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Modular Natural Gas Processing Plant

PCC provides advanced oil gas technology & equipment all over the world.

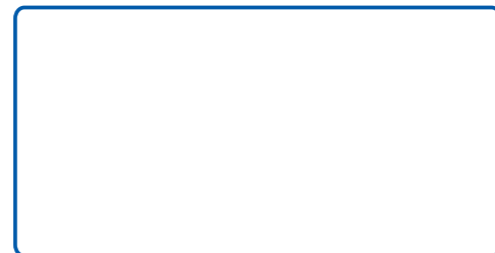
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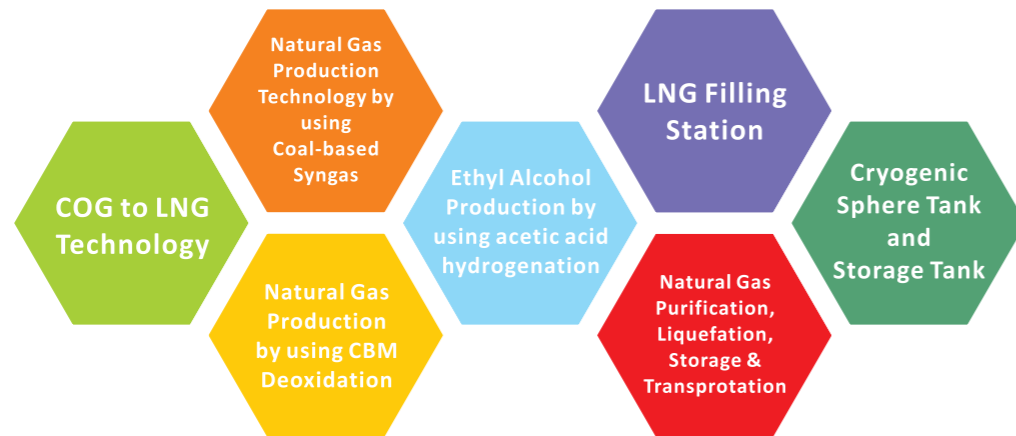
EPC Turn-key Services

Integrated Service Mode

Our Technology and Products

Worldwide Supplier

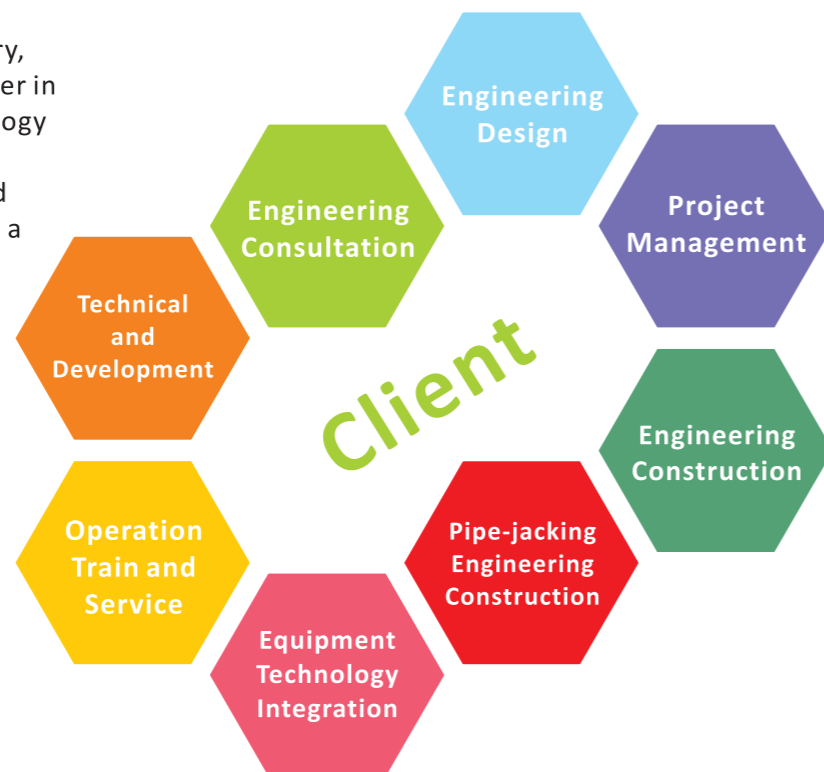
PCC is a CHINA based full service oil and gas company that specializes in the design, engineering, procurement, fabrication, sales, installation and maintenance of modular crude oil refineries, modular gas plants, mini crude oil refineries, crude oil flow stations and oil & gas process equipment. Amerisource strives to be the choice for companies that need its experience and expertise in the establishment of their petroleum refineries.



Our Services

As an integrated service provider in clean energy utilization, PCC focuses on how to use its own comprehensive ability to create more value for the client.

We are experienced and powerful in coal chemical industry, petrochemical industry, natural gas liquefaction and heating power in different fields. By incorporating technology R&D, engineering design, professional procurement, equipment integration and project construction, we can provide you a highly integrated one-stop engineering solutions and services with powers from different parties.



Modular Gas Processing Plant

Advanced Modular Integration

Gas Processing Plant

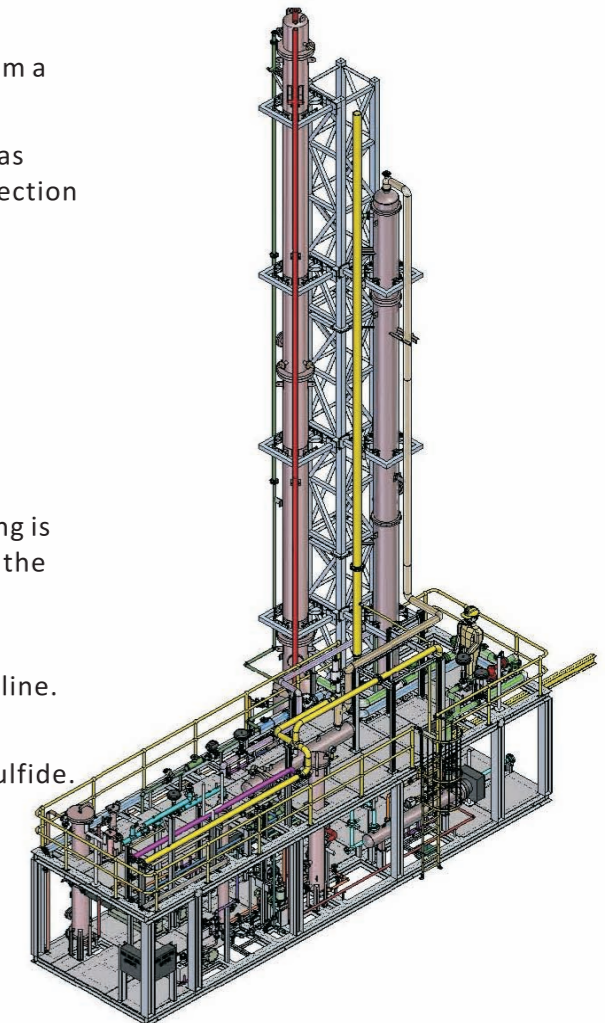


With modular construction, components of a gas plant are manufactured and assembled in modules at our manufacturing facility, then transported to the site. This facilitates shorter project timelines yielding improved business case outcomes. By using modular construction, a client can also relocate a PCC gas plant as situations dictate.

A natural gas processing plant is required for most gas streams that are produced from a gas well or an associated oil well. Natural gas in its raw form can contain water, NGL (Natural Gas Liquids), CO₂ and H₂S. The natural gas from well heads usually requires processing to remove these contaminants from the gas stream.

PCC manufactures the following Modular Gas Processing Components

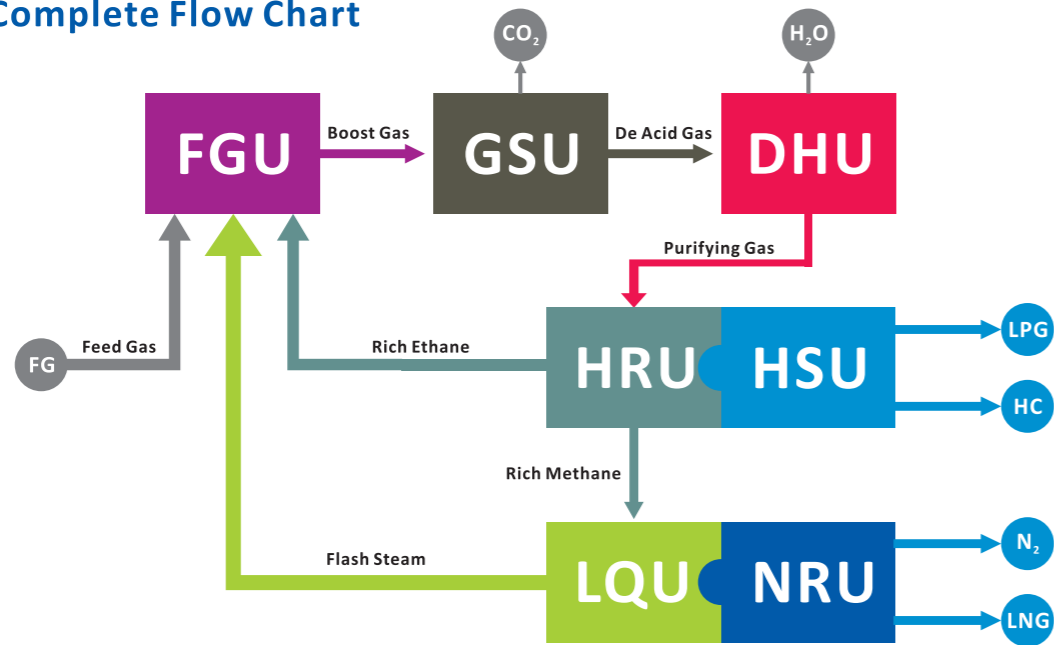
- Field Compression System – raises the gas pressure from the well heads to the pressure required for gas transmission.
- Amine Treater - removes CO₂ in excess of 3% or any H₂S from a gas stream.
- Glycol Dehydrator - removes water to prevent freezing. A gas stream is treated using a glycol dehydrator or methanol injection for transmission or processing.
- PCC supplies glycol dehydrators from 100 to 30,000 Mscfd (thousand standard cubic feet per day). Design pressure available from 230 to 2,160 psig.
- Mole Sieve Dehydrators – removes all the water from a gas stream. This unit is used when gas is processed to very low temperatures.
- Natural Gas Processing Plant - another step in gas processing is to remove the NGL from a gas stream. To remove the NGLs, the gas is cooled until the NGL condenses.
- NGL Fractionator – a NGL stream normally contains three components: propane, field grade butane and natural gasoline. These three components are separated.
- Recovery Unit - recovers elemental sulfur from hydrogen sulfide.
- Emergency Flare - burns unwanted or flammable gas and liquids released by plant equipment.



Process Flow and Program

Universal Modular LNG Production Line

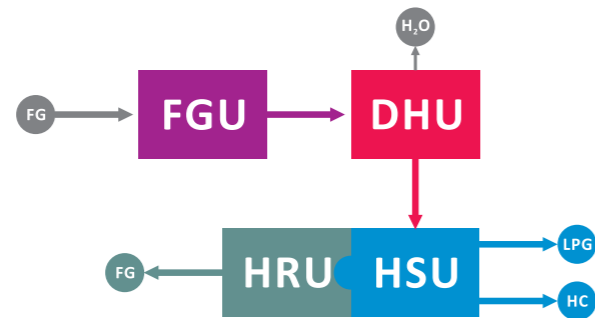
PUMLT Complete Flow Chart



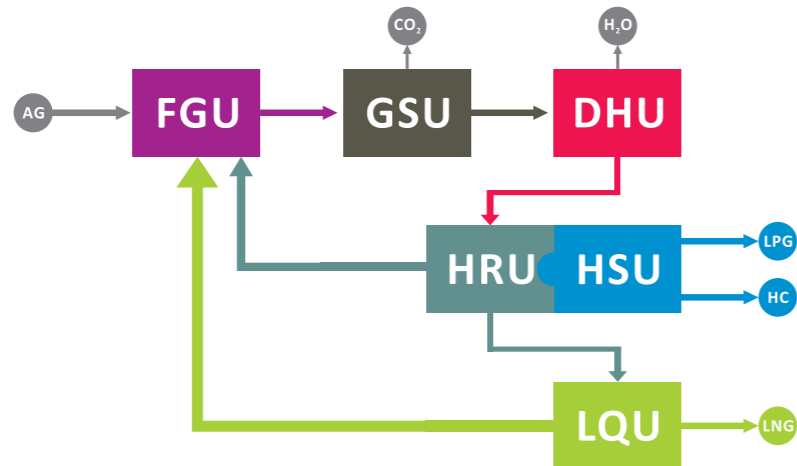
Typical Solution for Different Gas

PUMLT is highly versatile, and can be combined targeted for different gas source (coal bed methane, wellhead associated gas, Pipeline natural gas etc.), mixed into a complete liquefaction production line. The figure below shows several typical solution of configuration.

1 The associated gas (LNG) recovery scheme



2 Gas liquefaction scheme, with recovery of LPG

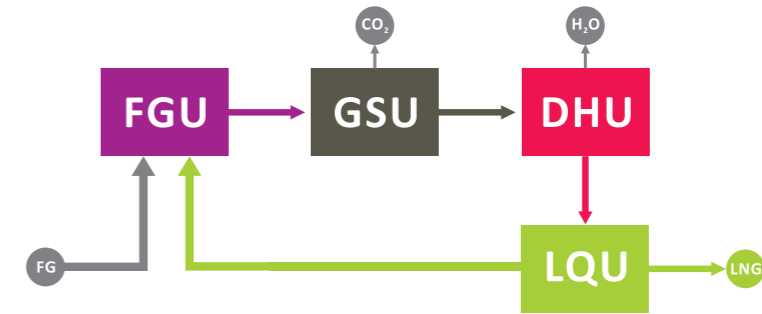


Process Flow and Program

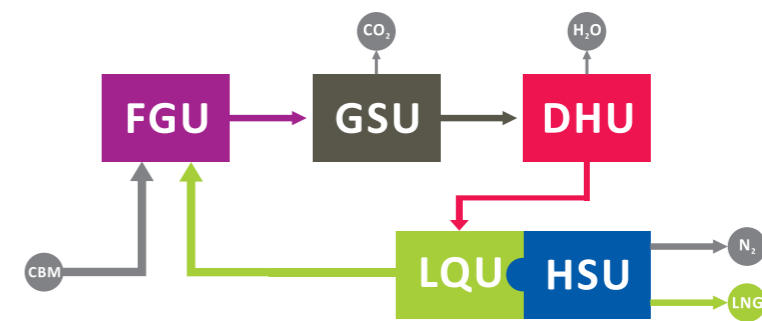
Universal Modular LNG Production Line

According to the Typical Configuration of Different Gas Sources

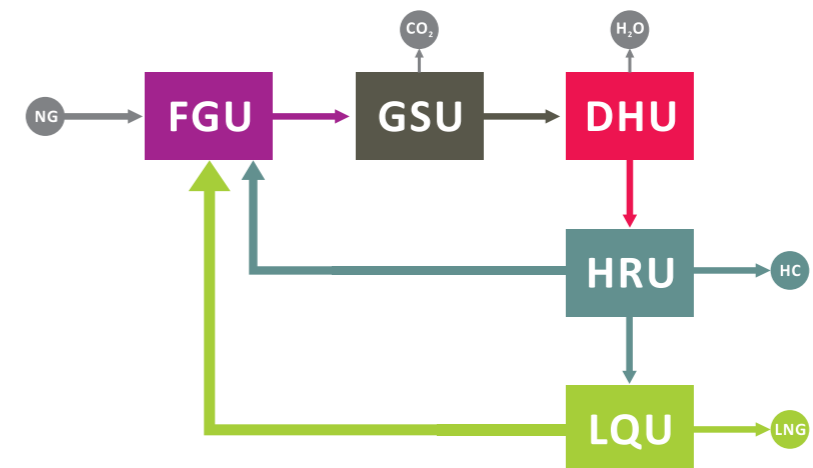
3 Coal bed gas liquefaction scheme



4 High nitrogen coalbed gas liquefaction scheme



5 Pipeline gas liquefaction scheme



PUMLT™ General Introduction

Universal Modular LNG Production Line

General Introduction

PUMLT is a set of small universal modular liquefaction solution of natural gas, which adapts to a variety of gas properties, and is very fast, simple and easy to use.

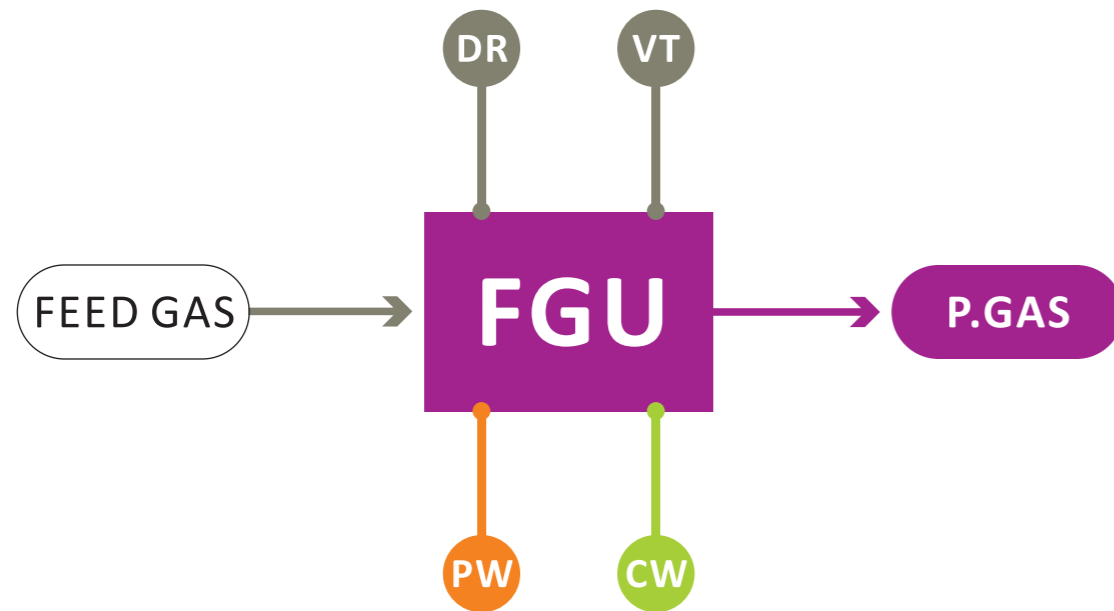
1. Design Principle

Modularization is the core principle of SUMLT. We divide all kinds of complete liquefaction process according to function/ process, and then form skid-mounted modules. The combination of all kinds of modules constitutes a complete liquefaction solution.

PUMLT series are P30K, P60K, P100K, P150K, covering the liquefaction capacity of 30,000Nm³/d, 60,000 Nm³/d, 100,000 Nm³/d, 150,000 Nm³/d, which will fully meet customer demand.

2. Modules

2.1 FGU: Feed Gas Unit



Function

At normal status, the entrainment free droplets and mechanical impurities of filtering inlet gas is pressurized and sent out as the input air of liquefaction production line, at the same time, outputs flow signal for measuring. This module can also be equipped with heavy hydrocarbon separation components, in order to apply to high heavy hydrocarbons gas.

Internal Flow

Feed gas is through rough filtered and measure, flows to the feed filter buffer tank, through pressure regulator, is compressed out by feed compressor.

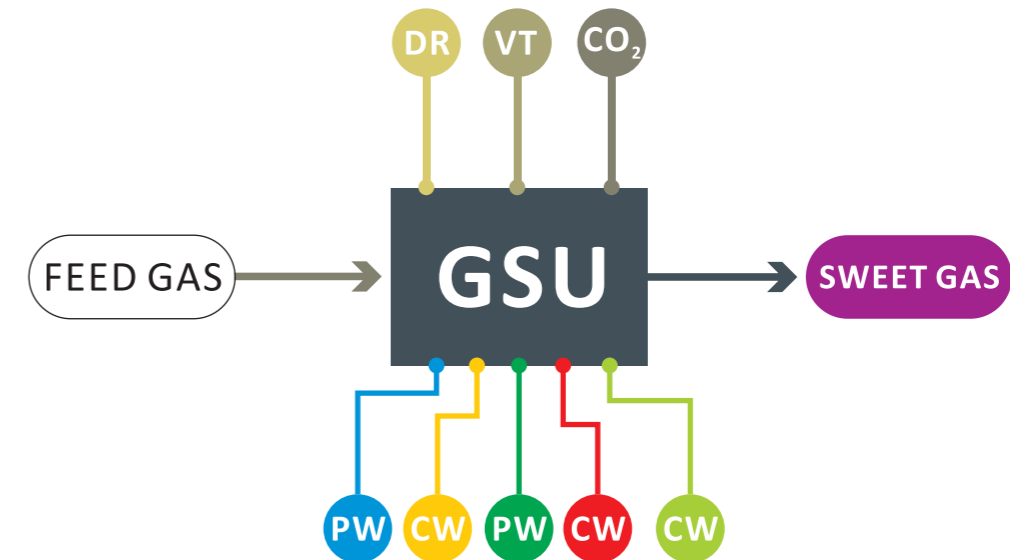
PUMLT™ General Introduction

Universal Modular LNG Production Line

FGU Parameter Table

	P30K	P60K	P100K	P150K
Processing Capacity	30,000Nm ³ /d	60,000Nm ³ /d	100,000Nm ³ /d	150,000Nm ³ /d
Inlet Pressure	2-4barg	2-4barg	2-4barg	2-4barg
Outlet Pressure	26barg	26barg	26barg	26barg
Inlet Temperature	30°C	30°C	30°C	30°C
Cooling Water	46 t/h	46 t/h	76 t/h	113 t/h
Compressor Shaft Power	210kW	420kW	690kW	1029kW
Module Size	6.0×3.0×2.5 (L×W×H)(m)	7.5×3.0×2.5 (L×W×H)(m)	9.5×3.0×2.5 (L×W×H)(m)	12.5×3.0×2.5 (L×W×H)(m)

2.2 GSU: Gas Sweetening Unit



Function

At normal status, the acid gases (CO₂, H₂S) in the inlet gas is removed, and makes the CO₂ content less than 50ppm.

Internal Flow

The feed gas enters to the absorption tower and reversely contacts with amine liquid for heat and mass transfer, the acid gases in the inlet gas are absorbed by amine liquid. Then feed gas flows out from the tower top, through cooling and separating, liquid phase enters to rich amine flash tank, when CO₂ content is tested qualified the gas phase is out, otherwise the gas phase is out from unqualified product pipe.

PUMLT™ General Introduction

Universal Modular LNG Production Line

Internal Flow

The rich amine solution which fully absorbs CO₂ flows from the bottom of absorption tower, reduces pressure to about 0.5MPa(g) and flows to rich amine flash tank, flash gas is sent out of this module. The flashed rich amine solution enters to rich-lean heat exchanger, and returns to the regeneration tower top after exchanging heat with the lean amine solution at the bottom of generation tower. Steam reflux at the generation tower bottom fully contacts and conducts mass transfer. CO₂ is separated out of the rich amine solution, the tower kettle provides heat by use of reboiler to amine solution regeneration.

The lean amine solution out of regeneration tower flows through, in turn, rich-lean heat exchanger, lean solution cooler, lean solution pump to absorption tower for recycle.

FGU Module Diagram & Parameter Table



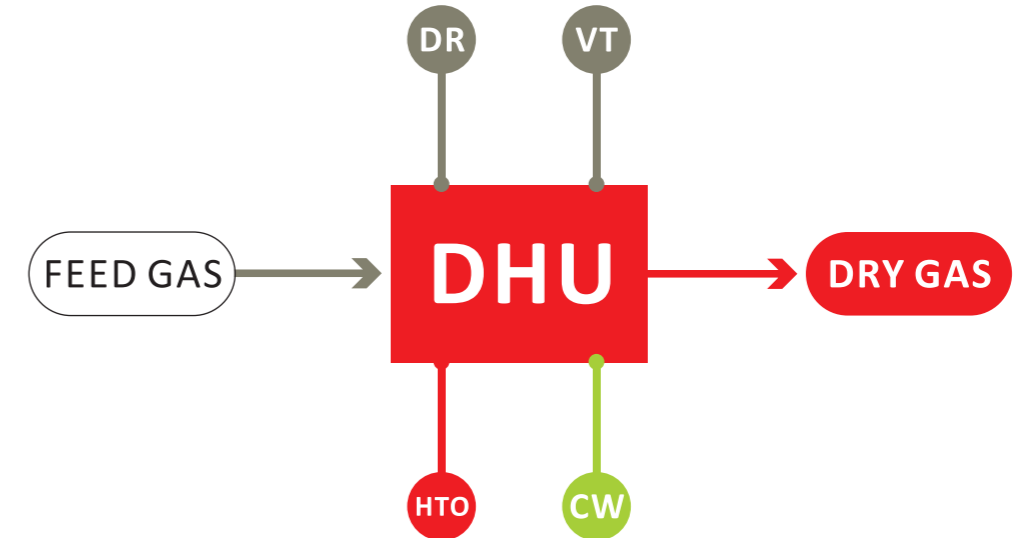
	P30K	P60K
Processing Capacity	60,000Nm ³ /d	60,000Nm ³ /d
Inlet Pressure	26barg	26barg
Inlet Temperature	37℃	37℃
CO ₂ Content	0.8-3.0mol%	0.8-3.0mol%
Cooling Water	23 t/h	46 t/h
Heat Conducting Oil	109kW	218kW
Power	5kW	10kW
Module Size	3.4×3.4×10.8 (L×W×H)(m)	3.8×3.8×13.5 (L×W×H)(m)
	P100K	P150K
Processing Capacity	152,715Nm ³ /d	227,909Nm ³ /d
Inlet Pressure	26barg	26barg
Inlet Temperature	37℃	37℃
CO ₂ Content	0.8-3.0mol%	0.8-3.0mol%
Cooling Water	76 t/h	113 t/h
Heat Conducting Oil	358kW	535kW
Power	17kW	25kW
Module Size	Combined Type	Combined Type

PUMLT™ General Introduction

Universal Modular LNG Production Line

2.3 DHU: Dehydrate Unit

Remove H₂O in the feed, output dry gas, and control its dew point not higher than -80 °C .



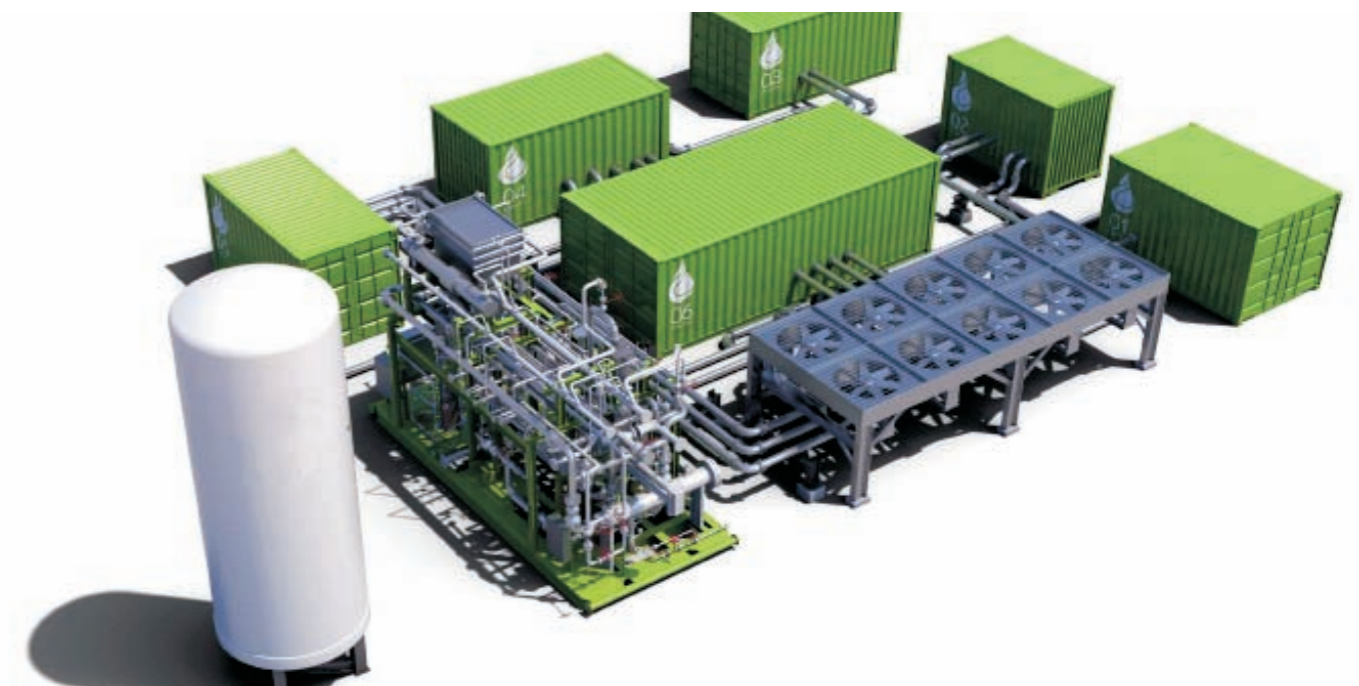
Function

Reduce the H₂O content in inlet gas to less than 1ppm.

Internal Flow

The input gas stream firstly passes through the de-mercury tower to provide protection for the subsequent modules, after removing dust, then enters to molecular sieve dehydrate unit. The DHU adopts TSA process and the adsorbent is molecular sieve whose specification (3A/ 4A/ 5A) depends on the input gas composition. Dehydration and regeneration are alternatively achieved by program control valve free switch. The gas stream removed water is internally tested, if the H₂O content is less than 1ppm and CO₂ content is less than 50ppm, the gas is qualified and output from the major joint, otherwise is output from the unqualified gas joint.

DHU Module Diagram



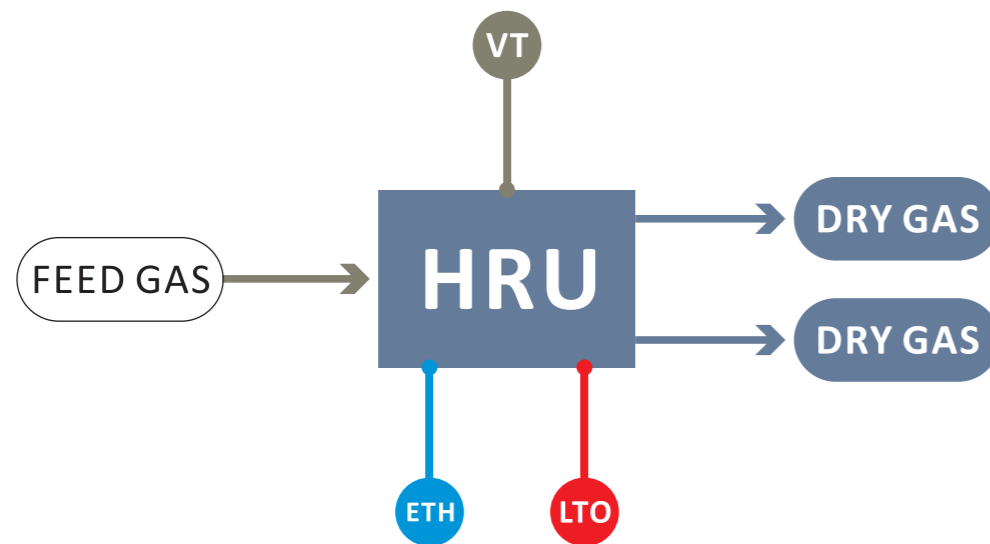
PUMLT™ General Introduction

Universal Modular LNG Production Line

DHU Parameter Table

	P30K	P60K	P100K	P150K
Processing Capacity	46,512Nm ³ /d	92,976Nm ³ /d	152,715Nm ³ /d	227,909Nm ³ /d
Inlet Pressure	26barg	26barg	26barg	26barg
Inlet Temperature	37°C	37°C	37°C	37°C
Cooling Water	10 t/h	20 t/h	33 t/h	49 t/h
Heat Conducting Oil	65kW	130kW	214kW	319kW
Compressor Shaft Power	7.0×3.5×3.7 (L×W×H)(m)	10.0×3.5×3.7 (L×W×H)(m)	Combined Type	Combined Type

2.4 DRU: Heavies Removal Unit



Function

Primarily separate the heavy and light component, C3+ are output as NGL, and the light hydrocarbons are output as rich methane.

Internal Flow

The input gas is precooled and enters to demethanizer, the top stream is cooled and separated, gas phase is reheated and output as rich methane. Liquid at the bottom continued enters to the deethanizer, the top stream is cooled and separated, gas phase is reheated and output together with rich methane, liquid at the bottom is output as NGL.

The cold source is low temperature ethylene, and the heat source is 180°C low temperature thermal conductive oil.

PUMLT™ General Introduction

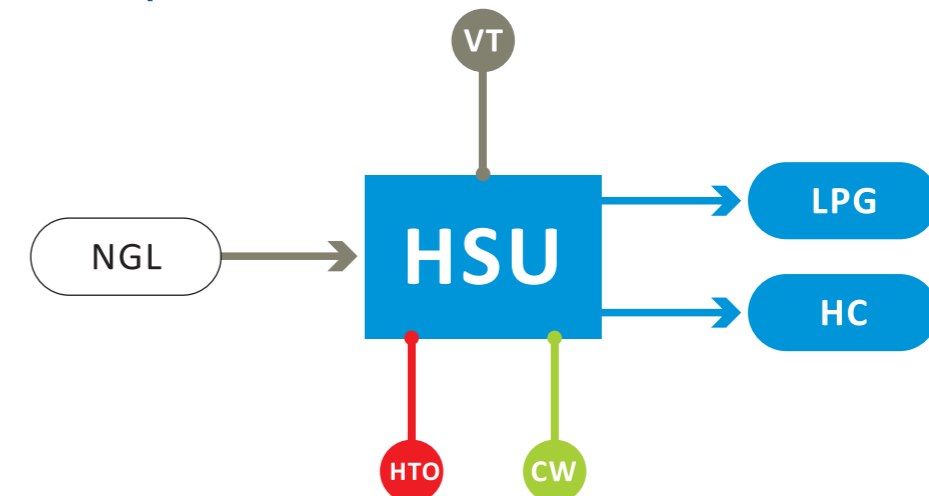
Universal Modular LNG Production Line

HRU Module Diagram & Parameter Table



	P30K	P60K
Processing Capacity	46,416Nm ³ /d	92,760Nm ³ /d
Inlet Pressure	26barg	26barg
Inlet Temperature	37°C	37°C
Heat Conducting Oil	29kW	58kW
Ethylene Thermal Load	51kW	102kW
Module Size	3.2×3.0×15.6 (L×W×H)(m)	3.6×3.6×16.6 (L×W×H)(m)
	P100K	P150K
Processing Capacity	151,626Nm ³ /d	227,909Nm ³ /d
Inlet Pressure	26barg	26barg
Inlet Temperature	37°C	37°C
Heat Conducting Oil	96kW	143kW
Ethylene Thermal Load	168kW	250kW
Module Size	3.8×3.8×17.4 (L×W×H)(m)	Combined Type

2.5 HSU: Heavies Separation Unit



Function

Combine with the HRU to recover LPG(C3) out of NGL.

PUMLT™ General Introduction

Universal Modular LNG Production Line

Internal Flow

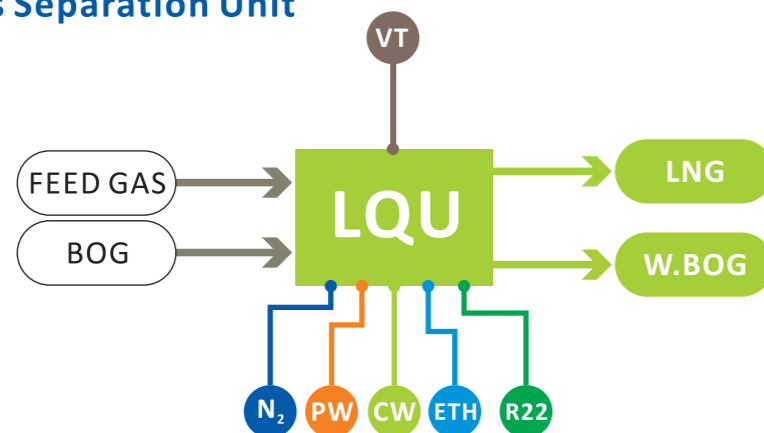
NGL is input to LPG distillation tower, the top stream is cooled and separated, liquid phase partial reflux, and the rest is withdrawn as LPG product. The bottom condensates are heavy hydrocarbons. The cold source is circulating cooling water, and the heat source is high temperature thermal conductive oil.

HSU Module Diagram & Parameter Table



	P30K	P60K
Processing Capacity	-	-
Inlet Pressure	26barg	26barg
Inlet Temperature	37°C	37°C
Cooling Water	-	-
Heat Conducting Oil	-	-
Module Size	3.0×2.5×14.0 (L×W×H)(m)	3.2×2.8×14.4 (L×W×H)(m)
	P100K	P150K
Processing Capacity	-	-
Inlet Pressure	26barg	26barg
Inlet Temperature	37°C	37°C
Cooling Water	-	-
Heat Conducting Oil	-	-
Module Size	3.0×2.5×14.0 (L×W×H)(m)	3.2×2.8×14.4 (L×W×H)(m)
- According to the composition of feed gas to determine		

2.5 HSU: Heavies Separation Unit



PUMLT™ General Introduction

Universal Modular LNG Production Line

Function

Receive the input pure gas and output LNG.

Internal Flow

Qualified pure input gas flows through gas booster and refrigerated heat exchanger, and divides into two liquid stream after cooled. One stream (about 35%) returns to refrigerated heat exchanger to provide cool energy, and returns to pure gas booster inlet after reheated; the other stream (about 60%) is output as LNG after throttle. The boil off gas (BOG) enters to refrigerated heat exchanger for reheating and returns to the production line input port. The rest cold source for this module is provided by low temperature R22 and ethylene.

LQU Module Diagram & Parameter Table

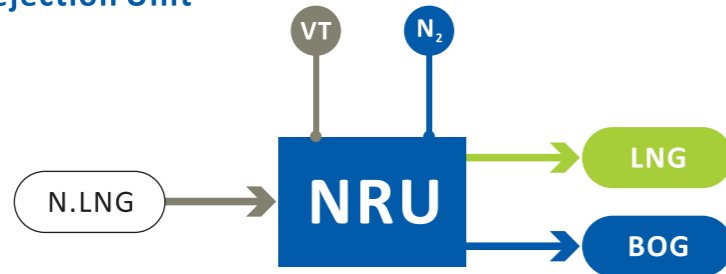


	P30K	P60K
Processing Capacity	41,952Nm ³ /d	83,485Nm ³ /d
Inlet Pressure	25barg	25barg
Inlet Temperature	36°C	36°C
Cooling Water	16t/h	32t/h
Ethylene Thermal Load	114kW	228kW
Power	160kW	320kW
R22 Thermal Load	73kW	146kW
Module Size	3.0×3.0×9.5 (L×W×H)(m)	3.2×3.2×9.5 (L×W×H)(m)
	P30K	P60K
Processing Capacity	152,715Nm ³ /d	227,909Nm ³ /d
Inlet Pressure	25barg	25barg
Inlet Temperature	36°C	36°C
Cooling Water	53t/h	79t/h
Ethylene Thermal Load	375kW	559kW
Power	526kW	784kW
R22 Thermal Load	240kW	358kW
Module Size	3.5×3.5×9.5 (L×W×H)(m)	3.8×3.8×10.5 (L×W×H)(m)

PUMLT™ General Introduction

Universal Modular LNG Production Line

2.7 NRU: Nitrogen Rejection Unit



Function

When nitrogen is a little high (2%~5%) in the feed gas, NRU combines only with LQU to remove nitrogen in the LNG to product requirement (1%).

Internal Flow

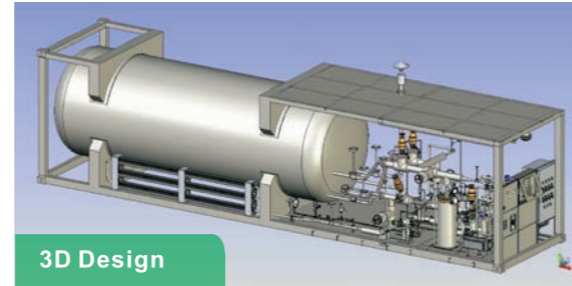
The input gas enters to the de-nitrogen tower, nitrogen vents off with the top gas, and LNG flows out of the bottom and provides cool energy for top condensation, the liquid phase is product while the gas phase is BOG.

Skid Mounted LNG Filling Station

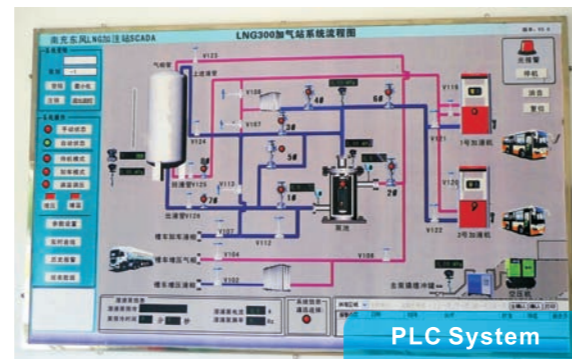
Skid Mounted Filling Station



LNG filling station is composed by storage tank, pump, carburetor, pipes & valves, dispensers & other components, centralized to install in a skid, which is a complete LNG filling system assembled, tested, commissioned in the factory. It can complete the function independently of LNG vehicle refueling, measurement & automatic control.



3D Design



PLC System



New Energy Automobile



LNG Unloading System

PUMLT™ General Introduction

Case of Universal Modular LNG Production



COG processing capacity of 240 million Nm^3/a , LNG production of 95 million Nm^3/a .

Henan Jingbao COG to LNG Project

The project is located in Pingdingshan, Henan province. PCC is responsible for providing design and installation service based on its proprietary complete process package, including COG purification, methane synthesis, and liquefying separation technologies. By using COG to produce LNG, the project solves COG's comprehensive utilization problem and saves investment and running cost effectively for the client.

In May 2013, the plant was put into production successfully and smoothly. It is the first large-scale plant that starts up successfully in a short time by using Chinese technology.

Hebei Huaqi Bazhou Kangxianzhuang LNG Plant Project

The project is located in Kangxianzhuang, Bazhou city. It includes a 20,000 Nm^3 LNG storage tank, a filling station with 6 loading arms, matching utilities, and power transformer and distribution substations. The project uses the world leading refrigeration and liquefaction technologies with mixed refrigerant (MRC), which can reduce the operation cost for the client maximum.

It was put into production successfully in March, 2013.



Processing Capacity is 1million Nm^3/d .



Natural Gas Liquefaction Plant Processing Capacity is 1million Nm^3/d .

LNG Plant Project 1million Nm^3/d

The feed gas of this plant is ammonia byproduct methane gas. PCC is responsible for engineering design, core equipment fabrication, control system, commissioning and test run.

This plant makes use of new technology, and has the characteristics of high liquefaction efficiency, low energy consumption, simple and convenient operation, stable operation, and less operators.