



ANSI B16.5 5" 150LB WNRF F304L



江阴市华西法兰管件有限公司

Jiangyin Huaxi Flange & Pipe Fitting Co.,Ltd



中共中央总书记、国家主席、中央军委主席习近平亲切接见华西村书记吴协恩
 In the photo are Xi Jin Ping, Secretary General, Chairman and Chair of Central Military Committee and Wu Xie'en, secretary of Hua Xi Village

亲切关怀 巨大鼓舞

The heart-felt warm attention brings huge inspiration and encouragement



- 1、原中共中央总书记胡锦涛与吴协恩书记合影
 Previous General Secretary of the Communist Party of China Hu Jintao and Huaxi Secretary Wu Xie'en
- 2、原中共中央总书记江泽民做客华西村农家
 Previous General Secretary of the Communist Party of China Jiang Zeming visiting a family in Huaxi Village
- 3、原中共中央总书记胡锦涛视察华西村
 Previous General Secretary of the Communist Party of China Hu Jintao visiting Huaxi Village
- 4、中共中央总书记习近平亲切接见全国模范退役军人代表吴协恩等
 Xi Jinping, general secretary of the CPC central committee, received Wu Xie'en, representative of the national model ex-servicemen
- 5、中共中央总书记习近平亲切接见吴仁宝书记等劳动模范
 General Secretary of the Communist Party of China Xi Jinping and Huaxi Secretary Wu Renbao
- 6、王岐山书记与吴协恩书记亲切握手
 Central Commission for Discipline Inspection of the CPC Secretary Wang Qishan and Huaxi Secretary Wu Xie'en
- 7、中央政治局委员、上海市委书记李强调研华西村
 Li Qiang, member of the political bureau of the CPC central committee and secretary of the CPC Shanghai municipal committee, investigates Huaxi Village
- 8、江苏省委书记娄勤俭调研华西村
 Lou Qinjian, Secretary of Jiangsu provincial Party Committee investigated Huaxi village



华西村党委委员
江阴市华西法兰管件有限公司 总经理
Huaxi village Member of CPC committee
General Manager of Jiangyin City Huaxi flanges & pipe-fitting Co.,Ltd

张建国
Zhang Jianguo

江阴市华西法兰管件有限公司是江苏华西集团公司下属企业。创建于一九八四年，专业从事出口法兰的生产。1990年与新加坡东和五金私人有限公司（SINGAPORE TOWA HARDWARE PIE LTD）创建合资企业，成立无锡华安法兰有限公司。2005年，公司实施技改延伸工程，新上3600吨油压机，5米碾环机，8吨、5吨电液锤，2~5米立式车床，5米数控钻床，热处理炉等环型锻件生产设备，企业核心产品实现战略调整。目前，公司占地面积15万平方米，厂房面积8万平方米，拥有员工1000多名，其中高中级技术人员115名。年产环型锻件3.5万吨，成品法兰、管件2.5万吨，分不锈钢、碳钢、合金钢、双相钢等多种材质，10000多个规格品种，远销日、美、法、德、意等28个国家和地区。公司拥有自营进出口权，可以直接承接国外客户的订单，可按照JIS、ANSI、EN、DIN、BS、GB等国内外标准生产标准法兰和管件，也可根据客户的图纸或样品生产环型锻件、非标准法兰和管件。

公司拥有完善的质量保证体系和一整套现代化理化检测设备。近年来，先后通过ISO9001质量体系认证、德国TUV莱茵ISO9001 & PED体系认证，英国劳氏认证、日本JIS认证、中国船级社工厂认可证书，特种设备（压力管道）制造许可证，国家质检总局一类出口企业评定，BV工厂认可证书，中国锻造协会会员证书，压力容器用钢锻件产品安全注册证书和风力机械分会会员证书。

Jiangyin Huaxi Flanges & Pipe Fittings Co.,Ltd is a subsidiary of Jiang Su Hua Xi Group. The company was established in 1984 and is specialized in flange manufacturing. In 1990, a joint venture was established with SINGAPORE TOWA HARDWARE PIE LTD and is named Wu Xi Huaan Flange Co, Ltd. In 2005, company went through technical expansion during which 3600t hydraulic press, 5M ring rolling machine, 8T and 5T electrohydraulic hammer, 2M-5M vertical lathe, 5M numerical control drilling mill and heat treatment oven which are needed for manufacturing circular wrought parts were introduced. Core product strategy was adjusted accordingly. Currently, company has a land area of 150,000M², plant area of 80,000M² and over 1000 employees, out whom are 115 staffs having technical background at medium and senior levels. The company can produce on a yearly basis 35,000 tons of circular wrought parts and 25,000tons of finished flanges and pipe fittings out of stainless steel, carbon steel, ally steel and dual phase steel in over 10,000 types. Products are exported to 28 countries and territories like Japan, USA, France, Germany and Italy. Company has rights to conduct import and export business and can directly contract overseas orders. Company can also produce standard flanges and pipe fittings to domestic and foreign standards like JIS, ANSI, EN, DIN, BS and GB. Company is also able to produce circular wrought parts, non-standard flanges and pipe fittings according to customer drawings or samples.

Company has implemented quality assurance system and owns complete equipment package for physical and chemical inspection and testing. Company has been successfully certified for ISO 9001, Obtained Lloyd' s Register Certification, Japan JIS Certification,TUV and CCS. It also obtains the permit to manufacture special equipment (pressure pipeline). Company has been awarded as Grade A export enterprise by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, BV certificate of works approval, In October, 2008, company obtained safety registry certificate for steel foundry parts for pressure vessels and membership for Wind Power Machinery Association.



资质过硬 业绩突出

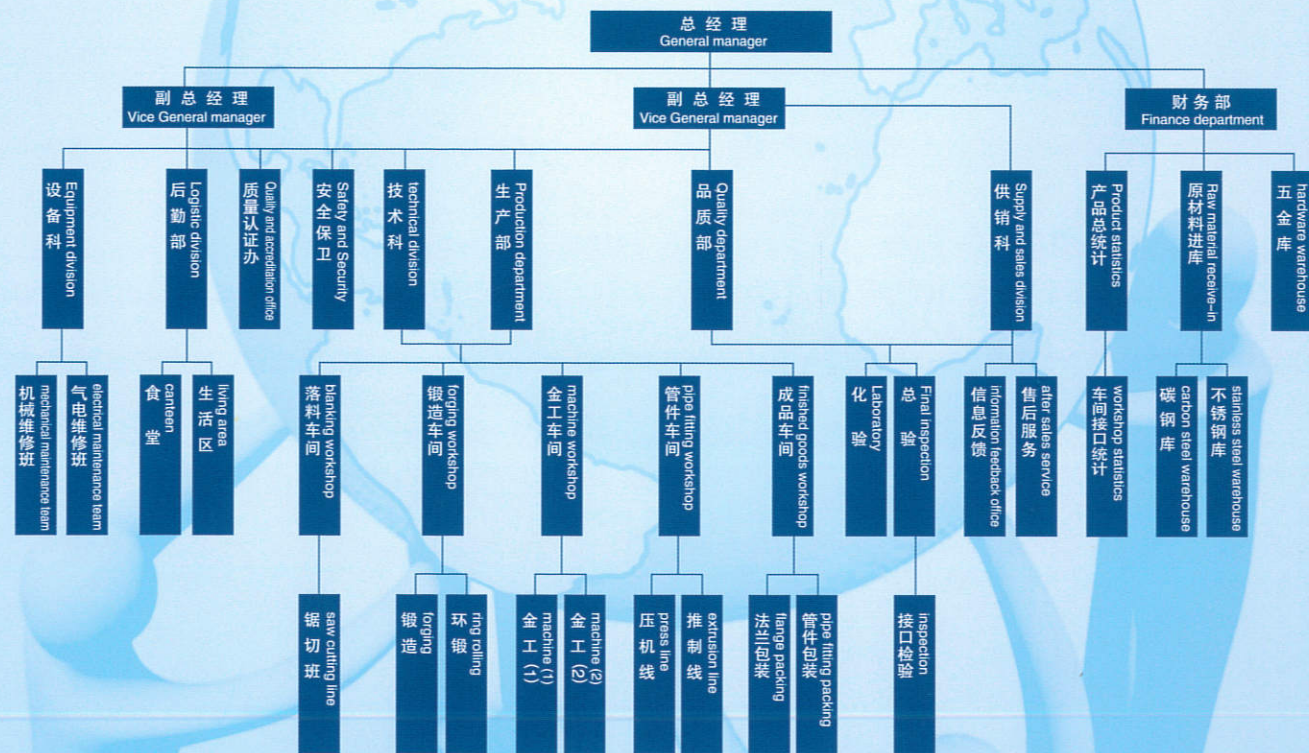
Top qualification and excellent performance

卓越的品质铸就了华西法兰辉煌的事业大厦。精细化的质量管理，使企业实现了由精品、名品到品牌的战略转移，品牌产品和品牌企业的同步提升，华西法兰不仅得到了国内外专业机构的认可，而且受到客户的广泛好评。

Predominant quality has been forging business brilliance of Huaxi Flange. Concrete quality management enables business to transfer from elite and well-known products to famous brands. Product brands and enterprise image have been enhanced in parallel. Huaxi Flange has obtained acknowledgement both from professional institutions at home and abroad and a wide range of customers.



华西法兰管件有限公司行政管理网络图 Management organization at Hua Xi Flange & Pipe Fittings Co.,Ltd





装备精良 技术领先

premium equipment and leading technology



法兰生产线主要设备 Main equipment for flange production line

下料 Blanking			
1、1300x1300mm锯床	1300x1300mm sawing machine	9	台 sets
2、各种规格锯床	sawing machine of various types	40	台 sets
3、自动、半自动割具	automatic and semiautomatic cutting tool	3	套 sets
锻造 forging			
1、3600T油压机	3600t hydraulic press	1	台 set
2、5米数控辗环机	5m numerical control ring rolling machine	1	台 set
3、8T电液锤	8t electrohydraulic hammer	1	台 set
4、5T电液锤	5t electrohydraulic hammer	1	台 set
5、1T空气锤	1t air hammer	4	台 sets
6、750Kg空气锤	750kg air hammer	8	台 sets
7、560Kg空气锤	560kg air hammer	5	台 sets
8、65Kg空气锤	65kg air hammer	1	台 set
9、KYA60A辗环机	KYA60A ring rolling machine	1	台 set
10、天然气加热炉	natural gas heating oven	16	台 sets
11、热处理工业电阻炉	industrial resistance oven for heat treatment	6	台 sets
12、5吨操作机	5t manipulator	1	台 set
13、10吨操作机	10t manipulator	1	台 set
14、20吨进出料机	20t feed extruder	1	台 set
15、10吨进出料机	10t feed extruder	2	台 sets
金加工 machine			
1、常规车床C620-CW61160	normal lathe C620-CW61160	120	台 sets
2、数控车床GJK6140H-CAK6360B	numerical control lathe C620-CW61160	20	台 sets
3、大型立式车床φ1.6m-φ5m	jumbo vertical lathe φ1.6m-φ5m	15	台 sets
4、数控钻床	numerical control drilling machine	9	台 sets
5、普通立钻、摇臂钻	general vertical drilling machine, radial drill	28	台 sets
包装 packaging			
1、清洗流水线	washing line	2	套 sets
2、产品干燥线	product drying line	1	套 set
3、油漆线	painting line	1	套 set
4、钢印机	punch head stamping	6	台 sets

管件生产线主要设备 main equipment for pipe fitting production line

下料 blanking			
1、锯床	sawing machine	5	台 sets
2、半自动割具	semiautomatic cutter	2	套 sets
3、等离子切割机	plasma cutter	1	台 set
压制 pressing			
200T、300T、500T、1000T自动液压机六台 automatic hydraulic press for 200T, 300T, 500T and 1000T.			
热推制 thermal extrusion			
DN100-DN200各一套 1 set of DN100-DN200 each			
DN250-DV600各一套 1 set of DN250-DV600 each			
冷推制 cold extrusion			
150T、300T弯头机各一台 one set of bender each for 150t and 300t			
破口机 facing machine			
各种型号 (最大口径630mm)	various types (max size 630mm)	9	台 sets
油漆烘干线 paint drying line			
		1	套 set
热处理炉 heat treatment oven			
		1	台 set



D53K-4000 数控辗环机
D53K-4000 numerical control ring rolling machine



5米立式车床 5m vertical lathe



原材料库 raw material



锯床 sawing machine



8吨电液锤 8t electrohydraulic hammer



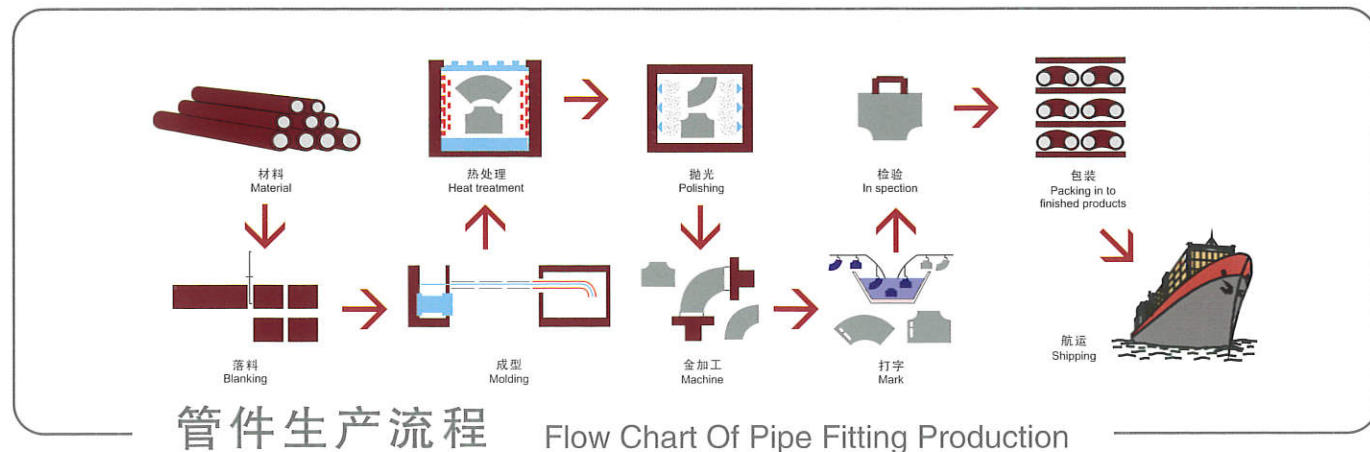
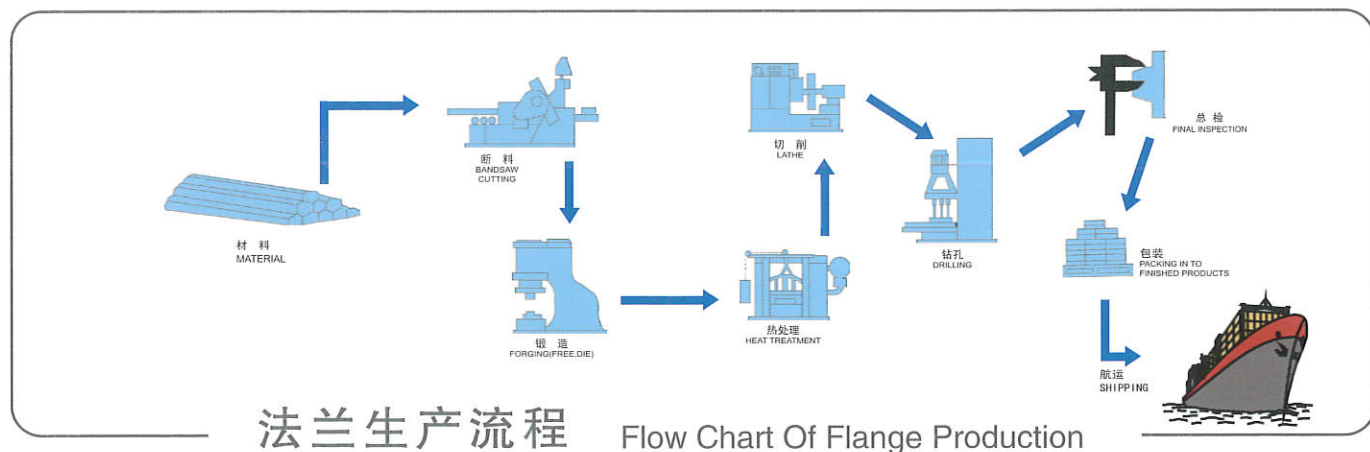
5吨电液锤 5t electrohydraulic hammer



热处理炉 heat treatment furnace



立式车床 vertical lathe



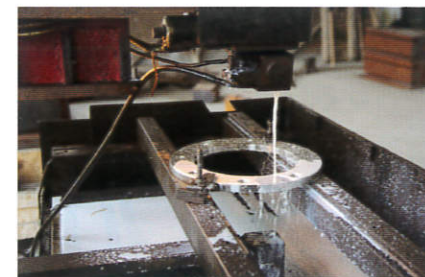
数控钻床 numerical control drilling machine



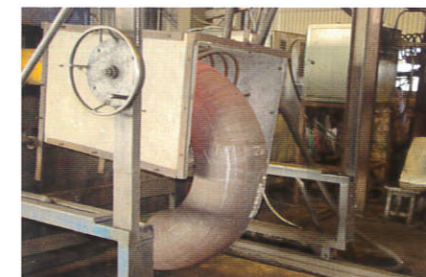
数控车床 CNC



普通车床 normal lathe



线切割 weldm



弯头液压推制机 elbow hydraulic pushing machine



喷漆 spray paint

为牢牢掌握市场竞争的主动权，华西法兰人不断加快新技术、新产品、新型管理体制改革的步伐。2005年，公司投入亿元资金实施技改延伸工程，新一批环型锻件生产检测设备，使公司生产能力和检测水平实现历史性跨越。现在，公司可加工最大工件单重20吨，环型锻件直径5米，自由锻轴类长9米。

To have a firm market grip, Huaxi Flange always speeds up improvement towards new technology, new products and new management system. In 2005, company invested millions of RMB on technical competence expansion during which equipment for circular foundry parts production and testing were introduced so that the production capacity and testing competence have been dramatically improved ever in history. The max weight of single work piece that could be processed is 20t. Diameter of circular foundry part is 5M. Length of shaft out of flat die forging is 9m.



直读光谱金属分析仪 Direct reading spectrum metal analyzer



微机控制电子万能试验机
microcomputer controlled electronic universal tester



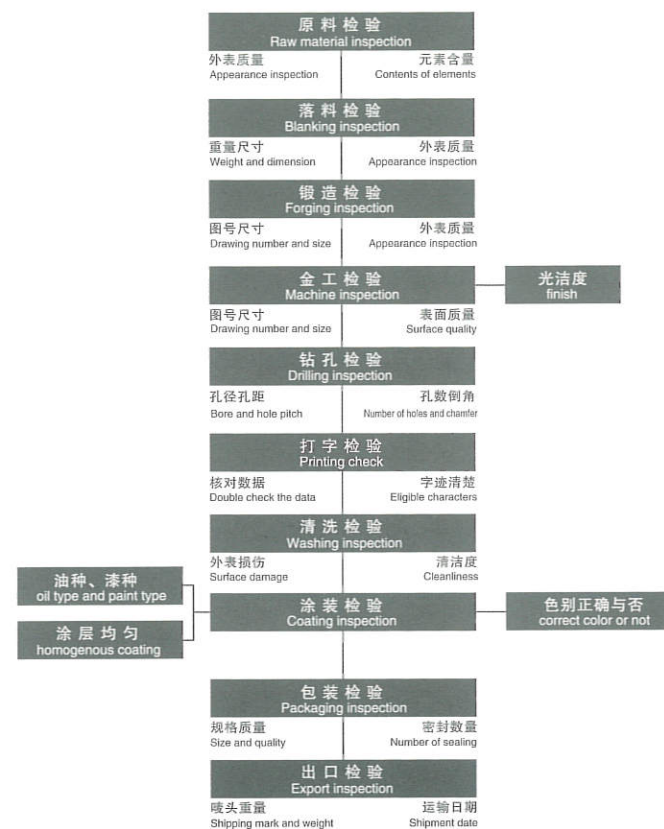
超声探伤仪
UT

国际标准 世界品牌

International standard and worldwide brand

法兰检验流程图

Flange Inspection Process Flow Chart



金相分析仪 metallography microscope



便携式金属分析仪 PMI

检测设备 inspection and testing equipment

直读光谱金属分析仪 ARL4460	Direct reading spectrum metal analyzer ARL4460	1台 set
微机控制电子万能试验机CMT5305	microcomputer controlled electronic universal tester CMT5305	1台 set
指针式金属摆锤冲击试验机ZBC2302-1	dial Charpy impact machine tester ZBC2302-1	1台 set
金属冲击试样缺口自动拉床QYJ4201	notched impact specimen automatic tensioner QYJ4201	1台 set
冲击试样低温槽DWC-60A	impact specimen low temperature bathDWC-60A	1台 set
布氏硬度计HB-3000B-1	Bushel hardness tester HB-3000B-1	1台 set
箱式电阻炉SX2-24-12	chamber type electric resistance furnace SX2-24-12	1台 set
光谱试样磨样机GPM-1	spectrum specimen grinder GPM-1	1台 set
超声探伤仪CTS-9002、CTS9003	supersonic flaw detector CTS-9002、CTS9003	各1台 one set for each
磁粉探伤仪	magnetic particle inspector	3台 sets
便携式金属分析仪XLT898	portable metal analyzer XLT898	3台 sets
超声波测厚仪UTM	supersonic thickness gauge UTM	2台 sets
洛氏硬度计HR-150A-1	Rockwell hardness tester HR-150A-1	4台 sets
着色探伤DPT-5	dye penetrant inspection DPT-5	
金相分析仪 DMILM		1台 set
量具 (150mm-5000mm)	measurement tool (150mm-5000mm)	1200把 1200 fistful



摆锤式冲击试验机
impact test



硬度检测
HT



渗透探伤
PT



马蹄形磁粉探伤仪
MT

质量是华西法兰的生命。公司全面推行ISO9001质量管理体系，质检部直接对总经理负责，对产品进行检验和试验，严把每道工序质量关，做到不合格原材料不入库、不合格产品不转序，不合格成品不出厂。

Quality is life of Huaxi Flange. Company promotes full range of ISO9001 quality management system. Quality department reports directly to General Manager and is responsible for product inspection and testing. They strictly control each step of production processes and make sure non-conforming materials will never enter warehouse or move to next process or go out of the factory.



专 注 技 术 锐 意 创 新

Focusing on technology and open to innovation



螺纹法兰 Threaded Flange



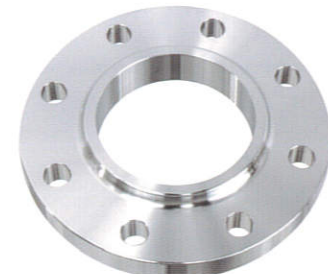
盲板法兰 Blind Flange



承窝焊接法兰 Socket Welding Flange



对焊法兰 Welding Neck Flange



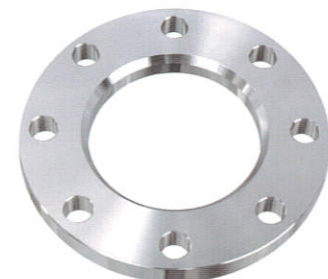
滑动法兰 Slip-on Flange



平板法兰 Plate Flange



特殊法兰 Special Flange



搭接法兰 Lap Joint Flange



长颈法兰 Long Weld Neck Flange



三通 Tee



90° 弯头 Elbow



180° 弯头 Elbow



风电法兰 wind power flange



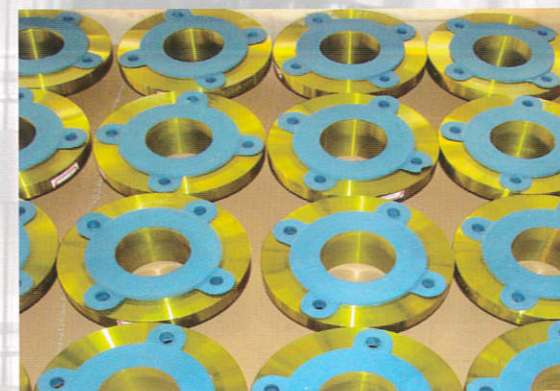
轴 shaft



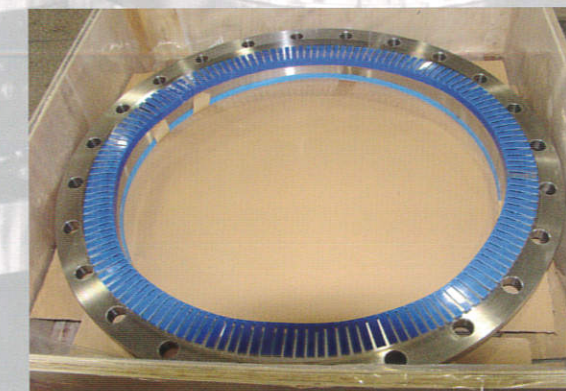
环锻 ring forging



接口 nozzle



法兰包装 flange packing



法兰包装 flange packing

面对全球化、全方位的市场竞争，企业始终坚持不断学习实践，依靠科技人员的智慧，紧跟市场节奏，滚动开发，提升老产品，研发新产品。特别是风电法兰的开发，华电、华能等企业的充分认可，使企业走上了一条“以技术制高点抢占市场制高点”之路。科技创新已成为企业发展战略创新和掌握市场竞争主动权的有效工具。

Facing globalization and full range of competition in the market, company has always been keen on learning and practice. With intelligence and smartness of technical crews, company closely follows rhythm of the market, continues, development, makes improvement to old products and develops new products. Especially the development of the wind power flange, is widely recognized by Huaneng, Huadia and other power enterprise, so that the enterprises have come into the road of racing the market commanding point by high technology commanding. Scientific and technical innovations are already efficient tools for enterprise to develop strategic innovation and have grip of the market in the competition.



质量领先 精益求精

Leadership in quality and perfection



材 质 (material grades)

国家标准 China Material Standard	20#,35#,16Mn,50Mn,42CrMo,5CrNiMo,20MnMo,20MnMoNb,15CrMo,12Cr1MoV, 14Cr1Mo,12Cr2Mo1,1Cr5Mo,16MnD,09MnNiD,Ocr13,S30408,S30403, S31608,S31603,S32168,Q345E,GH3039,哈氏合金 ,Inconel625,Monel400
日本标准 Japanese Material Standard	SS400,S20C,S25C,SF390A,SF440A,SFVC2A,SUSF304,SUSF304L,SUSF316, SUSF316L, SUSF321,SUS403
欧美标准 Europe and Americal Material Standard	X10GMoVN69-1,F304/1.4301,F304L/1.4307,F316/1.4401,F316L/1.4404,F321/1.4541,F316Ti/1.4571,F304H, F316H,F5,F9,F11,F12,F22,F91,F51,F53,A105,A350LF1/LF2,S235JRG2,S275JR,S355JR,P250GH, 16Mo3,11GrMo9-10,P280GH,16Mo3,13CrMo4-5,A-266,St.37-2,C22.8,TSSTE355,WPB234, F310,HASTELLOY C276,UNS NO8020,UNS NO4400,INCOLOY 825,INCONEL 600,MONEL 400

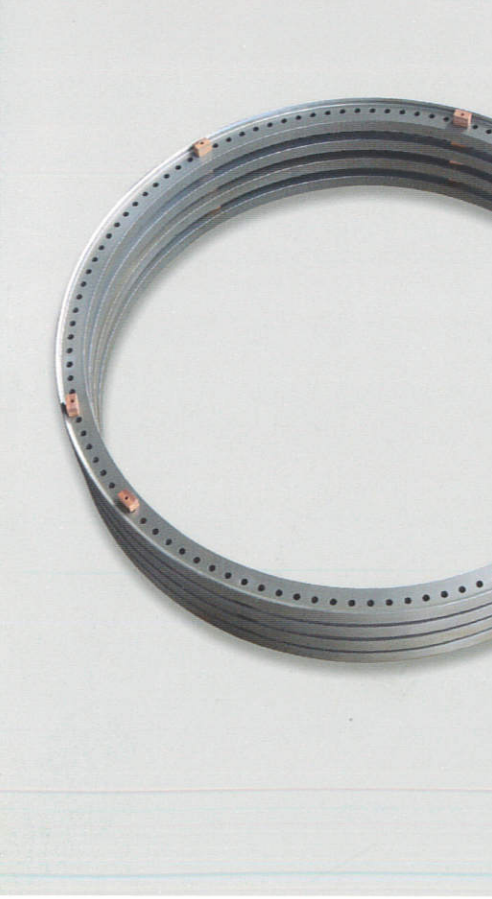
强大的规模和实力，为华西法兰新品开发和品质提升提供了坚强保证。如今，公司产品已发展到20多个国家标准、10000多个品种规格，涉及到不锈钢、碳钢、合金钢、双相钢等多种材质。年产环型锻件3.5万吨，成品法兰、管件2.5万吨。

Large scale and strength offers strong supports to new product development and quality enhancement at Huaxi Flange. So far, company has developed products to the standards from over 20 different countries in over 10,000 different types, including stainless steel, carbon steel, alloy steel and dual phase steel. Company can produce on a yearly basis 35,000 tons of circular wrought parts and 25,000tons of finished flanges and pipe fittings



行业领先 追求完美

leading technology in the field and pursue the perfection



1	2
3	4

- 1、渗透检测 PT
- 2、硬度检测 HT
- 3、超声检测 UT
- 4、平整度检测 flatness inspection



品质保证 应用广泛

Quality guarantee and wide application



创新的产品和卓越的品质，使华西法兰在做大、做强、做优的道路上乘风破浪、直挂云帆。现在，华西法兰的环型锻件、法兰、管件已广泛用于风力发电、核电、船舶、压力容器、石化、机械加工、航空航天、军工等领域。

Innovative products and predominant quality enable Huaxi Flange to be bigger, stronger and better on the way to be leadership. Currently, circular foundry parts, flanges and pipe fittings which are produced by Huaxi Flange have been widely applied to wind power generation, nuclear power generation, ship, pressure vessels, petrochemical, machinery manufacturing, aviation and aerospace and military.

江阴市华西法兰管件有限公司 QC工程图 (锻件及锻造法兰产品)

流程图	工序		控制特性			控制方法			记录
	名称	仪器设备	控制项目	指标	频次	检测方法	负责人		
01	材料检验	光谱分析仪	化学成分	原材料标准	每炉号	质保书/材料复验	检验员	原材料检验记录/复验报告	
02	材料贮存		外观质量 尺寸及极限偏差	原材料检验标准	逐根	目测	检验员		
1	下料	带锯床	分区堆放、先进先出 产品标识、材料批号在本体标识	仓库管理制度 程序文件	每批	目测	仓管员		
2	加热	燃气加热炉	材质、规格/下料重量 标记移植 (涂色、炉批号等)	落料单 锻造法三工艺守则	逐根	目测/磅秤	仓管员	工艺流转卡	
3	锻造成型	空气锤 锻模及工装	加热温度/加热时间 锻造比、始锻温度、终锻温度、尺寸 外形尺寸	加热工艺规范 锻造法三工艺守则 工装模具图纸	逐件	目测	下料员 锯料车间主任		
4	冷却		冷却方式	冷却工艺守则	逐批	目测	带班长	锻造工艺卡 工装设备验证记录	
5	入库检验		外形尺寸	锻件检验规范	逐件	卷尺/钢直尺	检验员	锻件成品检验记录	
6	热处理	热处理炉	热处理温度 热处理时间/冷却	热处理工艺守则 产品标准	逐炉	自动平衡记录仪 自动平衡记录仪	热处理作业人员	热处理工艺卡 热处理报告	
7	试棒加工	车床	尺寸	试棒图纸	逐件	游标卡	理化责任人		
8	机械性能测试	便携式硬度计 万能试验机 冲击试验机	硬度 拉伸强度、延伸率、屈服强度 冲击功 金相检查 (如晶间腐蚀等)	测试标准 测试标准 测试标准 测试标准	3次/炉批号 1组/炉批号 3组/炉批号 需要时	仪器显示 仪器显示、计算 仪器显示、计算 验证检测报告	力学性能检验员 力学性能检验员 力学性能检验员 力学性能检验员	机械性能试验原始台账 机械性能试验报告 机械性能试验原始台账	
9	粗车	车床	尺寸、外观	探伤标准	逐件	目测	IPQC	过程跟踪流转卡	
10	超声探伤	超声探伤仪	设备调整	探伤标准	逐件	仪器显示、计算	检验员	锻件超声检测报告	
11	精车	车床	尺寸	产品标准	逐件	游标卡	作业人员	工艺流转卡	
12	过程检验		尺寸	产品标准	逐件	游标卡	检验员	工艺流转卡	
13	磁粉探伤	磁粉探伤仪	设备调整/磁粉及辅助材料配制	探伤标准	逐件	仪器显示、计算	检验员	磁粉检测报告	
14	着色探伤			探伤标准	逐件	目测	检验员	着色检测报告	
15	钻孔	钻床	孔径/孔位	产品标准	逐件	钻模	作业人员	工艺流转卡	
16	过程检验		孔径/孔位/外观	锻制法兰检验规范	逐件	游标卡、百分表/目测	检验员	工艺流转卡	
17	标记	印字机	印字内容	产品标准/顾客要求	逐件	印字模	作业人员	工艺流转卡	
18	总检		外观 尺寸/标记	锻制法兰检验规范 产品标准/合同	IL=1 AQL=4.0	目测 游标卡/百分表/目测	检验员	法兰成品验收记录 质量证明书	
19	防护/包装		防锈处理/防锈处理 木箱包装并标记	产品标准 防护标准/顾客信息	逐件 逐箱	目测 目测	作业人员 作业人员	装箱单	



牌号 Name of Material	化学成份 Chemical Composition(%)													
	C		Mn		P	S	Si	Cr		Ni	Mo	N	Ti	Cu
	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
1.4301	0.070	2.00	0.045	0.015	1.00	17.00-19.50	8.00-10.50	---	---	---	---	---	---	---
A182 F304	0.080	2.00	0.045	0.030	1.00	18.00-20.00	8.00-11.00	---	---	---	---	---	---	---
A182 F304H	0.04-0.10	2.00	0.045	0.030	1.00	18.00-20.00	8.00-11.00	---	---	---	---	---	---	---
SUS F304	0.080	2.00	0.040	0.030	1.00	18.00-20.00	8.00-11.00	---	---	---	---	---	---	---
S30408	0.080	2.00	0.035	0.020	1.00	18.00-20.00	8.00-10.50	---	---	---	---	---	---	---
1.4307	0.030	2.00	0.045	0.015	1.00	17.50-19.05	8.00-10.00	---	---	---	---	---	---	---
A182 F304L	0.030	2.00	0.045	0.030	1.00	18.00-20.00	8.00-13.00	---	---	---	---	---	---	---
SUS F304L	0.030	2.00	0.040	0.030	1.00	18.00-20.00	9.00-13.00	---	---	---	---	---	---	---
S30403	0.030	2.00	0.035	0.020	1.00	18.00-20.00	8.00-12.00	---	---	---	---	---	---	---
1.4401	0.070	2.00	0.045	0.015	1.00	16.50-18.50	10.00-13.00	2.00-2.50	0.11	---	---	---	---	---
A182 F316	0.080	2.00	0.045	0.030	1.00	16.00-18.00	10.00-14.00	2.00-3.00	0.10	---	---	---	---	---
A182 F316H	0.04-0.10	2.00	0.045	0.030	1.00	16.00-18.00	10.00-14.00	2.00-3.00	0.10	---	---	---	---	---
SUS F316	0.080	2.00	0.040	0.030	1.00	16.00-18.00	10.00-14.00	2.00-3.00	---	---	---	---	---	---
S31608	0.080	2.00	0.035	0.020	1.00	16.00-18.00	10.00-14.00	2.00-3.00	---	---	---	---	---	---
1.4404	0.030	2.00	0.045	0.015	1.00	16.50-18.50	10.00-13.00	2.00-2.50	0.11	---	---	---	---	---
A182 F316L	0.030	2.00	0.045	0.030	1.00	16.00-18.00	10.00-15.00	2.00-3.00	0.10	---	---	---	---	---
SUS F316L	0.030	2.00	0.040	0.030	1.00	16.00-18.00	12.00-15.00	2.00-3.00	---	---	---	---	---	---
S31603	0.030	2.00	0.035	0.020	1.00	16.00-18.00	10.00-14.00	2.00-3.00	---	---	---	---	---	---
1.4541	0.080	2.00	0.045	0.015	1.00	17.00-19.00	9.00-13.00	---	---	---	---	5x%C to 0.70	---	---
A182 F321	0.080	2.00	0.045	0.030	1.00	17.00-19.00	9.00-12.00	---	---	---	---	5x%C to 0.70	---	---
SUS F321	0.080	2.00	0.040	0.030	1.00	17.00-19.00	9.00-12.00	---	---	---	---	5x%C to 0.70	---	---
S32168	0.080	2.00	0.035	0.020	1.00	17.00-19.00	9.00-12.00	---	---	---	---	5x%C to 0.70	---	---
1.4571	0.080	2.00	0.045	0.015	1.00	16.50-18.50	10.50-13.50	2.00-2.50	---	---	---	5x%C to 0.70	---	---
SS400	---	---	0.050	0.050	---	---	---	---	---	---	---	---	---	---
Q235A	0.14-0.22	0.30-0.65	0.045	0.050	0.30	---	---	---	---	---	---	---	---	---
20	0.17-0.23	0.60-1.00	0.030	0.020	0.15-0.40	0.25	0.25	---	---	---	---	---	---	0.25
16Mn	0.13-0.20	1.20-1.60	0.030	0.020	0.20-0.60	0.30	0.30	---	---	---	---	---	---	0.25
SA105	0.35	0.60-1.05	0.030	0.040	0.10-0.35	0.30	0.30	0.40	0.30	0.40	V Max 0.05	Nb Max 0.02	0.40	---
F9	0.15	0.30-0.60	0.030	0.030	0.50-1.00	8.0-10.0	---	---	---	0.90-1.10	---	---	---	---
F11	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.00	1.00-1.50	---	---	---	0.44-0.65	---	---	---	---
F51	0.030	2.00	0.030	0.020	1.00	21.0-23.0	4.5-6.5	2.5-3.5	---	---	---	---	---	---
F53	0.030	1.20	0.035	0.020	0.80	24.0-26.0	6.0-8.0	3.0-5.0	---	---	---	---	---	---
F60	0.030	2.00	0.030	0.020	1.00	22.0-23.0	4.5-6.5	3.0-3.5	---	---	---	---	---	---
Q345E	0.18	1.70	0.025	0.020	0.50	0.30	0.50	0.10	0.12	0.012	0.20	0.30	0.40	---
LF2	0.30	0.6-1.35	0.035	0.040	0.15-0.30	0.30	0.40	0.12	0.40	---	---	---	---	0.40



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