

15000 K/07 E36 KOPS 14.07.81
 KRUPP-KOPPERS GMBH *DE 3127-706
 14.07.81-DE-127706 (10.02.83) C01b-03/52
 Methanol synthesis gas prodn. from coal gas - by low temp. hydrogen sulphide and carbon dioxide scrubbing with conversion of partial stream

E(10-E4E, 31-A, 31-N5)

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ADVANTAGES

Fine desulphurisation can be omitted.

DETAILS

The CO₂ content of the synthesis gas may be controlled by adjusting the amt. of stripped wash liquor recycled to the CO₂ scrubber. The desired ratio of the gas components

$$\frac{H_2 - CO_2}{CO + CO_2} \geq 2$$

may be obtd. by controlling the amt. of gas passed directly from the H₂S scrubber to the CO₂ scrubber, this stream being 30-45 vol.% of the total. Before conversion, the gas may be reheated by heat exchange with the compressed crude gas and the converted gas re-cooled by heat exchange with the MeOH synthesis gas from the CO₂ scrubber. The H₂S and CO₂ scrubbers pref. use MeOH at temps. between -20 and -60°C.

EXAMPLE

332,000 Nm³/hr gas at 1.1 bar, obtd. by the gasification of 187 t/hr. coal, was compressed to 38 bar. The gas

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Prodn. of methanol synthesis gas from the crude gas from low pressure gasification of coal comprises H₂S scrubbing, conversion and CO₂ scrubbing of the gas, in which the compressed gas is divided into sub-streams after the low temp. H₂S scrubbing and these are treated further to different extents.

One stream is passed directly to the top or middle of a low temp. CO₂ scrubber, whilst the other is converted after re-heating, then re-cooled and passed into the bottom of the CO₂ scrubber. The gas stream obtd. from this scrubber is passed directly to MeOH synthesis without further desulphurisation. The H₂S and CO₂ scrubbers are connected by a common scrubbing cycle, the regenerated wash liquor from the H₂S scrubber being supplied to the top of the CO₂ scrubber, whilst part of the stripped wash liquor from the CO₂ scrubber is passed to the H₂S scrubber and the rest to the top of the CO₂ scrubber.

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contained 5.5 (vol.)% CO_2 , 62.8% CO , 29.6% H_2 , 1.0% H_2S , 0.1% COS and 1.0% N_2 , $\text{Ar} + \text{CH}_4$. After indirect heat exchange with gas from the column, it was cooled to -30 to -40°C and passed to an H_2S scrubber operating with MeOH at -35°C , where the S content was reduced to 2 ppm. The gas at -33°C was divided into 2 streams. One (38 vol.% of the total) passed to the top or middle of the CO_2 scrubber and the rest was reheated to 25°C by heat exchange and converted to a stream, contg. 40.0% CO_2 , 3.7% CO , 55.6% H_2 and 0.7% N_2 , $\text{Ar} + \text{CH}_4$. This was cooled to -40 to -45°C by indirect heat exchange with MeOH synthesis gas, then passed to the bottom of the CO_2 scrubber, which used MeOH at low temp. 320,000 Nm^3/hr . MeOH synthesis gas contg. 3.0% CO_2 , 28.4% CO , 67.5% H_2 , 1.1% N_2 , $\text{Ar} + \text{CH}_4$ and < 0.1 ppm S was obtd. (17pp016).

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