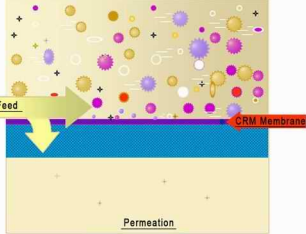


CRBR™ Ceramic Membrane Process

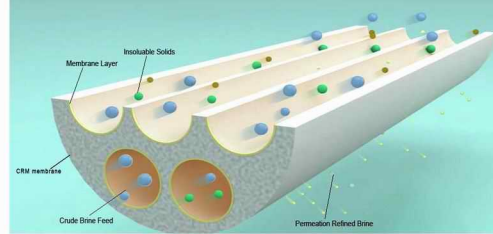
CROSSFLOW FILTRATION



Crossflow Filtration



Brine before&after CRM-UF



CRM Membrane Crossflow Filtration

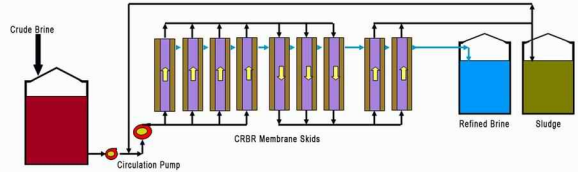
DESCRIPTION OF CRBR PROCESS

Raw salt is dissolved in Dissolver at concentration 280-300g/L at 55-60°C. When reacted with NaOH & Na₂CO₃, Mg²⁺ and Ca²⁺ will be transformed into sediments Mg(OH)₂ and CaCO₃. Other organic solids like alga, humic acid will be decomposed to small fragments by oxidant NaClO. All those impurities have micron particle size, and are difficult to be removed.

After reaction, crude brine will be pumped into a prefilter by feed pump to remove the fibers and sand. Circulation pump will increase high velocity for the brine, to flow across the membrane layer. Driven by pressure, clean NaCl solution will pass through the membranes, which is called Permeation stream and goes to secondary refining process-Chelating resin. The micron solids like Mg(OH)₂, CaCO₃, fragments, mud will be rejected into the Retentate stream, and then go to Filter Press to remove the sludge.

The flowrate, operating pressure, and VCF (volume concentrated factor) can be automatically controlled by remote DCS or PLC system.

Backpulsing will be automatically applied to increase the flux. Compressed air is fed into the Buffer tank, pushing the clean brine into the permeation side of membrane module from an opposite direction. The fouling cake will be blown away. Chemical cleaning in space with 15% HCl can also be very effective to remove deep scaling inside the porous structure. By crossflow filtration which is combined with backpulsing and CIP, CRBR process can keep flowrate high and stable for long time operation.



ADVANTAGES OF CRBR PROCESS

- >> Stable and high quality of refined brine, with SS < 0.5ppm (0.1NTU), Ca+Mg < 0.5ppm.
- >> Simple process for primary brine refining, which can reduce equipment investment.
Total investment of CRBR process can be reduced by 30-50%, compared with traditional Primary refining processes.
- >> Wide adaptability to different crude brine, especially to brine with higher Mg²⁺ concentration than Ca²⁺.
- >> Benefits for better worklife of Chelating resin and Ionic membrane.
- >> Less additives and chemical consumption, low running cost.
- >> Less no-corrosion to piping & equipment without corrosive FeCl₃.
- >> Convenience for maintenance and operation, low labour cost.
- >> Less floor space, convenience for upgrading and capacity expansion.

The CRBR membrane filtration system can be modularly designed as a compact skid-mounted plant, which requires much less floor space. It can be installed on the first or second floor. The production capacity can be easily expanded based on current process. Most of the equipments can be reused after upgraded to new CRBR process.

