The ammonia and amines added downstream the reforming section and upstream the last shift reactor will accumulate in the section and thus cause increased level of ammonia and amines in the process condensate. Newly formed ammonia is continuously admitted to the shift section from the reforming section. The formed amines and the residual ammonia will only be removed by stripper steam admitted to the reforming section. The stripper steam added downstream the reforming section does not contribute to the removal of amines. Addition at this point is only to control steam/drygas at inlet of the shift section.

A problem arises when the content of amines is high in the feed steam to the reforming section as this leads to carbon formation in the reforming section either in the preheat equipment or on the catalyst bed.

The invention solves this problem by purging a required part of the stripper steam thus reducing the amine level at inlet of the reforming section to an acceptable level.

Summary

In one aspect of the present disclosure, there is provided a process for producing synthesis gas, the process comprising the steps of

a) reforming a hydrocarbon feed in a reforming section thereby obtaining a synthesis gas comprising CH4, CO, CO2, H2 and H2O and impurities comprising ammonia;

b) shifting the synthesis gas in a shift section comprising one or more shift steps in series to a shifted synthesis gas;

c) separating from the shifted synthesis gas a process condensate originating from cooling and optionally washing of the shifted synthesis gas;

d) passing the process condensate to a condensate steam stripper, wherein dissolved shift byproducts comprising ammonia, methanol and amines formed during shifting the synthesis gas are stripped out of the process condensate using steam resulting in a stripper steam stream,

e) adding a part of the stripper steam stream from the process condensate steam stripper to the hydrocarbon feed, wherein

the remaining part of stripper steam is purged.

Claims

1. A process for producing synthesis gas, the process comprising the steps of
a) reforming a hydrocarbon feed in a reforming section thereby obtaining a synthesis gas comprising CH_4, CO, CO_2, H_2 and H_2O and impurities comprising ammonia;
b) shifting the synthesis gas in a shift section comprising one or more shift steps in series to a shifted synthesis gas;
c) separating from the shifted synthesis gas a process condensate originating from cooling and optionally washing of the shifted synthesis gas;
d) passing the process condensate to a condensate steam stripper, wherein dissolved shift byproducts comprising ammonia, methanol and amines formed during shifting the synthesis gas are stripped out of the process condensate using steam resulting in a stripper steam stream,
e) adding a part of the stripper steam stream from the process condensate steam stripper to the hydrocarbon feed, wherein
the remaining part of stripper steam is purged.

2. The process of claim 1, wherein the condensate steam stripper is a medium pressure stripper.

3. The process of claim 1 or 2, wherein the purge stripper steam is passed to a hydrocarbon combustion step.

4. The process of claim 3, wherein the hydrocarbon combustion step is the fuel side of a steam reformer.

5. The process of claim 3, wherein the hydrocarbon combustion step is the fuel side of a fired heater.

6. The process of any one of claims 3 to 5, wherein the purge stripper steam is mixed with the combustion air or hydrocarbon fuel before entering the hydrocarbon combustion step.