ZPJE

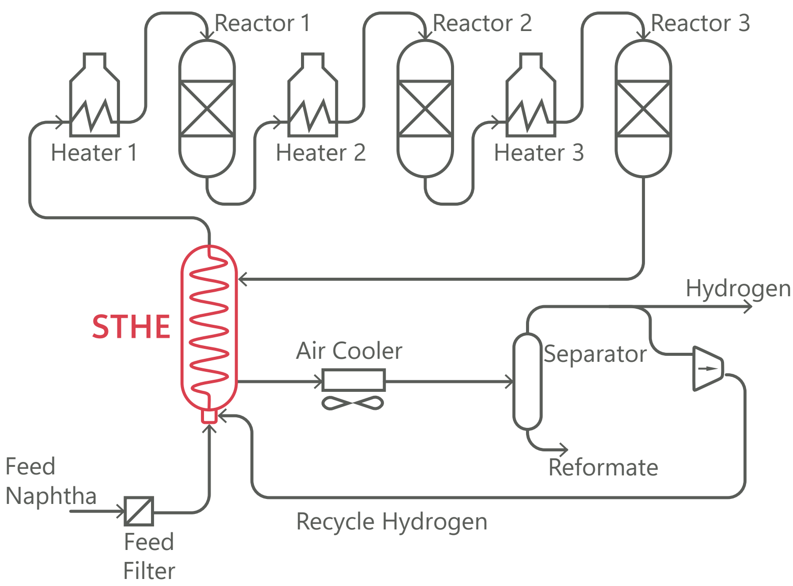
Creating Value for Our Customers

Zhenhai Petrochemical Jianan Engineering Co.,Ltd.

镇海石化建安工程股份有限公司

STHE Technology in Catalytic Reforming

Catalytic reforming uses catalytic reactions to transform heavy low-octane naphthas into high-octane reformate, which is a major blending product for gasoline.The hydrotreated naphtha mixed with the recycled hydrogen is preheated into a feed-effluent heat exchanger and further heated into a fired heater before entering the first reactor. This mixed feed is treated into a serie of reactors before coming back on the effluent side of the heat exchanger to recover a part of its heat. The complete reaction being endothermic, the reforming loop requires a lot of heat input through the fired heaters, so the efficiency of the heat recovery in the feed-effluent heat exchanger is crucial to the whole unit efficiency. This is where ZPJE proposes large, robust and efficient feed-effluent spiral tube heat exchangers (STHE) to optimize the unit. Even for the largest unit capacities, only one exchanger is required.



STHE Benefits

STHE technology brings many advantages in Catalytic Reforming :

Efficiency :

On the tube side, the Helix-pattern flow in the tubes creates a secondary flow consisting of a pair of vortices enhancing the heat transfer coefficient at the peripheral of the tubes. On the shell side, the pulse-surge collision flow regime brings high turbulence increasing the coefficient outside the tubes.
This allows for an achievable **hot approach temperature** of less than **30°C**.

Leakage :

High quality tubes fabrication and proprietary designed internals, severe welding procedures and state-of-the-art fabrication workshop make ZPJE exchangers strong, robust and **reliable**.

Fouling :

On the shell side, the high turbulence created by the pulge-surge collision flow pattern and the absence of stagnant zone greatly reduces the possibility of fouling. On the tube side, the helix-pattern flow creates a secondary flow which increases the shear force. This effect, added to the very low surface roughness, gives an **anti-fouling** and **self cleaning** design.

Robustness:

There are **no mechanical limitations** in temperature rise and fall, making STHE technology highly reliable under process condition fluctuation. It allows for very **low constraints** on start-up/shutdown procedures, and emergency situations.

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Case Study

Example of a 20,000 bpsd CCR unit equipped with 2 texas tower exchangers :

	ZPJE	S/T
Number of exchanger	1	2
Hot Approach Temperature	30 °C	60 °C
Energy Saved	3.52 Gcal/h	
Operation Savings		
Fuel Savings (*)	1,300 k€/year	
Emission savings (**)	600 k€/year	
Total Savings	1,900 k€/year	

(*) Considering Fuel Gas @300€/ton. (**) Considering emission savings in Europe. May vary upon installation area.

ZPJE Experience

STHE as Feed/Effluent in Reforming :

114 references

16 years in Operation in CCR unit

95 in Operation

>180,000 Days of cumulative operation

>136 MMTA total installed Capacity

Contact Us

Zhenhai Petrochemical Jianan Engineering Co.,Ltd.
Lianhua Road,Jiaochuan Street,Zhenhai District,
Ningbo,Zhejiang,China

In China :
Zhenning Zhang
sales@izpje.com
+86 574-86444831

In Europe :
Christophe Gajecki
christophe.gajecki@htrans-ferconsulting.com
+33 602029453

http://www.sthezpje.com