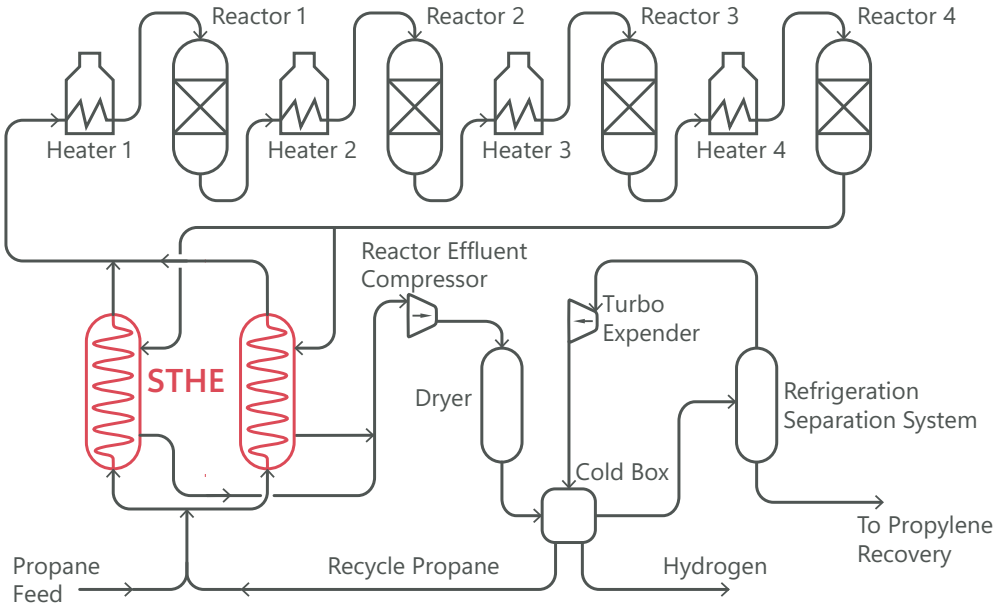
ZPJE

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 Propane Dehydrogenetion

Propane Dehydrogenation (PDH) is a dehydrogenation catalytic cracking technology used to convert propane into propylene . The PDH plant represents the fastest return on investments for propylene production, with typical payouts of less than one year. The propylene demand is rising steadily since 2018 and is supposed to achieve almost 150 MMT by 2028, driven mainly by the demand of propylene derivative, particularly polypropylene. ZPJE proposes a dedicated large feed-effluent Spiral Tube Heat Exchangers (STHE) for propane dehydrogenation unit, specifically optimized for this very demanding and long lifeline process.



STHE Benefits

STHE technology brings many advantages in Propylene production :

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 **25°C**.

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.

Fouling :

On the shell side, the high turbulence created by the pulse-surge 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.
In case of DeltaP increase, the tube side is mechanically and chemically cleanable while the shell side is chemically cleanable.

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**.

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Case Study

Example of a 0.66 MMTA PDH unit equipped with 4 Shell and Tubes heat exchangers :

	ZPJE	S/T
Number of exchanger	2	4
Hot Approach Temperature	25 °C	50 °C
Energy Saved	7.11 Gcal/h	
Operation Savings		
Fuel Savings (*)	2,700 k€/year	
Emission savings (**)	1,300 k€/year	
Total Savings	4,000 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 :

48 references

7 years in Operation in CCR unit

29 in Operation

>22,000 Days of cumulative operation

>11 MMTA total installed Capacity

Contact Us

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