FERROPLAN

NatWat-process

Natural water purification: from Iron, manganese and acidic gases

Ferroplan – The Best Solution

Ferroplan NW Natural water
Ground water treatment modules

Top quality potable water without use of chemicals.

Ferroplan NW water treatment process is a multi-phase oxidizing-stripping-biofiltration system that can effectively remove from water soluble iron and manganese and gases causing aggressiveness in tap water, such as methane,radon, sulphuric acid, ammonia and carbon dioxide. The treatment is also effective for any possible organic and inorganic impurities in water.

Iron and manganese residues are lower than measuring equipment can measure. In normal circumstances, the NW process works completely without chemicals. The chemical free process is both safe without any chemical residues in water and also economical, because there are no costs for chemicals and for use of chemicals.

NWF *Water filtration unit*

NWA *Areation, stripping and biology unit*

NWS *Filter dispersion water backwash unit*

NW *Natural Water system*

TYPICAL APPLICATIONS FOR THE NW NATURAL WATER MODULES TECHNIQUES:

- ***Purification of ground water*** *Iron, manganese and acid gases containing raw water with odor compounds.*
- ***Internal water purification of factories and institutions*** *The removal of cumulative substances from pipeline contamination and internal circulation. Minimizes water consumption on filter backwashing.*
- ***Filtering and reject water purification of biological sewage plants and land fillings*** *Using oxidation, stripping and biofiltration in pre-handling of waters to be led to a sewer.*

Ferroplan NW

Natural Water-modules

The different unit operations of the process are tailored according to the quality of the influent water reaching on this way the optimal process.

NWA Natural Water Aeration

- Degassing by stripping in underpressure
- Oxidating by aerating
- Biological treatment

Stripping and aerating NWA, typical example sizes: height 2000 mm

Diameter mm	Production rate m³/hrs	Filtering areas m²
400	0,3 - 1	0,1256
640	0,6 - 2	0,321
1300	2,0 - 8	1,276
1900	4,0 - 16	2,864
2400	6,0 - 20	4,476

NWF Natural Water Filtering

- A traditional open filtration with low surface loads
- The filtration masses can be chosen case by case
- The treated water is excellent and backwashing interval long
- The filter's backwashing method requires only 20 % of power compared to traditional filters
- The NWF-filter has no wearable parts. The filter wash does not need separate washing pumps or compressors, which reduces considerably costs, in operation and purchasing

Filtration NWF, typical example sizes height 2700 mm

Diameter mm	Production rate m³/hrs	Filtering areas m²
640	0,3 - 1	0,32
1300	1,5 - 3	1,276
1900	3,0 - 12	2,864
2400	4,0 - 16	4,476
2900	6,0 - 22	6,447

NWS Natural Water Scouring

- NWF filter backwash system with dispersion water
- Saves water considerably and removes sludge effectively

NW Natural Water System

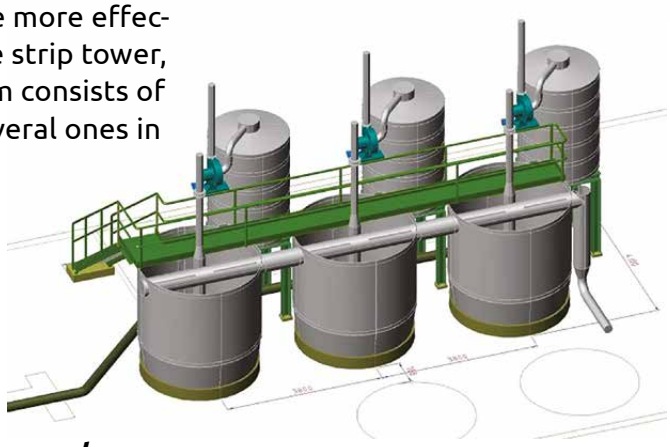
Prefabricated system
Pre-installed at factory
Easy to assemble
Low designing costs
A minimal need for control equipment
Delivery is executed as a completely automatic system
or as "undressed" manual equipment

Plants, typical combinations and example sizes:

NWA 400*2000	NWF 640*2700
NWA 640*2000	NWF 640*2700
NWA 1300*2000	NWF 1300*2700
NWA 1900*2000	NWF 1900*2700
NWA 1900*2000	NWF 2400*2700
NWA 2400*2000	NWF 2900*2700

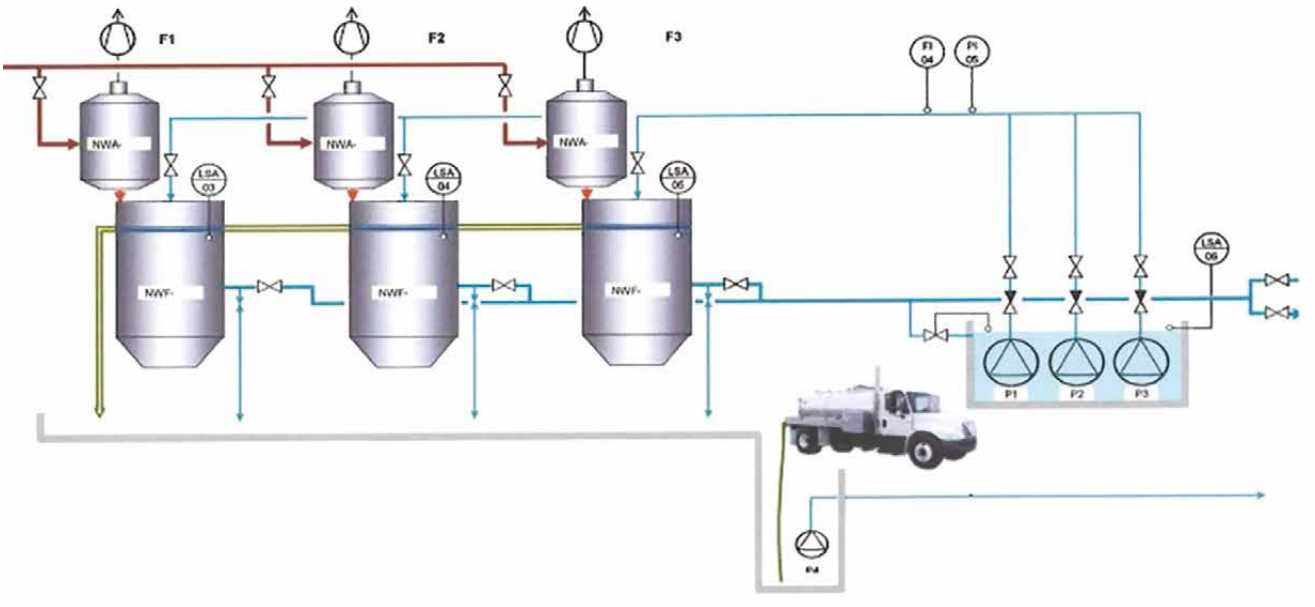
In NW-systems, the aeration and biological filtration are built together in a stripping tower where a vacuum upstream floats droplets of water. The unit is built from half meter high ring elements. The needed number of elements can be set one on the other. Number of elements depends on demands of aeration.

There are approximately ten phases in strip tower to make more effective chemical, mechanical and biological process. After the strip tower, there is a multi-layer mass sand filter. Normally, the system consists of two parallel strip tower and filters, but it can also have several ones in parallel.



NW SYSTEM - EQUIPMENT

Module dimensioning
Enlarging of capacity by modulation
Materials made of AISI 304 or 316
An inexpensive and qualified product from the engineering works
Easily combined with the existing or even more extensive plant solutions



SYSTEM OPERATION COST

The NW-system uses only little treated water, very little electricity and no chemicals, for its process. If the backwashing process is fully automated, it also needs very little work for washing, maintenance or other. The system can be operated fully unmanned, as under remote operation.

Cost factor	NW system opex	
Chemicals	**Consumption**	**Cost**
Oxidizer (KMnO4)	not needed	no cost
Alkalizing (NaOH)	not needed	no cost
Fe-/Al-salt		0 €/a
consumable mass (green sand)	not used	no cost
Electricity	4 500 kWh/a	315 €/a
Labour 30€/h	3 h/w	4 680 €/a
Service, Maintenance	1% of investment	2 000 €/a
Washing water	16 m³/d	1 840 €/a
		(1,4% of total treated water)
Total operation cost		**8 835 €/a**

Unit pricing for opex estimation

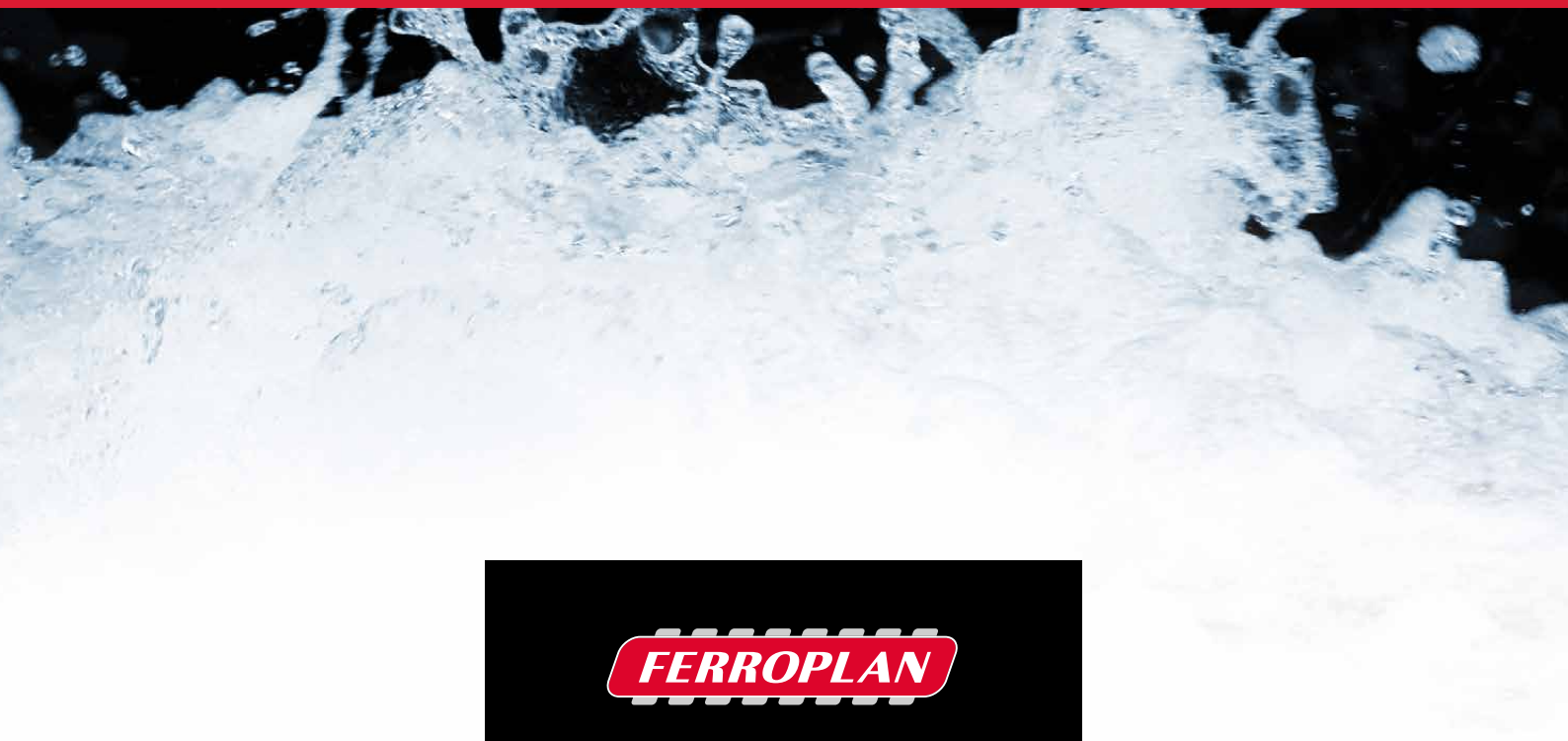
In the calculations some costs have been estimated, such as chemicals transport costs, plus installation, running- and maintenance costs. As can be seen, operation costs are low. If all costs are included, it can be estimated that the NWF-filters annual operation costs are 2/3 lower than other filter systems opex.

Sample case for opex estimation:

Flow 50 m³/h / 438 000 m³/a, Fe = 2500 µg/l, Mn = 150 µg/l

The water purification process **NATWAT-PROCESS** you can't afford to miss.

Ferroplan *– The Best Solution*



Ferroplan Oy

Takojantie 4,
16300 Orimattila,
Finland

+358 207 189 720

www.ferroplan.fi

Design Kumina - **05/2016**