Trusted Provider of Ethylene Technology and Engineering Services

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Wison Engineering is a leading provider of ethylene technology and engineering services in China. With over 25 years of experience in the research, development, and engineering practice of steam cracking technologies (including cracking furnaces and olefin separation), we have established a mature system covering technology licensing, process package development, engineering design, procurement, construction, as well as digital and modular delivery, backed by extensive project execution experience.

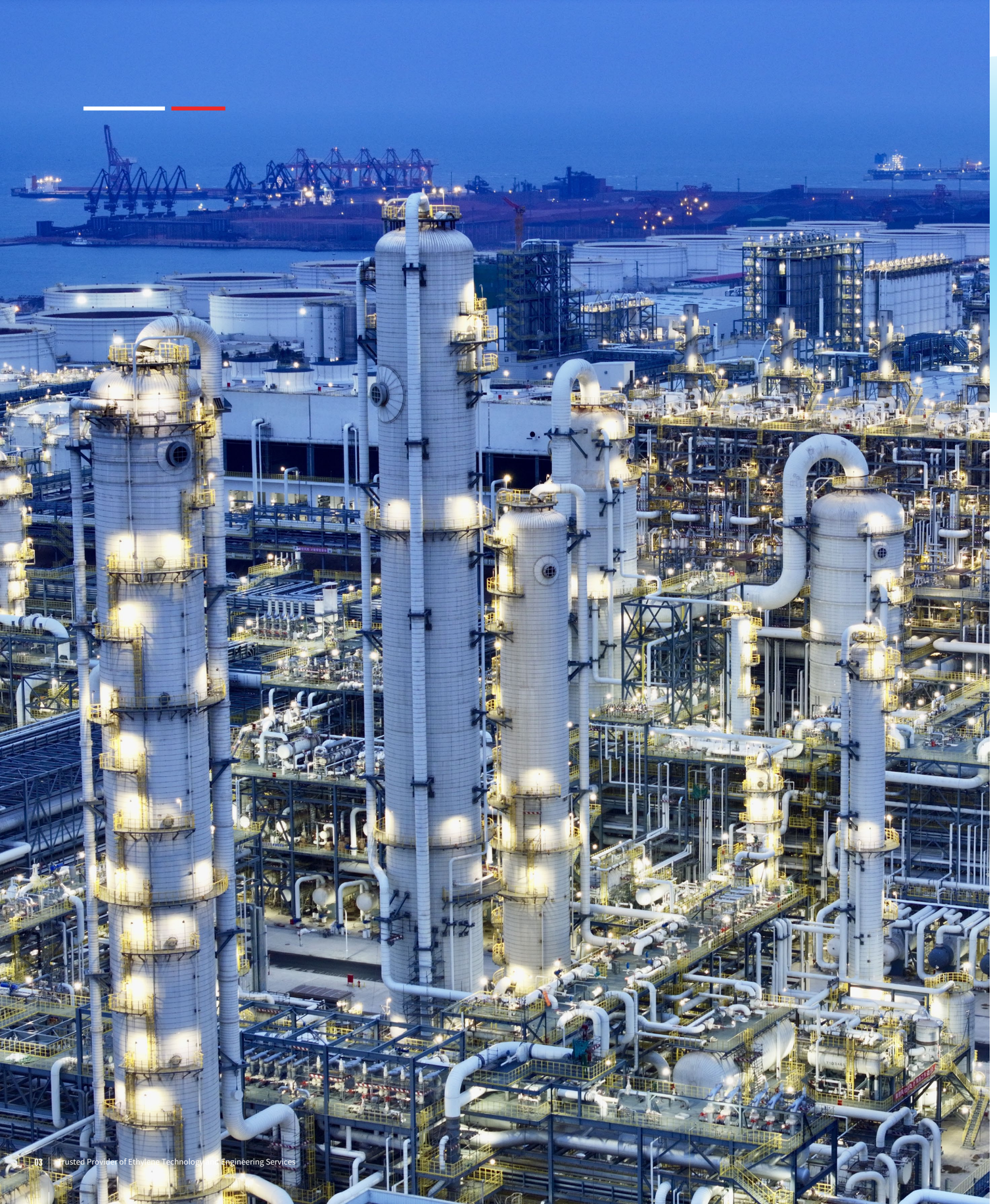
We offer a complete ethylene technology with proprietary intellectual property, including steam cracking furnace technology and advanced olefin separation technology, which have been applied in over 1,000 KTA capacity-level ethylene plants, achieving commercial deployment. In engineering services, we pioneered full-process digital delivery for over 1,000 KTA capacity-level ethylene plants in China and were early adopters of modular delivery. We completed the world's first integrated modular delivery of a 200 KTA cracking furnace. Leveraging a robust quality and safety management system, our deliverables have received global recognition, including the "Golden Key Award" from SABIC. To date, we have provided over 240 new-build and revamp services for cracking furnaces worldwide, more than 120 of which utilized our proprietary core technologies, earning widespread industrial acknowledgment.

25+
Years
Experience

240+
Cracking Furnaces
Constructed /Revamped

50%
of China's Ethylene Cracking Furnace Market

120+
Cracking Furnaces
Use Wison's Proprietary Technology



Full Range Services offered

- Feasibility Studies
- Process Design Package
- FEED
- Basic Engineering Design
- Detailed Engineering Design
- EPF/EPC
- LSTK

New Construction
- Technology License
- Additional Furnace to Existing Plant
- E / EP / EPC Basis

Revamp
- Diagnostic Skills
- Increase Run Length
- Improve Overall Thermal Efficiency
- Increase Capacity
- Integrate Super High Pressure Steam by Abolishing Steam Super Heater

Coil Replacement
- Radiant Tubes Supply
- Newly Designed Coil Configuration and / or Upgraded Material Application to Improve Performance

Advanced and Reliable Cracking Furnace Technology

Diagnostic Skills and One Stop Solution

High Efficiency and International Standard EPC Execution

Made in China

Innovation Driven Solutions for Environmental and Economic Benefits

Ethylene Decarbonization Technology

Electrically Heated Cracking Furnace

Wison Engineering's electrically heated cracking furnace solution uses silicon-molybdenum rods as heating elements in the radiant section, providing heat directly from green electricity without burners, avoiding flue gas and CO_2 emissions. A closed-loop heat transfer system conveys the radiant heat to the convection section, achieving a high overall furnace efficiency of over 98%. This technology is suitable for both new builds and revamps of conventional furnaces, enabling low-carbon transformation without impacting steam balance. In scenarios with electrified downstream equipment such as compressors, the furnace can be simplified to a single radiant box, with high-temperature cracking gas efficiently preheating feedstock and dilution steam, minimizing power consumption.

Recovery of Low Temperature Waste Heat

Wison Engineering's cracking furnace technology has made significant advancements in energy saving and efficiency. Cracking furnaces built or revamped using Wison's technology can achieve maximum recovery of flue gas waste heat, with exhaust gas temperatures reduced to below 90°C (compared to the conventional >120°C), and overall thermal efficiency exceeding 95%. Additionally, Wison has independently developed the FIT furnace tubes with enhanced heat transfer internals, achieving over 20% higher heat transfer efficiency compared to standard tubes.

Electrification of Rotating Equipment

Electrifying key rotating equipment in chemical plants is a practical path to decarbonization. Wison Engineering has applied electric drives to cracking gas compressors, syngas compressors, reaction gas discharge compressors, and low-temperature propylene refrigerant compressors, replacing conventional steam turbines. The electric drive system offers fast response, stable operation, and high control accuracy, reducing boiler and steam system requirements, thereby lowering energy and water consumption. Design fully accounts for grid integration and load characteristics, with scalability for renewable energy, supporting overall energy efficiency and carbon emission control.

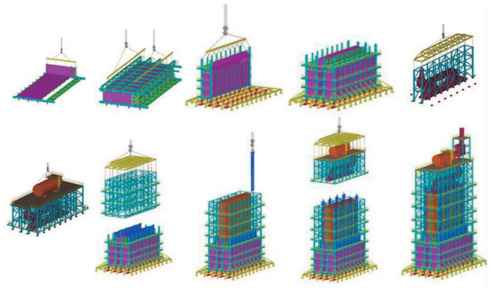
Hollow Intersecting Plate Enhanced Heat Transfer Tubes

This patented technology embeds hollow intersecting plate inserts in the radiant tubes of cracking furnace, improving heat transfer, reducing tube wall temperature by approximately 20°C, delaying coke formation, and increasing ethylene yield and run-length. The principle involves increasing fluid turbulence and heat transfer area to enhance conduction efficiency. Developed in collaboration with leading universities and research institutes, this technology is exclusively owned by Wison Engineering and has been implemented industrially.

Fully Modularized Ethylene Cracking Furnace

For Phase I of Zhejiang Petrochemical's 40 MTPA refining and petrochemical project, Wison Engineering was responsible for the full modular design, construction, transportation, installation, and commissioning of all nine cracking furnaces. Each cracking furnace in the 1,400 KTA ethylene unit of Phase I at Zhejiang Petrochemical has a capacity of 200 KTA, making it the largest cracking furnace built at the time and the world's largest single cracking furnace delivered in a modularized form.

Approximately 30,000 tons of cracking furnace modules were prefabricated at Wison's construction facilities, assembled on slipways, and ultimately shipped and delivered as complete furnaces. This integrated approach—sectional prefabrication, slipway assembly, and full-furnace delivery—fully leveraged Wison's workshops, heavy equipment, and port facilities.



Advantages of Modularization for This Project

- Project site located on an isolated island with limited space and no adequate prefabrication yard
- Lack of large-scale cranes at site
- Shortage of skilled welders and other construction resources at site
- Presence of a roll-on/roll-off quay for module transportation
- Modular yard located only 5 hours from project site with minimal impact from weather conditions

Project Execution Benefits

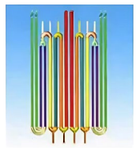
- Reduced schedule, especially installation time: conventional construction (~12 months) vs. modular approach (8–9 months)
- Improved installation quality with full sets of standardized prefabrication equipment at the modular yard
- Integrated assembly and transportation enabling higher standardization

Wison's Ethylene Technology

Cracking Furnace Technology

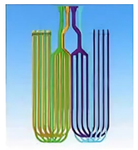
Wison Engineering has developed the HS-I, HS-II, and HS-III ethylene cracking furnaces

HS-I



HS-II

HS-III



The cracking furnace is the core unit of an ethylene plant. Its capacity and technology directly determine production scale, product quality, and operational efficiency. Therefore, the ethylene cracking furnace plays a leading role in the production of the ethylene unit and even the entire integrated petrochemical complex.

Since 2000, Wison Engineering has developed the HS-I, HS-II, and HS-III ethylene cracking furnaces, offering more stable operation, advanced performance, and extended furnace tube life.

• Large twin-cells furnace, with single capacity exceeding 200 KTA, allowing one radiant chamber to operate while the other undergoes decoking to enhance cracking furnace uptime. HS-I is suited for gaseous feedstock; HS-II/III for liquid feedstock.

• First to reduce furnace exhaust temperature below 90°C (normally >120°C). With an overall thermal efficiency exceeding 95%, flue gas waste heat is maximally recovered, enhancing energy efficiency while ensuring safety.

• High cracking selectivity and olefin yield.

• Long run-length: gas furnaces can run for over 80 days (up to 120+ days), while liquid furnaces have operating cycles of 60–80 days or longer.

• Furnace tubes feature favorable thermal stress conditions and a service life exceeding the industry average by over 50%.

• Featuring 100% bottom heating with air preheaters, the cracking furnace significantly reduces energy consumption, capital investment, and maintenance requirements.

• The high-temperature cracked gas is cooled in two or three stages with a quench exchanger, enabling maximum heat recovery, reduced equipment investment, and enhanced high-grade energy utilization.

• Decoking exhaust gas is recycled back into the fire box, ensuring zero solid waste emissions.

• Equipped with ultra-low NOx burners and SCR (Selective Catalytic Reduction), the furnace achieves low NOx emissions, below 40 mg/Nm^3.

Olefin Separation Technology

Wison has identified key design principles for the ethylene quench system and developed the proprietary “Viscosity-Reduction Quench Oil Process Technology.”

Wison Engineering began developing olefin separation technology in 2002, initially applied to the olefin separation section of MTO units. Based on years of engineering practice in ethylene and MTO plants, Wison has gradually developed proprietary olefin separation technology suitable for a wide range of hydrocarbon feedstocks, featuring low energy consumption and low capital investment. This technology has obtained multiple patents and proprietary technology authorizations.

The quench oil system is a critical unit in ethylene plants. Mastery of steam cracking technology enables detailed analysis of product distribution, particularly for C6+ components, which form the foundation for process calculations of the ethylene quench system. Based on simulations of production data from multiple ethylene plants, Wison has identified key design principles for the ethylene quench system and developed the proprietary "Viscosity-Reduction Quench Oil Process Technology."

The process flow and core technical elements of Wison's ethylene separation technology are very similar to those of its MTO olefin separation technology. Both utilize core "pre-cut" technology, cracking gas compression, ethylene distillation, propylene distillation, C2 hydrogenation, and propylene refrigeration units. The process flows are fundamentally identical, making Wison's olefin separation technology a mature and reliable industrially proven solution.

• High or low temperature quench using quench oil towers or quench water towers, customized according to feedstock, ensuring long-term stable plant operation.

• Unique "pre-cut" technology to increase ethylene recovery and reduce overall energy consumption.

• Five-stage compression of cracking gas, maintaining low compressor outlet temperatures for extended operational cycles.

• Flexible selection of pre-hydrogenation processes, such as front-end de-ethanization or front-end de-propanization, depending on feedstock characteristics.

• Adopting high and low pressure dual towers for de-ethanization and / or de-propanization to reduce tower bottom temperature and extend the operating cycle.

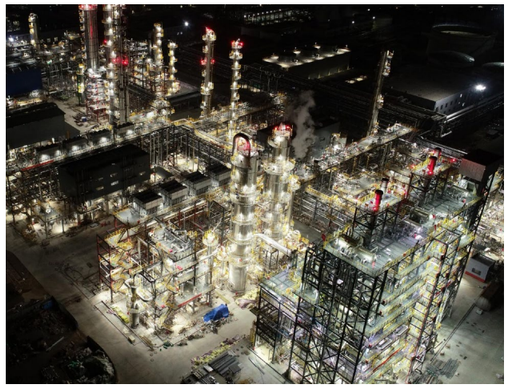
• The cryogenic demethanization system adopts "methane wash" technology to improve ethylene recovery.

• The ethylene distillation tower is designed with a heat pump process, reducing capital investment and energy consumption.

Project Case

Shandong 500 KTA Styrene Plant Feedstock Preparation Project

CHINA



Service Scope:
500 KTA Styrene Feedstock Preparation Unit (150 KTA Ethylene Unit)
Licensor: Wison
Contract Mode: EPC
Time: Nov 2018 – Jun 2020

This project marked the first application of Wison's full-set ethylene technology in a new ethylene plant. It adopted Wison's proprietary HS-II cracking furnace technology, pre-hydrogenation before front-end deethanization, and a short-flow separation process without ethylene distillation or C3 separation. Compared with conventional ethylene technology, this approach reduced capital investment by over 20%, shortened the process, lowered energy consumption, minimized emissions, and reduced operating costs. The plant produced qualified ethylene on the first feed, ensuring a stable feedstock supply to the downstream styrene unit. This integration of Wison's ethylene technology with the styrene unit and existing units significantly enhanced the overall economic efficiency of the company.

Shandong 1.2 MTPA Ethylene Project

CHINA

Service Scope: 1.2MTPA Ethylene Unit
Licensor: Wison
Contract Mode: EPC
Time: Sep 2022 – Aug 2024

This 1.2 MTPA ethylene plant adopts Wison Engineering's patented HS-I and HS-II cracking furnaces, together with advanced separation technologies including pre-cut, methane wash, and ethylene heat pump systems. The design accommodates multiple feedstocks such as ethane, butane, and naphtha, maximizing ethylene recovery, reducing energy consumption, and extending operating cycles. A C2 recycling process is applied to minimize start-up material emissions, and the project is executed with a deeply integrated digital design. Wison's scope of work includes process package design, basic and detailed engineering, procurement support, and turnkey PC services for the cracking furnaces.