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COSWEETTM: A new process to reach very high COS specification on natural gas treatment combined with selective H₂S removal

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 \mathbf{N} atural gases are commonly polluted with many contaminants such as sulfur compounds and CO_2 . Throughout the oil and gas treatment chain, various steps intended to separate most of the real variable. gas treatment chain, various steps intended to separate most of the undesired compounds from the profitable part of the natural gas. Natural gas desulfurization is usually performed in generic treatment processes and in order to remove H₂S and/ or CO₂ to meet the export gas specifications. However, commercial gas specifications are not restricted to H₂S and CO₂. New specifications have been imposed for many years to also remove most of other sulfur compounds from the natural gas. One of these, Carbonyl Sulfide (COS) is usually present in sour natural gases containing both H₂S and CO₂, in quantities which may exceed 200 vol. ppm. COSWEET[™] process, developed for the treatment of COS containing natural gases, is based on a combination of deacidification through any alkanolamine solution with a COS hydrolysis section over on a metal oxide based catalyst. Nearly complete COS conversion is reached, even at a relatively low operating temperature. Coupled with a classical sweetening unit, in which an adapted alkanolamine solvent is used in order to optimize the removal of H₂S, CO₂, as well as the H_aS/CO_a selectivity, the high catalyst activity and the original integration of the scheme secure the COS removal at minimum extra cost. Benefits of capital and operating expenditures of the plant result both from the reduction of the absorption column and solvent flow rate and from the quality of the acid gas, which has positive consequences on the design of the sulfur recovery facilities units, including Claus unit. The approach set for the process development and the results obtained on COS conversion will be presented, as well as the model and simulation tool, and a case study showing the advantages of coupling COSWEETTM to amine-based solvent.



COSWEET[™] Process scheme

Biography

David Chiche did PhD in materials science from Pierre et Marie Curie University (Paris, France). He has been working in the Separation Department at IFP Energies Nouvelles for 10 years. His expertise was developed in the field of Synthesis Gas and Natural Gas Purification Technologies, especially in relation with the Development of Metal Oxides Adsorbents, Catalysts and related processes.

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