

86-246900/38 E36 J01 (E35) ICIL 08.03.85
 IMPERIAL CHEM INDS PLC *EP -194-765-A
 22.11.85-GB-028854 (+ GB-006C11) (17.09.86) C01b-03/50
 Ammonia synthesis gas stream produced from raw gas - by wet
 carbon dioxide removal, other gases by PSA and stripping absorbent
 using waste gas
 C86-106190 E(AT BE CH DE FR GB IT LI LU NL SE)

E(11-Q1, 31-A2, 32-A1) J(1-E3B, 1-E3D)

gas to strip carbon dioxide from the loaded absorbent liquid to give the regenerated absorbent liquid.

ADVANTAGE

The addn. of a PSA unit enables conventional ammonia synthesis plants to be upgraded, giving an increased output and/or more economic operation, with only minor other changes to the plant.

EMBODIMENTS

The other gas comprises one or more of nitrogen, argon, carbon monoxide or methane. The hydrogen-containing gas stream is ammonia synthesis gas and the raw gas stream is made by primary steam reforming followed by secondary reforming, using air, of a carbonaceous feedstock and contains an excess of nitrogen over that required in the ammonia synthesis gas and the excess of nitrogen is separated in the PSA process.

In the secondary reformer outlet gas, the molar ratio of hydrogen + carbon monoxide to methane + argon + nitrogen is 1.7-2.3 and the nitrogen represents 80 vol.% of total nitrogen plus argon plus methane. 40-90% of the carbon di-

EP-194765-A*

A hydrogen-contg. gas stream is produced from a raw gas comprising hydrogen, carbon dioxide, and other gas of intermediate b.pt. Carbon dioxide is removed from the raw gas stream in a wet carbon dioxide removal stage in one or more absorption steps. The carbon dioxide is absorbed from the raw gas into an absorbent liquid to give a carbon dioxide-loaded absorbent liquid which is then passed to one or more regeneration steps in which absorbed carbon dioxide is separated from the carbon dioxide-loaded absorbent liquid to regenerate the absorbent liquid recycled to the absorption steps. The process comprises

(a) removing at least part of the other gas by a PSA process to produce the required hydrogen-contg. gas stream and waste gas; and

(b) in at least one of the regeneration steps, contacting the carbon dioxide-loaded absorbent liquid with some waste

oxide in the raw gas is removed in the wet carbon dioxide removal process and the bulk of the remainder in the PSA process. Some carbon dioxide is removed in the PSA process and the latter is operated to give a first waste gas stream relatively lean in carbon dioxide and a second waste gas stream relatively rich in carbon dioxide and only the first waste gas stream is used for stripping the loaded absorbent liquid.

The regeneration of the loaded absorbent liquid includes flashing carbon dioxide from it prior to stripping with waste gas from the PSA process. No heat, save that in the raw gas, is imported into the wet carbon dioxide removal stage.

OTHER APPLICATIONS

(a) Replacement of the cryogenic purifier in the "Braun" process (see GB 1156002 and 1156003); (b) introduction of excess-air secondary reforming into conventional ammonia production plants; (c) replacement of the reformer and secondary reformer by a single stage adiabatic air/steam reformer, while retaining energy recovery from hot reformer gas by steam raising; and (d) replacement of the conventional fired primary reformer and the secondary reformer by a combination reformer in which the heat input for primary reforming is supplied by heat exchange with secondary reformer gas. (27pp1684RBHDwgNo0/1).

(E)ISR: No Search Report.

EP-194765-A