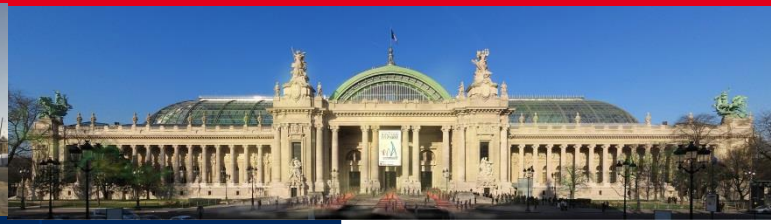
26th World Gas Conference

1 – 5 June 2015, Paris, France



Development of high efficiency gas burners for industrial use.

Yuki Shibata
Osaka Gas Co., Ltd.

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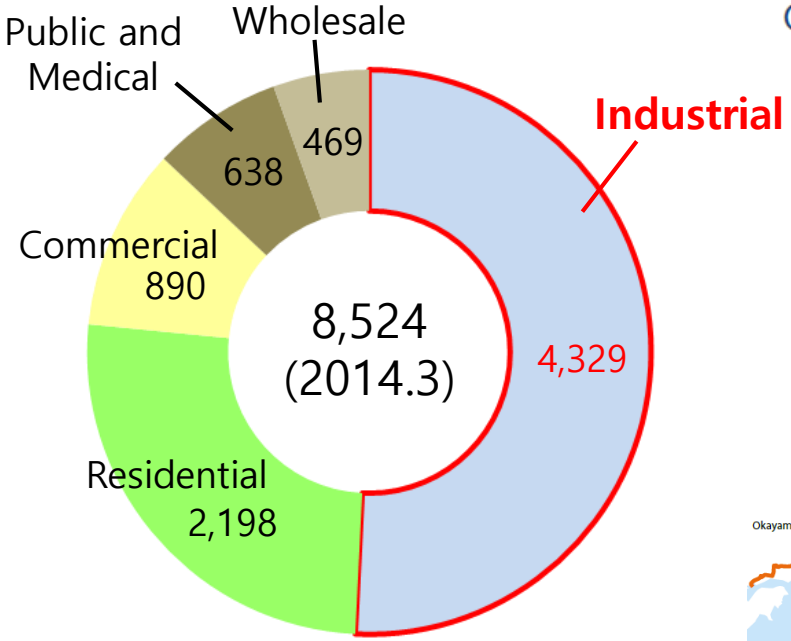
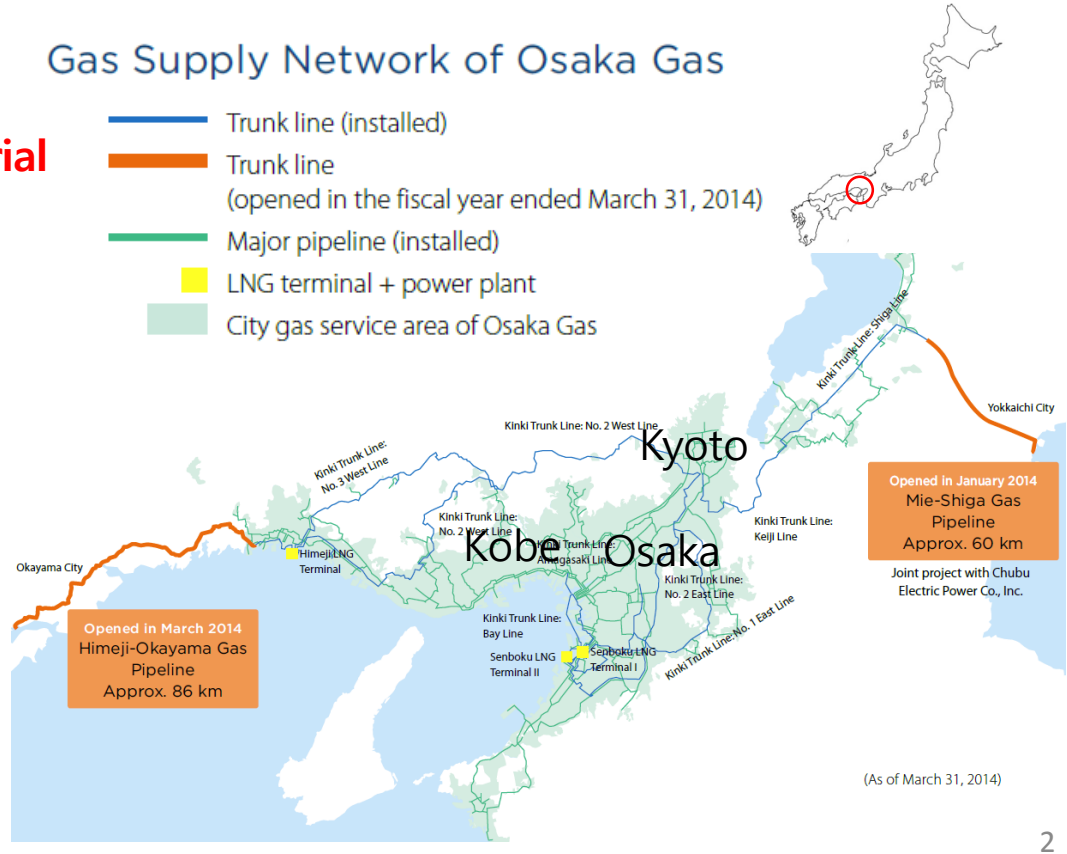
Overview of Osaka Gas Co., Ltd.



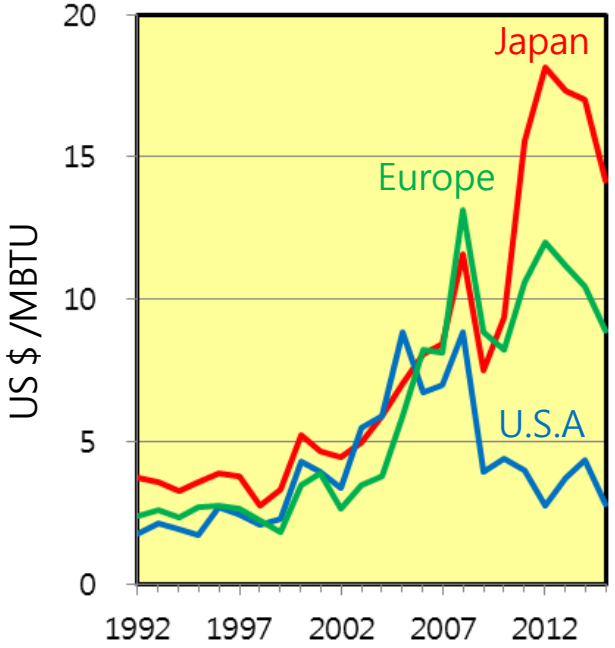
Gas Sales Volume by Use
(Million m^3)



Demand for developing of gas burners

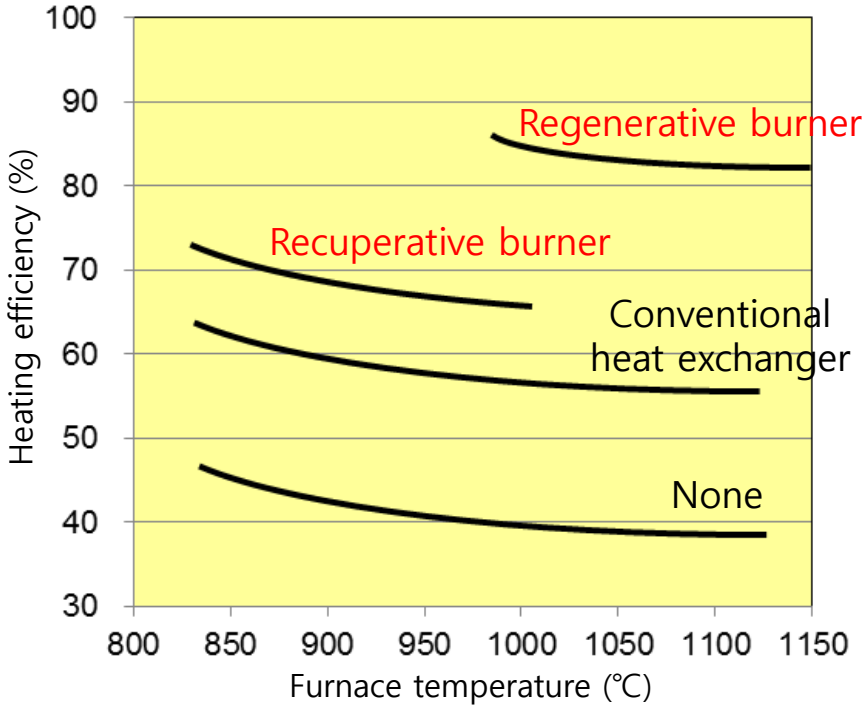
- ✓ Energy saving
- ✓ Low cost
- ✓ Green action
- ✓ Higher performance

High demand for developing of gas burners, according to the each customers' furnace's configuration or operating conditions.



Transition of natural gas price.

Energy-Saving Systems for Industrial Use



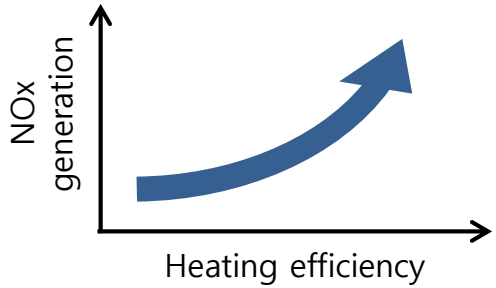
Heating efficiency for each energy-saving system.

Key Points For Energy Saving Burners

1 .High Heating Efficiency

2. Low NOx < 378ppm (O_2=0%)

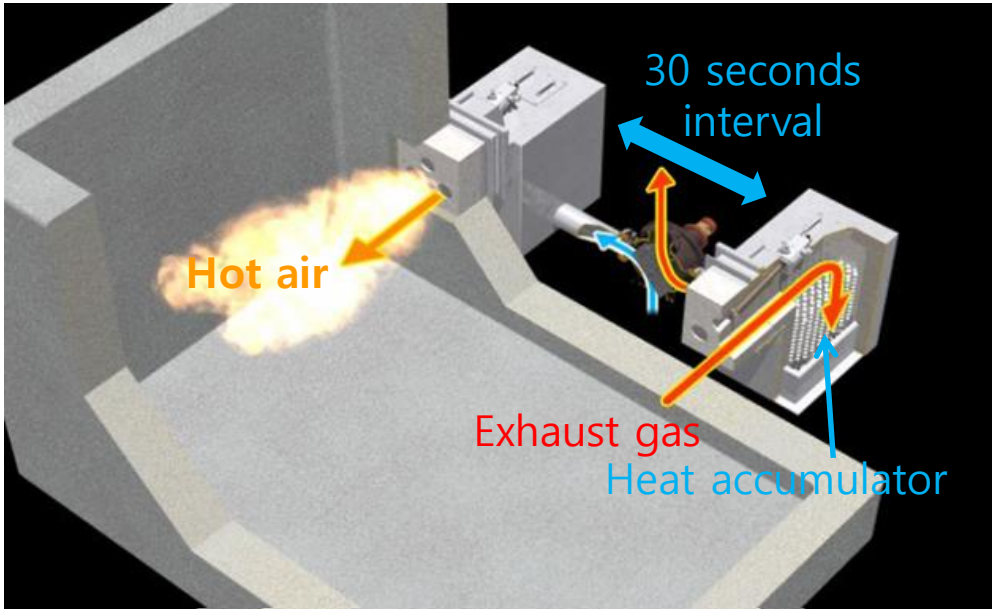
*In the case of METAL category,
regulated by Air Pollution Control Act.



Energy-Saving Systems for Industrial Use

Regenerative burner system

New Burner ① : Insert type Regenerative Burner

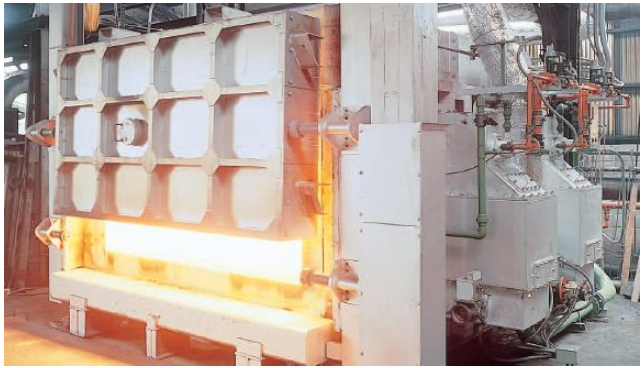


Features :

1. Heat efficiency > 80%.
2. Each burner combusts alternatively.
3. Each burner has heat accumulator.

Use application :

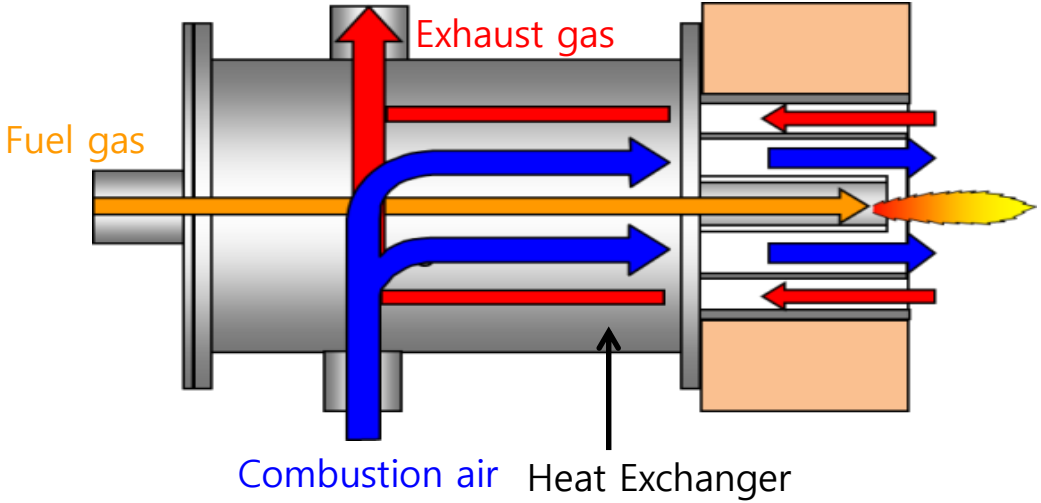
- ✓ Forging
- ✓ Direct heat treatment, etc.



Energy-Saving Systems for Industrial Use

Recuperative burner system

New Burner ② : Direct Heating Recuperative Burner
③ : High-Efficiency Single Ended Radiant Tube Burner (Indirect heating)



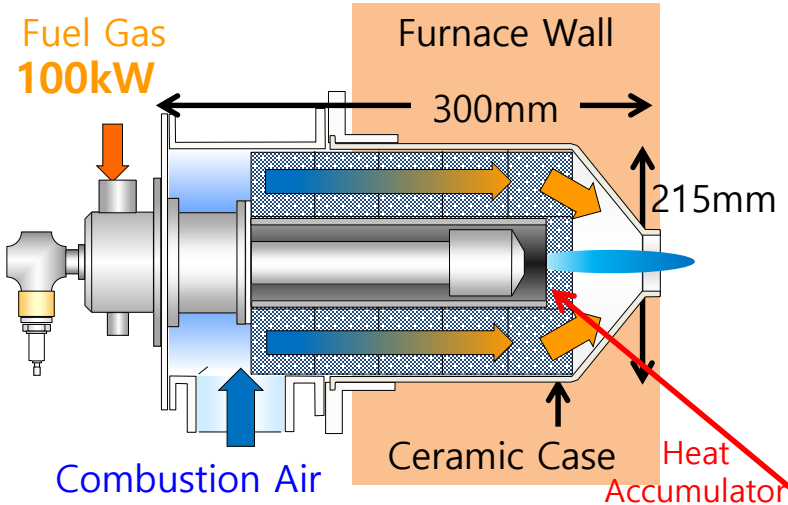
Features :

1. Heat efficiency ~65% (conventional type).
2. Burner has the heat exchanger.
3. Low cost compared to Regenerative burner.

Use application :

✓ Heat treatment, etc.

New Burner ① : Insert type Regenerative Burner (Regenerative Burner)



Structure of the burner

Conventional type (Aluminum ball)

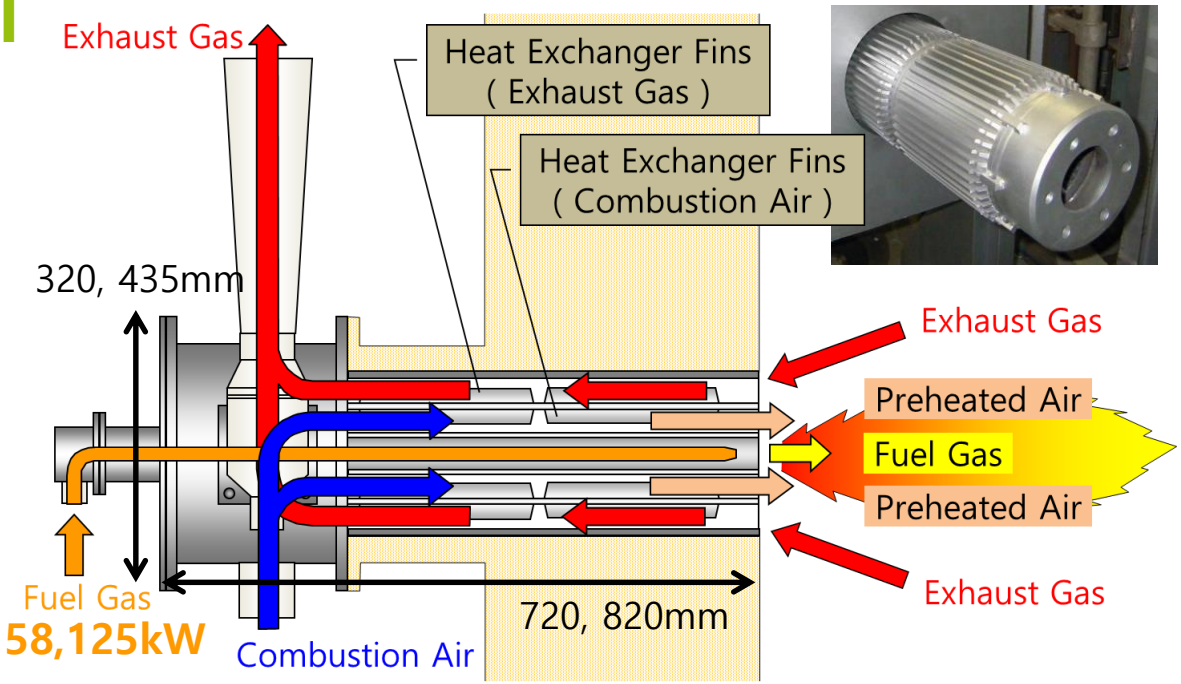
Osaka Gas type (SiC ceramics)

Flame of the burner

Features :

- ✓ High heating efficiency ~ 84% (at furnace temp. 1,150℃).
- ✓ Low NOx emission ~ 313 ppm (O_2=0%, at furnace temp. 1,150℃) due to unique gas nozzle.
- ✓ High durability due to adoption of ceramic case instead of burner-tile.
- ✓ Small installation space by inserting the burner into the furnace wall.

New Burner ② : Direct Heating Recuperative Burner

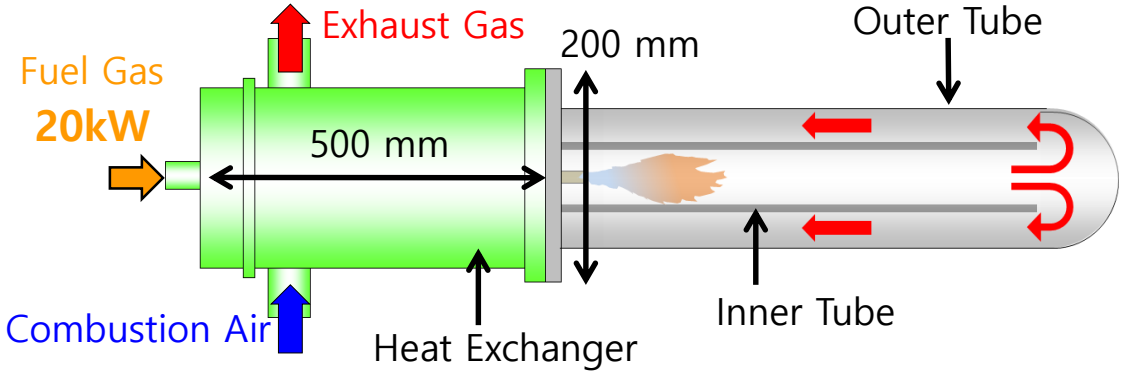


Structure of the burner

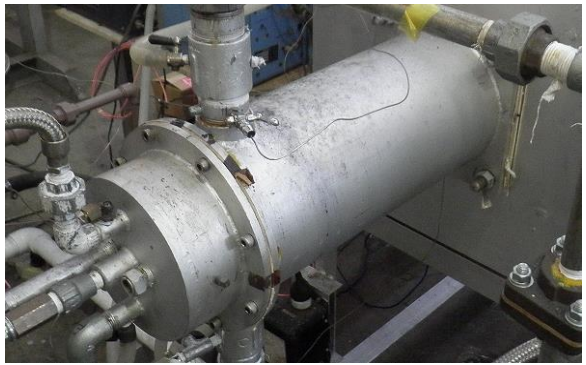
Features :

- ✓ High heating efficiency ~ 68% (+8%, at furnace temp. 1,100℃) by the unique heat exchanger.
- ✓ Low NOx emission ~ 86 ppm (O_2=0%, at furnace temp. 1,000℃) due to self EGR.
- ✓ Homogeneous heat distribution in the furnace due to high speed of combustion air.
- ✓ Small installation space.

New Burner ③ : High-Efficiency Single Ended Radiant Tube burner (Indirect Heating Recuperative Burner)



Structure of the burner



Features :

- ✓ High heating efficiency ~ 75% (+15%, at furnace temp. 950℃) by unique heat exchanger in the burner body. (ordinary type ~ 60%)
- ✓ Low NOx emission ~ 298 ppm (O_2=0%, at furnace temp. 950℃) due to unique gas nozzle and EGR.

Summary

	New burner① **Insert type** **Regenerative Burner**	**New burner②** **Direct Heating** **Recuperative Burner**	**New burner③** **High-Efficiency Single Ended** **Radiant Tube Burner**
Efficiency	84% (at 1,150℃)	68%(+8%) (at 1,000℃)	75%(+15%) (at 950℃)
NOx (O_2=0%)	313ppm (at 1,150℃) (< 378ppm)	86ppm (at 1,000℃) (< 378ppm)	298ppm (at 950℃) (< 378ppm)
Application examples	Forging, Direct heat treatment, etc. (1,000 - 1,150℃)	Direct heat treatment, etc. (800 - 1,000℃)	Indirect heat treatment, etc. (800 - 950℃)

Thank you for your attention.