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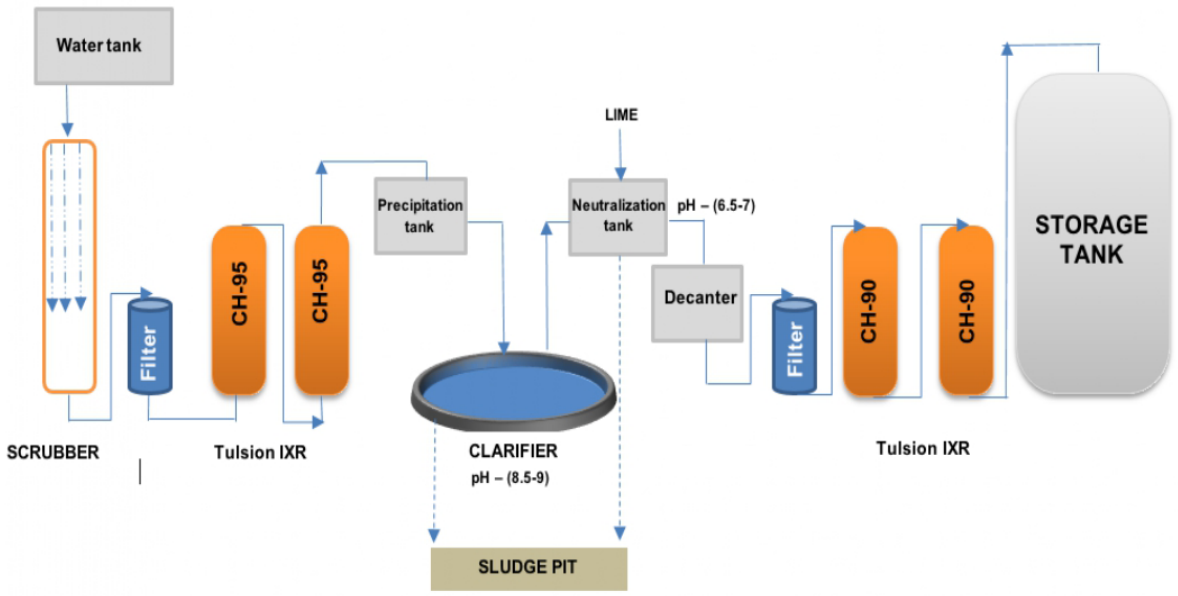
Heavy Metals Removal from FGD Wastewater

Overview

Flue gas treatment contains different methods and scrubbing processes. Commonly used wet scrubber systems generate wastewater which contains high concentrations of ions with scaling potential, heavy metals, TSS and ammonia. This wastewater stream needs to be treated before disposal and maybe even re-used as process water; that is where ion exchange comes into play. Ion exchange can remove traces of ion impurities from water and process streams of FGD and give desired quality product.

Process

In ion exchange systems, wastewater of FGD is fed into the top of a column containing ion exchange resins that have ligands with weak counter ions. When wastewater is introduced to the column, the heavy metals as per their selectivity displace the counter ionsfrom the ligand. These heavy metals are retained by the ion exchange resins eluting treated water stream at the bottom. Over the time, heavy metal ions will bind with all the available exchange sites and resins will get exhausted. In order to repeat the cycle, the resin bed is regenerated with concentrated regenerant solution. Depending upon the type of resin and the application, the regenerant may be a salt, acid, or caustic solution. As the regeneration cycle proceeds, the ion exchange resins release contaminant ions, swapping them for ions present in the regenerant solution.



Typical Operating Conditions

Parameters	Mercury Removal	Heavy Metal Removal
pH	6-7	6-7
Ca (ppm)	20,000 ppm	20,000 ppm
Turbidity (NTU)	<2	<2
Service Flow	10-20 BV/hr	10-20 BV/hr
Exchange Capacity	40 gm hg/L	15-25 gm/L
Regeneration & Conditioning	HCl (7.5%) - 2BV NaOH (4%) - 2-3 BV (up flow)	Non- regenerable resin
Obtained Residual Value	2 ppb	<50 ppb

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Thermax Solution

Recommended Tulsion® products:

Tulsion® Resins	Ions Removed
Tulsion® CH-90 **Tulsion® CH-93**	Cu^{2+}, Zn^{2+}, Cd^{2+}, Cr^{3+},Mn^{2+}, Co^{2+}
Tulsion® CH-95 **Tulsion® CH-97**	Hg^{2+} ($HgCl_2$)

Advantages

- Save costs for hiring or training skilled operators to manage ion exchange system operations in FGD plants as the technology is most common in captive power plants & widely used by many industries for different applications.

- Resins available for removal of varied heavy metals such as chromium, copper, zinc, nickel, cobalt, manganese, mercury, cadmium from industrial wastewaters at different concentrations.

- Environmentally most compatible.

- Cost-effective solution.

Applications

Tulsion® ion exchange resins are widely used in analytical chemistry, hydrometallurgy, antibiotics, purification, and separation of ions/minerals and find large application in water treatment and pollution control. The list of metals which are removed on an industrial scale by means of ion exchange include: chromium, copper, zinc, nickel, cobalt, manganese, mercury, cadmium. Ion exchange process is particularly suitable for removal of metal ions with a high value and low processing. The use of ion exchange processes in hydrometallurgy is high and every year continues to grow.

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- Boiler and Heater
- Build-Own -Operate
- Chemical
- Cooling
- Projects and Energy Solutions
- Process Heating
- Renewable Energy
- Water and Waste Solutions

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