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MITSUBISHI JUKOGYO *DE 3525-904-A
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Heat-recovery in methanol synthesis - by sepg. reaction gas into partial streams for pre-heating synthesis and scrubbing gas and pressure relaxation of heated scrubbing gas

C86-015420

E(10-E4E1) H(4-E)

In the recovery of energy from MeOH synthesis, the reaction-stream is sub-divided into 2 partial streams. The 1st partial stream is used for pre-heating the synthesis gas charged. The 2nd partial stream is used for heat-exchange with a pt. of the scrubbing gas which was sepd. down-stream from the reactor. The 2 partial streams are combined. MeOH is condensed out of the combined streams. The pre-heated scrubbing gas is passed into a pressure-relaxation unit in which its heat content is recovered.

ADVANTAGE

The scrubbing gas can be heated to 180-300°C. The energy recovered is high.

PREFERRED CONDITION

After compression, the non-condensed gas from the separator is charged to the synthesis gas.

FLOW DIAGRAM

The synthesis gas (1) is set to synthesis pressure 50-150 bar in the compressor (101). The pressure of the non-condensed gases (4) from the separator (106) is increased by the circulating pump (107). Gas from (4) is pre-heated with the compressed synthesis gas (1) in the pre-heater (103) and fed to the reactor (102).

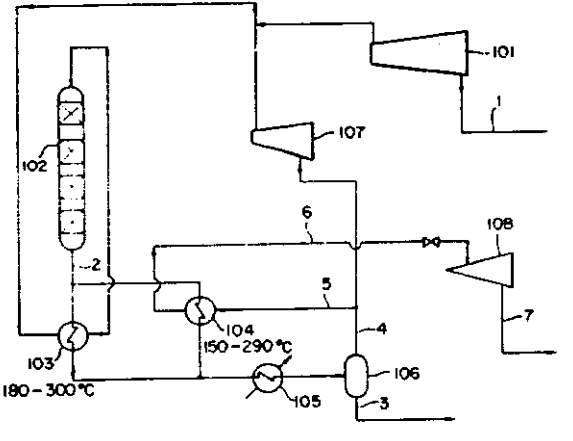
The reaction gas (2) is divided into 2 streams. One stream is fed to the pre-heater (103) for synthesis gas and the other to the pre-heater (104) for scrubbing gas. The partial streams leaving the parallel pre-heaters (103,104) are combined and cooled in condenser (105). MeOH is condensed, sepd. in the separator (106) and discharged. The non-condensed gas (4) is removed partly as scrubbing gas (5) and charged to pre-heater (104) for scrubbing gas. The pre-heated scrubbing gas (6) is passed to the pressure relaxation unit (108) where the heat content is recovered. The expanded scrubbing gas (7) is burnt.

EXAMPLE

A scrubbing gas contg. by vol., 58.74% H_2, 5.59% CO, 8.96% CO_2, 19.47% CH_4, 7.22% N_2, 0.02% MeOH, was circulated

at 1100 kmol/hr under 75 bar.

The pressure-relaxation unit had end-pressure 3 bar and adiabatic efficiency 65%. The scrubbing gas was heated to 240°C. On recovering the heat content, efficiency was 1900 kW, as against 1500 kW in a control in which the scrubbing gas was pre-heated only to 160°C with gas from the compressor for synthesis gas, according to JP-A-1 56 40624. (10pp200RHDwgNo1/1).



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