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Liquefaction of coal - using high recycle rate of hydrogen-contg. gas

from the low-temp. separator is cleaned and used as recycle gas.

EXAMPLE

Long-flame coal was slurried in recycle solvent (40% 200-325°C and 60% 325°C) and liquefied at 475°C and 300 bar in the presence of 1.2% Fe oxide and 0.3% Na sulphide. The coal:solvent wt. ratio was 1:1.42, the make-up H₂ rate was 1.0 Nm³/kg and the slurry flow rate was 1.36 kg/hr.

Using a recycle gas rate of (a) 4.25, (b) 5.6, (c) 6.9, (d) 2.4 Nm³/kg MAF coal, with an H₂ content of (a) 81, (b) 80.5, (c) 81, (d) 86 vol.%, the light distillate yield was (a) 47, (b) 49.5, (c) 54.5, (d) 40% based on MAF coal. (16pp367).

Hydroliquefaction of coal is carried out by passing a mixt. of particulate coal, solvent oil, recycle gas and make-up H₂ through a reactor at 300-550°C and more than 100 bar. The improvement comprises maintaining a high recycle gas flow rate of 4000-8000 Nm³ per tonne of feed coal.

ADVANTAGES

The high recycle rate increases the yield of distillates.

EMBODIMENT

The feed coal is mixed with recycle solvent and pumped via a preheater to a liquefaction reactor together with recycle gas (pref. contg. at least 70 vol.% H₂) and make-up H₂. The effluent from the reactor is passed to a high-temp. separator from which the bottoms stream is distd. to recover heavy distillates and the overhead stream is passed to a low-temp. separator to recover light and heavy distillates. The heavy distillates from the high- and low-temp. separators are used as recycle solvent. The overhead gas