

Research Projects on Gasification at Institute for Advanced Engineering (IAE)

2009. 10. 7.

The Broadmoor Hotel, Colorado Springs

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Current Gasification-Related Projects at IAE

✓ Coal Gasification :

- 1) Korea Electric Power Research Institute, Korea Western Power Co.
(Pilot tests with candidate coals, metal/ceramic filters, etc.)
- 2) Korea Electric Power Research Institute
(Pilot tests for hot gas cleanup, WGS reactor)
- 3) SK Energy
(Pilot tests)

✓ Synthetic NG from Coal :

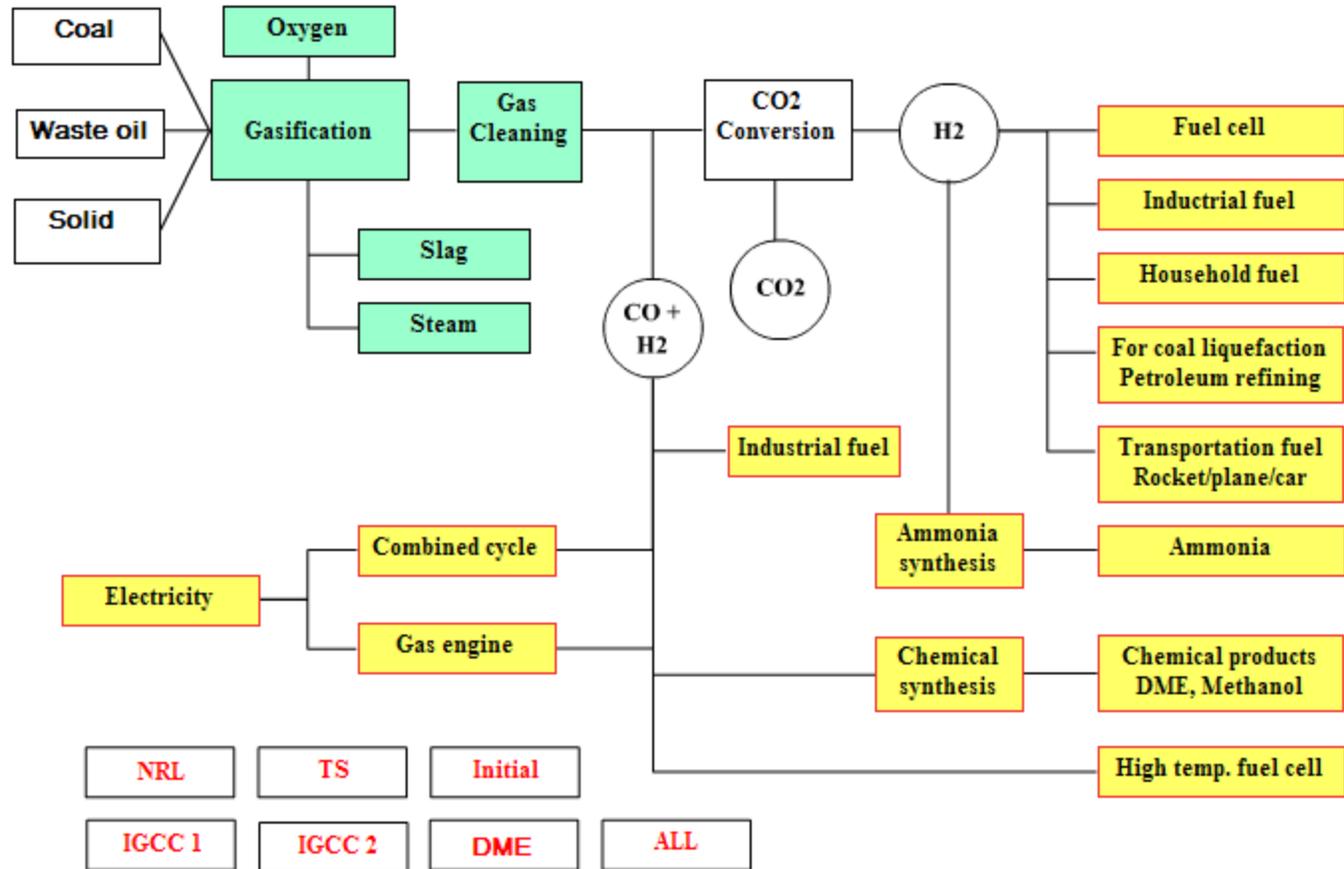
- 1) POSCO
(Pilot tests with commercial catalysts, etc.)

✓ Wastes Gasification :

- 1) One 50 ton/day project on gasification of medical wastes
(Design/Pilot tests)
- 2) One 50 ton/day project on syngas production from wastes for
chemical company
(Design/Pilot tests)



Gasification Facilities at IAE



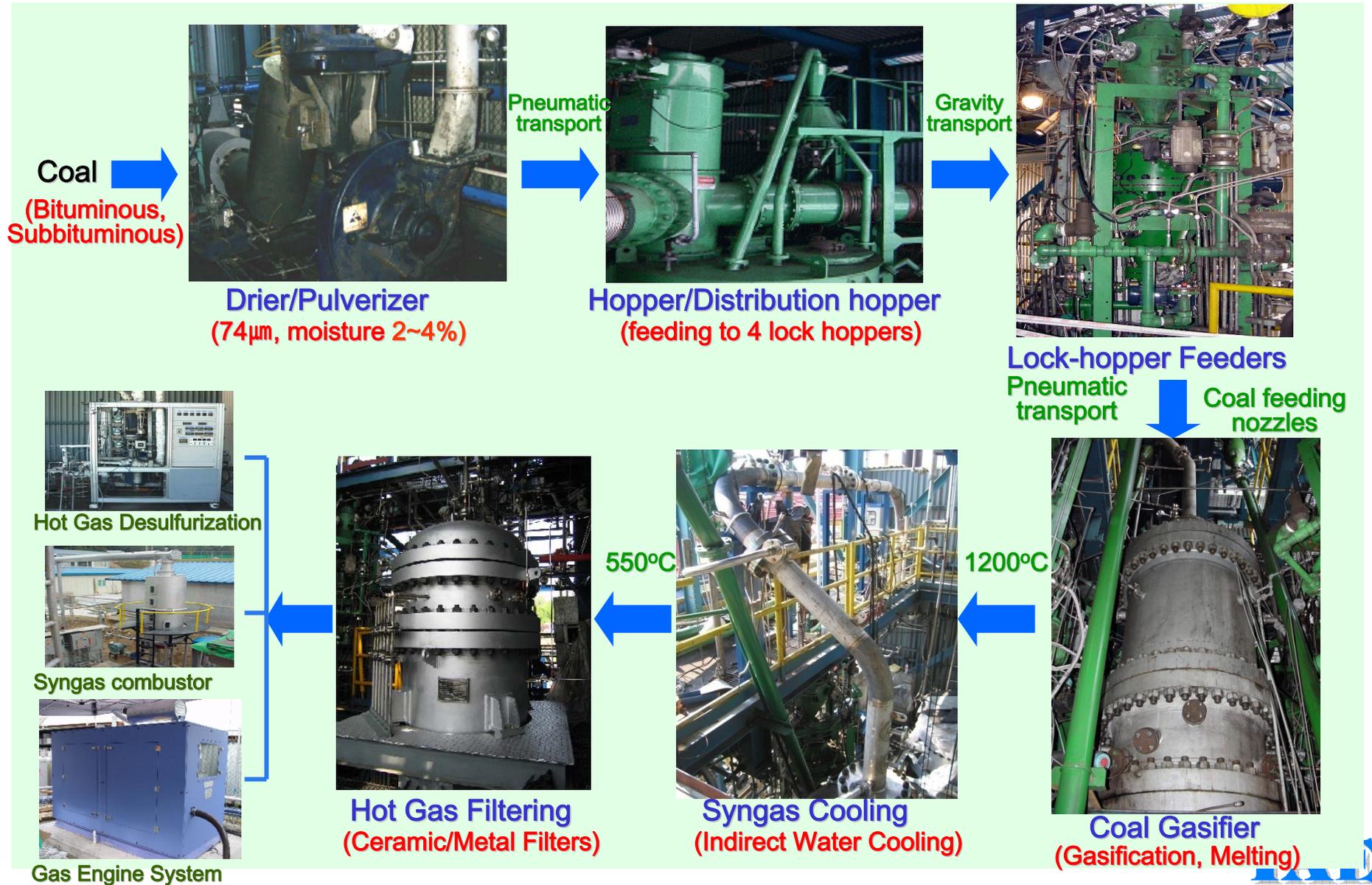
1) 3 Ton/Day Coal Gasification Pilot Plant



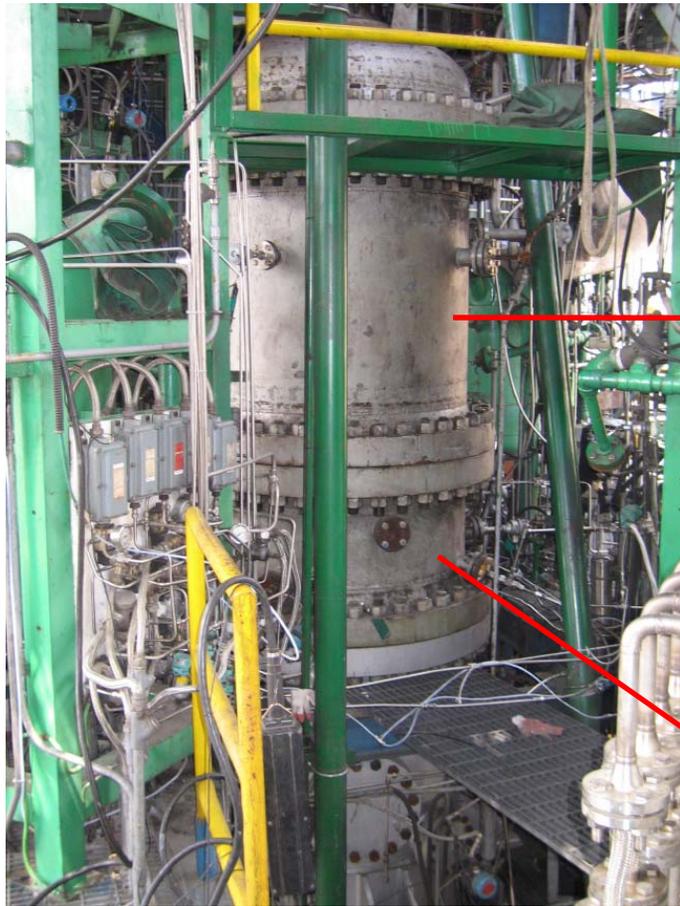
Operated from 1995
(Max. Pressure: 28 bar,
Max. Temperature: 1550°C)



Process Flow of 3 T/D-Scale Coal Gasification System



Entrained-Bed Gasifier (Up-flow)

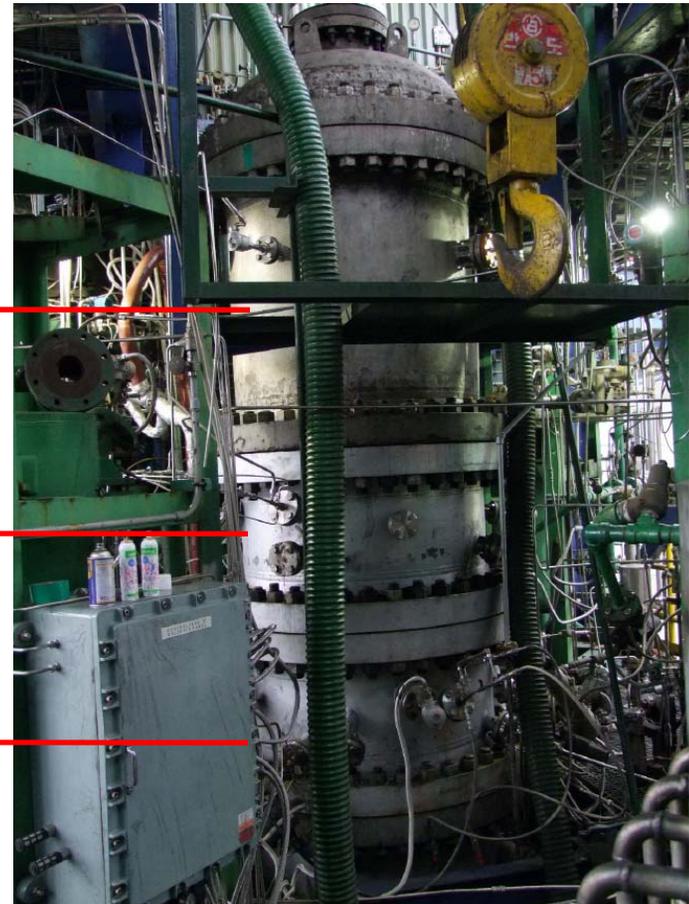


One-Stage Gasifier

Upper section

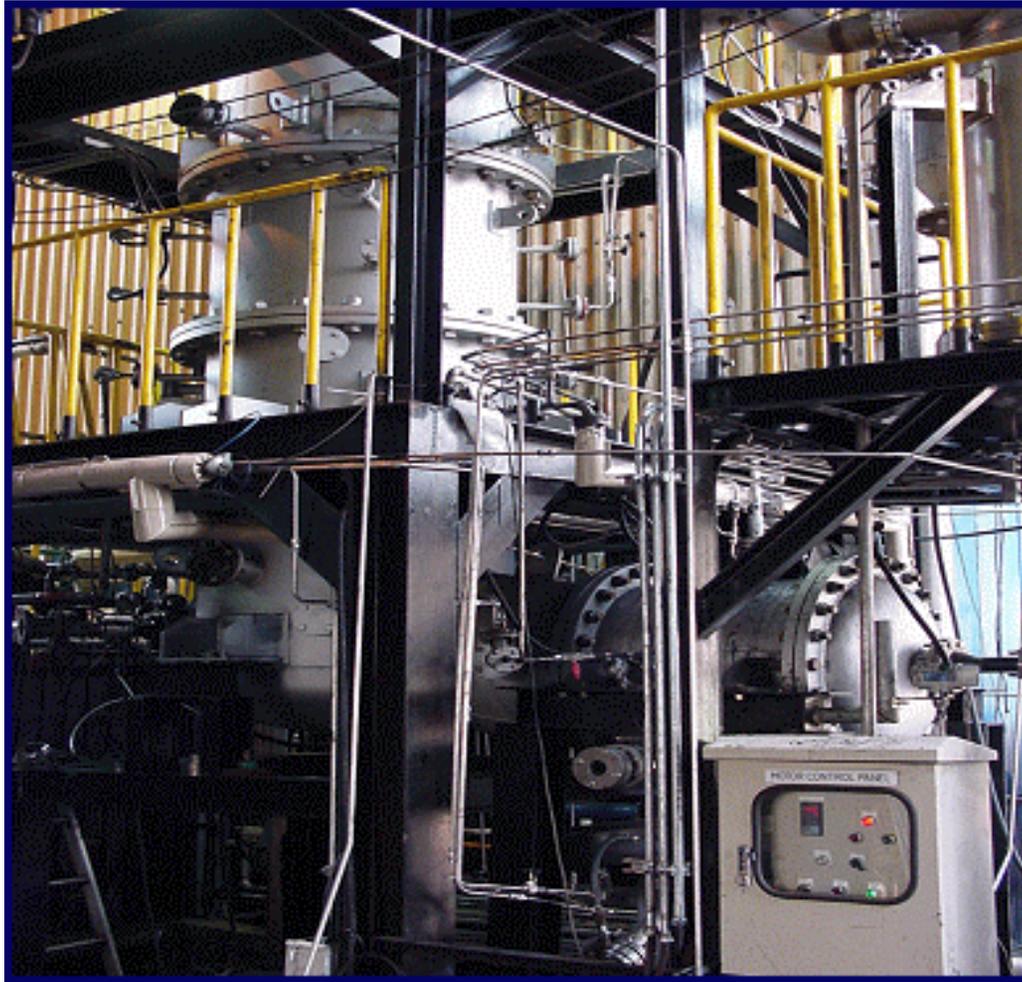
Additional middle section

Middle section



Two-Stage Gasifier

Entrained-Bed Gasifier (One-stage/Down-flow)



Entrained-Bed Gasifier for
Hot Gas Cleanup + One-step
WGS system

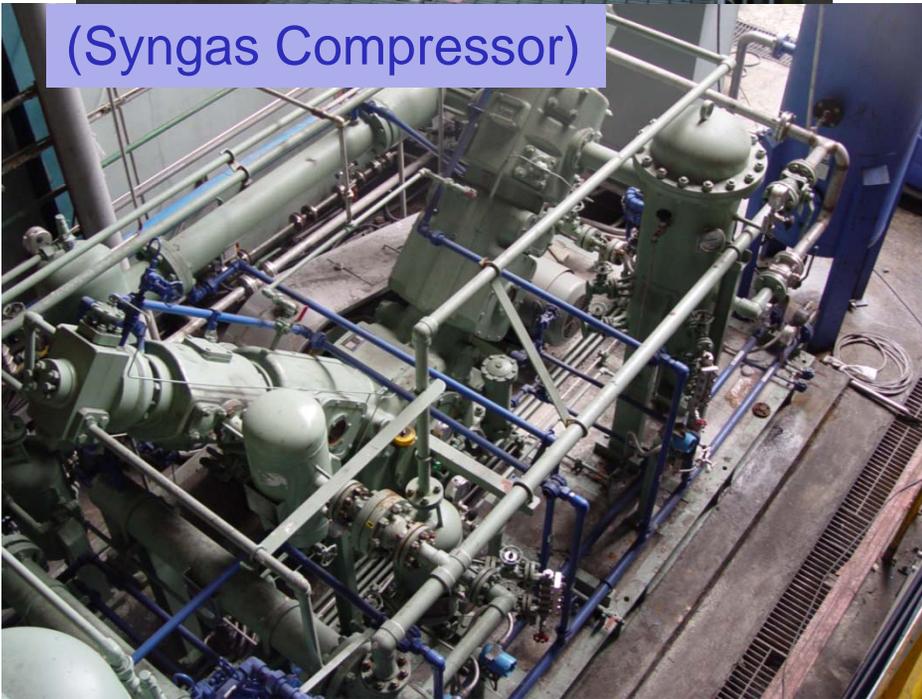


DME Synthesis Pilot System

(WGS Reactor)



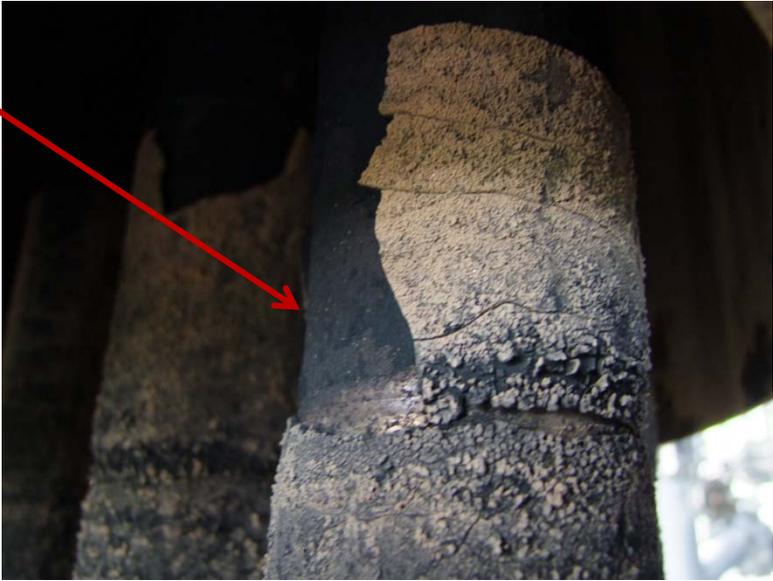
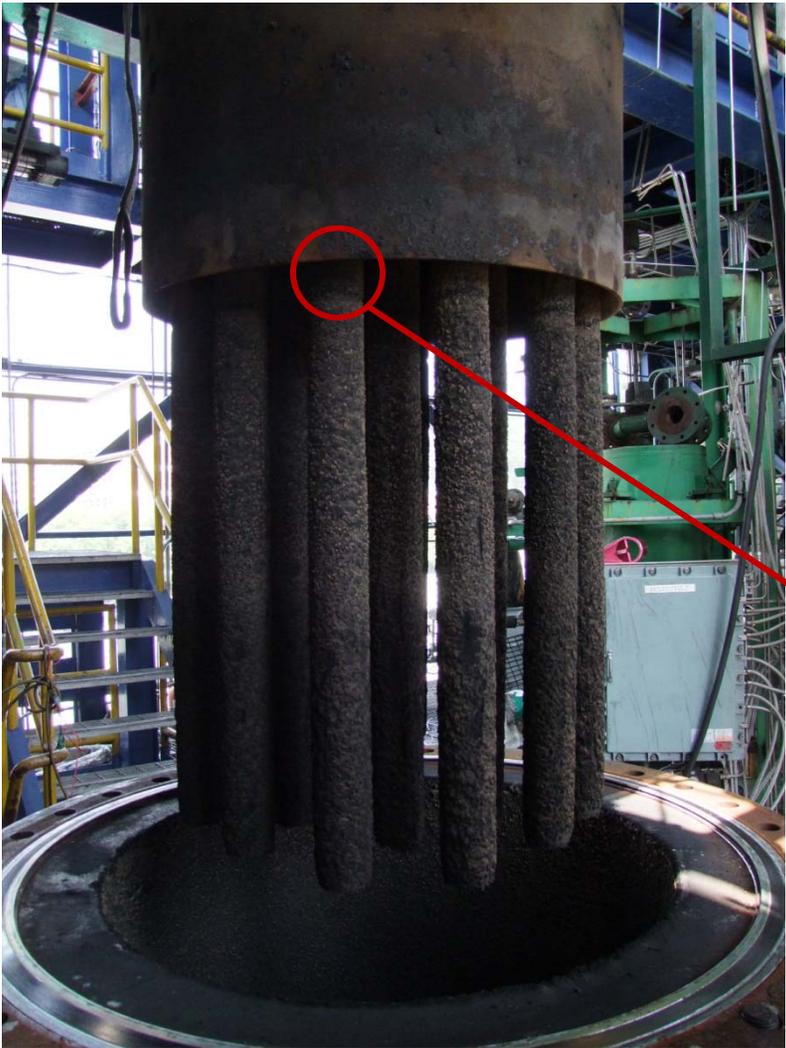
(Syngas Compressor)



(DME Reactor)



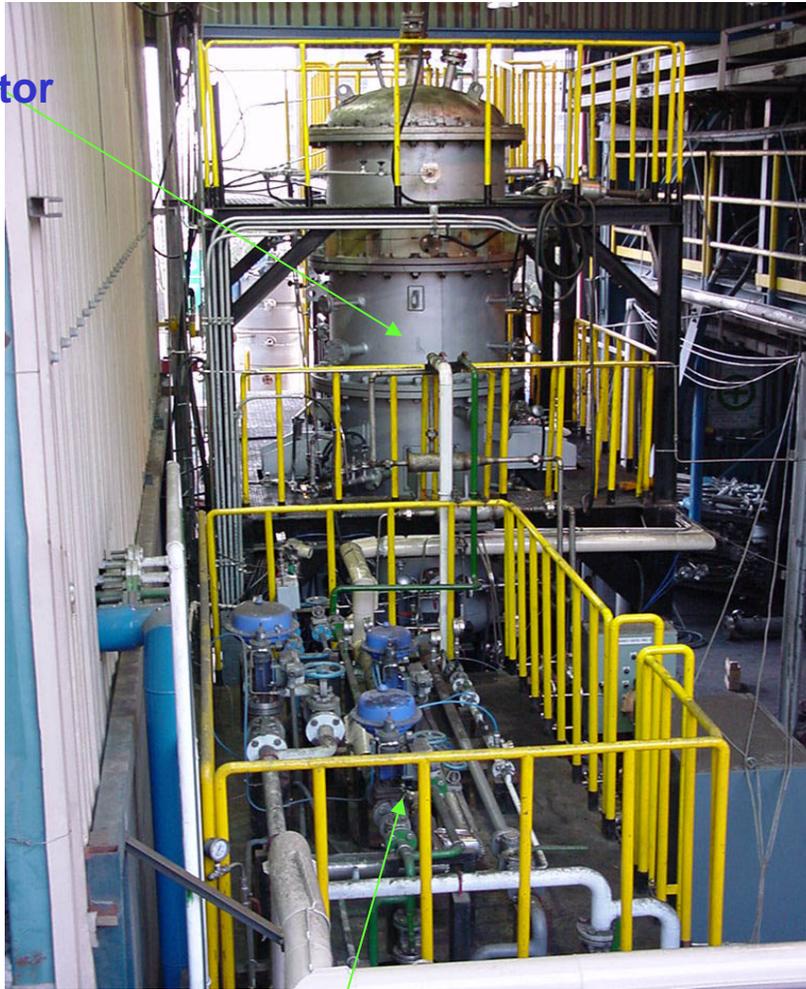
Metal Filters after Gasification Test (Indonesian coal)



2) 1 Ton/Day Waste-Oil Gasification/Melting System

Capacity : Waste-oil 1 ton/day, Max. 10 bar operation

Reactor



Feed/utility supplying system Waste gas treatment



Slag
Quen-
cher

Slurry-type feeding system

Process Flow of Waste-Oil Gasification/Melting System



□ Oxygen, Nitrogen Supply System



□ Main Control Panel



□ Local Control Panel



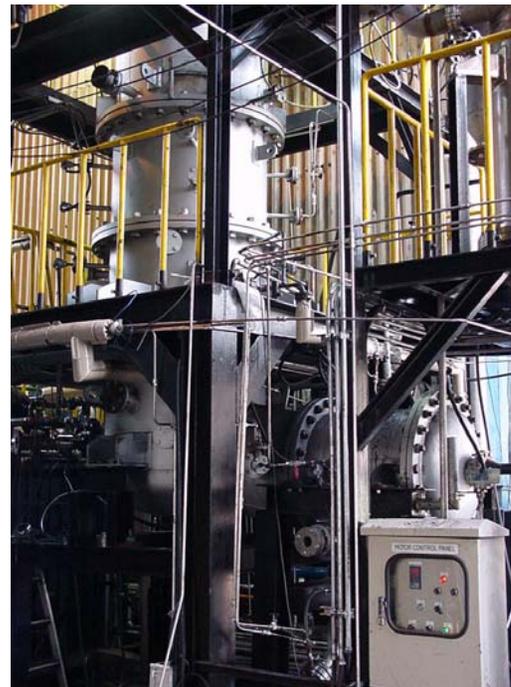
□ Waste Gas Treatment



□ Liquid-type Feeding System



□ Slurry-type Feeding System

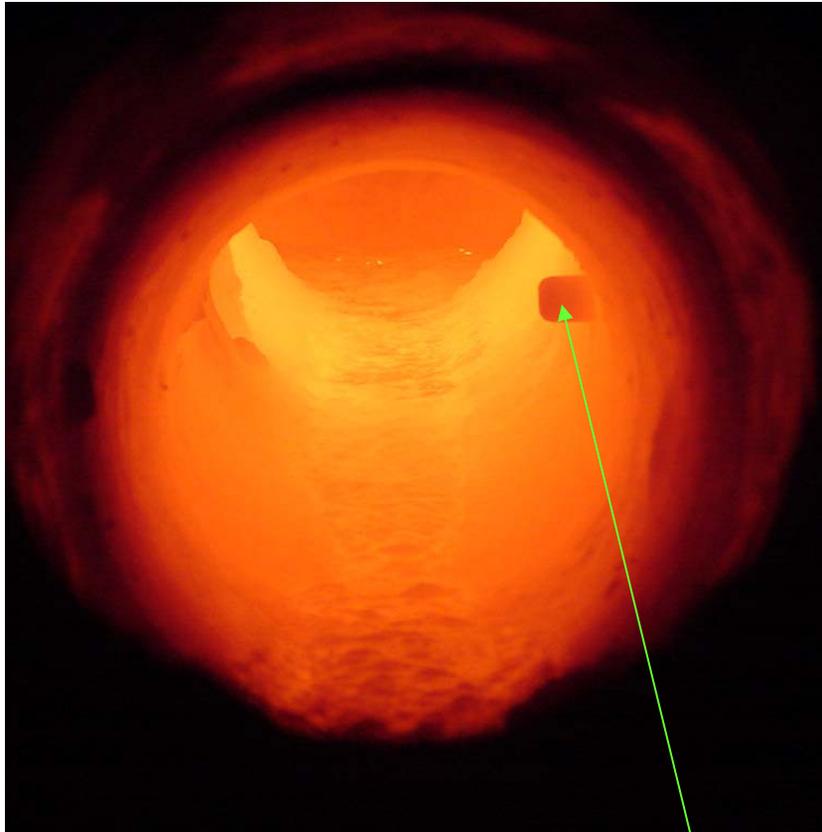


□ Gasification/Melting Reactor

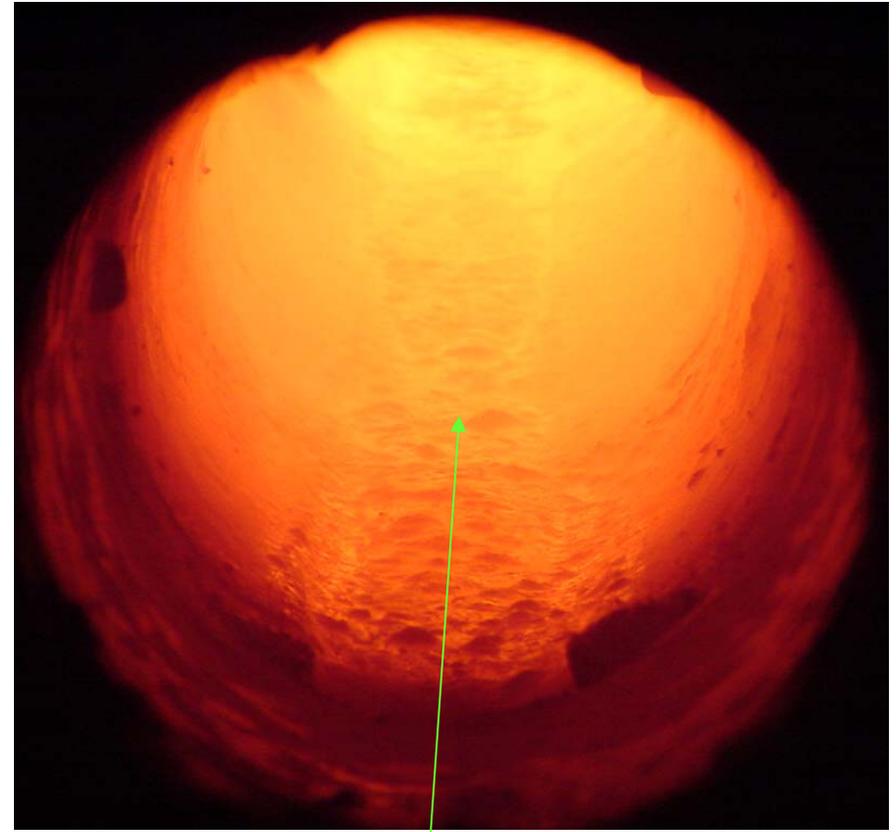


□ Flare stack

Flow inside Gasification/Melting Reactor for Waste-Oil/Flyash Feed

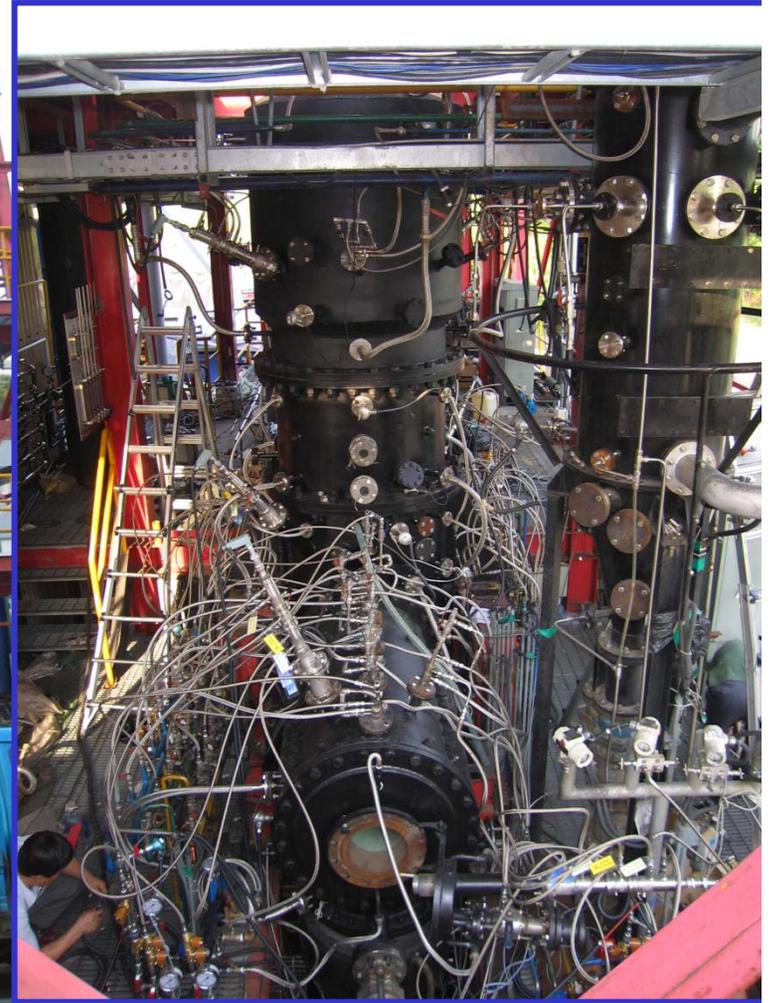


thermocouple

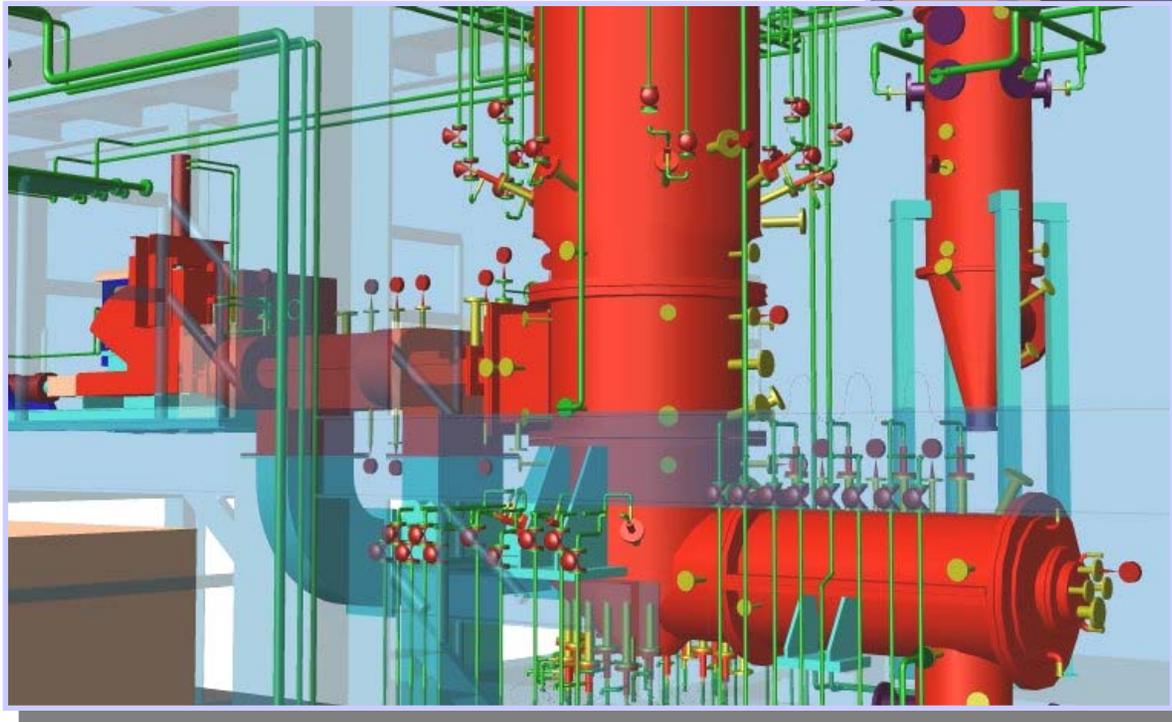
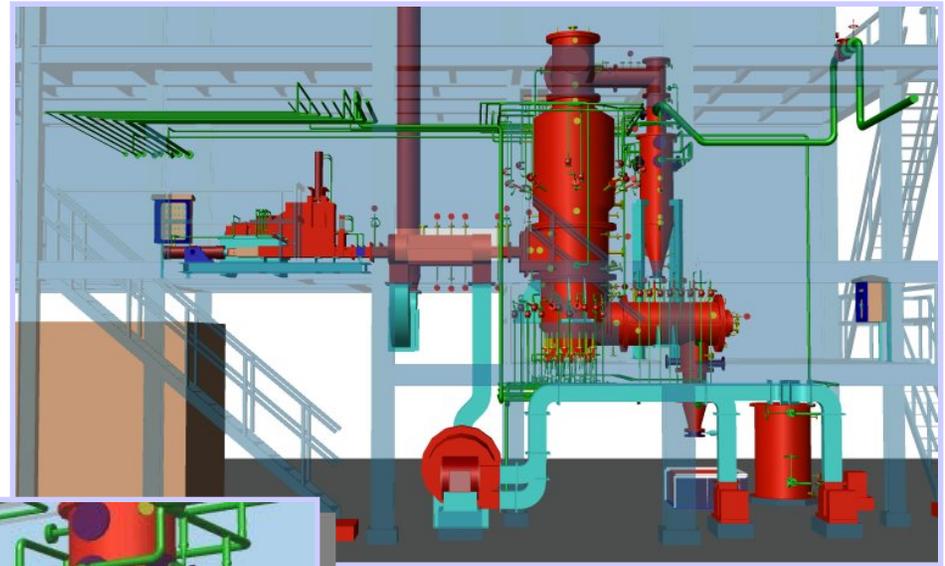
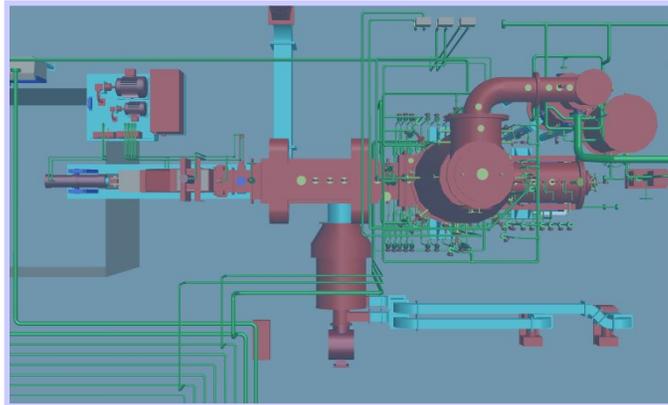


Molten Slag

3) 5 Ton/Day Wastes Gasification/Melting Pilot Plant

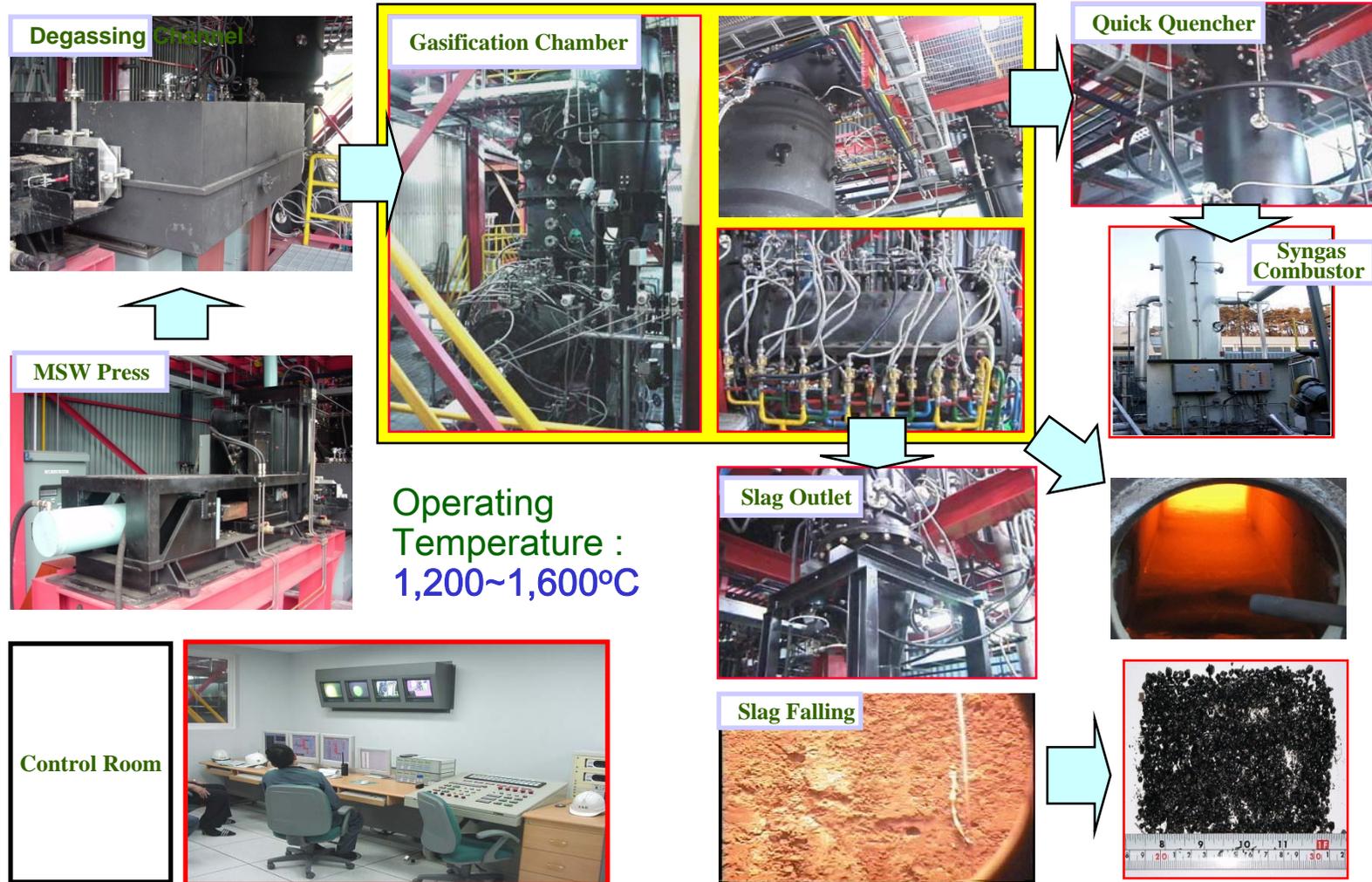


3-D Design View of Wastes Gasification System

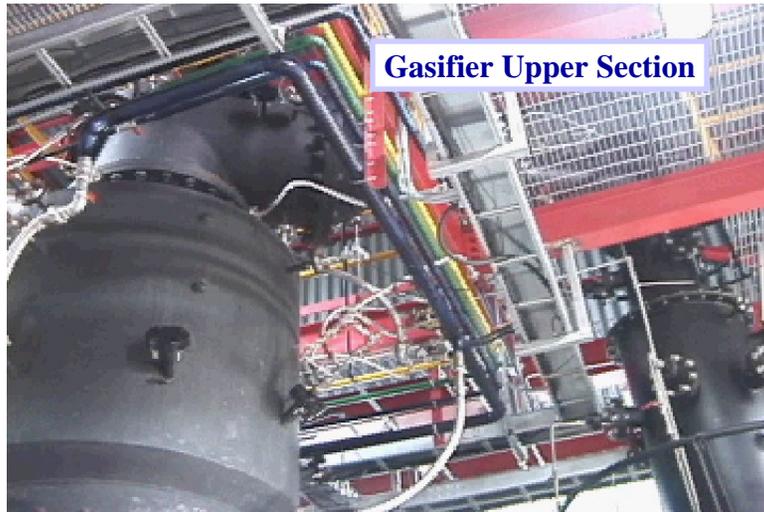


- ◆ Based on Thermoselect™ System
- ◆ Asked by Daewoo Construction Co. to confirm applicability on Korean high moisture MSW in 2003.
- ◆ Obtained a certificate of New Environmental Technology from Korea Ministry of Environment in 2003.

Process Flow of 5 T/D Wastes Gasification Pilot Plant



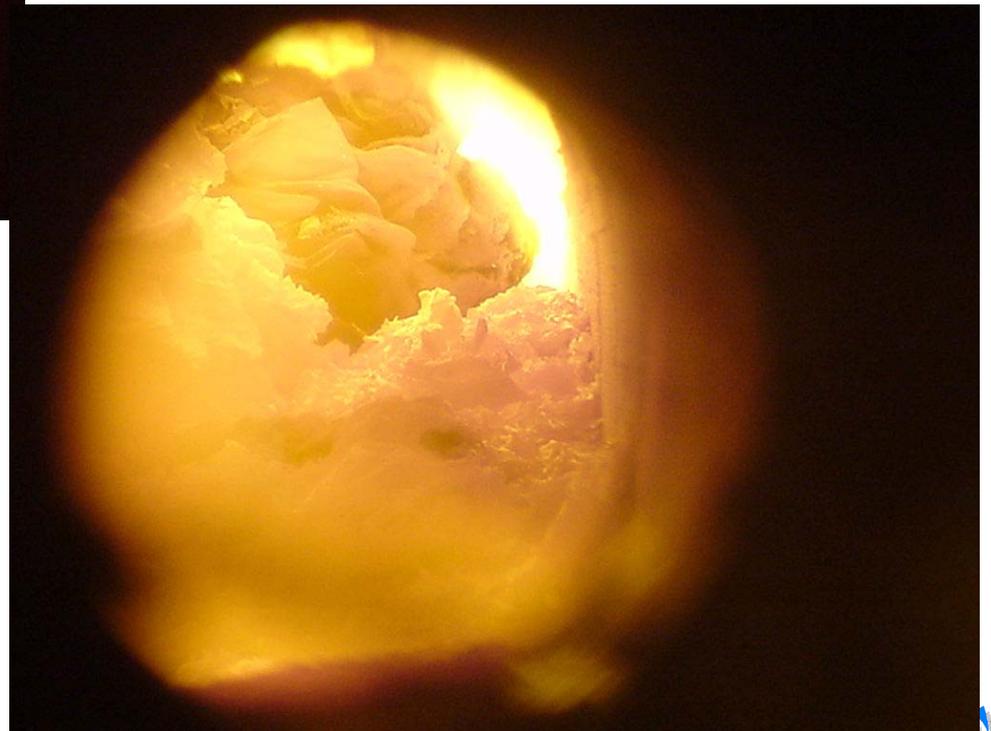
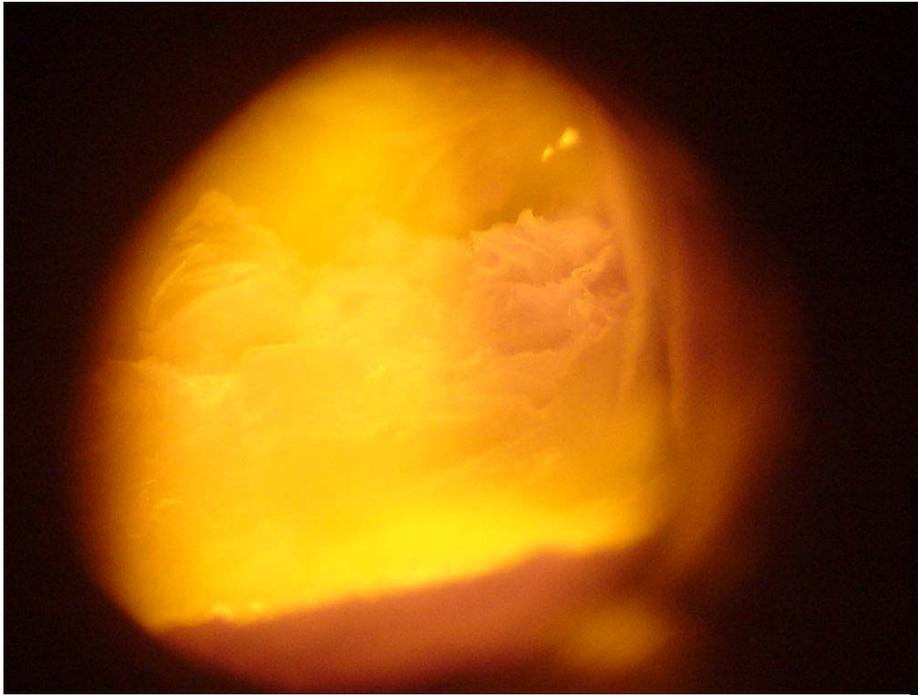
Main Equipments Following Process Flow



Typical Municipal Solid Wastes in Korea



View of Gasification/Melting Main Section



Slag from 30-50 wt% Moisture-Containing MSW

Molten slag falling from slag tap



Slag falling in slag quencher



Quenched slag

