

Process Integration: Mathematical Model for Contaminant Removal in Refinery Process Stream

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Abstract : This research presents the graphical design analysis and mathematical programming technique to dig out the possible water allocation distribution to minimize water usage in process units. The study involves the mass and property integration in its core methodology. Tehran Oil Refinery is studied to implement the focused water pinch technology for regeneration, reuse and recycling of water streams. Process data is manipulated in terms of sources and sinks, which are given in terms of properties. Sources are the streams to be allocated. Sinks are the units which can accept the sources. Suspended Solids (SS) is taken as a single contaminant. The model minimizes the amount of freshwater from 340 to 275m³/h (19.1%). Redesigning and allocation of water streams was built. The graphical technique and mathematical programming shows the consistency of results which confirms mass transfer dependency of water streams.

Keywords : minimization, water pinch, process integration, pollution prevention

Conference Title : ICCEA 2015 : International Conference on Chemical Engineering and Applications

Conference Location : Miami, United States

Conference Dates : March 09-10, 2015