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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

ZPJE SUCCESS STORY IN DELIVERING 20 SPIRAL TUBE HEAT EXCHANGERS FOR THE HENGLI'S COTC PLANT

Presentation

In May 2019, Hengli Petrochemical (Dalian) Co. Ltd. started up the world's largest catalytic dehydrogenation plant at its integrated 20 million mt/year (400,000 bpsd) crude-to-paraxylene refining and petrochemical project in Hengli Petrochemical Industrial Park (HPIP) on Changxing Island in Dalian, China. For this megaproject, Hengli Petrochemical trusted Zhenhai Petrochemical Jianan Engineering Co., Ltd to deliver 20 Spiral Tubes Heat Exchangers to be installed on 10 units in less than 18 months with a shorter delivery time of 15 months.

The Customer

Hengli's plant is a Refinery Based Crude Oil-To-Chemicals (COTC) technology. This configuration lets the refinery produce a maximum chemicals instead of traditional transportation fuels. While the gasoline demand is stagnating due to transportation slowdown and rise of electrical vehicles, the growth of chemical products is still strong. This robust market and its attractive margins push oil companies to further strengthening their interest on petrochemical markets.

恒力石化 HENGLI PETROCHEMICAL

The total project investment of 26 Billion Euro includes a 12 MMTA PTA unit, a 20 MMTA refining and chemical integration unit and a 1.5 MMTA ethylene plant. The 20 MMTA refining and chemical integration project, approved by the state as the first large-scale private refining project. Hengli, as a major petrochemical producer, owns the largest global PTA production base in China.

It is recognized as a key worldwide oil refining and petrochemical project, with the largest one-time construction scale, the highest degree of integration and the most complete supporting facilities.

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ZPJE Supply

For this megaproject, Hengli wanted to select only premium quality equipment with strong and proven experience on the selected applications. ZPJE was chosen for its huge and successful installed base on a large-scale application and its flawless experience in the industry. The technical skill, pursuit of high quality and support capability during the whole life of the heat exchanger allowed ZPJE to pass the strict supplier selection procedure imposed by Hengli.

Here is the complete ZPJE list of supply :

Unit	Service	No.	Licensor	Delivery	Start-up
3.0 MTA Diesel Hydrocracker Unit	1ST Stage Reactor Feed / Effluent Exchanger	2x1	AXENS	2018	2019-03
	2ND Stage Reactor Feed / Effluent Exchanger	2x1	AXENS	2018	
	Hot HP Separator Tempered Water Cooler	2x1	AXENS	2018	
3.8 MTA SR VGO Hydrocracker Unit	1st Reactor Feed / Effluent Exchanger	1	AXENS	2018	2019-04
	Fractionator Feed / Reactor Effluent Exchanger	1	AXENS	2018	
	2nd Reactor Feed/Effluent Exchanger	1	AXENS	2018	
0.6 MTA Base Oil Isodewaxing Unit	DW Reactor Feed/ Effluent Exchanger	1	LUMMUS	2018	2019-05
	DW Feed/ HDF Reactor Effluent Exchanger	1	LUMMUS	2018	
3.2 MTA CCR Unit	Reaction Feed/Effluent Exchanger	3x2	AXENS	2018	2019-03
3.3 MTA Disproportionation Unit	Reaction Feed/Effluent Exchanger	2x1	SRIPT	2018	2019-03
0.45 MTA PP Unit	Refrigeration Interchanger	1	GRACE	2017	2019-05

The Success Story

The project construction started in April 2017, with the whole production process opened in March 2019, and it was fully put into operation in May 2019.
Regarding the feed/effluent exchanger of the Diesel hydrocracker unit, here is what our customer is saying about our technology :

“The unit was originally designed to use 12 sets of breech lock heat exchangers (6 shells in series per train with a total of 2 parallel trains). An optimization study was done, and the result of the study was to adopt one single ZPJE’s Spiral Tube Heat Exchanger. By using STHE technology, not only the equipment investment was lower, but also the plot area, the piping workload, the number of high-pressure flanges sealing surfaces were reduced. At the same time, the pressure drop of STHE was reduced to 400 kPa, being only 1/3 of the 1200 kPa pressure drop of in the original scheme. The result is an energy saving of ~ 15% for the compressor and ~ 7% for the feedstock pump.”

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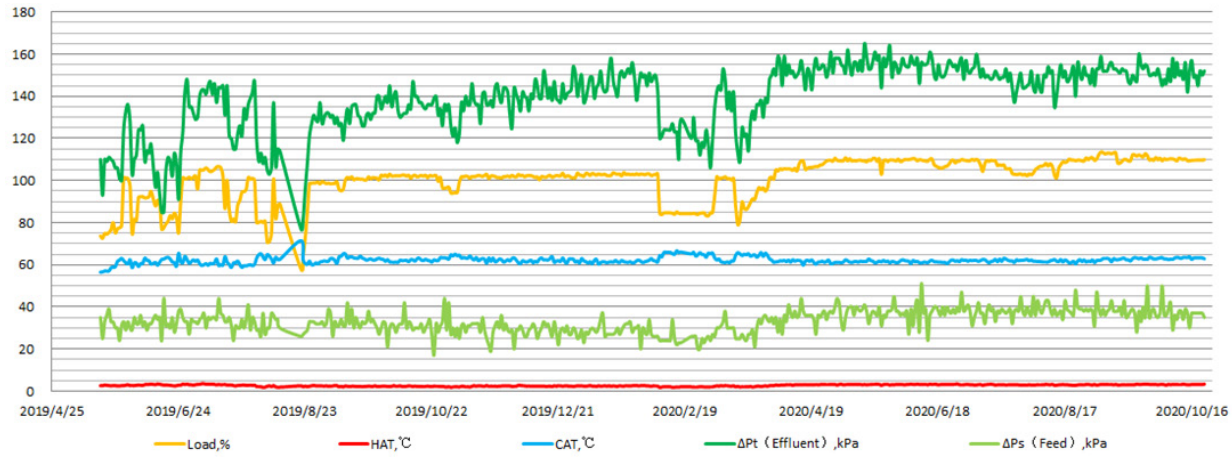
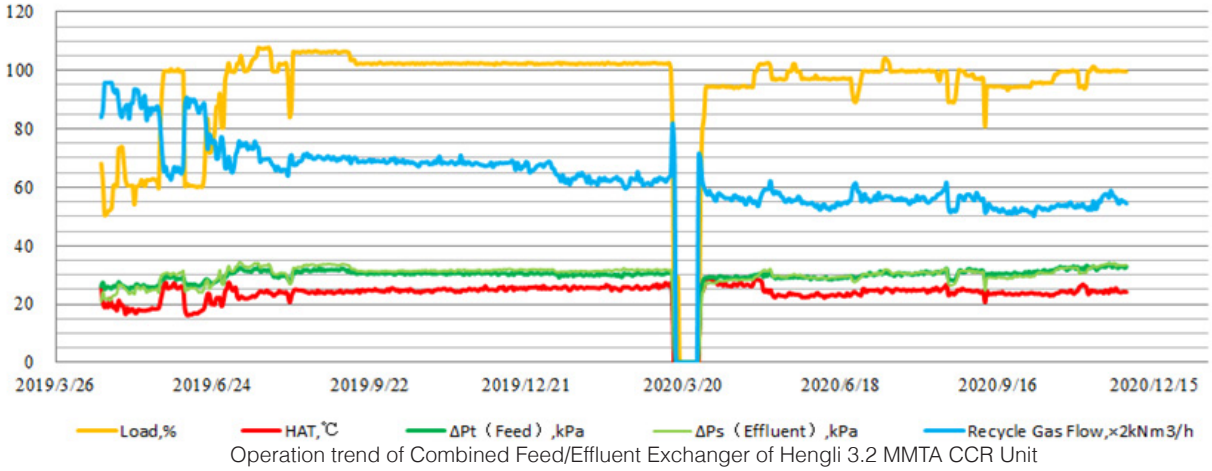
Since its start-up, all the units are operating at design capacity within the guaranteed performances without any mechanical problem.
As shown on the following operating records, the delivered performances are steady, and back to normal after the unit shutdown and restart :



Operation record of the 1st Reactor Feed /Effluent Exchanger of Hengli 3.835 MMTA SR VGO (HCK2A) Hydrocracker Unit



Operation trend of Combined Feed/Effluent Exchanger of Hengli 3.2 MMTA CCR Unit

Customer's satisfaction

On this unprecedentedly large Crude Oil to Chemical project, ZPJE delivered on time, with a strong project support and impeccable quality 20 large spiral tubes heat exchangers to Hengli Petrochemical in less than 18 months.
The unmatched heat transfer efficiency and low-pressure drop allow Hengli to save on operating cost by reducing the pressure drop of the diesel hydrocracker unit by 1/3, and dramatically reducing the equipment cost by offering only one exchanger against a set of 12 breech lock technology.

Since their start-up, all the exchangers are operating smoothly, within the project guaranteed values. The uncompromised fabrication quality gave the needed mechanical robustness our customer was looking for, offering low constraints during the start-up and shut down procedures.