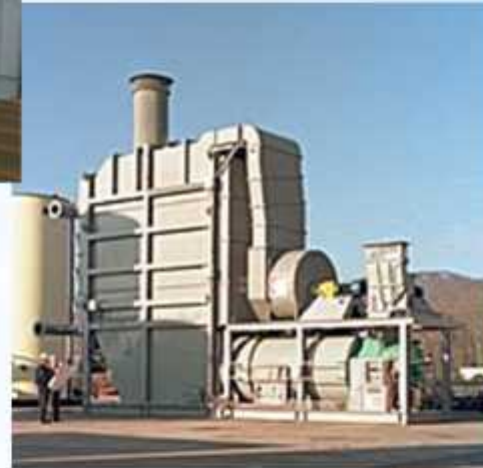


ENCE GmbH

Engineering of Chemical Equipment



**ENCE GmbH
Presentation
2015**

About us

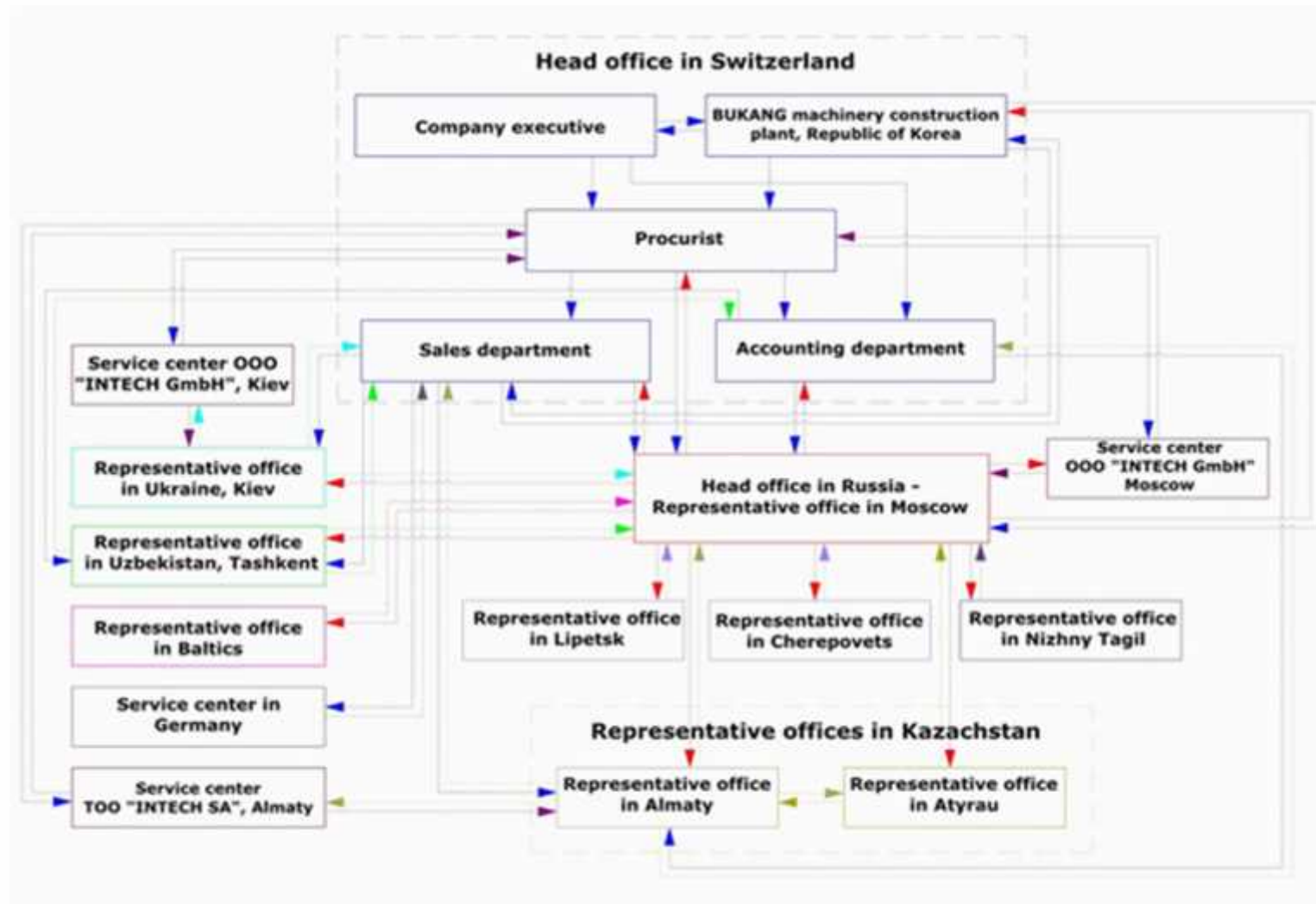


Manufacturing and engineering company ENCE GmbH (www.ence.ch) is an international enterprise with the head office in Switzerland and a number of branches and representative offices in Western and Eastern Europe. Moreover ENCE GmbH is a joint owner of BUKANG modern machine building plant located in the Republic of Korea, Yeongcheon.

Our company's structures and brunches number more than 200 employees at the moment. Further, there are around 25 engineers in our service centers in Russia, Uzbekistan and Kazakhstan.



Structure of ENCE GmbH Representative Offices



The CIS countries where company ENCE GmbH carries out its activities:

- the Russian Federation
- Belarus
- Kazakhstan
- the Ukraine
- Uzbekistan
- Turkmenistan
- Latvia
- Lithuania
- Azerbaijan
- Kyrgyzstan
- **For additional information please follow: www.ence.ch**

Main list of implemented projects:

- High-performance oil treatment and refining units (dehydrators, desalters, separators, heater treaters)
- Pumps and stations for formation pressure maintenance, hydraulic stations for formation fracturing
- Reactors and column equipment
- Special-purpose calcination kilns for bulk materials and catalysts, revamping of reforming furnaces
- Automatic hydrocarbons (kerosene, gasoline) loading/unloading systems with vapor removal (vapor recovery units)
- High-efficient modular systems for methanol recovery (95% and above)

- Screw flow generators for gas pressure reduction in a gas line
- Vapor recovery with energy generation – turbines by Shin Nippon Machinery
- Mobile stations for NGL loading/unloading from a gas pipeline dead end or close tanks into pressurized gas pipeline
- Complex projects for gas separation, dehydration, cooling
- Incineration packaged systems for waste gas, liquid and solid waste disposal (incineration)

Bukang plant in South Korea



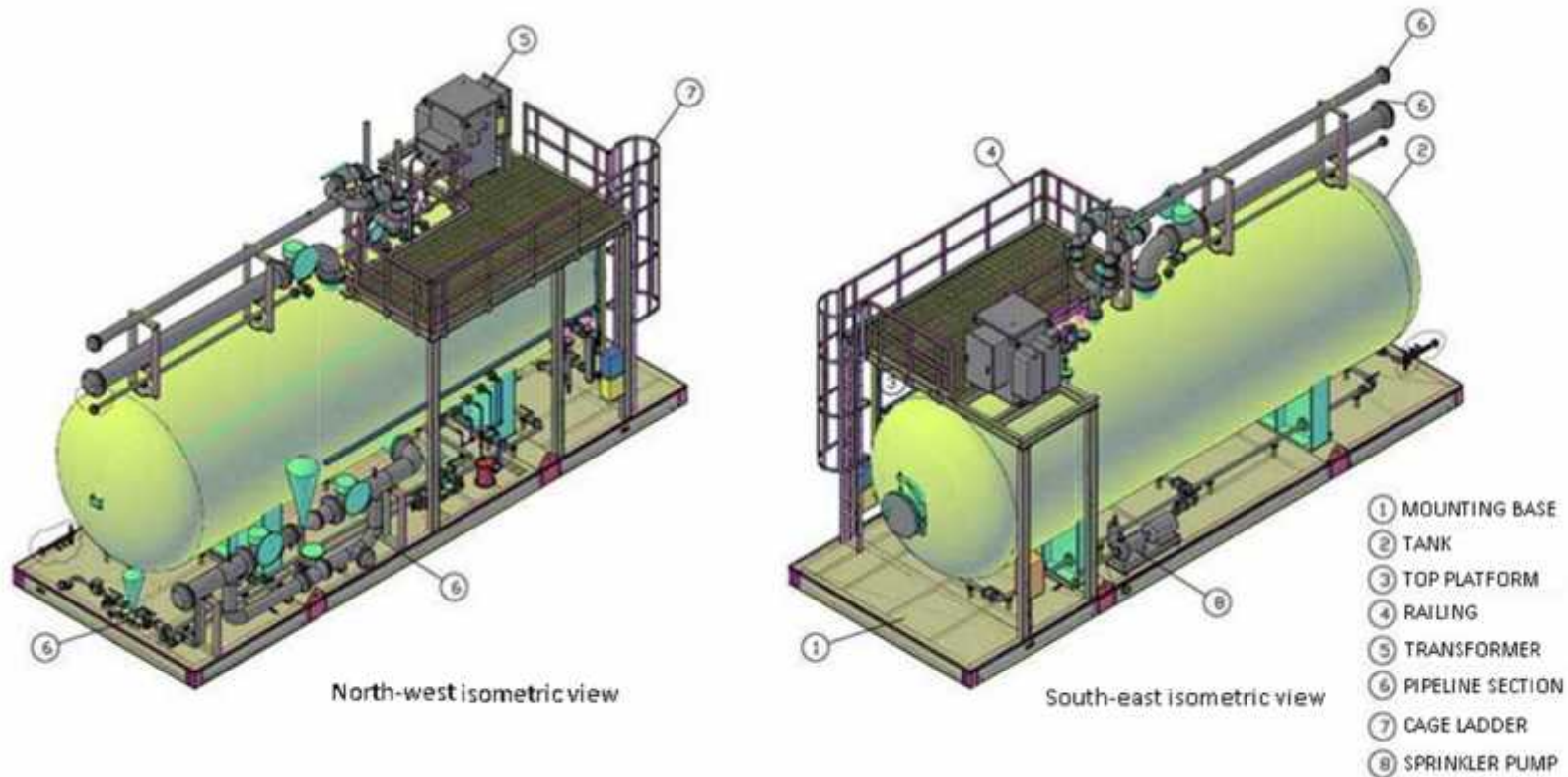
Manufacturing and engineering company «ENCE GmbH» appears to be one of the incorporators of Bukang machine building plant (Yeongcheon city) established in 1986. It is one of the leading manufacturers in South Korea specializing in production of replaceable equipment, high-impact units and spare parts for a variety of industrial plants.

**High-performance oil treatment and refining units
(dehydrators, desalters, separators, heater
treaters)**





Oil dehydration units (electric dehydrators)



Technical description:

Electromechanical dehydrator is a horizontal tank containing electrostatic grids, coalescers and an input heat-up section. This type of oil dehydrating and desalting units utilizes mechanical coalescing means for liquid/liquid mediums. This type of units is effective for treating stable emulsions.

The final part of the system is a settling/ coalescing section. It should be designed for constant flow minimizing any disturbances. It is achieved by eliminating gas emission, minimizing temperature drop and maintaining constant rate. Flow is controlled by means of a correctly designed flow distributor which ensures its steadiness with the help of a special manifold and by draining liquid from the whole separator.

Benefits

Using an electric dehydrator to reduce salt content in oil effects a substantial saving:

- Two times longer equipment service life;
- Lower fuel consumption;
- Less corrosion;
- Lower catalyst consumption;
- Higher quality of gas-turbine and boiler fuels, petroleum cokes and asphalts.

4-phase high pressure separators for crude oil

Used for solid phase separation, liquid degasification with subsequent gas separation from liquid droplets and separation of immiscible fluids of different density.

Volume: 16...40 m³

Overall dimensions:

Length: 12.2 m

Width: 2.59 m

Height: 3.2 m



Technical features:

- 100...250 barrel 4-phase separator
- small size
- pipelines operating at 3 000 psi ... 10 000 psi
- dimensions from 3 to 8 inches
- different pump feed options
- oil/water pumping
- solids transfer
- internal spraying pumps
- full data
- programmable system for all pressures monitoring
- control of the whole pump, valves and control valve function

Oil heating units

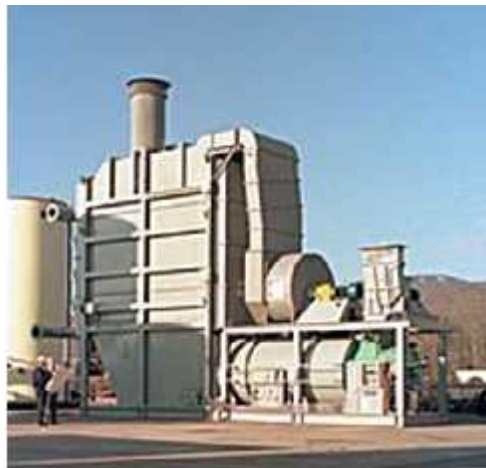
Efficiency: 90%

Heater capacity: 5 ... 40 MW

Oil flow rate: max. 2000 m³/h

Service life: max. 30 years

Design: ex- and fireproof



Oil heating unit has the following process functions:

- Technical record-keeping of oil and gas fed to the unit
- Phase separation of oil and gas into oil, gas and water phases
- Secondary water-oil emulsion separation into water and oil phases
- Treatment and partial dehydration of the gas received after primary separation
- Treatment of separated water and reinjection into the formation
- Oil dehydration and desalination
- Fiscal metering of dehydrated and desalted oil

Unit designs

- With an intermediate heat carrier
- With a convection heater

Benefits

- Due to no need for additives to increase oil shipping properties, a substantial saving in shipping costs
- The pumped oil is used as an energy source for heating, i.e. as fuel for burners, associated gas can also be used as fuel
- Closed cycle technologies are used to the maximum extent possible: flue gas recirculation, use of constantly circulating non-toxic liquid heat carrier
- High ecological performance of oil heating units
- Oil heating units ensure the set process mode of the oil pipeline, meet the high reliability, safety, automation and control requirements and operational and economic parameters

Helical coil heaters



Production rate - 17,58 MW
Lifetime- 20-25 years

Design features:

- Helical coil is the main part of heater design which is installed on supports inside of the cylindrical body in such a way that there is an annular space between body wall and the coil.

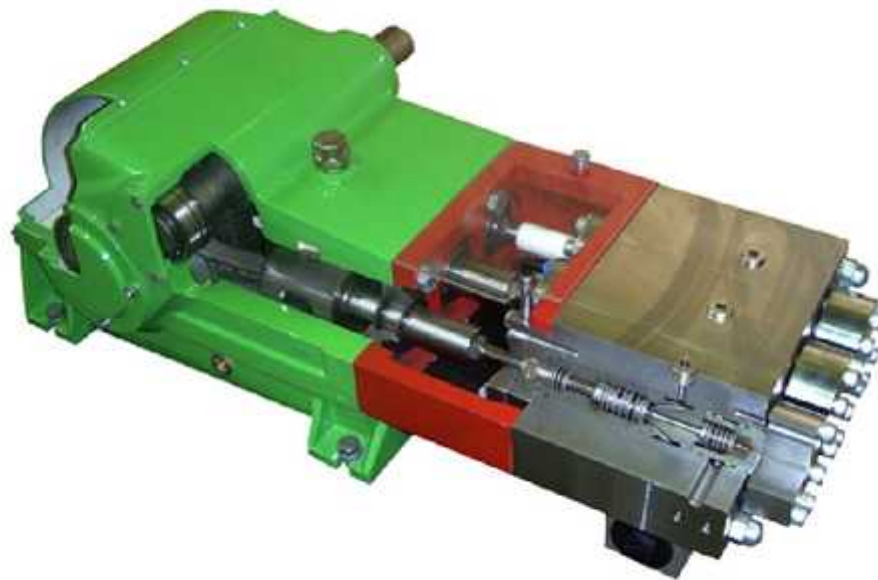
Benefits:

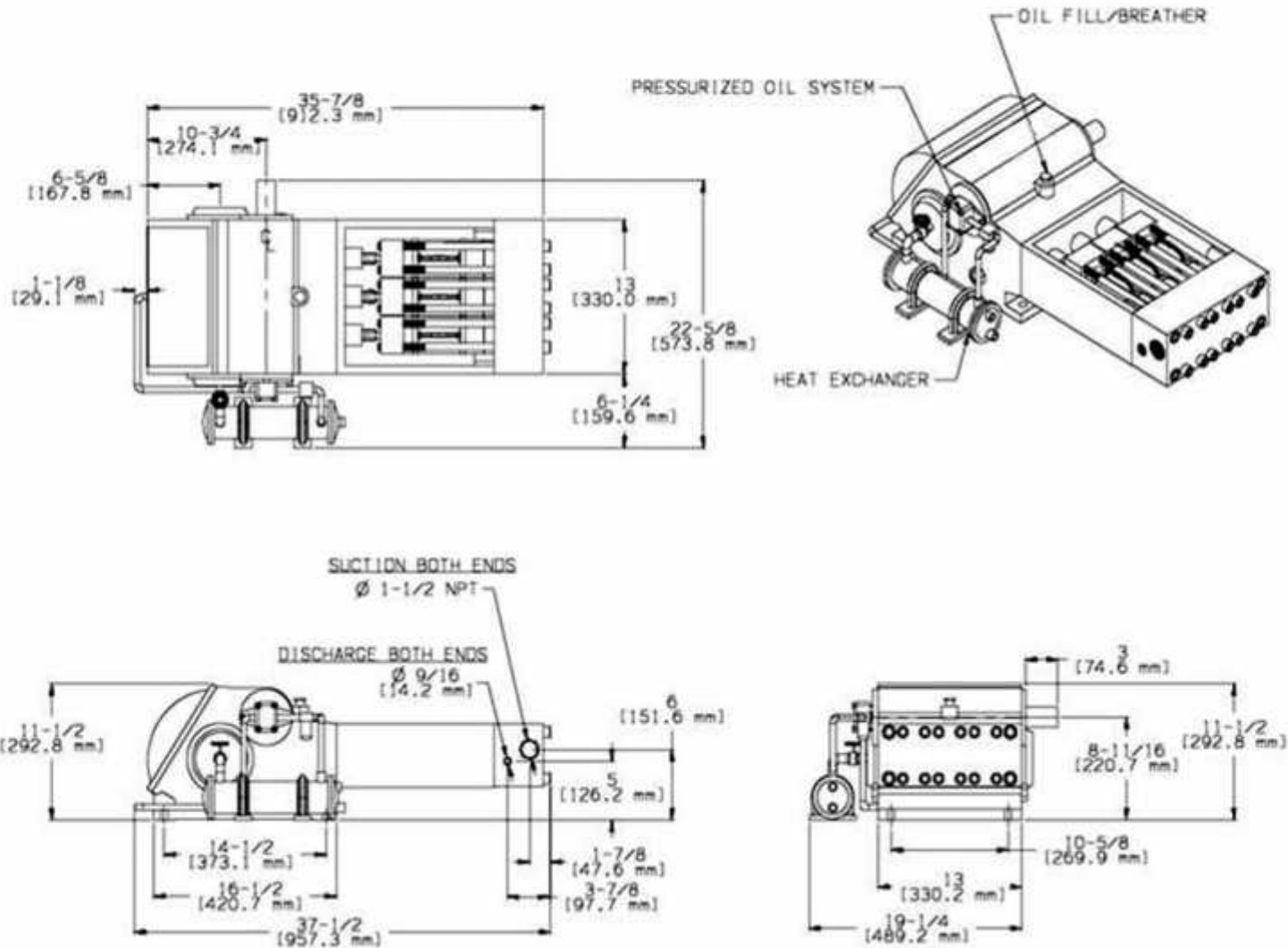
- Another important criteria of each heater besides reliability and safety is a thermal efficiency. The efficiency value of two-pass heaters offered by us is very close to the theoretically maximum possible one as for the similar type heaters.
- If necessary the existing thermal efficiency can be increased by including economizer into exhaust stack design. Economizer shall heat with exhaust gases the combustion air entering the burner and as a result increase the burner efficiency. Utilizing the additional economizer in the exhaust stack the total thermal efficiency can be increased by approximately +5%.



Pumps and stations for formation pressure maintenance, hydraulic stations for formation fracturing.

Sample piston pump for FPM (formation pressure maintenance)

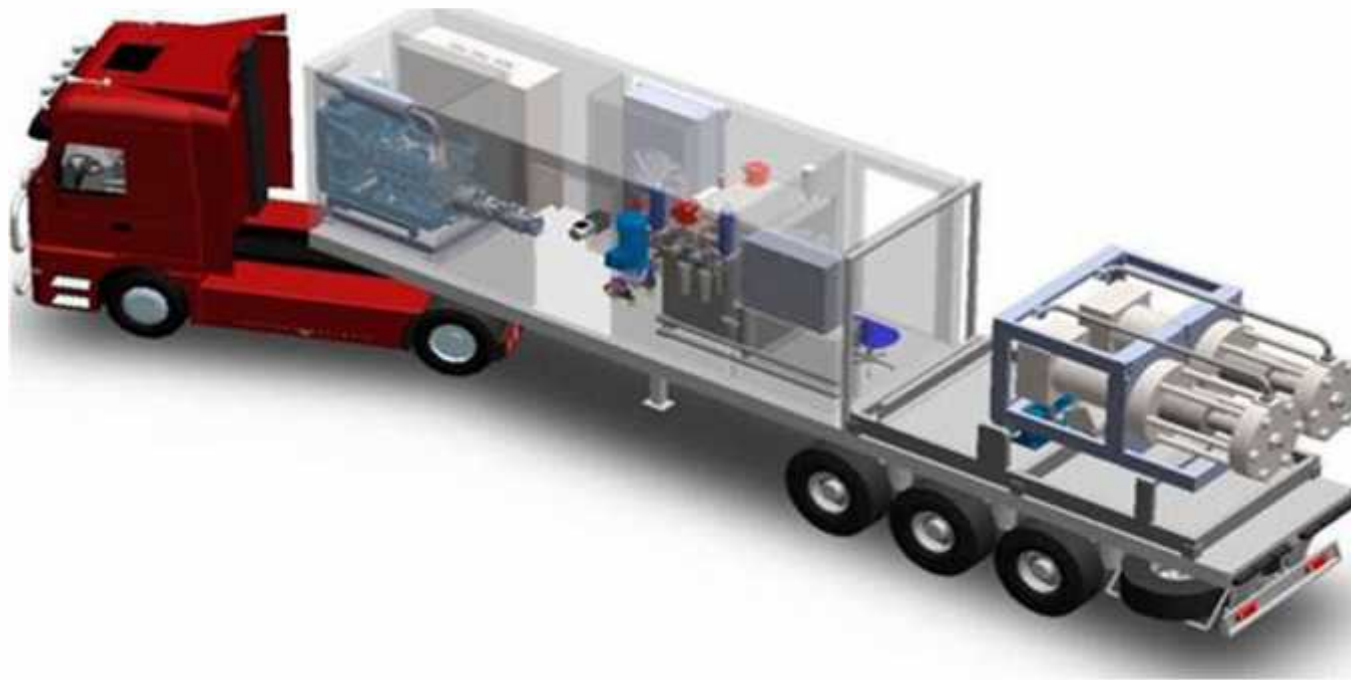




Sample mobile modular station for FPM (formation pressure maintenance) or formation fracturing.
Station design.



General view of the hydraulic system located on a trailer for transportation:



General view of the hydraulic system located on a trailer for operation:



Main general advantages of the designed pumping systems incorporate:

- Guaranteed operation of the pumping system without cavitation at the suction pressure from 0.2 bar is secured by means of applying a multistage pump arrangement on a single frame;
- Smooth start-up of the whole system is achieved by a consecutive start-up of the system units;
- High reliability and long service life of the sealing system of the pumping units, which are complete with double mechanical seals with a common fully controlled barrier fluid line;
- Steady and reliable operation of the system pumping unit is secured by a required set of instruments and controls mounted according to the logic diagram designed by our company's engineers.

Design advantages of the piston pumping system with a slow piston stroke include:

- Piston stroke speed in the operating cylinder is significantly (approximately 10 times) decreased from 2.5 m/sec. to 0.25 m/sec.;
- The duration of one piston working cycle is increased 40 times from 0.2 seconds to 8 seconds;
- The number of suction and discharge valve actuation cycles is reduced 40 times from 300 cycles per minute to 7.5 cycles per minute;
- It is possible to discharge the operating fluid with extremely high pressure up to 1000 bar;
- Vibration absence in the discharge pipeline makes it possible not to apply a pulsation damping system and increases operating reliability;
- Low wear of valves and a piston block and consequently increased service life of the pumping system operation;
- High efficiency.



Reactors and column equipment

- Distillation columns
- Rectification columns
- Reactors
- Absorption vessels
- Water electrolysis cells
- Crystallizers
- Extractor vessels
- Washing towers



Technical features:

- The reactors and column equipment is custom designed equipment tailored to technical specifications and drawings of the Customer.
- All welds are subjected to non destructive testing prior to shipment to the customer.
- The columns and other vessel and reactor equipment can be provided and supplied with various internals such as trays, support grids, distributors etc., if requested by the customer.

Special-purpose calcination kilns for bulk materials and catalysts





Example of catalyst calcination kiln characteristics

Kiln application – heating of feed material to max. temperature 950 °C.

Chamber/heating elements characteristics:

	Capacity	Current	Voltage	Length
Kiln section -1	68 kW	99 A	400 V/3phase/50Hz	1,52 m
Kiln section -2	48 kW	70 A	400 V/3phase/50Hz	1,37 m
Kiln section -3	90 kW	131 A	400 V/3phase/50Hz	2,90 m

Revamping of reforming furnaces



Example project “Revamping of reforming furnaces including replacement of roof burners with new custom-designed energy-saving burners of assigned type “DSMR-UZ CHIRCHIK” at OAO " Maksam Chirchik" (Chirchik, Uzbekistan)

Performance data of DSMR-UZ CHIRCHIK roof burner:

Furnace depression near burners: 8 mmca

Max. burner capacity: 1,4 mW/h

Fuel: Uzbekistan natural gas only

Flame length: 3 m Excess air: 10 % Gas temperature: 170°C

Max. gas pressure: 2,5 bar (g)

- NO_x: < 50 mg/m³

Automatic hydrocarbons (kerosene, gasoline) loading/unloading systems with vapor removal (vapor recovery units)



ENCE GmbH

Engineering of Chemical Equipment



Engineering company ENCE GmbH presents to your attention the complete range of equipment for liquid product transfer, such as:

- Marine loading arms;
- Floating pump units;
- Swivels;
- Various loading platforms and devices;
- Unloading arms;
- Swivel joints;
- Grounding devices;
- Heating systems.

System advantages:

- Systems with vapor removal make the loading process more cost-effective as there are neither product emissions, nor personal injury, nor pollution of environment.
- Apart from being efficient the offered equipment proves to be extremely reliable and safe; it can operate both in arctic winter and in sandy storm or tropical monsoon rain. Ranging from elementary units to complex solutions involving automatic emergency release system, vapor removal and high-quality monitoring system, our loading/unloading arms ensure high efficiency, safety, non-failure operation, the highest quality and reliability. We select solutions dependent on the properties of transferred product, and completely in accordance with the Customer's specified requirements.



High-efficient modular systems for methanol recovery (95% and above)



Design conditions:

- Max. discharge at unit inlet 60,000 t/year
- Min. inlet temperature (°C) 10
- Min. inlet pressure (bar g) ATM
- Feed blend composition (% wt) 15% methanol / 85% water

Description of output product:

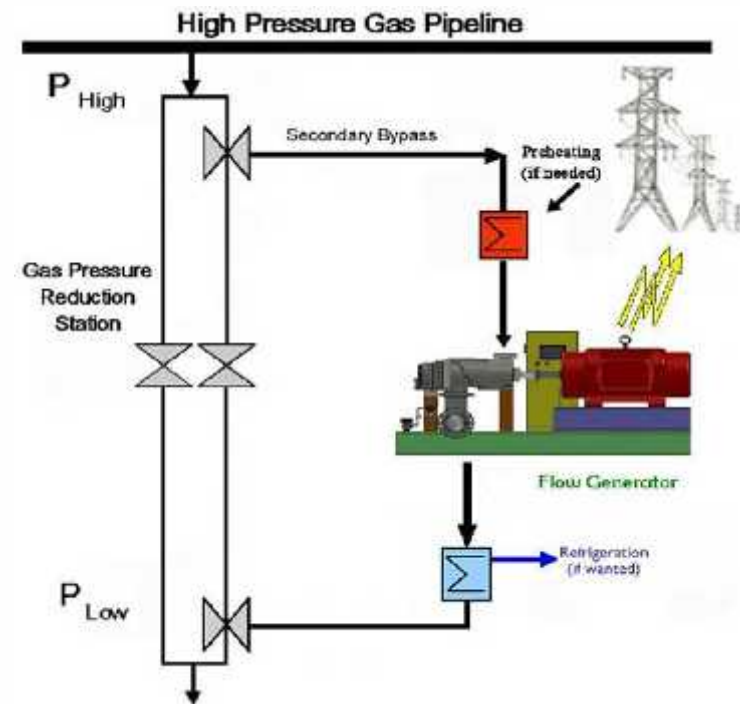
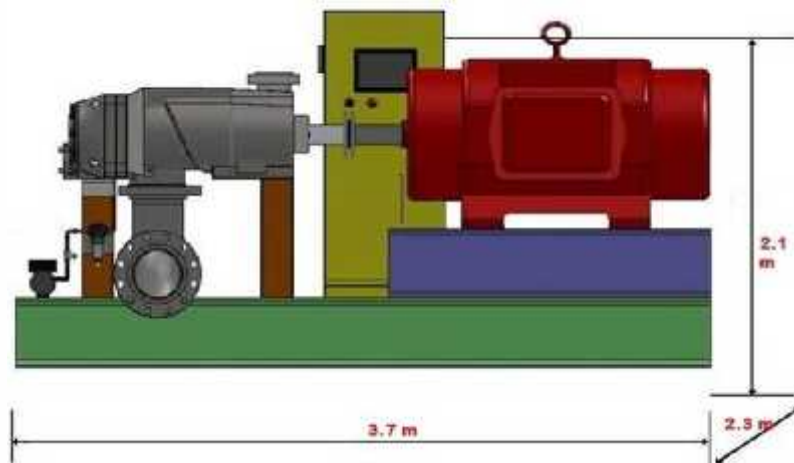
- **Methanol:**
- Min. methanol concentration at outlet (%) 95
- Max. outlet temperature (°C) 35

- **Discharge water:**
- Max. methanol concentration (% wt) 2
- Max. outlet temperature (°C) 65

Screw flow generators for gas pressure reduction in a gas line

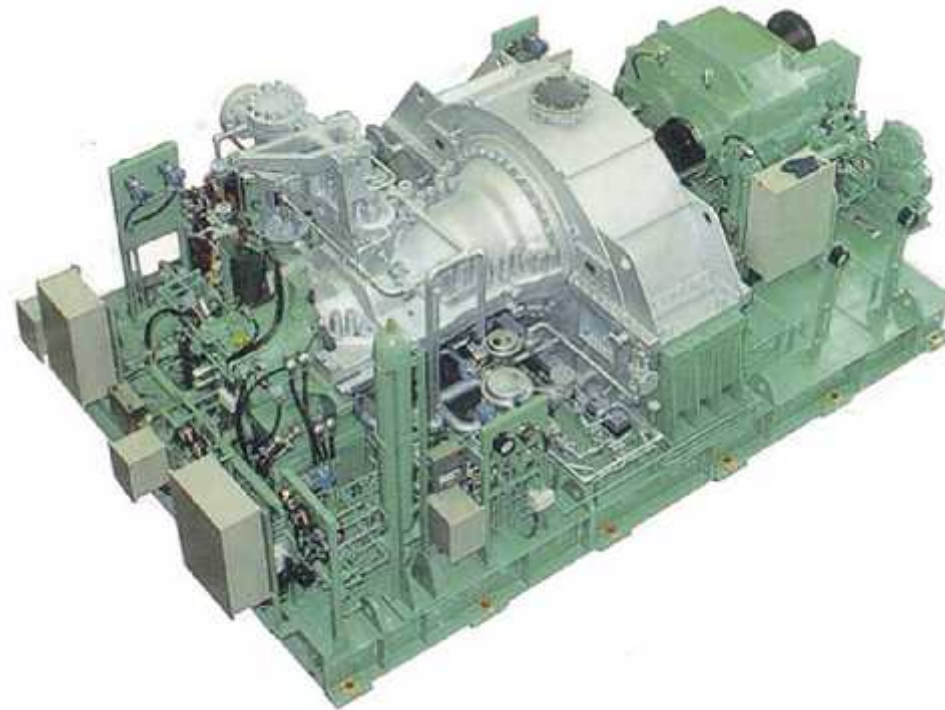


- **Screw flow generators** are a very profit-making solution for energy recovery that is applied in gas pressure reduction stations, so called gas-distributing stations. This method of secondary energy recovery can drastically change costs of green power.



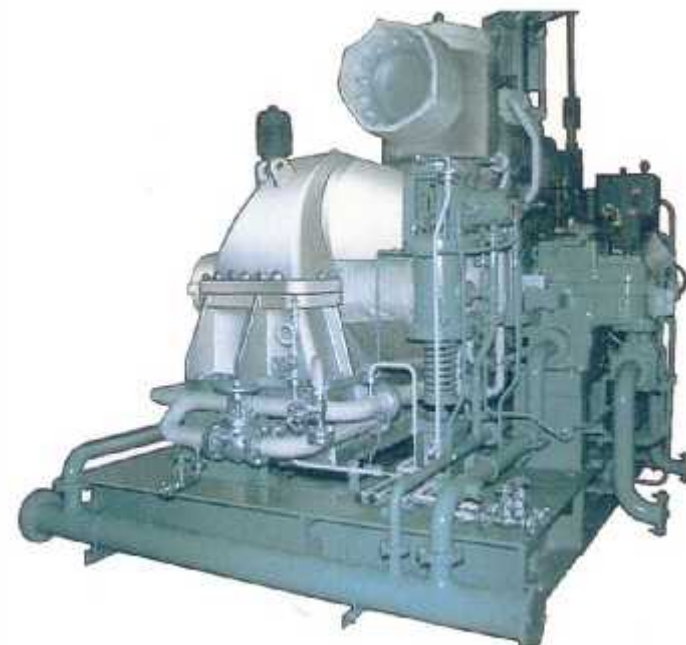


Vapor recovery with energy generation – turbines by Shin Nippon Machinery





Process **steam turbines** are applied in the field of energy generation for drive of generators, fans, feed-water pumps, compressors, air blowers in petrochemical and other industries. Turbine capacity reaches up to 100 MW.



Advantages:

- Various types of fuel can be used
- Availability of heat-transfer medium
- High operational life
- High speed and capacity
- Cost-efficient and high performance
- Portability

Steam turbines gained great popularity in the energy industry due to its high efficiency, especially in multicylinder turbines, as well as due to its capability to generate high power and rotation speed.

**Mobile stations for NGL loading/unloading from a
gas pipeline dead end or close tanks into
pressurized gas pipeline**



Mobile station technical features:

- Container-type pump station with outer cylinders, of modular construction (container) includes: pump, diesel engine with electric generator, electric cabinet, and heat-exchanger for internal container space and a heating system. Station construction allows a base frame to be dismantled from skids for transportation. Lifting points are available. Pump station is designed for operation in explosion-hazard zones (ATEX design for fire- and explosion-hazard atmosphere (Zone 2)).
- Max. flow output shall be not less than 2000 l/min (at constant pressure). Increase and decrease (stepless fluctuation of variable flow) is available. Flow fluctuation is available for system pressure adjustment, with simple adjustment from control panel (response time shall be max. 1 - 2 sec).
- Pressure at inlet of discharge pipeline: (min. 5 bar, max. 60 bar)
- Dimensions of cylinder frame: 5000x2400x2400mm, container dimensions: 8000x2400x2600mm, overall dimensions 13000x2400x2600mm.

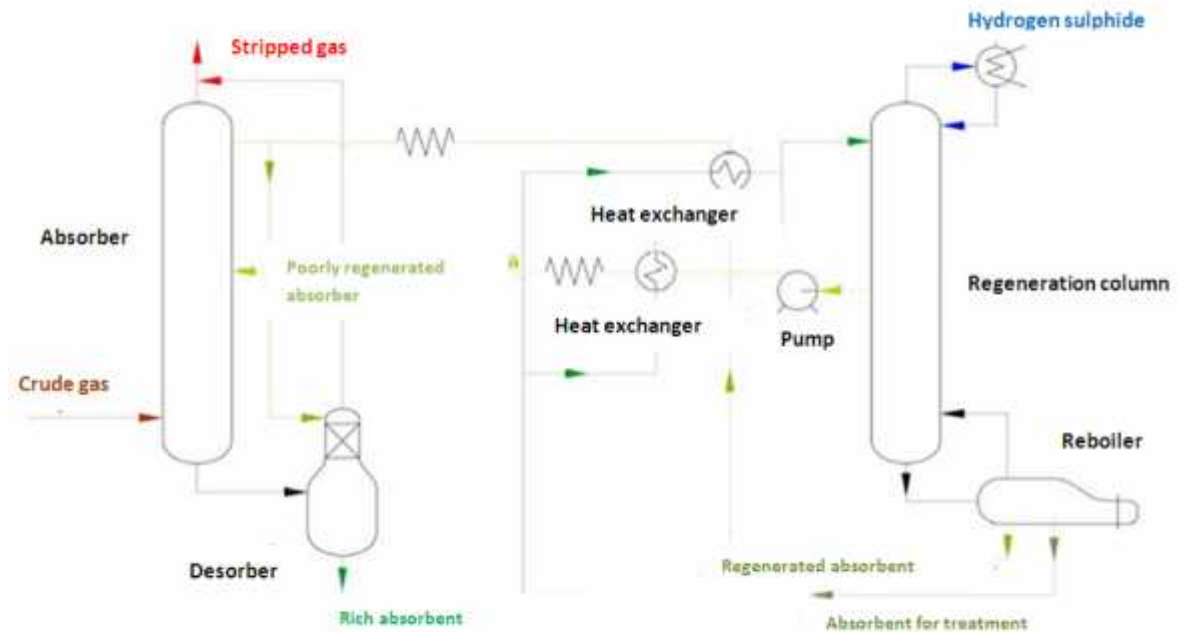
Complex projects for gas separation, dehydration, cooling





Hydrocarbon gas treatment units

- Treatment units for hydrocarbon associated and natural gases are designed for removing from gas harmful, poisonous, highly corrosive sulfur-containing compounds and incombustible noble gases which reduce gas combustion heat.



Typical scheme of gas treatment unit from hydrogen

Treatment technology:

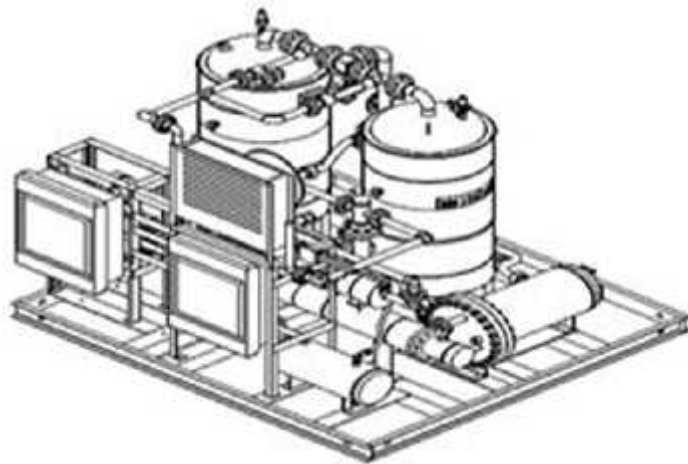
- The treated hydrocarbon gas is fed to absorber where sequentially, in two stages it comes into contact with absorbent (25% diethanolamine solution). At the first stage it comes into contact with poorly regenerated absorbent flow and at the second stage it comes into contact with fully regenerated one. From the absorber bottom absorbent goes to the desorber of dissolved gas where hydrocarbon gas that is physically dissolved in absorbent separates. Afterwards, absorbent that is rich in sour components goes to the regeneration column through the heat exchanger where H₂S and CO₂ absorbent complex compounds decompose. The released mixture of sour gases is led up to the top of the column. From the absorber bottom the regenerated absorbent goes to the absorber through reboiler and cooling units. Then the cycle repeats.

Benefits of use:

- The benefits of gas treatment units based on absorption process are that any high content of harmful impurities in gas is not critical. And in contrast, gas treatment based on adsorption method is used when initial concentrations of pollutants are low (up to 5%), but it allows to treat gas more deeply.

Gas dehydration, gas (natural gas) dehydration unit

- An essential requirement to compressed air based fuel is low water dew point. If water dew point under supply conditions exceeds the minimum ambient temperature, gas dehydration equipment has to be installed.



Technical data:

- Natural gas dew point: - 60...- 80°C
- Natural gas flow: up to 10 000Nm³/h
- Min./max. operating pressure: 2-200 bar g
- Power consumption: 1 – 40kW (depending on operation conditions)

Benefits of use:

- Regeneration in closed circuit without gas consumption;
- Automatic control logic and system monitoring;
- Free-standing skid;
- Easy operation and maintenance;
- High reliability and flexibility;
- Special design for very low ambient temperatures.

Incineration packaged systems for waste gas, liquid and solid waste disposal (incineration)



- Application of **incinerators** is disposal of:
 - solid industrial and household waste
 - liquid waste
 - hazardous biological waste
 - oil sludge
 - refinery waste



Benefits of use:

- waste disposal in situ;
- wide variety of incinerable waste;
- waste reduction up to 95%;
- recovery of heat used for in-house loads;
- effective gas cleaning system;
- closed circulation of gas cleaning system.

Use of incinerators allows not only to solve the waste disposal issues and to improve environmental situation, ensuring industrial safety requirements, but in certain cases to turn the waste industry from costly to profitable. Incineration has no alternative when it is technically impossible or economically inefficient to transport waste to a waste disposal or storage site.

Representative office in Nizhny Tagil, the Ural region

Address: Russia, 632036 Nizhny Tagil, Novostroy Str. 20A, Office 18

Tel.: +7 (3435) 41 73 56

Fax: +7 (3435) 41 73 56

Email: N.Tagil@ence.ch

Head of the representative office: Mr. Oleg V. Nedosekin

Representative office in Lipetsk

Address: Lipetsk, Oktyabrskaya Str. 32

Tel.: +7 (4742) 23 35 84, +7 (980) 351 49 91

Fax: +7 (4742) 23 35 84

Email: aksenova@ence.ch

Website: www.ence.ch

Head of the representative office – Ms. Anastasia A. Aksyonova

Representative office in Cherepovets

Address: Cherepovets, Sovetskiy prospekt 111

Tel.: +7 (931) 517 15 16

Email: filin@ence.ch

Website: www.ence.ch

Head of the representative office – Mr. Igor V. Filin

The Republic of Kazakhstan

Representative office in Almaty

Address: Medeuskiy Region, Luganskogo Str. 5, Office 3

Tel.: +7 (3272) 62 80 42, +7 (3272) 64 40 36, +7 (3272) 64 40 37

Fax: +7 (3272) 62 93 73

Email: almaty@ence.ch

Website: www.ence.kz

Head of the representative office: Mrs. Almagul T. Izbassarova

Representative office in Atyrau

Address: Smagulova Str. 56 a, Office 2

Tel.: +7 (7122) 45 85 70, +7 (7122) 45 85 71, +7 (7122) 45 85 72

Fax: +7 (7122) 45 81 75

Email: atyrau@ence.ch

Website: www.ence.kz

Head of the representative office: Mr. Sergey A. Tochilin

The Republic of Uzbekistan

Representative office in Tashkent

Address: Chilanzarsky District, Massiv Almazar 16.1, Flat 66

Tel.: +998 (7122) 7 46 44

Fax: +998 (7122) 7 47 06

Email: tashkent@ence.ch

Website: www.ence.uz

Head of the representative office: Mr. Abdurasul Sh. Shabdukarimov

Ukraine

Representative office in Kiev

Address: Luteranskaya Str. 21A / 12

Tel.: +38 (044) 253 07 33 (0833)

Fax: +38 (044) 253 94 42

Email: market@intechsa.com.ua Website: www.ence.com.ua

Head of the representative office: Mr. Pyotr P. Govorun

The Baltic states

Executive in the head office of ENCE GmbH: Mr. Andrey Stulov

Tel.: +41/41-632 53 67

Fax: +41/41-632 53 68

Email: stulov@ence.ch

Website: www.ence.lt and www.ence.lv