



“Ultra Filtration (U. F.) – Nano Filtration (N.F.) And Reverse Osmosis (R.O.) “

Water processing technology nowadays is already advanced and can provide drinking water, which is free of bacteria, viruses and minerals. In conventional way water is purified by evaporation or distillation and the water vapor is condensed.

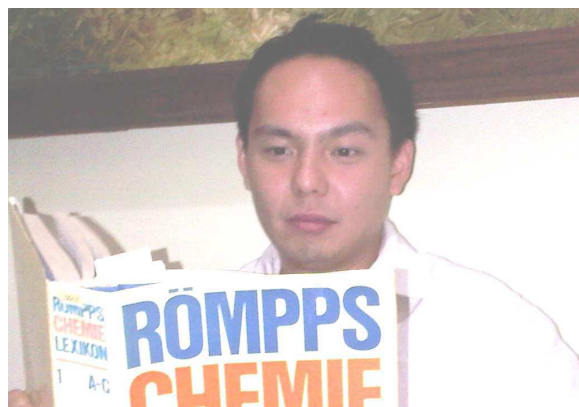
Water purification process in the nature happens every time and day. During the day water from pond, river, sea, ocean, land etc are evaporated by the sunshine and by night as the weather is colder, it condenses as dew. Dew is pure water and also rain water. They wets our earth surface every morning.

By conventional method water purification is done with coagulation and flocculation using alum (aluminum sulphate) or PAC (poly aluminum chlorite) and then sedimentation or precipitation in clarifier and it follows by filtration using graded silica sand.

Communal water works (PAM or PDAM) in Indonesia clarify surface water from river, pond, irrigation canal etc using the above mentioned conventional process. In this method chlorine gas or solution is normally used to disinfect the clarified water.

What is “U.F”, “N.F” and “R.O” ?

What are the advantages of “U.F”,
“N.F” and “R.O” technology ?



U.F, N.F. and R.O. are based on membrane filtration. This technology is able to produce filter with very small pore size, which can filter small particles such as bacteria, viruses, molecules and ions, those can not be seen by the normal human eyes.



The filtration spectrum can be seen in table 1.

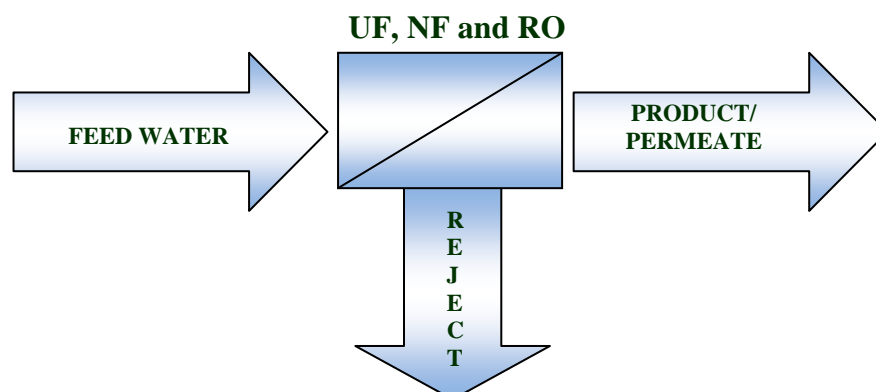
Table 1. The Filtration Spectrum

Filter	Pore Size [micrometer]	Goods to be filtered	Particle size
Sand Filter	50 – 1000 Particle Filtration	- Starch - Hair - Sand - Sludge	Macro particle
Micro Filter	0,1 – 50 Micro Filtration	- Asbestos / latex - Bacteria - Paint pigment - Tobacco smoke	Micro particle until Macro molekul
Ultra Filter	0,01 – 0,1 Ultra Filtration	- Albumin protein - Bacteria - Virus - Gelatin - Colloidal silica	Macro molecular until Molecular range
Nano Filter	0,001 – 0,01 Nano Filtration	- Sugar - Synthetic dye - Ions with > 2 electric loading - Pesticide & herbicide	Molecular range
Reverse Osmosis	< 0,001 Hyperfiltration	- Aqueous salts - Metal ion - Atomic radius	Ionic range

Sand filter has been used since the ancient time to filter visible particles and clarify water. It can separate particles up to 50 micrometer. For smaller particles, which are not visible to naked eye, they can be filtered using the micro filter, which pore size is in the range of 0,1 – 50 micrometer.

U.F, N.F. and R.O. can filter particles, substances, bacteria, viruses and other items not visible to naked eye. The U.F, N.F. and R.O. will produce permeate (product) which is the purified water and reject (concentrate), which contains all particle, substances and minerals, those can not pass the filter. All pollutants will be collected and concentrated in the reject water.

The process flow diagram of membrane filtration can be seamed in drawing 1.



Drawing 1. Flow Diagram membrane filtration



Smaller pore size will produce more reject or concentrate. NF has a bigger percentage of reject than U.F. and R.O. reject bigger than N.F.

The percentage of reject is shown in table 2.

Type of filtration	Reject volume[%]
Ultra Filtration	10 – 15
Nano Filtration	15 – 20
Fresh water R.O	30 – 35
Sea water R.O	60 – 70

R.O. can be used for desalination, since the R.O. membrane can separate and filter out salt. The product of R.O. has low total dissolved solid (TDS) or low conductivity. The R.O. is capable to filter out 97 % of the TDS in the feed water.

The advantages of **U.F, N.F. and R.O.** are to produce “pure water”, which are free of bacteria, viruses and toxic substances with affordable cost.

For all your water problems such as water clarification and purification our experts will give you the right solution.

For further information and assistance please contact:

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