

# WATER TREATMENT

*filtration equipment*



DELTA ENGINEERING

Natural Gas &  
Water Treatment

Delta Engineering, thanks to the experience throughout more than 30 years of industrial process solutions, **designs** and **manufactures** a large range of products and technologies for **water treatment**.

**Markets:**

- STEEL INDUSTRY
- POWER GENERATION
- OIL & GAS
- PETROLCHEMICAL
- LPG
- DESALINATION
- AGRICULTURE

Delta Engineering **know-how** covers the following main **equipments/plants**:

**FILTRATION & SEPARATION:**

Filtration is used for removal of solids from process water. Various type of filtering media such as wire-mesh, wedge-wire, quartz sand, silica sand, anthracite coal and other materials may be used as filtration media.

**DEOILING:**

De-oiling is a device used to separate Oil and Grease from water, dedicate solutions have been studied for remove oil from water such as CPI, Flotation units, Granular Activated Carbon.

**DEAREATOR:**

Deareator is a device that is widely used for the removal of air and other dissolved gases from the feed water to steam generating boilers. In particular, dissolved oxygen in boiler feed waters will cause serious corrosion damage in steam systems.

**CONDENSATE POLISHING:**

Ion exchange uses are not limited to process and boiler water makeup. Ion exchange can be used to purify, or polish, returned condensate, removing corrosion products that could cause harmful deposits in boilers. Condensate polishers filter out the particulates and remove soluble contaminants by ion Exchange (Iron and Copper).

**NUTSHELL FILTERS:**

Delta Engineering provides high-performance tertiary treatment equipment employing nutshell media filtration. The use of nutshell media provides the benefit of reducing or eliminating the need for large quantities of backwash water, scouring, and surfactants. The unique qualities of the pecan / walnut shell media blend make for an effective, hydrophilic bed, which is extremely hard and durable.



## FILTRATION / SEPARATION TECHNOLOGY

- CARTRIDGE FILTERS
- BASKET FILTERS
- SELF CLEANING FILTERS
- SELF CLEANING CARTRIDGES FILTERS
- DUAL MEDIA FILTERS
- CARBON BED FILTERS
- TWO/THREE PHASE SEPARATORS
- NUTSHELL FILTERS

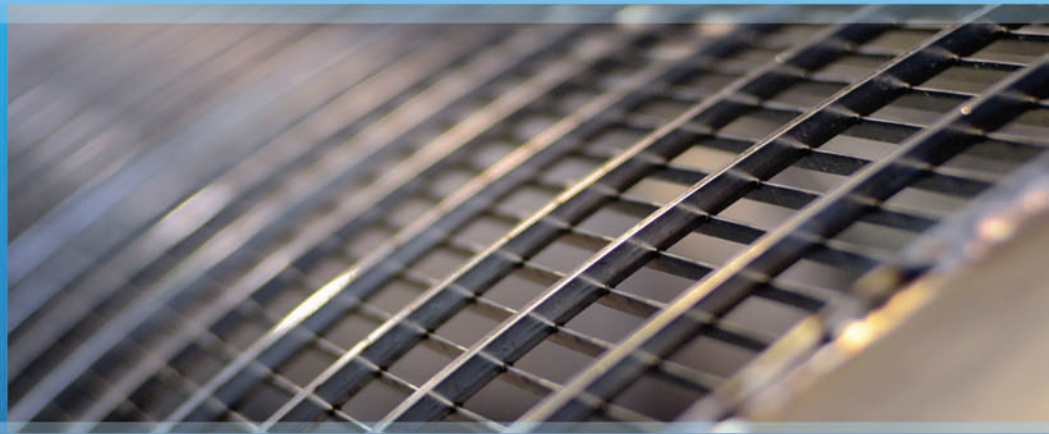


## PROCESS INTERNALS:

POLYPROPYLENE



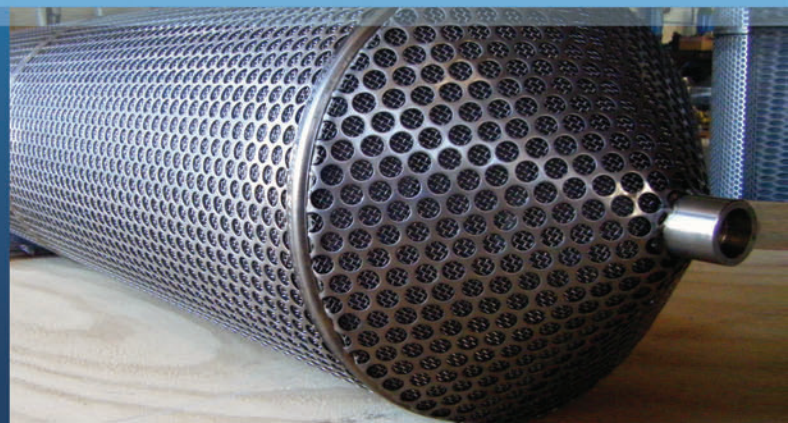
WEDGE-WIRE



WIRE-MESH



CUSTOMIZED



## CARTRIDGE/BASKET FILTER:



The Simplex Filter can be supplied with cartridge or basket filtering elements. Are normally installed on non-intensive plant where is possible to maintenance during the programmed service.

The duplex filters are consist of two filters - one in operation and one in stand-by connected by two 3-way valves (both with a single drive). The filters can be supplied with cartridge (outside/inside filtration) or with basket (inside/outside filtration). Filtering elements are pleated type with a high surface.



## DUAL MEDIA: SAND/CARBON FILTERS



Carbon filters are equipped with a built in carbon bed made of wedge wire support or polypropylene nozzles drilled plate. Sand filters are developed with advanced technology in order to reach a high filtration level (up to 10  $\mu$ ).

## LIQUID / LIQUID SEPARATOR



Typically, the produced water is separated from the hydrocarbons by passing the well stream through process equipment such as three-phase separators, heater-treaters and/or free-water knockout vessel.



## SELF CLEANING FILTER:

Automatic self-cleaning filters are simple and reliable devices and are normally used to remove solids from fluids (such as oil, industrial water and sea water) and are especially suited to cooling plant for steel works, continuous casting plants, rolling mills, electric power stations, refineries, chemical plants and the oil industry.



## OPERATION:

Thanks to their simple construction, these filters offer extremely reliable operation for 24 hours a day, even in unmanned installations.

Apart from topping up the geared motor oil, they are virtually maintenance-free, just requiring basic servicing after long periods of work.

The filters basically operate in this way: after entering the vessel, the fluid flows through filtering element from the inside to the outside. The filtering element catches any impurities.

Once the pressure drop reaches a set value due to the progressive clogging of the filtering tube, the differential pressure switch sends a signal to activate the rotation of the cleaning system and the opening of the discharge valve.

The cleaning cycle can also be programmed with a timer. During the cleaning cycle, the filtering element is in line with the cleaning arm and the drain pipe, at atmospheric pressure. The fluid inside this flows away, taking with it any impurities.

While the cleaning arm rotates, all the filtering tubes are back-washed. At the end of the cleaning cycle, the geared motor valve is closed; the filter then works normally.



## SELF CLEANING CARTRIDGES FILTER

Automatic self cleaning back-washing cartridge filters are normally used to remove solids from industrial water, river water and sea water and are especially utilized to water injection plants, turbine condensate polishing and in general in electric power stations, refineries, chemical plants and the oil industry.

Filtration is made on cartridges with mesh in the range of 2 to 10 microns. The filtration process became diffused when backwash technology by gas pulse was assessed through successful tests.



### PROCESS:

The filtration process has been applied to the filtration of turbine return condensate in power stations where removal of suspended solids (iron, precipitates) which may contaminate the stream are to be removed to protect the turbine circuit and river water filtration for water injection for removal of suspended solids (sand, rust etc.) from water stream before re-injection in the well. The treatment has to combine fine filtration with high flowrates and often high operating pressure.

### SYSTEM DESCRIPTION:

The Delta Engineering backwash cartridge filters packages are simple and compact units. The filter is a vertical vessel with installed cartridges that can guarantee the perfect regeneration during the backwash cycle. The principle is that the suspended solids which are accumulated on the external surface of the cartridges are periodically removed by an automatic backwash sequence which includes as main step a “gas bubble” and then the sequence includes the water backwash.

### FILTERING ELEMENTS:

The filtering elements are normally cylindrical cartridges with a pleated filtering screen, specifically designed and fabricated. Thanks to the cartridges features and to the system concept, the cartridges life is very long.

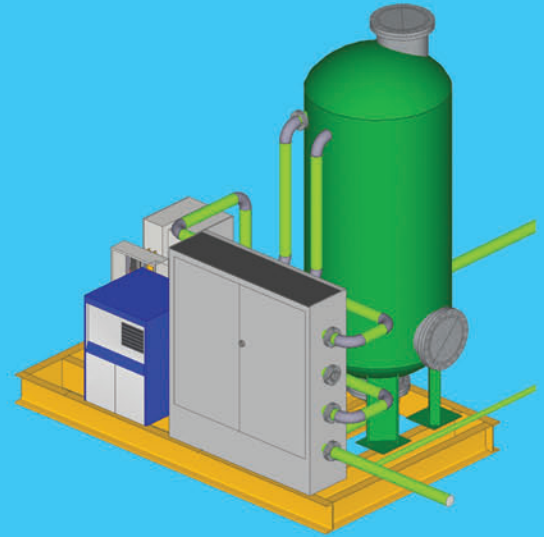
### COMPLETE SYSTEMS:

Delta Engineering system includes all the accessories, valves, instruments needed for the proper operation such as air accumulation drum, ON/OFF valves as well as all other required auto valves. All these items can be installed on a transportable skid, tested at shop and ready to be connected at site.



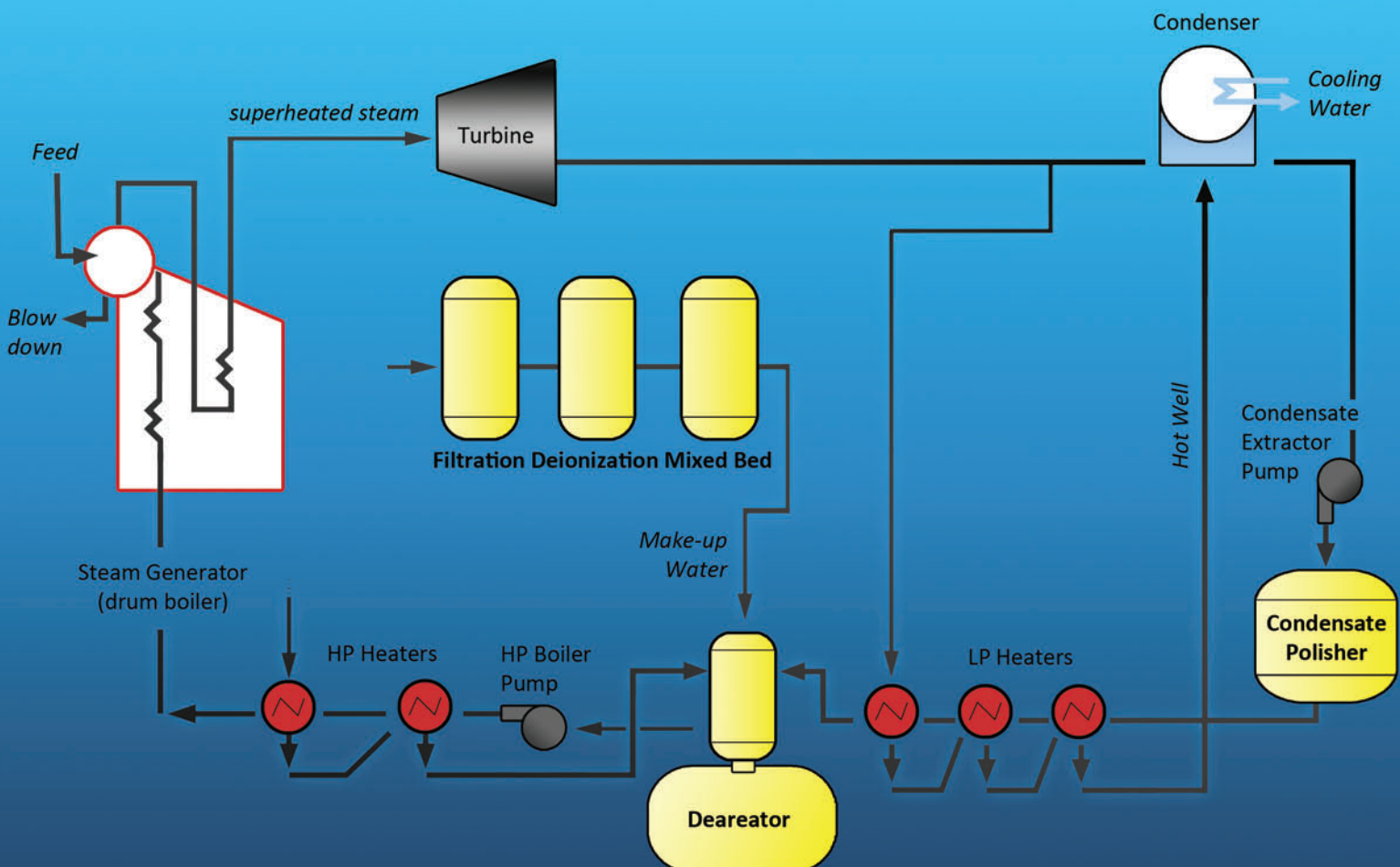
## NUTSHELL FILTER

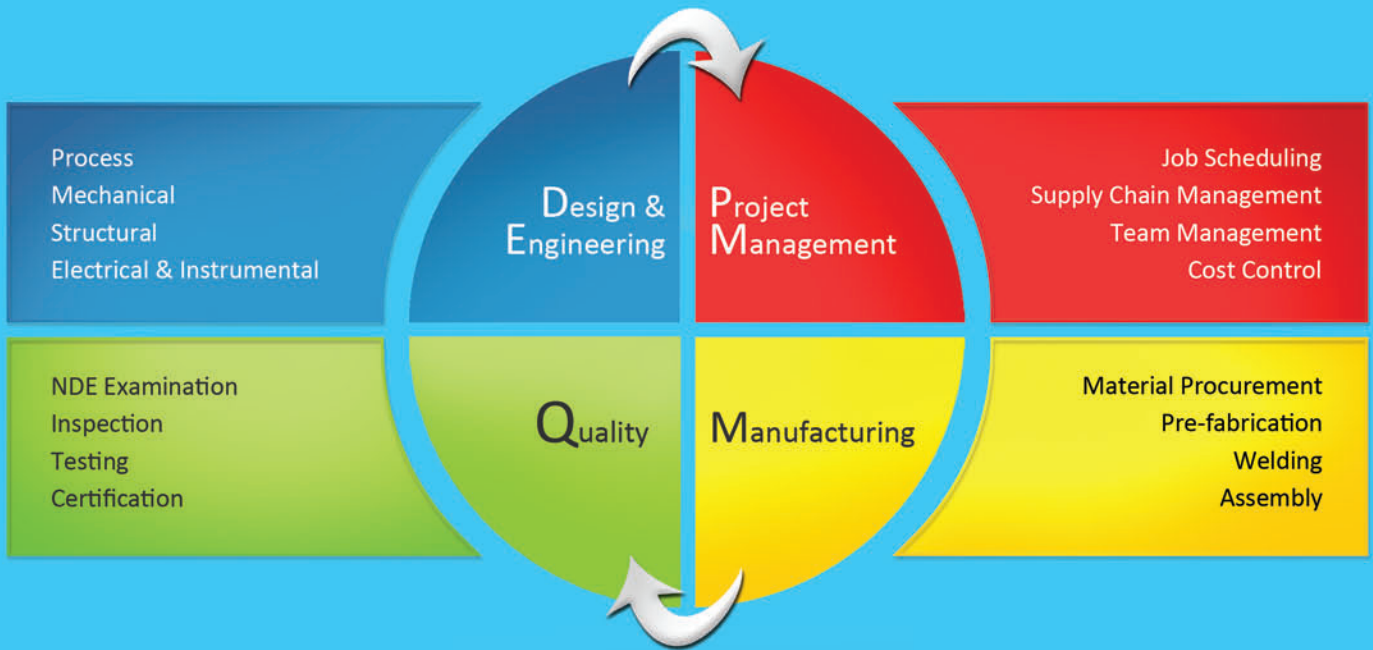
Delta Engineering Nutshell filters represent the most advanced technology for oil removal and solid removal from water. Nutshell media has a combined of coalescent and solid separation technologies. The common application is the treatment of produced water in the oil-fields, to make the water quality suitable for the re-injection in the fields; Nutshell filters are used also in steel industry, waste water treatment in refinery and petrochemical industry. Under normal operation condition with a normal inlet oil concentration of 50 mg/l or less and comparable solids inlet concentration, nutshell filters will produce an effluent with less than 5 mg/l of dispersed oil.



## POWER GENERATION APPLICATION

Fossil-fuelled and nuclear power stations produce electricity with turbines powered with high pressure steam. A schematic representation of this steam circuit is shown in the picture below. After going through the turbine, the steam is condensed and recycled.





Total Area: 8.000 m2  
 Covered Area: 3.000 m2  
 Open Area: 5.000 m2  
 Capacity Crane: 20 tons

Total Area: 4.000 m2  
 Covered Area: 2.000 m2  
 Open Area: 2.000 m2  
 Capacity Crane: 50 tons



Headquarter & Workshop #1



Workshop #2



our Brands

