



METHANOL
INSTITUTE

METHANOL INDUSTRIAL BOILER

The background image shows a close-up of industrial boiler components. Large, polished metal pipes and valves are visible, with a blue arrow pointing upwards on one of the pipes. On the right side, a circular pressure gauge is partially visible, showing a scale from 0 to 120 with a needle pointing near 100. The overall scene is industrial and metallic.

METHANOL INDUSTRIAL BOILER

Introduction

A boiler is a type of energy conversion device that uses chemical energy of a fuel or other energy sources to heat water and/or generate steam. Boilers are widely used in China, to generate heat in the processes of manufacturing, food production, and hot water for bath, or to generate steam for sterilization and dehydration.

The boiler design includes the boiler proper (main components), auxiliary, and safety devices. The two major components of the boiler proper are the "boiler drum" (water vessel for heating over a flame) and the furnace (combustion chamber and burner). Existing boilers can be retrofitted to burn methanol.

Chinese companies also sell dedicated methanol boilers. They started exploring methanol boilers in 2012 to replace coal and fuel oil for heating, food processing, agriculture warming, pharmaceutical production process and medical sanitation.

METHANOL

Replacement for coal & fuel oil



Heating



Food Processing



Agriculture Warming



Pharmaceutical Production



Medical Sanitation

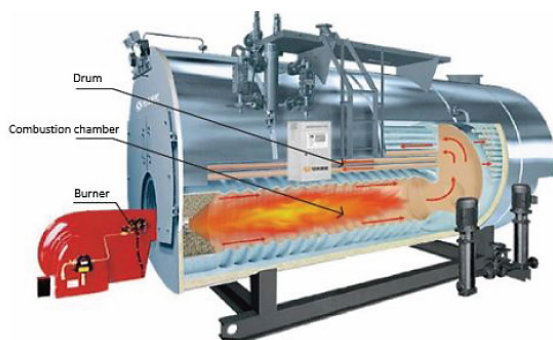


Illustration of boiler



Methanol Boiler

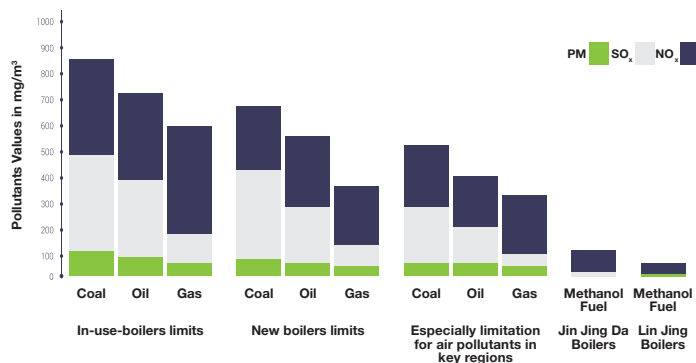


Methanol Burner

CURRENT DEMAND DRIVERS IN CHINA

• **Environmental Driver:** Coal was the primary source of air pollution in Northern China and other manufacturing areas due to inefficiency of equipment and low quality of coal.

- ▶ Caused haze and poor air quality
- ▶ Industrial boilers contributed to 33% of soot, 27% of SO_x and 9% NO_x emissions in China
- ▶ Methanol boilers show superior emission benefits of at 75% reduction of total emissions in terms of PM, SO_x , and NO_x , when compared to coal boilers; significant emission reduction when compared to natural gas boilers



• **Government action caused shift in market:** China's Air Pollution Control Action Plan issued by the State Council proposed the elimination of coal-fired boilers and specifically mentions a need to switch to new energy boilers which are environmentally friendly and energy efficient.

• **Infrastructure for gas is not ubiquitous in China and is expensive:** Methanol is easily transported as it is a liquid at ambient temperature and pressure.

• Methanol's fuel is economical for small boilers:

Heat Values and Economics of Fuels for Small Boilers

Fuel	Methanol	Natural Gas	Natural Gas (High Price)	Diesel	Coal	Commercial & Industrial Electricity
Unit price of fuel (RMB)	1.8/kg	2.2/m ³	4.5/m ³	5.5/kg	0.4/kg	0.9/kWh
Unit price/0.1 Cal (RMB)	3.8	2.6	5.4	5.5	0.8	10
Thermal Efficiency 4	90%	90%	90%	90%	55%	96%
Actual Economics (RMB/0.1 Cal)	4.2	2.9	6.0	6.1	1.5	10.4

Indicative pricing based on time of publication

CHINA'S NATIONAL POLICIES RELATED TO THE BOILER INDUSTRY



MARKET SIZE

Methanol Boilers in over 10 Provinces in China



Shanxi, Shaanxi, Shanghai, Shandong, Tianjin, Chongqing, Beijing, Hebei etc.

Existing Total: Approximately 1,000 units of methanol boilers in China, consuming 2MMTs of methanol annually.

MARKET PLAYERS

Primary domestic manufacturers of methanol burners with dedicated production lines

n-Brilliant

Dongguan Brilliant

Specializes in the manufacture of methanol burners
Website: www.dg-brilliant.com



无锡赛威特燃烧器制造有限公司
WUXI SAIWEI BURNER MANUFACTURING CO. LTD

Wuxi SWT

A renowned domestic burner supplier
Focuses on specialty gas burners
Main customers include boiler manufacturers
Methanol burners form a small portion of the business
Website: www.china-burner.com

Primary domestic suppliers of methanol boiler burners that use retrofitting lines

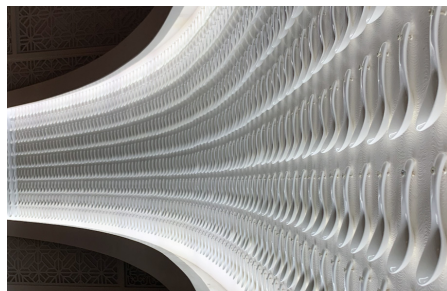
Xi'an Tianwaitian	Manufacture of burners of less than 1 ton
Tianjin Enguang	Original equipment manufacturer of burners, up to 15 tons
Beijing Jinjingda	Manufacture of burners of less than 10 tons
Zhongke Bosheng	Manufacture of methanol burners of less than 1 ton
Shanghai Linjing	Able to reconstruct 4 tons methanol burners

MARKET ESTIMATIONS

China has approximately 624,000 boilers

Approximately 100,000 boilers were identified by the Chinese Ministry of Environment Protection that would need to go into disuse or switch to a cleaner fuel by 2020 to comply with the Air Pollution Control Action Plan drafted by the State Council. Assuming methanol captures 5% of the boiler market, 5MMTs of it can be consumed annually. Methanol burners used in boilers are also now being used in ceramic kilns and tobacco drying.

Existing Total: Approximately 1,000 units of methanol boilers in China, consuming 2MMTs of methanol annually.



Ceramics in Dehua

Ceramic kilns

- China produces up to 90% of ceramics globally
- Dehua is the main centre of ceramic production in China
- 0.5 MMTs per annum methanol demand from Dehua alone if ceramic kilns burned methanol

Methanol is fuel of choice for ceramic kilns because

- ▶ Methanol is safer and easier to handle than LPG
- ▶ Methanol burns cleaner producing ceramic products with a cleaner and whiter finish
- ▶ Burning it achieves higher temperatures of up to 1400°C



Tobacco being dried

Tobacco Drying

- 1 out of 3 cigarettes globally are consumed in China
- Tobacco industry has RMB 1.7 trillion profits annually, contribution to government budget equals to China's military spending

Methanol is used in tobacco drying because

- ▶ Coal is being banned for use in tobacco drying
- ▶ Methanol's clean burning properties preserves the quality of tobacco




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