

Features

- By using UBE's polyimide membrane, it is possible to supply the feed vapor with the temperature of 120 °C (248 °C) and the pressure of 2 barg (28 psig) for example. The partial pressure of water vapor at the feed side is so high that no extremely high vacuum at the permeate side is required to secure the necessary driving force for dehydration.
- No serious fouling problem occurs on the membrane surface because the feed is a clean vapor; not a liquid with contaminants. It brings an advantage of higher durability regarding the membrane performance.
- Simple and compact unit, easy startup and shutdown operation and easy maintenance can improve the overall process economics.

Applicable solvent or material

The dehydration for almost all kinds of organic solvents or materials is possible except phenols and acetoaldehyde. Especially preferable solvents are alcohols, esters and ethers.

Applicable process

The basic flow diagram of the vapor separation process is as follows. It depends on the state of feed materials; however, the vapor with the increased pressure such as 1 to 2 barg (14 to 28 psig) is the most preferable in terms of the process economics.

1. Combination of membrane separation with distillation process or some other process

- When concentrating a solvent-water mixture up to the content of the solvent as high as 99.5% in weight, a combined process is economically preferable, that is, up to 80% by using a distillation process and up to 99.5% followed by the membrane process. Especially it is most economical in case of treating an azeotrope mixture with water.
- When raising the capacity of existing distillation column, there is no need to install a new bigger column because the decreased reflux operation is possible by adding a suitable membrane separation unit.
- Reaction processes involving dehydration such as esterification.
- Other processes requiring dehydration.

Module Performance

UBE has two kinds of testing equipment, lab. scale and pilot scale, in order to obtain the design information for the customer's objective including multi components. The photograph shows our pilot scale unit using a commercial sized membrane module. Typical performance of this unit as follows:

Alcohol/water	Alcohol content in Supply wt%	Alcohol content in Product wt%	Supply quantity kg/hr (lb/H)
Ethanol	94	99.8	90 (198)
Isopropylalcohol	93	99.5	80 (176)