

Shandong Iron and Steel Co., Ltd. Laiwu Branch Coking Plant Coking Wastewater Deep Treatment and Reuse Project

Project Introduction

After the upgrading of three sets of biochemical treatment systems in the coking plant of Laiwu Branch of Shandong Iron and Steel Company Limited, the effluent indexes basically meet the indirect emission standards. At present, the coking wastewater identified by the company is mainly used for slag flushing in the blast furnace, water for the sintering machine, flue gas cooling in the converter and wet quenching of coking. After the completion of the technological transformation, according to the company's planning, coking wastewater will no longer be used for slag flushing in the blast furnace, and coking wastewater will no longer be used for water consumption in the sintering machine and flue gas cooling in the converter. In order to improve the coking dry quenching rate and meet the demand for coking quality in the blast furnace, the water consumption of coking wet quenching is very low, and a large amount of coking production wastewater will be indigestible by that time. In order to completely solve the problem of coking wastewater, the project of coking wastewater deep treatment and reuse is constructed, and the biochemical effluent is subjected to the deep treatment of "double membrane + salt extraction (sodium chloride)". The first stage reverse osmosis permeate enters the circulating water system as recycled water; After further concentration and salt separation of concentrated salt water, sodium chloride industrial salt is extracted. The salt separation concentrated water is further treated to meet the needs of subsequent slag flushing or coke quenching users.

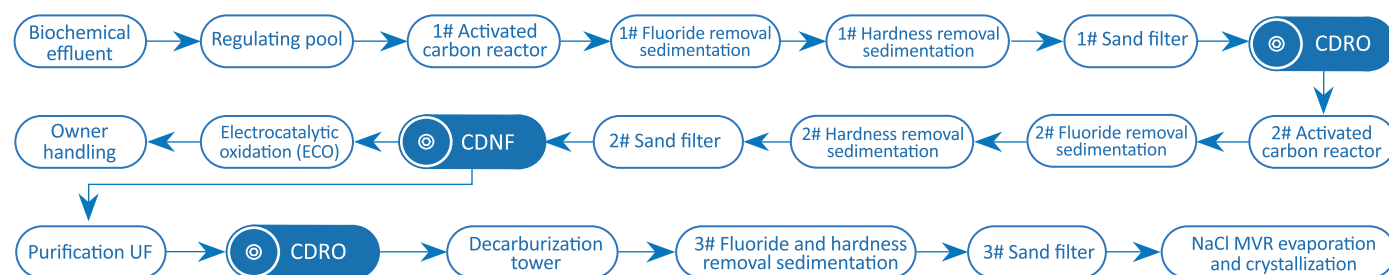


Project capacity: 3600m³/d **Process Flow:** Powder Carbon + Fluoride Removal + Hardness Removal + Filtration + Flat Membrane + Evaporation and Crystallization

Inlet: TDS≤9000mg/L, COD≤200mg/L, Cl⁻≤2200mg/L, SO₄²⁻≤3200mg/L, F⁻≤75mg/L

Permeate: TDS≤1000mg/L, The rest of the indicators are in line with the "Design Code for Industrial Circulating Cooling Water Treatment (GB/T50050-2017)".

NEWA process



Project highlights

Flat membrane technology

The flat membrane technology can effectively solve the problems of UF+RO's strict requirements for influent water quality, long pre-treatment process, and easy fouling and blockage of the membrane, ensuring the stable operation of the system as a whole.

Sedimentation + magnetic separation coupling technology

NEWA developed the "Sedimentation + magnetic separation" coupling technology, with strong flocculation ability, stable water quality characteristics (turbidity is generally <5NTU). This technology serves as a pre-treatment for the membrane treatment process and ensures the stable operation of the whole system.

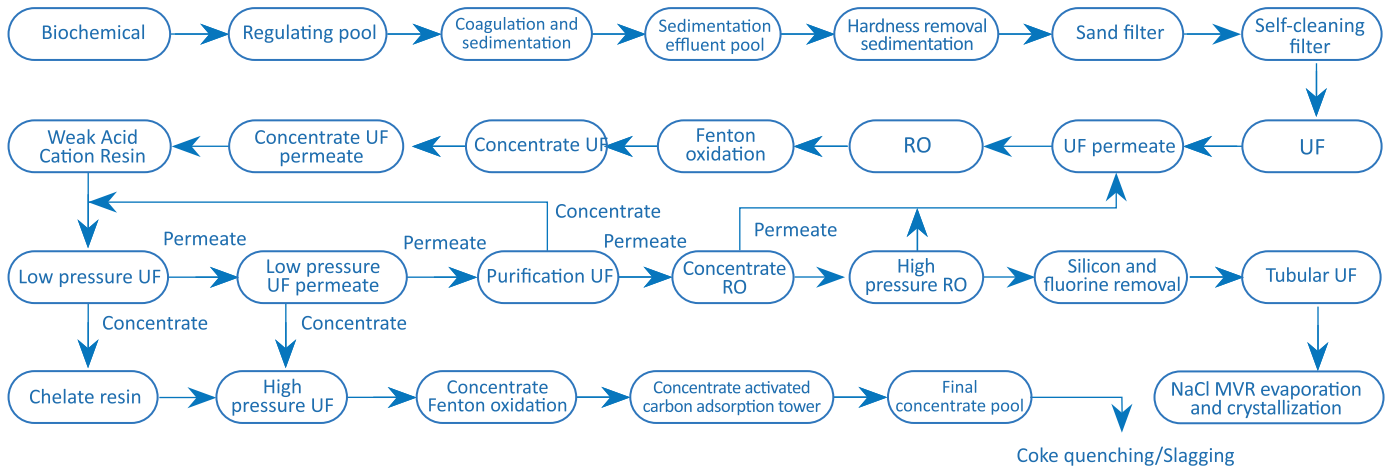
Powder activated carbon process

This project adopts powder activated carbon process to replace granular activated carbon adsorption + activated carbon regeneration process, with good COD removal effect, less activated carbon dosage, and low investment and operation cost.

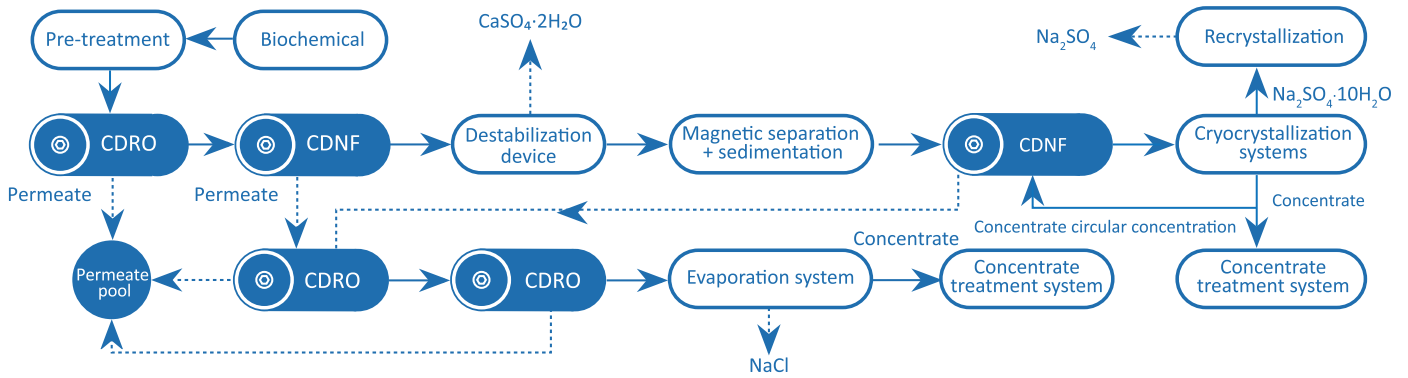
Reduce 20% OpEx

In the conventional process, high OpEx has been the pain point of the industry. Under specific water quality, NEWA innovative process reduces the evaporation system treatment capacity by 10%~20%, reduces dosage by 5%~15%, and reduces OpEx by 10%~20% compared with conventional process.

Conventional process



NEWA Steel Wastewater ZLD Process Route and Advantages



- Flat NF coupled with destabilization system, and flat UF coupled with cryocrystallisation with no phase change in crystallisation mode.
- Compared with the conventional process, dosage is reduced by more than 50%, and OpEx is reduced by 20~30%.

- NF desalination is synchronized with the concentration of COD, which can be reduced by mother liquor treatment system.
- Tolerant of high COD, high hardness, high TDS and other complex water quality to enter.

NEWA process compared to conventional process

Item	NEWA process	Conventional process	Result
Main process	Flat membrane	UF+RO	Can completely replace conventional process
Dosage	Many	Few	Reduce 5%~15%
Sodium Hydroxide	2.1t/d (w%≥30%)	4.9t/d (w%≥30%)	Reduce 57.1%
Sodium carbonate	0.9t/d	1.86t/d	Reduce 51.6%
Evaporation capacity	Small	Large	Reduce 10%~20%
Evaporation capacity	Short	Long	Few points of failure low maintenance cost

Partial cases

Project name	Location	Type	Capacity
CDRO system for concentrated brine ZLD project of the old district integration project Hebei	Hebei	Steel wastewater	13m ³ /h
South Xinjiang Coking Plant Concentrated Brine Treatment Project	Xinjiang	Steel wastewater	25m ³ /h
Procurement of DTRO equipment for Taihang Iron & Steel Central Water Treatment Phase II and ZLD System EPC Project	Hebei	Steel wastewater	16m ³ /h
Wuhan Iron and Steel Company Limited Wastewater ZLD Centre for Steel Rolling Area Project Mother liquor NF system	Laiwu	Steel wastewater	150m ³ /h
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