On the Design of Optimum Heating Systems for Reuse Water in the Sunlight Lime Production = Rancangan Optimasi Proses Pemanasan untuk Reuse Water dalam Proses Produksi Sunlight Lime

Deandra Armyni Hasan, author

Abstrak

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Di dalam pembuatan Sunlight Lime, PT Unilever Tbk, limbah yang terbuat dari process pembuatan produk tersebut di simpan di dalam tanki. Untuk meningkatkan sistem recycle di PT Unilever Tbk, sistem baru yang dinamakan proses pasteurisasi diajukan untuk memperlakukan limbah yang dihasilkan oleh produksi sunlight lime. Memilih alat pemanas yang sesuai untuk proses pasteurisasi ini dilakukan oleh literature review, optimisasi diperlukan untuk meningkatkan performa alat pemanasnya. Dua optimisasi diberlakukan, yang pertama adalah single unit parameter optimization, dimana rumus di buat untuk menurunkan jumlah channels yang ada di dalam Plate Heat Exchanger (PHE) yang sama dengan menurunkan area heat transfer pada exchanger. Dengan melakukan hal ini, parameter lain yaitu fixed cost juga menurun. Single unit parameter optimization dilakukan melalui program ASPEN Exchanger Design and Rating. Method yang digunakan pada simulasi ini adalah HTFS Method. Didalam method ini, screening dan branching method di lakukan. Dengan mengubah 6 parameters (jumlah channels, passes pada side I dan II, koneksi feed, lokasi fluida panas, tipe dari flow) di dalam konfigurasi PHE, jumlah minimum pada channel bisa di dapat sehingga nilai optimum untuk area heat transfer dapat dicapai. Untuk network design optimization, PHE menggunakan metodologi pinch analysis untuk mengurangi utilities cost untuk fluida panas dan dingin. Setelah optimisasi, 22.4% reduksi pada cost, 66.66% reduksi pada area, 50% reduksi pada biaya utility panas dan 95% pada utility dingin.
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ABSTRACT
In the sunlight lime production in PT Unilever Tbk, the waste created by the production is stored in the tank. To improve the recycle system in PT Unilever Tbk, a new system called the pasteurization process is proposed to treat the waste caused by the production of sunlight lime production. Choosing the heating equipment for pasteurization process was done in literature review, optimization is required to enhance the performance of the heating system. Two optimizations are performed, the first one is called single unit parameter optimization, where it is formulated as the minimization of the number of channels which is equivalent to minimizing the exchanger heat transfer area. By doing this optimization, the other parameter that will be decreasing is its fixed cost. The single unit parameter optimization is done by using ASPEN Exchanger Design and Rating. The method used in this simulation is the HTFS method or the Heat Transfer and Fluid Flow Services method. In this method, screening and branching method is performed. By changing 6 parameters (Number of channels, passes on sides I and II, feed connection, hot fluid location, type of flow) in the configuration of plate heat exchanger, the minimum number of channels can be obtained thus optimum value for heat transfer area required is obtained. For network design optimization of the plate heat exchanger use pinch method analysis to minimize the cost utilities for both hot and cold fluid. After optimization, 22.4% reduction in the cost, 66.66% reduction in the area, 50% reduction on the hot utility

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