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公司官网



金属板带解决方案服务商

SOLUTIONS PROVIDER FOR METAL STRIP

北京京杰锐思技术开发有限公司

BEIJING JJRS TECHNOLOGY

DEVELOPMENT

CO., LTD

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企业文化 Corporate Culture



企业使命 >> Corporate Mission

做冶金行业技术创新的践行者;
To Be Practitioner of Technological Innovation in Metallurgical Industry;

依靠技术创造价值;
To Create Value by Virtue of Technology;

为员工提供发展(事业)平台;
Provide a development platform for employees

为社会创造持久财富。
To Create Permanent Wealth for Society.

企业愿景 >> Enterprise Vision

成为全球范围内同行业中受尊重的企业。
To Be a Worldwide Respected Enterprise in the Industry.

企业宗旨 >> Corporate Tenet

为员工、为客户、为社会。
For Staff, For Customer, For Society.

核心价值观 >> Core Value

始于诚信，止于至善。
Start with Integrity, Strive for Perfection.

企业简介

Brief Introduction



北京京杰锐思技术开发有限公司注册于国家级科技园区—北京经济技术开发区，是专业从事金属表面涂覆、金属板带深加工等冶金成套设备的民营股份制企业，是集机-光-电-液一体化的高新技术企业。

Beijing JJRS Technology Development Co., Ltd. registered in national high-tech park - Beijing Economic and Technological Development Zone, is a high-tech enterprise specialized in a complete set of metallurgical equipments for metal surface coating and steel strip intensive processing, etc, with the integration of mechanism, optics, electricity and hydraulic pressure together.

公司承做项目的总体承包，包括规划-设计-制造-安装-调试-服务，同时承接单机设备的设计、制造，以及工程项目的自动化控制系统等。

JJRS undertakes the overall contracting of projects, including planning, design, manufacturing, installation, debugging, and services, as well as the design and manufacturing of single machine equipment, as well as the automation control system of engineering projects.

公司通过了ISO9001质量管理体系认证，ISO14000环境管理体系认证和GB/T28001职业健康安全管理体系认证。

JJRS has passed ISO9001 quality management system certification, ISO14000 environmental management system certification and GB/T28001 occupational health safety management system certification.

公司致力于冶金装备技术创新，工艺持续改进，在能源节约、废物循环利用等方面取得了多项科研成果，获得了多项国家专利，赢得了国内外客户好评。

JJRS is committed to technology innovation and continuous process improvement of the metallurgical equipment, has achieved a number of scientific research achievements in energy conservation, waste recycling, etc, has obtained several national patents, and has won a good reputation from customers both domestic and abroad.

京杰锐思秉承技术领先、队伍专业、用户至上、服务完善的管理理念，以精湛的技术、科学的管理方法凝聚了过硬的技术攻关队伍、高素质的管理人才、完善的管理体系、强大的工程设计和成套能力。

Bearing philosophy of advanced technology, professional team, customers first and perfect service in mind, JJRS gathers excellent technology research team, highly qualified management personnel, perfect management system, powerful engineering design and complete project capability by virtue of exquisite technology and scientific management.



董事长致辞

President Speech



» 京杰锐思自成立之日起

Since JJRS was founded

» 本着“为员工、为客户、为社会”的企业宗旨

In line with enterprise mission " For staff, For customer, For society"

» 承载着众多合作单位产业腾飞的梦想

JJRS Bears the dream of rapid industry development of many cooperation partners

» 创业、成长、发展……

Started with Entrepreneurship, and go forward with growth and development...

» 路漫漫其修远兮

A long way to go

» 我们仍将与您携手并进，共同创造美好明天！

We will still go forward hand in hand with you to create a bright future together!



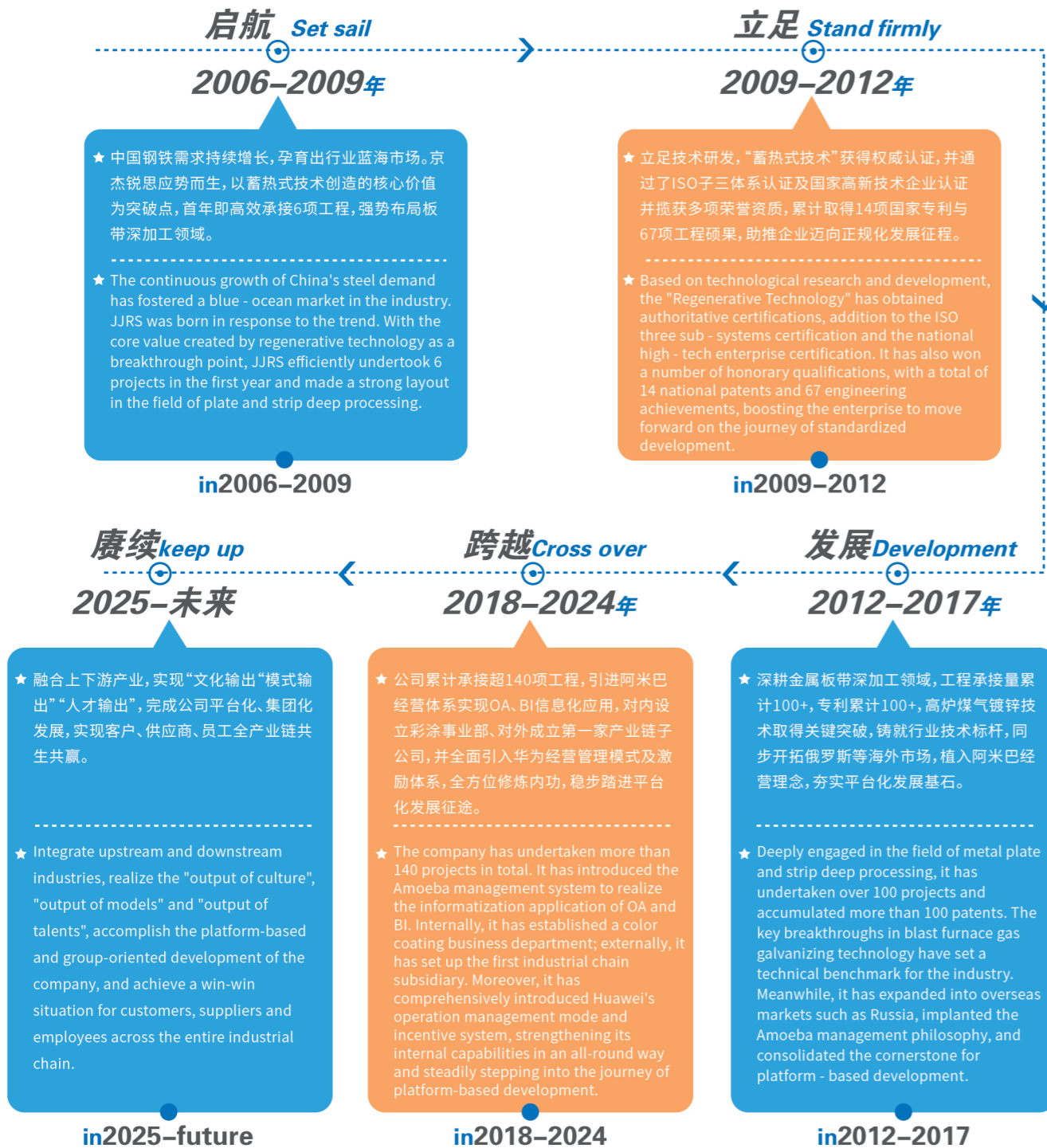


发展历程 Development History



公司自2006成立以来，本着“为员工、为客户、为社会”的企业宗旨，从创造、积累到发展。京杰锐思已成为中国冶金行业最具发展潜力的品牌，并用一个个坚实的足迹印证自己逐渐壮大的身影。

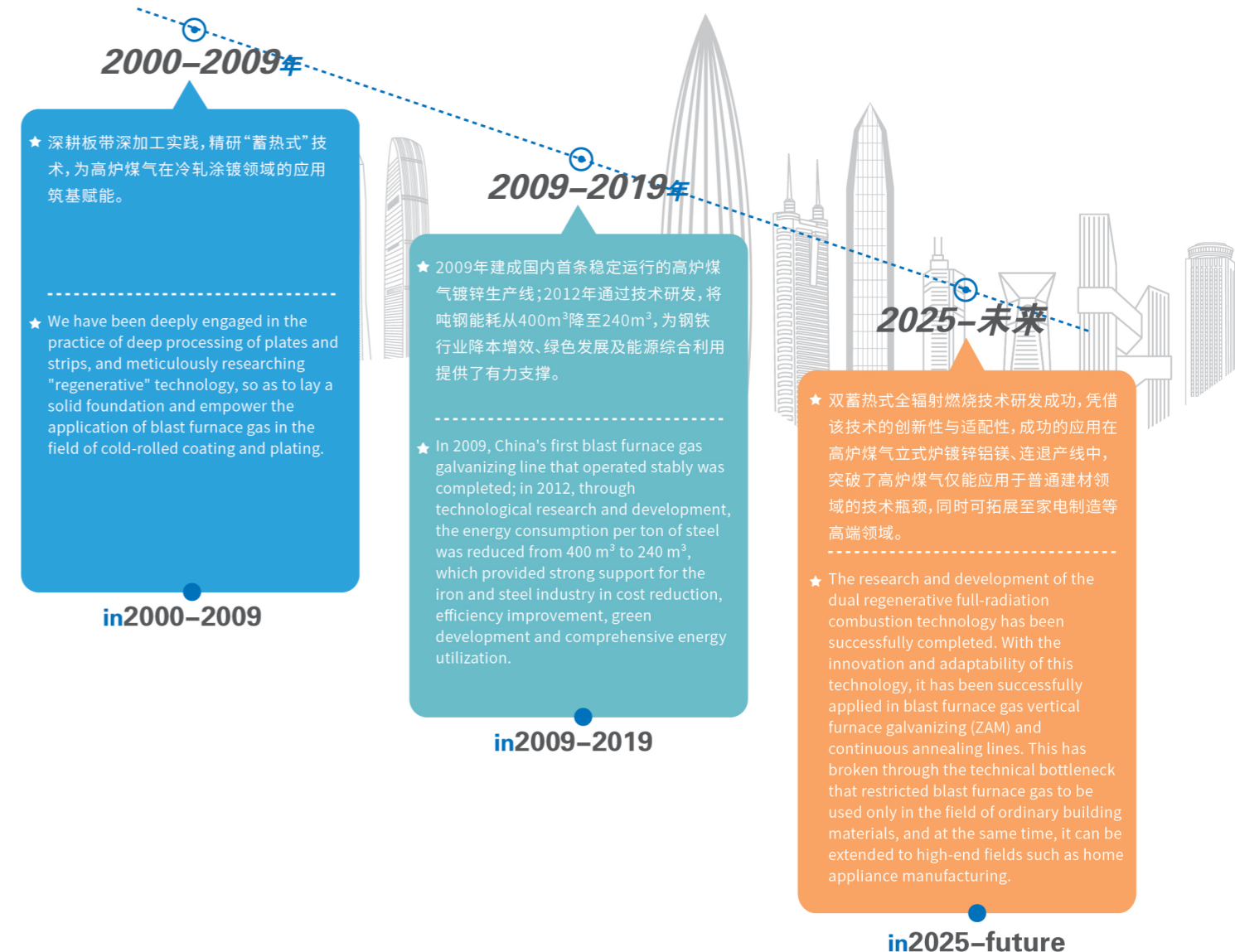
Since JJRS was founded in 2006, In line with enterprise mission "For staff, For customer, For society", from entrepreneurship, growth, to development, JJRS has become the most potential brand in China's metallurgical industry, and is confirming its growing figure with one and another solid footprint



高炉煤气发展历程（部分节选） Development History of Blast Furnace Gas (Excerpt)

截至目前，已经成功投产38条高炉煤气生产线，均稳定运行。

Up to now, 38 blast furnace gas production lines have been successfully put into operation, all of which are operating stably.





荣誉资质

Honor And Qualification

资质认证

Technical certification

累计荣获政府“荣誉资质”20余项
 累计荣获政府“奖励资金”1000余万元

Accumulated over 20 government "honorary qualifications"
 Accumulated government "reward funds" of over 10 million yuan



俄罗斯GOST认证
 COST qualification



知识产权

Intellectual property rights

授权发明专利15项; 授权实用新型专利110项; 授权软件著作权8项
 15 authorized invention patents, Authorized 110 utility model patents and 8 software copyrights

技术认证

Technical certification

ISO质量、环境、健康管理体系认证
 ISO qualification environment healthy management



欧盟CE认证
 CE qualification





国际先进的工艺技术,确保京杰锐思产品的卓越品质
International Advanced Technology to Guarantee
Excellent Quality of JJRS Products

镀锌 (铝、镁) 生产线 Galvanizing (GI, GL, ZAM) Line

热镀锌 / 镀铝锌 / 镀锌铝镁 是在带钢表面通过热浸镀方式覆盖一层锌或铝锌、铝镁合金,具有较强的阴极保护性。

镀锌板(GI钢板)因其良好的防腐性能已经广泛用于家电、装饰、广告和民用等行业,尤其以家电行业(空调室外机、冰箱外板、洗衣机面板、电脑机箱、微波炉等)和彩涂基板需求很大。

热镀锌铝硅钢板即Galvalume(简称GL钢板),是在钢板的表面热镀铝(Al55%)、锌(Zn43.5%)、硅(Si1.5%)合金的钢板。它是钢基复合材料,具有优良的耐腐蚀性能。热镀锌铝硅合金钢板既具备了镀铝钢板优良的耐大气腐蚀性和耐热抗氧化性,又具备了镀锌钢板优良的电化学保护性。

热镀锌铝镁钢板(Galvanizing(Zn-Al-Mg)钢板),在镀锌和镀铝锌液成分中加入镁(0.5%-3%),具有比GI和GL更好的耐腐蚀性能、具有断口自修复性能、耐刮痕性,广泛应用到汽车、家电、建筑结构、管廊桥架、畜牧设施、光伏支架、建筑板材等领域。

我司可提供“美钢联法”和改良的森吉米尔法、锐森法”三种工艺技术的 Galvanizing (GI, GL, ZAM) Line 生产线。

Hot dip (or hot) galvanizing /Galvanizing (GI, GL, ZAM) Line is the technology to dip the pretreated original plate of carbon steel into melted liquefied zinc to obtain a protective zinc coating.

Due to its good anticorrosion performance, galvanized steel plate (GI steel plate) is vastly applied into the industries of home appliance, decoration, advertisement, and civil construction, etc. Particularly, the home appliance industry (outer shell of air conditioner, outer plate of refrigerator, outer shell of washing machine, computer, and microwave oven, etc) and color coated plate has large demands on galvanized plate.

Hot dip aluminum zinc silicon steel plate - Galvalume (Referred to GL steel plate), is steel plate to hot dip aluminum (Al 55%), zinc (Zn 43.5%), silicon (Si 1.5%) alloy on the surface of the steel plate. It is a steel matrix composite. It has excellent corrosion resistance. Hot aluminum zinc alloy steel plate possesses both the excellent atmospheric corrosion resistance and the thermal oxidation resistance of the aluminized steel plate, and the excellent electrochemical protection of the galvanized steel plate.

Hot dip galvanized Zn-Al-Mg steel plate, with the addition of magnesium (0.5%~3%) in the zinc plating and aluminum zinc plating solution, has better corrosion resistance, fracture self-healing performance, and scratch resistance than GI and GL. It is widely used in fields such as automobiles, home appliances, building structures, pipe racks and bridges, livestock facilities, photovoltaic brackets, and building panels.

Our company can provide Galvanizing (GI, GL, ZAM) line with three process technologies: "American Steel Union Process" and improved Sendzimir Process and Ruisen Process.



镀锌 (铝、镁) 机组产能参数表

Technical Parameters

机组型号 Model	1250镀锌线 1250 Galvanizing Line		1000镀锌线 1000 Galvanizing Line		850镀锌线 850 Galvanizing Line	
原料状态 Material Status	冷轧、热轧酸洗卷 Cold Rolling & HotRolling Acid Pickling Coil		冷轧&热轧酸洗卷 Cold Rolling & HotRolling Acid Pickling Coil		冷轧、热轧酸洗卷 Cold Rolling & HotRolling Acid Pickling Coil	
原料厚度 (mm) Thickness (mm)	0.15-1.5	1.5-6.0	0.3-2.0	2.0-6.0	0.5-2.5	2.0-6.0
TV值(mm·m/min) TV Value(mm·m/min)	27-120	48-180	36-150	80-180	60-150	80-180
年产量 (万吨) Annual Output(Unit: 10,000 ton)	15-40	25-70	15-45	20-60	15-35	18-50

新一代带钢连续退火热浸镀锌 (铝、镁) 工艺技术-锐森法 蓄热式NOF

New generation continuous annealing Galvanizing (GI, GL, ZAM) Line process technology for steel strip - regenerative NOF

北京京杰锐思技术开发有限公司的技术研发团队,通过深入研究分析,整合了传统工艺技术“改良森吉米尔法”和“美钢联法”的优点,并融入了自主研发的蓄热式烧嘴及余热高效再利用技术,同时装备了自行设计的最新工艺控制技术,推出了新一代的带钢连续退火热浸镀锌工艺控制技术,我们将之命名为“锐森法”。

The technology R&D team of Beijing JJRS Technology Development Co., Ltd., launched a new generation of steel strip continuous annealing hot dip galvanizing process control technology through in-depth study and analysis, consolidating the advantages of the traditional technology "improved Sendzimir" and "United States Steel Corp", integrating the independent research and development regenerative nozzle and waste heat efficient recycling technology, equipping with the latest self-designed process control technology at the same time. We named it as "JJRS-Sendzimir".

“锐森法”的研发宗旨

Research & Development Objective of "JJRS-Sendzimir"

- 真正的蓄热式无氧化加热余热的“极限回收”节能环保没有终点。

True heat regenerative non-oxidation heating
Waste heat "extreme recycling"
No end in energy conservation and environmental protection



“锐森法”的二个核心

Two Core of "JJRS-Sendzimir"

相比传统工艺，“锐森法”可以极大地提高产能，源于：

Compared with the traditional technology, the method of "JJRS-Sendzimir" can greatly increase productivity. For its:

- 高温明火一次性加热工艺：在加热炉能够将带钢从入炉20℃的常温下，在无氧化气氛中直接加热到带钢能够发生再结晶的温度区。
- High temperature flame one-time heating technology: In the heating furnace, steel strip from the normal temperature of 20 °C can be heated directly to the re-crystallization temperature zone of strip steel in the non-oxidation atmosphere.

带钢高炉煤气镀锌（铝、镁）机组

Strip Steel Continuous Galvanizing (GI, GL, ZAM) Line (with blast furnace gas)

高炉煤气是钢铁工业中高炉炼铁过程中副产的一种低气体燃料，高炉煤气热值低，应用范围小，许多钢铁企业并没有充分利用，甚至大量放散，既浪费了能源，又污染了环境。

Blast furnace gas is a kind of low gas fuel produced in the ironmaking process of blast furnace in the steel industry. Blast furnace gas has low calorific value and small application range. Many steel enterprises have not fully utilized it and even released a large amount, which not only wastes energy, but also pollutes the environment.



高炉煤气的典型组成
Typical composition of blast furnace gas

主要成分 Main components	CO	CO ₂	H ₂	CH ₄	N ₂	硫化物 Sulfide
体积百分含量/% Volume percentage /%	22-27	13-19	1-4	0.2-0.4	54-58	微量 Trace

高炉煤气与天然气的对比

如果能将大型钢铁企业富裕的高炉煤气应用到板带连续热镀锌生产线上，那么可以明显提高能源利用率，优化企业的环保排放水平，提升企业和产品的竞争力。目前热镀锌生产线吨钢高炉煤气250m³/吨（普通管料为190-220 m³/吨），高炉煤气单价按0.07-0.1元/m³核算，吨钢燃气成本约合17.5-25元；镀锌生产线吨钢天然气18m³/吨，燃气单价按3元/m³计算，吨钢天然气成本约合54元。以年产100万吨生产线对比，在能源上，一年节约2900余万元。

我公司于2009年在浙江元立集团采用蓄热式加热炉成功将高炉煤气应用到板带连续热镀锌生产线上，目前为止

我公司是最早也是唯一成功实现高炉煤气应用到板带连续热镀锌生产线上的成套设备供应厂家。继2009年浙江元立集团首条高炉煤气板带热镀锌生产线投产之后，我公司又陆续与浙江元立集团、唐山东海钢铁集团、磐石建龙、山西建龙、宁夏建龙集团、赤峰远联钢铁、云南穆光钢铁集团相继合作。至今国内已陆续有38条高炉煤气（宽度范围500mm-1250mm）热镀锌线投产运行，并且所有生产线目前均超产稳定运行。

Comparison between blast furnace gas and natural gas

If the abundant blast furnace gas from large steel enterprises can be applied to the continuous hot-dip galvanizing production line of plates and strips, it can significantly improve energy utilization efficiency, optimize the environmental emission level of enterprises, and enhance the competitiveness of enterprises and products. At present, the hot dip galvanizing production line has a ton of steel and a blast furnace gas of 250m³/Tons (190-220 m³/Ton for ordinary pipe materials), the unit price of blast furnace gas is 0.07-0.1 CNY /m³. According to accounting, the cost of gas per ton of steel is approximately 17.5-25 CNY; Galvanization production line with a ton of steel and natural gas of 18m³/Tons, gas unit price is 3 CNY /m³. Calculated, the cost of natural gas per ton of steel is approximately 54 CNY. Compared to the production line with an annual output of 1000000 tons, it saves over 29 million yuan in energy in one year.

In 2009, our company successfully applied blast furnace gas to the steel strip continuous hot galvanizing line in Zhejiang Yuanli Group with regenerative heating furnace. So far, our company is the first and only complete equipment supplier that successfully applied blast furnace gas to the steel strip continuous hot galvanizing line. After Zhejiang Yuanli Group's first steel strip hot galvanizing line for blast furnace gas was put into operation in 2009, our company has successively cooperated with Zhejiang Yuanli Group, Tangshan Donghai Steel Group, Panshi Jianlong, Shanxi Jianlong, Ningxia Jianlong Group, Chifeng Yuanlian Steel, and Yunnan Muguang Steel Group. Up to now, 38 hot galvanizing lines with blast furnace gas (width range of 500mm-1250mm) have been put into operation in succession in China, and all production lines are now running stably in excess of capacity.



马口铁连退生产线

Tinplate continuous annealing line

马口铁连续退火是马口铁（镀锡板）生产中的核心工序，在洁净的保护气氛中，对冷轧后的带钢进行快速加热、均热、精确控冷及过时效处理，获得所需的机械性能（如硬度、强度、延伸率）和优良的板形，特别是优异的深冲加工性能。

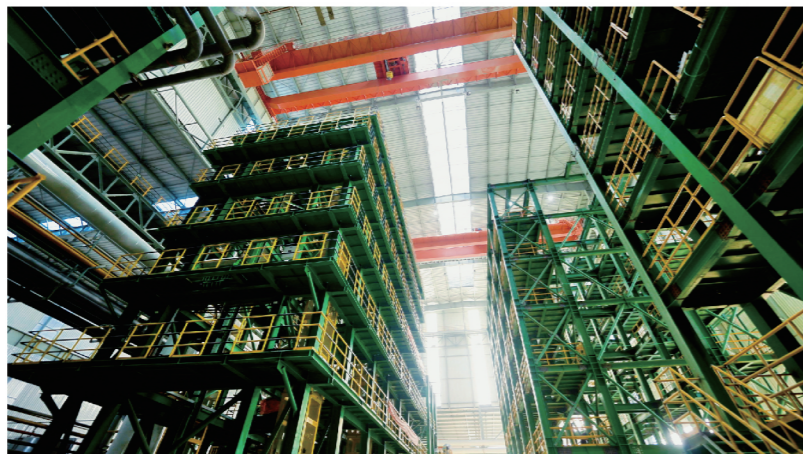
马口铁（镀锡板）经过连续退火处理后，具有组织均匀、性能稳定、表面洁净、成型性好等显著特点。这使其成为食品饮料罐（两片罐、三片罐、易拉罐）、化工罐、皇冠盖、旋开盖、干电池外壳、电子元件等的理想材料，尤其对需要高速冲压、深拉深和复杂成型的罐身、罐盖需求巨大。

我司可提供先进的马口铁连续退火生产线，运用高炉煤气等低热值燃气的创新燃烧系统，高效处理不同规格（厚度、宽度）的基板，满足从T2到T5、DR等各级别硬度的马口铁生产需求。

Continuous annealing of tinplate is a core process in the production of tinplate. In a clean protective atmosphere, the cold-rolled steel strip undergoes rapid heating, soaking, precise controlled cooling, and over-aging treatment to obtain the required mechanical properties (such as hardness, strength, and elongation), excellent plate shape, and particularly superior deep drawing performance.

After continuous annealing, tinplate has significant characteristics such as uniform structure, stable performance, clean surface, and good formability. This makes it an ideal material for food and beverage cans (two-piece cans, three-piece cans, easy-open cans), chemical cans, crown caps, twist-off caps, dry battery casings, electronic components, etc., especially with huge demand for can bodies and lids that require high-speed stamping, deep drawing, and complex forming.

Our company can provide advanced tinplate continuous annealing lines (CAL), which use an innovative combustion system with low-calorific-value gases such as blast furnace gas. It can efficiently process base plates of different specifications (thickness, width) to meet the production needs of tinplate with various hardness levels from T2 to T5, DR, etc.



普板连退生产线

Carbon Steel Continuous Annealing Line

普板连续退火是高端冷轧工序生产中的核心工序，在洁净的保护气氛中，对冷轧后的带钢进行快速加热、均热、精确控冷及过时效处理、平整、双侧切边，获得所需的机械性能（如硬度、强度、延伸率）和优良的板形，特别是优异的高强&深冲加工性能的产品。

带钢经过连续退火处理后，具有组织均匀、性能稳定、表面洁净、成型性好等显著特点。

机组将清洗、退火、平整、表面自动检查、涂油、重卷和剪切一次性完成，减少了多次钢卷处理，减少了因此产生的废品。

我司可提供先进的普板连续退火生产线，运用高炉煤气等低热值燃气的创新燃烧系统，高效处理不同规格（厚度、宽度）的基板，满足从CQ、DQ、DDQ、DP生产需求。

Continuous annealing of carbon steel plates is a core process in high-end cold rolling production. In a clean protective atmosphere, the cold-rolled steel strip undergoes rapid heating, soaking, precise controlled cooling, over-aging treatment, temper rolling, and double-sided trimming to obtain products with required mechanical properties (such as hardness, strength, and elongation), excellent plate shape, and particularly superior high-strength & deep drawing performance.

After continuous annealing treatment, the steel strip has significant characteristics such as uniform structure, stable performance, clean surface, and good formability.

The production line completes cleaning, annealing, temper rolling, surface automatic inspection, oiling, recoiling, and shearing in one go, reducing multiple coil handling operations and reducing unqualified products.

Our company can provide advanced continuous annealing lines (CAL) for carbon steel plates, which adopt an innovative combustion system using low-calorific-value gases such as blast furnace gas. It can efficiently process base plates of different specifications (thickness, width) to meet the production needs of CQ, DQ, DDQ, DP, etc.

马口铁连退机组 Tinplate CAL	
年产量 Annual capacity	35万吨 350,000 tons
产品 Product	T2.5、T3、T4、T5、DR
带钢厚度 Strip Thickness	0.15~0.55mm
带钢宽度 Strip Width	700~1150mm
机组速度 Process Speed	max600m/min

普碳钢连退机组 Carbon steel plate CAL	
年产量 Annual capacity	70万吨 700,000tons
产品 Product	CQ、DQ、DDQ、DP
带钢厚度 Strip Thickness	0.5~2.0mm
带钢宽度 Strip Width	700~1150mm
机组速度 Process Speed	max450m/min

带钢/铝板彩涂生产线

Strip Steel (Aluminium) Color Coating Line (CCL)

我们公司可提供各种类型的彩涂生产线，包括建材板彩涂生产线，家电板彩涂生产线，覆膜板彩涂生产线，印花板彩涂生产线等等。烘涂形式可以为一涂一烘，两涂两烘，三涂三烘。所有类型的彩涂生产线均可配置废气回用和快速换色的功能。

Our company can provide various types of colorcoating line, including construction grade color coatingline, home appliance grade color coating productionline,color coating line with laminator, color coating linewith printers and so on. Coating and Baking form can beone-coating-one-baking,two-coating-two-bakingthree-coating-three-baking. All types of color coating linecan be configured with surplus heat recycling and fast color changing.

我公司在彩涂生产线节能领域有非常先进的技术，主要表现形式为：蓄热式废气焚烧炉（RTO），联合废气回用系统。可使生产线能耗降到业界超低水平，为客户带来巨大的商业价值。

Our company have very advanced technology in energy saving in color coating line, the main manifestation is: Regenerative thermal oxidizer (RTO), combined with surplus heat recycle system. By adopting such configuration, we can reduce the energy consumption to a ultra low level and bring great business value to the customer.



我公司可为彩涂生产线选配二级计算机管理系统，可实现用户管理、原料管理、过程管理、成品管理、报表管理、能源管理、通讯管理等功能。生产工艺可实现自动采集工艺参数，实现工艺参数自动记录、可追溯、可参考。生产线可配置板带表面质量检测，自动检测、记录板带表面质量。

The color coating line can be equipped with 2 level computer management system, which can realize management for user, raw material and process, finished product , production report, energy consumption and communication.The production process can realize automatic process parameters collection and automatic recording, which is traceable and referable. The production line can be configured with strip surface quality detection, automatic detect and record the strip surface quality.



主要参数

Technical Parameters

- ◆ 原料：镀锌板，镀铝锌板，铝板，冷轧板
 - ◆ 生产线速度：整线速度40-200m/min
 - ◆ 成品重量：3500-15000Kg/卷
 - ◆ 钢卷外径：φ900-2100mm
 - ◆ 钢卷内径：φ508/φ610mm
 - ◆ 钢板厚度：0.18-1.6mm
 - ◆ 钢板宽度：600-1600mm
 - ◆ 能源：液化石油气/天然气/高炉煤气/发生炉煤气、蒸汽和电
- ◆ Material: GI, GL, AL, CRC
 - ◆ Line speed: whole line speed 40-200m/min
 - ◆ End product weight: 3,500-15,000kg/coil
 - ◆ Coil OD: φ900-2100mm
 - ◆ Coil ID: φ508/φ610mm
 - ◆ Strip Thickness: 0.18-1.6mm
 - ◆ Width of steel plate: 600-1,600mm
 - ◆ Energy: LPG/natural gas/blast furnace gas/producer gas, steam and electricity

带钢酸洗生产线

Strip Steel Pickling Line

带钢酸洗生产线 >>

Strip Steel Pickling Line

酸洗生产线是冷轧带钢生产工艺中非常重要的工序，其目的是清除带钢表面的氧化铁、剪除裂边，为轧制提供合格原料；根据酸洗工艺不同分为推拉式酸洗和连续酸洗。

Pickling production line is a very important process in the production process of cold rolled strip steel. Its purpose is to remove the iron oxide on the surface of the strip steel, cut the cracked edge, and provide qualified raw materials for rolling; According to different pickling processes, it can be divided into push-pull pickling and continuous pickling.

推拉式浅槽紊流酸洗线 >>

Push-Pull Shallow Trough Turbulence Pickling Line

推拉式酸洗是钢带每卷均单独穿带，无需焊接，先推后拉，完成酸洗过程；通常年产量低于60万吨时采用该工艺方法；我公司采用先进的浅槽紊流推拉式酸洗工艺单机组产能已经达到100万吨/年，具有占地小、投资少、机组设备简单、对带钢品种变化的适应性强，操作方便、易维护等优点，非常适合中小冷轧厂。

Push-pull pickling is that each roll of steel strip is threaded separately without welding, and the pickling process is completed by pushing and pulling first; This process is usually used when the annual output is less than 600,000 tons; Our company has adopted the advanced shallow groove turbulent pickling process with a single unit capacity of 1 million tons/year, which has the advantages of small land occupation, small investment, simple unit equipment, strong adaptability to the variety of strip steel, convenient operation and easy maintenance, and is very suitable for small and medium-sized cold rolling plants.



主要参数

Technical Parameters

- ◆ 生产纲领：20~80万吨/年
(根据用户需要确定，当前最大产能已达到100万吨/年)
- ◆ 原料：热轧碳素结构钢、优质碳素结构钢及低合金钢卷、硅钢
- ◆ 带钢厚度：1.5~6.0mm
- ◆ 带钢宽度：700-1350 mm
- ◆ 工艺速度：30~180m/min (根据产量确定速度)
- ◆ 钢卷重量：Max 25吨
- ◆ 工艺方法：推拉式浅槽紊流盐酸酸洗
- ◆ 能源：水、电、蒸汽

- ◆ Production capacity: 200,000- 800,000 tons annually (depend on the needs of customer, Max. annual capacity is 1,000,000 tons at present)
- ◆ Raw material: hot rolling carbon structure steel, high quality carbon structure steel and low alloy steel coil, silicon steel
- ◆ Thickness of steel strip: 1.5-6.0mm
- ◆ Width of steel strip: 700-1,350mm (when less than 600mm, semi-continuous method will be adopted)
- ◆ Processing speed: 30-180m/min (depend on the needs of output)
- ◆ Coil weight: Max. 25tons
- ◆ Technology: push-pull shallow trough turbulence acid pickling
- ◆ Energy: water, electricity, steam

连续式酸洗 >>

Continuous Pickling Line

连续酸洗是将钢带头尾相连，带钢连续运行，设备工艺段两侧分别设有储料活套，保证工艺段的连续运行，一般年产量超过70万吨时采用该工艺方案。

Sections are equipped with accumulators to guarantee a continuous operation. Generally when the annual capacity exceeds 700,000 tons, continuous pickling line will be adopted.



主要参数

Technical Parameters

- ◆ 生产纲领：70~200万吨/年 (根据用户需要确定)
- ◆ 原料：热轧碳素结构钢、优质碳素结构钢及低合金钢卷、硅钢
- ◆ 带钢厚度：1.5~6mm
- ◆ 带钢宽度：700-1350mm
- ◆ 工艺速度：100~400m/min (根据产量确定速度)
- ◆ 钢卷重量：Max 25吨
- ◆ 工艺方法：连续式浅槽紊流盐酸酸洗
- ◆ 能源：水、电、蒸汽

- ◆ Annual production capacity: 700,000-2,000,000 tons (depends on the needs of customer)
- ◆ Raw material: hot rolling carbon structure steel, high quality carbon structure steel and low alloy steel coil, silicon steel
- ◆ Thickness of steel strip: 1.5-6mm
- ◆ Width of steel strip: 700-1,350mm
- ◆ Processing speed: 100-400m/min (depend on the needs of output)
- ◆ Coil weight: Max. 25tons
- ◆ Technology: continuous shallow trough turbulence acid pickling
- ◆ Energy: water, electricity, steam

工艺特点和装备水平

Technology Characteristics & Equipment Level

我公司酸洗机组采用浅槽紊流式酸洗，工艺段投资少，酸洗效率高，操作简单。

Our company's pickling unit adopts shallow groove turbulent flow pickling, with low investment in the process section, high pickling efficiency, and simple operation.

自动化系统：连续酸洗线可以实现连续生产线自动上料，自动开卷，自动穿带，自动焊接，自动液位控制，自动甩尾，自动卷取，自动卸料，自动称重等功能。

机组可选配二级计算机管理系统，可实现用户管理、原料管理、过程管理、成品管理、报表管理、能源管理、通讯管理等功能。

Automation system: The continuous pickling line can achieve functions such as automatic feeding, automatic uncoiling, automatic threading, automatic welding, automatic liquid level control, automatic tailing, automatic coiling, automatic unloading, and automatic weighing in the continuous production line.

The unit can be equipped with a level computer management system which can achieve functions such as user management, raw material management, process management, finished product management, report management, energy management, communication management, etc.

酸再生机组

Acid Regenerating Unit

废酸再生机组可将酸洗机组产生的废酸进行分解，获得与原废酸浓度基本相同不含（或含少量）铁盐的再生盐酸和高附加值的氧化铁粉。再生酸无需调配浓度即可重新投入酸洗生产线中使用。



The waste acid regeneration unit can decompose the waste acid produced by the pickling unit to obtain the regenerated hydrochloric acid and high value-added iron oxide powder with the same concentration as the original waste acid without (or a small amount of) iron salt. The regenerated acid can be reused in the pickling line without mixing the concentration.

机组特点

Characteristics of the Acid Regeneration Line

我司酸再生机组环境友好、投资少、能耗低、自动化程度高、操作简单、运行稳定、铁粉品质高。机组产能可根据客户要求，在废酸处理量0.5~20m³/h之间灵活配置。

我司废酸再生机组均与酸洗机组无缝衔接，从厂房规划、机组设计到调试、生产以及检修均已统一考虑。实现了资源配置最优化，减少用户成本，简化操作，提高效率，保障机组更加稳定安全运行。

随着社会环境保护意识的加强，对废酸处理提出

Our acid regeneration unit is environmentally friendly, with low investment, low energy consumption, high automation, simple operation, stable operation and high iron powder quality. The unit capacity can be 0.5~20m³ in waste acid treatment capacity according to customer requirements³/ Flexible configuration between h.

The waste acid regeneration unit of our company is seamlessly connected with the pickling unit, and the plant planning, unit design, commissioning, production and maintenance have all been considered. It realizes the optimization of resource allocation, reduces user costs, simplifies operation, improves efficiency, and ensures more stable and safe operation of the unit.

With the strengthening of social environmental protection awareness, more requirements are put forward for

更多要求。我公司废酸再生机组采用先进的喷雾焙烧法（即鲁兹纳法），经过我公司多年项目实践与开发，盐酸回收效率较高，再生酸浓度控制稳定，三废排放较小，尾气经净化后HCL、颗粒物排放指标低于10mg/m³，根据客户要求，也可配置尾气“消白”装置，实现尾气消白功能，生产的铁粉品质高，市场价值高，不仅解决了环保问题，而且具有非常好的社会效益和经济效益。

waste acid treatment. The waste acid regeneration unit of our company adopts the advanced spray roasting method (i.e. Luzhner method). After years of project practice and development of our company, the recovery efficiency of hydrochloric acid is high, the concentration of regenerated acid is controlled stably, the discharge of three wastes is small, and the emission index of HCL and particulate matter after tail gas purification is lower than 10mg/m³. According to customer requirements, the tail gas "whitening" device can also be configured to realize the tail gas whitening function. The iron powder produced is of high quality and high market value, which not only solves the environmental protection problem, but also has very good social and economic benefits.

机组性能

Performance of the Acid Regeneration Line

我公司酸再生机组产能主要为：0.5m³/h，3m³/h、4m³/h、6m³/h、8m³/h、10m³/h、15m³/h、20 m³/h等。产能可根据用户需求进行设计。

The capacity of our acid regeneration unit mainly is: 0.5 m³/h, 3 m³/h, 4 m³/h, 6 m³/h, 8 m³/h, 10 m³/h, 15 m³/h, 20 m³/h. Capacity can be designed according to user needs.

主要参数

Technical Parameters

- ◆ 废酸 Fe₂₊ ≤120g/L HCL 3~5%
- ◆ 再生酸 Fe₂₊ ≤5g/L HCL 190~210g/L
- ◆ 铁粉 Fe₂O₃ ≥99.3% CL- ≤0.15% H₂O ≤0.5%
- ◆ 废气 Fe₂O₃ ≤10mg/Nm³ HCL ≤10mg/Nm³
- ◆ 废液 Fe₂₊ 0~120g/L HCL 0~20% (间断排放)
- ◆ 效率 ≥99.5%
- ◆ 能耗 <750Kcal/L
- ◆ 能源 电、水、压缩空气等

- ◆ Waste acid Fe₂₊ ≤120g/L HCL 3-5%
- ◆ Regenerating acid Fe₂₊ ≤5g/L HCL 190-210g/L
- ◆ Iron powder Fe₂O₃ ≥99.3% CL- ≤0.15% H₂O ≤0.5%
- ◆ Exhaust gas Fe₂O₃ ≤10mg/Nm³ HCL ≤20mg/Nm³
- ◆ Effluent Fe₂₊ 0-120g/L HCL 0-20% (discontinuously discharge)
- ◆ Efficiency ≥99.5%
- ◆ Energy consumption <750Kcal/L
- ◆ Energy electricity, water, compressed air





● 电气自动化 Electrical Automation

京杰锐思是集机-光-电-液一体化的高新技术企业，以专业的团队、先进的理念、科学的手段为冶金行业提供工业自动化、降本增效和节能减排服务，公司本着“用户第一、品质至上、价格满意”的宗旨，诚信务实的精神，竭诚为广大新老客户服务。

JJRS is a high-tech enterprise that integrates machinery, optics, electronics, and hydraulics. With a professional team, advanced concepts, and scientific methods, we provide industrial automation, cost reduction, efficiency increase, and energy conservation and emission reduction services to the metallurgical industry. The company adheres to the principle of "user first, quality first, and price satisfaction", and the spirit of honesty and practicality, wholeheartedly serving the vast number of new and old customers.

专业从事 >

Professional engagement

- 一、冶金电气自动化工程项目设计、研发、安装、调试、技术服务。
- 二、承接各类工业自动化系统集成、设备成套、安装调试项目。
- 三、代理销售电气自动化产品和备品备件供产订货。

公司是汇川的授权代理商，并和SIEMENS、施耐德、P+F、SICK.....等国际著名厂商建立了长期稳定的合作。

- 1、Design, research and development, installation, debugging, and technical services for metallurgical electrical automation engineering projects.
- 2、Undertake various industrial automation system integration, equipment assembly, installation and debugging projects.
- 3、Agent sales of electrical automation products and spare parts for production and ordering.

The company is an authorized agent of Huichuan and has established long-term and stable cooperation with internationally renowned manufacturers such as SIEMENS, Schneider, P+F, SICK.

技术实力 >

Technical strength

我公司配备专业的传动及自动化团队，关键工程师从业经验20年以上，专业调试板带热镀锌和彩涂生产线数百条。具有如下实力和亮点：

- 一、开卷自动上卷、自动穿带、自动焊接；收卷自动分卷、焊缝自动剪切、自动下料。
- 二、HMI画面可视化多媒体监控：焊缝自动跟踪、动态显示；语音报警；程序联锁动态画面提示。
- 三、生产线二级软件，实现对生产和工艺全过程监控。
- 四、先进的容错机制保证了生产线的连续生产和安全运行。

五、我司和北京科技大学、百度等知名院校和企业合作开发，致力于通过大数据和人工智能推动产业的技术革新和进步。

Our company is equipped with a professional transmission and automation team, with over 20 years of experience as key engineers. We specialize in debugging hundreds of hot-dip galvanizing and color coating production lines for steel plates and strips. Having the following strengths and highlights:

- 1、Automatic loading, uncoiling, Automatic threading, Automatic welding; Automatic winding, automatic cutting of welds, and Automatic unloading.
- 2、HMI visual multimedia monitoring: automatic seam tracking and dynamic display; Voice alarm; Program interlocking dynamic screen prompt.
- 3、The Level 2 software of the production line enables monitoring of the entire production and process process.
- 4、The advanced fault-tolerant mechanism ensures the continuous production and safe operation of the production line.
- 5、Our company collaborates with well-known universities and enterprises such as Beijing University of Science and Technology and Baidu to promote technological innovation and progress in the industry through big data and artificial intelligence.

● 智能制造

Intelligent Manufacturing

智能制造板块是公司核心业务方向之一。我们依托AI技术，开发系列智能控制模型，覆盖带钢加热、冷却、镀层处理等关键环节，实现降本、提质和增效。

The intelligent manufacturing sector is one of the core business directions of the company. Relying on AI technology, we have developed a series of intelligent control models covering key links such as strip steel heating, cooling and coating treatment, so as to achieve cost reduction, quality improvement and efficiency enhancement.

主要产品 >

Main products

01

锌铝镁镀后冷却智能控制

Intelligent Control of ZAM post-coating Cooling

★ 针对锌铝镁产线镀后冷却易出现表面黑点缺陷的问题，基于机器视觉和AI算法对镀层冷却过程进行全自动控制，降低因人工经验不足、调控疏忽而造成的缺陷品。

★ In response to the issue of surface black spot defects that tend to occur during post-coating cooling in ZAM production lines, we have implemented full-automatic control over the coating cooling process using machine vision and AI algorithms. This approach reduces defective products caused by insufficient manual experience and oversight in regulation.

02

锌层厚度闭环控制

Closed-loop Control of Zinc Coating Thickness

★ 基于历史生产数据构建AI模型，并在生产过程中结合工况信息实时自动调节气刀参数，以维持锌层厚度的均匀性，并降低锌锭用量。

★ An AI model is built based on historical production data. During the production process, it automatically adjusts the air knife parameters in real time in combination with working condition information to maintain the uniformity of the zinc coating thickness and reduce the consumption of zinc ingots.

03

连退炉智能燃烧控制系统

Intelligent Combustion Control System for Continuous Annealing Furnace

★ 针对热值波动、频繁换规格导致的带温控制不稳问题，融合大数据算法与传热机理，通过空燃比与燃气流量自适应协同调控炉区温度，实现带温稳定控制，既提高产品质量又降低能耗成本。

★ To address the issue of unstable strip temperature control caused by calorific value fluctuations and frequent strip gauge changes, we integrate big data algorithms with heat transfer mechanisms. By adaptively and synergistically regulating the furnace zone temperature through air-fuel ratio and gas flow, we achieve stable control of strip temperature. This not only improves product quality but also reduces fuel consumption costs.

客户业绩汇总表
Project List

截至2025年6月，公司累计承建生产线共计173条，累计服务国内外客户60+。以下是部分典型案例。

As of June 2025, the company has cumulatively constructed a total of 173 production lines and has served over 60 domestic and foreign customers. The following are some typical achievements.

中宽带镀锌线/镀铝锌线/镀锌铝镁线(部分) Galvanizing Line/Galvalume line/ Zn-Al-Mg plating Line (PART)		
序号 S/N	客户名称 Customer Name	项目名称 Project Name
1	河南·海洪 Henan Haihong	1.0mm-4.0mm×900mm年产38万吨镀锌生产线(转炉煤气) 1.0mm-4.0mm × 900mm 380,000 TPY galvanizing line (converter gas)
2	秦皇岛·宏腾 Qinhuangdao·Hongteng	0.25mm-2.5mm×1050mm家电板铝镁线年产40万吨(高炉煤气立式炉) 0.25mm-2.5mm × 1050mm 400,000 TPY household appliance grade ZAM galvanizing line (blast furnace gas vertical furnace)
3	秦皇岛·宏腾 Qinhuangdao·Hongteng	0.5mm~3.5mm×1050mm家电板铝镁线年产40万吨(高炉煤气立式炉) 0.5mm-3.5mm × 1050mm 400,000 TPY household appliance grade ZAM galvanizing line (blast furnace gas vertical furnace)
4	广西·榕鼎 Guangxi Rongding	0.4mm~2.75mm×1300mm镀锌线年产量58万吨(焦炉煤气) 0.4mm-2.75mm × 1300mm 580,000 TPY galvanizing line (coke oven gas)
5	天津·宇润德 Tianjin Yurunde	1.0mm~4.0mm×685mm年产19万吨镀锌生产线 1.0mm-4.0mm × 685mm 190,000 TPY galvanizing line
6	赤峰·远联 Chifeng Yuanlian	0.3mm~2.0mm×1050mm镀锌铝镁线年产量32万吨(高炉煤气立式炉) 0.3mm-2.0mm × 1050mm ZAM galvanizing line with capacity of 320,000 tpy (blast furnace gas vertical furnace)
7	赤峰·远联 Chifeng Yuanlian	0.5mm~3.5mm×1050mm镀锌铝镁线年产量40万吨(高炉煤气立式炉) 0.5mm-3.5mm × 1050mm ZAM galvanizing line with capacity of 400,000 tpy (blast furnace gas vertical furnace)
8	赤峰·远联 Chifeng Yuanlian	0.3mm~3.0mm×1050镀锌铝镁线年产量40万吨(高炉煤气立式炉) 0.3mm-3.0mm × 1050mm, 400,000 TPY ZAM galvanizing line (blast furnace gas; vertical furnace)
9	阿城建龙 Acheng Jianlong	0.7~2.5mm×520mm年产量21万吨镀锌(高炉煤气) 0.7-2.5mm × 520mm 210,000 TPY galvanizing line (blast furnace gas)
10	山西·建龙 Shanxi Jianlong	1.5mm~3.0mm×520mm一号镀锌线改造(高炉煤气) 1.5mm~3.0mm × 520mm 1# Galvanizing Line Revamping (Blast Furnace Gas)
11	越南 Vietnam	0.2mm~0.8mm1250mm15万吨产能铝镁 0.2mm~0.8mm × 1250mm, 150,000 tpy ZAM galvanizing line
12	山西·建龙 Shanxi Jianlong	0.5~3.0mm×1250mm年产量32万吨中铝中镁生产线(高炉煤气) 0.5~3.0mm × 1250mm 320,000 TPY ZAM galvanizing line (blast furnace gas)
13	赤峰·远联 Chifeng Yuanlian	二冷轧年产量22万T镀锌生产线1线和2线(高炉煤气) 1# Galvanizing Line and 2# 220,000 TPY Galvanizing Line (Blast Furnace Gas)
14	宁夏·建龙 Ningxia Jianlong	1.5~4.0mm×525mm年产20万T连续热浸镀锌铝镁(中铝中镁)生产线1线(高炉转炉混合煤气) 1.5~4.0*525mm 1# 200,000TPY ZAM Galvanizing Line (Mixed gas of blast furnace and converter)
15	宁夏·建龙 Ningxia Jianlong	0.5~2.5mm×525mm年产20万T连续热浸镀锌生产线2线(高炉转炉混合煤气) 0.5~2.5*525mm 2# 200,000TPY Galvanizing Line (Mixed gas of blast furnace and converter)

客户业绩汇总表
Project List

16	宁夏·建龙 Ningxia Jianlong	0.5~2.5mm×525mm年产20万T连续热浸镀锌(预留铝镁)生产线3线(高炉转炉混合煤气) 0.5~2.5*525mm 3# 200,000TPY Galvanizing Line (reserve function of ZAM)(Mixed gas of blast furnace and converter)
17	宁夏·建龙 Ningxia Jianlong	0.5~2.5mm×525mm年产20万T连续热浸镀锌(预留铝镁)生产线4线(高炉转炉混合煤气) 0.5~2.5*525mm 4# 200,000TPY Galvanizing Line Ne4 (reserve function of ZAM)(Mixed gas of blast furnace and converter)
18	赤峰·远联 Chifeng Yuanlian	1.0~4.0mm×800mm 年产量42万T镀锌中铝中镁生产线1(高炉煤气) 1.0~4.0*800mm 420,000TPY Galvanizing LineNg4(blast furnace gas)
19	四川·方鑫 Sichuan Fangxin	0.6~2.5mm×1100mm 年产40万T连续热浸镀锌铝镁生产线 0.6~2.5mm × 1100mm continuous hot-dip galvanized aluminum-magnesium production line with an annual output of 400,000 tons
20	泰国 AMC Thailand	0.7~3.0*550年产量18万T连续热浸镀锌铝镁生产线 0.7~3.0mmx550mm 180000TPY Continuous hot dip Zn-Al-Mg plating Line
21	云南·穆光 Yunnan Muguang	0.6~2.0mm×800mm 年产25万T连续热浸镀锌生产线1线和2线(高炉煤气) 0.6~2.0mmx800mm 1# and Line 2# Galvanizing Line with capacity of 250000TPY for each (blast furnace gas)
22	赤峰·远联 Chifeng Yuanlian	0.5~2.5mm×800mm 年产量34万T连续热浸镀锌1号和2号生产线(高炉煤气) 0.5~2.5mmx800mm 1# and 2# Galvanizing Line with capacity of 340,000TPY for each (blast furnace gas)
23	赤峰·远联 Chifeng Yuanlian	0.3~1.2mm×800mm 年产量27万T连续热浸镀锌生产线3(高炉煤气) 0.3~1.2mmx800mm 270,000TPY Galvanizing Line 3(blast furnace gas)
24	福建·辉源 Fujian Huiyuan	0.3~1.2mm×1250mm 年产量25万T连续热浸镀锌生产线 0.3~1.2mmx1250mm 250,000TPY Galvanizing Line
25	福建·辉源 Fujian Huiyuan	0.7~2.5mm×1250mm 年产量45万T连续热浸镀锌生产线 0.7~2.5mmx1250mm 450,000TPY Galvanizing Line
26	柬埔寨 Cambodia	0.6~2.0mm×750mm 年产量21万T连续热浸镀锌生产线 0.6~2.0mmx750mm 210,000TPY Galvanizing Line
27	天津·新宇 Tianjin Xinyu	0.2~1.2mm×1250mm 年产25万T连续热浸镀锌铝生产线 0.2~1.2mm x1250mm 250,000TPY Galvalume Line
28	河北·彦博 Hebei Yanbo	0.2~1.2mm×1250mm 年产15万T连续热浸镀锌生产线 0.2~1.2mmx1250mm 150,000TPY Galvanizing Line
29	山东·汇丰 Shandong Huifeng	0.12~0.8mm x1300mm 年产15万T连续热浸镀锌生产线 0.12~0.8mm x1300mm150,000TPY Galvanizing Line
30	河北·京华 Hebei Jinghua	0.2~1.2mm×1250mm 年产20万T连续热浸镀锌生产线 0.2~1.2mmx1250mm 200,000TPY Galvanizing Line
31	山东·东鼎轧钢 Shandong Dongding	0.16~0.8mm x1250mm 年产20万T连续热浸镀锌生产线 0.16~0.8mm x1250mm 200,000TPY Galvanizing Line
32	山东·亿科 Shandong Yike	0.18~0.8mm×1250mm 年产15万T连续热浸镀锌生产线 0.18~0.8mmx1250mm 150,000TPY Galvanizing Line
33	天津·新宇 Tianjin Xinyu	0.2~1.2mm×1250mm 年产25万T连续热浸镀锌生产线 0.2~1.2mmx1250mm 250,000TPY Galvanizing Line
34	山西·建龙 Shanxi Jianlong	0.5~2.5mm×550mm 年产19万T连续热浸镀锌生产线 1号线、2号线、3号线(高炉煤气) 0.5~2.5mm × 550mm 1#, 2#, 3# 190,000TPY galvanizing line
35	吉林·建龙·恒联 Jilin Jianlong henalian	0.7~2.5mm×500mm 年产16万T连续热浸镀锌生产线(高炉煤气) 0.7~2.5mmx500mm 160,000TPY Galvanizing Line (with blast furnace gas)

客户业绩汇总表
Project List

彩涂客户业绩汇总表(部分) Color Coating Line Reference List (PART)		
序号 S/N	客户名称 Customer Name	项目名称 Project Name
1	赤峰·远联 Chifeng Yuanlian	0.2mm~0.8mm×1250mm彩涂1线和2线年产量15万吨(高炉煤气) 0.2mm~0.8mm×1250mm 1# and 2# 150,000 TPY Color Coating Line (blast furnace gas)
2	越南 Vietnam	0.2~0.8mm×1250mm 年产10万T彩涂生产线 0.2~0.8mm×1250mm 100,000 TPY coating line
3	福建·辉源 Fujian Huiyuan	0.2~1.0mm×1250mm 年产15万T彩涂生产线 0.2~1.0mm×1250mm 150,000 TPY color coating line
4	苏州·禾盛 Suzhou Hesheng	0.2~1.2mm×1250mm 彩涂RTO改造 0.2~0.6mm×1250mm Color Coating Line RTO Revamping
5	合肥·禾盛 Hefei Hesheng	0.2~1.2mm×1251mm彩涂RTO改造 0.2~0.6mm×1250mm Color Coating Line RTO Revamping
6	乌兹别克斯坦 Uzbekistan	0.2~0.6mm×1250mm 年产8万T彩涂生产线 0.2~0.6mm×1250mm 80,000TPY Color Coating Line
7	河北·京华 Hebei Jinghua	0.2~1.2mm×1250mm 年产12万T彩涂生产线 0.2~1.2mm×1250mm 120,000TPY Color Coating Line
8	山东·亿科 Shandong Yike	0.18~0.8mm×1250mm 年产12万T彩涂生产线 0.18~0.8mm×1250mm 120,000TPY Color Coating Line
9	天津·新宇 Tianjin Xinyu	0.2~1.2mm×1250mm 年产12万T彩涂生产线 0.2~1.2mm×1250mm 120,000TPY Color Coating Line

连退业绩汇总表(部分) Continuous Annealing line Reference list (PART)		
序号 S/N	客户名称 Customer Name	项目名称 Project Name
1	赤峰·远联 Chifeng Yuanlian	0.5mm~2.0mm×1150mm连退线年产量70万吨(高炉煤气立式炉) 0.5mm~2.0mm × 1150mm 700,000 tpy continuous annealing line (blast furnace gas vertical furnace)
2	赤峰·远联 Chifeng Yuanlian	0.15mm~0.55mm×1150mm连退线年产量35万吨(高炉煤气立式炉) 0.15mm~0.55mm × 1150mm 350,000 tpy continuous annealing line (blast furnace gas vertical furnace)

酸洗、酸再生客户业绩汇总表(部分) Pickling Line & ARP Achievement List (PART)		
序号 S/N	客户名称 Customer Name	项目名称 Project Name
1	福建·辉源 Fujian Huiyuan	4m³/h废酸再生机组 4m³/h Acid Regeneration Plant
2	福建·辉源 Fujian Huiyuan	2.0~4.0mm×1250mm年产50万T酸洗卷板 2.0~4.0mm×1250mm 500,000TPY Pickling line
3	福建·辉源 Fujian Huiyuan	5m³/h酸再生 5m³/h Acid Regeneration Plant
4	乌兹别克斯坦 Uzbekistan	1.8~4.0mm×1300mm 年产40万T酸洗卷板 1.8~4.0mm×1300mm 400,000TPY Pickling line
5	乌兹别克斯坦 Uzbekistan	年产40万T酸洗板的废酸再生机组 Acid Regeneration Plant for 400,000TPY pickling line

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