

源自百年首钢 服务世界钢铁
Expertise from hundred-year Shougang

首钢国际工程公司是由原北京首钢设计院改制成立、首钢集团相对控股的国际型工程公司，是北京市首家获得工程设计综合甲级资质的市属企业。公司可承揽各行业、各等级的所有工程设计，同时可提供规划咨询、设备成套、工程总承包等技术服务。公司在钢铁厂总体规划设计，炼铁、炼钢、轧钢、烧结、球团、焦化、工业炉单项设计，冶金设备成套等方面具有独到优势和丰富业绩。

公司业绩遍布国内70余家钢铁企业，以及巴西、印度、马来西亚、越南、孟加拉、菲律宾、津巴布韦、安哥拉、秘鲁、沙特等多个国家。

公司是北京市高新技术企业，获得国家科学技术奖和全国优秀设计奖等30余项、冶金行业和北京市优秀设计及科技成果奖等近300项，拥有数百项专利技术，多个项目创中国企业新纪录。

BSIET is an international engineering company, established through reorganization of Beijing Shougang Design Institute, which is invested by Shougang Group who takes relative majority of the share.

BSIET has the Engineering Design Integrated Qualification Class A issued by the State, it is the first unit of Beijing municipal enterprises that awarded this Qualification and is able to undertake engineering design for all industries and all grades. Meanwhile, it can provide technical services such as planning consultation, equipment integration and general contracting. BSIET owns unique technology and rich practical experience in overall design of iron and steel plants, individual design for iron making, steel making, steel rolling, sintering, pelletizing, coking, industrial furnace and integration of metallurgical equipment.

BSIET has served more than 70 iron and steel enterprises in China, and has its achievements in more than 20 countries such as India, Malaysia, Brazil, Viet Nam, Bangladesh, the Philippines, Zimbabwe, Angola, Peru and Saudi Arabia, etc.

BSIET is Hi-tech Enterprise of Beijing City, and has been awarded with 30-odd national science & technology prizes and national excellent design prizes, nearly 300 metallurgical industry and Beijing city excellent design and achievement prizes, and hundreds of national patents. More projects have created the new records of the Chinese enterprises.



高炉煤气干法除尘技术 BFG DRY DEDUSTING TECHNOLOGY

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北京首钢国际工程技术有限公司

BEIJING SHOUGANG INTERNATIONAL ENGINEERING TECHNOLOGY CO.,LTD.

发展历程 HISTORY OF DEVELOPMENT

高炉煤气干法除尘技术具有节水、节电、环保、减少占地和提高劳动生产率等显著优点，是国家在冶金行业重点推广的“三干一电”技术之首。作为首创单位，首钢国际工程公司在高炉煤气干法除尘技术发展上始终走在行业前列。

◎ 1996年，首钢国际工程公司自主开发的高炉煤气低压脉冲布袋除尘技术，在成都钢铁厂318m³高炉上成功应用，通过省、部级鉴定，迅速在国内钢铁企业推广应用。

◎ 2004年，首钢国际工程公司总承包的首秦1200m³高炉煤气干法除尘系统建成投产，开创了世界大型高炉煤气全干法除尘的先河，迅速推动了此项技术在冶金行业的发展。

◎ 2009年，首钢国际工程公司将该项技术成功推广于首钢京唐5500m³特大型高炉，为世界钢铁行业节能环保做出了突出贡献。

◎ 2009年12月1日，首钢国际工程公司主编的《高炉煤气干法袋式除尘设计规范》国家标准（编号为：GB50505-2009）正式颁布实施。

◎ 2011年3月，首钢国际工程公司承担的“十一五”国家科技支撑计划项目“特大型高炉煤气全干法除尘技术的开发”课题研究通过验收，并取得了一系列重大成果。

BFG dry dedusting technology has obvious priority of water saving, electricity saving, environment protection, decrease of occupied land, improvement of labour productivity, etc. It is the first one of "Three-Dry One-Electricity (BFG dry dedusting, Converter gas dry dedusting, CDQ, as well as TRT)" technologies which are critically promoted in national metallurgical industry. As the first enterprise, BSIET is always the leader in BFG dry dedusting technology development.

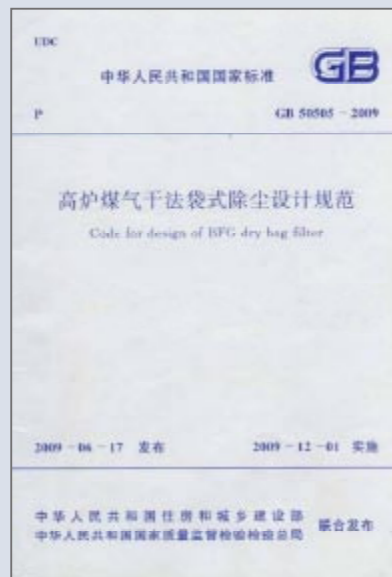
◎ In 1996, BFG low pressure impulse bag dedusting technology self-developed by BSIET was successfully applied in 318m³ BF of Chengdu Iron & Steel Plant, which is authenticated by the ministry and the municipality, and is promoted and applied in domestic iron and steel industry popularly and rapidly.

◎ In 2004, BFG dry dedusting system for Shouqin 1200m³ BF undertaken by BSIET in EPC format was completed and put into production. This is the first time for BFG full dry dedusting technology applied in large scale BF all over the world. Development of this technology was promoted in metallurgical industry rapidly.

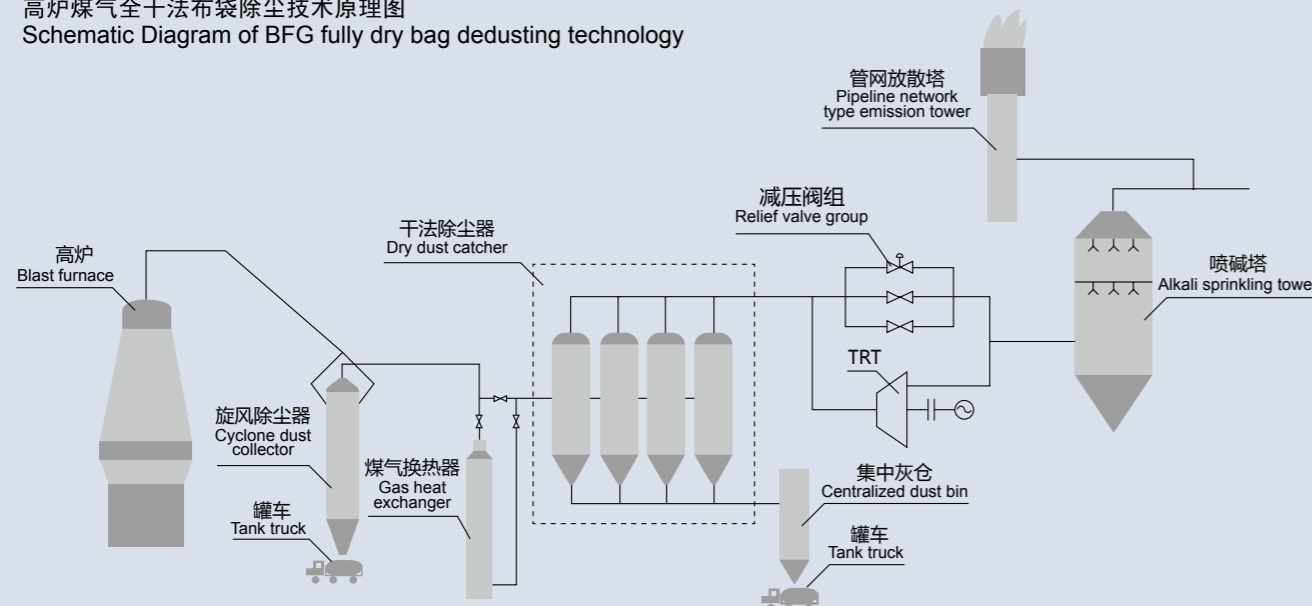
◎ In 2009, BSIET took this technology successfully to Shougang Jingtang 5500m³ ultra large BF and made great contribution to energy saving and environment protection in world iron and steel industry.

◎ On Dec.1, 2009, National standard "Code for design of BFG dry bag filter" (GB50505-2009), BSIET as the editor in chief, was officially issued.

◎ In March, 2011, the study on "Development of Full Dry Dedusting Technology in Ultra-large Scale BF" borne by BSIET, which is one of the 11th Five national science and technology support projects, was approved with achievement with yield of a series of substantial results.



高炉煤气全干法布袋除尘技术原理图
Schematic Diagram of BFG fully dry bag dedusting technology



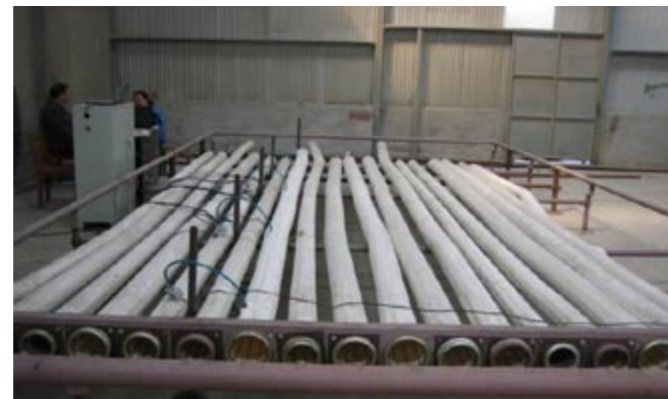
技术优势 TECHNICAL ADVANTAGE

紧凑化工艺布置技术 Compact process arrangement technology

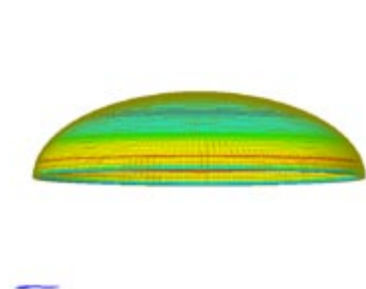
- ◎ 自主研发了除尘器箱体双侧脉冲清灰技术，实现除尘装备单元装置实现大型化、集约化、高效化
 - ◎ 除尘器FEM结构优化
 - ◎ 脉冲喷吹实验机理研究
 - ◎ 除尘器CFD流场分析
 - ◎ 除尘器气流均布装置开发
 - ◎ 三维动态仿真精准设计
 - ◎ 通过紧凑化工艺布置可以大大减少占地和设备数量，降低投资和维护成本30%以上
- ◎ Impulse dust collecting technology at both sides of the dust catcher box self-developed can realize enlargement, intensification and high efficiency of unit device of the dust catcher furnishment
 - ◎ Optimization of FEM structure of dust catcher
 - ◎ Mechanism test and study of impulse injection
 - ◎ Analysis of CFD flow field of dust catcher
 - ◎ Development of gas flow distribution device of dust catcher
 - ◎ 3-D dynamic simulation precise design
 - ◎ Compact process arrangement is used so as to reduce the occupied land and quantity of equipment greatly and decrease more than 30% investment and maintenance cost



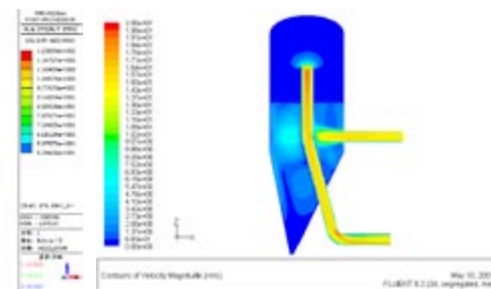
大型化紧凑型除尘器(箱体直径可达6.2m, 长度24m, 容积537m³, 大大提高了单箱煤气处理量)
Large and compact dust catcher (diameter of the box can reach to 6.2m, length 24m, volume 537m³, which can improve gas treatment capacity of every unit box)



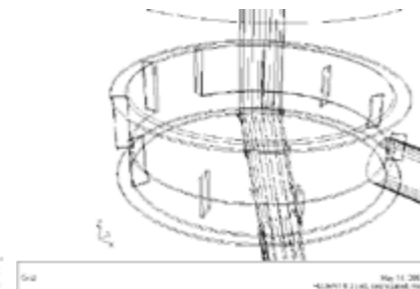
脉冲喷吹实验机理研究
Mechanism test and study of impulse injection



除尘器FEM结构优化
Optimization of FEM structure of dust catcher



除尘器CFD流场分析
Analysis of CFD flow field of dust catcher

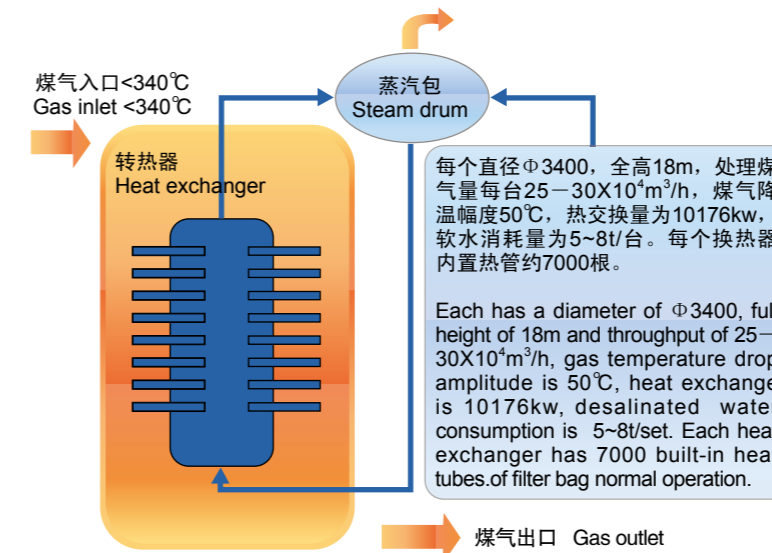


除尘器气流均布装置开发
Development of gas flow distribution device of dust catcher

降温技术 Temperature lowering technology

自主研发的降温装置可使温降达70℃以上，运行效果好，确保高炉顶温短时偏高时干法除尘系统滤袋正常运行。

Temperature lowering device self-developed can have more than 70℃ temperature lowering range with good running result to ensure normal operation of the filter bag of dry dedusting system in case of short time and high BF top temperature.



降温装置原理图
Schematic diagram of temperature lowering device



降温装置外景
Exterior view of temperature lowering device

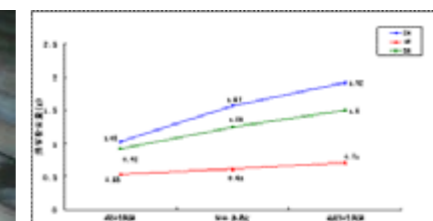
新型滤料技术 New filtration technology

在对滤料过滤特性、阻力损失、抗高温、耐腐蚀、抗静电、使用寿命等综合性能进行试验研究的基础上，根据不同工况选择滤料，确保不出现烧毁和粘结布袋的情况，使滤袋使用寿命达到2年以上。

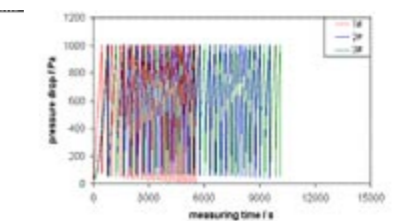
At the basis of comprehensive performance test and study of filtration characteristics, resistance loss, resistance of high temperature, resistant of corrosion, anti-static, service life, etc., and according to filtration selection at different conditions, it is guaranteed there is no burning and adhering happened to bags and it makes the service life of filtration bag more than 2 years.



生产中的设备净气箱侧
A view of gas purification box during production



滤袋材料测试结果1
Test result 1 of filter bag material



滤袋材料测试结果2
Test result 2 of filter bag material

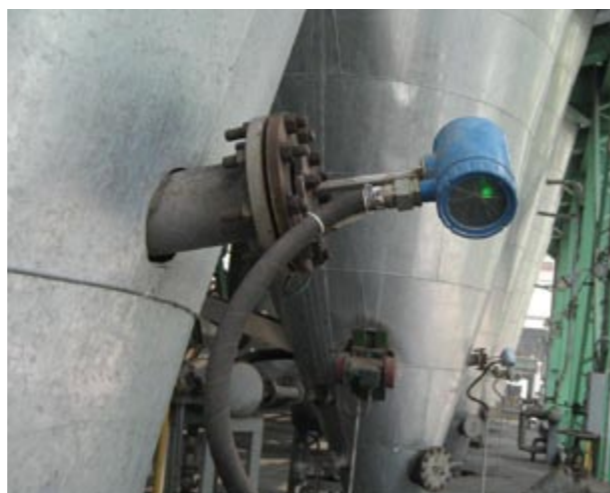
全系统智能检测及过程自动化
Intelligent detection and process automation of the whole system

◎ 自主研发的新型灰位仪

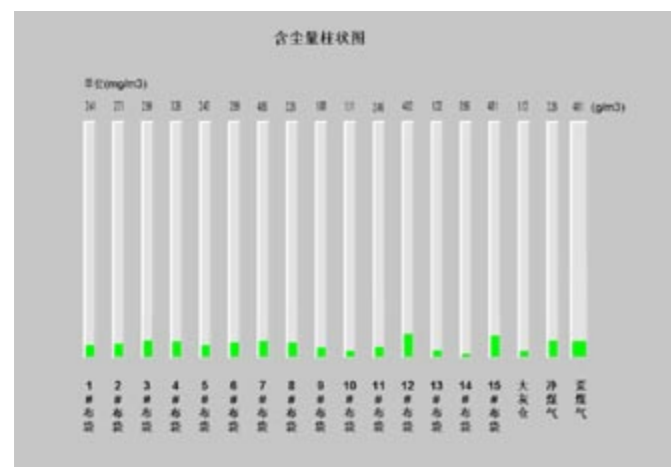
能够克服潮湿和震动等影响，精确计量灰位，为全自动卸灰提供了可靠的生产操作依据。

◎ Dust level gauge self-developed

It can overcome influence of dampness, vibration, and so on, meter dust level precisely, and provide reliable production operation basis for automatic dust discharging.



运行中的灰位检测仪
 Dust level detector during running



新型煤气含尘在线检测装置工作状态
 Working condition of new online dust detector in gas

◎ 自主研发的干法除尘系统自动控制单元

实现全自动反吹清灰，全自动煤气灰气力输送，全自动煤气温度控制，全自动“一键式卸灰”。

◎ Automatic control unit of the dry dedusting system self-developed

It is realized full automatic back flushing and dust cleaning, full automatic gas dust pneumatic conveying, full automatic gas temperature control, and full automatic "one-key type dust discharging".

◎ 自主研发的新型煤气含尘在线检测装置

含尘量显示数据与人工手动取样对比结果一致，为布袋破损检测提供了可靠的依据，实现了全流程数字化监测控制。

◎ New gas dust online detector self-developed

Data of dust content displayed is the same with the result by test of manual sample. This gives the reliable basis for detection of bag damage so as to realize digital monitor and control of the whole process flow.

管道防腐复合技术
Anti-corrosive compound technology for pipe

◎ 喷碱脱氯防腐装置

自主研发的碱液雾化喷洒装置通过物理化学吸附原理使高炉煤气析出水PH值达到6左右，Cl⁻浓度达到400mg/l左右，避免发生腐蚀情况。

◎ 金属波纹管防腐蚀措施

- ☆ 选用铬、镍、钼含量高的材质制造波纹管
- ☆ 波纹管补偿器内衬涂料防护
- ☆ 改进补偿器制造和焊接工艺,降低残余应力

◎ 研究开发了适用于管道全程防腐的防腐隔离涂料

◎ Anti-corrosive device with alkali sprinkling and dechlorination

Alkali solution mist sprinkling device self-developed, by principle of physical and chemical adsorption, makes BFG precipitated water PH achieve to about 6, Cl⁻ density around 400mg/l to avoid corrosion occurred.

◎ Anti-corrosive measures for metal bellow

- ☆ Material with high content of chrome, nickel and molybdenum is selected for fabrication of bellow compensator
- ☆ Inner lining coating is used for bellow compensator for protection
- ☆ Fabrication and welding process of the compensator is improved to reduce residual stress

◎ Anti-corrosive and separation coat suitable for resistant corrosion is researched and developed.



喷碱脱氯防腐装置外景
 Exterior view of the anti-corrosive device with alkali sprinkling and dechlorination



环氧鳞片胶泥试验
 Test of epoxy flake and daub



聚脲涂料试验
 Test of polyurea coat

干法除尘与大功率TRT发电耦合技术 Dry dedusting and Powerful TRT coupling technology

- ◎ 设计的高炉煤气余压发电机组(TRT)装机容量达36.5MW，为世界最大
- ◎ 稳定负荷运行，实现最高月平均发电量65kWh/tHM
- ◎ 独立可靠控制高炉炉顶压力，炉顶压力稳定达到0.28MPa，有效保证高炉生产稳定顺行
- ◎ 实现能源高效利用，TRT发电量比湿法除尘提高45%

◎ The installed capacity of BFG Top Recovery Turbine Unit (TRT) designed is 36.5MW, the biggest one in the world

◎ Reliable load running, realization of 65kWh/tHM maximum monthly average generation capacity

◎ Independent, reliable control of BF top pressure, the top pressure is stabilized to 0.28MPa to ensure the smooth and stable BF production sufficiently

◎ Realization of high efficient utilization of energy, TRT generation capacity is improved by 45% in comparison with that from the wet type dust catcher



首钢京唐TRT发电装置 Shougang Jingtang TRT device

除尘灰浓相气力输送技术 Dense-phase pneumatic conveying technology for collected dust

- ◎ 采用正压浓相输送技术和设备，使煤气灰输送浓度>20kg/kg，降低动力消耗
- ◎ 实现了除尘灰全流程密闭输送，解决了二次污染，实现了固体粉尘“近零排放”
- ◎ 通过实验与试验研究，解决了输灰管道易磨损的问题，大幅度提高了系统使用寿命

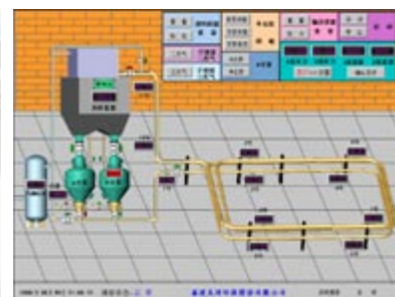
◎ Positive pressure dense-phase conveying technology and equipment is applied to have gas dust conveying density >20kg/kg so as to reduce power consumption

◎ Full process flow enclosed conveying for collected dust is realized, secondary pollution problem is settled down and solid dust "nearly zero emission" is actualized

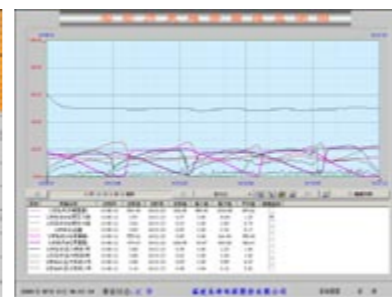
◎ The experiment and test study is applied to solve the problem of pipe wear and loss for dust conveying, and the service life of the system is improved greatly



浓相输送试验现场
Test field of dense-phase conveying



浓相输送试验流程
Test flow of dense-phase conveying



浓相输送试验检测结果
Test and detection result of dense-phase conveying

技术指标与社会经济效益 TECHNICAL INDICES AS WELL AS SOCIAL AND ECONOMIC BENEFIT

技术指标 Technical indices

- ☆ 生产稳定以后箱体压差控制在2kPa~3kPa
- ☆ 净煤气含尘量长期稳定在2mg/m³~4mg/m³
- ☆ 煤气降温装置使用效果良好，滤袋寿命达到2年
- ☆ 年平均吨铁TRT发电量达到53kWh，高于湿法除尘45%
- ☆ After production stabilization, the pressure difference of the box is controlled in the range of 2kPa~3kPa
- ☆ Dust content of purified gas is stabilized in 2mg/m³~4mg/m³ for long time
- ☆ Utilization result of the temperature lowering device for gas is good, and the service life of the filter bag can reach to 2 years
- ☆ Annual average TRT capacity of every tonnage of hot metal can be 53kWh, which is more than that from the wet type dust catcher by 45%

社会经济效益 Social And Economic Benefits

“零水消耗” "Zero water consumption"	节约湿法除尘年全部消耗新水 Total annual fresh water consumption of wet dedusting is saved
节电效果突出 Effect on power saving is excellent	节约湿法除尘年耗电的98.5%，同时TRT发电缓解当地用电负荷紧张局面 98.5% of annual power consumption of wet dedusting is saved, and at the same time, the tension of local load can be eased through TRT power generating
提高TRT发电量 TRT power generating capacity is increased	干法除尘后煤气压力损失小、温度高、含尘量低，比湿法除尘TRT发电能力提高了45% Loss of gas pressure is low, temperature is high and dust content is low after dry dedusting and the capacity of TRT power generating is increased by 45% compared with wet dedusting
提高热风温度 Temperature of hot blast is increased	干法除尘后的煤气热值高、含水量少，利于提高热风温度，在全烧高炉煤气的条件下，实现热风温度长期稳定在1300℃；同时大幅度减少CO ₂ 排放 Gas after dry dedusting has higher calorific value and lower water content, this helps to increase the temperature of hot blast, and realizes long term stabilization of temperature at 1300℃; Meanwhile, greatly reduce emission of CO ₂
粉尘“近零排放” "Near-zero emission" of dust	干法除尘系统整体设备运行安全稳定，处理后高炉净煤气含尘量达到5mg/m ³ 以下，长期稳定在2mg/m ³ ~4mg/m ³ ；除尘灰全密闭输送、卸除，无外排 Operation of overall equipment of dry dedusting system is safe and stable, dust content of purified BFG after treated reaches below 5mg/m ³ , and stabilizes at 2mg/m ³ ~4mg/m ³ for long term; Collected dust is conveyed and dumped in fully enclosed manner without discharging

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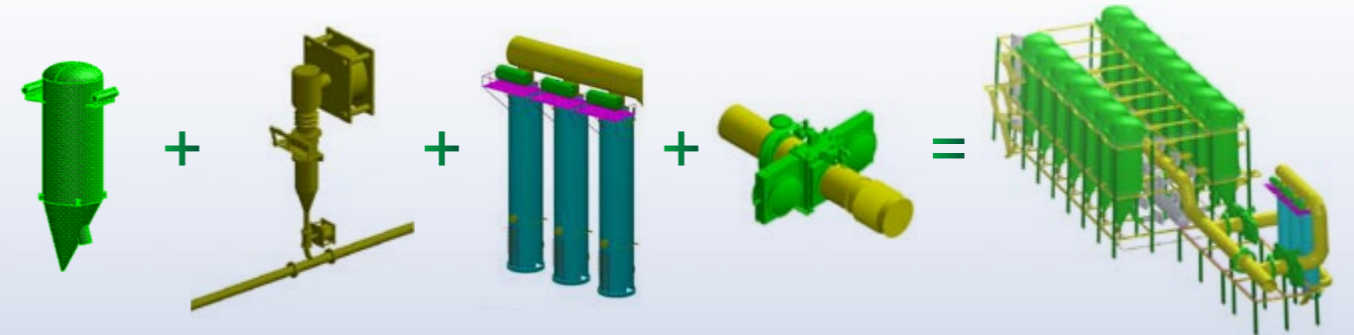
序号 NO.	专利名称 Name of patent	专利类型 Type of patents	专利号 Patent No.	备注 Remarks
1	一种高炉煤气中氯化氢净化吸收复合装置及方法 One kind of BFG hydrogen chloride purification and absorption compound device and method	发明 Invention	201010264346.4	已受理 Accepted
2	全干式高炉炉顶余压发电装置及其方法 Full dry TRT device and method	发明 Invention	200910242326.4	已受理 Accepted
3	一种用于高炉煤气干法除尘工艺的煤气降温装置 One kind of gas cooling device for BFG dry dedusting process	实用新型 Utility model	ZL 200920172957.9	已授权 Authorized
4	大型高炉煤气干法一体化布袋除尘在线监测装置 On-line monitoring device for integrated bag filter of gas dry dedusting for large BF	实用新型 Utility model	ZL 200920239565.x	已授权 Authorized
5	炉煤气干法除尘热管升、降温装置 Hot pipe heating and cooling device for BF gas dry dedusting	实用新型 Utility model	ZL 200920106930.X	已授权 Authorized
6	一种高炉干法除灰专用料位开关 Dedicated stock level switch for BF dry dedusting	实用新型 Utility model	ZL 200820123017.6	已授权 Authorized
7	高炉煤气氯化物清除装置 Chloride removing device for BFG	实用新型 Utility model	ZL 200820108093.X	已授权 Authorized
8	高炉煤气干法除尘煤气管道防腐装置 Gas pipe line corrosion proof device for BFG dry dedusting	实用新型 Utility model	ZL 200820079850.5	已授权 Authorized
9	高炉煤气除尘灰自流式罐车输送装置 Gravity conveying device of tank car for BF gas collected dust	实用新型 Utility model	ZL 200620166523.4	已授权 Authorized
10	高炉煤气干法除尘安全放散装置 Bleeding device for BF gas dry dedusting	实用新型 Utility model	ZL 200620139163.9	已授权 Authorized
11	大型高炉煤气干法除尘含尘量在线监测装置 Dust content on-line monitoring device for large BF gas dry dedusting	实用新型 Utility model	ZL 200520112339.7	已授权 Authorized
12	高炉煤气干法除尘蒸汽升温装置 Steam heating device for BF gas dry dedusting	实用新型 Utility model	ZL 200520001691.3	已授权 Authorized
13	高炉煤气干法除尘热管升温装置 Hot pipe heating device for BF gas dry dedusting	实用新型 Utility model	ZL 200520001690.9	已授权 Authorized
14	重力除尘器的罐车输灰装置 Ash conveying device of tank car for gravity deduster	实用新型 Utility model	ZL 200420118846.7	已授权 Authorized
15	高炉煤气低压脉冲布袋除尘器 Low pressure impulse bag filter for BF gas	实用新型 Utility model	ZL 200420118845.2	已授权 Authorized
16	高炉煤气重力除尘器 Gravity deduster for BF gas	实用新型 Utility model	ZL 200420118844.8	已授权 Authorized
17	高炉煤气干法除尘罐车输灰装置 Dust conveying device of tank car for BF gas dry dedusting	实用新型 Utility model	ZL 200420118843.3	已授权 Authorized
18	高炉煤气干法除尘降温装置 Cooling device for BF gas dry dedusting	实用新型 Utility model	ZL 200420118842.9	已授权 Authorized
19	高炉煤气加热升温装置 Heating device for BF gas	实用新型 Utility model	ZL 200420118841.4	已授权 Authorized

仿真设计 SIMULATION DESIGN

三维设计 3-D design

全三维动态设计保证设计建造精准高效，实现对建设全过程动态、精准管理。

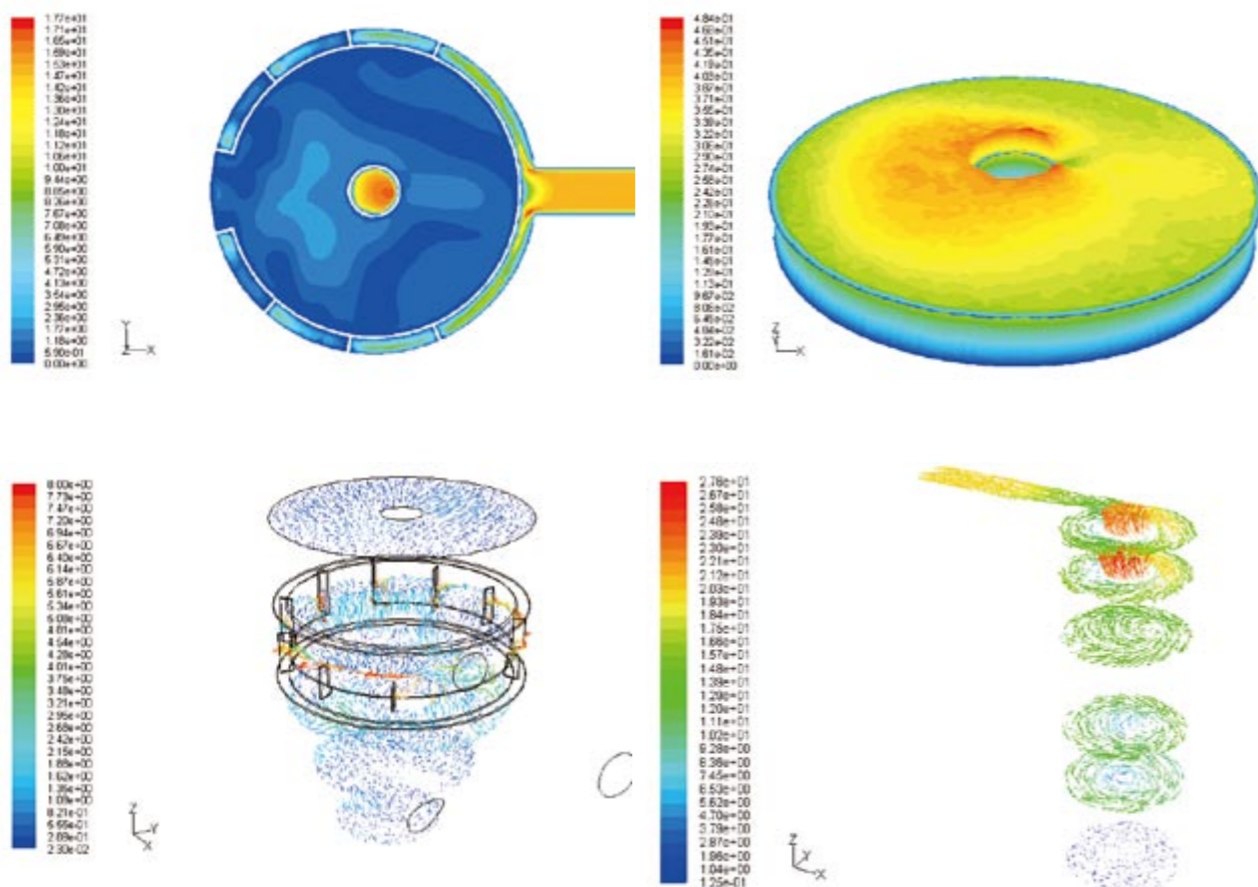
Complete 3-D dynamic design ensures the precision and high-efficiency of design and construction, and realizes dynamic and precision management of the whole process.



流场分析 Flow field analysis

首创干法除尘流场分析方法，大幅延长滤袋整体使用寿命。

First set up flow field analysis method of dry dedusting, and greatly prolong the service life of filter bag.



典型工程

TYPICAL PROJECT

首钢京唐1号5500m³高炉煤气干法除尘系统
BFG dry dedusting system for Shougang
Jingtang's No.1 5500m³ BF



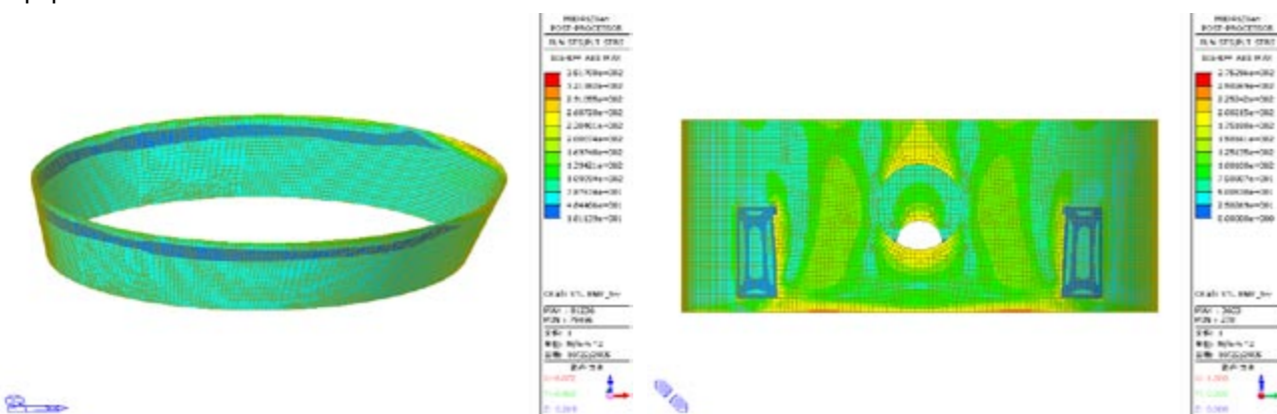
基本情况 Basic information

高炉容积: 5500m ³	BF volume: 5500m ³
煤气量: 87×10 ⁴ m ³ /h	Gas volume: 87×10 ⁴ m ³ /h
炉顶压力: 0.28Mpa	Top pressure: 0.28 MPa
煤气温度: 100 ~ 250℃	Gas temperature: 100 ~ 250℃
箱体数量: 15个	Number of boxes: 15
箱体直径: 6200mm	Diameter of boxes: 6200mm
单箱滤袋数量: 409条	Number of bags per single box: 409
滤袋规格Φ×L: 160×7000mm	Specification of bag Φ×L: 160×7000mm
总过滤面积: 21586m ²	Total filtration area: 21586m ²
单箱过滤面积: 1439m ²	Filtration area of single box: 1439m ²
标况滤速: 0.59m/min	Filtering velocity under standard condition: 0.59m/min
工况滤速: 0.23m/min	Filtering velocity under operation condition: 0.23m/min
净煤气含尘量: ≤5mg/m ³	Dust content in purified gas: ≤5mg/m ³

应力分析 Stress analysis

拥有完善的应力分析手段保证承压、承重设备的可靠质量。

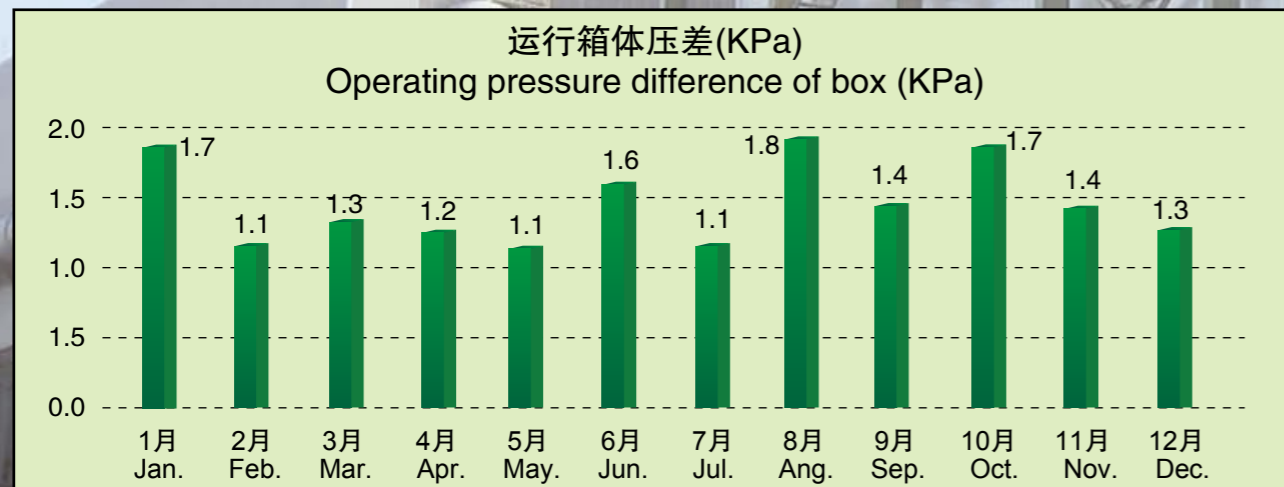
Having complete stress analysis means to ensure reliable quality of pressure-bearing and load-bearing equipment.



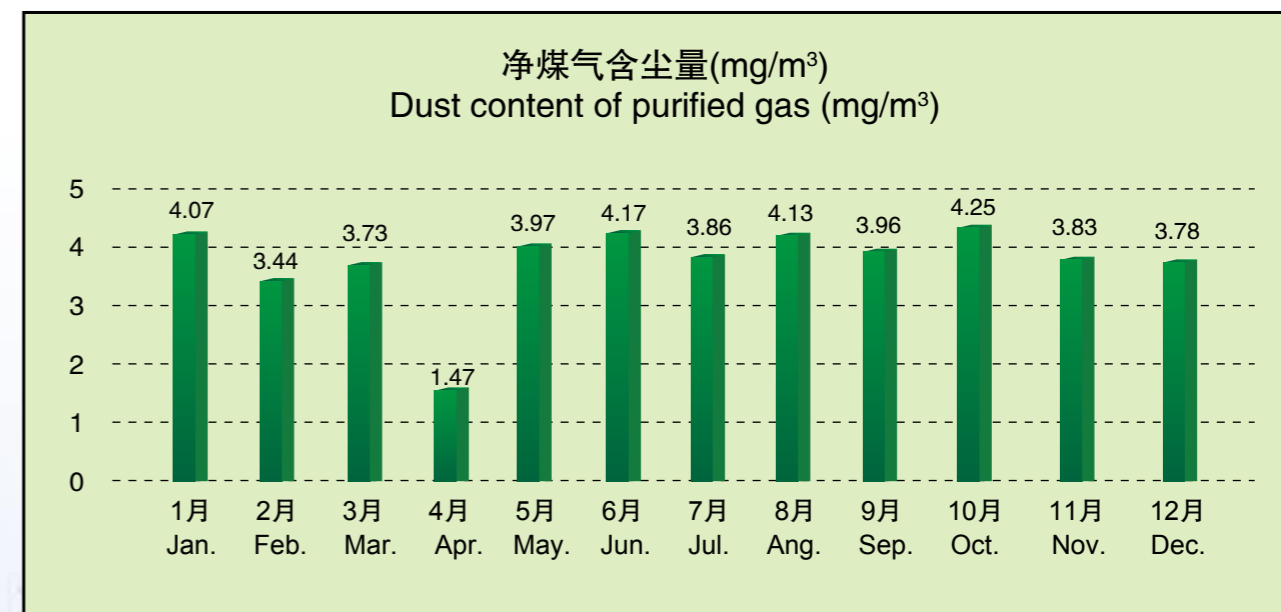
含尘量统计(2010年数据) Statistics of dust content (data in 2010)

日期 Date	入口荒煤气温度 Temperature of crude gas at inlet (°C)	出口净煤气温度 Temperature of purified gas at outlet (°C)	荒煤气含尘量 Dust content of crude gas (mg/m ³)	净煤气含尘量 Dust content of purified gas (mg/m ³)	箱体运行压差 Operating pressure difference of box (kPa)	TRT发电量 TRT power generating capacity (kWh/tHM)
2010年1月 January, 2010	319	109	7320	4.07	1.7	49.7
2010年2月 February, 2010	191	112	7320	3.44	1.1	50.4
2010年3月 March, 2010	228	120	10930	3.73	1.3	51.5
2010年4月 April, 2010	127	122	9170	1.47	1.2	49.8
2010年5月 May, 2010	138	135	7130	3.97	1.1	49.8
2010年6月 June, 2010	141	137	8470	4.17	1.6	50.7
2010年7月 July, 2010	154	150	8060	3.86	1.1	51.3
2010年8月 August, 2010	174	167	7730	4.13	1.8	53.2
2010年9月 September, 2010	156	152	9000	3.96	1.4	55.2
2010年10月 October, 2010	172	166	8840	4.25	1.7	64.9
2010年11月 November, 2010	177	170	7800	3.83	1.4	57.3
2010年12月 December, 2010	169	163	7950	3.78	1.3	58.5
平均值 Average value	178	142	8310	3.72	1.4	53

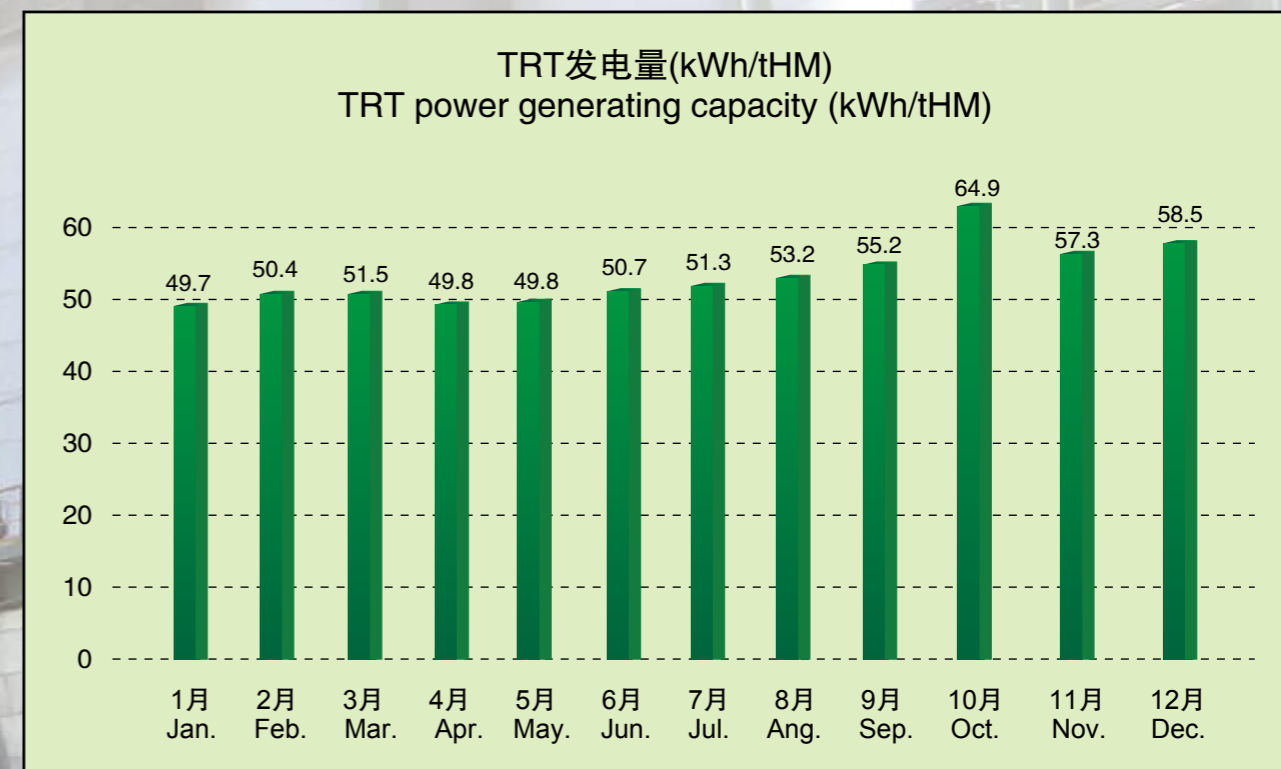
运行箱体压差(2010年数据) Operating pressure difference of box (data in 2010)



净煤气含尘量(2010年数据) Dust content of purified gas (data in 2010)



TRT发电量(2010年数据) TRT power generating capacity (data in 2010)



工程业绩 ENGINEERING ACHIEVEMENTS

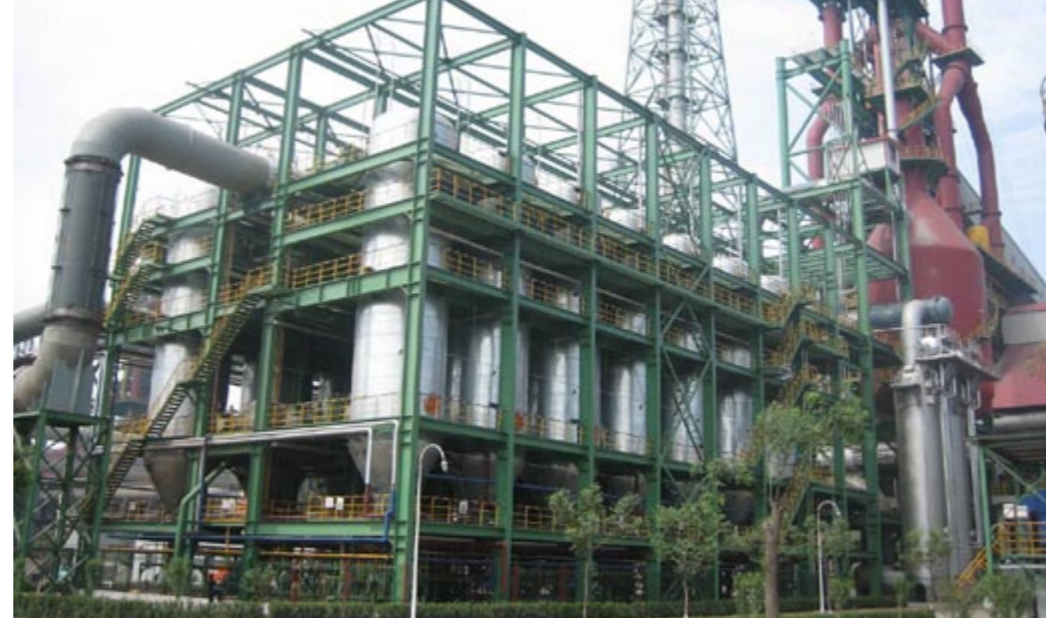
序号 NO.	项目名称 Names of items	高炉容积 BF Volume	实施方式 Modes of execution	投产时间 Start-up time	获奖情况 Prizes winning
1	成都钢铁厂高炉煤气布袋除尘系统 BFG bag filter system for Chengdu Iron & Steel Works	318m ³	设计 Engineering	1995	
2	石家庄高炉煤气布袋除尘系统 Shijiazhuang BF gas bag filter system	420m ³	设计 Engineering	2001	
3	莱钢高炉煤气除尘系统 BFG dedusting system for Laigang	750m ³	设计 Engineering	2001	
4	天津荣程高炉煤气布袋除尘系统 BFG bag filter system for Rocheng, Tianjin	588m ³	设计 Engineering	2002	
5	印度沙塔高炉煤气布袋除尘系统 BFG bag filter system for SIL, India	350m ³	设计 Engineering	2003	
6	江苏淮钢高炉煤气布袋除尘系统 BFG bag filter system for Huaigang, Jiangsu province	2X450m ³	设计 Engineering	2004	
7	首秦1号高炉煤气布袋除尘系统 BFG bag filter system for 1# BF, Shouqin	1200m ³	总承包 EPC	2004	第十一批中国企业新记录(10月) 11 th session New Record of Chinese Enterprises (Oct.)
8	济钢3号高炉煤气布袋除尘系统 BFG bag filter system for 3# BF, Jigang	1750m ³	总承包 EPC	2005	冶金行业优秀工程总承包奖 Prize of Excellent General Contract In Metallurgical Industry
9	首秦2号高炉煤气布袋除尘系统 BFG bag filter system for 2# BF, Shouqin	1800m ³	总承包 EPC	2006	
10	重钢4号高炉煤气布袋除尘系统 BFG bag filter system for 4# BF, Chonggang	1350m ³	总承包 EPC	2005	
11	首钢迁钢2号高炉煤气布袋除尘系统 BFG bag filter system for 2# BF, Shougang's Qiangang	2650m ³	总承包 EPC	2007	冶金行业优秀工程总承包奖 Prize of Excellent General Contract In Metallurgical Industry 第十二批中国企业新记录(10月) 12 th session New Record of Chinese Enterprises (Oct.)
12	太钢3号高炉煤气布袋除尘系统 BFG bag filter system for 3# BF, Taigang	1800m ³	设计 Engineering	2007	
13	宣钢10号高炉煤气布袋除尘系统 BFG bag filter system for 10# BF, Xuangang	2500m ³	总承包 EPC	2008	冶金行业全国优秀工程总承包三等奖 3 rd Prize of General Contract of National Excellent Project in Metallurgical Industry

序号 NO.	项目名称 Names of items	高炉容积 BF Volume	实施方式 Modes of execution	投产时间 Start-up time	获奖情况 Prizes winning
14	首钢京唐1号高炉煤气布袋除尘系统 BFG bag filter system for 1#BF, Shougang's Jingtang	5500m ³	总承包 EPC	2009	冶金行业全国优秀工程总承包三等奖 3 rd Prize of General Contract of National Excellent Project in Metallurgical Industry 第十四批中国企业新记录(9月) 14 th session New Record of Chinese Enterprises (Sept.) 冶金科学技术二等奖 2 nd Prize of Metallurgical Science and Technology
15	首钢迁钢3号高炉煤气布袋除尘系统 BFG bag filter system for 3# BF, Shougang's Qiangang	4000m ³	总承包 EPC	2010	
16	首钢京唐2号高炉煤气布袋除尘系统 BFG bag filter system for 2#BF, Shougang's Jingtang	5500m ³	总承包 EPC	2010	
17	宣钢新2号高炉煤气布袋除尘系统 BFG bag filter system for new 2# BF, Xuangang	2500m ³	总承包 EPC	2010	
18	宣钢8号高炉煤气布袋除尘系统 BFG bag filter system for 8# BF, Xuangang	2000m ³	总承包 EPC	2011	
19	印度BIL高炉煤气布袋除尘系统 BFG bag filter system for BIL in India	1780m ³	总承包 EPC	暂停 Pause	
20	首钢宝业1号、2号高炉煤气布袋除尘系统 BFG bag filter systems for 1# BF & 2# BF, Shougang's Baoye	3200m ³ ×2	设计 Engineering	暂停 Pause	
21	文水海威钢铁1号高炉干法除尘系统 BFG bag filter system for 1#BF, Wenshui Haiwei Iron & Steel Works	1380m ³	总承包 EPC	在施 Under construction	
22	涟钢新3号高炉煤气布袋除尘系统 BFG bag filter system for new 3# BF, Liangang	2800m ³	设计 Engineering	在施 Under construction	





首秦1号1200m³高炉煤气干法除尘系统总承包工程
General contract project for BFG dry dedusting system for Shouqin's 1# 1200m³ BF



首秦2号1780m³高炉煤气干法除尘系统总承包工程

General contract project for BFG dry dedusting system for Shouqin's 2# 1780m³ BF



济钢3号1750m³高炉煤气干法除尘系统总承包工程
General contract project for BFG dry dedusting system for Jigang's 3# 1750m³ BF



重钢4号1350m³高炉煤气干法除尘系统总承包工程
General contract project for BFG dry dedusting system for Chonggang's 4# 1350m³ BF



宣钢10号2500m³高炉煤气干法除尘系统总承包工程

General contract project for BFG dry dedusting system for Xuangang's 10# 2500m³ BF



首钢京唐1号5500m³高炉煤气干法除尘系统总承包工程
General contract project for BFG dry dedusting system for Shougang Jingtang's 1# 5500m³ BF



首钢京唐2号5500m³高炉煤气干法除尘系统总承包工程
General contract project for BFG dry dedusting system for Shougang Jingtang's 2# 5500m³ BF



宣钢新2号2500m³高炉煤气干法除尘系统总承包工程

General contract project for BFG dry dedusting system for Xuangang's new 2# 2500m³ BF



首钢迁钢3号4000m³高炉煤气干法除尘系统总承包工程
General contract project for BFG dry dedusting system for Shougang Qiangang's 3# 4000m³ BF