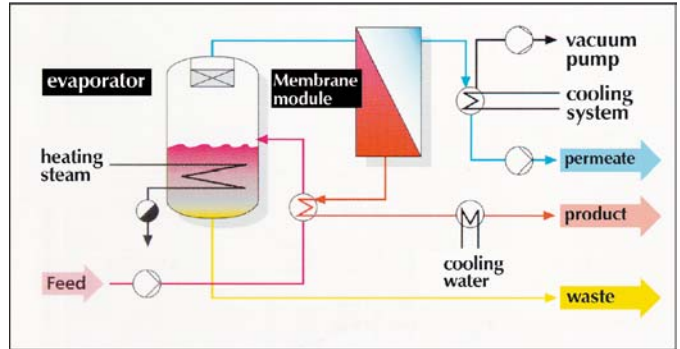


## Equipment for Separating Liquid Mixtures



are used for filling the permeate collecting tank and for draining it. The working pressure of the valves in these positions is 0 to 20 mbar at 10 to 100°C. As the equipment is automated and operates in the 'ex' area the valve position must be transmitted to the process controller. The valves are pneumatically operated.

### Application

There are various reasons for separating liquid mixtures or for changing their ratio of mixture. Pervaporation/steam permeation (membrane filtration) enables the separation of water / solvent mixtures, the separation of liquids with similar boiling points, the dehydration of multicomponent mixtures, the displacement of equilibrium in reactions where water is released and the dehydration of organic compounds. The complete system consists of an evaporator and a membrane module. If the liquid to be separated is a distillation product, the steam can be directly passed into the membrane module. In this application the mixture is composed of water with maximum 5% alcohol. The equipment is located in an 'ex' area.

### Plant Design

The feed is brought in contact with a polymer layer through which only certain components are soluble. The continuous transportation by evaporation on the back of the membrane results in a concentration gradient which causes diffusion through the membrane (osmosis). As a result permeate, product and waste are carried away from the system. Valves are installed in the permeate sector where they

### Solution

The valves installed are GEMÜ 687 diaphragm valves in investment cast stainless steel 1.4435, pneumatically operated, normally closed, surface finish 3.2 µm (ref. no. 1509), in size DN 15. The diaphragm is EPDM (ref. no. 13). GEMÜ 1211 NAMUR electrical position indicators with proximity sensors are mounted and linked with protective wiring to NAMUR.

### Legend

**Osmosis:** Filtration of liquids through a membrane due to a pressure difference and a corresponding "mesh width" of the membrane.

**Permeate:** The filtered liquid (normally water) from osmosis/reverse osmosis.

### Additional advantage

In addition to minimal deadleg diaphragm valves for aseptic processes and globe valves e.g. for steam, the modular GEMÜ product range also offers an extensive range of accessories and instruments suited to the application. Stroke limiters, manual overrides, electrical position indicators and electropneumatic positioners as well as field bus connections can normally be quickly mounted or retrofitted.

