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Dual dephlegmator process for sepn. and purifícn. of syngas mixts. - recovers more carbon mon:oxide at high pressure to produce high purity hydrocarbon(s)

AIR PRODUCTS & CHEM INC 12.07.84-US-579845

E17 H09 (E36) (25.06.85) F25j-03/02

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High pressure feed gas comprising H2, CO and C1 + hydrocarbons are separated into H2-CO prod. streams and a C1 + hydrocarbon stream by (a) cooling the high pressure feed gas by indirect heat exchange in a high pressure dephlegmator, the feed stream flowing in an upwardly direction to condense and rectify essentially all of the C1 + hydrocarbons, thereby providing a separate high pressure H2-CO vapour stream anda high pressure C1 + enriched liq. stream; (b) expanding the high pressure C1 + enriched liq. stream to form a low pressure C1 + enriched liq. stream; (c) partially vapourising the low pressure C1 + enriched liq. stream to form a low pressure vapour stream and a low pressure C1 + liq. prod.; (d) cooling the low pressure vapour stream by indirect heat exchange in a low pressure dephlegmator, to condense and rectify essentially all of the C1 + hydrocarbons, thereby producing a separate low pressure H2-CO vapour stream and additional low pressure C1 + liquid.prod; and (e) recovering the high pressure H2-CO vapour stream at a net purity of no more than about 1 mole % of C1 and higher hydrocarbons, the low pressure H2-CO vapour stream at a net purity of no more than about 1 mole % C1 and higher hydrocarbons, and the low pressure C1 + liq. prod.

ADVANTAGE - Process is more efficient for H2-CO syngas purifícn. than the prior art processes because it minimises the quantity of CO which is condensed in the high pressure stage and subsequently separated from the C1 + hydrocarbons. Therefore, more of the CO is recovered at high pressure, resulting in reduced refrigeration load, a reduced quantity of CO to be separated from the C1 + hydrocarbons in the low pressure separation stage, and reduced CO recompression. Similarly, less CO is recondensed in the low pressure separation stage, which further reduces refrigeration requirements, partic. where high CO recovery and high C1 + hydrocarbon purity are essential. (7pp Dwg.No.0/1)

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