



焦炭气化生产燃气
项目介绍
**The Gasification Converts Coke
into Gas**

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SinoCoking Coal and Coke Chemical Industries, Inc.

目录/Contents



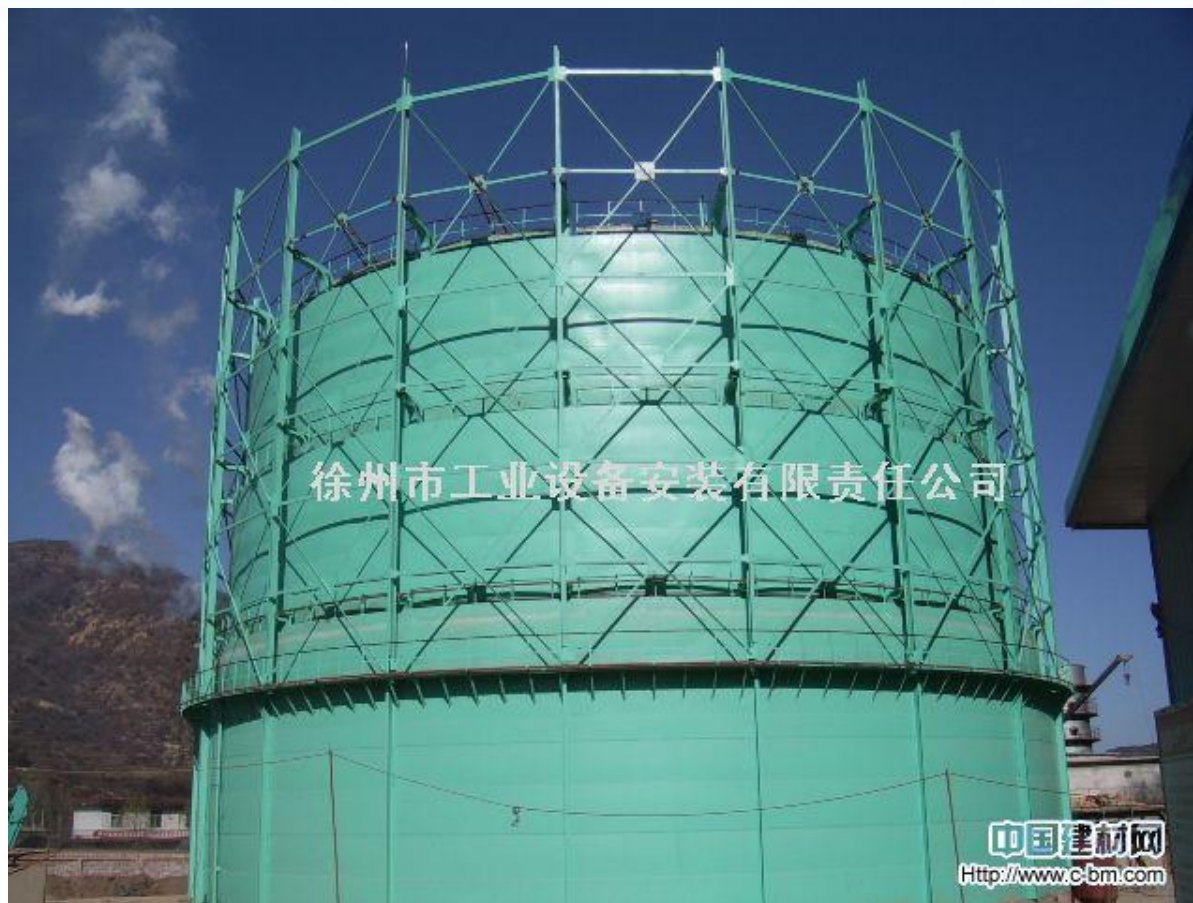


1、项目提出的背景 / Background of the proposed project

目前焦炭市场受钢铁行业不景气等方面影响，销量和价格一直处于低迷，根据总体产量及下游需求情况分析未来仍然长期不容乐观，目前焦化厂周围企业用煤气较多，已呈供不应求态势，所以建议改变焦炭应用途径，就地以焦炭为原料生产煤气外卖，给焦化厂的生存和发展带来新的活力。

The sales and prices of coke have been in the doldrums due to the weak demand for steel. Based on the overall production and the demands going forward, the downward trend will remain. Right now lots of neighboring companies have increased the usage of gas and it appears that the supply can't meet the demand. Therefore, we suggest to change the application of coke and use coke as a raw material to produce gas for sales to inject new life to our business.

20000立方米气柜/The 20,000 cubic metres tank



徐州市工业设备安装有限责任公司

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2、设计条件 / Design Conditions

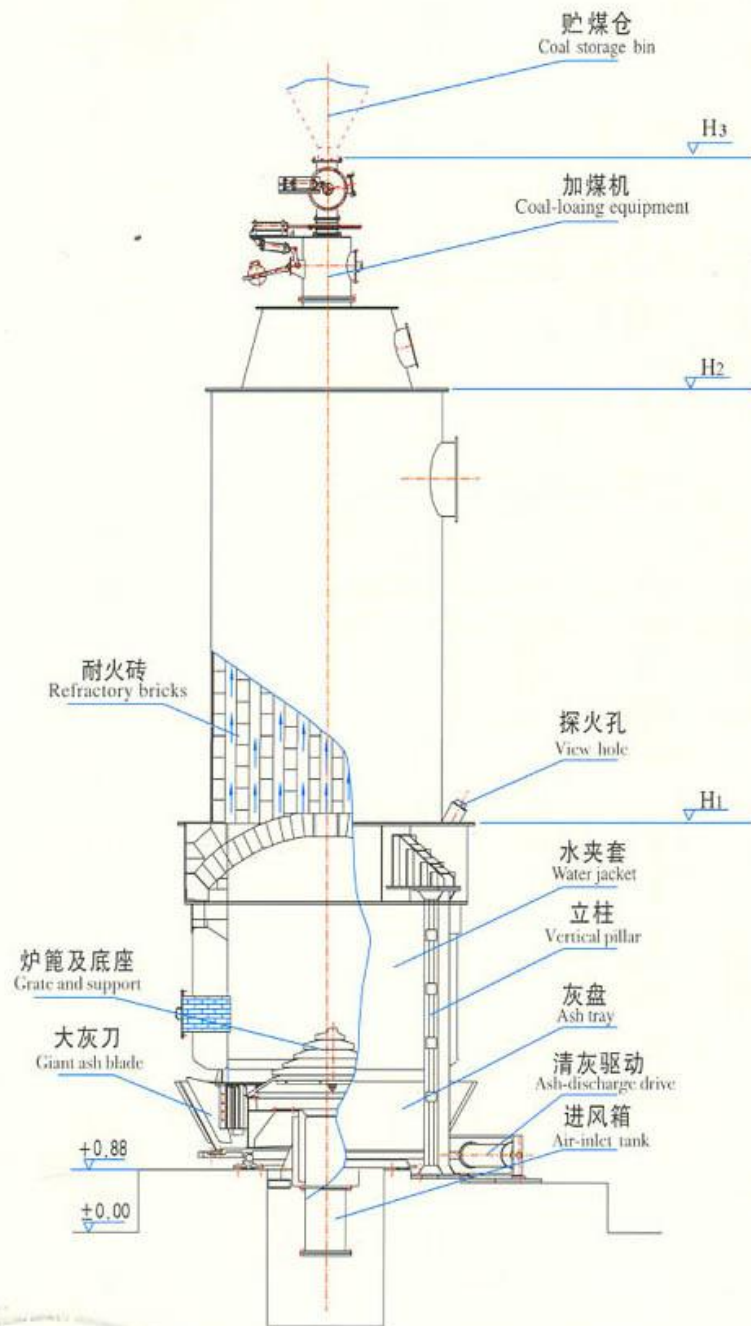


气化焦/Gasified

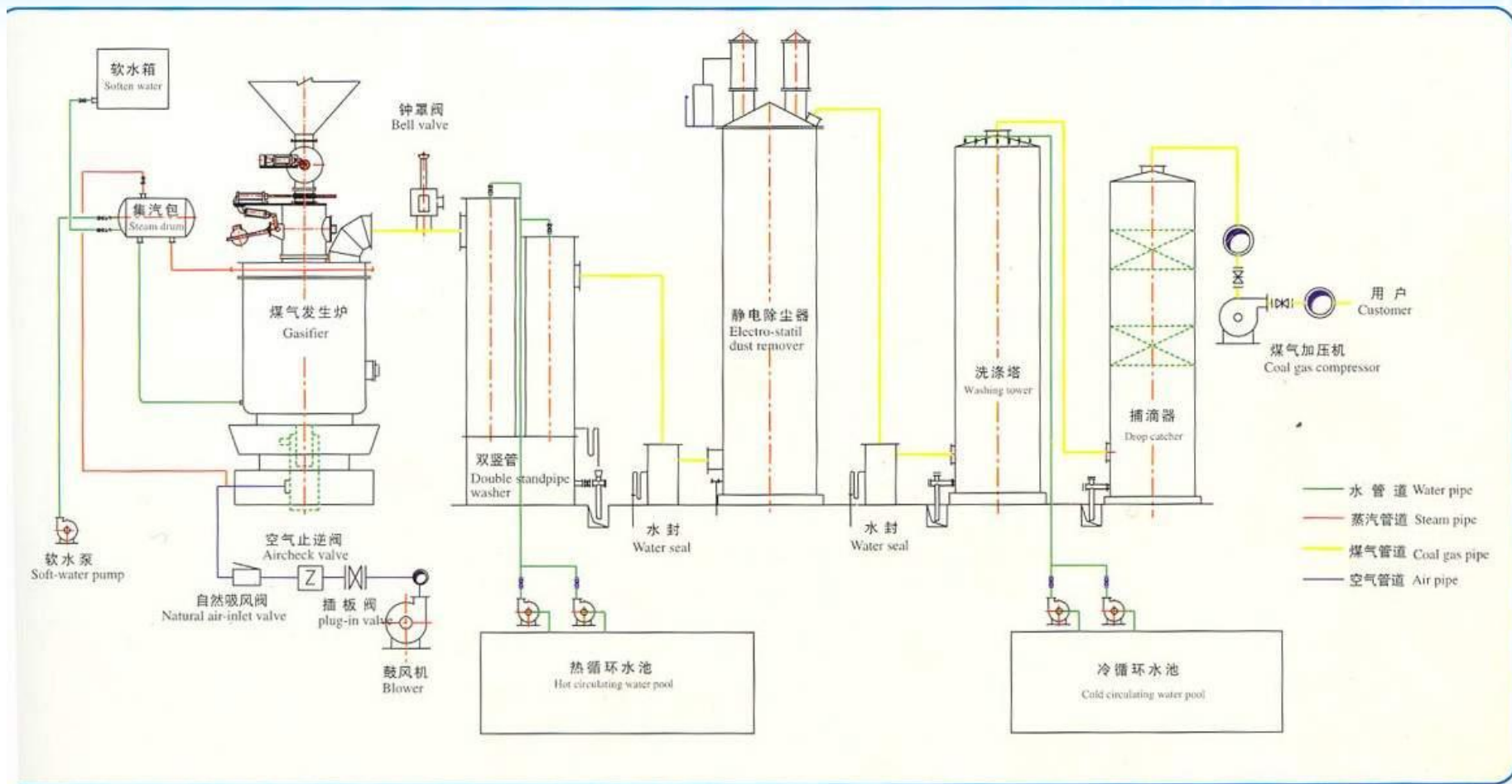
分项 /Item	固定碳 (Fcdaf)	挥发分 (Vdaf)	水分 (Mad)	• 灰分 (Ad)	硫分 (St.d)	灰熔点 °C
数据%	>78	3.0	<6	<18	<1.5	>1200

产品：燃气，煤气需求量约达50000Nm³/h / Product: the demand of gas will be 50000Nm³/h

炉体结构 /Furnace Structure



流程 / Process





3、气化工艺和气体成分 / Gasification process and composition of the gas

- 气化装置制燃气初步选择固定床间歇制气工艺路线，经过上焦、入炉、造气炉中空气蒸汽与炽热焦炭发生复杂的化学反应生成煤气、气化后煤气经除尘、余热回收、冷却后（根据实际情况选择流程：煤气先经煤气柜储存、除尘：细小微粒及煤焦油、风机加压、脱硫等工序）经管线阀门、计量后送至用户。此装置可根据用户要求进行气体成分调节满足用户对煤气热值的需求。 / The gasification process initially choose to employ fixed bed intermittent gasification generator, including serving coke, sending into the furnace, the complicated chemical reaction between superheated steam and carbon takes place to produce coal gas, after removal of dust and waste heat recovery and cooling down (specific process chosen based on the actual situation: gas is stored in the gas tank first, remove the dust: fine particles and tar, fan pressure, desulfurization processes), goes through pipeline valves and being measured and send it to end users. The system can be adjusted to produce gas with different composition to meet the customer demand for different temperature.



造气炉安装工程 / Installation of gas furnace



造气炉大修 / Repairmen of gas furnace



固定床工艺技术特点 / The characteristics of the fixed bed technology



- 采用 $\phi 2800\text{mm}$ 炉，操作灵活，运行成本低，投资低，由于此炉具有技术成熟，单位产气量投资省的特点，可大大减低投资和生维护费用。 / Using $\phi 2800\text{mm}$ furnace has advantages including the flexibility of operation, low cost of operation and low investment. The technology associated with this type of furnace has matured with large production capacity per unit and low capital input, resulting in savings on investment and repair and maintenance.
- 造气炉风机入口设计联锁程序控制阀，在不送风是可关闭风机入口，因此可大幅度减低风机的能耗 噪音。 / Add an interlock device at the entrance of the fans for the gas furnace. Turn off the entrance of the fan when no fan is sent to reduce the energy consumption of fan noise.
- 采用高效铸铁防磨旋风分离器，不仅提供了除尘效果，而且大大延长了旋风分离器使用周期。 / The adoption of efficient iron wear cyclone not only removes dust, but also greatly extend the life cycle of the cyclone.



固定床工艺技术特点 / The characteristics of the fixed bed technology

•本着造气生产“安全、节能、高效、环保”的设计原则，固定床间歇造气技术以固定床间歇气化炉为核心，通过对流程优化，系统配置优化，先进的系统设备采用、专利技术的应用，管道设计、自控系统的优化等全方位综合提升固定床造气技术，达到节能降耗、高效稳定、安全环保的目的。 / While following the design principal of “safe, energy efficient, environmentally friendly” during the gasification process, intermittent fixed bed gasifier is the center of the intermittent fixed bed gasification technology, along with the integration of process and system configuration optimization, the adoption of the advanced technology, application of the patented technology, pipeline design and optimization of automatic control system to improve the gasification using fixed bed technology to save energy, increase efficiency and fulfill the goal of environment friendly.

节能措施: Energy-saving strategies



- 焦炭气化采用过热蒸汽制气和蒸汽递减技术的应用，可提高蒸汽分解率，降低蒸汽消耗和焦耗。 / Coke gasification using superheated steam gas and steam decreasing technology, can increase the decomposition rate of steam, reducing steam consumption and coke consumption.
- 造气炉上下行煤气均采用余热锅炉回收煤气中的热量，即可增加蒸汽产量，又可以降低煤气洗涤水耗量。 / The circulation of gas inside of the gas furnace use the gas heat recovered from waster heat boilers . It not only increases steam production, but also reduces water consumption used for gas washing.
- 通过总结全国间歇式造气炉运行及工艺配管经验，充分优化工艺配管设计，减少系统阻力可以有效提高造气炉的产气能力，降低原料消耗。 / After studying other intermittent gas furnace operations and pipeline assembling in China, fully optimize the process piping design, reduce system resistance to effectively improve the gas production and lower the material costs.
- 吹风气回收技术采用三废流化混燃炉装置，解决废气废渣出路，充分利用煤渣中的残炭，对原料利用率充分提高、多产蒸汽。 / Blown recovery technology using waste streams of multifuel burner device, a way to solve the waste gas. It makes the best use of the residual carbon of cinder to increase the utilization of raw materials and steam.

燃气气体成分 / Gas composition:



分项 /Composition	CO2	O2	CO	H2	N2	CH4	热值/Calorific value
组份%	7	0.4	29	41	22.6	1.0	2218kcal

4、 系统配置及占地面积/System configuration and footprint



- 产品需求:煤气需求量达50000Nm³/h以上。 / Demand of products: The demand of gas is over 50000Nm³/h
- 出造气气化装置水煤气: /Water gas from gasification
- 压力P=0.007MPa / Pressure P=0.007MPa
- 温度T=45°C / Temperature T=45°C
- 造气炉配置:/Configuration of gasifier
- 采用固定床间歇气化炉φ2800mm直筒煤气炉,单炉产煤气量可达7000Nm³/h, 煤气炉配置数量: 50000÷7000=7.1台。 考虑一台生产备炉, 共配置8台φ2800直筒型造气炉。 / Using intermittent fixed bed cylinder gasifier furnace of φ2800mm, produces 7000Nm³/h per gasifier. The number of gas furnaces: 50000÷7000=7.1 . For each production equipment furnace, eight φ2800 cylinder furnaces will be facilitated.
- 造气气化装置占地面积: / Gasification gasification systeme covers an area of:
- 7台φ2800提升型固定床间歇气化炉和系统设施占地规划面积约: 30×80 m=2400m²; / Seven φ2800 upgrade fixed-bed gasifier and system facilities occupies an area of about: 30×80 m=2400m²

循环水处理装置 / Circulating water treatment plant



- 主要冷却水量来自洗气塔，另外小部分是造气炉冲渣水、冲洗水和其它装置冷却水等。（还有部分脱硫用水），总循环水量约为 $1000\text{Nm}^3/\text{h}$ 。占地面积约： $60 \times 40 \text{ m} = 2400\text{m}^2$
The majority cooling water comes from scrubber with the remaining coming from slag water from gas furnace, rinse water, cooling water and other devices. (including part of desulfurization water), total circulation of water is around $1000\text{Nm}^3/\text{h}$. It occupies a land of $60 \times 40 \text{ m} = 2400\text{m}^2$.

干燥棚及输煤系统/Dry coal shed and coal transportation system



- 贮存一个月用煤量，约15000吨，占地总面积约： 100×40 m=4000m²。

(根据本厂具体情况调整)

Store a month coal needed for production, or 15000 tons on a place about: 100×40 m=4000m²

(adjusted based on the actual situation)

- 4.4三废炉：蒸汽产量约30t/h

(根据本厂蒸汽总体用量调整)

4.4 Waste furnace: steam production is about 30t/h

(adjusted based on the total usage of steam of our factory)

- 占地总面积约： 50×20 m=1000m²。

On a area of about: 50×20 m=1000m²

5、投资估算/Investment budget: 5000万元/RMB 50 million



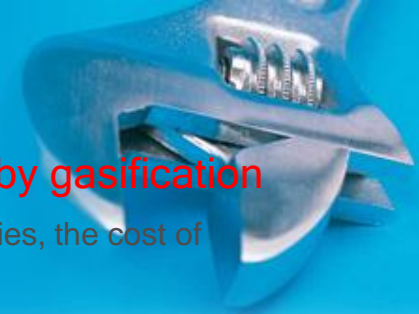
气化装置（气化炉）/Gasification unit (gasifier)	200x8
气化装置循环水处理系统 / circulating water system for gasification	30
干煤棚 / Dry coal shed	
三废炉 / Waste furnace	600
其他辅机、杂项投资 / Other auxiliary equipment, miscellaneous investment	150
	1840
煤气柜 / Gas Tank	据具体情况/ According to the circumstances
电除尘/ electrical dust precipitator	据具体情况/ According to the circumstances
罗茨风机 / Roots blower	据具体情况/ According to the circumstances
脱硫 / Desulfurization	据具体情况/ According to the circumstances

6、 消耗及成本分析 / Consumption and Cost Analysis



造气系统外界需要提供介质/ External media need of gasification system:

名称/Name	来源/Source
气化焦/GASIFIED	本厂自产/Self-produced
循环水/Recycled water	循环水装置提供/Provide by the recycling system
电/Electricity	其他装置提供/Provide by other systems
0.4MPa过热蒸汽/Superhot steam	
脱盐水/Desalinated water	
除氧水/deoxygenated water	
一次水/Primary water	
仪表空气/Instrument air	
置换用氮气/Replaceable nitrogen	



气化焦生产每Nm³水煤气成本核算（元）/The cost of per Nm³ water gas by gasification

考虑其它不确定因素：煤气成本按0.45元/Nm³进行计算。/Take into account of other uncertainties, the cost of per Nm³ coal gas is 0.45 yuan

序号/No	成本项目/Item	单位/Unit	单价/Unit price	消耗/Volum	金额/Cost
1	原料煤/Coal	吨/Ton	700	0.85	595
2	清水/Clean water	吨	0.1	0.65	0.06185
3	软水/Soft water	吨	9	1.2	10.8
4	除氧水/deoxygenated water	吨	6	1.12	6.72
5	蒸汽/Steam	吨	50	1	50
6	电/Electricity	KWh	0.56	100	56
7	油料/Oil	Kg	13	0.25	3.25
8	职工薪酬/Labor costs	元			50
9	制造费用/Production cost	元			100
10	折旧/Depreciation	元			10
11	财务费用/Finance costs	元			50
12	造气制造成本 /Gasification manufacturing costs				931.77
13	净化制造成本 /Purification manufacturing costs				380.99
合计制造成本/Total manufacturing costs					1311.77
吨氨消耗煤气/Gas consumption per ton of ammonia				3400	
每立方煤气成本（造气）/Gas cost per cubic (gasification)					0.45
煤气含有有效气/Gas containing effective gas				70%	
氢气收率/Hydrogen yield				90%	

7、经济效益分析/Economic analysis:



- 生产煤气外卖按0.75元/m³（不含税）计算： /Sales of gas to outside at 0.75yuan/m³ (excluding taxes):
- 年产生效益/annual sales: $(0.75-0.45) \times 50000 \times 8000/10000=120$ million yuan
- 投资回收期/ The payback period : $5000/12000=0.4233$ 年/years。

中国炼焦和煤化学工业股份有限公司 SinoCoking Coal and
Coke Chemical Industries, Inc.



谢谢观看/Thank you