

A Pilot-scale Study on Treatment of Membrane Concentrate of Landfill Leachate by Dtro

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Abstract: A pilot-scale test, using the DTRO process, reduce membrane concentrate landfill leachate from a waste incineration plant, carried out, operational states, produced water quality. DTRO system under different water recovery conditions, investigated besides, flux restoration effect through membrane washing, also analyzed. It showed, when water recovery 50% DTRO system ran stably, good treatment effect, desalinization about 97%, removal COD, total N, chloride ions above 99.3% 97.3%, 98.1%. when water recovery rate increased from 50% to 65% serious membrane fouling appears while produced water quality changes little. after a 14-day continuous operation, membrane cleaned by HCl, NaOH, degree membrane flux recovery above 95%. The DTRO penetrating fluid could be used as boiler feed water after mixed. Reverse Osmosis Water, concentrate could be sent to incinerator burning.

Keywords: Landfill leachate; dtro; concentrate; reduction

Butterfly Reverse Osmosis (DTRO) Membrane processing technology is in recent years the rise of a concentration suitable for high liquid processing of anti-pollution reverse osmosis technology. Has water quality requirements low, Water quality good, Recovery rate high, Run stability and Characteristics. Has been in Waste Leachate, Desulfurization wastewater and so on Application^[8-10]. This study use DTRO Process of Infiltration

Filtrate of membrane concentrate the reduction Pilot Test. The ITS in different water recovery rate under the operation conditions and water quality. And the membrane clear Wash After flux recovery the analysis. In order to DTRO Process processing membrane concentrate of engineering application provide technical reference.

1. Material and Methods

1.1 Test Material

Test with wastewater from Wuhan A Garbage Incineration Plant of reverse osmosis Membrane concentrate. Main water quality index such as table 1 Shown in.

DTRO Membrane module of effective membrane area 9.4 m^2 Maximum operating pressure $75 \times 10^5 \text{ Pa}$. Test for an arcane will water samples join to water quality regulation tank in and add Scale Inhibitor and Hydrochloride Regulation scale inhibitor quality concentration

7 mg/LPH Value 6.0. With water pump will regulation good water samples into feed tank in mixed Feed tank in Water Samples by water pump import to filter in the pre-filter. Filter after the water samples through the booster pump pressurized into membrane module. By concentrate pipeline control valve Regulating column in the pressure. In pressure of drive dry water purification through membrane by Water Production Pipeline collection to Water Tank Concentrate

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divided 2 Road All the way back to feed 1.2 Test Methods

Test by regulation effluent concentrated water flow and production water flow control different water recovery rate. The system operation conditions and water quality. And the membrane cleaning after flux recovery the analysis. Test the simulation work. Industry Operation Style Continuous operation 14 d Middle process not the cleaning to a cycle end. Membrane cleaning style the first hydrochloride pickling again sodium hydroxide caustic washing of combination style.

1.3 Analysis Methods

Test process in pH Value, Conductivity, Chloride Ion, COD_{Cr}, Total Nitrogen of using The 《Water and Wastewater of analysis monitoring methods (Fourth Edition) Of In provisions of methods^[11].

2. Results and discussion

$\times 10^5$ Pa Gradually increase to the first 14 Days 49×10^5 Pa Pressure growth is slow. In 50% Water Recovery Rate under run an arcane system of membrane pollution degree lighter. Can be long time stable operation. And System in 65% Water Recovery Rate under With the Run Time of extended Membrane column pressure first slow increase. More 6 d After pressure increased speed significantly speed up. In the first 6 Day membrane column pressure compared with the initial pressure increase. 10% About. In 65% Water Recovery Rate under DTRO System run for an arcane membrane pollution degree is serious. System Operation 6 d After need to the membrane cleaning. Or Membrane Pollution of rate will significantly increased^[12].

2.1 Different Water Recovery Rate under DTRO Water Quality

With the Run Time of extended DTRO Water water quality change amplitude not Water Quality Stability. In water conductivity 35 000 ~ 45 000

μ S/Length Chloride Ion quality concentration 7/500 ~ 8 000 mg/L Total Nitrogen quality concentration 1 500 ~ 1 800 mg/L An arcane Different Water back

Yield under the Water Conductivity, Chloride Ion, Total Nitrogen of quality concentration were Respectively in 800 ~ 1 500 μ S/Length, 100 ~ 150 mg/L, 25 ~ 40 mg/L Between Removal rate respectively 95.7% ~ 98.2%,

98.1% ~ 98.6%, 97.3% ~ 98.3%. In water COD_{Cr} The quality concentration 1 400 ~ 2 000 mg/L Time, 50% Water Production by water recovery rate COD_{Cr} The mass concentration is 5 ~ 20 mg/L, 65% Water Production by water recovery rate COD_{Cr} The mass concentration is 25 ~ 25 ~ 40 mg/L, Slightly elevated. The improvement of water recovery rate, DTRO The removal efficiency of organic matter will decrease slightly. This could be because DTRO

In the process of treatment of leachate membrane concentrate, The increase of water recovery would lead to the increase of membrane fouling. So that the operating pressure increased. Some of the small molecules in the leachate will enter the clear water through the membrane pore under high pressure. Improved water production COD_{Cr} Concentration^[12].

Overall Look, DTRO System water recovery rate from 50% Rise 65%, Little impact on water quality. Water quality can be reached GGB 16889-2008 《Standard for Pollution Control of Domestic Waste Landfill》 Table

2.2 Emission Standard, And DTRO Mixing of produced water and original reverse osmosis Produced Water

The pollutant concentration can be further reduced. After mixing, the water quality can meet the requirements of boiler feedwater supply in incineration plant.

Slave chart 4. You can see, The membrane flux of the system before operation is 18.4 L/(M²·H), In 50% Continuous operation under water recovery rate 14 d Empress, Membrane flux dropped 12.3 L/(M²·H), The flux recovered 17.1 L/(M²·H), Alkali Washing flux recovery after pickling

18 L/(M²·H), The membrane flux recovery rate reached 97.8%; In 65% Continuous operation under water recovery

rate 14 d, Membrane flux dropped 6 L/(M²·H), Membrane flux decreased degree big. But after pickling and Recovery Rate 95.1%. So in water recovery rate 50% and 65% of conditions under. When system due to Membrane Pollution and lead to membrane flux Decreased when can by acid washing and caustic washing of cleaning style recovery and membrane flux recovery degree high.

3. Conclusion

The DTRO Process processing garbage leachate reverse osmosis membrane concentrate can effectively improve the water recovery rate, reducing concentration fisheries. DTRO

50% Water Recovery Rate Under CAN continuous stable operation. Membrane pollution degree lighter; In 65% Water Recovery Rate under System Operation 6 d After Run pressure significantly increase Membrane pollution degree high. By hydrochloride acid pickling and sodium hydroxide caustic washing of combination style can effectively remove the membrane surface of Sewage Dyeing. Membrane flux recovery rate can achieve 95.1% More.

DTRO System Water Quality Stability And different water recovery rate under water quality change not. DTRO Water Production of Conductivity, Chloride Ion, Total Nitrogen, COD_{Cr}. The quality concentration respectively 800 ~ 1500 μS/

Length, 100 ~ 150 mg/L, 25 ~ 40 mg/L, 5 ~ 40 mg/L. Removal rate respectively 95.7%, 98.1%, 97.3%, 99.3% More. DTRO Water Production and the original Reverse Osmosis Water mixed after can be used as a incineration plant of boiler water supply. And reduction after the concentrated water can all back to spray to furnace burning. To solve membrane concentrate the problem of the treatment.

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