



KEYSINO



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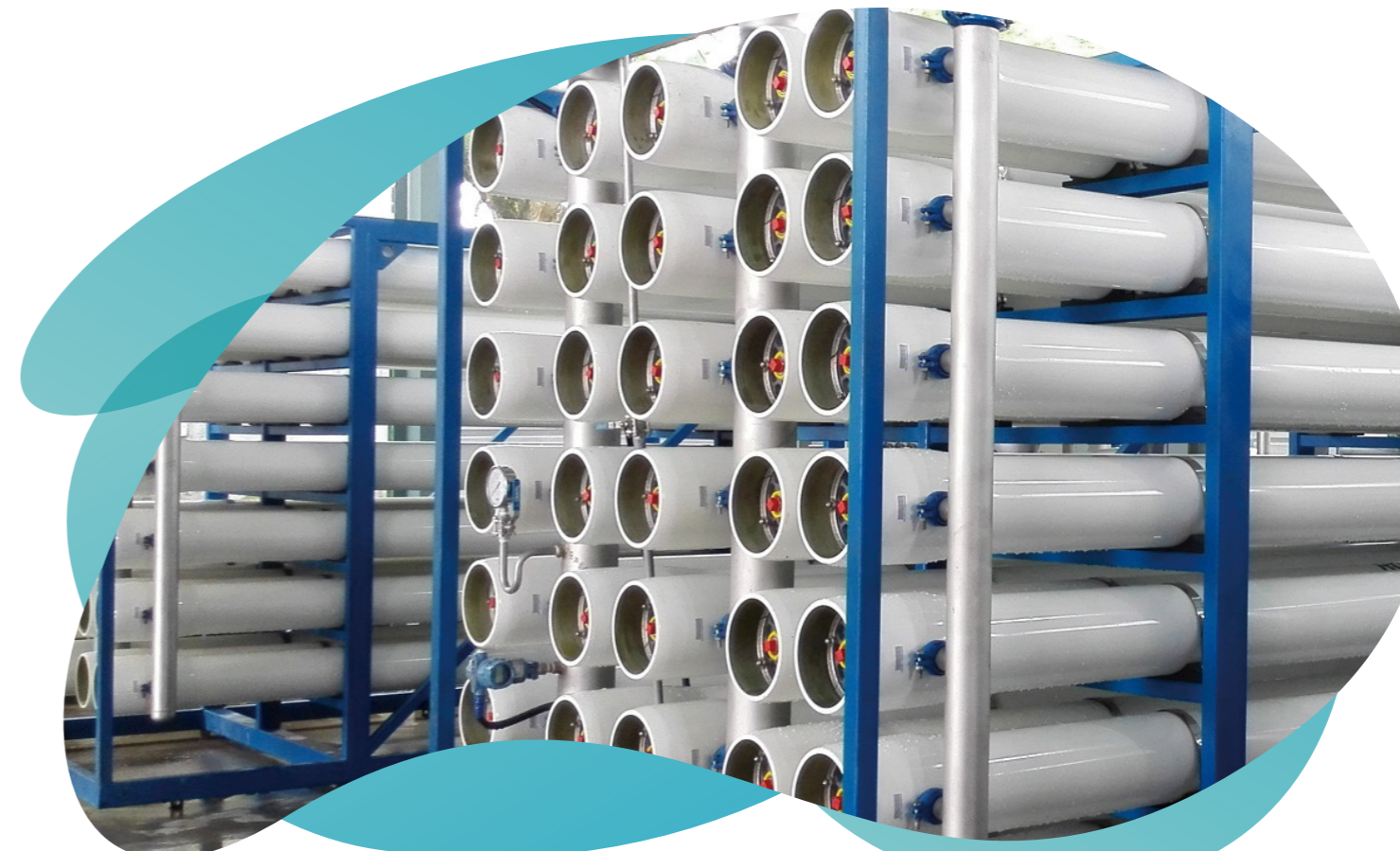
Professional Solution Provider for
Industrial Fluid Treatment and Wastewater Reuse

KEYSINO - Professional Technical Service Company for Industrial Fluid Treatment and Wastewater Reuse

Keysino, as a technology-based environmental protection company specializing in the separation business of industrial fluids, is committed to researching and developing membrane separation technology, optimizing production processes for industrial customers and providing total solutions for emission and consumption reduction, and comprehensive utilization of waste recycling. It's all about letting customers truly experience the housekeeper-type, one-stop services. Keysino's business scope covers petrochemical, steel metallurgy, textile printing and dyeing, food fermentation, biopharmaceuticals, pulping and paper making and other industries.

Based on differentiated demands of industrial customers in the field of industrial fluid separation and wastewater treatment, Keysino relies on self-developed membrane separation application technology to provide customers with total solutions for the membrane technology application, including the design and implementation of clean production technology solutions, integration of membrane separation equipment, operational technical support and after-sales services. As a consequence, *Separating clean from turbid, making the best use of everything* would be achieved by helping customers improve resource utilization efficiency, reduce production costs and cut pollutant emissions. Furthermore, *mutual benefits and mutual wins* between the economic benefits of customers, environmental protection benefits of the society and the economic benefits of companies would be achieved.

With R&D as the guidance and engineering capability as the guarantee, Keysino has been awarded many honors since 2013 such as Shanghai High-tech Enterprise, Shanghai Professional-Excellent-Special and New Enterprise, Patent Pilot Demonstration Enterprise, and 'Little Giant' Enterprise.



CORE TECHNOLOGIES

MetaSep™ Metal Membrane Technology

Originating from America, the membrane surface of MetaSep™ metal membrane is smooth and anti-pollution. Due to its unique membrane modulus form and highly durable membrane layer, excellent filtration performance and stable and reliable service life could be provided under extreme process conditions. Therefore, it could still be able to meet the needs of various industrial separations when other membrane products fail to be available.

Ceramic Membrane Technology

By adopting originally German-made filtration components, the inorganic membrane technology of Keysino is much more precise to control, robust to chemical and mechanical eruption, and endurable to anti-corrupt. In combination with the complete and stable process design and automatic operating system, the inorganic membrane technology is applicable to separation of materials with high contents of contaminants and suspended solids under harsh conditions.

Organic Ultrafiltration and Nanofiltration Technology

This technology is precise to control and sensitive to intercept, and could be used for molecule-level separation of proteins, pyrogen, pigments, colloids, etc. Precise election could be made according to the molecular weight of the target product. One-step concentration and purification could be realized under normal or low temperature. At the same time, the concentration costs could be reduced greatly, and damage to the product and harmful substances arising from phase-changing concentration could be avoided.

Electrically-driven Membrane Technology

By adopting the new efficient ion exchange membrane as the core separation element, and combining it with the unique structural design and reasonable system design, the electrically-driven membrane system of Keysino is more energy-efficient, resistant to contamination and stable to operate. It could be used for desalination, concentration, refining and recycling of ionic substances under electric drive.

Ion Exchange Technology

By adopting the unique design with double filter caps, counter-flow operations could be realized. With the installation of online sampling and PH meter maintenance could be carried out. As four columns could be connected in series or in parallel and the operation control program is embedded, continuously automatic operation could be performed. Operating parameters could be changed according to process requirements to better achieve process purposes. When this system is applied, the resin, water, acid and alkali consumption could be reduced.

KEYSINO

CORE PROCESSES

Comprehensive Treatment in Food, Biological and Medical Process

The suitable membrane process could be selected according to user demands to solve the problems of clarification, decoloration, concentration, desalination and separation, improve the quality, and reduce costs and waste emissions.

Alkali Recycling

Alkali and contaminants in waste alkali discharged in the process could be effectively separated from each other, the purified alkali liquor could be reused in the process, and contaminants could be recycled. This technology is widely applied in the industries of pulping, papermaking, adhesive chemical fiber, biomedicine, metallurgy and chemical.

Acid Recycling

Single-component or multi-component waste acid of various concentrations in the industries of metallurgy, electroplating and polycrystalline silicon could be separated and purified, so as to repeatedly use acid and greatly reduce waste acid emissions.

Zero Emission of High-concentration Brine

For high-concentration brine discharged in the processes of the chemical, power and pharmaceutical industry, water and salt could be recycled and nearly zero emission of contaminants could be realized, by using the pressure-driven and electrically-driven membrane technology in combination with the efficient evaporation and crystallization technology.

Mother Liquor Recycling

The mother liquor of crystallization in the pharmaceutical, medical and fine chemical extraction process could be desalinated, decolored and purified by adopting the membrane integrated, so that the purpose of product purification and recycling could be realized.

Comprehensive Treatment of Printing and Dyeing Wastewater

By adopting the A2O-MBR technology, COD and ammonia nitrogen in wastewater could be eliminated effectively, and heat in wastewater could be recycled. MBR effluent is treated with the RO technology. RO permeate water could be directly used as the process water, and concentrate complies with discharge standards.

SERVICE PROCESS

Understanding of Customer Demands

Solution Formation

Preparation of System Design

Equipment Manufacturing and Installation

Commissioning and Training

System Delivery

After-sales Service

Keysino sticks to the principles of energy conservation, consumption reduction, waste recycling and wastewater utilization, focusing on customer demands. It adopts the point source control method, combines the core membrane separation technology and various filtration and ion exchange technologies, and integrates upstream and downstream processes to provide customers with system solutions for energy conservation, consumption reduction, waste recycling and comprehensive resource utilization in industrial fluid processing. The company could help customers to comprehensively evaluate the process, including process evaluation, technology selection, membrane filter selection, etc., to accurately achieve the expectations and technical standards of customers.

Keysino adopts the most stringent project management system to ensure that separation systems meet the requirements of various industrial users.

Delivery is not the end, but the new beginning of cooperation. Our well-trained technicians would provide powerful and lifelong technical support for systems to ensure the performances of customers' products and processes.

SEPARATING CLEAN FROM TURBID



Efficient Utilization for Material Consumption Reduction

The new ion exchange technology could be applied to reduce the water and chemical consumption. The membrane integrated technology could be applied to optimize the metallurgical, salt chemical and pharmaceutical process for process simplification, efficiency improvement and energy consumption reduction. Waste acid, waste alkali, catalyst, mother liquor of crystallization and lignin could be recycled.

Clean Production for Contaminant Reduction

Keysino technologies could be applied to directly reduce contaminant emissions and achieve clean production. Adopting MetaSep™ metal membrane integrated process to increase concentration factors, raise efficiency and reduce subsequent processing costs. The crystallization mother liquor recycling technology of Keysino could be applied to reduce contaminant emissions and achieve clean production. The point source treatment technology is conducive to reduction of contaminant emissions. The biological treatment and MBR technology could be applied to meet wastewater discharge standards.

Raw Material Updating for Cost Reduction

New technologies of Keysino could be applied to manufacture qualified products with low-grade raw materials, thus expanding the sources of raw materials and reducing production costs.

Integrated technology for energy efficiency

Keysino adopts the membrane integrated technology including nanofiltration, RO and electrodialysis, in combination with the steam compression technology, to treat high-concentration brine and minimize the energy consumption. Adopting MetaSep™ metal membrane to further concentrate the fermentation liquor and concentrated liquor.

Custom Management for Water Consumption Reduction

Keysino, as a water management expert, could provide economical, reasonable and tailor-made solution for customers to recycle water and heat energy and meet the wastewater discharge standards.

Optimized Technology for Quality Improvement

The membrane integrated technology could be applied to stabilize and improve the quality of antibiotics, vitamins, amino acids, etc.

Efficient Impurity Removal for Yield Increase

The membrane integrated technology could be applied to remove impurities and increase the crystallization yield. The overall efficiency could be improved by means of recycling the mother liquor of crystallization.

Resource Recycling for Revenue Increase

Wastes such as TPA, hemicellulose and lignin could be recycled as new products to increase revenues and provide new profit growth or enterprises.

MAKING THE BEST USE OF EVERYTHING



20-year Industrial Experience

The team of Keysino has over 20 years of industrial experience and technical accumulation, took the lead in applying the sea water desalination technology into the salt chemical process. With the MBR technology, the COD in printing and dyeing wastewater could be reduced to below 80 after treatment. The full chamber bed (ion exchange technique) could be applied in the amino acid extraction process.

20+ Senior R&D Talents

Keysino has 20 senior R&D talents, who master market demands and the latest technologies both at home and abroad, and have rich experience in projects, ensuring constant innovations of the company and launching of new technologies, and keeping the company leading in technologies on the market.

30+ Patented Technologies

Keysino has over 30 patented technologies and plays a leading role in such technologies. It has dozens of pilot equipment and the 500m² R&D base. A large number of achievements have been acknowledged as the implementation projects of Shanghai. Keysino has also implemented Shanghai innovative fund projects.

100% High-quality Service

Keysino provides turn-key services including design, equipment machining, manufacturing, installation, commissioning and after-sales services. In addition to quality and efficiency guarantee, the company provides meticulous, thorough and stringent engineering services and provides the powerful guarantee for project implementation.

100+ Projects

The members of Keysino team has rich experience in large-scale project design, installation and commissioning, and have implemented a lot of wastewater recycling projects (scale: 10,000m³) and wastewater treatment projects (daily treatment capacity: 1,000m³) and dozens of waste alkali recycling projects.

1K+ Equipment Supply

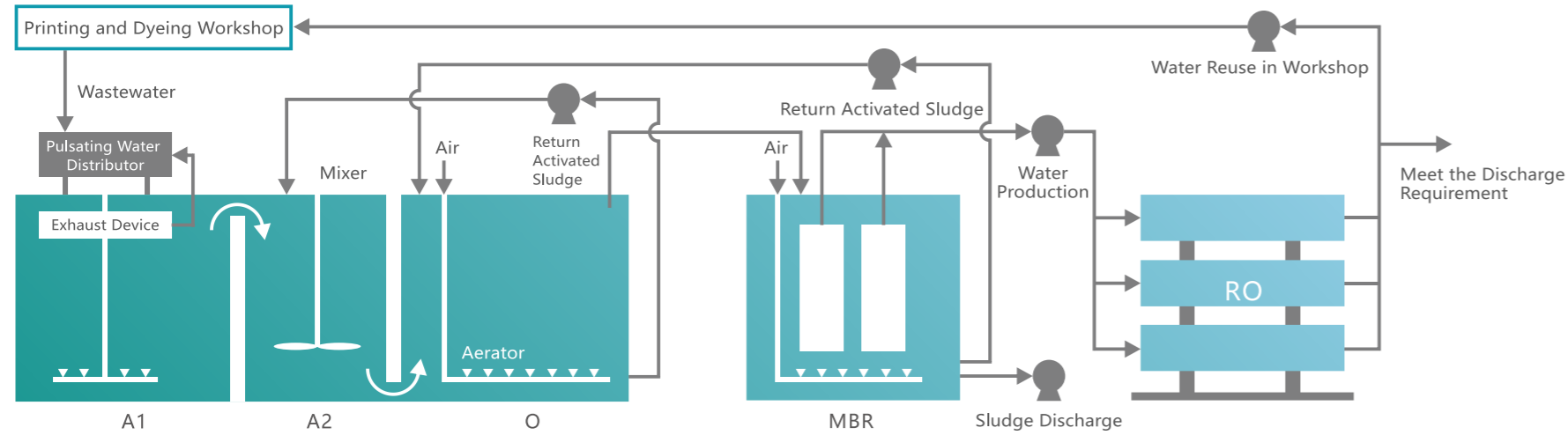
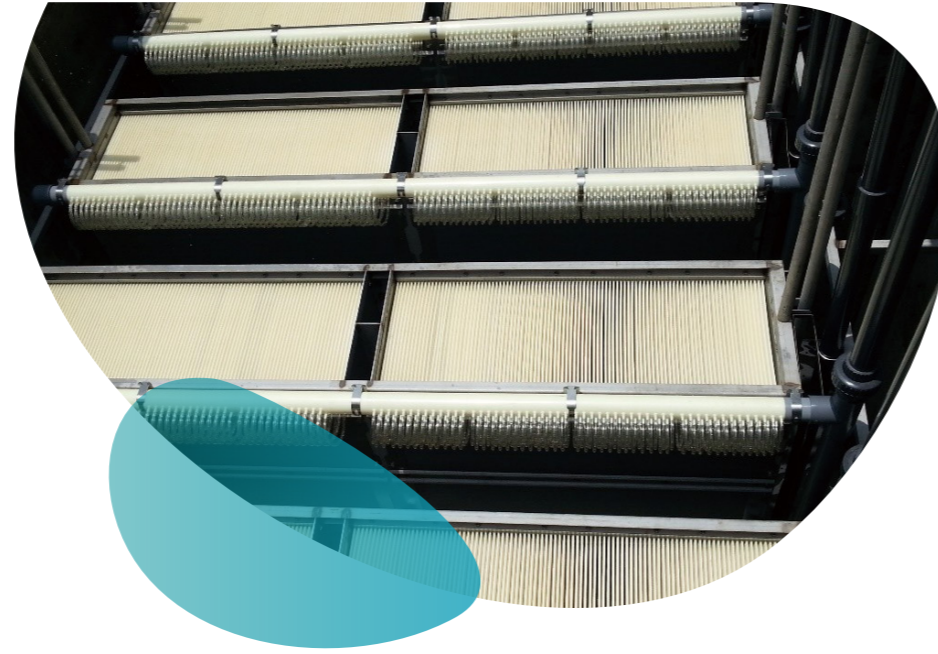
1000+ sets of equipment have been supplied, including various kinds of membrane filter equipment, biochemical treatment equipment, MBR equipment, ion exchange equipment, filtration equipment, manual operation equipment and automatic control equipment, 1000 times verified as the reliable product quality.

1M+ Treatment Capacity

With efforts of Keysino, the quantities of contaminants are reduced by hundreds of thousands of cubic meters each year, and about 100,000m³ alkali, 1,000,000m³ water and a large number of other valuable substances are recycled, thus greatly reducing the enterprise burden and creating huge additional benefits for enterprises.

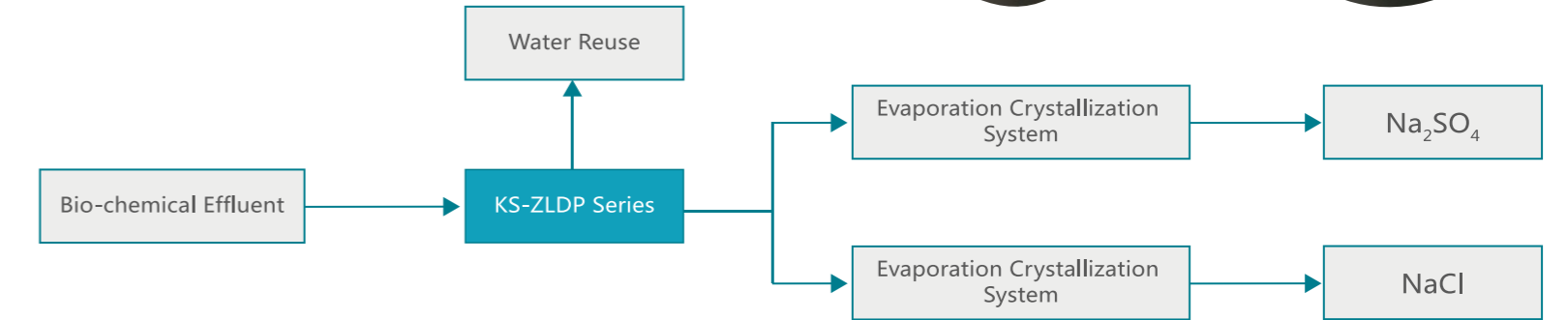
Water Management Expert for Textile Printing and Dyeing Enterprises: Provide Comprehensive Wastewater and Heat Energy Recycling Solutions

- The point source treatment technology could be applied to highly contaminated wastewater in the pretreatment section, to recycle alkali and other wastes.
- The A2O-MBR technology could be applied to efficiently remove total nitrogen and COD and provide space for water recycling.
- MBR effluent could be further purified by means of direct RO. RO effluent could be directly used as the process water. The water recycling rate is more than 50%.
- The MBR technology could be applied to greatly reduce biological sludge.
- Wastewater stable complies with the discharge standards. At the same time, water and heat energy could be recycled, thus solving the problems negatively affecting enterprise development.



Comprehensive Utilization and Zero Discharge of High-salt Wastewater

For the water quality characteristics of high salinity wastewater: high concentration of organic substance, high calcium and magnesium content, and high salinity, KS-ZLDP Zero Discharge System researched and developed by Keysino would be used to realize water reclamation and utilization of salt recycling in wastewater to achieve zero discharge.



Typical Performance

- Treatment Capacity: 6,000m³/d
- Salinity: 5,000 - 6,000mg/L
- COD: about 500mg/L
- Treatment Result: Water reclamation, salt separation and recycling utilization have been realized after the treatment for wastewater in the pretreatment unit, the highly-concentrated salt separation unit and the highly-concentrated unit. Compared with traditional concentration methods, the aforesaid process has saved 30% of energy, reduced more than 95% of wastewater quantity, cut more than 60% of evaporation unit's investment and operating cost, decreased the treatment costs for solid waste, reduced the pollution discharge pressure for enterprises, curtailed the energy consumption expenditure for enterprises and created a new profit for enterprises.

Industrial Waste Alkali Recycling

Waste alkali liquor in the industrial production process could be purified and recycled, which realizes comprehensive utilization of resources. This technology could be widely applied in the industries of petroleum, chemical, pulping, papermaking, food, etc.

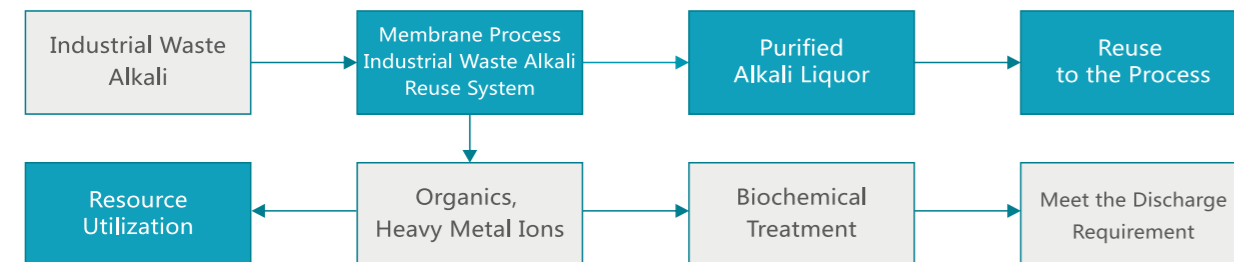
It is widely applied in the industries of pulping, paper making, adhesives, chemical fibers, textiles, printing and dyeing, biology, food, pharmacy, etc.

Alkali, water and organic matters could be recycled.

1. High-concentration waste alkali liquor in the adhesive fiber production process could be efficiently purified, to realize recycling of high-concentration liquor and high-value reuse of organic matters in waste alkali.
2. Resin regeneration alkali liquor in the antibiotic production process could be recycled. After pigments, proteins, polypeptides, polysaccharides and other impurities in waste alkali liquor are removed, the alkali liquor could be recycled in the process.
3. Various kinds of waste alkali for cleaning in other industries could be recycled.

Benefits for Customers:

1. The consumption of raw and auxiliary materials is lower. The alkali liquor utilization rate could be increased effectively, and the consumption of raw and auxiliary materials could be reduced.
2. The cost of waste treatment is lower. By using the membrane separation technology of Keysino, useful components in waste alkali liquor could be effectively recycled, and the cost of subsequent waste treatment could be reduced.



Comprehensive Industrial Waste Acid Utilization System

Waste acid and alkali in the industrial production process could be purified and recycled to realize comprehensive utilization of resources. This technology could be widely applied in the industries of petroleum, chemical, pulping, papermaking, food, etc.

Market Applications

It is applied in the field of wet metallurgy, steel production, electroplating, battery, titanium dioxide, polycrystalline silicon, further graphite processing, etc.

Water Quality Application

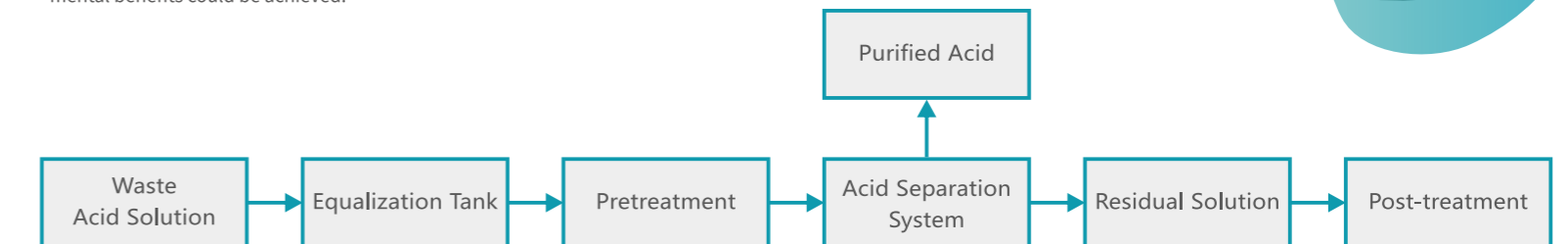
Single or mixed components in high-concentration and low-concentration hydrochloric acid, nitric acid, sulfuric acid and hydrofluoric acid could be separated and recycled.

Treatment Effects

More than 80% of single or mixed acid could be recycled, and the rate of non-acidic component removal is above 90%.

Process Advantages

- Compared with the traditional neutralization technology, the costs of raw acid and alkali for neutralization could be reduced greatly. In particular, solid waste treatments costs could be reduced by 80% to 90% and significant economic benefits could be achieved.
- The costs of maintenance and operation are low.
- Automatic and unattended control could be realized.
- Compared with the traditional treatment method, significant economic and environmental benefits could be achieved.



Application Cases

- Water provided by the customer: the HNO₃ concentration of waste solution provided by one steel production enterprise is 16-18%, the HF concentration is 5%, and the daily treatment capacity is 40m³/d.
- Process performance: the acid recycling rate is 80%, and the rate of non-acidic component removal is above 90%.
- Economic benefits: compared with the traditional neutralization technology, the costs of neutralizing alkali is reduced by 343/m³ CNY of waster solution, the cost of raw acid is reduced by 739/m³ CNY of waster solution, and the solid waste treatment cost is reduced by 1,112 /m³ CNY of waster solution. Based on 330d/a treatment, the annual average net profits reach 27.5 million RMB Yuan, after deduction of equipment investment.

