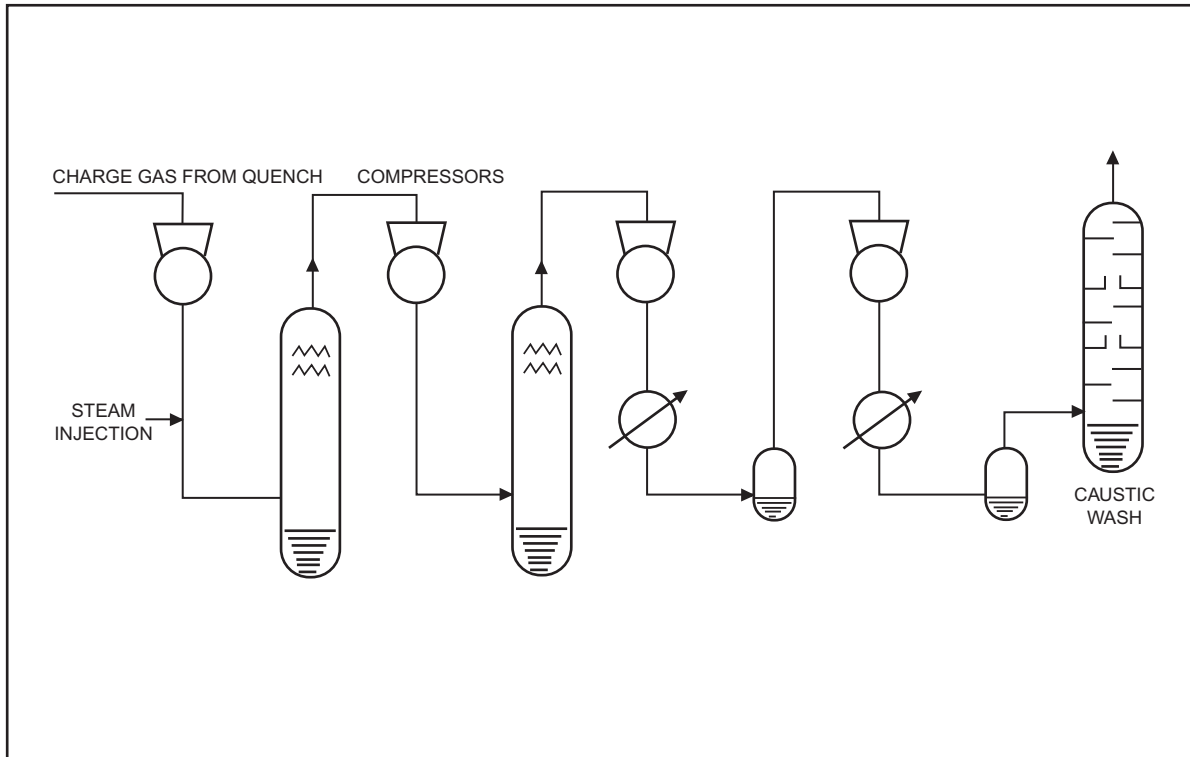


Charge gas compression and caustic wash (ethylene)



Introduction

In ethylene production, the feedstock, usually naphtha or ethane, initially is cracked to produce the desired ethylene, and other useful by-products. The cracked gas is rapidly quenched to stop the degradation of the olefins and coke formation. These steps take place in what is sometimes called the "hot" part of the ethylene plant. The cooled gas then proceeds to the "cold" part of the plant, where the actual product separation takes place.

The Process

The gas leaves the quench tower at about 450 °C/840 °F, and enters the stage of compression and condensing, which is actually the primary stage of separation, as some of the desired by-products, e.g. an unpurified state, are removed after compression. However, the true purpose of the compression and condensation stage is to prepare the gas for the final cryogenic fractionation, which is the separation of the liquified gases.

There are multiple stages of compression, usually four to five, with intermediate cooling to avoid temperatures that might induce undesirable polymerisation. At the gas compressor inlet,

the pressure is low (11-15 barg/160-218 psig). During compression, the pressure is raised to 35-40 barg/510-580 psig. This higher pressure, and the low temperatures found in the cryogenic fractionator aid in distilling the different components (ethylene, propylene, etc.) during the fractionation stage.

After each stage of compression, liquified components are removed, and the lightest of these are recycled to be used in other areas of the process. Before the last compression stage, the product gas is desulphurized.

Dimethyl Disulphide has been added to the feedstock at the cracking stage to reduce coking. This is the major source of sulphur in the system, and is removed after the last stage of compression in the form of hydrogen sulphide (H_2S). A caustic wash is effected to remove the H_2S and carbon monoxide. The spent caustic stream can be treated in various ways, depending on the technology used, including low pressure wet air oxidation (Stone and Webster) or washing and steam stripping.

Valve applications

Related application bulletin	Code	Issue
Compressor Anti-Surge	2722/03/01	3/03
Charge Gas Drying	2722/03/02	3/03

The information provided in this bulletin is advisory in nature, and is intended as a guideline only. For specific circumstances and more detailed information, please consult with your local automation expert at Metso.

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