

DISTILLATION

ENERGY EFFICIENT SYSTEM



EPCON EVAPORATION TECHNOLOGY AS

EVAPORATORS – DRYERS – DISTILLATION & DEHYDRATION – HEAT RECOVERY SYSTEMS
ENGINEERING AND AFTERSALES SERVICES

Our competence

With its history going back to 1986, EPCON is an international supplier of separation and energy recovery technology, based in Trondheim, Norway. These technologies provide added value for our customers.

EPCONs key competence is thermal separation processes like evaporation, distillation and drying.

EPCON always find the energy optimal solution for the customers. Often the best energy solution includes MVR.

MVR, or Mechanical Vapour Recompression, is in principle a highly efficient heat pump typically applied directly in process vapour of water or other solvents.

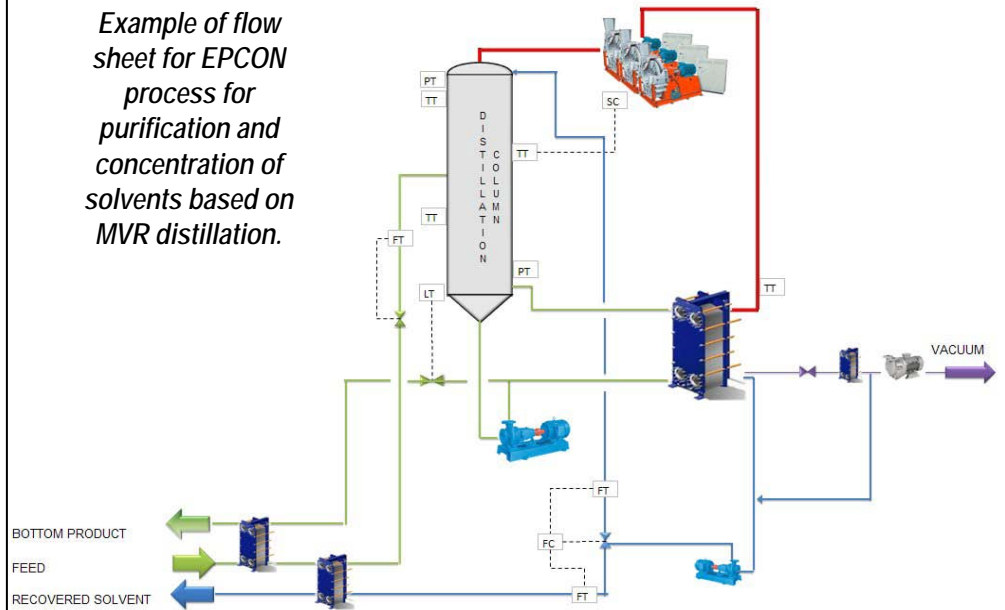
EPCON offers all customers a 24-hour aftersales service that includes trouble-shooting, spare parts, preventive and corrective maintenance, as well as inspection of installations.

Applications

Other applications for EPCON distillation plants, with or without MVR, are:

- Regeneration of ethanol, e.g. from extraction processes.
- Regeneration and concentration of methanol, e.g. in biodiesel plants.
- Biodiesel- and glycerol stripper.
- Concentration of iso propanol.
- Other suitable distillation processes.

Example of flow sheet for EPCON process for purification and concentration of solvents based on MVR distillation.



Bioethanol distillation

EPCON sees a great potential in the bio ethanol industry, and substantial new competence has been developed during the last years.

The plant extracts ethanol from a fermentation liquid, and further refines the ethanol to an ethanol content of 85-95 wt% depending on the customer requirements.

The energy system often chosen by EPCON, assuming sufficiently high capacity, is the direct MVR principle, integrated to obtain optimum energy- and cost efficiency for this application. In basic design this mean to compress directly the top vapour upstream the re-boiler, where condensation energy is transferred into the boiling bottom liquid. Energy consumption is low and normally 80-85% energy saving is achieved.

This MVR distillation also means a very low total energy consumption when combined with the downstream MVR dehydration process (refer separate brochure).

The distillation column itself with the trays or packing is normally delivered from one of EPCONs pre qualified business partners.

MVR distillation

A number of traditional distillation processes, e.g. concentration of ethanol, methanol and isopropanol are well suited for direct- or indirect MVR energy system.

By using MVR in the distillation process one would normally experience as much as 80-90% energy saving.



Layout drawing of a distillation process with MVR technology.

One-stage stripping

This EPCON technology is used when evaporation or one-stage stripping process is sufficient for the solvent recovery / -purification task to be performed .

The plant can be designed for different types of liquids. Initially the liquid is heated in a heat-exchanger. The pressure in the exchanger is higher than the saturation pressure for the liquid to avoid boiling. By feeding the hot liquid into a vacuum state chamber (the flash chamber), solvent vapour will be emitted until the liquid reaches thermal equilibrium. The vapour is thereafter condensed to distillate in a condenser. The distillate is transported through a sub-cooler where incondensable volatiles are removed before the distillate is ready for reuse.

The incondensable volatiles are removed by a vacuum-pump. When the evaporation is finished the remaining liquid in the flash chamber is drained and the flash chamber and the circulation system is cleaned.

EPCON's plants are designed pursuant to prevailing safety regulations for this type of equipment.

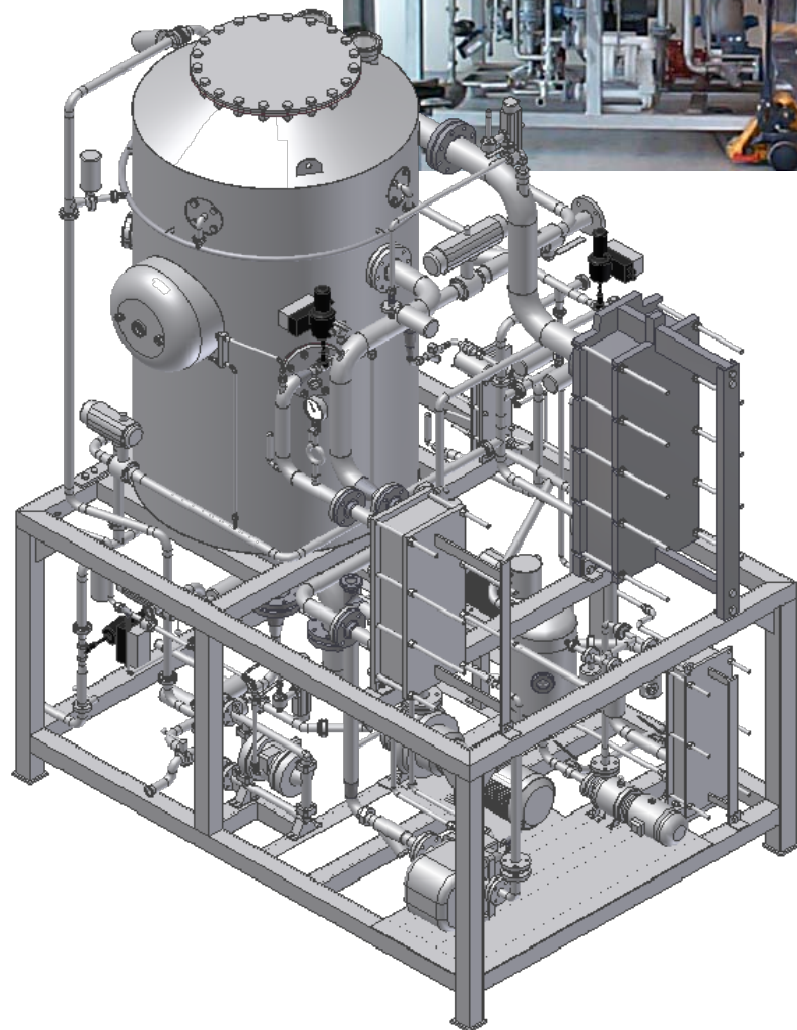
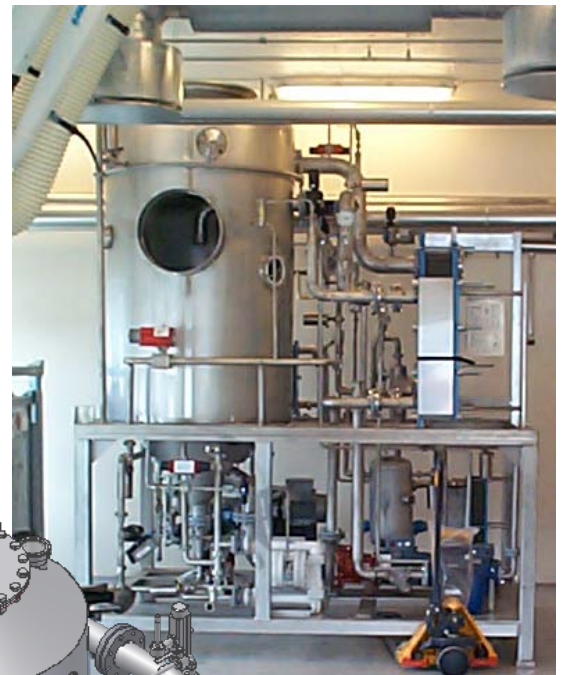
Energy system

The energy system applied depends upon plant capacity, ATEX requirement and product characteristics. The options are direct steam, cascade, MVR or MHP, the latter being a Modular Heat Pump based on traditional heat pump technology.

Advantages

- Considerable cost savings by recycling used solvents
- Easy to expand for increased capacity
- Can utilize alternative heating agents
- Based on well known methods
- Easy cleaning
- Easy maintenance and repair
- Designed for different types of liquids
- Compact design

Turn-key plant delivered by EPCON for recovery of solvents from extraction process.



TECHNICAL SPECIFICATIONS (example):

- Solvent: Ethanol
- Conc. ethanol: > 90 %
- Capacity: 700 l/h
- Boiling temp.: 55 - 70 °C
- Dimensions: 2.5 x 1.8 x 3.5 m
- Steam cons.: 280 kg/h
- Op. Pressure: 0.4 barA (vac.)

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