AAT Engineering & Consultancy

www.aktifaritma.com

ABOUT US

AAT Engineering & Consultancy was established in 1998 with the sole purpose of developing efficient and unique solutions for Environmental Pollution Industry.

AAT is headquartered in İstanbul-Turkey. All units and equipment are manufactured atour own factory located in Kocaeli, 90 km from our head office.

Today AAT has become a well-knownbrand name in Environmental Pollution Industry due to premium tailor-made design capability, satisfied after sales & technical service, unique know-how and hands on experience at water and gas industry.

AAT has built or revised more than hundreds of treatment plants all over Turkey, Europe, Middle East, Asia and Africa since 1998.

Our factory was established in Kocaeli on a closed area of 2000 m2.

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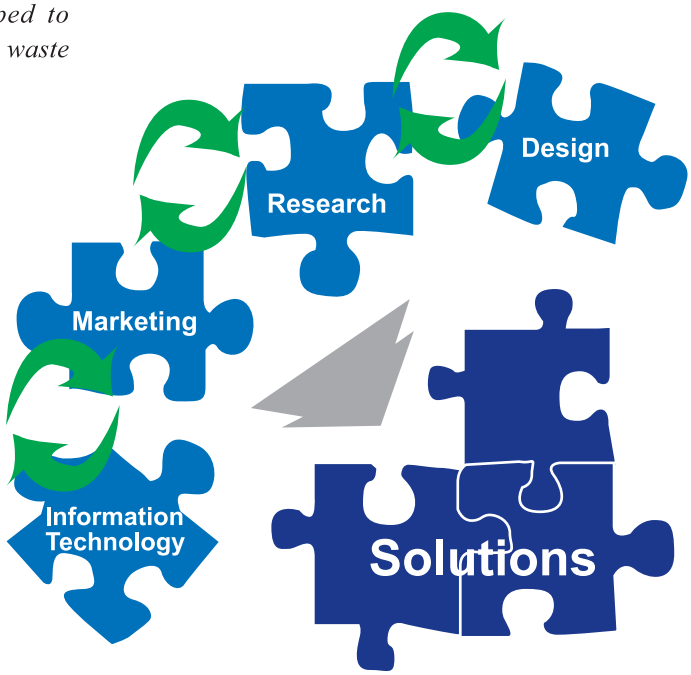
OUR SERVICES

Our extensive range of advanced technology & know-how for environmental pollution control has been developed to significantly improve the supply and service of water, waste water and waste gas treatment systems.



AAT deals with following subjects;

- *Wastewater Treatment Plants*
- *Water Treatment Systems*
- *Waste Gas Treatment Systems*
- *Odor Removal Systems*
- *Environmental Engineering Service*
- *Manufacturing Equipment for Treatment Plants*
- *Lab Equipment &Analysis*
- *Project Management & Consultancy*
- *Periodical Maintenance Service*
- *Discharge & Emission Assessment Reports*

AAT Engr. & Cons. is powered by MVT Company Best German Engineering

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WASTE WATER TREATMENT

Wastewater treatment is the process of removing contaminants from industrial, household sewage, intuitional applications. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants.

	Domestic wastewater	*Industrial wastewater*
Definition	***The wastewater coming from bathroom, WC, kitchen etc due to daily activities in houses, offices etc.***	***The wastewater formation during an industrial application or production.***
Aim Of Treatment	***Wastewater decreases the dissolved oxygen concentrations in water receiving bodies (lake, river, sea etc). Decrease in oxygen levels will cause aquatic life to be in danger. The food chain over the aquatic life will end up to humans who will be affected seriously. Discharge of untreated wastewater to receiving bodies is restricted by environmental laws.***	
Treatment Method	***Generally biological treatment methods are preferred. Biological Treatment Process depends on bacteria which converts the organics (pollutants) to harmless by products or new bacteria cells without using any chemicals.***	***Physical, chemical and / or biological Treatment methods are utilized in industrial wastewater treatment. Physical treatment is carried out without any chemical addition or biological activity. Chemical treatment process depends on the chemical reactions of wastewater with added chemicals.***

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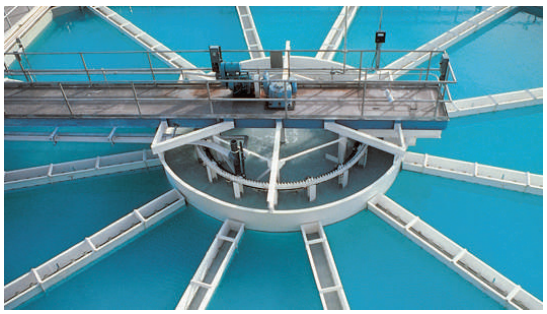

Phsyical Treatment

Examples would be coarse screening to remove larger entrained objects and sedimentation (or clarification). In the process of sedimentation, physical phenomena relating to the settling of solids by gravity are allowed to operate. Usually this consists of simply holding a wastewater for a short period of time in a tank under quiescent conditions, allowing the heavier solids to settle, and removing the "clarified" effluent. Sedimentation for solids separation is a very common process operation and is routinely employed at the beginning and end of wastewater treatment operations.While sedimentation is one of the most common physical treatment processes that is used to achieve treatment, another physical treatment process consists of aeration -- that is, physically adding air, usually to provide oxygen to the wastewater. Still other physical phenomena used in treatment consists of filtration. Here wastewater is passed through a filter medium to separate solids. An example would be the use of sand filters to further remove entrained solids from a treated wastewater. Certain phenomena will occur during the sedimentation process and can be advantageously used to further improve water quality. Permitting greases or oils, for example, to float to the surface and skimming or physically removing them from the wastewaters is often carried out as part of the overall treatment process.

Physical treatment methods;

- *Sedimentation (Clarification)*
- *Screening*
- *Aeration*
- *Filtration*
- *Floatation and Skimming*
- *Degasification*
- *Equalization*
- *Oil Separation*

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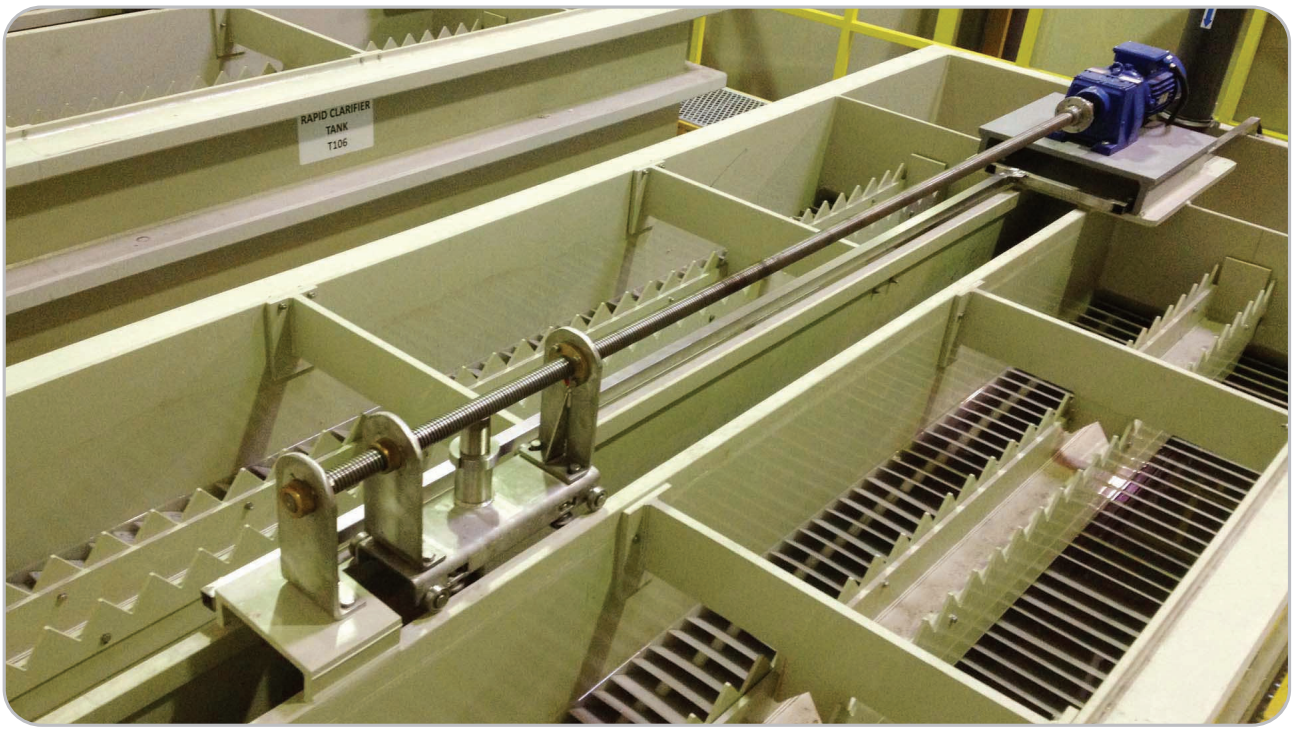
Chemical Treatment

Chemical treatment generally includes the dosing of suitable chemicals to precipitate impurities. This precipitate containing the impurity is then generally removed by sedimentation, flotation and filtration. If undertaken correctly, this process will remove specific impurities and produce treated water suitable for either discharge or next process step depending on overall process. Sludge can then generally be treated and dewatered for subsequent disposal.

Chemical treatment methods;

- *Coagulation & Flocculation*
- *Neutralization*
- *Adsorption*
- *Ion Exchange*
- *Chlorination / Ozonation*



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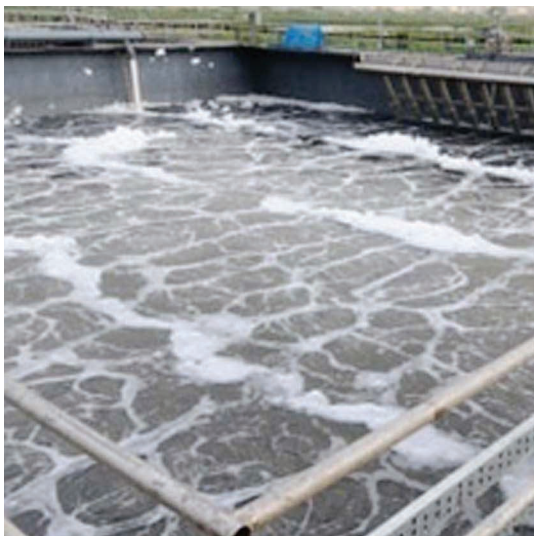

Biological Treatment

Secondary treatment is designed to substantially degrade the biological content of the sewage which are derived from human waste, food waste, soaps and detergent. The majority of municipal plants treat the settled sewage liquor using aerobic biological processes.

To be effective, the biomass requires both oxygen and food to live. The bacteria and protozoa consume biodegradable soluble organic contaminants (e.g. sugars, fats, organic short-chain carbon molecules, etc.) and bind much of the less soluble fractions into floc. Secondary treatment systems are classified as fixed-film or suspended-growth systems.

Biological treatment methods;

- *Activated Sludge Treatment Methods*
- *Trickling Filtration*
- *Oxidation Ponds*
- *Lagoons*
- *Aerobic Digestion*

Anaerobic

- *Anaerobic Digestion*
- *Septic Tanks*
- *Lagoons*

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Tertiary & Advanced Treatment

The purpose of tertiary treatment is to provide a final treatment stage to further improve the effluent quality before it is discharged to the receiving environment (sea, river, lake, ground, etc.). More than one tertiary treatment process may be used at any treatment plant. If disinfection is practiced, it is always the final process. It is also called "effluent polishing."

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Industrial Waste Water Treatment

Industrial wastewater treatment covers the mechanisms and processes used to treat waters that have been contaminated in some way by anthropogenic industrial or commercial activities prior to its release into the environment or its re-use.

Most industries produce some wet waste although recent trends in the developed world have been to minimize such production or recycle such waste within the production process. However, many industries remain dependent on processes that produce wastewaters.

Package type of industrial waste water treatment plant (I-WWTP) can contain one of or all of physical, chemical, biological and tertiary treatment methods depending on raw wastewater quality & quantity.

Package type of industrial WWTP are available for ;

- *Manufacturing industry*
- *Paper industry*
- *Textile industry*
- *Chemicals industry*
- *Mining industry*
- *Automotive industry*
- *Hospitals*
- *Metal finishing industry*
- *Glass industry*
- *Paint industry*
- *Food Industry*

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AKTIFPAK

AKTIFPAK is a packaged type of sewage treatment plant. Compact type of prefabricated AKTIFPAK units utilize several biological processes depending on raw wastewater quality & quantity.

AKTIFPAK package type of sewage treatment plants can be designed according to;

- *Extended Aeration Systems (EA)*
- *Sequencing Batch Reactors (SBR)*
- *Membrane Bio Reactors (MBR)*
- *Moving Bed Bio Reactor (MBBR)*
- *Fixed Bed Bio Reactor (FBBR)*
- *Rotating Biological Contactor (RBC)*

Extended Aeration System

Since AKTIFPAK units are mainly transported by trucks, the maximum dimensions are up to;W : 240 cm, L : 1300 cm and H : 290 cm. It's also possible to fit AKTIFPAK units into 40" shipping containers.

Extended aeration is a method of sewage treatment using modified activated sludge procedures. It is preferred for relatively small waste loads, where lower operating efficiency is offset by mechanical simplicity.

In extended aeration process the raw sewage goes straight to the aeration tank for treatment. The whole process is aerobic. This simplification implies longer aeration time which has earned for the process the name "extended aeration".

The BOD removal efficiency of the extended aeration process is higher than activated sludge process which makes it especially desirable to use where it is to be followed by tertiary treatment for reuse.

Did you know ?

- *Extended Aeration systems do not need a primary settling tank.*
- *More resistant to shock organic loadings than any other processes.*
- *Requires more volumes and larger footprints*

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Sequencing Batch Reactor (SBR)

The Sequencing Batch Reactor (SBR) is an activated sludge process designed to operate under non-steady state conditions. A SBR operates in a true batch mode with aeration and sludge settlement both occurring in the same tank. The major differences between SBR and conventional continuous-flow (i.e. extended aeration) , activated sludge system is that the SBR tank carries out the functions of equalization aeration and sedimentation in a time sequence rather than in the conventional space sequence of continuous-flow systems. In addition, the SBR system can be designed with the ability to treat a wide range of influent volumes whereas the continuous system is based upon a fixed influent flowrate. Thus, there is a degree of flexibility associated with working in a time rather than in a space sequence .

AKTIFPAK - SBRs produce sludges with good settling properties providing the influent wastewater is admitted into the aeration in a controlled manner. Controls range from a simplified float and timer based system with a PLC to a PC based SCADA system with color graphics using either flow proportional aeration or dissolved oxygen controlled aeration to reduce aeration to reduce energy consumption and enhance the selective pressures for BOD, nutrient removal, and control of filaments . SBR process, designed by AAT, is a unique combination of equipment and software. Working with automated control reduces the number of operator skill and attention requirement.SBR system works sequentially, depend on the amount of raw water, total period is calculated.

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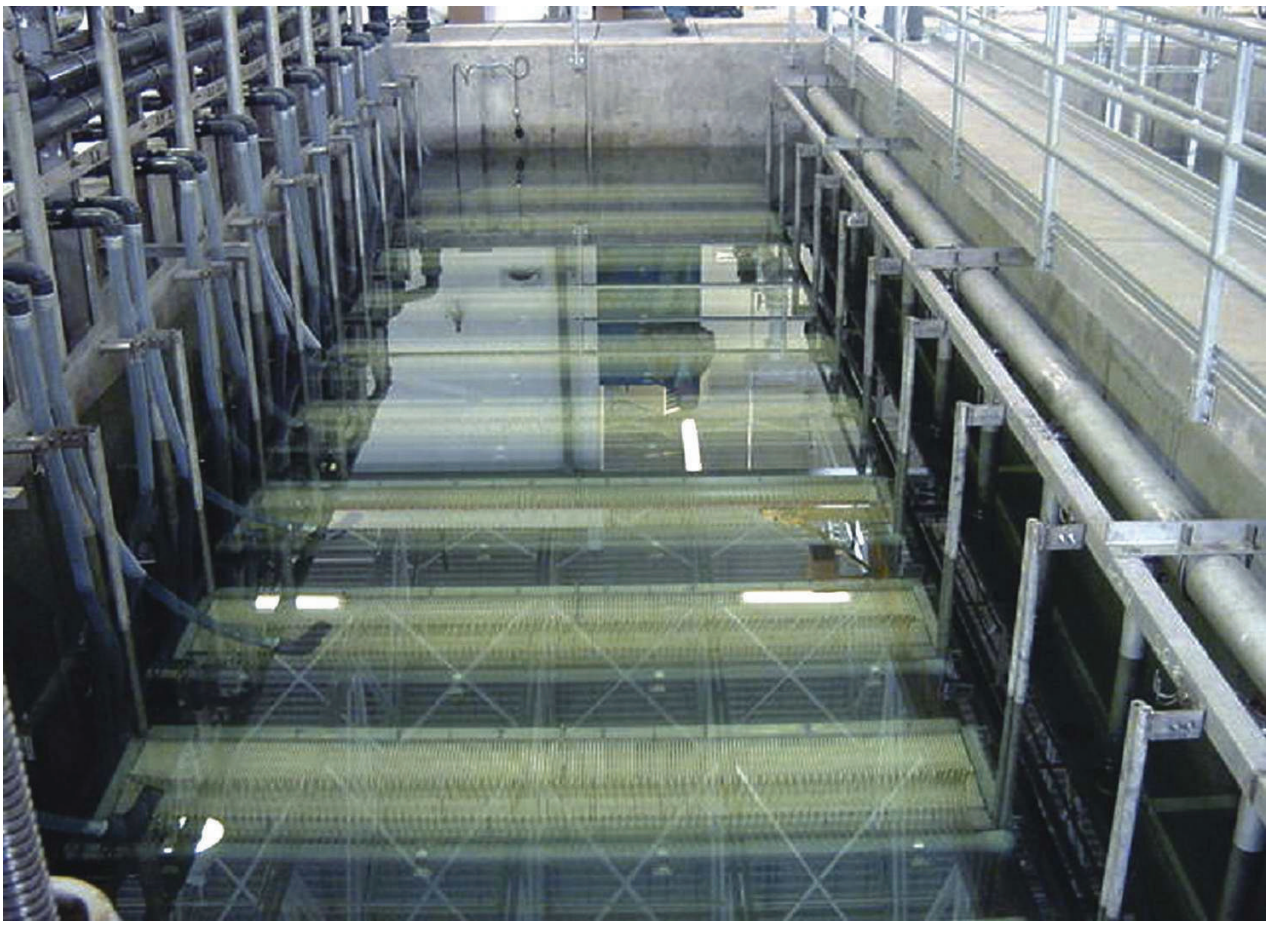
Membrane Bio Reactor (MBR)

When used with domestic wastewater, MBR processes could produce effluent of high quality enough to be discharged to coastal, surface or brackish waterways or to be reclaimed for urban irrigation. Other advantages of AKTIFPAK-MBRs over conventional processes include small footprint, easy retrofit and upgrade of old wastewater treatment plants.



Membrane bioreactors, designed by AAT, also known as AKTIFPAK membrane biological reactor systems or AKTIFPAK -MBRs, comprise a unique wastewater treatment process designed for numerous municipal and industrial applications. Membrane bioreactor systems may be used in such applications as water reuse, new housing developments, parks and resorts, retrofits, and turnkey projects.

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Moving Bed Bio Reactor (MBBR)

MBBR technology, designed by AAT, employs thousands of polyethylene biofilm carriers operating in mixed motion within an aerated wastewater treatment basin.

Each individual bio carrier increases productivity through providing protected surface area to support the growth of heterotrophic and autotrophic bacteria within its cells.

It is this high-density population of bacteria that achieves high-rate biodegradation within the system, while also offering process reliability and ease of operation.

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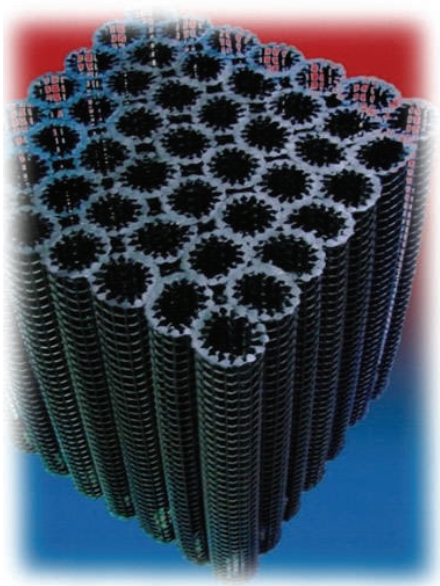
Fixed Bed Bio Reactor (FBBR)

AKTIFPAK - FBBR,is a biological waste water treatment system that applies the attached growth of decomposing micro-organisms on corrugated media plate assembled into modules which are arranged in a sequential form (cascade). In this media plates decomposing micro-organisms grow and regenerate quickly to form a layer of biomass that will actively degrade organic pollutants in waste water in time of contact between wastewater and biomass layer.To arrange progressive contact between waste water and biomass layers , cascaded aeration system is applied to form the waste water flow evenly through module by module overgrown with biomass, such that the contacts between waste water and biomass layers occur in unlimited repetition, providing very high degradation efficiency of organic contaminants (COD, BOD, ammonia).



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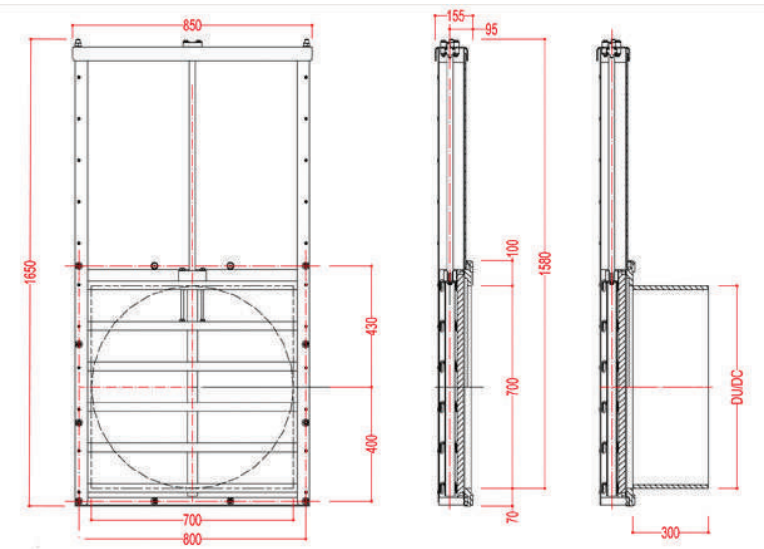
EQUIPMENT MANUFACTURING

AAT is manufacturing below equipment for water and waste water treatment plants ;

- *Penstocks & Sluice Gates*
- *Mechanical Screen*
- *Grit Removal Systems*
- *Mixers& Flocculators*
- *Scrapers*
- *Dissolved Air Flotation (DAF)*
- *Gravity Thickener*
- *Electric Control Panels*

Penstock & Sluice Gates

Flow in channels can be controlled by penstocks, slice gates and stop logs. They operate as on seating or off seating based on flow direction. Penstocks and sluice gates are manufactured from carbon steel or stainless steel depending on customer requests. The smallest leakage rate is mainly provided by double lip seals (neoprene etc). Manual or motorized options are available.



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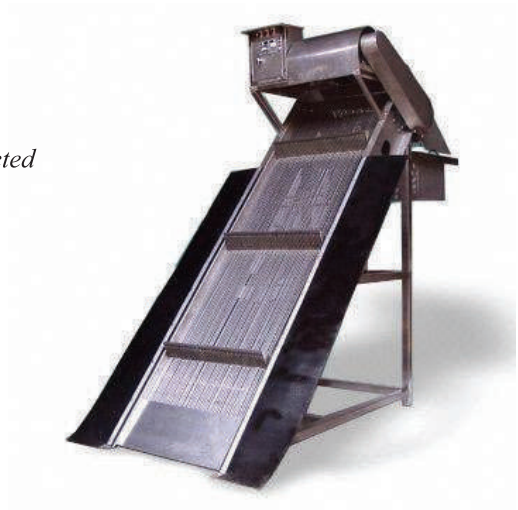
Mechanical Screen



For coarse and fine screening options the openings are designed to be 5 to 75 mm depending on the project requirements. The material is selected to be as carbon steel, HDG or stainless steel. AAT can manufacture the screens as ;

- *Cable operated type,*
- *Grab type*
- *Multi rake type*

Main components of the screen are ; frame, bar screens, wiping mechanism, discharge chute and the drive mechanism.

Grit Removal

The incoming sewage is adjusted to allow the settlement of sand, grit, stones, and broken glass. Grit accumulated at the aerated grit chambers is removedwith the help of grit bridges which moves in bilateral direction. Single dual or multiple type of grit bridges isavailable with scum scraping options. Material alternativesare carbon steel, stainless steel or aluminum

Grit classifiers are used to separate / dewater the sucked grit and the water content. Waste containers are placed just under the discharge chute of the classifier.

Designing the transport of grit by screw conveyors is also possible.

Smaller capacities allow to design above equipment as all -in-one compact systems

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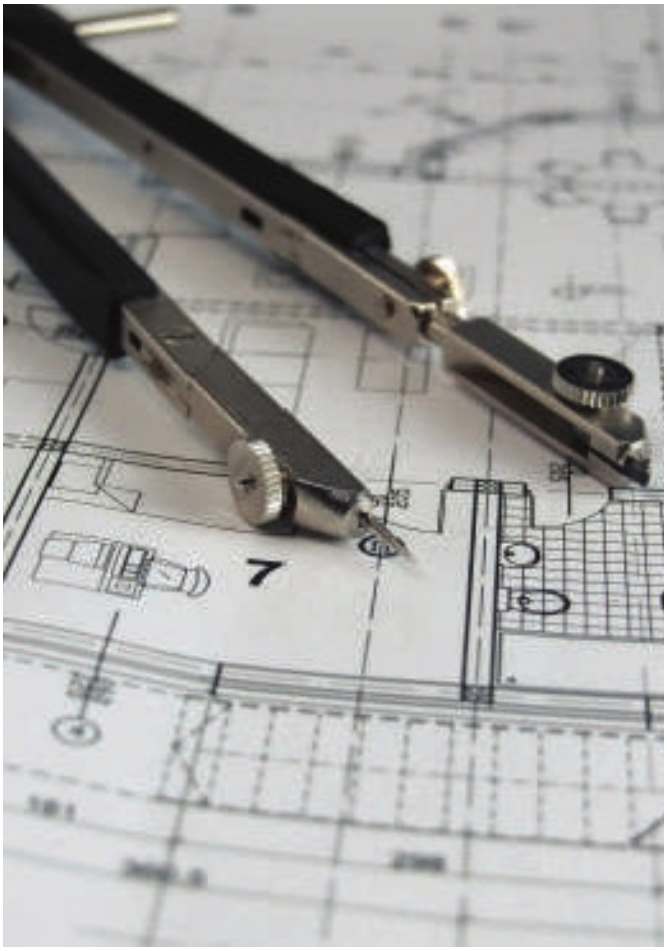
Mixer and Flocculators

To supply effective and homogeneous mixing, design of mixers and/or Flocculators are very important. Appropriate "G.t" values are determined according to many factors and all are designed by AAT engineers. Selecting the right motor / redactor powers make us save energy.

Tailor made solutions only by AAT Engr. & Cons.



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Dissolved Air Flotation (DAF)

Dissolved air flotation (DAF) is a water treatment process that clarifies wastewaters (or other waters) by the removal of suspended matter such as oil or solids. The removal is achieved by dissolving air in the water or wastewater under pressure and then releasing the air at atmospheric pressure in a flotation tank or basin. The released air forms tiny bubbles which adhere to the suspended matter causing the suspended matter to float to the surface of the water where it may then be removed by a skimming device. Dissolved air flotation is very widely used in treating the industrial wastewater effluents from oil refineries, petrochemical and chemical plants, natural gas processing plants, paper mills, general water treatment and similar industrial facilities. A very similar process known as induced gas flotation is also used for wastewater treatment. Froth flotation is commonly used in the processing of mineral ores.

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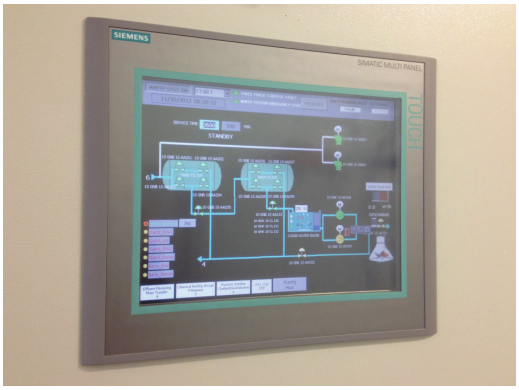
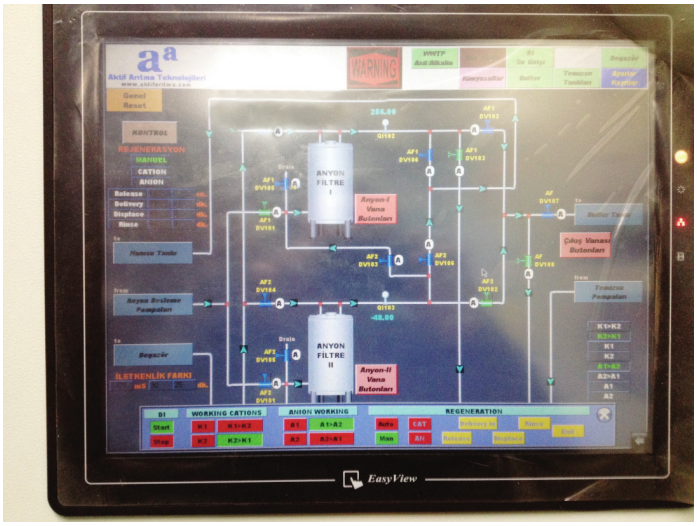
Electric Control Panels

AAT manufactures electric control panels for water & wastewater treatment plants. All PLC & SCADA are programmed by AAT engineers. Components of MCC are selected according to project requirements.





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WASTE GAS TREATMENT

Emissions due to burning or production can cause air pollution. Ministry of Environmental& Forestry restrict those emissions to the atmosphere.These emissions must be controlled by gas treatment systems.AAT manufacturers Wastegas Treatment Systems for solving emissions problems.

- *Waste Gas From Process*
- *Waste Gas From Furnace Flue(De SOx)*

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ODOR REMOVAL SYSTEM

Transfer basin & sludge handling units of Waste Water Treatment Plants or some other industrial applications can cause odor problems. Wet scrubber gas treatment technology can be used for many applications for removing odor problems.

Wet Scrubber

In AAT wet scrubbers, the polluted gas stream is brought into contact with the scrubbing liquid, by spraying it with the liquid, by forcing it through a pool of liquid, or by some other contact method, so as to remove the pollutants. Packing material alternatives are plastic, stainless steel and ceramic.

Scrubber material alternatives are PP, HDPE, FRP or SS 316 Ti / L.

Biological Filter (Bio Filter)

The BIO - AAT, biological odor control system can be used to remove H2S and reduced sulfur compound (RSC) odors generated during the treatment of municipal wastewater at pump stations, headworks and dewatering applications. The system uses the specially designed media technology, a unique combination of synthetic and / or organic medias that provide the proper environment for promoting bacteria growth to eliminate odorous compounds.

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Multi Media & Activated Carbon Filters

Multimedia Filters are used for removal of sediment and suspended particulate matter. The Multimedia Filter uses a variety of different media types distinctly layered with the coarsest media found on top and the finest at the bottom. This layering of the media allows the larger particles to be removed near the top of the bed while the smaller particles are filtered out toward the bottom.

The suspended matter is filtered throughout the entire media bed depth rather than forming a layer on top and only filtering in the top few inches of the bed.

Softeners

Softening is the removal of hardness in water caused by calcium and magnesium ions using cationic resin.

Hard water causes calcification on the surfaces of steam cauldrons, heaters and hot water installations. This way their cross-section get narrower, important transfer losses and energy consumption occur.

Softener systems are time controlled or capacity controlled as standard.

Time adjustable and control panel with hardness sensor alternatives are available.

In backwash process block valves or pneumatic or hydraulic operating cast frame diaphragm valves are used. They are equipped with salt absorbing system with PVC injector, polyethylene brine tank and control unit to control them.

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Ultrafiltration (UF)

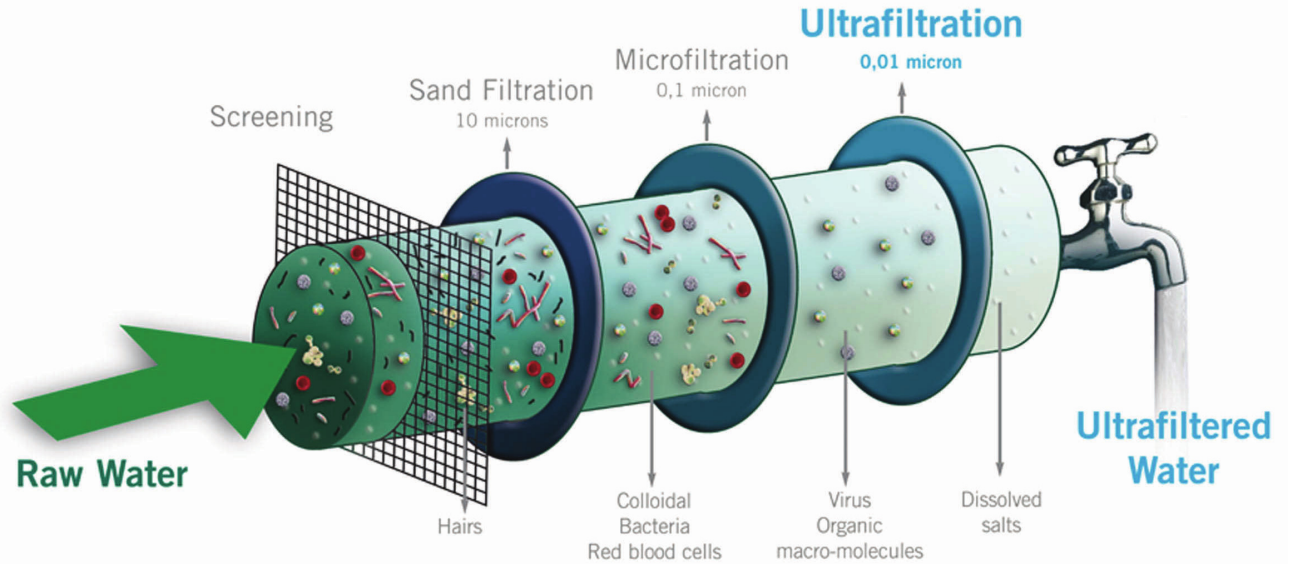
It is one of the filtration method ultrafiltration methods. On the contrary to purification methods like nanofiltration and reverse osmosis, it does not cause any change in chemical parameters of water and achieves maximum level of improvement at all physical features of water. By ultrafiltration modules which has 0,01 micron pores act as a barrier for suspended solids, bacteria, viruses and other microorganisms. This technology has more advantage especially supplying food and beverages, drinking water, spring water requirements.

FIELDS OF APPLICATION

Bottling spring water
Pretreatment unit of seawater and brackish water reverse osmosis unit
River and lake water which has high concentrate suspended solids treatment
Disinfected process water

ADVANTAGES

Produce disinfected water
Each the filter area disinfected due to backwash and chemical cleaning
Only need 200 micron filtration as a pretreatment
Low pressure requirement and low operational cost
Low area requirement



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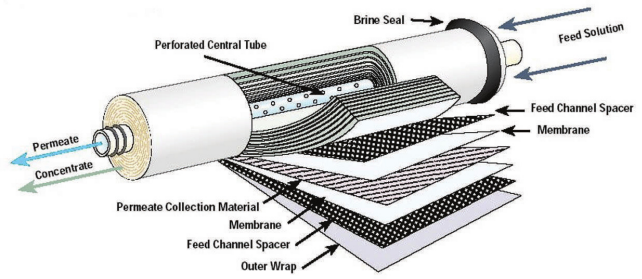
Reverse Osmosis (RO)

Reverse osmosis process is the removal of dissolved solids from the water by pressurizing the water through a semi-permeable membrane. Reverse osmosis is used purification for well water, river water, lake water and seawater which has high salinity.

Water is forced to circulate under high pressure through porosities on membranes which has 5 angstrom diameter of pore. While water molecules and some inorganic molecules can pass through these porosities during this process most substances in water cannot pass through these porosities and it is exhausted as concentrated water.



What the membrane surface keeps always clear and unblocked is the "cross flow" action realizing within membrane element. While a part of liquid (product water) passes through membrane due to the cross flow another part of liquid (concentrated water) hiders bonding impurities to membrane. Surface of the membrane is swept by an auto flush application periodically to keep clean membrane.

It is very important to condition the feed water to ensure reliable performance and longer lifetime of the reverse osmosis membranes. The feed water must be very well filtered (SDI < 3), disinfected and conditioned with chemicals to prevent fouling of the membranes.

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ADVANTAGES of REVERSE OSMOSIS:

* *Ease of operation and maintenance;*
* *Reliable quality of treated water;*
* *Low consumption of chemicals;*
* *Lower operating cost compared to alternative methods of deionization.*

FIELDS of APPLICATION of REVERSE OSMOSIS:

* *Drinking Water Supplying*
* *Glass Industry*
* *Textile Industry*
* *Pharmacy and Cosmetic Industry*
* *Purification of well water and sea water*
* *Electronic Industry*
* *Farm & Green housing*
* *Power Plants*
* *Food Industry*
* *Cooling System & Boilers*

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Water Compact Unit (WCU)

Compact water treatment plants are designed for villages, small communities or cities in order to provide drinking water.

WCU can be called as Water Compact Unit or River Water Treatment Systems.

WCU is based on a conventional treatment system consisting :

- Rapid Mixing

- Slow Mixing

- Sedimentation

- Filtration

- Disinfection.

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Demineralization Plants

Water treatment by ion exchange is a common unit operation in chemical, petrochemical, oil refining, semiconductor manufacturing, power plants and utility plants, etc.

Ion exchange resins effectively remove silica, dissolved solids and total organic carbon (TOC) for reduced chemical regeneration usage, waste handling, and maintenance costs.

The Demineralization Plant is designed to remove the dissolved solids from the raw water. The Demineralization plant (DEMIN Plant) consists of Strong Acid Cation and Strong Base Anion Unit.

The raw water is passed through Cation Unit and then through the Anion Unit. The Total ionic load gets absorbed on resin, and you get water with Total Dissolved Solids (TDS).

Anion- Cation exchangers depend on water quality Degassifier and mixbed are used for Demineralization Plant.

FEATURES :

- *Highly effective*
- *Decreases the TDS*
- *Latest technology*
- *Cost effective*

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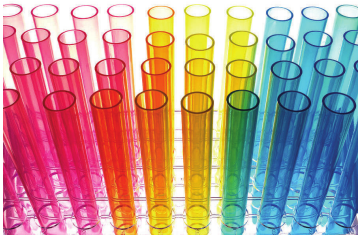
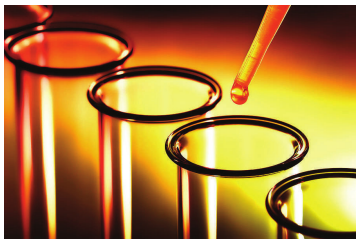
Laboratory Equipment & Analysis

AAT is able to proceed Jar-Test studies at his own laboratory. By this way, it is possible to optimize treatment plant's consumables. AAT also supplies below to his customers;

- *Photometer / Spectrophotometer*
- *TSS analysis set*
- *Imhoff Cone*
- *Glass Materials*





WTW

HORIBA

OAKTON INSTRUMENTS

HACH LANGE
UNITED FOR WATER QUALITY

MN MACHEREY-NAGEL

HANNA instruments

MERCK

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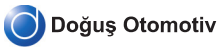
SOME OF OUR REFERENCES



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NOTES :

AAT Engr. & Cons.

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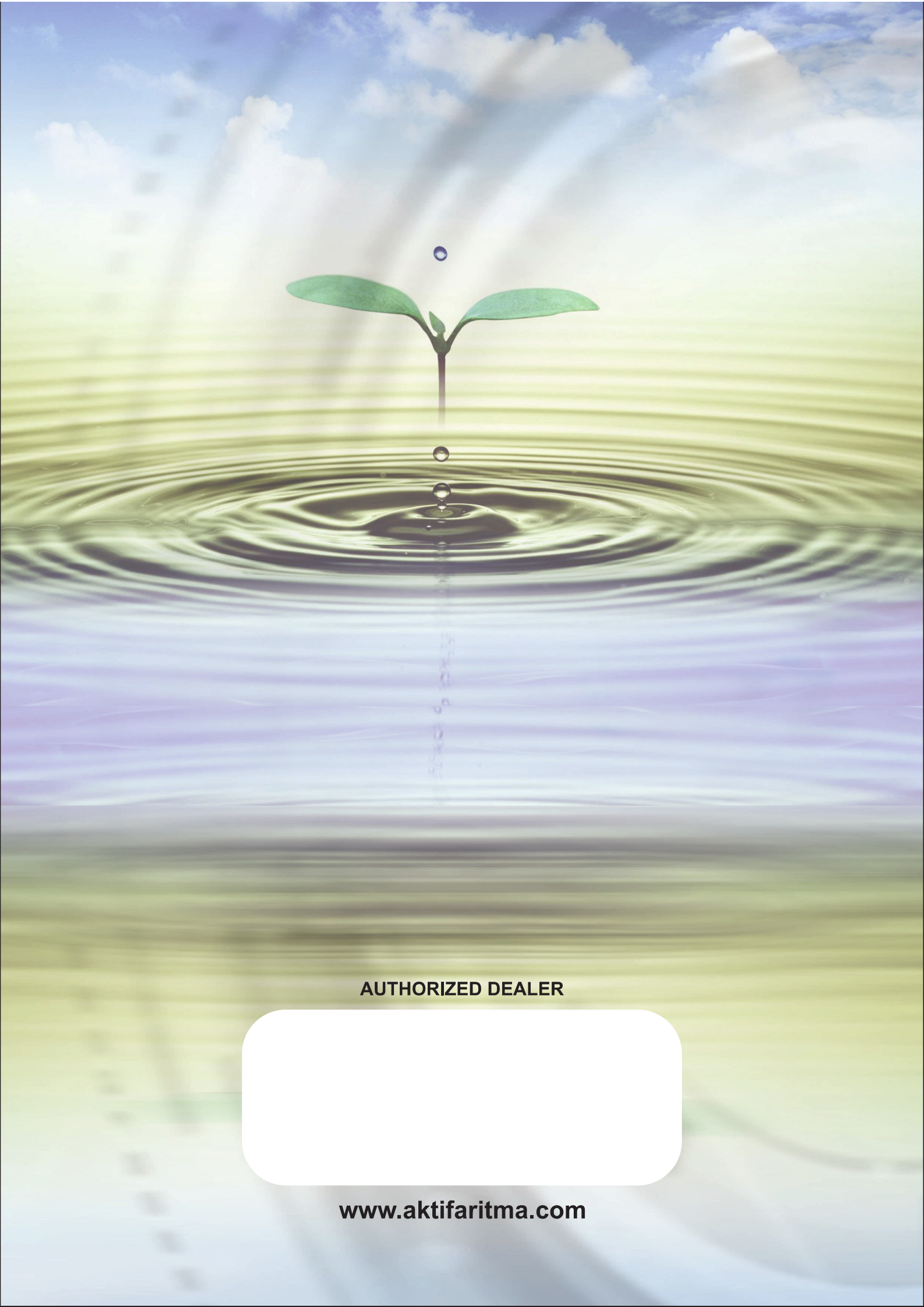

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