NANO FILTERING SYSTEM

Membrane technology

The nano filtration technique is mainly used for the removal of two valued ions and the larger mono valued ions such as heavy metals. This technique can be seen as a coarse RO (reversed osmosis) membrane.

Because nano filtration uses less fine membranes, the feed pressure of the NF system is generally lower compared to RO systems. Also the fouling rate is lower compared to Ro systems.

Applications for NF systems are:

1. Softening
2. Specific removal of heavy metals from process streams for reuse of water
3. Reduction of salt contents of slightly brackish water
4. Typical membrane performance for NF membranes are 50% NaCl removed and 90% (or more) for CaSO4

There are two types of membranes:

1. Spiral membranes, cheapest but more sensitive for pollution
2. Tubular/ straw membranes, the most used membranes seen the costs and effect, shall not easily be polluted
The surfaces from the filter determine the capacity from the filter. Spiral membranes have the biggest surface area in general and are therefore the most cheapest in use. The surface area from Tubular/straw membranes is less in general.

The pre purifying of the feeding water has an influence on the performance of the installation. The need of pre purifying depends on the feeding water quality.

1. Installing pre cleaning has the following advantages:
2. Long-life
3. Long production of the installation is possible
4. Simple management
5. Besides pre cleaning, chemical doses can be taken place to prevent scaling, precipitation on the surface from the membrane.

A membrane system consists of several basic compounds:
1. Feed pump
2. Membrane elements compiled in pressure vessels
3. Pipes
4. Cleaning system
NANO FILTERING

Silicon carbide (SiC) is a new and revolutionary Nano Filter with superior chemical & mechanical properties. The SiC nano filters have unique advantages of:

Features
1. HIGHEST FLUX for any filtering material
2. Chemically inert (pH 0-14)
3. Thermally resistant up to 800 °C
4. Completely stable in solvents
5. Accepts any amount of oxides
6. Hydrophilic characteristics
7. Extremely hard and durable material

Benefits
1. Reduce your footprint and system costs
2. Fast cleaning, more efficient chemical cleaning
3. Unmatched performance in oil/water separation
4. Long life time, less down time and maintenance
APPLICATION
Produce Water
Due to the unique hydrophilic properties of SiC it is possible to obtain higher water fluxes with SiC based nano filter than with other filtering materials such as polymeric or ceramic. Continuous process flux for oil/water separation is recorded between 200 - 2000 L/(m²*h) – depends on the oil type. This means that membrane filtration has become a viable alternative to hydro cyclones, induced gas flotation units, micro-flotation and wallnut shell filters.

Industrial Applications
SiC nano filter offers unique possibilities for treating liquids at extreme pH and temperature. This is due to the fact that SiC nano filters is not attacked by any chemical typically found in the industry. SiC nano filters can be used in the full pH-range (0 to 14) at any temperature, allowing treatment of strong mineral acids and strong bases. SiC nano filters also tolerates oxidizers like hypochlorite at any concentration and temperature. Not only can SiC nano filters treat solutions at extreme conditions, it can also be cleaned at extreme conditions, e.g. cleaning with steam at high pressure for melting of crude oil.

Some of drinking water approach is:
Ground water: removal of precipitated salts like iron and manganese.
Surface water: removal of organic suspended solids and humic acid.
Sea water: pre-filtration before RO.

HIGH FLUX MEANS COMPACT SYSTEMS!

SiC nano filters are in particularly excellent for removal of iron and manganese in oxidized form with a very high flux and 1000-2000 LMH

Waste Water Treatment
SiC nano filters are a compact and robust solution for among others Waste Water re-use application. The SiC nano filters are ideal In a scenario with known bio fouling potential, since the SiC nano filters can be cleaned with any chemicals (pH 0-14), strong oxidizers (e.g. ozone) and have a high mechanical strength which enables high pressure back flush.

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OTHER APPLICATION

Pre-filtration for RO - IMPROVE YOUR RO OPERATION!

![Diagram of filter components]

It is well-known that the performance of a RO system highly depends on the quality of the pre-filtration. This is due to the following facts:

Improved pre-filtration in terms of more efficient removal of suspended solids results in longer operating intervals of the RO system before the need of chemical cleaning, the reduced number of chemical cleaning cycles means prolonged lifetime for the RO membranes and reduced operating costs.

Efficient removal of suspended solids, results in reduced fouling of the RO membranes. This reduces concentration polarization which again improves the quality of the RO permeate. An increase of the RO capacity is often seen when improving the pre-filtration step.
Pre-filtration for chillers:

Chillers performance and efficiency relate directly to its ability to transfer heat, which begins with clean evaporator and condenser tubes. Chillers efficiency deteriorates as tubes become fouled, when mud, heavy metals, algae, sludge, scale or contaminants accumulate on the waterside of heat-transfer surfaces.

With SiC Nano filters we may achieve higher efficiency rate of removing suspended solids resulting in reduced fouling of chillers tubes & waterside of heat-transfer surfaces. SiC NANO FILTERS – THE HIGH PERFORMANCE AND ROBUST FILTERING ALTERNATIVE TO SAND FILTERS AND POLYMERIC FILTERS.

The robust SiC nano filters are ideal in scenarios with bio fouling potential, since the SiC nano filters can be cleaned with any chemicals (pH 0-14), strong oxidizers (e.g. ozone) and have a high mechanical strength which enables high pressure back flush. The temperature resistance is an operational advantage to assure efficient cleaning at higher temperatures.