

BAOHUA 宝华

BAOHUA

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山东宝华耐磨钢有限公司
SHANDONG BAOHUA ABRASION RESISTANT STEEL CO.,LTD.

山东宝华耐磨钢有限公司

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COMPANY PROFILE

公司简介

山东宝华耐磨钢有限公司（以下简称宝华耐磨）是上海宝钢国际与山东华星耐磨钢有限公司共同组建的合资企业，成立于2012年9月。宝华耐磨位于山东省临沂市兰山经济开发区，项目占地面积300亩。按照“一次规划、分期实施”的战略，公司规划建成年产30万吨优质耐磨钢、高强结构钢、防弹钢的生产能力。公司建立了完善的质量管理与评测体系，确保所生产的耐磨钢品质与世界水平同步。

宝华耐磨可生产全系列的热处理产品，并率先在国内成功开发薄规格耐磨钢，力学性能、板形质量达到进口产品实物水平，摆脱了国内薄规格耐磨钢依赖进口的局面。宝华耐磨成功研发出2mm超薄耐磨钢产品，同时也可生产硬度 $\geq 600\text{HBW}$ 的耐磨钢板，可极大地提升工程机械、煤矿机械、粮食机械、水泥机械、自卸车等产品的性能。

Shandong Baohua abrasion resistant steel Co., Ltd. (hereinafter referred to as Baohua Wear-resisting Steel Co., LTD.) is a joint venture between Shanghai Baosteel International and Shandong Huaxing Wear-resisting Steel Co., LTD., It was founded in September 2012. Baohua Wear-resistant is located in Lanshan Economic Development Zone, Linyi City, Shandong Province, the project covers an area of 300 acres. In accordance with the strategy of "Plan once, Implement in phases", the company plans to build an annual production capacity of 300,000 tons of high-quality wear-resistant steel, high-strength structural steel, bullet-proof steel. The company has established a perfect quality management and evaluation system to ensure that the quality of wear-resistant steel produced is synchronized with the world level.

Baohua wear resistant steel can produce a full range of heat treatment products, and take the lead in the successful development of thin gauge wear-resistant steel in China, whose mechanical properties and plate shape quality reaches the level of imported products in kind, to get rid of the situation that domestic thin specification wear-resistant steel always rely on imports. Baohua wear resistant successfully develops 2mm ultra-thin wear-resistant steel products, and can also produce wear-resistant steel with hardness $\geq 600\text{HBW}$, which can greatly improve the performance of construction machinery, coal mining machinery, grain machinery, cement machinery, dump trucks and other products.



宝华防弹钢板的研发填补了国内常规技术的空白，已经通过国内检测机构的权威测试，符合国军标和国外防弹钢板的性能要求，产品质量稳定、可靠，可媲美国外同等级的产品，在国内的民用防弹和军工产品上实现规模应用。

宝华耐磨钢配备有专业的剪切配送中心，为广大用户提供“精度高，质量优”的零部件产品，实现“钢铁部件零库存”的服务模式。宝华耐磨钢具有规格组距跨度大、品种全面的现货资源库，耐磨钢常备库存20000吨，高强度结构钢和低合金钢常备库存10000吨。可满足广大客户多样化的需求。

宝华耐磨钢通过“完备的能力保障，完善的营运服务”励志成为耐磨特钢行业的领航者，打造成热处理产品的行业专家。同时，作为宝钢参股的合资公司发挥一站式配送服务能力，在提供宝华生产产品的同时，为广大用户提供宝钢期货现货资源的配套供货服务。

公司始终弘扬优良企业精神，秉持着“品质、服务、协同、创新”的核心价值观，为用户提供最优的产品和服务。

The research and development of Baohua bulletproof steel plate fills the blank of domestic conventional technology, and has passed the authoritative test of domestic testing institutions, which meets the performance requirements of the national military standard and foreign bulletproof steel plate. The product quality is stable and reliable, which can be comparable to the products of the same grade in foreign countries, and achieves the large-scale application in the domestic civil bulletproof and military products.

Baohua wear-resistant steel is equipped with a professional cutting and distributipn centre distribution center, which is to provide users with "high precision, excellent quality" components products, to achieve "steel parts zero inventory" service mode. Baohua wear-resistant steel has a large size group distance span, a comprehensive variety of spot resources, wear-resistant steel standing stock of 20,000 tons, high strength structural steel and low alloy steel standing stock of 10,000 tons. Can meet the diversified needs of our customers.

Baohua wear-resistant steel strives to become the leader of wear-resistant special steel industry and the industry expert of heat treatment products through "complete ability guarantee and perfect operation service". Meanwhile, as a joint venture company with an equity stake from Baosteel, this company leverages its one-stop distribution service capabilities. In addition to providing products from Baohua, it also offers comprehensive supply services for Baosteel's futures and spot trading resources to a wide range of users.

The company has always upheld excellent corporate values, adheres to the core values of "quality, service, collaboration and innovation", and provides users with the best products and services.

CORPORATE CULTURE

企业文化

企业文化是企业发展之魂，传承着企业的价值取向和行为标准，凝聚着企业的共同信念和整体合力，激励着员工的事业追求和工作激情，推动着企业的日益兴盛和持续发展。

宝华在十多年的发展实践中，形成了以“高效执行的工作态度、严格苛求的精神导向、真诚可靠的公司形象、合作共赢的服务思维”为主线，以“协同、务实、进取、共建”的核心价值观的宝华文化，把成为最专业的耐磨钢方案解决者作为公司使命。宝华必将在核心价值观的引领下走向更广阔的领域。

Enterprise culture is the soul of enterprise development, inheriting the enterprise's value orientation and standards of conduct, cohesion of the enterprise's common beliefs and overall synergy, inspire the pursuit of the cause of the staff and passion for work, and promote the growing prosperity and sustainable development of the enterprise.

In more than ten years of development, Baohua has formed a culture of "efficient execution of work attitude, strict and demanding spiritual guidance, sincere and reliable company image, win-win cooperation and service thinking" as the main line, with the core values of "collaboration, pragmatism, progress, and joint construction", "BAOHUA culture takes becoming the most professional wear-resistant steel solution provider as the company's mission. Finally, Baohua will certainly go to a broader field under the guidance of core values.

◎ 高效执行的工作态度

EFFICIENT WORK ATTITUDE

高效执行的工作态度，是有令必行、敢于担当的态度，是精准把握关键目标的态度，是做事有方法、有过程、有结果的态度。

The work attitude of efficient work attitude, is the attitude of having the order must be carried out, daring to take responsibility, accurately grasping key objectives, and having clear methods, processes and results.

◎ 严格苛求的精神导向

STRICT DEMANDING SPIRIT

严格苛求的精神导向，是关注细节、敢于较真的精神，是深思一层、多迈一步的精神，是严标准、高要求，追求卓越的精神。

The spirit of strict and demanding is the spirit of paying attention to details, daring to be serious, thinking more and taking more, and having strict standards, high requirements, and the pursuit of excellence.

◎ 真诚可靠的公司形象

SINCERE AND RELIABLE COMPANY IMAGE

真诚可靠的公司形象，是急他人之所急、想他人之所想的形象，是凡事有交代、事事有回音的形象，是言行一致、说到做到，成为用户信赖的专家的形象。

Sincere and reliable company image, is the image of being urgent thinking in others' shoes, is being accounted and answered for everything, and always being trusted by users.

◎ 合作共赢的服务思维

COOPERATION AND WIN-WIN SERVICE THINKING

合作共赢的服务思维，是以客户为中心的服务思维，是提供定制化服务、一站式配送，实现用户综合成本最优的思维，是提供技术性服务，为用户提供最优化的材料应用方案的思维。

Cooperation and win-win service thinking, is the thinking of customer-centric service, is providing personalized and tailored services, one-stop delivery, to achieve the user's optimal comprehensive cost, is providing technical services, to provide users with the most optimal material application solutions.



协同 SYNERGY

协同，就是积极主动、齐心协力地去实现一个共同的目标，充分发挥团队的力量，发挥一体化的效应，实现总体利润、整体价值最大化。

Synergy is to take the initiative and work together to achieve a common goal, give full play to the strength of the team, play the effect of integration, and maximize the overall profit and overall value.

务实 PRAGMATISM

务实，就是对事物进行充分的调研和了解，抓住主要矛盾不断实践，把工作做深做细，并做出基于事实的结论或决策。

Pragmatism is to fully investigate and understand things, grasp the main contradiction and constantly practice, do in-depth work and make conclusions or decisions based on facts.

进取 PROACTION

进取，就是在实践中学习，在创新中成长。通过不断学习，不断创新在挑战中获得新的经验和成长，不断超越期待。

Proaction is to learn in practice and grow in innovation. Through continuous learning, continuous innovation in the challenge to gain new experience and growth, continue to exceed expectations.

共建 CO-CONSTRUCTION

共建，就是取长补短，互鉴共赢，在工作中找到归属感和成就感，树立“功成不必在我、功成必定有我”的大局意识，将“以人为本”的发展理念不断贯穿于公司发展的各个方面。

Co-construction is to learn from each other, Establish a sense of the big picture: "Success does not count on me, but success does depend on me", and the "people-oriented" development concept continues to run through all aspects of the company's development.

CORE COMPETITIVE ADVANTAGE OF THE ENTERPRISE

企业核心

一站式配货及定制化服务:

宝华耐磨钢配备有专业的剪切配送中心, 可以为广大用户提供一站式配货及定制化服务, 可满足广大客户多样化的需求。可以为广大用户提供“精度高, 质量优”的零部件产品, 实现“钢铁部件零库存”的服务模式。

全流程及专业化产品质量:

宝华耐磨可生产全系列的热处理产品, 宝华耐磨钢公司建立了完善的质量管理与评测体系, 确保所生产的耐磨钢品质与世界水平同步。

充足的库存及短时效货期:

宝华耐磨具有规格组距跨度大、品种全面的现货资源库, 耐磨钢常备库存20000吨, 高强度结构钢和低合金钢常备库存10000吨。宝华耐磨生产加工能力强, 生产效率高, 具有很强的交货期管控能力。

One-stop distribution and customized services:

Baohua wear resistant steel is equipped with a professional cutting and distribution centre, which can provide one-stop distribution and customized services for the majority of users, and can meet the diversified needs of customers. Can provide the users with "high precision, excellent quality" parts products, to achieve the "steel parts zero inventory" service model.

The whole process and professional product quality:

Baohua wear-resistant steel Company can produce a full range of heat treatment products, Baohua wear-resistant steel company has established a perfect quality management and evaluation system to ensure that the quality of wear-resistant steel produced is synchronized with the world level.

Sufficient stock and short delivery time:

Baohua wear-resistant has a large size group distance span, a comprehensive variety of spot resources, wear-resistant steel standing stock of 20,000 tons, high strength structural steel and low alloy steel standing stock of 10,000 tons. Baohua has strong wear-resistant production and processing capacity, high production efficiency, and strong delivery control ability.

 东风商用车 DONGFENG TRUCKS	 中国一汽
 山东临工 SDLG	 陕汽重卡
 CIMC 中集	 中国重汽 SINOTRUK
 徐工集团	 WIRTGEN GROUP



BHNM WEAR-RESISTANT STEEL

BHNM 耐磨钢板

耐磨钢是耐磨损性能强的钢铁材料的总称，广泛应用于工况条件特别恶劣，要求高强度、高耐磨性能的工程、采矿、建筑、农业、港口、电力以及冶金等机械产品上。解决磨损和延长机械设备及其部件的使用寿命，成为工业界人士在设计、制造和使用各种机械设备所需要考虑的首要问题。

宝华耐磨作为国内唯一具备超薄耐磨钢生产能力的专业企业，公司产品不仅具有极高的耐磨性能，还具有良好的焊接、冷弯，及机加工性能，在低温环境下也能保持良好的抗冲击性。在不同的磨损作业环境下，宝华耐磨钢极高的硬度和耐磨性能，能够显著延长产品设备的使用寿命数倍不等。采用宝华耐磨钢可设计结构更简单，自重更轻的同时又可承担更重的负载的产品。

高品质的基材、精湛的淬火以及科学合理的合金化学成分含量调配工艺。保证了宝华耐磨钢质量性能的均一稳定：既具有极高的耐磨、抗裂和防变形能力，又易于焊接和机加工，从而保证了耐磨产品的生产和使用。

Wear-resistant steel is a general term for steel materials that are highly resistant to wear and tear. It is widely applied in bad working conditions, which need high strength, high abrasion resistant engineering, mining, construction, agriculture, port, electric power and metallurgy and other mechanical products. Wear-resistant steel can solve the wear and prolong the service life of machinery and equipment and its components, becoming the industrialists' priority choice in the design, manufacture and use of a variety of machinery and equipment.

BHNM is the only domestic professional enterprise with ultra-thin wear resistant steel production capacity. The products of the company not only has high hardness and wear resistance but also has good welding and machining performance; it is particularly worth mentioning here that it also can maintain good impact resistance under low temperature. Under different abrasion operating environment, BHNM with higher hardness and abrasion resistance, can significantly extend the service life of product equipment.Using BHNM wear resistant steel can let the design becomes more simple,the product own weight becomes lighter,at the same time,it can bear heavier load.

High quality base material, consummate exquisite quenching process, and scientific & reasonable deployment process about alloy chemical composition content, abrasion resistant, cracking resistance and deformation and These characteristics guarantee the uniformity and stability of the quality of Baohua wear-resistant steels: high resistance to abrasion, cracking and deformation, as well as ease of welding and machining, thus guaranteeing the production and use of wear-resistant products.



BHNM400 WEAR-RESISTANT STEEL

BHNM400 耐磨钢板

应用：破碎机、筛板、给料漏斗、刃板、输送机、挖斗、刃板、自卸车、铲运机、工业卡车、铁路货车、推土机、挖掘机、螺旋输送机等。

Application:Crusher,sieve plate,feeding hopper,blade plate,conveyor,bucket,cutting board,dump truck, scraper,industrial truck,railway wagon,bulldozer,excavator,screw conveyor and etc.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Ni
	厚度/mm Thickness	%	%	%	%	%	%	%
	2-120	0.11-0.25	0.38-0.95	1.20-1.80	0.005-0.025	0.005-0.010	0.01-0.8	0.004-0.8
硬 度 Hardness	HBW 370-430							
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	屈服强度 Yield strength		抗拉强度 Tensile strength		延伸率 Elongation		
		Re		Rm		A50		
		MPa		MPa		%		
		≥1050		≥1250		12		
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	试验 Test			冲击力 Force of impact			
		温度 temperature			Charpy-V 纵向 Charpy-V Longitudinal			
		℃			J			
		-20			40			

以上数据仅供参考,具体数据以质保书为准

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BHNM450 WEAR RESISTANT STEEL

BHNM450 耐磨钢板

应用：筛板、衬板、给料漏斗、刃板、输送机、挖斗、刀板、自卸车、铲运机、工业卡车、铁路货车、推土机、挖掘机、螺旋输送机等。

Application:Sieve plate,wear resistant liner,feeding hopper,blade plate,conveyor,bucket,cutting board,dump truck, scraper,industrial truck,railway wagon,bulldozer,excavator,screw conveyor and etc.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Ni
	厚度/mm Thickness	%	%	%	%	%	%	%
	2-120	0.19-0.25	0.75-0.95	1.40-1.80	0.005-0.025	0.005-0.010	0.01-0.80	0.001-0.80
硬 度 Hardness	HBW 430-470							
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	屈服强度 Yield strength		抗拉强度 Tensile strength		延伸率 Elongation		
		Re		Rm		A50		
		MPa		MPa		%		
		≥1150		≥1350		10		
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	试验 Test				冲击力 Force of impact		
		温度 temperature				Charpy-V 纵向 Charpy-V Longitudinal		
		℃				J		
		-20				30		

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BHNM500 WEAR RESISTANT STEEL

BHNM500 耐磨钢板

应用：筛板，衬板，给料漏斗，选粉机，输送机，刮板机，自卸车，螺旋输送机等。

Application:Sieve plate,wear resistant liner, feeding hopper,powder concentrator,conveyor,scraper conveyor,dump truck,screw conveyor and etc.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Ni
	厚度/mm Thickness	%	%	%	%	%	%	%
	2-120	0.25-0.35	0.25-1.70	0.40-1.80	0.005-0.025	0.005-0.010	0.20-1.00	0.001-1.00
硬 度 Hardness	HBW 470-520							
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	屈服强度 Yield strength		抗拉强度 Tensile strength		延伸率 Elongation		
		Re		Rm		A50		
		MPa		MPa		%		
		≥1250		≥1500		7		
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	试验 Test				冲击力 Force of impact		
		温度 temperature				Charpy-V 纵向 Charpy-V Longitudinal		
		℃				J		
		-20				20		

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BHNM550 WEAR RESISTANT STEEL

BHNM550 耐磨钢板

应用：耐磨条、溜槽、筛板、刀具、刀板等。

Application:Wear resistant strip,chute, sieve plate, knives,cutting board and etc.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Ni
	厚度/mm Thickness	%	%	%	%	%	%	%
	2-120	0.30-0.40	0.25-1.7	0.40-1.80	0.005-0.025	0.005-0.010	0.30-1.00	0.002-1.00
硬 度 Hardness	HBW 520-580							
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	屈服强度 Yield strength		抗拉强度 Tensile strength		延伸率 Elongation		
		Re		Rm		A ₅₀		
		MPa		MPa		%		
		≥1300		≥1550		6		
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值 Typical value of 10mm steel plate	试验 Test				冲击力 Force of impact		
		温度 temperature				Charpy-V 纵向 Charpy-V Longitudinal		
		℃				J		
		-20				12		

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MN13 HIGH MANGANESE WEAR-RESISTANT STEEL

MN13 高锰耐磨钢板

应用：破碎机衬板、溜槽、筛板、抛丸机护板、矿车车厢、电磁分选耐磨件等。

Application:Crushing machine liners, chutes, screen plates, shot blasting machine guards, mine car compartments, electromagnetic sorting wear-resistant parts, etc.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Nb
	厚度 Thickness	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum
	毫米millimeter	%	%	%	%	%	%	%
	3-16	1.20	0.80	14.00	0.035	0.030	1.00	0.5
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate		抗拉强度 Tensile strength		延伸率 Elongation		布氏硬度 Brinell hardness	
			Rm		A		HBM	
			MPa		%			
			≥685		≥22		≥100	
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值		试验 Test			冲击力 Impact Test		
			温度 temperature			Charpy-V纵向 Charpy-V Longitudinal		
			℃			J		
			-20			≥17		

以上数据仅供参考,具体数据以质保书为准
All the data above is for reference purpose only,for exact data,please check quality assurance certificate.

WEAR-RESISTANT TUBE

耐磨管

耐磨管主要应用于：码头输送、粮食输送、砂石输送等工况。
它具有耐磨损、易焊接、韧性好、使用寿命长的特点。
Wear-resistant pipe is mainly used in: wharf transport, grain transport, sand and gravel transport and other conditions.
It has the characteristics of abrasion resistance, easy welding, good toughness and long service life.



WEAR-RESISTANT SCREW

耐磨螺旋

螺旋叶片主要应用于：码头输送、粮食输送、煤机、抛丸等工况。
它具有耐磨损、易焊接、韧性好、使用寿命长的特点。
Spiral blade is mainly used in: wharf conveying, grain conveying, coal machine, shot blasting and other conditions.
It has the characteristics of abrasion resistance, easy welding, good toughness and long service life.



HIGH STRENGTH STRUCTURAL STEEL PLATE

BHG 高强度结构钢板

高强度结构钢板，因其高强度的特点，广泛地应用于对强度及自身重量要求较高的工程、专用车辆等机械产品上。特别是在汽车轻量化领域，应用更加广泛。在节能减排要求日益突出及环保意识越来越强的今天，汽车的轻量化更成为了汽车制造行业的主要发展方向。
宝华耐磨作为国内具备特种钢生产能力的专业企业，能够定制生产性能优异的高强钢板。在同等作业环境下，宝华耐磨推出的高强钢产品性能，有较好的减重效果。
宝华耐磨推出的高强钢产品具备科学合理的合金化学成分含量调配工艺。保证了宝华耐磨的高强钢产品质量性能的均一稳定。

High strength structural steel plate, because of its high strength characteristics, is widely used in engineering, special vehicles and other mechanical products with high strength and weight requirements, especially in the field of automotive lightweight, whose application is more extensive. In today's increasingly prominent requirements for energy conservation and emission reduction and increasingly strong environmental awareness, the lightweight of automobiles has become the main development direction of the automobile manufacturing industry.
As a professional enterprise with special steel production capacity in China, Baohua can customize high-strength steel plates with excellent performance. Under the same working environment, the performance of high-strength steel products launched by Baohua has better weight reduction effect.
Baohua high-strength steel products with scientific and reasonable alloy chemical composition content allocation technology, which can ensure the uniform and stable quality performance of Baohua high-strength steel products.





BHG700 HIGH TENSILE STEEL

BHG700 高强度结构钢板

应用于对降低自重要求较高的承载结构。
Application: Bearing structure with higher demand of reducing its weight.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Nb
	厚度 Thickness	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum
	毫米millimeter	%	%	%	%	%	%	%
	2-40	0.16	0.60	2.10	0.025	0.015	0.1	0.09
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate		屈服强度 Yield strength		抗拉强度 Tensile strength		延伸率 Elongation	
			ReL		Rm		A	
			MPa		MPa		%	
			≥600		≥700		17	
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值 Typical value of 10mm steel plate		试验 Test			冲击力 Impact Test		
			温度 temperature			Charpy-V纵向 Charpy-V Longitudinal		
			℃			J		
			-20			34		

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BHG750 HIGH TENSILE STEEL

BHG750 高强度结构钢板

应用于对降低自重要求较高的承载结构。
Application: Bearing structure with higher demand of reducing its weight.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Nb
	厚度 Thickness	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum
	毫米millimeter	%	%	%	%	%	%	%
	2-40	0.16	0.60	2.10	0.025	0.025	0.1	0.09
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate		屈服强度 Yield strength		抗拉强度 Tensile strength		延伸率 Elongation	
			ReL		Rm		A	
			MPa		MPa		%	
			≥680		≥750		16	
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值 Typical value of 10mm steel plate		试验 Test			冲击力 Impact Test		
			温度 temperature			Charpy-V纵向 Charpy-V Longitudinal		
			℃			J		
			-20			30		

以上数据仅供参考,具体数据以质保书为准
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BHG1000 HIGH TENSILE STEEL

BHG1000 高强度结构钢板

应用于对降低自重要求较高的承载结构。
Application: Bearing structure with higher demand of reducing its weight.

化学成分 Chemical Composition	钢板 Steel Plate	C	SI	Mn	P	S	Cr	Nb
	厚度 Thickness	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum	最大 Maximum
	毫米millimeter	%	%	%	%	%	%	%
	2-40	0.15	0.50	1.50	0.025	0.008	0.6	0.0023
机械性能 Mechanical properties	10毫米厚度 钢板典型值 Typical value of 10mm steel plate		屈服强度 Yield strength		抗拉强度 Tensile strength		延伸率 Elongation	
			ReL		Rm		A	
			MPa		MPa		%	
			≥950		≥1000		14	
冲击韧性 Impact Toughness	10毫米厚度 钢板典型值 Typical value of 10mm steel plate		试验 Test			冲击力 Impact Test		
			温度 temperature			Charpy-V纵向 Charpy-V Longitudinal		
			℃			J		
			-20			40		

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BULLET-PROOF STEEL

防护钢板

适用防护标准
Applicable Bulletproof standard

- 一、公安部国家军用标准公安部(GA164-2018)防护等级从低到高分A、B、C。
- 二、NIJ防弹衣标准
- 三、美国UL752防弹标准
- 四、德国DIN1063防弹标准
- 五、欧洲EN1063防弹标准
- 六、英国BS5051防弹标准

- 1.The ministry of Public Security of the People's Republic of China. Chinese Military Standard (GA164-2018) Protection grade from low to high marks A, B, C.
- 2.NIJ body armor standard
- 3.The United States UL752 bulletproof standard
- 4.German DIN52290 bulletproof standard
- 5.European EN1063 bulletproof standard
- 6.British BS5051 bulletproof standard

交货状态
Delivery status

调制钢板, 或各种异型切割后成品钢板。
钢板外形、尺寸偏差完全满足GB/T 709-2019的要求。
Tempered Steel Plate, or finished steel plates by cutting for abnormal shape.
The shape of the plate and dimensional deviation fully meet the requirement of GB/T 709-2019.



BAOHUA 宝华

BAOHUA SERVICE

宝华服务

宝华耐磨拥有数控火焰、数控水下等离子、数控激光切割机、3600吨数控折弯机、1600吨数控折弯机、1000吨数控折弯机、1000吨数控卷板机、加工中心、钻床、13米数控纵剪设备、大型铣边机等先进的大型切割、成型、机加工设备，可为客户提供专业、优质、高效的服务。

Baohua has CNC flame, CNC underwater plasma, CNC laser cutting machine, 3600 tons CNC bending machine, 1600 tons CNC bending machine, 1000 tons CNC bending machine, 1000 tons CNC plate rolling machine, machining center, drilling machine, 13 meters CNC slitting equipment, large milling machine and other advanced large-scale cutting, forming and machining equipment. We can provide customers with professional, high quality and efficient service.

7 X 24 小时

7 X 24 HOURS

专业服务团队

PROFESSIONAL SERVICE TEAM

积极快速响应

ACTIVE AND RAPID RESPONSE

数控切割设备

CNC CUTTING EQUIPMENT

数控火焰切割机 CNC FLAME CUTTING MACHINE

有效切割长度Effective cutting length: 20000mm
有效切割宽度Effective cutting width: 5000mm
最大切割厚度Maximum cutting thickness: 120mm
切割精度Cutting accuracy: ±2mm
切割速度Cutting speed: 50—6000 mm/min
适用范围: 厚度大于6mm且板幅较大的零件
Applicable scope: parts with thickness greater than 6mm and large plate width
备注: 火焰切割热影响区较大, 会对所切割钢板的边缘部位性能造成影响。
Note: The flame cutting heat affected zone is large, which will affect the performance of the edge of the cut steel plate



开平线 CUT-TO-LENGTH LINE

适用厚度Applicable thickness: 2-18mm
宽度Width: 1200-2200mm



数控水下等离子切割机 CNC UNDERWATER PLASMA CUTTING MACHINE

有效切割长度Effective cutting length: 17000mm
有效切割宽度Effective cutting width: 5000mm
最大切割厚度Maximum cutting thickness: 30mm
切割精度Cutting accuracy: ±1mm
切割速度Cutting speed: 50—6000 mm/min
适用范围: 厚度小于30mm的钢板
Applicable scope: steel plate with thickness less than 30mm
备注: 带有自动打坡口功能。
Note: With automatic beveling function.



数控纵剪设备 NUMERICAL CONTROL SLITTING EQUIPMENT

适用厚度Applicable thickness: 3-20mm
最大宽度Maximum width: 3200mm
最大长度Maximum length: 13000mm



数控激光切割机 CNC LASER CUTTING MACHINE

有效切割长度Effective cutting length: 20000mm
有效切割宽度Effective cutting width: 5000mm
最大切割厚度Maximum cutting thickness: 20mm
切割精度Cutting accuracy: ±0.2mm
切割速度Cutting speed: 50—6000 mm/min
适用范围: 精度要求较高, 厚度小于20mm的钢板。
Scope of application: Steel plate with high precision and thickness less than 20mm.



立式加工中心 VERTICAL MACHINING CENTER

适用范围: 钻孔、铣槽、镗孔等各类机加工服务。
Scope of application: drilling, slot milling, boring and other machining services.



数控成型设备

3600吨数控折弯机
3600 TONS CNC
BENDING MACHINE

最大折弯长度：12200mm
最大折弯宽度：4400mm
折弯角度：≤90°
备注：配套模具规格齐全

Maximum bending length: 12200mm
Maximum bending width: 4400mm
Bending Angle: ≤90°
Note: Complete set of mould specifications



CNC MOULDING EQUIPMENT

1600吨数控折弯机
1600 TONS CNC
BENDING MACHINE

最大折弯长度：8000mm
最大折弯宽度：3500mm
折弯角度：≤90°
备注：配套模具规格齐全

Maximum bending length: 8000mm
Maximum bending width: 3500mm
Bending Angle: ≤90°
Note: Complete set of mould specifications



1000吨数控折弯机
1000 TONS CNC
BENDING MACHINE

最大折弯长度：4200mm
最大折弯宽度：3000mm
折弯角度：≤90°
备注：配有多套异形模具

Maximum bending length: 4200mm
Maximum bending width: 3000mm
Bending Angle: ≤90°
Note: Equipped with multiple sets of special-shaped molds



数控卷板机
CNC PLATE ROLLING
MACHINE

最大卷板宽度：4000mm
最小卷板半径：412mm
适用厚度：4-25mm

Maximum roll width: 3600mm
Minimum pipe bending radius: 412mm
Applicable thickness: 4-25mm



PRODUCT INSTRUCTIONS

产品使用说明

宝华耐磨拥有摇臂钻床、进口大型立式加工中心等数控钻孔设备，可以为用户提供钻孔、铣槽、镗孔等各类机加工服务。

宝华耐磨钢广泛应用于工况条件特别恶劣，要求高强度、高耐磨性能的工程、采矿、建筑、农业、港口、电力以及冶金等机械产品上。

本产品使用说明旨在帮助客户科学合理地使用宝华耐磨钢。

Baohua has radial drilling machine, imported large vertical machining center and other CNC drilling equipment, which can provide users with drilling, milling, boring and other machining services.

Baohua wear-resistant steel is widely used in engineering, mining, construction, agriculture, port, power and metallurgy and other mechanical products that require high strength and high wear resistance under particularly harsh working conditions.

This product instructions are designed to help customers use Baohua wear-resistant steel scientifically and reasonably.

耐磨性能 ABRASION RESISTANCE

销-盘法磨粒磨损实验 Pin-on-disk friction wear test

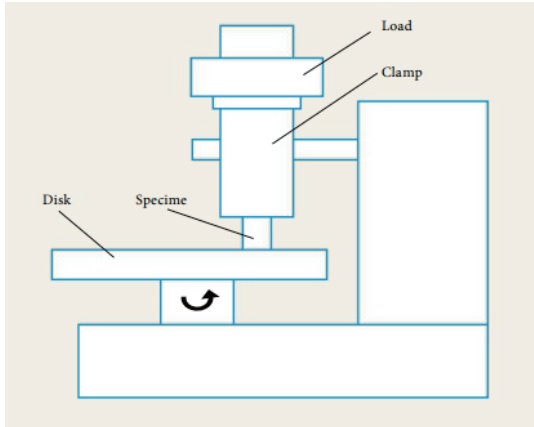


图1 ML-100磨粒 磨损试验机工作原理

Figure 1 ML-100 abrasive particle
Working principle of wear testing machine

耐磨性实验采用国际通用的销-盘法磨粒磨损实验进行，材料的耐磨性水平会随着试验参数的改变而发生变化。

实验条件是：耐磨钢试样测试部分加工成φ4mm的圆柱，对磨材料选用粒度为120目的SiC砂纸，在84N载荷作用下进行实验。

对宝华BHNМ400钢板沿厚度方向进行的耐磨性测试结果列于表1中，耐磨性实验结果与硬度测试结果相呼应，即在整个截面范围内耐磨性沿厚度方向变化较小；采用相同的试验条件检验了某进口品牌400级别耐磨钢样板，试验结果列于表2，对比可见两者耐磨性相当。

Abrasion resistance experiment adopts the internationally used pin-on-disk friction wear test; the wear-resisting property will be changed with the changing of the parameters

The experiment condition: abrasion resistance steel sample testing parts processed into a cylindrical phi is 4 mm; selecting the granularity is 120SiC emery paper as abrasion material, under the 84 n loading.

Table 1 lists the test results of wear-resisting property of Baohua BHNМ400 steel plate along the thicken direction,

Experiment results of wear-resisting property is consistent with the hardness test results, that is to say, the change of abrasion resistance along the thickness direction is slight in the scope of the whole cross section; under the same test conditions, some important brand 400 level abrasion resistance steel model is also tested and the results listed in table 2. By comparing, we can find the wear-resisting property of both are equivalent.

表1 BHNМ400钢8mm厚钢板的耐磨性测试结果

TABLE 1 BH400 8 MM THICK STEEL PLATE ABRASION RESISTANCE TEST RESULTS

钢 种 steel grade	失重量mass lose(mg)				磨损率wear rate(mg/m)			
	1	2	3	均值 mean value	1	2	3	均值 mean value
BHNМ400	127.90	101.40	96.85	108.72	14.21	11.27	10.76	12.08
某进口品牌 imported brand	128.55	133.35	122.10	128.00	14.28	14.82	13.57	14.22



图2 测试后砂纸表面的螺旋线
FIG. 2 Helix of sandpaper surface after test

环块磨损试验 RING ON BLOCK WEAR TEST

采用ASTM G77-05环块试验方法测试了BHNМ400和Q345B钢板耐磨损性能，并加以对比，磨环副的材料为GCr15，硬度约为HRC60。磨损试验结果如表2所示，磨损面形貌如图3所示。采用环块试验方法测试结果表明， BHNW400相对耐磨损约为Q345B的30倍。

BHNМ400 and Q345Bwith ASTM G77-05 ring on block wear test was carried out. Deputy of ring material is GCr15, and its hardness is about HRC60.The test results are shown in table 2 and the abrasive surface is shown in figure 3. Test results show that the relative wear rare of BHNW400 is about 30 times less than Q345B.

表2 BHNМ400钢8mm厚钢板的耐磨性测试结果

TABLE 2 BH400 8 MM THICK STEEL PLATE ABRASION RESISTANCE TEST RESULTS

	平均磨痕宽度(mm) average grinding crack width	磨损体积(mm) mm, abrasion loss mm	磨损率(mm³N-1m-1) wear rate mm³N-1m-1
Q345B	6.90	10.0577	9.1571E-05
BHNМ400	2.29	0.3638	3.3122E-06

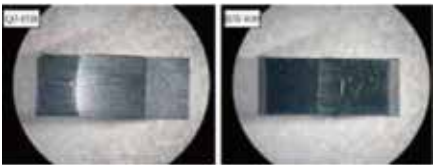
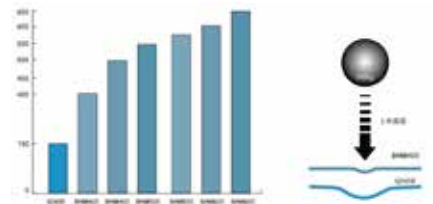


图3 环块磨损试验后试样表面磨损形貌
FIG. 3 Surface wear morphology of specimens after ring wear test

销-盘法磨粒磨损实验 PIN-DISK WEAR TEST

硬度是表征耐磨损性能的关键指标之一， 因此对BHNМ系列进行了硬度测试，结果如图所示，BHNМ400的布氏硬度大约为400，而普通结构钢Q345B的布氏硬度大约为150，耐磨钢的硬度约为普通钢的3-5倍。

Hardness is one of the key indicators to characterize the wear resistance, so that the BHNМ series hardness test was carried out. AS shown shown in the figure, the Brinell hardness of BHNМ400 is about 400, while the Brinell hardness of ordinary structural steel Q345B is about 150, and the hardness of wear-resistant steel is about 3-5 times that of ordinary steel.



抗冲击凹陷性能 IMPACT DENT RESISTANCE

BHNМ耐磨钢板具有良好的冲击韧性,在承受重物冲击时,抗凹陷能力表现显著优于普通结构钢,该性能适用于制作自卸车车厢底板，适合钢板的减薄设计。

BHNМ abrasion resistant steel plate has good impact toughness, when bearing heavy shock, Sag resistance performance is significantly better than ordinary steel. The performance is suitable for production of dump truck’s platform floor and thinning design of steel plate.

钢板尺寸、外形、重量及允许偏差

STEEL PLATE SIZE, SHAPE, WEIGHT AND ALLOWABLE DEVIATION

钢板尺寸、外形、重量及允许偏差满足《GB/T709-2019热轧钢板和钢带的尺寸、外形、质量及允许偏差》的要求。用户如对尺寸公差、不平度等有附加要求，供需双方协商确认，并在合同中注明。

The sizes, shape, weight and allowable deviation of steel plate should meet requirements of GB/T709-2019 hot rolled steel plate and steel belt. If the users have additional request for dimension tolerance, flatness.etc, Seller and buyer should negotiate to confirm and indicate relevant provisions in the contract.

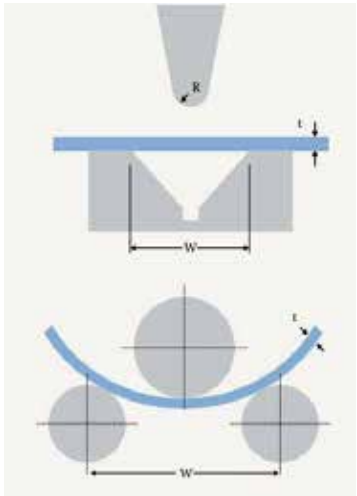
钻铣加工 DRILLING AND MILLING

钻孔加工一般应采用高速钢或陶瓷硬质合金钢钻头。为保证批量钻孔作业时的高效和精确，我们推荐使用高速合金钢（HSS-E）或含钴高速合金钢（HSS-Co）钻头。

铣削加工时应确保夹紧工件，建议采用宽矩铣刀，平面铣刀的材质可选用硬质合金涂层、陶瓷合金等，端面铣刀可选用硬质合金、含钴高速合金钢等，尽量避免采用组合铣头，平面铣的切削宽度应为铣头直径的75%-80%。

Drilling and Milling should generally use high-speed steel or ceramic hard alloy steel drill bit. For efficient and accurate batch drilling operations, we recommend high speed alloy steel (HSS-E) or High speed alloy steel with cobalt (HSS-Co) bits.

It is recommended to use a wide-moment milling cutter, whose material of the plane milling cutter can be selected carbide coating, ceramic alloy, etc., The end milling cutter can be selected carbide, high-speed alloy steel containing cobalt, etc., as far as possible to avoid the use of combined milling head, the cutting width of the plane milling should be 75%-80% of the diameter of the milling head.



折弯加工 BENDING

钢板可进行折弯加工，但必须严格控制折弯内径和角度。钢板进行冷弯时钢板的强度越高，需要的弯曲力越大，回弹力和回弹角度越大，因而应采用合适的上模直径和下模开口度。表4推荐了BHNM系列耐磨钢的折弯加工工艺。

为避免钢板边部因加工硬化造成弯曲开裂，可适当采用打磨机去除毛边。

钢板纵向冷弯性能略好于横向冷弯性能，因而进行相同弯曲角度的折弯时，横向弯曲内径应略大一些。所谓纵向是指钢板的轧制方向垂直于折弯机冲头长度方向。

Steel plate can be bent but must control the bent and angle strictly. When the plate is bented, if the needed bending force higher, the resilience force and the spring back angle is bigger. Therefore, it is better to adopt appropriate diameter of upper die and openness of lower die. Table 4 recommends the bending process of BHNM series of abrasion resistant steel.

In order to avoid plate edge bending cracking caused by work hardening, it is better to appropriately adopt polishing machine to remove burrs.

The vertical cold bending performance of steel plate is slightly better than that of horizontal, therefore, when implementing the same bending angle, inner diameter of transverse bending should be slightly larger. The so-called vertical means that the steel plate rolling direction is perpendicular to the bending machine punch's length direction.

折弯冲压力可参照如下公式计算：
$$P=\frac{1.6\times b\times t^2\times R_m}{10000\times W}$$
其中：P = 折弯冲压力（t），b = 钢板宽度（mm），t = 钢板厚度（mm），Rm = 钢板抗拉强度（MPa），W = 下模开口距离（mm）。

Bending pressure can refer to the following formula:
$$P=\frac{1.6\times b\times t^2\times R_m}{10000\times W}$$
Of which:P = Bending pressure（t），b = Steel plate width（mm），t = Steel plat thickness（mm），Rm = Steel plate tensile strength（MPa），W = lower die opening distance（mm）

表3 BHNM400常用折弯工艺参数速查

TABLE3 BHNM400 COMMON BENDING PROCESS PARAMETERS QUICK SEARCH

板厚t, mm Thickness t, mm	6	8	10
折弯内径D, mm Bending inner diameter D, mm	≥36	≥64	≥80
下模开口距离W, mm Low die opening distance W, mm	≥60	≥80	≥100
若冲击力计算条件为： If impact force computation condition	W=75,	W=90,	W=110,
	Rm=1350	Rm=1350	Rm=1350
则每米宽度折弯冲压力P,t Bending impact pressure for each meters widthP,t	104	154	196

表4 90度折弯加工时推荐工艺参数及可能的回弹角

TABLE 4 RECOMMENDED PROCESS PARAMETERS AND POSSIBLE SPRINGBACK ANGLES FOR 90 DEGREE BENDING PROCESSES

牌号 Grades	板厚 thickness (mm)	最小折弯内径(D) minimum bending inner diameter		最小支撑距离(W) minimum support spacing		回弹角° springback angle°
		纵向 lengthways	横向 crosswise	纵向 lengthways	横向 crosswise	
BHNM400	t < 8	5t	6t	9t	10t	9-13
	8≤t < 10	6t	8t	10t	10t	
BHNM450	t < 8	7t	8t	10t	10t	11-18
	8≤t < 10	8t	10t	10t	12t	

剪切 SHEARING

高强耐磨钢理论上可以进行剪切，但抗拉强度越大，所需的剪切力就越大，所以剪切时应选择坚硬、锋利、并稍带一点圆边的刀刃。剪切过程中刀刃间隙也应随钢板强度的不同而变化，强度越大，刀刃间隙越大，不合理的刀刃间隙会影响切面质量。由于高强耐磨钢强度高，可能会对设备刀刃造成损坏，所以我们不建议对BHNM400、BHNM450钢板进行剪切，建议通过热切割方式进行加工。

High strength abrasion resistant steel can be cut in theory; the larger tensile strength, the greater shear force required. So it is better to choose a hard, sharp blade with a little round edge . In the process of shear, the blade gap should also change along with the strength of steel plate: the greater intensity, the greater gap. The unreasonable blade gap will affect the shearing quality. Because the high strength of abrasion resistant steel may cause damage to the blade of equipment, we do not recommend to shear BHNM 400, BHNM 500 steel plates but suggest processing by heat cutting way.

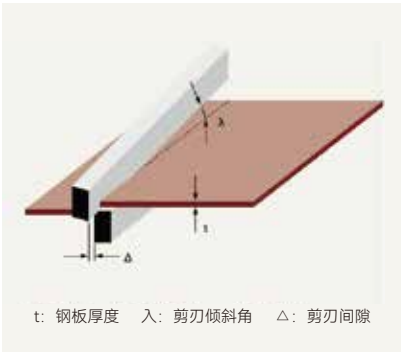


表5 剪切工艺基本参数（仅供参考）

TABLE5 BASIC PARAMETERS OF SHEARING PROCESS(FOR REFERENCE ONLY)

牌号 Grades	剪刀间隙Δ= 16%-18%板厚 Knife gap Δ= 16%-18%Strip thickness	剪刀倾斜角λ Scissors slant angleλ
BHNM400	板厚=6mm, Δ=0.96-1.08 Strip thickness=6mm, Δ=0.96-1.08	3°-5°
	板厚=8mm, Δ=1.28-1.44 Strip thickness=8mm, Δ=1.28-1.44	
	板厚=10mm, Δ=1.6-1.8 Strip thickness=10mm, Δ=1.6-1.8	

焊接工艺要点： THE MAIN POINTS OF WELDING PROCESS

- (1) 建议采用实心焊丝进行MAG焊接，焊接保护气体为（15-25%）CO2的富Ar气体，气体流量为15~25 l/min。

(2) 手工焊条焊接时，优先选用碱性焊条。

(3) 坡口形式优先选用U形，其目的是减少母材熔入焊缝金属中的比例，降低焊缝中的含碳量，防止裂纹产生。

(4) 预热有利于减小热影响区的最高硬度，防止产生冷裂纹。整体预热有困难时，可采用局部预热，局部预热范围是焊口两侧150-200mm。
- (1) It is recommended to use solid welding wire for MAG welding, welding protection gas is (15-25%) CO2 rich gas, gas flow is 15~25 l/min.

(2) When welding with manual electrode, the basic electrode is preferred.

(3) The groove form is preferred to be U-shaped, which aims to reduce the proportion of the base metal fused into the weld metal, reduce the carbon content in the weld, and prevent cracks.

(4) Preheating is conducive to reducing the maximum hardness of the heat affected zone and preventing cold cracks. When the overall preheating is difficult, local preheating can be used, and the local preheating range is 150-200mm on both sides of the welding joint.

焊接 WELDING

对于推荐的焊丝适用于全位置焊接，当垂直位置焊接时，推荐采用上向焊接方法，这样可避免焊接缺陷产生。热轧耐磨钢适用于多种接头型式的焊接，常用的接头型式有：对接接头、角接接头和搭接接头；常用的坡口型式有：I型坡口，V型坡口和双V型坡口型式。在焊接时，若出现未焊透时，应检查是否间隙太小，是否电弧没有垂直钢板表面。

对于打底焊时，可采用较小焊接参数的熔滴过渡形式，即小电流，小电压，快速焊；对于特别重要的结构件，也可考虑采用TIG焊打底。对于定位焊接，为了防止出现裂纹，应保证一定的焊接长度，至少大于50mm长，焊接参数可选用稍大一些的熔滴过渡形式。对于MAG焊，以常用焊丝规格φ1.2mm为例，典型打底焊的焊接参数为：100 ~ 200A，12-19V，2.5 ~ 7mm/s；典型的定位焊接参数为：200 ~ 250A，20 ~ 23V，4.0 ~ 6.5mm/s。

对于填充和盖面焊接，可以采用稍大一些的熔滴过渡和射流过渡形式的焊接工艺。对于MAG焊，以常用规格φ1.2mm为例，推荐的典型填充和盖面焊接工艺为：200 ~ 240A，20 ~ 24V，4.0 ~ 6.5mm/s（熔滴过渡）或260 ~ 320A，26 ~ 32V，4.0 ~ 6.0mm/s（射流过渡）。

The recommend welding wire is suitable for all-position welding. When welding in vertical position, upward direction welding method is recommended. This method can avoid weld defects. Hot rolled abrasion resistant steel is suitable for a variety of joint types of wear-resisting welding. For example, the common used joint types are: butt joint, angle joint and lap joint. Common used bevel types include: type I groove, type V groove and double" V" groove. At welding, if the welding is not complete, the best advice is check whether the gap is too small or the electric is not vertical to plate surface.

For bottoming welding, melt dripping transition form with smaller welding parameters can be use, namely small current, small voltage, fast welding; For particularly important structure, the TIG welding method can be consider to weld backing. For positioning welding, in order to prevent crack, a certain welding length should be guarantee, at least more than 50mm and the welding parameters can choose larger melt dripping transition form. As for MAG welding, take the common wire specifications phi 1.2mm for example, typical backing welding parameters are: 100 ~ 200 A, 12-19 V, 2.5 ~ 7 mm/s; Typical positioning welding parameters are : 200 ~ 250 V, 20 to 23 V, 4.0 ~ 6.5 mm/s.

As for filling and covering welding, both of the larger drop transfer and spray transfer forms of welding can be adopt. For MAG welding, take common specification Phi 1.2mm for example, recommended for typical filling and covering of welding process: 200 ~ 240 A, 20 to 24 V, 4.0 ~ 6.5 mm/s (droplet transition) or 260 ~ 320 A, 26 ~ 32 V, 4.0 ~ 6.0 mm/s (spray transfer).



热切割 THERMAL CUTTING

钢板热切割包括火焰切割、等离子切割、激光切割等。钢板热切割时可能会产生切边裂纹，断面裂纹产生时间往往会延迟到24小时或几周内才出现，和焊接裂纹相似是一种延迟裂纹。钢板的硬度和厚度越大，出现切边裂纹的风险也越高。热轧耐磨钢由于板厚较薄，在低温环境下热切割时适当降低切割速度是防止切边裂纹的有效方法，另外切割后对工件保温缓冷，在一定程度上也可以降低切割边缘的残余应力。

钢板热切割或热加工时，钢板会因为受热而产生软化，钢板的抗软化能力取决于钢的化学成分、显微组织及加工方式，切割工件越小，热量会在工件中聚集导致软化的风险越大。避免软化风险的最好方式是采用冷切割和冷加工。如果必须进行热切割时，优先使用激光切割或等离子切割。水下等离子切割可以大大缩小热影响区、防止工件硬度降低、减少切割部件变形、降低噪音、无烟尘。

Hot cutting of steel plate includes flame cutting, plasma cutting, laser cutting and so on. When the steel plate is hot cut, the edge crack may be produced, and the section crack generation time is often delayed to 24 hours or a few weeks, and the welding crack is similar to a delayed crack. The greater the hardness and thickness of the steel plate, the higher the risk of cutting edge cracks. Due to the thin plate thickness of hot-rolled wear-resistant steel, reducing the cutting speed is an effective method to prevent cutting edge cracks in the low-temperature environment. In addition, keeping the workpiece warm and cooling slowly after cutting can also reduce the residual stress on the cutting edge to a certain extent.

When the steel plate is hot cutting or hot processing, the steel plate will be softened by heat, and the softening resistance of the steel plate depends on the chemical composition, microstructure and processing method of the steel, the smaller the cutting workpiece, the greater the risk of heat gathering in the workpiece leading to softening. The best way to avoid the risk of softening is to use cold cutting and cold working. If thermal cutting is necessary, laser cutting or plasma cutting is preferred. Underwater plasma cutting can greatly reduce the heat affected zone, prevent workpiece hardness reduction, reduce cutting parts deformation, reduce noise and smoke.

表3 BHNМ400常用折弯工艺参数速查

TABLE 3 QUICK CHECK OF COMMON BENDING PROCESS PARAMETERS OF BHNМ400

切割方式 Cutting way	切割速度 mm/min Cutting speed	热影响区宽度 mm Heat affected zone width	尺寸公差 mm Dimensional tolerance
水刀切割 Water cutting	8-150	0	±0.2
火焰切割 Flame cutting	150-700	4-10	±2.0
激光切割 Laser cutting	600-2200	0.4-3	±0.2
等离子切割 Plasma cutting	1200-6000	2-5	±1.0

以上数据均为参考值,具体视生产情况而定 The above data are reference values, depending on the production situation

SYSTEM CERTIFICATION
体系认证



BAOHUA 宝华

QB/BH

山东宝华耐磨钢有限公司企业产品标准
Q/BHNM J001-2020

耐磨钢板尺寸、成分、性能的允许偏差
Wear resistant steel plate size, components, properties of allowable deviation

2020-12-01发布

2020-12-01实施

山东宝华耐磨钢有限公司发布

PURPOSE OF DEVELOPING THIS STANDARD

制定本标准的目的

耐磨钢广泛应用于工况条件特别恶劣，要求高强度，高耐磨性能的工程、采矿、建筑、农业、港口、电力以及冶金等机械产品上。如推土机、装载机、挖掘机、自卸车及各种矿山机械、抓斗、堆取料机、输料弯曲结构等。多年来一直困扰着工业界人士的一个重大问题就是磨损，尤其是接触岩石、矿料等受磨擦、撞击、冲刷的结构。据统计，工业发达的国家，机械装备及其零件的磨损所造成的经济损失占国民经济总产值4%左右。因此，解决磨损和延长机械设备及其部件的使用寿命成为工业界人士在设计、制造和使用各种机械设备时所需要考虑的首要问题。从国民经济的角度考虑，研制工程机械用高强度耐磨钢是非常必要的。国外已有企业生产并应用高强度耐磨钢，如日本住友公司、JFE、瑞典SSAB和SWEBOR，国内多数使用NM360 ~ 400，国际上多使用NM400 ~ 650，年消耗60 ~ 120万吨。

山东宝华耐磨钢有限公司（简称宝华耐磨）是上海宝钢国际与山东华星耐磨钢有限公司共同组建的合资企业，引进了国外先进技术，生产的BHN M系列薄规格高强度耐磨钢填补了国内同类产品的空白。目前，我国尚无较为完整的通用化、系列化的标准体系，我公司根据自身情况，制定了该检验标准，目的是使其成为日常生产的一个检验依据，使产品检验方式统一，更为明了地突出产品特性。

本标准规定了耐磨钢板的化学成分、外形尺寸、力学性能的允许偏差，并对公司生产的欧标和国标产品进行了区分。

本标准所有内容符合强制性国家标准、行业标准及地方标准。本标准由山东宝华耐磨钢有限公司提出，并只适用于本公司产品的检验指导依据。本标准起草单位：山东宝华耐磨钢有限公司。本标准解释权归山东宝华耐磨钢有限公司所有。

Wear-resistant steel is widely used in engineering, mining, construction, agriculture, port, power and metallurgy and other mechanical products that require high strength and high wear-resistant properties under particularly harsh working conditions. Such as bulldozers, loaders, excavators, dump trucks and all kinds of mining machinery, grab, stacker and reclaimer, feed bending structure. A major problem that has plagued industry for many years is wear, especially contact with rocks, minerals and other structures subjected to friction, impact, and erosion. According to statistics, in industrially developed countries, the economic loss caused by the wear and tear of machinery and equipment and its parts accounts for about 4% of the gross national economic output value. Therefore, solving wear and extending the service life of mechanical equipment and its components has become the primary issue that industry professionals need to consider when designing, manufacturing and using various mechanical equipment. From the perspective of national economy, it is very necessary to develop high strength wear-resistant steel for construction machinery. Foreign enterprises have produced and applied high-strength wet-resistant steel, such as Japan Sumitomo Corporation, JFE, Sweden SSAB and SWEBOR, most of the domestic use of NM360 ~ 400, the international use of NM400 ~ 650, annual consumption of 600 ~ 1.2 million tons.

Shandong Baohua Wear-resisting Steel Co., LTD. (referred to as Baohua Wear-resisting Steel Co., LTD.) is a joint venture established by Shanghai Baosteel International and Shandong Huxing Wear-resisting Steel Co., LTD., introducing and absorbing foreign advanced technology, the production of BHN M series thin specification high strength wear-resisting steel fills the gap of similar products in China. At present, there is no relatively complete universal, serialized standard system in China, our company according to its own situation, formulated the inspection standard, the purpose is to make it a daily production of inspection basis, so that the product inspection method is unified, more clearly highlight the product characteristics.

This standard specifies the permissible deviations of the chemical composition, external dimensions and mechanical properties of wear-resistant steel plates, and distinguishes the European and national standard products produced by the company.

All contents of this standard comply with mandatory national standards, industry standards and local standards. This standard is proposed by Shandong Baohua Wear-resistant Steel Co., LTD., and is only applicable to the company's product inspection guidance basis. This standard drafting unit: Shandong Baohua wear-resistant Steel Co., LTD. The right of interpretation of this standard belongs to Shandong Baohua Wear-resistant Steel Co., LTD.



标准适用于宝华耐磨生产的布氏硬度400级、450级、500级、550级耐磨钢板，具体牌号为：BHNМ400、BHNМ450、BHNМ500、BHNМ550。

The standard is applicable to Brinell hardness 400 grade, 450 grade, 500 grade, 550 grade wear-resistant steel plate produced by Baohua wear-resistant steel plate, the specific brand is: BHNМ400, BHNМ450, BHNМ500, BHNМ550.

1、分类和代号 CLASSIFICATION AND CODE

1.1字母 LETTER

牌号前字母BHNМ，BH为公司名称宝华汉语拼音的首字母，NM为耐磨汉语拼音的首字母。
The first letter of the brand is BHNМ, BH is the first letter of the company name Baohua Pinyin, and NM is the first letter of wear-resistant Pinyin.

1.2字母 LETTER

牌号中的数字分别代表公司生产钢板的级别，具体如下：
BHNМ400-----代表布氏硬度400级的耐磨钢板； BHNМ450-----代表布氏硬度450级的耐磨钢板；
BHNМ500-----代表布氏硬度500级的耐磨钢板； BHNМ550-----代表布氏硬度550级的耐磨钢板；
The numbers in the grades represent the levels of steel plates produced by the company, as follows:
BHNМ400----- stands for Brinell hardness 400 wear-resistant steel plate;
BHNМ450----- stands for abrasion-resistant steel plate with Brinell hardness level 450;
BHNМ500----- stands for wear-resistant steel plate with Brinell hardness of 500;
BHNМ550----- stands for Brinell hardness class 550 wear-resistant steel plate;

2、尺寸、外形、重量及允许偏差 SIZE, SHAPE, WEIGHT AND ALLOWABLE DEVIATION

欧标产品表面喷防锈漆、整板喷有钢板牌号、生产日期、批号等标识。
欧标产品钢板采用齐边轧制、切头尾、切两纵边工艺，切边余量按正常切边板控制，表面平整度要求在3mm/m²内，长宽、厚度、重量允许偏差符合GB/T709-2019。
国标产品表面仅做抛丸处理，表面质量符合标准GB/T3274，钢板采用齐边轧制、切头尾、切两纵边工艺，切边余量按正常切边板控制，表面平整度要求在5mm/m²内。
钢板外形尺寸、重量允许偏差符合GB/T709-2019。
为最大限度满足客户需求，体现客户至上原则，可提供满足客户需求的定轧服务。

The surface of European standard products is sprayed with anti-rust paint, and the whole board is sprayed with steel plate grade, production date, batch number and other marks.
European standard steel plate adopts edge rolling, cutting head and tail, cutting two vertical edge process, cutting margin is controlled according to normal cutting plate, surface flatness is required within 3mm/m², length width, thickness, weight allowable deviation in line with GB/T709-2019.
The surface of the national standard product is only shot blasting treatment, the surface quality meets the standard GB/T3274, the steel plate uses the edge rolling, cutting the head and the tail, cutting the two longitudinal edge process, the edge margin is controlled according to the normal edge plate, the surface flatness is required to be within 5mm/m².
Steel plate dimensions, weight allowable deviation in line with GB/T709-2019.
In order to meet customer needs to the maximum extent and reflect the principle of customer first, we can provide fixed rolling services to meet customer needs.

3、钢板牌号及其主要化学成分含量 STEEL PLATE GRADE AND ITS MAIN CHEMICAL COMPOSITION CONTENT

本标准规定了宝华耐磨生产的耐磨钢系列产品的合金成分及允许偏差，具体偏差范围见表一。
This standard specifies the alloy composition and allowable deviation of the wear-resistant steel series products produced by Baohua Wear-resistant. The specific deviation range is shown in Table 1.

表一 耐磨钢化学成分允许偏差

TABLE 1 WEAR RESISTANCE TEMPERING CHEMICAL COMPOSITION ALLOWABLE DEVIATION									
Chemical composition 化学成分 牌号 Abrand	化学成分最大含量 Maximum content of chemical composition W/T%								
	C	Si	Mn	P	S	Cr	Ni	Ti	B
BHNМ400	0.25	0.95	1.8	0.025	0.01	0.8	0.8	0.1	0.003
BHNМ450	0.25	0.95	1.8	0.025	0.01	0.8	0.8	0.1	0.003
BHNМ500	0.35	1.7	1.8	0.025	0.01	1	1	0.45	0.006
BHNМ550	0.4	1.7	1.8	0.025	0.01	1	1	0.45	0.006

除以上几种主要元素外，还含有Mo、Nb等作为合金元素，确保材料具有良好的综合力学性能。
In addition to the above main elements, it also contains Mo, Nb and other alloy elements to ensure that the material has good comprehensive mechanical properties.

4、钢板的性能 PROPERTIES OF STEEL PLATE

4.1国标产品 NATIONAL STANDARD PRODUCT

国标产品我们只对板材的硬度做要求，其允许的偏差范围见表二
National standard products we only make requirements for the hardness of the plate, and the allowable deviation range is shown in Table 2

表二 耐磨钢硬度

TABLE 2 HARDNESS OF WEAR-RESISTANT STEEL			
牌号 Brand	厚度范围 Thickness range	表面布氏硬度(HBW) 表面铣掉1.0-2.5mm Surface Brinell Hardness (HBW) Surface milling 1.0-2.5mm	芯部硬度(HBW) 铣掉板材厚度一半 Core hardness (HBW) Milled half the thickness of the sheet
BHNМ400	3 — 60mm	370 — 430	360 — 430
BHNМ450	3 — 60mm	430 — 470	420 — 480
BHNМ500	3 — 60mm	470 — 520	460 — 530
BHNМ550	3 — 60mm	520 — 580	510 — 580

注：表面硬度测试3个点，测试点位置应铣掉1mm以上。
Note: Surface hardness test 3 points, test point position should be milled more than 1mm.

4.2欧洲标准 EUROPEAN STANDARD

欧洲标准的钢板做全面的检测，具体包括硬度、屈服强度、抗拉强度、断后伸长率、冷弯性能、冲击功七项
A European standard steel plate for comprehensive testing, including hardness, yield strength, tensile strength, elongation after break-ing, cold bending performance, impact work seven items.

其检测方法参照以下标准： THE DETECTION METHOD FOLLOWS THE FOLLOWING STANDARDS:

- 1：硬度测试，测试方法：DIN EN ISO 6506-1:2014

2：拉伸测试，测试方法：EN ISO 6892:2019

3：弯曲测试，测试方法：EN ISO 7438:2020

4：冲击测试，测试方法：EN 10045-1:2018

硬度允许偏差同表二

其他力学性能见表三
- 1: Hardness test, test method: DIN EN ISO 6506-1:2014

2: Tensile test, test method: EN ISO 6892:2019

3: Bending test, test method: EN ISO 7438:2020

4: Impact test, test method: EN 10045-1:2018

The allowable deviation of hardness is shown in Table 2

Other mechanical properties are shown in Table 3

表三 钢板力学性能允许偏差范围

TABLE 3 ALLOWABLE DEVIATION RANGE OF MECHANICAL PROPERTIES OF STEEL PLATE					
牌号 Abrand	力学性能 Mechanical property			90°冷弯 90° Cold bending	-20°冲击功纵向 KV2(J) -20° Impact power longitudinal KV2(J)
	屈服强度 Rp0.2/MPa Yield strength Rp0.2	抗拉强度 Rm Tensile strength Rm	断后伸长率 A ₅₀ Elongation after breaking A ₅₀		
BHNМ400	≥1050	≥1250	12	D≥8a	40
BHNМ450	≥1150	≥1350	10	D≥8a	30
BHNМ500	≥1250	≥1500	7	—	20
BHNМ550	≥1300	≥1550	6	—	12

注：（1）数据以厚度 10mm 为标准值测定，实际延伸率、冲击功随钢板厚度变化基本呈比例变化。（2）D为弯心直径，a为试样厚度。
Note: (1) The data is measured with the thickness of 10mm as the standard value, and the actual elongation and impact work are basically proportional to the change of the thickness of the steel plate. (2) D is the diameter of the bending center and a is the thickness of the sample.

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