



華東理工大學
EAST CHINA UNIVERSITY OF SCIENCE & TECHNOLOGY



洁净煤技术研究所
Institute of Clean Coal Technology

Commercial Applications of the Opposite Multi-Burner Gasification Technology

Institute of Clean Coal Technology

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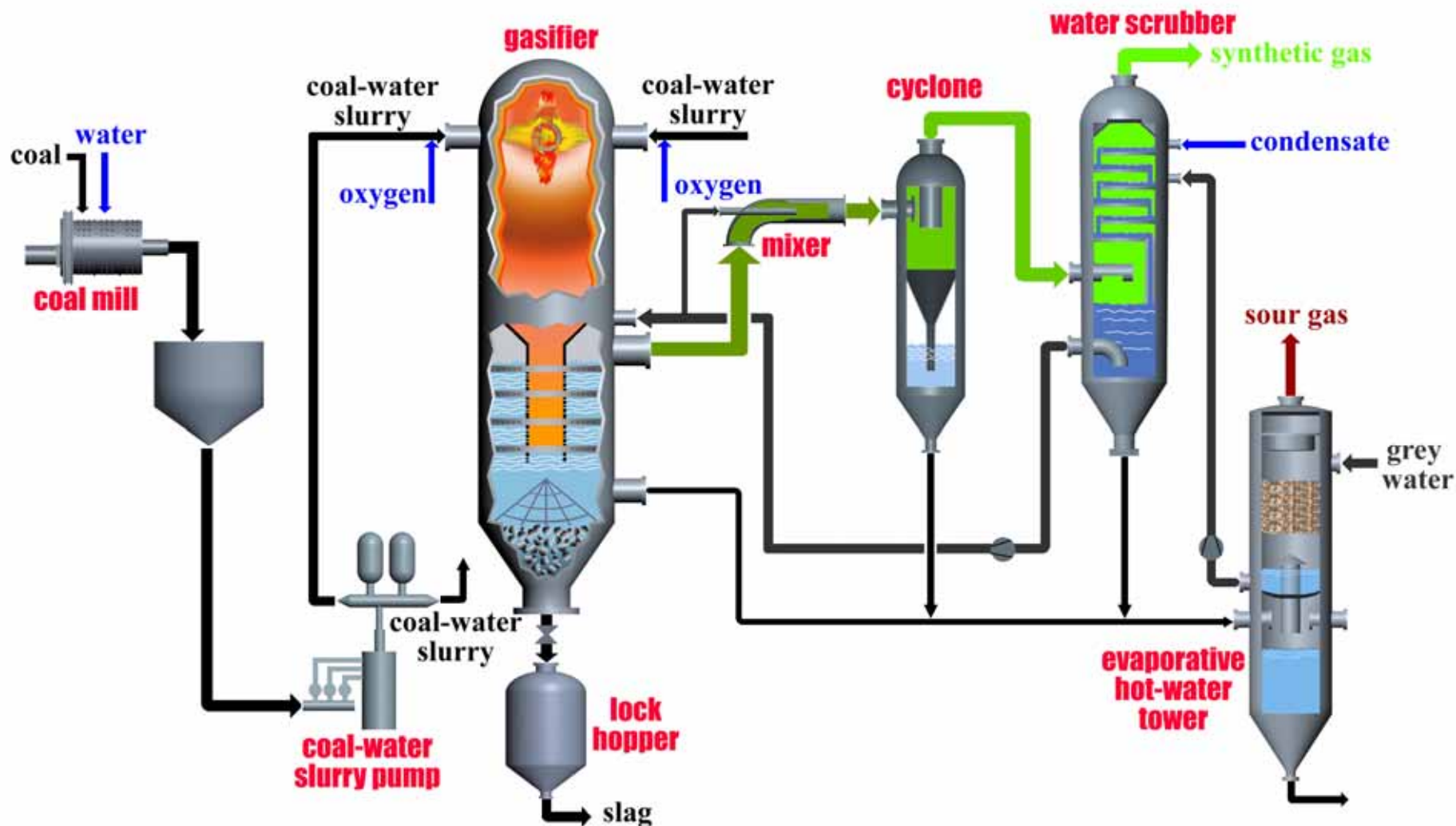
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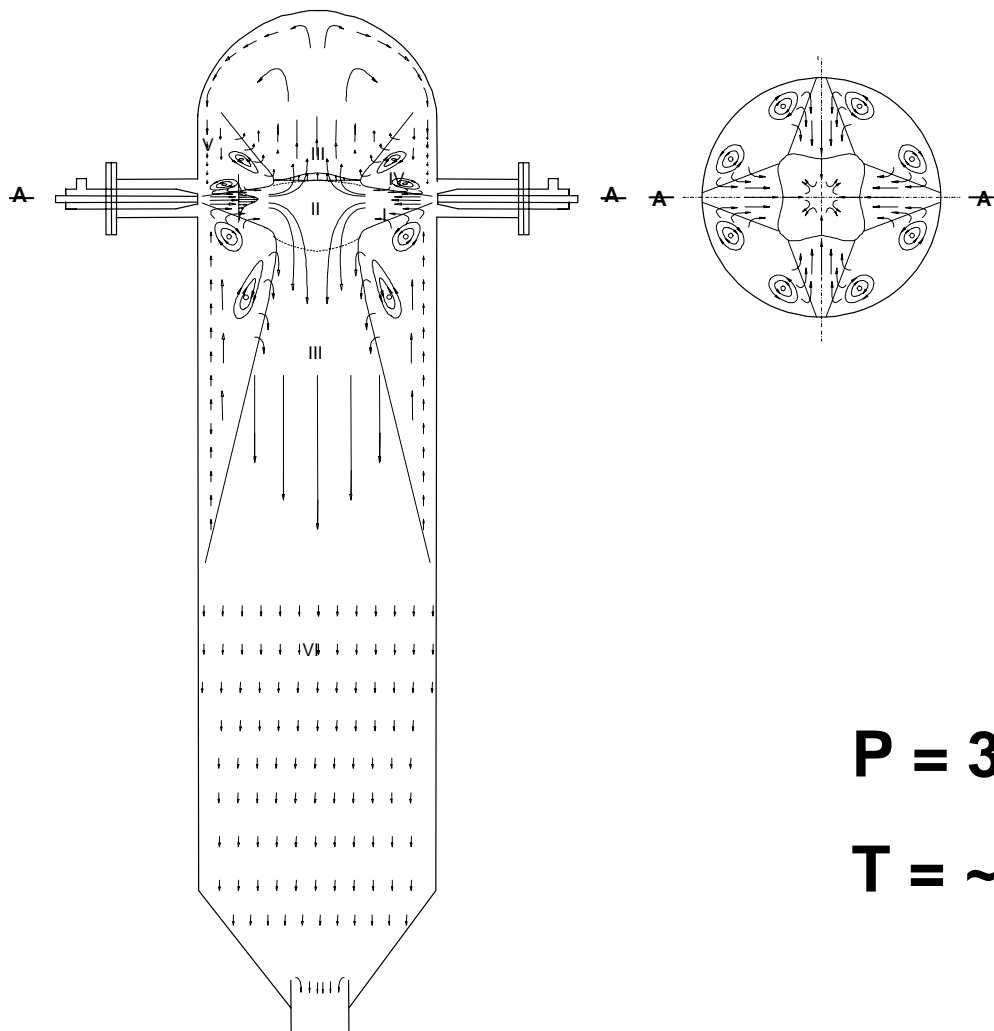
Coal Gasification Process





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Gasification Furnace



$P = 3.0 \sim 6.5 \text{ MPa}$

$T = \sim 1300$

Nozzle:

Oxygen and slurry leaving the nozzle simultaneously without pre-mixing inside the nozzle.

Advantages:

- **Drop size 10% smaller and oxygen pressure drop being reduced**
- **The low velocity at the nozzle outlet reducing the friction of the nozzle channel and thus prolonging the life of the nozzle**



Example I: ECUST & Yankuang Cathy Coal Chemicals Co., Ltd.

- **National “Tenth-Five” 863 Key Project**
“Novel Opposite Multi-Burner Coal Water Slurry Gasification”
- **Investment of 1.6 billion Yuan covering:**
 - + **Two furnaces (4.0MPa) of 1,150 ton coal per day**
 - + **240,000 ton/year methanol**
 - + **71.8 MW Power generation**





Example I: History

- **Jul. 21, 2005: started up the gasification process. After 80 hours run, shut down. Devices ok.**
- **Oct. 16, 2005: started up the whole process. Methanol was produced.**
- **Nov. 30, 2005: reset a pair of burners under 3.0MPa with gasifier keep running**
- **Mar. 18, 2006: the very first IGCC power generation in China**
- **Up to Jun. 4, 2006: totally >5,600 hrs, producing methanol >80,000 tons.**



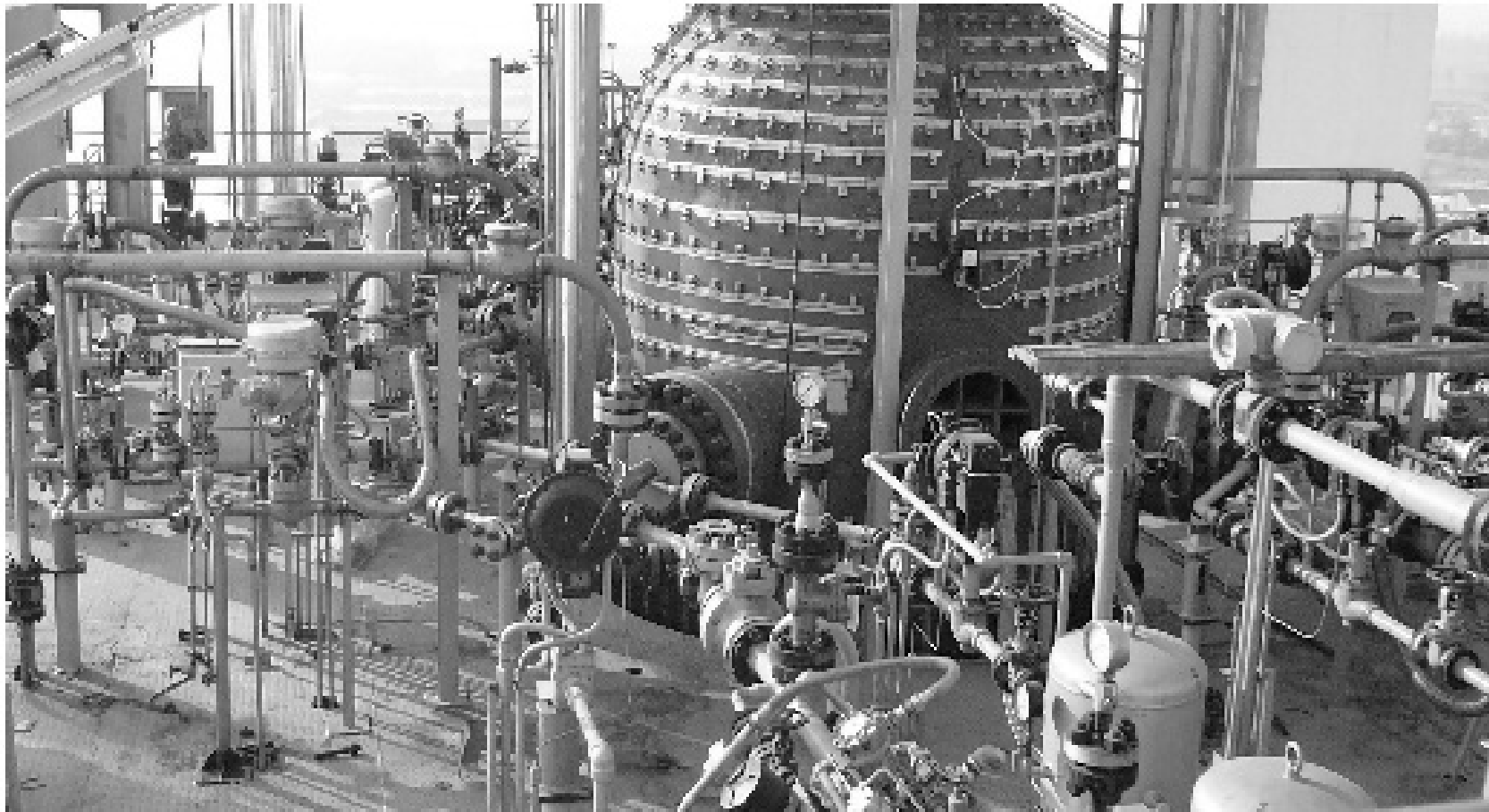
Example I: Specifications

- **Oxygen Consumption:** $309 \text{ Nm}^3\text{O}_2/1000\text{Nm}^3 (\text{CO}+\text{H}_2)$
- **Coal Consumption:** $535\text{kg coal}/1000\text{Nm}^3(\text{CO}+\text{H}_2)$
- **(CO+H₂) :** 84.9%
- **C conversion:** $>98\%$
- **P:** 4.0MPa
- **T:** $\sim 1,300$
- **Capacity:** $\sim 1,150 \text{ ton coal per day}$



Example II: ECUST & Hua-lu Heng-sheng Chemical Co., Ltd.

Furnace Nozzle System





Example II: Short History

- **Dec. 1, 2004: Started up successfully**
- **From Jun. 2, 2005: steady-state ran over 5,000 hrs**
- **After 784 hrs run, the four nozzles, the furnace and the furnace were in good condition.**



Example II: Specifications

- **Oxygen Consumption:** $393 \text{ Nm}^3\text{O}_2/1000\text{Nm}^3 (\text{CO}+\text{H}_2)$
- **Coal Consumption:** $581 \text{ kg coal}/1000\text{Nm}^3(\text{CO}+\text{H}_2)$
- **(CO+H₂) :** $82\sim 84\%$
- **C conversion:** $>98\%$
- **P:** 6.5 MPa
- **T:** ~ 1300
- **Capacity:** $\sim 750 \text{ ton coal per day}$



Advantages of Technologies

- **High carbon conversion and low oxygen/coal consumption because of proper fluid character in the gasifier**
- **Easy to scale up (like 2000-3000 ton coal/day) because of multi-burner**
- **High efficient of syngas clean-up section, low process pressure lost and low flyash in syngas because of “Step-by-Step” concept**
- **High heat recover efficient and stability in slag water treat section because of direct heat exchange between grey water and vapor from high pressure flash of slag water**



Conclusions

OMB CWS gasification technology gives option for gasification choice especially for huge scale.

Thanks for Your Attention!



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