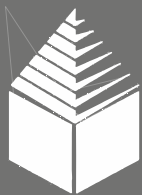


KAILAS
GROUP



1.1. Engineering Capabilities

Engineering tools

Our main maintaining software including... International Code Lists

Mechanical Calculation:

Microprotol, EU Research, France
PVElite, COADE, US

Thermal Design and Hydraulics Design:

HTFS, AspenTech, UK
HTRI, USA

Process Simulation:

HYSIS, AspenTech, US

Analysis Design:

Ansys, ANSYS, US

Fluid Analysis:

Fluent, COMSOL, US

Standards we follow

Pressure Vessel:

ASME VIII-1,
PED

Shell and Tube Heat Exchanger:

ASME VIII-1+TEMA
API660

Plate Heat Exchangers:

API 662
ISO15547

Air Coolers: API661

ISO13067

Spherical Tanks, Columns:

ASME VIII-1, 2
PED



Certificates

Our main certificates including...

ASME U stamp
ASME U2 stamp

ASME S stamp
National Boiler certificate

API certificates
ISO 9001-2015 certificate
OHSAS 18001 certificate
ISO 14001 certificate

1.2. Company Main Facilities (Shanghai)

lanpec fully owns 2 separate manufacturing bases in Lanzhou & Shanghai city, China.
In Shanghai, we enlarged our production capacity especially for heavy pressure vessels & patent products.
Shanghai Plant size: 100,000 m².
Plate rolling

One of the heaviest plate roller Max. Plate rolling thickness:
210/260 mm(cold/hot)



Mechanical machining

Horizontal double-spindle CNC
Deep Hole Drilling Machine
Max. drilling depth: 780 mm
Max. machining diameter: 6300 mm



Heat treatment

One of the biggest heat
treatment furnace
Inner size: 8m x 8m x 30m



Laser cutting & welding

NC controlled Laser cutting &
welding center especially used
for S.S & titanium
thin plate processing.



1.3. Company Main Facilities (Shanghai)

5. Plasma cutting
NC controlled flame/plasma cutting center
Max. flame cutting depth: 220mm
Max. Plasma cutting depth: 80mm



6. Welding
Auto. TIG welding line: 6 units
Auto. SAW center: 7 units
Auto. narrow gap welder: 4 units
Tube-Tube sheet automatic welder: 10 units



7. NDT facility
Full scope of NDT including RT, UT, PT, MT etc by ASME authorized inspectors



RT room: 8m x 8m x 30m
4 MeV accelerator: 1 unit
Max. testing thickness: 220mm

8. Delivery

One of the heaviest overhead crane & inside workshop jetty

Max. lifting capacity: 500 Tons
Inside workshop jetty max. deliverable unit wt. 1,000+Tons



1.4. Company Main Facilities(Lanzhou)

Lanzhou Plant

Workshop size: 26,000 m²

Max. lifting capacity: 200 Tons

Max. plate cutting depth capacity: 200 mm (flame)

Max. plate cutting depth capacity: 60

mm (plasma) Max. plate rolling thickness

capacity: 160 mm

Max. drilling depth: 750 mm

Max. machining diameter: 4000 mm

Furnaces inner chamber size: 5×5×11 m

Pressure testing pump pressure rating: 400 Mpa.



1.5. Company Main Facilities (Lanzhou)

Lanzhou Plant

Workshop size: 26,000 m²

Max. lifting capacity: 200 Tons

Max. plate cutting depth capacity: 200 mm (flame)

Max. plate cutting depth capacity: 60

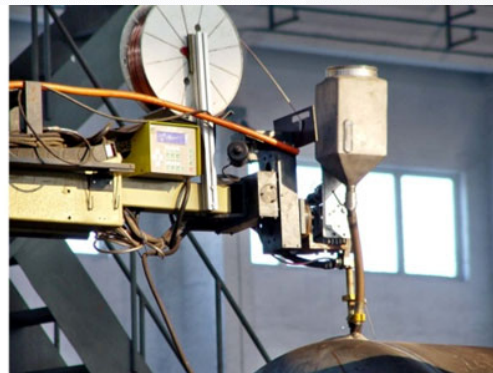
mm (plasma) Max. plate rolling thickness
capacity: 160 mm

Max. drilling depth: 750 mm

Max. machining diameter: 4000 mm

Furnaces inner chamber size: 5×5×11 m

Pressure testing pump pressure rating: 400 Mpa.



PART FOUR

MAIN PRODUCTS

Downstream equipment:

The downstream equipment study was the starting business of this enterprise.

Back to history, In the year 1960 lanpec was established as a governmental institute, that only focused on the R&D of heat and mass transferring equipment for the downstream refineries and petrochemical plants.

Upstream machinery:

The upstream equipment design and manufacture have been part of our portfolio since our first oil/gas/water separator design in 1980, and our first drilling rig reference in China in 1983.

2.2. Plate Heat Exchangers

Plate & Frame Heat Exchangers

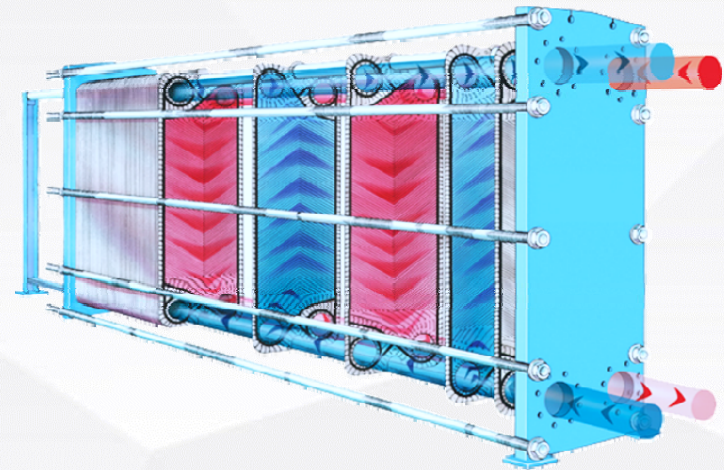
The plate and frame was firstly developed in China by lanpec in year 1960. Over more than 60 years of R&D and supply of plate heat exchangers to domestic and overseas customers, lanpec now provides a series of plate and frame heat exchangers, evaporators and condensers for various applications in the oil & gas industries, refineries, petrochemical plants, and food & beverage plants.

Operating Parameters

- # Temperature: -49°C to 200°C
- # Pressure: Vacuum to 30 bar

Construction Parameters

- # Plate: AISI 304, 316L, 904L, SMO 254, Nickel Alloys, pure Nickel, Ti and Ti-Pd Alloy etc.,
- # Gasket: Nitrile Rubber, EPDM Rubber, Chloroprene Rubber, HNBR, NBR-HT, FPM/FKM, Butyle etc.
- # Frame: Painted Carbon Steel, or Stainless Steel (pure and clad)
- # Code & standards: ASME, PED, GOST, GB



2.3. Plate Heat Exchangers

Welded plate & frame heat exchangers

The Welded plate & frame heat exchangers are used in a wide range of cooling, heating, evaporation and condensing duties.

Welded plate & frame heat exchanger features all welded corrugated plates pack without gasket that produce highly turbulent flow in a true counter-current direction.

The result is high efficiency in a very compact design. Due to the smaller size and reduced material content, welded plate & frame heat exchangers can be the most economical heat transfer choice.

Operating Parameters

- # Temperature: -100°C to 1000°C
- # Pressure: Vacuum to 70 bar, on both sides
- # Capacities: up to 4000m³/h
- # Connections: 1" to 20" studded or flanged
- # Surface area: 5 to 1900m²

Construction Parameters

- # Plates: AISI 304, 316L, S32205, S31254, Nickel Alloy, Ti, and Ti-Pd Alloy
- # Plate thickness: 0.6 mm to 1.0mm
- # Frame: Painted carbon steel, or stainless steel
- # Connections material: same with plates
- # Codes and Standards: ASME, PED, GOST, GB

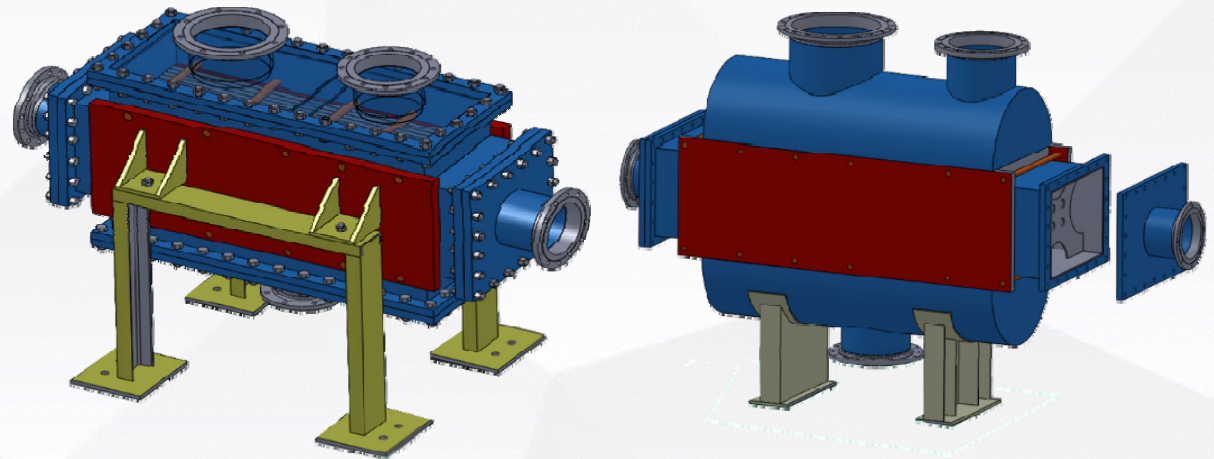


Plate Heat Exchanger

The Plate Heat Exchanger is suitable for applications in the oil & gas, chemical, and petrochemical industries. Its bolted frame structure comprises four columns, top/bottom plates, and four side panels. Designed for handling media on both sides that are prone to adhesion, clogging, and fouling. The seal cover plate can be periodically opened for convenient internal cleaning and maintenance.

Operating parameter Temperature:-40°C to 350°C Pressure:3.5MPa (flange version).

Materials

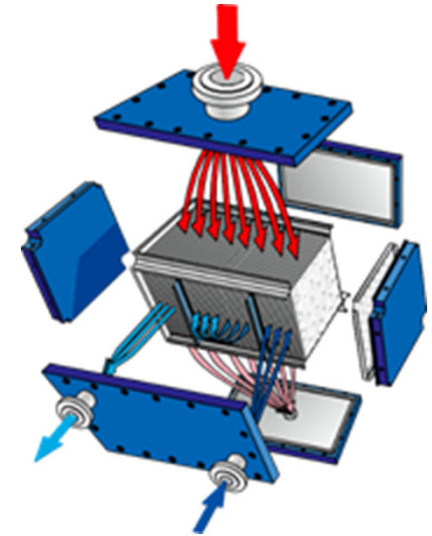
AISI 300 SS, 254SMO, C276, 2205, 2507, Ti, Zr.

Cleaning & Maintenance

Removable cover plate enables mechanical cleaning of the plate bundle interior for efficient maintenance.

Inspection & Repair

Welded joints of the plate bundle become visible for leakage inspection and repair after cover plate removal.



3.1. Plate Heat Exchangers

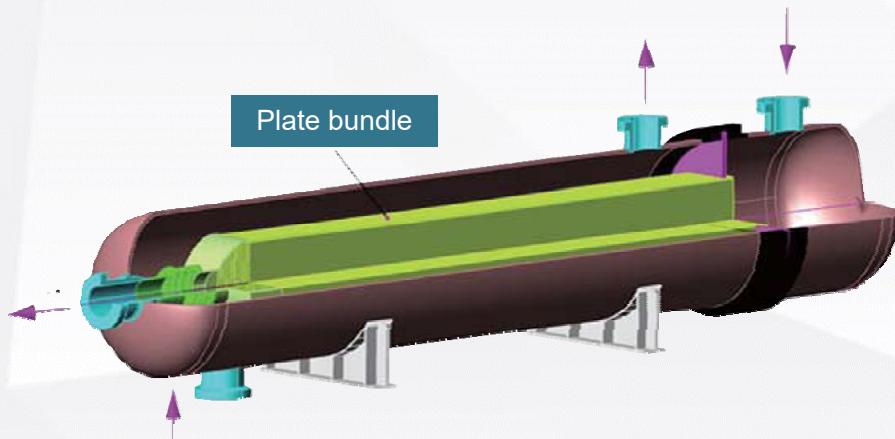
Large plate & shell heat exchangers

Large plate & shell heat exchanger is the largest type of plate heat exchanger currently available in China. It is the only manufacturer in China for this type of huge heat transferring vessels.

According to the different services & design, these heat exchangers can usually be categorized into either “**Non-feed/effluent**” or “**Feed/effluent**” type.

Non-feed/effluent plate & shell heat exchangers

The exchanger consists of an inner welded plate bundle and an outer pressure vessel shell, working with superior efficiency, high pressure & corrosion resistance and compact structure. It is an optimum substitute for tubular heat exchangers.



Operating Parameter

- # Shell diameter: 1 to 3.5 m
- # Shell total length: 2 to 20 m
- # Surface area: 100 to 5000 m²
- # Plate width: 200 to 2000 mm
- # Plate length: 1 to 16 m
- # Design pressure: ≤ 8.0 MPa
- # Design Temp.: ≤ 500 °C
- # Differential pressure ≤ 4.0 MPa (plate bundle)

Construction parameter

- # Plate bundle: SMO 254, Ti, AISI 300 SS, duplex SS, high nickel alloy, etc.
- # Shell: Carbon steel, stainless steel, Cr-Moly steel etc.
- # Codes and Standards: ASME, PED, GOST, GB

Circular Plate-Shell Heat Exchanger

The Circular Plate-Shell Heat Exchanger (PSHE) is a type of heat exchanger where a corrugated plate bundle, formed by plasma-arc-welded circular plates, is housed within a cylindrical shell. The two fluid mediums flow separately through the plate side and the shell side, exchanging heat. The fluids undergo highly turbulent flow across the corrugated plates, enabling highly efficient heat transfer.

Operating parameter Temperature:-40°C to 900°C Pressure:20.0MPa (flange version).

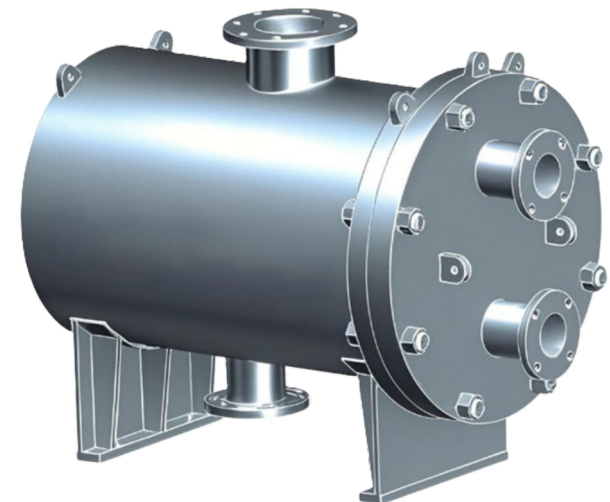
Materials

AISI 300 SS, 254SMO, C276, 2205, 2507, Ti

- Structural Optimization, Safe and Reliable

The integrated circular plate bundle ensures uniform stress distribution, providing superior resistance to pressure and thermal shock.

High Temperature & Pressure Resistance



4.1. Plate Heat Exchangers

Feed/effluent plate & shell heat exchangers

feed/effluent plate & shell heat exchanger (F/E PHE) is a patent product, specially designed for the feed/effluent heat transferring in catalytic reforming, diesel or naphtha hydrotreating and paraxylene production services.

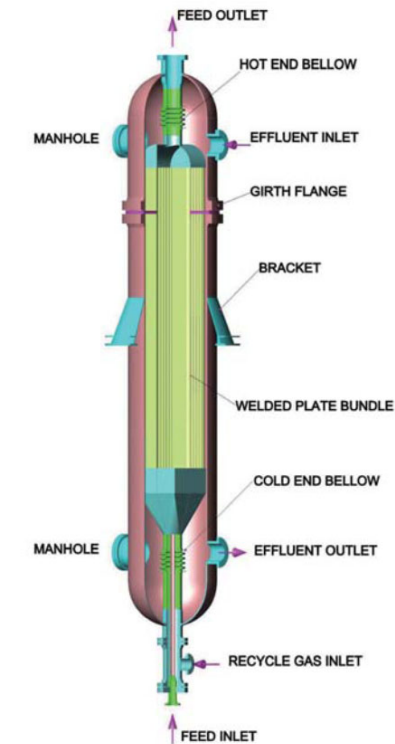


Operating parameter

- # Shell diameter: 1 m to 4 m
- # Shell total length: 10 m to 25 m
- # Surface area: 500 m² to 13000 m²
- # Plate width: 600 mm to 2000 mm
- # Plate length: 6 m to 20 m
- # Design pressure: ≤ 5.0 MPa
- # Design Temp.: ≤ 700 °C
- # Differential pressure: ≤ 1.0 MPa
(plate bundle)

The largest heat exchangers

In January 2015, The feed/effluent plate & shell heat exchanger supplied by lanpecfor 2400 KTA continuous catalytic reforming (CCR) unit in CNPC yunnan petrochemical plant, created a new record in largest single heat exchanger surface area.



4.2. Plate Heat Exchangers

Plate air pre-heater

plate air pre-heater is another patent product of gas/air heat transferring equipment.

The plate air pre-heater is normally installed after the fired heater or furnace, provide optimum heat recovery from flue gases to preheat feed air and reduce greenhouse emissions.

Operating parameter

Temperature: $\leq 750\text{ }^{\circ}\text{C}$

Surface area: $\leq 11000\text{ m}^2$

Construction parameter

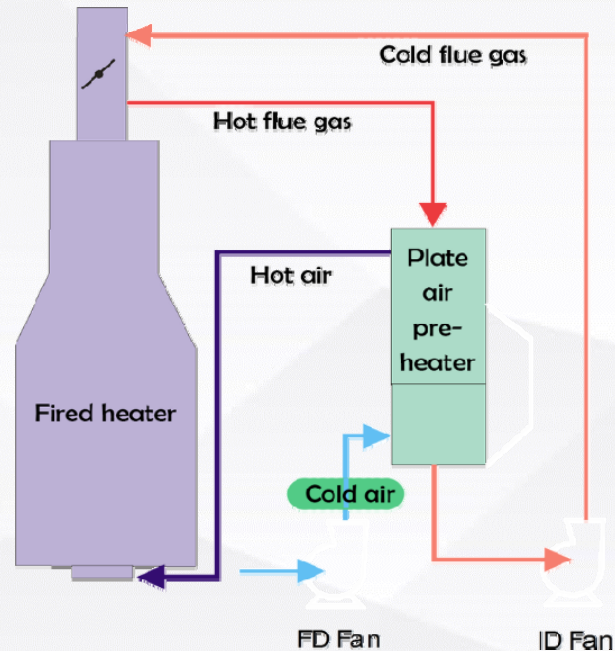
Plate material: CS, AISI 300, duplex SS, high nickel alloy, Ti, etc.

Applications

Ammonia and hydrogen production

Acrylonitrile production

Aromatics plants



4.3 Tubular Heat Exchangers

Tubular heat exchanger family

All shell & tube heat exchangers are built to strict industry standards and each unit will provide long dependable service. We are specialized in designing, manufacturing and testing of the heat exchangers as per ASME, TEMA and API standards.

Besides the most general & conventional TEMA type shell & tube heat exchangers, could also provide the engineering, mechanical design and fabrication for the heat exchangers fits for more severe & specific heat transferring situations, such as:

High pressure hydrogenating heat exchangers : for high pressure/temperature services

High efficiency heat exchangers : for more effective heat transferring

Waste heat boilers : for heat recovery

Surface evaporating air coolers : for air cooling services



4.4. Tubular Heat Exchangers

High pressure hydrogenating heat exchangers

high pressure hydrogenating heat exchangers use advanced sealing structures, which is our special know-how, to ensure dependable leak-free operation.

- # Design Pressure 7.0-35 MPa
- # Design Temperature 300-700 °C
- # Shell diameter ≤ 1800 mm

- # Hydrogenation/hydrocracking units
- # Ammonia plant
- # Any high pressure heat transferring services

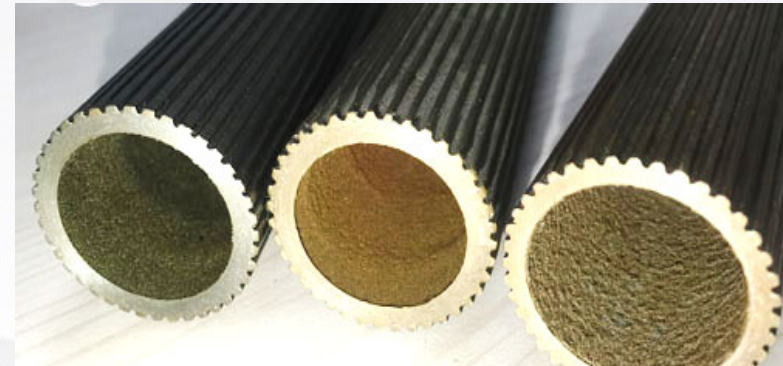
The special sealing with comparatively a simpler structure, could be easily maintained at site. This design not only decreases the size and weight of the equipment flange and main bolts, but also guarantees the reliability & lower cost of the heat exchanger.



4.5. Tubular Heat Exchangers

The high efficiency heat exchanger

The high efficiency heat exchanger, compared with the conventional shell & tube heat exchangers, the upgraded heat transferring element is employed to extend the surface, increase the transfer coefficient, therefore greatly enhance the heat exchanger working efficiency.



Left: A high efficiency heat exchanger with UOP high flux tube

According to the different situations, the upgraded heat transferring element inside the heat exchangers mainly including:

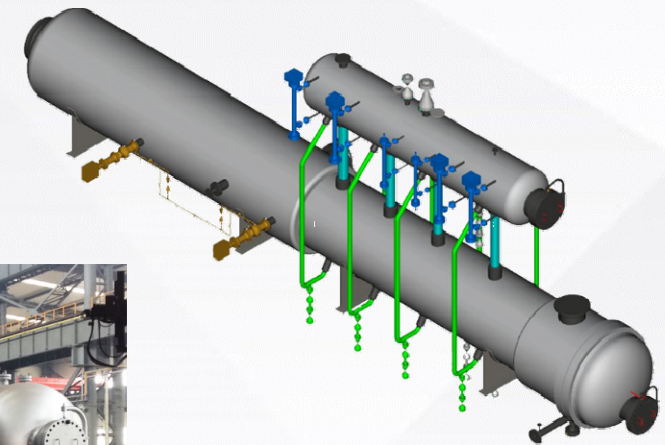
- # Low fin tubes
- # T-fin tubes (Rebolier)
- # Ripple tubes
- # Honeywell UOP high flux tubes
- # Others

4.6. Waste Heat Boiler

Waste Heat Boiler

designs and delivers waste heat boilers for various process applications, namely for chemical, power and processing industries.

Waste heat boilers can be of different design types, such as pressure vessels with tube bundles, fire-tube and water-tube arrangements, vertical or horizontal executions. Based on operating parameters, waste heat boilers are produced of carbon steel, stainless steel, alloy steel, and often combined with parts of high alloy steels to provide resistance under high temperature impact.



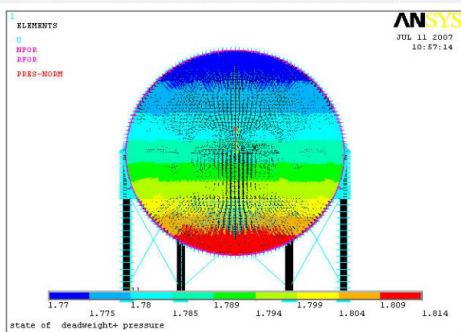
lanpecdelivers waste heat boilers within the parameters as follows:

- # Pressure $\leq 13\text{MPa}$
- # Temperature $\leq 1000^{\circ}\text{C}$ # Diameter $\leq 4000\text{ mm}$
- # Weight $\leq 120\text{ Tons}$

4.7. Tanks

Storage/Spherical Tanks

provides engineering, design, manufacture, delivery & site assembly for the spherical tanks and storage tanks containing: LPG, NG, LNG, ethylene, propylene, butadiene, vinyl chloride, ammonia, oxygen, and nitrogen etc.



The Largest fuel gas tank in Asia, size: 10,000 m³



First double-shell tank in China



The largest ethylene spherical tank farm in China, size: 3,000 m³

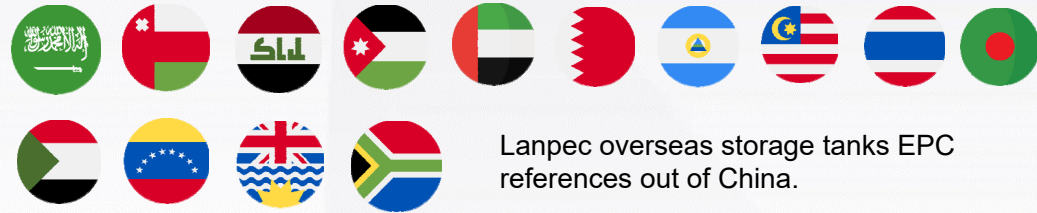


The Largest LPG tank in Asia, size: 8,000 m³

4.8. Storage Tanks

Storage Tanks

scope of supply for storage tanks could include design, material supply, fabrication, NDE and testing, inspection, painting and delivery, on site installation of storage tanks, which includes engineering, purchasing services, prefabrication and on-site erection of API storage tanks of various sizes.



Lanpec overseas storage tanks EPC references out of China.



4.9. Upstream Products

The upstream sector of the oil & gas industry mainly includes the onshore & offshore crude oil and natural gas production, as well as the oil & gas preliminary treatments.

As for the upstream, lanpec is capable to provide the engineering, design and manufacture of the equipment below:



Oil & gas production

- # Drilling rigs
- # Wellhead servicing equipment



Crude oil & gas treatment, Others

- | | |
|----------------------------|--|
| # Oil/Gas/Water Separators | # Modules for offshore platform/FPSO |
| # Test separator | # PIG launcher & receivers |
| # Production separator | # Chemical injection package |
| # Filter separator | # Pipeline manifold |
| # Slug catcher | # Scrubbers |
| # Dehydrators | # Oil-containing effluent treatment unit |
| # Desalter | # Natural gas treatment unit |
| | # Gas dehydration unit |

4.10. Separators & PVs

The upstream equipment design and manufacture have been part of our portfolio since our first oil/gas/water separator design in 1980.

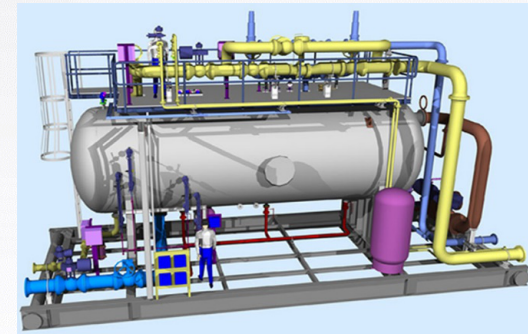
In last 30 years, our engineers have continuously improved the design to meet higher requirements of our clients from more than 20 countries, for both onshore & offshore services.

separator provision covers the full scope of the engineering, design and manufacture of all items in separator family.

The separator family

- # Three-phase separator (Oil/gas/water)
 - # Two-phase separator (Liquid/gas, oil/water) # Production separator
 - # Test separator
 - # Filter separator
 - # Slug catcher
 - # Scrubber
 - # Other separators
- Separator records:

- # Pressure (Max.): 35Mpa
- # Diameter (Max.): 5600mm # Length (Max.): 32000mm
- # Temperature (Min.): - 50 °C # Weight (Max.): 290 tons
- # Thickness (Max.): 160mm



4.11. Open-Rack Vaporizer, ORV

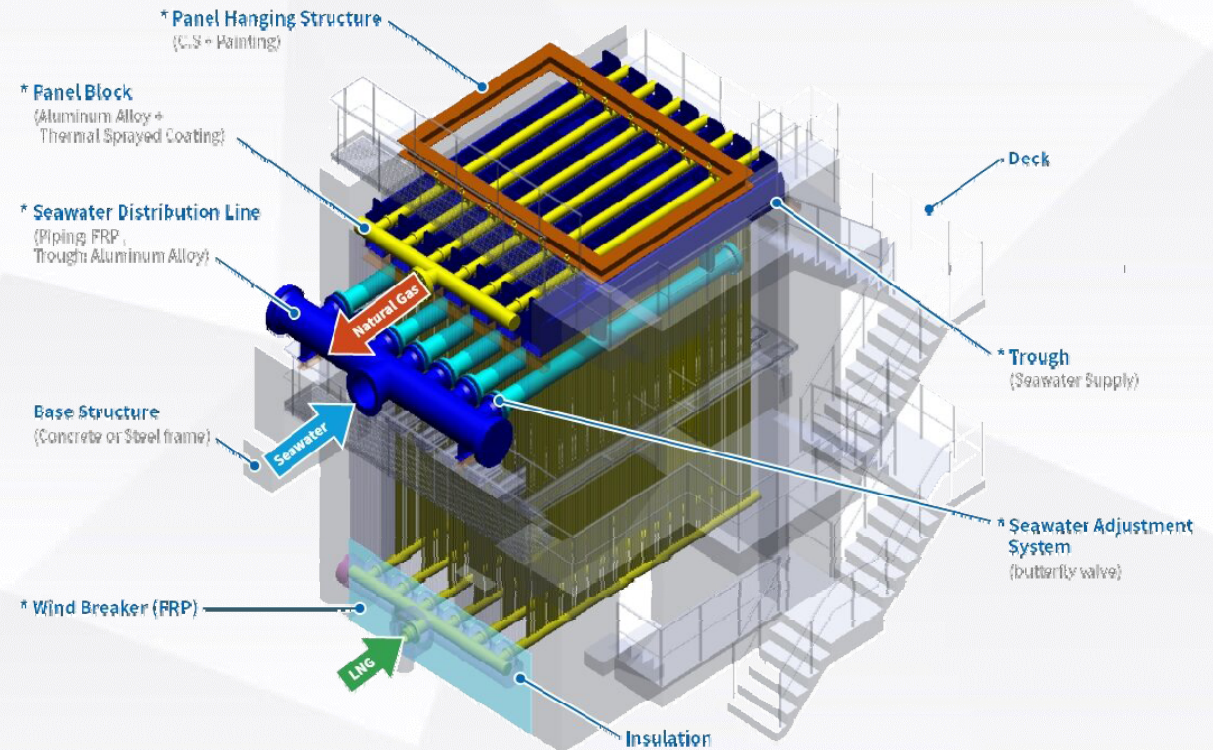
Open-Rack Vaporizer (ORV), is equipment for gasification of liquefied natural gas (LNG) by using seawater as the heating medium, for LNG terminals. LNG enters from the lower main pipe, then rises along the heat exchanger pipes, and is heat exchanged with seawater to be gasified into ambient temperature gas and then distributed out.

In year 2013, Lanpec developed the first Chinese-made Open-Rack Vaporizer.

Design pressure: 16MPaG

Design temperature: -170°C ~ +65°C Processing capacity 165 T/h

Fluids: LNG, ethylene, ethane, propane, butane, liquid hydrogen, and other fluids non-corrosive to aluminum



4.12. Skids & Modules

**COMPACT
ALL IN ONE
OFFSHORE/ONSHORE**



Separator Modules

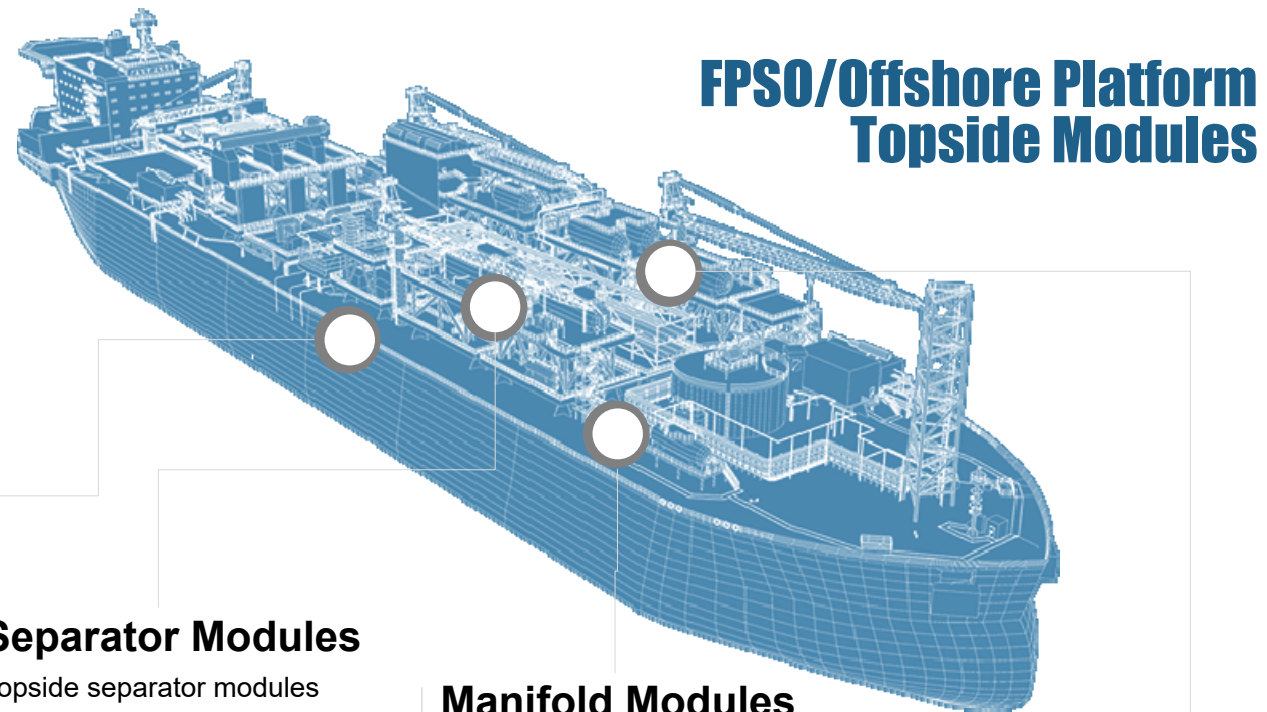
Topside separator modules for preliminary crude oil on deck treatment

Manifold Modules

Most completed piping connection engineering & supply

Block Engineering

Engineering service for topside modules & blocks on FPSO/Platform



FPSO/Offshore Platform Topside Modules



THANKS



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