KHN UF system

The ultrafiltration system selectively separates substances through the microporous structure on the membrane surface. When the liquid mixture flows through the membrane surface under a certain pressure, small molecular solutes permeate the membrane (called ultrafiltrate), while macromolecular substances are retained, so that the concentration of macromolecules in the original solution gradually increases (called concentrated solution). To achieve the purpose of separation, concentration and purification of large and small molecules,

ultrafiltration is different from all conventional filtration and microporous filtration (both static filtration). One is that the separation diameter of ultrafiltration is small, which can intercept almost all bacteria, viruses and viruses in the solution. Colloidal particles, proteins, macromolecular organic matter. Second, the entire filtration process is carried out under dynamic conditions, and the solvent is only partially separated. The raw material liquid entering the ultrafiltration module is driven by the pressure difference between the two sides of the membrane, part of it permeates the membrane and becomes the ultrafiltrate, while the rest becomes the concentrated liquid and flows out continuously, making the impermeable material on the membrane surface only limited accumulation. The filtration rate can reach an equilibrium value in a stable state without continuous attenuation, and the whole process can continue for a long time.

The principle of UF module

1. External pressure membrane module

The original liquid enters from one end through the central distribution pipe and flows radially in the module; part of the original liquid passes through the hollow fiber membrane wall under the action of the pressure difference and enters the inner hole to become ultrafiltrate, and then flows out from the other end of the module through the collector; the rest of the original liquid Flow out from the concentrating port on both sides.

Scope of application

The external pressure hollow fiber ultrafiltration membrane has high rejection rate and stable membrane rejection performance. It is especially suitable for processes such as concentration separation and heat-free preparation.

2. Internal pressure membrane module

The stock solution passes through the inner side of the membrane tube (hollow fiber membrane) under a certain pressure. The solvent and small molecular solutes penetrate the membrane wall and become ultrafiltrate. The polymer and colloidal particles in the stock solution are prevented from being on the surface of

the membrane. The circulating stock solution is taken away and becomes a concentrated solution.

PVDF ultrafiltration membrane characteristics

1. Anti-pollution and oxidation resistance

PVDF air-controlled ultrafiltration membrane has high pollution resistance, good chemical stability, and good acid and alkali resistance, organic solvent resistance, grease resistance, and light aging resistance. At the same time, PVDF material has good pollution resistance and strong durability, and can operate stably under bad water quality conditions (such as sewage and wastewater). At the same time, PVDF ultrafiltration membrane has strong oxidation resistance and can be cleaned with high-concentration oxidant to remove pollutants and restore membrane flux.

2. Good hydrophilicity

PVDF ultrafiltration hollow fiber membranes undergo special hydrophilization treatment, and the membrane filaments have permanent high hydrophilic properties. High water permeable flux can be obtained under low transmembrane pressure

difference, and the pollution resistance of the membrane filament is greatly improved.

PVDF ultrafiltration hollow fiber membranes have uniform micropores, which can remove microorganisms, colloids, algae and other substances that cause turbidity. All components are tested by air and water to ensure that the fibers are not damaged or defective.

3. Good mechanical strength

The mechanical strength of PVDF ultrafiltration membrane is high, and the membrane filaments have strong ability to resist broken filaments.

UF system influent water quality requirements

In order to prevent poor water quality from entering the ultrafiltration membrane module and causing fouling of the membrane module, the water entering the ultrafiltration membrane module should meet the following requirements:

Turbidity: ≤10NTU

Particle diameter: <0.5mm

Iron ion: <0.5mg/L

CODcr: <50mg/L

PH range: 2~10

Organic solvents: do not contain organic solvents such as alcohol, ketone, benzene, etc.

Total instantaneous residual chlorine tolerance: 300ppm

Ultrafiltration membrane element specification table

Parameters/Model	KUM30	KUM60	KUM55	KUM75
Maximum water inlet pressure (MPa)	0.3			
Molecular weight cutoff Dal	100000			
Operation form	External pressure			
Fiber inner and outer diameter (mm)	0.8/1.3			
Design water flux (L/㎡·h·25℃·0.1MPa)	60			

Effective membrane area (㎡)	30	60	55	75
Maximum transmembrane pressure difference (MPa)	0.15			
Operating temperature (℃)	5-45			
PH value range	2～11（washing 1-12）			
Operation mode	Full or cross-flow filtration			
Air washing time (seconds)	20～60			
Backwash water pressure (MPa)	＜0.15			
Backwash water volume (L/㎡·h)	100～150			
Backwash time (seconds)	30～60			
Chemical cleaning cycle	60～18 days			

Features of Ultrafiltration System

1. Ultrafiltration equipment features, small footprint, large membrane area, compact equipment structure, simple installation and maintenance, low energy consumption and stable performance. Ultrafiltration is a membrane separation technology. Its main component is an ultrafiltration membrane, which is used for the separation of material macromolecules in the solution. The ultrafiltration process is driven by the pressure difference on both sides of the membrane and is based on the principle of mechanical screening. For this solution separation process, the working pressure is usually 0.1Mpa-0,25Mpa, and the separation pore diameter is 1μm-0.1μm and the molecular weight cutoff is about 500-1,000,000.

2. Ultrafiltration is carried out at room temperature and low pressure, with low energy consumption, no heating, no need to add drugs to achieve the purpose of separation, concentration, separation, purification and classification. The ultrafiltration device is simple to operate, quick to start, easy to maintain, and easy to control. It can be used alone or used as the pretreatment of reverse osmosis equipment and the final finishing of high-purity water.

3. The filtration process is carried out at room temperature with mild conditions and no component damage, so it is particularly suitable for the separation,

classification, concentration and enrichment of heat-sensitive substances, such as drugs, enzymes, fruit juices, etc.

4. There is no phase change in the filtration process, no heating, low energy consumption, no chemical reagents, no pollution, and it is an energy-saving separation technology.

5. Ultrafiltration technology has high separation efficiency and is very effective for the recovery of trace components in dilute solutions and the concentration of low-concentration solutions.

6. The ultrafiltration process only uses pressure as the power of membrane separation, so the separation device is simple, the process is short, the operation is simple, and it is easy to control and maintain.

7. The ultrafiltration method also has certain limitations, it cannot directly obtain dry powder formulations. For protein solutions, generally only 10-50% concentration can be obtained.

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