



中国驰名商标



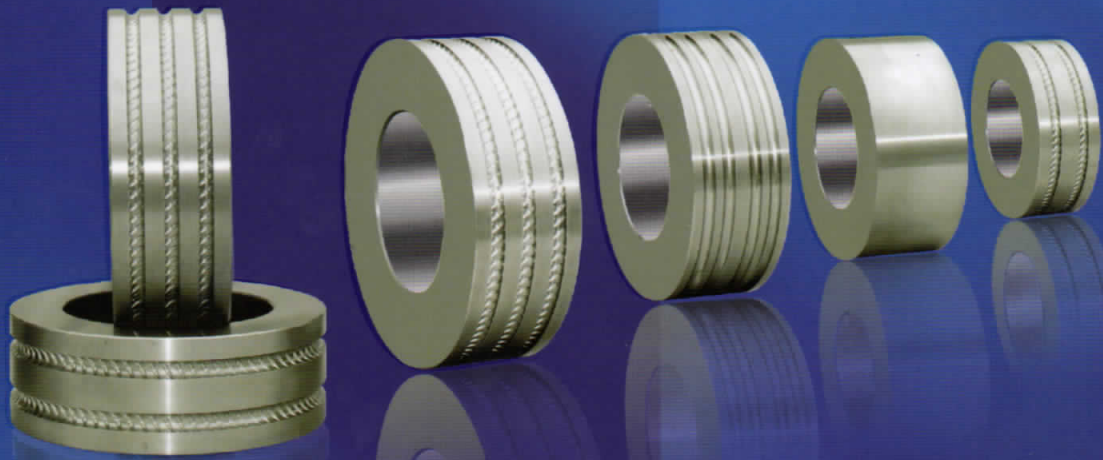
中国名牌

卓越品质

EXCELLENT QUALITY

自硬长城

ZIGONG "GREAT WALL"



硬质合金辊环

EMENTED CARBIDE ROLLS



中国五金

自贡硬质合金有限责任公司成都分公司

ZIGONG CEMENTED CARBIDE CO., LTD. CHENGDU BRANCH

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» “长城”牌辊环产品

"Great wall" cemented carbide rolls

我公司辊环生产线是当今世界一流的生产线。采用代表世界先进水平的石蜡工艺、数控配料系统和喷雾干燥技术，保证原料的高品质；拥有美国阿尔法精密压机、美国和德国压力烧结炉以及瑞典ASEA热等静压机等当今世界硬质合金生产的顶尖设备，能生产组织结构及性能更加优良的各种规格辊环产品。引进的德国万特辊环专用磨床和开槽成型专用修整机，为精磨辊环的尺寸精度提供了保证。整条生产线还多处采用本公司拥有自主知识产权的核心技术，建立了高水平的Q/62071126-8 J1801-2010和Q/62071126-8 K003-2009辊环内控标准。

公司产品规格齐全，辊环材质牌号完善，共有ZY和ZYA两大系列20多个牌号。当前我公司辊环最大外径可做到500mm，厚度最大可达250mm，并可根据客户的要求专门订制适应特殊要求的整体及复合硬质合金辊环。

先进的工艺，一流的装备，精密的加工制作，严格的质量检查，领先的开发设计，充分保证了“长城”牌辊环产品的可靠、稳定和高质量。

The roll production line in our company has adopted the up-to-date paraffine process combining with the digital mixing-system and spray drying technology to ensure the quality of the grade powder for the cemented carbide rolls. Equipped with the 500-tons and 1000-tons alpha presses imported from USA, Sinter-HIP furnaces from USA and Germany, and HIP furnace from Sweden. This line is able to produce all kinds of rolls blanks with improved microstructure and properties. By using Wendt Special Grinding Machines and Groove Grinding Machines from Germany, the dimensional precision of finished rolls thus are guaranteed. Both of our own proprietary technical know-how in manufacturing cemented carbide rolls and effective quality stands Q/62071126-8J1801-2010 and Q/62071126-8K003-2009, ensures the top quality of our products.

Cemented carbide rolls of various specifications ranged in two materials series of ZY and ZY-A in totally more than 20 grades are available in our company. The maximal outside diameter of our cemented carbide rolls can be reached to 500mm and the maximal thickness to 250mm. Specialized rolls are also available upon customers requests.



喷雾干燥塔用于生产高品质原料
Spray dryer for manufacturing high quality materials



刻痕机用于螺纹滚环精密加工
Special machine for processing high precision thread roll-rings



进口专用磨床用于高精度滚环的加工
Introduced special grinding machine for processing high precision roll-rings

一流的装备
Best equipments

先进的工艺
Advanced technology

优质的产品
Excellent products



500吨阿尔法压机用于滚环的精密成型
ALPHA press for precision forming of roll-rings



压力烧结炉能极大地改善合金的组织结构
Sinter HIP-can improve the microstructure of the cemented carbide by eliminating the porosity



» 高速线材轧机用硬质合金辊环

Cemented carbide roll-rings for high-speed wire rod mill

高速线材轧机用硬质合金辊环具有极高的耐磨损性能，同时具有优良的抗冲击及抗热疲劳韧性。我公司生产的硬质合金辊环具有如下显著特性：

Cemented carbide roll-rings used on high-speed wire rod mill we produced has excellent wear resistance, high impact resistance and good anti-fatigue toughness. They are distinguished from conventional carbide rolls by the following characteristics:

- ★ 适用于轧制速度超过100m/s的高速线材轧制，不易出现裂纹、碎辊、掉肉等问题；
- ★ 既可用于普通钢，又可用于合金钢的高速线材轧制；
- ★ 单槽过钢量高，下线后轧槽修磨量少；
- ★ 适用于高速低温轧制工艺。
- ★ Suitable for high speed wire rolling speed higher than 100m/s, without problems such as cracks, broken and peeling-off.
- ★ Suitable for the high-speed wire rolling of both common carbon steel and alloyed steels.
- ★ Longer service life time, Less downtime and regrinding.
- ★ Suitable for high speed, low temperature rolling process.

» 材质牌号特性一览表 Grades and properties

我公司设计生产的ZY、ZY-A两大系列20多个材质牌号，能广泛地满足不同用户不同的轧制需求。

ZY系列是粘结剂中含有耐酸腐蚀较强的Ni、Cr金属成分的材质，既适用于冷却水PH \geq 7.2，也适用于PH $<$ 7.2的冷却水质。

根据用户的特殊工艺要求或实际使用条件，我公司还可以提供ZY-A材质牌号或开发专用牌号。ZY-A系列牌号材质硬度高、韧性好，抗热裂纹性能优良。适用于轧制力大的工况条件，但要求PH \geq 7.2的碱性冷却水质。

The materials of ZY and ZY-A serials are able to satisfy customers' different requirements.

The ZY serial grade contain acid corrosion-proof metal elements Ni and Cr in the binder, so that they are suitable for the cooling water of both that PH \geq 7.2 and PH $<$ 7.2.

According to the customers' special requirements and actual working condition, we can offer ZY-A grades, and also develop the special grades for extra use. The grades of ZY-A serials have the properties of high hardness, good toughness and excellent thermal crack resistance, and are suitable for the use in the large force condition, but the cooling water should be alkaline with PH \geq 7.2.





牌号 Grades	粘结剂含量 Binder (wt.%)	WC晶粒度 WC Grain-Size	物理性能 Physical Properties			机械性能 Mechanical Properties		
			*密度 *Density 20°C g/cm ³	导热率 Thermal Conductivity W/(m.K)	平均热膨胀系数 Average Thermal Expansion Coefficient 10 ⁻⁶ /K	*硬度 *Hardness 20°C (HRA)	*抗弯强度 *Transverse Rupture Strength TRS 20°C Mpa	抗压强度 Compressive Strength ≥Mpa
ZY27T	30	超粗Extra-Coarse	12.73	60	5.8~7.0	79.0	2560	2700
ZY27	30	中粗Medium-Coarse	12.65	60	5.8~7.0	79.0	2626	2800
ZY26	27.5	中粗Medium-Coarse	12.85	65	5.6~6.8	79.8	2653	2800
ZY28T	25	超粗Extra-Coarse	13.00	70	5.5~6.5	80.3	2750	2800
ZY28	25	中粗Medium-Coarse	13.04	70	5.5~6.5	80.8	2625	3000
ZY29	22	粗Coarse	13.36	70	5.5~6.5	81.8	2840	3000
ZY30	20	粗Coarse	13.48	80	5.2~6.0	82.3	2742	3200
ZY31	18	粗Coarse	13.68	90	5.0~5.8	83.3	2802	3200
ZY32	16	粗Coarse	13.77	90	5.0~5.8	83.8	2872	3200
ZY32C	17.5	粗Coarse	13.66	90	5.0~5.8	84.5	2856	3100
ZY33	15	粗Coarse	13.98	100	5.0~5.8	84.5	2872	3200
ZY34	13	粗Coarse	14.17	100	4.8~5.6	85.5	2875	3400
ZY35	10	粗Coarse	14.43	100	4.8~5.6	86.5	2753	3500
ZY36	8	超粗Extra-Coarse	14.69	110	4.5~5.4	86.8	2406	4000
ZY37	6	超粗Extra-Coarse	14.87	110	4.5~5.4	87.5	2358	4100
ZY27A	30	中粗Medium-Coarse	12.70	60	5.8~7.0	79.5	2780	2900
ZY28A	25	中粗Medium-Coarse	13.15	70	5.5~6.5	81.2	2675	3000
ZY29A	22	粗Coarse	13.38	70	5.5~6.5	82.2	2750	3000
ZY30A	20	粗Coarse	13.50	80	5.2~6.0	84.0	2586	3100
ZY31A	18	粗Coarse	13.65	90	5.0~5.8	84.0	2806	3100
ZY33A	15	粗Coarse	13.92	90	5.0~5.8	85.5	2790	3200
ZY35A	10	粗Coarse	14.45	100	4.8~5.6	86.8	2456	3500
ZY36A	8	超粗Extra-Coarse	14.69	110	4.8~5.6	87.0	2460	4000
ZY37A	6	超粗Extra-Coarse	14.87	110	4.5~5.5	88.0	2386	4100

*实测典型值 typical value



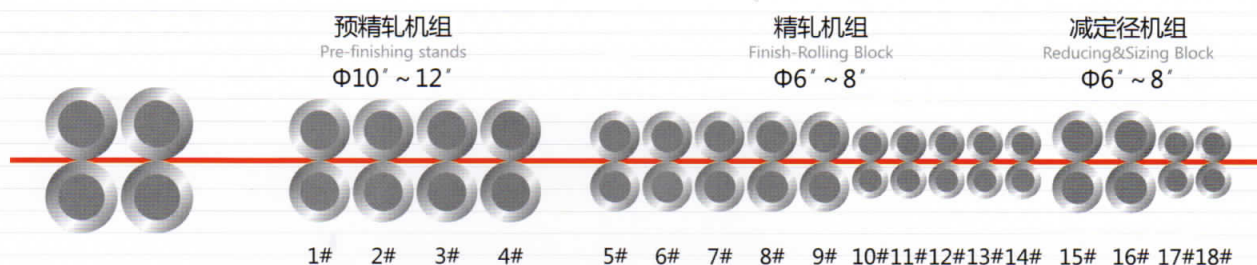
» 牌号用途推荐
Recommended applications

牌号 Grades	推荐用途 Recommended applications
ZY37 ZY37A	硬度最高，耐磨性最好，导热率高，适用于普线、硬线轧制中高速精轧机组成品机架和定径机组。 Highest hardness and thermal conductivity, best wear resistance and good thermal fatigue and shock resistance. Used in the last two stands of high-speed finish-rolling block and sizing stands.
ZY36 ZY36A	硬度高，耐磨性较好，同时有较好的抗冲击韧性，适用于普线、硬线轧制中高速精轧机组成品机架和定径机组。 High hardness, excellent wear resistance, good impact resistance. Used in the last two stands of high-speed finish-rolling block and sizing stands.
ZY35 ZY35A	硬度高，耐磨性较好，同时有较好的抗冲击韧性，适用于普线、硬线轧制中高速精轧机组成品机架和定径机组。 High hardness, excellent wear resistance, good impact resistance. Used in the last two stands of high-speed finish-rolling block or sizing stands.
ZY34 ZY34A	硬度高，耐磨性好，同时有较好的抗冲击韧性，适用于普线、硬线轧制中高速精轧机组成品机架和定径机组。 High hardness, good wear and impact resistance. Used in the last two stands of high-speed finish-rolling block or sizing stands.
ZY33 ZY33A	耐磨性和抗冲击性适中，通用性较好，适用于普线、硬线轧制中高速精轧机组后部机架。 Moderate wear resistance and impact resistance, good for general purpose use. Used in the rear stands of high-speed wire rod mill.
ZY32	耐磨性和抗冲击性适中，通用性较好，适用于普线、硬线轧制中高速精轧机组后部机架。 Moderate wear resistance and impact resistance, good for general purpose use. Used in the rear stands of high-speed wire rod mill.
ZY32C	耐磨性和抗冲击性适中，通用性好，适用于普线、硬线轧制中高速精轧机组。 Moderate wear resistance and impact resistance, good for general purpose use. Used in the finish rolling stands of high-speed wire rod mill.
ZY31 ZY31A	耐磨性较好，抗冲击性较强，适用于普线、硬线轧制中前部机架；也适用于轧制工况不稳定的精轧机组后部机架。 Good wear resistance and better impact resistance. Used in the front stands of high-speed wire rod mill. Also used in the rear stands of the finish rolling under unstable operation.
ZY30 ZY30A	具有适中的韧性和抗热裂纹能力，适用于普线、硬线轧制中高速精轧机组第1、2机架和减径机组；也适用于轧制工况不稳定的精轧机组前部机架。 Moderate toughness and thermal cracking resistance. Used in the first and second or reducing stands of finish rolling. Also used in the front stands of the finish rolling under unstable operation.
ZY29 ZY29A	具有较好的韧性和抗热裂纹能力，适用于普线、硬线轧制中高速精轧机组第1、2机架和减径机组；也可用作螺纹辊。 Good toughness and thermal cracking resistance. Used in the first and second or reducing stands of finish rolling. And also used for rolling rebar.
ZY28 ZY28A	具有良好的韧性和抗热裂纹能力，适用于高速线材预精轧后部机架，也适用于工况稳定的预精轧前部机架，也可用作螺纹辊。 Good toughness and thermal cracking resistance. Used in the pre-finish rolling stands, and also for rolling rebar.
ZY26	具有良好的韧性和抗热裂纹能力，适用于高速线材预精轧后部机架，也适用于工况稳定的预精轧前部机架，也可用作螺纹辊。 Good toughness and thermal cracking resistance. Used in the pre-finish rolling stands, and also for rolling rebar.
ZY27 ZY27A	具有很高的韧性和抗热裂纹能力，适用于高速线材预精轧前部机架，也适用于工况不稳定的预精轧后部机架，也可用作螺纹辊。 Excellent toughness and impact resistance, good thermal cracking resistance. Used in the pre-finish rolling stands, and also for rolling rebar.
ZY27T	韧性最好，抗冲击性最高，适用于热轧螺纹钢棒、线材和小型钢轧机成品机架，也适用于高速线材中轧机组。 Best toughness and impact resistance. Used in the finish rolling stands of wire rod mill and bar mill for rolling deformed bar and rebar. Also used in the intermediate stands of high speed wire rod mill.

各机架辊环材质牌号使用推荐 Recommended grades for each stand

硬质合金辊环材质的选择要根据实际使用时的工况条件进行。我公司将在对用户的轧机参数、机组的稳定性、受力情况、冷却水、轧件温度及轧制钢种等情况进行综合评估后,为用户提供最适宜的牌号配置。一般而言,对于机组震动大,压下量多的机架应选用粘结剂含量高、强韧性好的牌号,而对于速度快、工作稳定、压下量少的机架则应选择粘结剂含量低,硬度高,耐磨性好的牌号。

It must be correctly selected according to the actual work condition. We will recommend the proper grades to our customers after detailed studying all of the rolling parameters provided by them, such as equipment type, stability, rolling load, cooling condition, processing temperature and steel grades etc.. Generally, the grade of high binder content with good strength and toughness should be chosen when the mill aggregate shocked heavy and the pressing down amount is very big, contrary, the grade of low binder content with high hardness and good wear resistance should be chosen when the mill aggregate is working stably with small pressing down amount in high rolling speed.



牌 号 Grades	预精轧机组 Pre-finishing stands				精轧机组 Finish-Rolling Block										减定径机组 Reducing&Sizing Block			
	1#	2#	3#	4#	5#	6#	7#	8#	9#	10#	11#	12#	13#	14#	15#	16#	17#	18#
ZY27/ZY27A	■	■	■	■														
ZY26	▲	▲	▲	▲														
ZY28/ZY28A	●	●	●	●														
ZY29/ZY29A					■	■	■	■										
ZY30/ZY30A					▲	▲	▲	▲							■	■		
ZY31/ZY31A					●	●	●	●							▲	▲		
ZY32									■	■	■	■			●	●		
ZY33/ZY33A									▲	▲	▲	▲	■	■				
ZY34/ZY34A									●	●	●	●	▲	▲				
ZY35/ZY35A													●	●			■	■
ZY36/ZY36A																	▲	▲
ZY37/ZY37A																	●	●

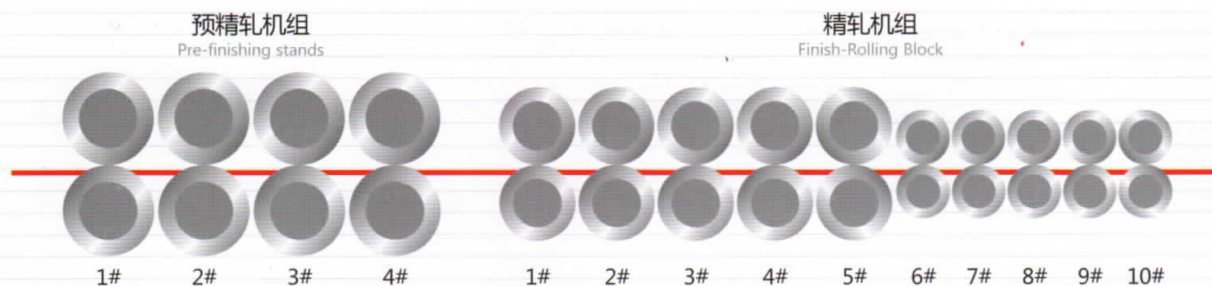
※ 注： ● 轧制工况良好时的牌号推荐配置 Recommended when work condition is good ;
▲ 轧制工况较好时的牌号推荐配置 Recommended when work condition is comparatively good;
■ 轧制工况较差时的牌号推荐配置 Recommended when work condition is bad.



应用举例 Examples

★ 精轧为国产仿Morgan五代轧机，预精轧和精轧机按4+10配置，终轧速度90~105m/s，主要轧制钢种为普碳钢，终轧温度1000~1100℃，硬质合金辊环牌号配置如下：

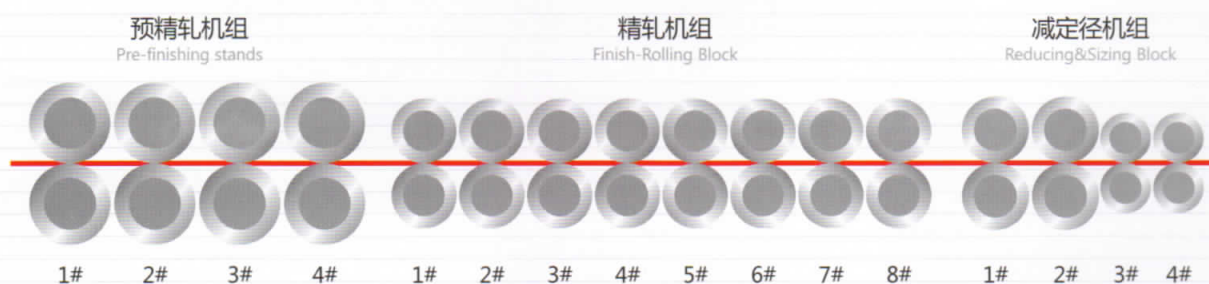
A Chinese steel factory employs Morgan V Mill aggregate consisted of 4 pre-finishing stands and 10 finish rolling stands with final rolling speed in 90~105m/s to roll the common carbon steel in a temperature of 1000~1100℃. The grades of roll-rings should be selected in a chosen as follows;



机架 Stands	预精轧机组 Pre-finishing Mill				精轧机组 Finish-rolling block									
	1#	2#	3#	4#	1#	2#	3#	4#	5#	6#	7#	8#	9#	10#
牌号配置 Grades	ZY28				ZY30		ZY31			ZY33			ZY35	

★ 精轧为进口Morgan轧机，预精轧和精轧机按4+8+4配置，终轧速度105~120m/s，主要轧制钢种为品种钢，硬质合金辊环牌号配置如下：

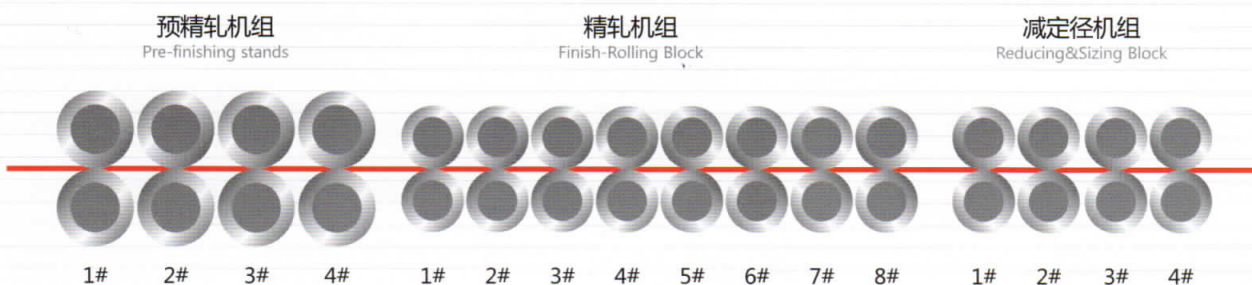
A Chinese steel company employs imported Morgan Mill aggregate consisted of pre-finishing stands and finish rolling stands plus reducing and sizing stands in 4+8+4, final rolling speed: 105~120m/s, mainly rolling high carbon steel and alloyed steel. The grades may be selected as follows;



机架 Stands	预精轧机组 Pre-finishing Mill				精轧机组 Finish-rolling block								减定径机组 Reducing and sizing block			
	1#	2#	3#	4#	1#	2#	3#	4#	5#	6#	7#	8#	1#	2#	3#	4#
牌号配置 Grades	ZY27				ZY30				ZY33				ZY30		ZY35	

★ 精轧为进口Danieli轧机，预精轧和精轧机按4+8+4配置，终轧速度105~120m/s，主要轧制钢种为硬线钢，终轧温度800~850℃，硬质合金辊环牌号配置如下：

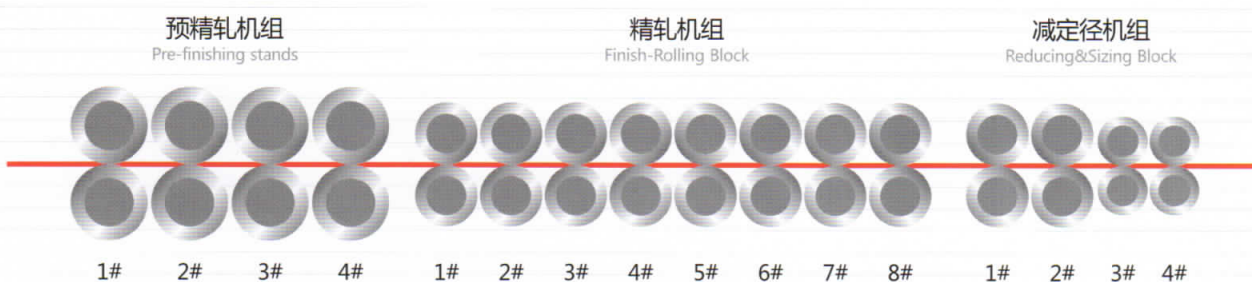
A Chinese steel employs imported Danieli Mill aggregate with 4 pre-finishing stands, 8 finishing stands and 4 TMB, final rolling speed 105~120 m/s, mainly rolling high carbon steel and low alloyed steel, final rolling temperature : 800~850℃, and the grades can be chosen as follows;



机架 Stands	预精轧机组 Pre-finishing Mill				精轧机组 Finish-rolling block								减定径机组 Reducing and sizing block			
	1#	2#	3#	4#	1#	2#	3#	4#	5#	6#	7#	8#	1#	2#	3#	4#
牌号配置 Grades	ZY27				ZY30				ZY33				ZY32		ZY36	

★ 精轧机为进口Danieli轧机，预精轧和精轧机按4+8+4配置，终轧速度105~120m/s，主要轧制钢种为不锈钢，硬质合金辊环牌号配置如下：

A Chinese steel company employs Danieli mill aggregate steel consisted of 4 pre-finishing stands, 8 BGV and 4TMB, mainly rolling stainless steel with the final rolling speed:105~120m/s, The grades can be chosen as follows;



机架 Stands	预精轧机组 Pre-finishing Mill				精轧机组 Finish-rolling block								减定径机组 Reducing and sizing block					
	1#	2#	3#	4#	1#	2#	3#	4#	5#	6#	7#	8#	1#	2#	3#	4#		
牌号配置 Grades	ZY27A				ZY29A				ZY31A				ZY33A		ZY32A		ZY35A	



投影仪
Optics projection apparatus



金相显微镜用于合金显微组织结构分析
Microscope for microstructure analyzing



C-S分析仪
C-S analyzing system



磁饱和和检测
Ms. analyzing system

领先的开发设计
Advanced R&D

精密的加工制作
Precision manufacturing

严格的质量检查
Strict quality inspection



S-3000N扫描电镜
SEM

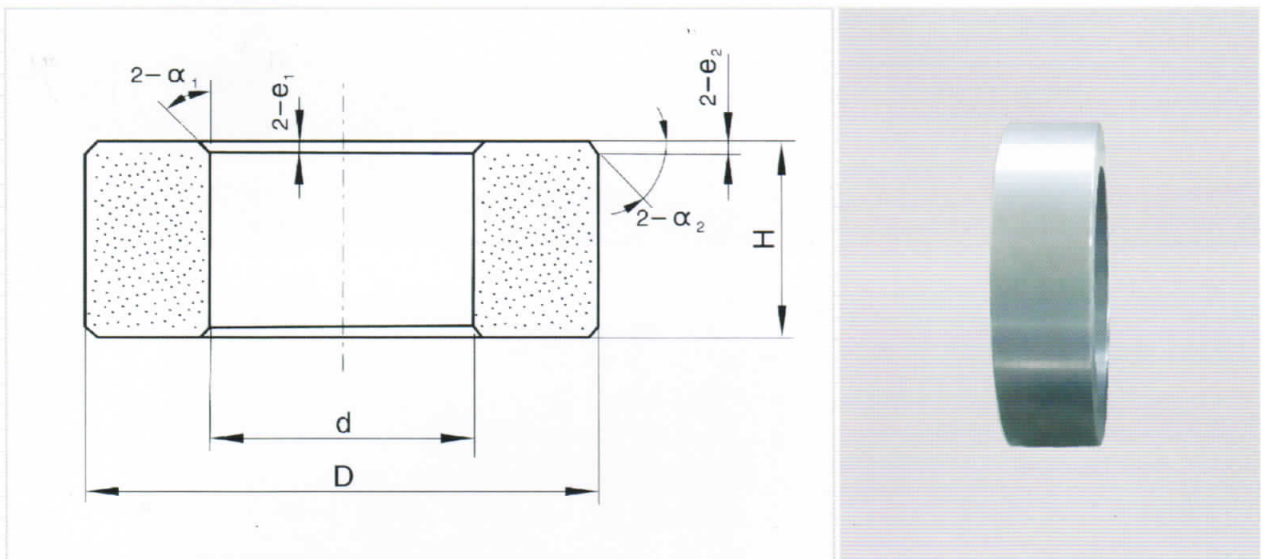
精磨辊环的技术要求

Specification for finish ground roll-rings

◆ 精磨辊环尺寸及精度 Dimensions and accuracy of finished roll rings

外径、内径、高度的允许尺寸偏差符合《精磨辊环基本尺寸及精度》表中要求或按用户提供图纸加工。

Dimensions tolerance of O.D., I.D. and height according to specifications in 《Table of dimensions and accuracy of finished rolls》 or as required by contract.



◆ 热轧辊环精坯加工尺寸范围 Dimension range of finished roll rings

外径 (OD)	内径(ID)	高度(H)
140~500mm	80~300mm	10~250mm

◆ 辊环外径、内径、高度允许偏差 Tolerance permitted for od, id and height of finished roll rings

精度等级Grade	1级 I	2级 II	3级 III	4级 IV	特殊要求 Special request
外径 (OD) Outside diameter	±0.02	±0.05	±0.10	±0.15	
内径 (ID) Inside diameter	+IT 5	+IT 6	+IT 7	+IT 8	
高度 (H) Height	±0.015	±0.050	±0.100	±0.250	

※ 注：我公司可按用户提供图纸加工

Note: Specialized products can be manufactured as per the drawing supplied by customers.



◆ 精磨辊环形位允许偏差 Permitted deviations of finished roll rings

项目 Items	外径D ≤ 200mm Outside D ≤ 200mm	外径D > 200mm Outside D > 200mm
同轴度 Coaxiality	≤0.02mm	≤0.03mm
端面跳动 End face run -out	≤0.01mm	≤0.015mm
端面平行度 End face parallelism	≤0.01mm	≤0.015mm
端面平面度 End face flatness	≤0.01mm	≤0.01mm
内孔圆柱度及圆度 Cylindricity and roundness of inner hole	0.006~0.008mm	0.008~0.01mm

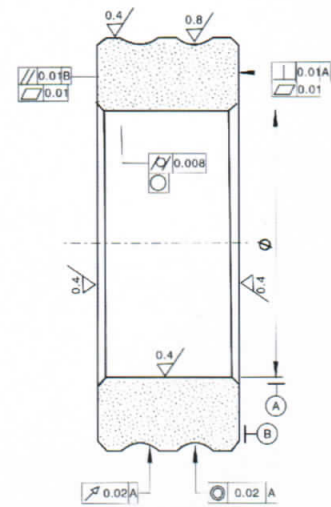
◆ 精磨辊环的粗糙度 Roughness of finished roll rings

内孔粗糙度 ≤ 0.4μm
Roughness of inner hole ≤ 0.4μm

外圆粗糙度 ≤ 0.4μm
Roughness of outer circle ≤ 0.4μm

端面粗糙度 ≤ 0.4μm
Roughness of end faces ≤ 0.4μm

槽面粗糙度 ≤ 0.80μm
Roughness of groove face ≤ 0.80μm



辊环形位允许偏差示意图
Schematic of Permitted Deviation of Shape and Position

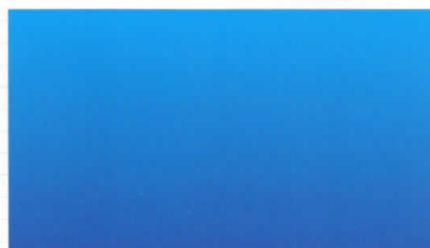


» 硬质合金辊环的使用

How to use

硬质合金辊环是轧机配套使用的重要部件，由碳化钨、钴、镍和微量稀有金属元素组成。具有高强度、高硬度、耐磨损及抗热疲劳等优良的特点。要使硬质合金辊环在轧制中充分发挥其优势，在辊环材质牌号的合理选择、辊环的使用和维护时，需注意以下事项：

With high strength, high hardness, and good wear and thermal fatigue resistance, cemented carbide rolls (composed of WC, Co, Ni and other rare metals) is developed for high-speed wire rolling. To make the best use of cemented carbide rolls, attentions should be paid to things listed below;



◆ 牌号的选择 Selection of the grades

硬质合金辊环使用时，由于各机架的槽形、轧制速度、压下量各不相同，受力情况也不同，因此，在选择使用硬质合金辊环时，一定要根据设备装备状况、轧制工艺以及轧制的钢种来综合考虑，选择适合的硬质合金辊环牌号（参考前面介绍）。

Choose the appropriate grades for different stands according to the work condition, such as rolling process, rolling speed and rolling loads.

◆ 辊环的安装 Installation of roll-rings

辊环是高速轧机的主要消耗附件。辊环安装一定要十分仔细。上机前，按照工艺设计要求的精度，首先对辊环的外形尺寸进行检查验收，然后对锥套、辊轴的装配状况进行检查，并且用酒精或丙酮仔细清洗干净辊环及锥套、辊轴的装配面。安装时，辊环、辊轴及锥套之间要求合适的配合，不能过紧或过松。如装配过紧，轧制时由于温度升高，使辊环处于大的张应力状态，稍大的轧制力波动将会使辊环产生径向裂纹，导致辊环断裂；间隙过大则会使辊环、辊轴及锥套之间产生相对滑动，造成接触面的磨损或刮伤，严重时损坏锥套、辊轴，引起辊环碎裂。另外，为防止因辊环的密度差异大而影响动平衡，同一机架最好安装使用同厂家同牌号辊环，对有较大缺损的辊环应禁止使用。

Before installation, check the roll ring, tapered hosing, roller and clean the assembly surface of the ring, tapered hosing and roller. The match between roll ring, roller and tapered hosing should not be too tight or too loose. The same grade is suggested for the same stand.

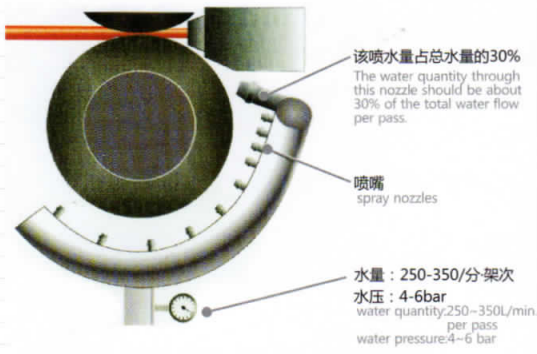
◆ 辊环的冷却 Cooling of roll-rings

辊环在工作时，辊环轧槽只有很小的区域与红钢接触，如果没有冷却或冷却效果不好，辊环的整体温度、最高温度及温度梯度都将迅速增大，再加上冷-热循环作用产生的交变应力的冲击下，轧槽表层极易产生网状热疲劳裂纹，随着热裂纹的延伸，严重时会造成合金的剥落，甚至引起碎辊。为防止辊环的破裂，减少高温对辊环表面的热腐蚀以及延缓裂纹的扩展，延长轧槽寿命，必须对辊环进行冷却，使辊环表面温度保持在50℃以下。在高线的精轧机组，冷却水的压力范围一般控制在0.4~0.6Mpa，最低水流量要求在250~300升/分钟·架次（最佳冷却水量如下表）。冷却水喷射的角度与喷嘴的排布如图所示：

Roll-rings must be cooled effectively to prevent thermal fatigue crack and to prolong the service life. 4~6bar cooling water pressure is recommended for finishing stands, and a flow quantity of 250~300L/min per pass (and it is best to satisfy the requirement in the blank below) is required to ensure the surface temperature of the roll-rings surface less than 50°C. The water jet angle and the distribution of nozzles are sketched in the figure below;



推荐的冷却方式 Recommended design for water cooling



架次 Stands		最佳冷却水流量 (L/min.架次) Water flow quantity (L/min.pass)
预精轧机组 Pre-finishing		480~500
精轧 机组 Finishing	1~2#	480~500
	3~4#	400~450
	5~8#	300~350
	9~10#	250~300
减定径机组 Reducing & Sizing		200~250

冷却水水质要求 The cooling water quality

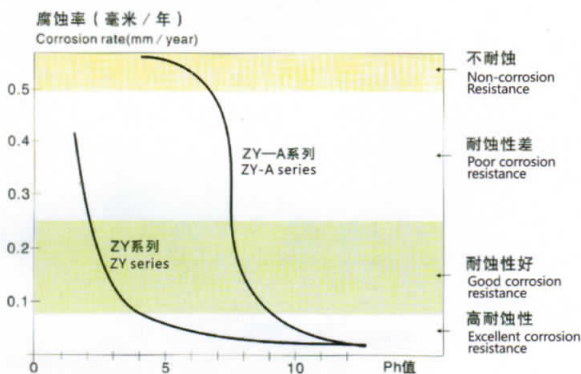
冷却水水质包括三个因素:

- ★ 冷却水的PH值。PH值的高低对轧制中硬质合金辊环的腐蚀影响很大，当PH值小于7.2时，对钴的腐蚀加剧，这时应采用含镍粘结剂的辊环。
- ★ 水中的固体粒子含量。冷却水中的固体粒子在轧制时如同磨料的作用，对辊环中粘结剂（钴或镍）有磨蚀作用，由于轧制速度快、轧制压力大，这种作用是相当严重的，它将使轧槽的微裂纹较快的扩大和延长。因此，轧制时需对冷却水进行沉淀和净化处理使固体粒子含量小于15mg/L；
- ★ 冷却效果。温度升高到600°C时，硬质合金的硬度和强度开始下降，到800°C时，将下降一半，同时辊环的温度差也将明显增大，因此保证辊环在使用过程中得到充分有效的冷却是必须的。研究表明冷却水水温对冷却效果有明显影响，冷却水温升高10°C，冷却效果降低15%。因此，为保证有效的冷却，冷却水的水温应控制在35°C以下。

The quality of cooling water includes three factors as below;

- ★ The PH value of cooling water: The PH value of cooling water has a large influence of the corrosion on the roll-rings. When the PH < 7.2, the corrosion of cobalt could be dramatically increased, therefore, Co+Ni+Cr based ZY series grades should be selected.
- ★ Solid particles content in cooling water: The solid particles in cooling water acts as a abrasive during rolling. Therefore sedimentation and purification of cooling water are required to reduce solid particle content to less than 15mg/L.
- ★ Cooling effect. Water temperature should be controlled no higher than 35°C to ensure the cooling effect.

◆ 辊环材质的耐腐蚀性 Corrosion resistance of cemented-carbide-roll grades.





◆ 合理的轧制量及修磨 Rolling rate and dressing of roll rings

辊环在使用时，由于受到热交变应力、轧制力及热腐蚀等作用，微裂纹的形成是不可避免的，当微裂纹达到一定深度时要及时修磨。过量轧制，会导致微裂纹迅速扩大，加深，深度太深，易引起辊环掉肉、破碎，甚至更严重事故。一般认为：微裂纹深度在0.2~0.4mm内是安全的，此时即应下机修磨，修磨的目的在于去除微裂纹，消除断裂源。微裂纹的产生和扩展与辊环的实际使用条件如冷却水、轧制力大小，轧制钢种及轧制温度等有关。一般情况下，合理的轧制量选择范围如下：

对于普碳钢，因为硬度较低，对辊环的磨损速度较慢，可以设定较高的轧制量如下：

- ★ 预精轧机架：4000~6000吨
- ★ 精轧1~4架：2500~4000吨
- ★ 精轧5~8架：1500~2500吨
- ★ 精轧9~10架：800~2000吨
- ★ 减定径机架：800~2000吨

对于优质碳素结构钢、合金钢、不锈钢及焊丝钢等硬线或特种钢线材，因为其硬度高，且含有与硬质合金亲和性大的元素和较高含量的Si等非金属元素，易对辊环轧槽产生粘着磨损和磨粒磨损，因此轧制量应相应降低。

辊环正常修磨时，每次的进给量宜控制在0.02~0.03mm，如进给量过大，易形成加工应力，减少辊环的使用寿命。且在修磨辊环时，必须将辊环槽形表面的微裂纹彻底磨去，否则，未磨尽的微裂纹将会使下次轧制时的微裂纹更快扩展，可能使辊环破裂。正常轧制量的工艺条件下的修磨量控制如下：

- ★ 预精轧机架辊环修磨量：1.2~2.0mm
- ★ 精轧机1~8架次辊环修磨量：0.6~1.2mm
- ★ 精轧机成品或减定径架次辊环修磨量：0.4~0.8mm.

When the thermal micro-crack extends to certain depth, generally 0.2~0.4mm, the roll needs to be dressed. Normally, the feed rate during routine dressing should be controlled to 0.02~0.03mm/round. The rolling rate is related to the kind of rolling steel, rolling process and rolling condition, It is suggested that for rolling common carbon steels as below;

- ★ Pre-finishing stands : 4000~6000 tons
- ★ Finishing stands No.1~4 : 2500~4000 tons
- ★ Finishing stands No.5~8 : 1500~2500 tons
- ★ Finishing stands No.9~10 : 800~2000 tons
- ★ RSM : 800~2000 tons

And it is recommended that:

- For roll-rings used in the last 1~2 stands of the finishing mill: 0.4~0.8mm;
- For roll-rings used in the other 8 stands of the finishing mill: 0.6~1.2mm;
- For roll-rings used in the pre-finishing mill: 1.2~2.0mm;

◆ 辊环的保管 Storage of roll rings

辊环是一种脆性材料，非常容易碰坏。因此，辊环在开箱后的搬运、转移过程中，应注意轻拿轻放，且放入坚固的木盒或有坚固隔板的大木箱中，严禁用铁锤或其它硬物敲打辊环。在加工、修磨后，应竖放于坚固的木质V型槽中，不可重叠、接触，以避免辊环间的相互碰撞，损坏辊环。

Cemented carbide roll-rings are fragile products and tend to crack easily. Therefore, it should be handled carefully to prevent them from damage.



棒材、型材轧制用硬质合金复合轧辊及复合辊环

Composite rolls and combine roll-rings for bar mill

硬质合金复合轧辊主要应用于高速线材中轧机组及型材轧制的250、300、350、400轧机成品机架和中轧机架。硬质合金复合轧辊用于热轧高速线材、螺纹钢、圆钢棒材、窄带钢角钢等，单槽一次过钢量是传统铸铁轧辊的8~10倍，轧制总寿命是传统铸铁轧辊的20~30倍，轧材的表面质量和尺寸精度大幅提高。该轧辊可采用简单的车削方法加工型槽。棒、型材轧制精轧各机架适用牌号见下表。

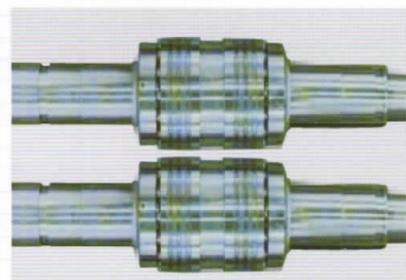
Composite cemented carbide rolls and roll rings are mainly used for high speed wire rolling mill aggregate in the interim stands and for 250,300,350,400 profile steel rolling mill in the middle and final stands. The lifetime is 20~30 times longer than common cast iron roll for hot rolling steel wire, rebar, round steel rod, narrow strip steel and angle steel with better product quality and dimension precision. Simple turning process can be employed to machine the slots in the carbide roll, using CBN or PCD insert. Grades available are as follows.



型钢轧制用硬质合金复合轧辊
Combine roll for profile mill



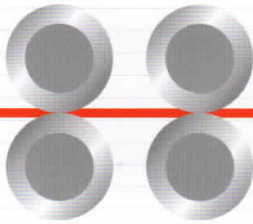
窄带钢轧制用复合辊环
Composite roll for strip steel rolling



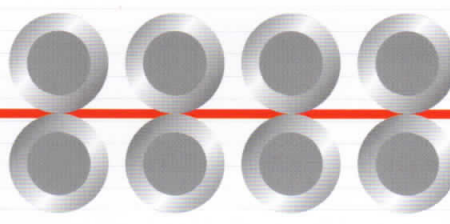
棒材轧制用复合轧辊
Combine roll for bar mill

各机架牌号推荐配置 Recommended grades selection

中轧机组
Interim
Φ16" ~ 18"



精轧机组
Finish-Rolling Block
Φ12" ~ 16"



K4

K3

K2

K1

项目 Items	K4	K3	K2	K1
轧制钢筋 For rolling rebar	ZY27T	ZY27T	ZY27T/ZY28T	ZY27T
轧制圆棒 For rolling bar steel	ZY27T	ZY27T	ZY27T/ZY28T	ZY27T/ZY28T
轧制型钢 For rolling profile steel	ZY27T	ZY27T	ZY27T/ZY28T	ZY27T/ZY28T

» 材质牌号及其物理机械性能 Grades properties

牌号 Grades	粘结剂含量 Binder (wt.%)	WC晶粒度 WC grain size	物理性能 Physical Properties			机械性能 Mechanical Properties			
			*密度 Density g/cm ³	导热率 Thermal Conductivity W/(m.K)	平均热膨胀系数 Average Thermal Expansion Coefficient 10 ⁻⁶ /K	*硬度 Hardness 20°C (HRA)	*抗弯强度 TRS 20°C Mpa	抗压强度 Compressive strength ≥Mpa	*断裂韧性 Fracture toughness K _{IC} Mpa.m ^{1/2}
ZY27T	30	超粗 Extra-coarse	12.73	60	5.8~7.0	79.0	2560	2700	28.2
ZY28T	25	超粗 Extra-coarse	13.00	70	5.5~6.5	80.3	2750	2800	24.3

*实测典型值 typical value

» 硬质合金三维轧辊环

3d-carbide rolls for kocks mill

我公司生产的应用于KOCKS型轧机热轧棒材和无缝钢管成品机架上的硬质合金三维轧辊具有槽型加工精度高，换辊频率低，使用寿命长的特点。我公司可以根据用户实际工况和需要提供整体硬质合金轧辊或硬质合金-钢组合式轧辊方案。适用牌号见下表：

The 3D carbide rolls use in the KOCKS style MILL for rolling bar and seamless-tube we produce features high precision of groove, less downtime and long service time. We are also able to provide solid carbide rolls or cemented-steel combined rolls according to the customers' requirements. Grades available are as follows;



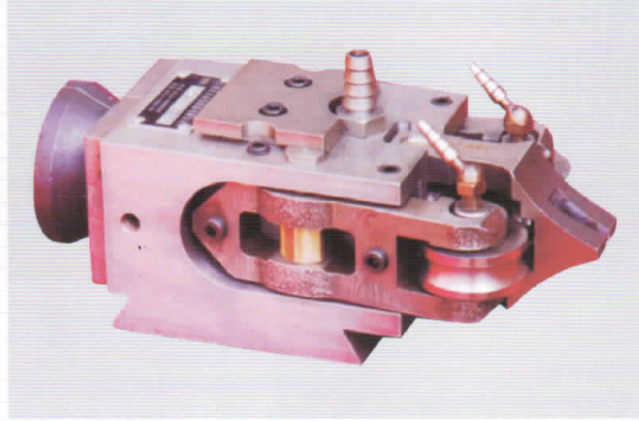
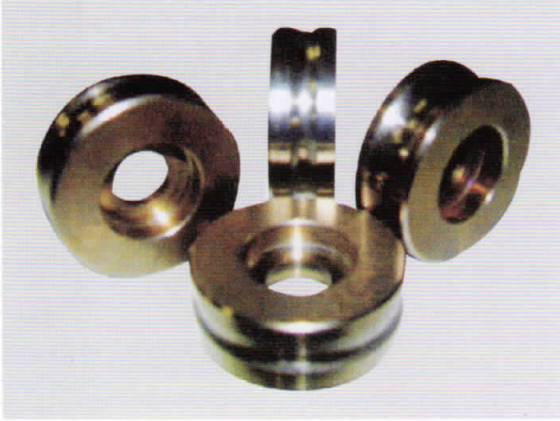
牌号 Grades	粘结剂含量 Binder (wt.%)	WC晶粒度 WC grain size	物理性能 Physical properties			机械性能 Mechanical properties		
			*密度 Density g/cm ³	导热率 Thermal Conductivity W/(m.K)	平均热膨胀系数 Average Thermal Expansion Coefficient 10 ⁻⁶ /K	*硬度 Hardness 20°C (HRA)	*抗弯强度 TRS (B sample) 20°C Mpa	抗压强度 Compressive strength ≥Mpa
ZY27T	30	超粗 Extra-coarse	12.73	60	5.8~7.0	79.0	2560	2700
ZY28T	25	超粗 Extra-coarse	13.00	70	5.5~6.5	80.3	2750	2800
ZY30	20	粗 coarse	13.48	80	5.2~6.0	82.3	2742	3200

*实测典型值 typical value



碳化钛基硬质合金导辊产品 (新)

TiC-based cermet guide roller (new)



牌号及其物理机械性能 Grades and properties

牌号 Grades	*密度 Density g/cm ³	*硬度 Hardness (HRA)	*抗弯强度 TRS(B sample) Mpa	杨氏 弹性模量 E modulus KN/mm ²	平均 热膨胀系数 Average Thermal Coefficient 10 ⁻⁶ /K
ZYT05	6.50	87.0	1830	380	6.0
ZYT10	8.06	86.8	1750	380	6.0
ZYT40	6.48	85.3	1987	360	6.2

*实测典型值 typical value

特点 Features

- ★ 比碳化钨导辊轻，加速性更好，有利于轴承寿命。
- ★ 比合金钢导辊更耐磨，整体寿命是其20~50倍。
- ★ 优越的耐热腐蚀性能，不易裂纹。
- ★ 无磁性，耐高温，化学稳定性好，与钢无亲和性，不粘钢。
- ★ 优良的耐磨性能，可多次修复使用，吨钢成本低。
- ★ 换辊次数少，与硬质合金辊环配套使用，生产效率高。
- ★ Lighter than WC-Co roll; Better acceleration, good for increasing the life time of bearings.
- ★ Better wear resistance than alloy steel, with a service life 20~50 times that of the latter.
- ★ Superior high temperature corrosion resistance, not easily tend to crack.
- ★ Non-magnetic, high chemical stability at high temperature, no affinity to steel. Not easy to be adhered by metal scraps.
- ★ Excellent wear resistance. Can be repeatedly used after dressing, low cost per ton steel.
- ★ Less mill downtime by utilized together with high productivity with cemented carbide rolls.

应用 Applications

导辊是棒、线材轧制设备上的主要消耗备件，与硬质合金辊环配套使用，在轧制过程中，保证红钢顺利进入辊槽，防止绕钢和甩尾。

Guide roller is a main wear part on the wire rod and bar rolling mill. It may be utilized with cemented carbide rolls, to ensure the steel to move smoothly into the grooves of the rolls to avoid winding and swing of the steel.

» 冷轧用硬质合金辊环

Cemented carbide roll-rings for cold rolling

我公司是四川省建筑科学院指定的硬质合金冷轧辊的生产企业，生产的辊环用于轧制（冷轧机）多头螺纹钢和带肋钢筋，覆盖省内外冷轧带肋钢筋生产厂家。它具有如下特点：

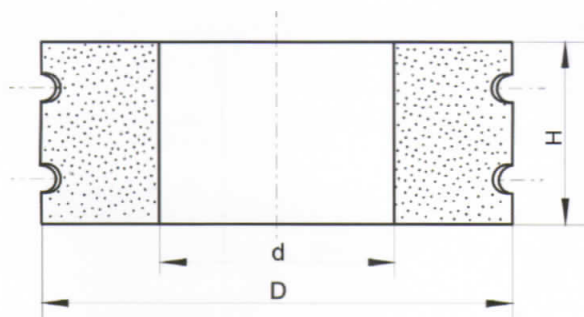
- 1、机械性能（延伸率、强度等）稳定，几何尺寸可靠。
- 2、表面质量好，光洁度高，有较强的抗锈蚀能力。

3、辊环正常使用，每修磨一次可加工600吨钢筋，可多次修磨使用，提高了冷轧带肋钢筋质量档次和生产效率，降低了综合成本。

Our company is a key enterprise engaged in manufacturing all kinds of rolls for cold rolling. All rolls feature:

1. Improved mechanical properties;
2. Good surface finish and corrosion-resistance;
3. Longer tool life and possible to 600-ton rebar, suitable for repeated use.

» GI主动连轧机用冷轧辊 Cold rolling plate for continuous rolling mills



代号 Type	名称 Name	尺寸 Dimension		
		D	d	H
GL180.*K1	双槽辊 Two-groove rolls	180	110	55
GL180.*K2	双槽刻痕辊 Two-groove carved rolls	180	110	55

轧制产品范围：Φ8~Φ12mm螺纹钢

代号举例：GL180.10K2

表示轧制Φ10钢筋用的Φ180双槽刻痕辊

*代表轧制钢筋直径

Rolled product range: Φ8~Φ12 reinforced bars

Type example: GL180.10K2 represents a Φ180 two-groove carved roll for rolling Φ10 reinforced bars.

*Represents the diameter of rolled reinforced bars.



» 精磨辊环的检验、标识与包装/Inspection, marking and packing of finished rolls

精磨辊环的检验按照Q/62071126-8 108.1-2011的规定进行；

Inspection as specified by Q/62071126-8 108.1-2011;

精磨辊环产品标识：在每个精磨辊环端面一侧规定部位用激光刻字机刻出“长城”商标图案、规格、型号、生产日期等或按用户要求标识。

Marking: Greatwall brand, specification, type and date of production are engraved on one of the surface by laser or mark as customer's required

精磨辊环采用木箱包装，外包装印有以下标识：牌号、规格、重量、槽型、用户名或按用户要求包装。

Grade, specifications, weight, shape of groove and customer's name are indicated on the wooden package.

» 订货须知/How to order

- ★ 订货前请仔细阅读该资料，了解推荐牌号的使用范围；
Pls. read this manual carefully to learn the recommended scope of application before ordering;
- ★ 订货时请按要求详细填写合同；
Pls. fill in contract according to the requirements when ordering;
- ★ 如有特殊要求，请直接与辊环销售部和技术服务部咨询；
If you have any special requirements, pls. contact our Sales Service Dept. or Technical Dept. for help;
- ★ 为更好地满足顾客的需要，公司将不断改进产品，并保留不经通知而改变技术参数和设计的权利
The specifications is subject to change without notice.

» 联系我们/Contact us

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