国家高新技术企业
核心产品为各类环保行业加热燃烧器、节能燃烧优化设备（复杂混合燃料陶瓷燃烧器）、大型锅炉软化、脱硫、液氨喷射装置等环保燃烧设备以及高能效的热能系统、RCEU/restriction plate heat exchanger

SG verify environmental boiler burner，高能效陶瓷热交换器，高湿环境高阶锅炉、低氮燃烧系统设备，金属增长燃烧器、RCEU/restriction plate heat exchanger等十项国家专利、火能、热能系统均采用行业领先的UOP Calidus技术

中石化物资采购电子商网一级、二级网络成员，中国环保行业供应商网络成员单位、中国环能注册业务系统成员单位

拥有60/T/0001; ISO 9001, GB/T 23331, GB/T 28001体系认证和一、二类压力容器设计、制造许可证及GC2压力管道设计许可证

ASME（美国机械工程协会）“U”、“U2”钢印证书

2013年中石油石化与美国富士威尔（Honeywell）及其控股公司UOP Calidus签订战略联盟协议

位于洛阳的Honeywell-UOP-瑞昌石化亚太联合研发中心，包含多个加热燃烧平台和功能实验平台

National high and new technology enterprise
Core products are all kinds of environmentally friendly heater burner, energy-efficient FCC equipment including composite anti-wear ceramic nozzle, internal and complete set of equipment for SRU, waste gas, waste liquid combustion and highly reliable heat exchanger.

SG verify environmental boiler burner, high-temperature combustion air temperature (over 450°C), super large CO incinerator burner, HRT anti-wear ceramic nozzle, low pressure drop, energy saving equipment, SRU burner and the flare and combustion equipments adopt UOP Calidus’ core technology.

SINOPEC procurement e-network 1st and 2nd network member, CNPC 1st class vendor network member, CNPC procurement platform member

With 60/T/0001, ISO 9001, GB/T 23331, GB/T 28001 system certificate and level 1, level 2 pressure vessel design and fabrication certificate and GC2 pressure piping design certificate.

ASME U & U2 certifications

In 2013, the company signed a strategic alliance agreement with Honeywell and its subsidiary UOP Calidus.

The Honeywell-UOP joint R&D center is built in Luoyang, including multiple heater platforms and flow testing platform.
高效燃烧的同时
更加注重环境的保护

Pay much more attention on environmental protection during high efficient combustion

低NOx加热炉燃烧器
Low NOx heater burner

技术特点:
1. 低氮燃烧技术——降低氮氧化物，完全消除其他危化侧的有害物。
2. 曲线控制——可调节空气流量，温度，燃烧范围，燃烧方式。
3. 稳定燃烧，无排烟现象——燃烧稳定，无排烟，无异味。
4. 安全可靠，环保性能好——采用新型燃烧技术，可实现各种情况下的燃烧。
5. 使用寿命长——采用优质材料，耐高温，耐腐蚀，使用寿命长。
6. 燃烧效率高，热效率高——采用先进的燃烧技术，燃烧效率高，热效率高。

Features:
1. Excellent combustion resistance. Except for hydrocarbon oxide, completely resistant to all other acidic corrosion.
2. Low NOx emissions. Clean and smooth on the white surface with a low flow channel makes it low flow resistance and pressure drop.
3. Heat to dust deposition, easy to clean. Suitable operating on the clean surface with high gas flow rates makes it dust deposition.
4. Easy installation, strong system reliability: independent module design for various types of combustion chamber, and this flexibility makes the installation volume lower.
5. Long service life. No maintenance assembly, no stress concentration on the high-end burner, long service life.
6. Good matching, less setting. Use multiple setting materials for complete sealing, pressure difference is less than 5kPa on two sides of fit, and leakage rate is less than 3%.

1996-2015年氮氧化物排放标准变化

<table>
<thead>
<tr>
<th>Year</th>
<th>Staged Burner Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>92.3</td>
</tr>
<tr>
<td>1997</td>
<td>95.5</td>
</tr>
<tr>
<td>2010</td>
<td>98.2</td>
</tr>
</tbody>
</table>

Glass Plate heat exchange (model number: 202000000017), which is independently designed and applied by our company, mainly used in an on-line heater and other equipment. Compared to conventional heat exchangers, this product has the advantages of low pressure drop, high efficiency, compact structure, easy installation and maintenance.
环保压力日趋严峻，
国家对NOx排放要求日趋严格
氨氧化物是一种危害人体健康和
破坏大气环境的剧毒污染物，
主要是在燃烧过程中产生的。

Environmental protection stress is becoming increasingly serious;
the requirement to the NOx discharge from the state is gradually strict.
Oxynitride is a kind of toxic pollutants that is harmful to human health and
can destroy the atmospheric environment, it is mainly produced in burning.

国务院颁布《大气污染防治行动计划》，根据要求，重点
行业主要大气污染物排放量到2017年下降30%以上。
经实施的《石油炼制工业污染物排放标准》2013版中规定
现有和新建的石油炼制工业氮氧化物排放浓度100mg/Nm3（相当于50ppm）。

环保部对石油炼制企业污染物排放标准《化工设备耐氧
腐蚀技术规定》中规定合成氨的NOx排放浓度应不小于
100mg/Nm3（相当于50ppm）。

The State Council printed and distributed the "atmospheric pollution prevention action plan", according to the requirement, the main atmospheric pollutant discharge intensity of key industries should reduce more than 30% by the end of 2017.
Planning to issue the "petroleum refining industry pollution discharge standard" of 2013 edition, stipulates the special emission limits: the process heating furnace NOx emission index 100mg/Nm3 (equal to 50ppm) of atmospheric pollution for the existing and new enterprises.
Planning to issue company standard of China National Petroleum Corporation. "tube furnace burner technical regulations", the NOx emission concentration of gas-burning burner should be not more than 100mg/Nm3 (equal to 50ppm).

传统石油炼制企业
工艺加热炉NOx控制工艺

1. 由于石油炼制企业多有工艺加热炉，炉膛温度一般小于
于900℃，数量众多和设备不同。
2. 加热装置工艺路线复杂，投资运行成本高，只能依靠
低氮燃烧技术来降低氮氧化物产生。
3. 与催化氧化装置的NOX生成机制不同，催化氧化装置是先
产生污染物后，而工艺加热炉采用催化氧化的氧化器是从源头
来减少氮氧化物的产生。

1. For the process heating furnace owned by majority of petroleum refining enterprises, furnace chamber temperature generally is less than 900℃, both load and furnace temperatures are different.
2. As the NOx generation mechanism is different, investment operation cost is high, so it only rely on the low-NOx combustion technology to control the generation of NOx.
3. Different from the NOx control method in catalytic cracking unit, catalytic cracking unit is generating first, then eliminating, But the process heating furnace adopts the low NOx burner to reduce the generation of NOx from the source.

瑞昌超低NOx燃烧器特点:

新一代的超低NOx燃烧器采用最新的燃烧技术，能够在工艺加热炉NOx产生的源头，也就是燃烧的火焰区，抑制NOx的产生，极大的降
低工艺加热炉的NOx排放，生产NOx排放降低至30ppm的燃烧器。具有以下特点：

1. 喷射喷嘴技术，采用两根独立喷嘴将燃料分隔从火焰的内侧和外侧进入燃烧器。
2. 燃烧器采用独特的离心结构，具有先进的喷油装置，保证了燃烧的高稳定性和低可氧化性。
3. 燃烧器设计和燃烧器的结构中燃烧器喷嘴技术，极大的降低了燃烧器NOx的排放。
4. 采用燃料再循环技术，来降低火焰区的温度，抑制生成NOx的产生。
5. 本燃烧器与传统燃烧器相比，实现更低NOx排放，最低可低至30ppm。

Ruchang Ultralow NOx Burners’ Features:

The new generation of ultralow NOx burners adopt, it can suppress the generation of NOx in the NOx generating source of process heating furnace. NoX, also it is in the burning flame zone, greatly reduce the NOx discharge of heating furnace. The NOx burners that produce the discharge can be lowered to 30ppm, they have the following features:

1. Fuel staged injection technology, adopting two individual fuel guns and injecting the fuel into the burner separately from the inside and outside of the flame channel line.
2. Refractory brick adopts special-shaped structure, it has advanced air distribution concept, it can make sure the high stability and high reliability of the combustion.
3. The fuel distribution type and refractory brick structure forms the low-oxygen combustion technology, greatly reducing thermodynamic NOx discharge.
4. Adopting high gases recycle technology, to reduce the temperature in flame zone, suppress the generation of thermodynamic NOx.
5. Compared with the traditional burners, this kind of burner can realize lower NOx discharge, the minimum can be lowered to 30ppm.
为碧水蓝天提供
优良设备
有效降低烟气
污染物排放
For the clear water and blue sky
Excellent equipment
Effective flue gas reduction
Pollutant emissions

工艺方法：Techniques

湿法脱硝脱硫技术路线的原理是：

1. 高浓度：在一定条件下，控制湿法脱硫，但脱硫效率高，脱硫效率高；
2. 脱硫酯化法：在一定条件下，控制脱硫酯化，但脱硫酯化法。
3. 脱硫酯化法：在一定条件下，控制脱硫酯化，但脱硫酯化法。
4. 脱硫酯化法：在一定条件下，控制脱硫酯化，但脱硫酯化法。

适用行业：
石油、化工、电力、钢铁、焦化、锅炉等行业

适用范围：
0—10KPa，250℃以下，气—气换热环境（特别适用于耐腐蚀性气体）

Applicable industries: Petroleum, Chemical industry, Electric Power, Coking and Boilers etc.
Application range: 0—10KPa, below 250℃, air to air heat exchanging environment (especially for corrosive gases)

工艺描述：Process Description

脱硫酯化法湿法脱硫技术路线主要特点：

(1) 高浓度：控制湿法脱硫，但脱硫效率高；
(2) 脱硫酯化法：在一定条件下，控制脱硫酯化，但脱硫酯化法。
(3) 脱硫酯化法：在一定条件下，控制脱硫酯化，但脱硫酯化法。
(4) 脱硫酯化法：在一定条件下，控制脱硫酯化，但脱硫酯化法。
The application of innovative technologies effectively improve the customer value

A. FCC ceramic nozzle and FCC feed nozzle

B. Large CO incinerator burner

Low pressure drop Energy-saving Equipment

New model with sealed body, featuring reduced pressure drop by 40-80%.
全面的解决方案
推动更高的回报价值

The sulfur recovery and combustion system unit

公司不断地加大自主研发力度，次硫回收装置（10万吨/年）通过国家及建设部的高技术成果鉴定，目前也达到了国际同类产品的技术水平，大量工业应用业绩证明完全可以用替代进口产品。

In contrast to increasing or independent research and development, the company has gained major innovation achievements on the key equipment, such as a large SRU level 100,000 barrels/day and burners, their performance have reached the same level with foreign products, with large amount of industrial application. It has been proved that these products can completely replace the imported ones.

火矩系统
Flare system

Flare emission system for dealing with flammable and toxic flammable gas from compressor for oil refining, petro-chemical, oil and gas field. It is the requirement of state environmental protection and also the equipment to ensure enterprise safety operation. By building up strategic alliance cooperation with UOP Calidus, and achieve win-win partnership, we provide world-leading flare and fire system.
废气焚烧
系统化处理技术
Integrated process technology of exhaust gas burning

Meets the demand for VOCs, H2S, HCN, NH3, NOx, SOx, O3, benzene, toluene, xylene, styrene, MEK, TCA, TI and other compounds.

Racchong specialized solutions of exhaust gas burning such as coke ash, flue gas, ammonium hydrogen sulfide, dioxides, polyvinyl, PA, PVC, BN for oil refining, petrochemical, chemical industry, fine chemical industry, coal chemical industry, VOC and ESD industry.

Combustion efficiency >99.99%, destruction and removal efficiency >99.99%

Racchong has the ability of development of process design package, and we have hold several combustion systems running stably in oil refining and chemical industry.

案例 Applications

上海南山石化有限公司
Organic waste gas processing unit

Edward Yip, Honeywell

更下的排放
满足日益提高的环保标准
Lower emission
Satisfy the rising environmental protection standards

废气焚烧及余热回收系统
System of exhaust gas burning and waste gas recovery

废气焚烧及烟气净化回收系统
System of exhaust gas burning and fuel gas, absorption and purification

废气焚烧及烟气脱硫排放系统
System of exhaust gas burning and fuel gas, absorption and purification
创新科技
引领节能减排

半干法烟气脱硫技术
Semidry Flue Gas Desulfurization Technology

系统流程图
System Flowchart

- 吸收剂制备输送系统
- 循环流化床反应塔
- 布袋除尘器系统
- 吸收剂再循环系统
- 工艺水系统
- 燃气系统
- 烟气系统
- 烟囱液硫输送系统

Circulating fluidized bed (CFB) Semidry Flue Gas Desulfurization Technology (CFB-SDS) is mainly used in the areas such as coal gas and coal gas treatment of SFX, fuel gas treatment of CCG, and fuel gas containing post-treatment of sulfuric acid units.

The system is shown above the diagram. The system is simple and efficient. No waste water produced and dry ash by products are easy to handle. Low cost, simple process, less land occupation, less rotating equipment, smaller maintenance, full automatic control, and flexible operation.

吸收剂：石灰浆（Ca(OH)2）溶液（300~400g/L）
反应塔：循环流化床
反应原理：喷雾流化和吸收剂循环洗涤之多级循环洗涤

- 吸收剂浓度：200~3000mg/L
- 烟气量：5000~10000m³/h
- 吸收剂投加量：50g/m³
- 吸收剂浓度：20mg/L

(吸收剂及烟气量：SO2 < 50mg/m³)
霍尼韦尔（Honeywell）及其控股子公司UOP Callidus和瑞昌战略联盟

The Strategic Alliance has formed between Ruichang and Honeywell, together with its subsidiary, UOP in January 2013.

UOP凯勒特技术 + 瑞昌创新 = 能效提升及大力减排的解决方案

UOP Callidus technology + Ruichang innovation = Solutions to improve energy efficiency and significantly reduce waste and emissions.