IndustrialPioneersFarayand Co.

Ion Exchange Resin Towers

Ion Exchange

Ion exchange is an exchange of ions between two electrolytes or between an electrolyte solution and a complex. In most cases the term is used to denote the processes of purification, separation, and decontamination of aqueous and other ion-containing solutions with solid polymeric or mineralic 'ion exchangers'.

Typical ion exchangers are ion exchange resins (functionalized porous or gel polymer), zeolites, montmorillonite, clay, and soil humus. Ion exchangers are either cation exchangers that exchange positively charged ions (cations) or anion exchangers that exchange negatively charged ions (anions). There are also amphoteric exchangers that are able to exchange both cations and anions simultaneously. However, the simultaneous exchange of cations and anions can be more efficiently performed in mixed beds that contain a mixture of anion and cation exchange resins, or passing the treated solution through several different ion exchange materials.

Using of Exchange Catalysts for Purification of Process Streams:

Ion-exchange resins are widely used in different separation, purification, and decontamination processes. The most common examples are water softening and water purification.

A bed of resin can be used either to remove unwanted ions from a solution passed through it or to accumulate a valuable mineral from the water which can later be recovered from the resin.

One of the earliest applications of ion exchange was the separation of rare earth elements.

Ion-exchange resins in the acid form are known as catalyst also to remove organic components from process streams passed through a resin bed. In this case organic impurities adsorbed by resin and after saturation of bed capacity, resin either can be regenerated or replaced with new batch of resin.

The most common examples are in petrochemical plants where refined products purified via resin beds to reach the final product specification. Methanol production plant is an example.

In methanol or integrated methanol and Ammonia production plants, refined methanol extracted from first methanol column contains Three Methyl Amin (TMA) which is an organic component and known as impurity for methanol product. Usually resin bed adsorption process is used down stream of methanol column to remove TMA from product. Using of resin catalysts TMA concentration in outlet of resin bed towers could be decreased to ppb levels.

IPF as a leading technological company for design and manufacturing of process packages in oil, gas and petrochemical industries had many experiences for design and supplying of Ion exchange resin towers in water purification and demineralization industries.

Based on these experiences from many time ago IPF R&D division started to study about resin tower for purification and polishing of process streams also andcooperating with foreign technology providers and resin manufacturers, now we are capable to design resin tower bed for process stream polishing also.

I.P.F.

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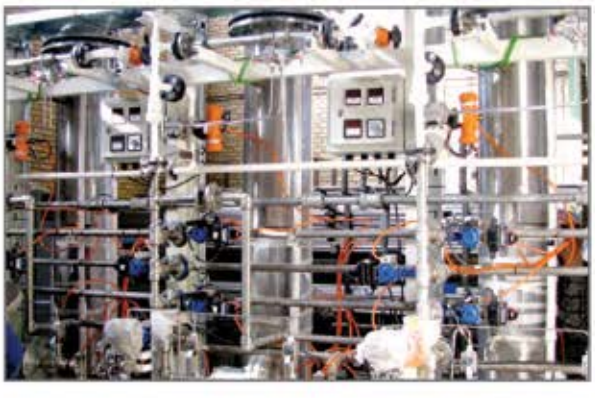
IPF Experiences

New Utility Unit for Abadan Refinery

Basic and detail design, procurement, construction, installation, pre-commissioning and start up of DM water package specially mixed bed as major part, including process design of vessel and resin selection i.e. resin volume and capacity calculation, integrated with all required control system, instrumentation, piping and …. Resin supplier was ROHM and HAAS with AMBERJET 1200 H technology. The manufactured mixed bed was the biggest in the refinery projects in Iran which is working for more than 2 years properly.

Molybdenum Removal

IPF has carried out the system consists of three molybdenum removal columns with fully automatic control system, as an EPC contractor, however, most the equipment have been completely manufactured by IPF. All columns can easily work in series and parallel with possibility of selection between the columns, The system includes regeneration system with possibility of regeneration with both DM water and %10 sulfuric acid. The complete system contains mixers, dosing pumps with special material, precise pH control system and ….



DM Unit as Part of Pharmaceutical Turn-Key Plants

IPF has run 4 pharmaceutical Turn-Key plants i.e.,Hakim, Taha, Parand and Daroo Pooyan. All of the plants are needed purified water which had been completely done by IPF using ion exchange and mixed bed for DM package. IPF scope was whole responsibility of the plant i.e. as an EPC contractor, however, most the equipment such as DM packages, vessels, chemical injection packages, glass lined reactors and so on have been completely manufactured by IPF.