Comparison of conventional UF+NF and NEWA CDNF processes

Item	High temperature carbonation + Dissolved salt + UF + Spiral Wound NF	NEWA CDNF
Process route	High temperature carbonation + Dissolved salt + UF + Spiral Wound NF	Dissolved salt + CDNF
System contamination resistance	NF is easy to be fouled and scaled, poor resistance to COD and biological pollution, need additional pre-treatment such as high temperature carbonization and UF.	CDNF is equipped with self-cleaning function, wide flow channel, and strong anti-pollution.
Pre-treatment requirement	NF requires strictly pre-treatment and inlet parameters, long process chain.	Wide range of inlet requirements, short process chain
Permeate stability	Hollow UF/ Spiral Wound NF is difficult to clean, once UF contamination, NF lack of water.	Easy to clean, pre-treatment full-flow filtration, strong equipment continuity.
Membrane recoverability	NF flow channel is narrow, grid is easy to be fouled and scaled, poor cleaning and recovery effect after contamination, flow channel 0.7-0.8mm.	Open flow channel, good cleaning recovery, flow channel 2.5mm.
Membrane replacement cost	Components need to be replaced in whole after destructive damage from air hammer, water hammer, etc.	Membrane can be replaced individually.
Oxidative damage	UF filled with oxidizing biocide, improper operation may cause irreversible damage to NF.	No need to add oxidizing biocides, no risk of oxidative damage
Chemical cleaning	Requires backwashing/30min, CEB/12h, chemical cleaning every 2 to 7 days or so.	No need to backwash, more than 30 days

Adopting CDNF instead of "high-temperature carbonization + UF + NF" process, the process is simpler and the advantages of each index are obvious; CDNF membrane module has superb pollution resistance for the treatment of high COD and high salt wastewater, no need to add high temperature carbonization and other pre-treatment equipment, so CDNF was chosen as the salt separation process.

Product Parameters

CDNF series			
Model	NF15S	NF30S	NF90F
Membrane material	Polyamide Composite Nanofiltration Membrane (NF)		
Max. operating pressure	15bar	30bar	90bar
Membrane area	17㎡	17㎡	15㎡
Disc qty	224	224	200
Membrane qty	223	223	199
Flux range	Depending on water quality,5~50 LMH		
Inlet flow	Normally900~1300 L/h, Max1500 L/h		Normally800~1200 L/h, Max1400 L/h
Recovery rate	Depending on water quality,Individual recovery rate＜45%		
Rejection rate	Min rejection rate94%、Stable rejection rate96%		
Average pressure drop	2~4 bar	2~4 bar	2~4 bar
Flow channel width	2.5 mm	2.5 mm	2.5 mm
Residual chlorine tolerance	＜0.1 ppm, Recommended for complete removal of residual chlorine		
Max. operating temperature[a]	45 ℃		
pH range	Continuous operation: 3~10 Short-term cleaning (30 min): 1~12		
Application	Separation of mono- and divalent ions in low salinity water	Separation of mono- and divalent ions in low salinity water	Separation of mono- and divalent ions in high salinity water and seawater, and concentration of divalent salts such as sodium sulphate and ammonium sulphate

[a]Maximum temperature of 35°C for continuous operation at pH above 10

Application industry

More industry solutions for you +

Brine Separation and Recovery Solution

H+S Technologie + NEWA 烟台金正环保科技有限公司 YANTAI JINZHENG ECO-TECHNOLOGY CO., LTD

Miscellaneous Salt/ Salt Separation Resourcing Industry Typical Case

Inner Mongolia Sanchangliang Industrial Park Miscellaneous Salt Resource Utilization Project

Industry Background

China's industrial wastewater discharges a total of 20 billion tons, of which the production of high-salt wastewater accounted for more than 5%, according to 1.5% of the salt content of the calculation, which produces more than ten million tons of waste salt, high salinity wastewater and waste salt if not properly handled, not only to destroy the ecological environment, Once the soluble salts and impurities in the contaminated salt have seriously caused soil salinization, and even the surrounding water sources and groundwater causing serious pollution. Industrial waste salts are complex, toxic and harmful, the disposal technology is difficult, the landfill method covers a large area, and the current high cost of domestic treatment of solid hazardous waste is difficult for enterprises to bear.

Therefore, to achieve the resourceful use of sewage wastewater, through the sewage treatment "last kilometre" is an effective measure to solve the above problems and a multi-win way, the resourceful treatment of concentrated brine and miscellaneous salt has become a key technology for industrial wastewater discharge.

Project Introduction

In June 2022, the annual output of 200,000 tons of miscellaneous salt resource utilization project in Sanjianliang Industrial Park, Dalat Economic Development Zone, Inner Mongolia, was officially put into operation and produced salt smoothly. The project marks the adoption of NEWA's CDNF process has truly achieved ZLD of highly concentrated brine and the resourceful utilization of salt separation products, allowing more industrial enterprises to achieve cleaner production and green sustainable development with low cost, high efficiency and stable operation.

The successful commissioning of the project effectively solves the environmental pollution problems caused by the concentrated brine, miscellaneous salts and solid wastes generated by enterprises in and around the Dalat Economic Development Zone, industrializes the water treatment and miscellaneous salts recycling economy, and builds a steady-state closed-loop recycling system for water treatment and miscellaneous salts treatment. It is listed in the Green Industry Guidance Catalogue (2019 Edition), and the process used is included in the Catalogue of Industrial Water Saving, Technology and Equipment Encouraged by the State (2021).

Project capacity: Processing 200,000 tonnes of miscellaneous salt per year, including 126,000 tons of solid miscellaneous salt and 74,000 tons of miscellaneous salt recovered from 3000m3/d concentrated brine.

Process technology: Chemical pretreatment, advanced oxidation, high-pressure CDRO, CDNF, evaporation crystallization, etc.

Resource product standards: Sodium chloride: It meets the requirements of the indicators for the preparation of nuclear-grade sodium metal salt, with a purity of 99.5% or more.

Sodium Sulphate: Industrial Anhydrous Sodium Sulphate (GB/T6009-2014) first class grade A standard.

Potassium nitrate: "Potassium nitrate for agricultural use" (GB/T 20784-2018) first grade standard.

Project highlights

Low OpEx

The NEWA CDNF system is highly efficient and stable in terms of fouling and scaling resistance, eliminating the need for high-temperature carbonization to remove organic matter and significantly reducing overall energy consumption by 30% to 50%, which greatly reduces operating costs.

Product Resourcing

chievement of resource utilization of various products such as sodium chloride, sodium sulphate, potassium nitrate, etc.

Highly efficient pretreatment

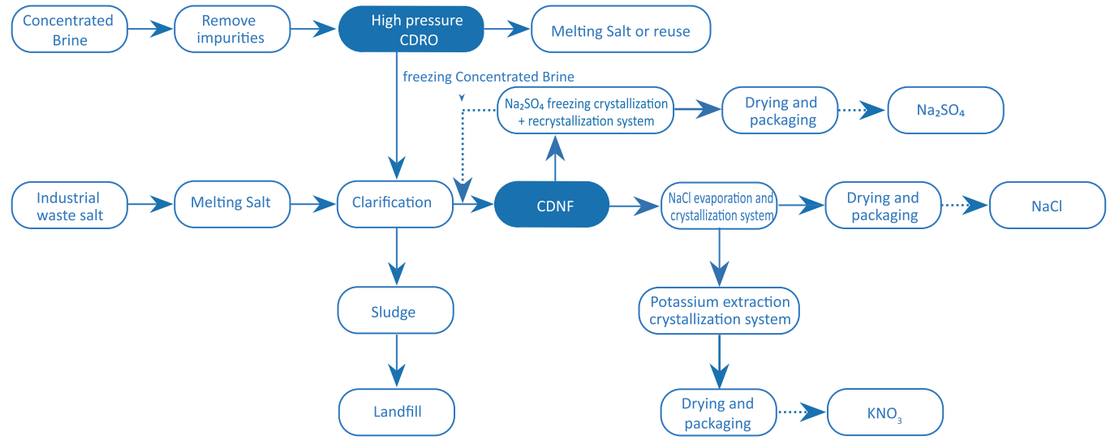
De-stabilisation and de-fluoridation technology significantly reduces the amount of pre-treatment dosage and operating costs.

Highly efficient COD removal method to ensure the quality of crystalline salt

The product meets the standard for nuclear-grade sodium metal salt

Multi-stage CDNF salt separation design effectively improves the purity of sodium chloride in the permeate, so that the crystalline sodium chloride salt meets the index requirements for the preparation of nuclear-grade sodium metal salt, with a purity of more than 99.5%.

Concentrated Brine and Miscellaneous Salt Resourcing Processes



Concentrated Brine and Miscellaneous Salt Resource Treatment Pain Points and Difficulties and NEWA Process Advantages

High energy consumption for high temperature carbonization

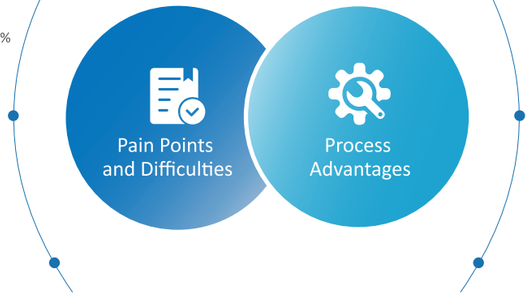
The conventional process requires high temperature carbonization to remove organic matter, with high energy consumption, 30%-50% higher than NEWA's process.

Low quality crystalline salt

The conventional process uses thermal salt separation, which has high evaporation cost and incomplete salt separation leading to high rate of miscellaneous salt;

High cost of rigid landfill

Most of the landfills in China are flexible landfills, waste salt landfills are restricted, and rigid landfills are costly and unaffordable for most waste-producing enterprises.



Excellent flat membrane performance

Excellent flat membrane performance, wide flow channel, strong resistance to fouling and scaling, no need for high-temperature carbonization, low energy consumption, and can effectively cope with complex water quality.

High quality crystalline salt

Centralized treatment of industrial waste salt into high-purity sodium chloride, sodium sulphate and potassium nitrate, which can be recycled as industrial salt, industrializing water treatment and miscellaneous salt recycling economy, and building a stable closed- loop recycling system

Resourceful Reuse

It solves the worries about the subsequent treatment of concentrated brine and miscellaneous salt, and provides strong hardware support and production guarantee for the sustainable development of the park and enterprises.

NEWA CDNF Product Advantages

Opening up the "last kilometer" of sewage treatment

NEWA's innovative CDNF separates the miscellaneous salts generated after evaporation with high quality and turns waste into treasure, which really realizes the whole industrial chain of sewage and wastewater resources, and the low-cost and high-efficiency treatment technology completely solves the problem of salt separation.

- Accurate salt separation
- Reduce energy consumption
- High product purity
- stable performance

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