UOP BENFIELD™ PROCESS

Low cost removal of CO_2 and H_2S from natural and synthesis gas

Existing potassium carbonate systems can reduce energy usage by 15% or more and increase capacity by 15-40% by adopting one or more of UOP's Benfield process conversions.



Originally developed at the U. S. Bureau of Mines in the early 1950s, the hot potassium carbonate (HPC) process has been modified and optimized by Benson and Field and, subsequently, UOP. The UOP Benfield Process is a thermally regenerated cyclical solvent process using an activated, inhibited hot potassium carbonate solution to remove CO_2, H_2S and other acid gas components.

More than 700 Benfield units have been put into commercial service, and competitors have installed their share of HPC systems. In addition to its wide use in ammonia and hydrogen production, the Benfield process has been applied in 50+ natural gas plants and in direct iron ore reduction plants. Any of these units can now obtain significant performance improvements.

UOP offers the opportunity to upgrade any hot potassium carbonate system through the selection (or combination) of three revamp options. Services and products are available to lower your operating cost and improve system throughput.

UOP BENFIELD ACT-1™ ACTIVATOR

ACT-1 activator promotes the absorption of carbon dioxide by hot potassium carbonate solution by increasing mass transfer rates. ACT-1 activator can do one or more of the following in comparison with DEA activation:

- Lower the CO_2 in the product gas by 25-85%
- Lower the carbonate solvent solution circulation by 5-15%
- Lower regeneration energy requirements by 5-15%
- Increase feed gas throughput by 5-15%
- Reduce the consumption of anti-foam and other chemicals
- Reduce or eliminate the reduction of vanadium valence state from V+5 to inactive V+4 in ammonia or hydrogen purification service, thus reducing the need to add inhibitor

Conversion to ACT-1 from DEA activation can be done "on-the-fly" without a complete replacement of the solvent inventory. UOP will provide a detailed procedure, and on-site advisory services are also available.

FEATURES & BENEFITS

- Reduced acid gas removal costs
- Improved carbon dioxide (CO_2) absorption
- Increased capacity by 15-40%
- Reduced energy usage by 15% or more
- Easy revamp options to upgrade existing systems

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UOP BENFIELD LOHEAT™ TECHNOLOGY

There are a variety of flow schemes available that permit process optimization and energy reduction within the near-isothermal Benfield unit operation. Existing plants can be revamped for either capacity increase and/or heat savings of 15-40% through the use of UOP's proprietary LoHeat technology. This upgrade requires the addition of a solvent flash drum with a range of configurations that progressively increase energy savings as capital cost increases.

UOP engineers help potential customers perform economic analysis of the various options to determine the best fit for your operation. Ask your UOP sales representative for an inquiry form to start the process of determining the best revamp option for your operation.

UOP PROPRIETARY PACKING

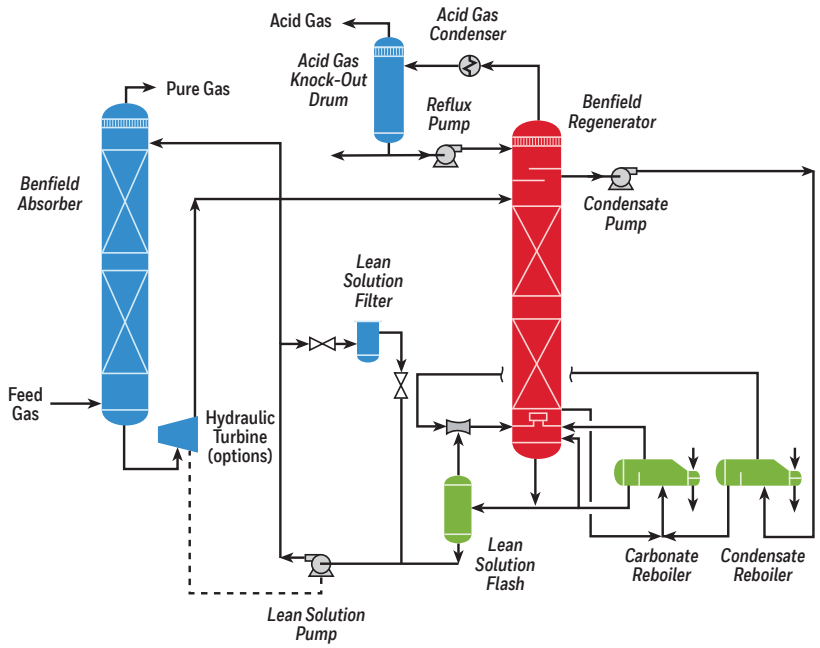
For HPC systems that have the ability to increase feed gas rates from upstream sources, UOP tower internals can be used to de-bottleneck the absorber and regenerator towers to allow higher vapor rates. UOP has teamed with Raschig to provide the highest capacity column packing for Benfield service. Depending upon the type of packing you currently have, capacity increases of 5% to more than 20% can be realized.

A combination of revamp options can result in even more capacity and/or energy savings. Design packages ranging from functional process specifications through complete equipment datasheets and operating manuals can be provided. As with all our UOP processes, service is always readily available through UOP's worldwide technical service organization. The process improvements achievable depend on the application and the options chosen for your revamp.

EXPERIENCE

UOP has access to many years of experience upgrading HPC systems all around the world. Our services range in complexity from simple chemical addition (ACT-1 activator) to a full range of revamp options that include equipment additions. More than 25 competitor HPC units and even more Benfield units have already been upgraded.

UOP Benfield Process



For more information
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RESPONSIBLE CARE®
OUR COMMITMENT TO SUSTAINABILITY

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