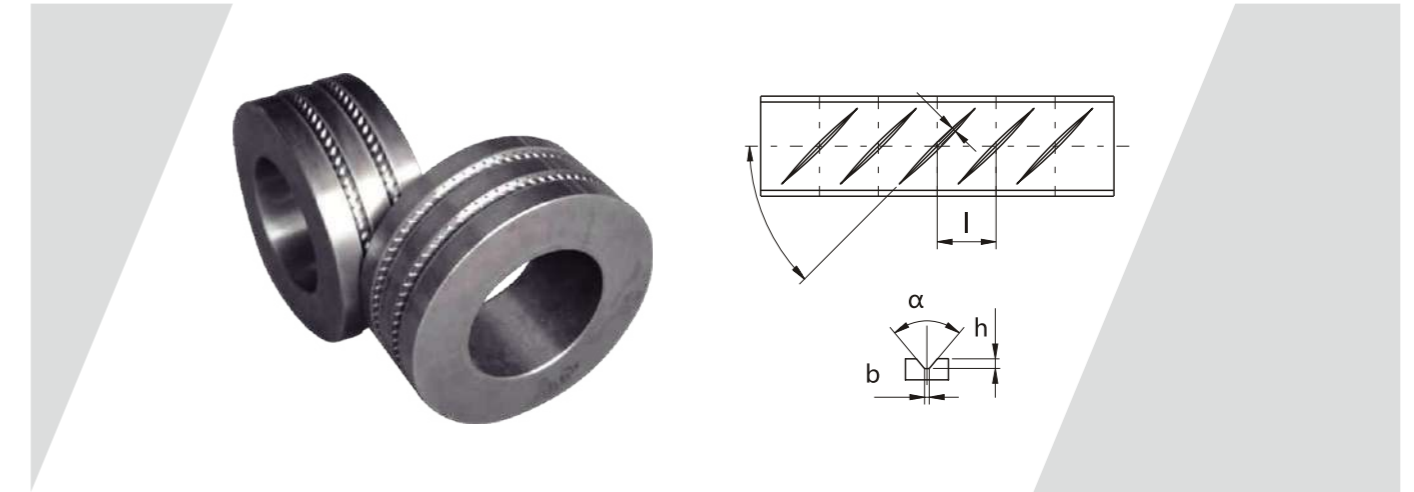
Rang of O.D.	Rang of I.D.	Rang of height (H)
145-330	87-260	45-130

Note : We can supply them according to the drawings provided by customers

## TECHNICAL SPECIFICATIONS OF FINISHED CARBIDE ROLL RINGS



## ROLL RINGS FOR HIGH SPEED ROLLING OF RIBBED STEEL BARS



Rang of O.D.	Rang of I.D.	Rang of height (H)
145-330	87-260	45-130

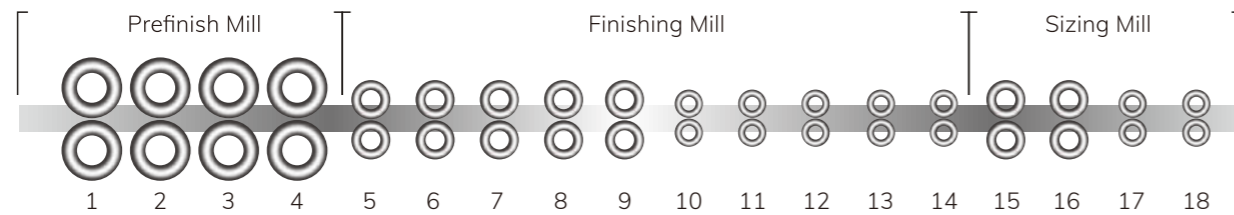
## TOLERANCES ALLOWABLE FOR THE O.D., I.D. AND HEIGHT OF ROLL RINGS

Precision class	I	II	III	IV	Special requirements
O.D. (±)	0.02	0.05	0.10	0.15	
I.D. (±)	IT 5	IT 6	IT 7	IT 8	
Height(-)	0.03	0.1	0.20	0.5	

# OPERATIONAL REQUIREMENTS OF CEMENTED CARBIDE ROLL RINGS

Cemented carbide roll is a kind of tool material which consists of tungsten carbide and cobalt with high hardness and wear resistance .To take advantage of high wear resistance,long life and high efficiency of cemented carbide roll rings during the high speed rolling, attention should be paid as follows when purchasing and using cemented carbide roll rings.

## 1 GRADES SELECTION



YGH60,YGR60	●	●																	
YGH55,YGR55	●	●	●	●	○	○													
YGH45,YGR45					●	●	○	○	○	○									
YGH40,YGR40					○	○	●	●	●	●	○	○	○						
YGH30,YGR30							○	○	○	●	●	●	●	●	●				
YGH25,YGR25										●	●	●	○	○	●	●			
YGH20,YGR20											●	●	○	○	●	●			

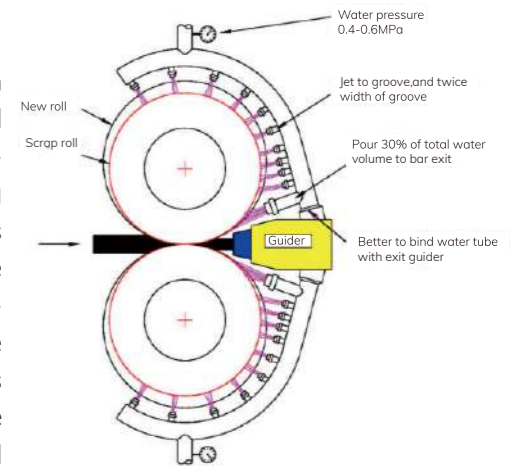
- First choice
- Alternate choice

## 2 ROLL RINGS INSTALLATION

Sleeve mounting and assembly of roll rings should be strictly performed according to the precision required by the design process . Proper fit is needed for the roll rings,roll mandrel for stands and conical sleeves,which can not be over tight or loose .When it is too tight ,the roll rings are in a tensile state and more fluctuation of rolling force will make the roll rings break. When it is too loose,it causes the roll rings . roll mandrel and conical sleeve to slide relatively during rolling which scratches conical sleeves and roll mandrel resulting in cracks. Before running the mill make a check if the roll ring meets the needs and the roll ring, the assembling faces of the conical sleeve and the roll mandrel need to be cleaned. It is forbidden to knock at the roll rings with a hammer or other hard materials when running the mill. It is forbidden for the roll rings to impact each other during the transportation and installation to prevent roll rings from damage.

## 3 COOLING AND COOLING WATER QUALITY

Cooling is intended to reduce the influence on the thermal corrosion of roll rings , fatigue and stress during miling. It can prevent the roll rings from cracking and slow down the diffusion of cracks , prolonging the life time of grooves .It plays an important role in optimizing the performances of roll rings .The reference data for cooling are as follows : The temperature of cooling water is below 25°C, pressure of cooling water is 4-6 bar with a water volume of 24-30m<sup>3</sup>/hr/stand.The water is jetted in a radial direction and the angle between the water jet and the rotating direction of roll rings is 15-30 degrees. The width of the water column is 2 times that of the groove and the water should be jetted directly into the grooves and the water should not be scattering or misty.



### WATER QUALITY REQUIRMENT

- For YGH series : Cooling water : 7.2 ≤ PH < 8
- For YGR and PA series : PH ≥ 8 or weak acid water of PH < 7.2
- The content of solid particles in the water < 15 milligram/Liter

## 4 REASONABLE ROLLED QUANTILY

During rolling microcracks in grooves can not be avoided, they need to be reground when they are at a certain depth (normally controlled at 0.2mm). Excess rolling causes the depth of microcracks to extend rapidly and higher risk of rolls crushing, which should be prevented. Ranges of reasonable Rolled tonnage are recommended as below:

- Stands of pre-finishing mill: 3,500-4,000 tons
- 1-2 Stands of finishing mill: 3,000-4,000 tons
- 3-4 Stands of finishing mill: 3,000-4,000 tons
- 5-6 Stands of finishing mill: 2,000-3,000 tons
- 7-8 Stands of finishing mill: 2,000-3,000 tons
- 9-10 Stands of finishing mill: 1,000-1,800 tons
- Stands for reducing and sizing mill: 600-1,200 tons

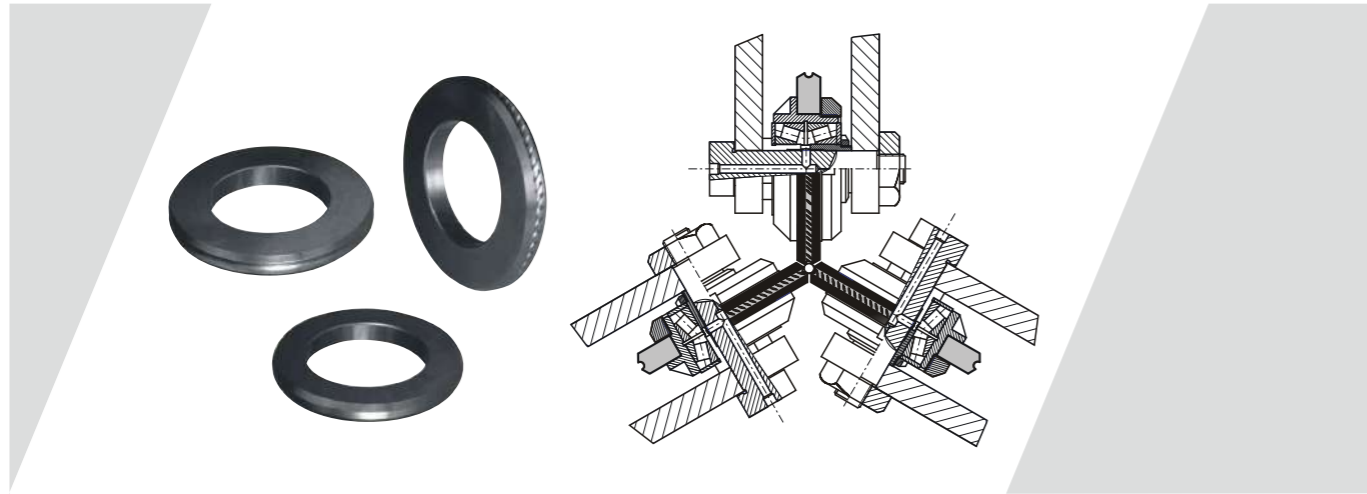
## 5 REGRINDING OF GROOVES

Microcracks will occur after rolling for a certain period of time. And when the microcracks extend to 0.2mm , regrinding is needed. Otherwise the microcracks will extend more rapidly during the next rolling and probably make the roll ring crack. The recommended amount of regrinding after normal rolling is as follows :

- Roll for stands 9-10 of finishing mill (0.4-0.6) mm
- Roll for stands 1-8 of finishing mill (0.7-1.2) mm
- Roll for stands of pre-finishing mill (1.2-2.0) mm



## THREE DIMENSIONAL CARBIDE ROLL RINGS FOR COLD ROLLING OF RIBBED STEEL BARS



### MAIN PERFORMANCE INDICATORS

Grade	Chemical composition		Mechanical properties			Recommended applications
	WC %	Co %	Density g/cm <sup>3</sup>	Hardness HRA	Transverse rupture strength (Sample B) Mpa	
YGH30	85	15	13.99	84.8	2870	Cold rolling ribbed steel bars

### APPLICATION REQUIREMENT

- Any compact and knock on roll rings is strictly prohibited .
- When installing the whole assembly of roll rings, the clearance of the bearings should be on the tighter side.
- The precision of rotation of the whole assembly (circular runout and end runout) should be kept within ±0.05mm.
- The fitting of the whole assembly and the roll rings shall be a transitional fitting and fastened.
- The roll rings should not be cooled by water or oil water emulsion.
- The joints of the pipes in the internal cooling system should not be leaky and it is advisable that no inner cooling is applied.

## CEMENTED CARBIDE ROLL RINGS FOR HOT ROLLING OF SEAMLESS STEEL TUBES



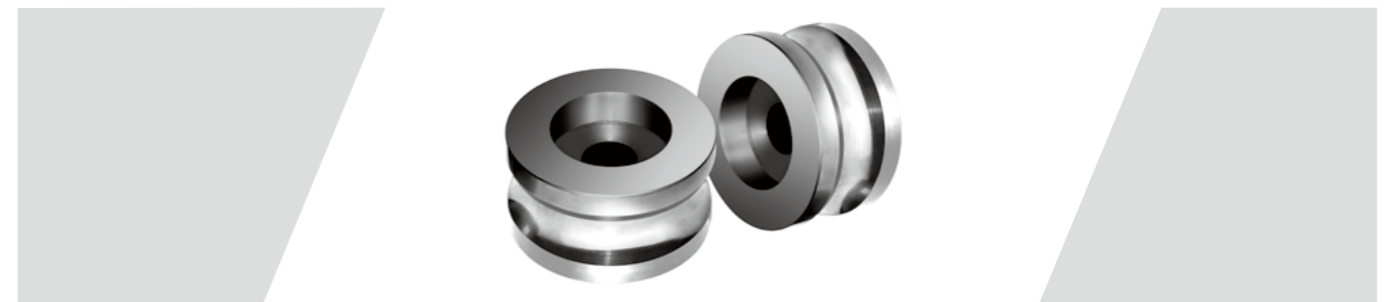
The lifetime of cemented carbide roll rings is 50-80 times that of conventional roll rings when they are used at tension tube, and the surface quality and dimensional precision is substantially improved. Based on the conditions of tension tube reducing machines (rolling force, speed, tube diameter) what is recommended is the use of either integrated roll rings or composite roll rings, achieving a good performance -price ratio.

Optional cemented carbide grades: YGR55 YGR60 For properties see the table above.

### INSTALLATION AND APPLICATIONS OF CEMENTED CARBIDE ROLL RINGS

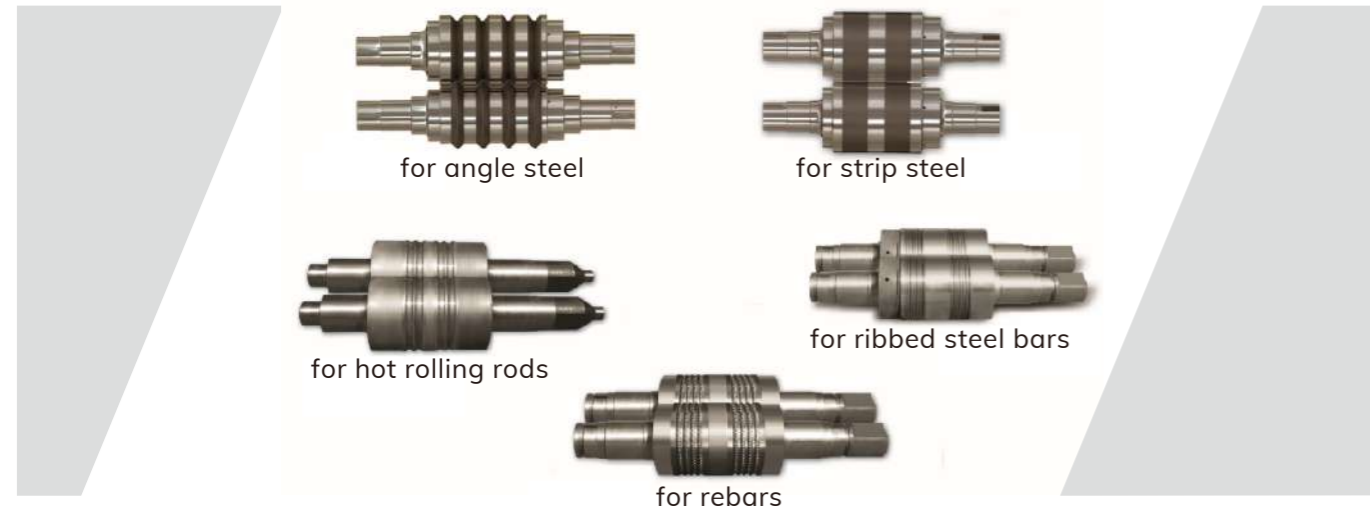
- A small clearance fit or transition fit is recommended for roll rings and roll shafts to avoid slipping between roll rings and roll shafts.
- During assembling the preheating temperature for roll rings shall not exceed 300°C. Otherwise it will reduce the performances of roll rings.
- Water nozzles shall be installed in a proper position and run smoothly.
- As the operating lifetime of roll rings is very long, The inspection of the stands on-time should be done and lubricant oil should be replenished after each rolling operation.
- A correct cooling can reduce the wear of roll rings and increase the lifetime of roll rings, cutting down the times of roll changes and keeping the surface quality of rolled material in a good state as well. The water pressure required is 0.2-0.4Mpa and the water flow rate is 20-40m<sup>3</sup>/hr.

## TITANIUM CARBIDE GUIDE ROLLER



Grade	Chemical composition	Mechanical properties		
		Hardness HRA	TRS Mpa	Density g/cm <sup>3</sup>
GT35	Fe+TiC	86.5	1450	6.43

# COMPOSITE CEMENTED CARBIDE ROLL RINGS FOR HOT ROLLING RODS AND RIBBED STEEL BARS



Installed on the front stands of machines for rolling ribbed steel bars and rods .composite roll rings can substantially reduce the times of groove changes and roll changes, reduce labor intensity, increase productivity, improve surface quality and yield of rolled material,thus achieving outstanding economic benefits.

- With hydraulic nuts locking devices and in-feed of oil with pressure of 100-200 Mpa, the hydraulic nuts create an axial pretighening force of 500-1500KN and fasten the cemented carbide roll rings to the mother shafts. The devices are practical in use and reliable and they can insure higher performances of composite cemented carbide roll rings under the protection of a proper prestress.
- Various composite cemented carbide roll rings for hot rolling ribbed steel bar and rods.
- Services are provided such as composite rolls design , groove machining and thread processing.
- Various compatible tools can be provided for machining composite cemented carbide roll rings.

## CARBIDE COMPOSITE ROLLS FOR HOT ROLLING RODS AND REBAR

Stand	Single rolling	2 slit rolling	3 slit rolling	Recommend materials
K1				Cemented carbide
K2				Cemented carbide
K4				Cemented carbide

We can design and manufacture single-line rolling, two-slit rolling, three-slit rolling and combined Carbide rolls according to customer Rolling line. The products include wire, bar, rebar, angle bar.

The high output of the cemented carbide composite roll can effectively reduce the times of roll changes and increase the unit output. The products are produced have the characteristics of good quality on the surface, small deformation, high negative tolerance rate and finished product rate.

# CARBIDE RINGS & ROLLS GRADES COMPARISONS

TCR INDIA	Binder %	Kennametal (USA)	Sandvik (Sweden)	TaeguTec (Korea)
<b>CoNiCr</b>				
YGR20/PA10	10		H10C	T11L
YGR25	13	BN45		T14L
YGR30/PA20	15	BN55	C15C	T15M
YGR40	18			T17L
YGR45/PA30	20	BN65	C20C	T20M
YGR55	25	RCV5	C25C	T27M
YGR60	30	RCV6	C30T	T30M
<b>Co</b>				
YGH05	6		H6T	T06S
YGH10	8			
YGH20	10	MN04	H10T	T10S
YGH25	13	MN1	H13C	
YGH30	15	MN2	H15C	T15S
YGH40	18			
YGH45	20	MN4	H20C	T20S
YGH55	25	MN5	H25P	T25S
YGH60	30	MN6	H30P	T30S