عنوان مقاله:

Evaluating Bottom Flashing and Vapor Recompression Methods : Efficiency in CO۲ Emission and Energy Reduction for Natural Gas Sweetening Process

محل انتشار:

دومین کنفرانس ملی و اولین کنفرانس بین المللی چالش های محیط زیست: صنعت و معدن سبز (سال: 1403)

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خلاصه مقاله:

Natural gas sweetening, a critical process for removing acidic compounds using amine solvents, typically involves high CO۲ emissions and energy consumption due to the use of absorption and distillation columns as well as the high operational energy requirement. Recognizing the need for energy optimization, this study introduces heat integration (HI) to the conventional sweetening process, utilizing inherent process flows for energy rather than external utilities. Accordingly, heat integration of the amine recovery column via Vapor Recompression (VRC) and Bottom Flashing (BF) methods is explored. The results reveal significant reductions in CO۲ emissions and energy usage : HI achieves a ۲۵% reduction, while VRC and BF methods achieve reductions of ۹۴% and ۹۶%, respectively. Similarly, energy savings are ۲۵% for HI, and an impressive ۸۸% and ۹۰% for VRC and BF, respectively. Notably, despite comparable compressor consumption, BF outperforms VRC with a ۳۳% greater reduction in utility consumption, establishing BF as the superior method for environmental and energy efficiency in natural gas sweetening.

کلمات کلیدی:

Bottom flashing, CO۲ emission reductions, Energy saving, Heat integration, Sour gas sweetening, Vapor recompression