

## CLAIMS

1. A process for steam cracking hydrocarbon feedstock in a steam cracking furnace, the process comprising:

vaporizing the hydrocarbon feedstock, using hydrocarbon feedstock vaporizing means or the hydrocarbon feedstock vaporizer external of the steam cracking furnace, wherein the hydrocarbon feedstock vaporizing means are heated with a heat transfer medium having a temperature less than or equal to 350 °C ;

feeding the vaporized hydrocarbon feedstock to the hydrocarbon feedstock superheating means or the hydrocarbon feedstock superheater in the convection section of the steam cracking furnace.

superheating the vaporized hydrocarbon feedstock using flue gas from a radiant section of the steam cracking furnace in hydrocarbon feedstock superheating means or the hydrocarbon feedstock superheater in a convection section of the steam cracking furnace;

superheating steam from a steam generator using the flue gas from a radiant section of the steam cracking furnace in second heat exchanging means;

steam cracking the super-heated hydrocarbon feedstock into cracked gas in a fired tubular reactor in the radiant section of the steam cracking furnace;

2. The process according to claim 1, wherein the vaporizing the hydrocarbon feedstock comprises:

pressurizing the hydrocarbon feedstock using a hydrocarbon feedstock pump;  
preheating the pressurized hydrocarbon feedstock in a first heat exchanger;

and

distilling the preheated hydrocarbon feedstock in a medium pressure distillation column connected to the first heat exchanger, wherein

the medium pressure distillation column is operated at an absolute pressure in a range of 0.7 to 1.2 MPa.

3. The process according to claim 2, further comprising distilling the hydrocarbon feedstock in the medium pressure distillation column using medium pressure stripping steam having an absolute pressure in a range of 0.8 – 2.0 MPa.

4. The process according to one of claims 2 or 3, wherein the medium pressure stripping steam has a temperature in a range of 180 - 350 °C.

5. The process according to any of claims 2 or 3, wherein the heat exchanger is heated using a heat transfer medium having a temperature in a range of 160 – 350 °C.

6. The process according to any one of claims 2 or 3, wherein the vaporizing the hydrocarbon feedstock further comprises:
- preheating fluid components of the hydrocarbon feedstock from the medium pressure distillation column through heat exchange in a second heat exchanger, and
  - distilling the hydrocarbon feedstock in a low pressure distillation column into at least one of a light distillate fraction and a middle distillate fraction and a heavy distillate fraction, wherein
  - the low pressure distillation column is operated at an absolute pressure in a range of 0.1 - 0.6 MPa.
7. The process according to claim 6, further comprising distilling the hydrocarbon stream in a low pressure distillation column using low pressure stripping steam having an absolute pressure in a range of 0.1 – 0.7 MPa.
8. The process according to claim 1, wherein the vaporizing the hydrocarbon feedstock comprises preheating in a multistage heat exchanging means.
9. The process according to any of claims 1, 2 or 3, wherein the preheating in the multistage heat exchanging means comprises at least one of
- preheating the hydrocarbon in a first heat exchanger stage using low pressure steam;
  - preheating the hydrocarbon in a second heat exchanger stage using medium pressure steam.
  - preheating the hydrocarbon in a third heat exchanger stage using high pressure steam.
10. The process according to any of the preceding claims, further comprising injecting steam in at least one steam injection inlets in the hydrocarbon feedstock stream multistage heat exchanging means.
11. The process according to any of the preceding claims, further comprising preheating boiled feed water for the steam generator using flue gas from the radiant section of the steam cracking furnace in a boiler feed water preheating means;
12. A system for steam cracking hydrocarbon feedstock, comprising
- a steam generator for producing steam,
  - a steam cracking furnace, comprising
  - a radiant section for steam cracking the hydrocarbon feedstock and

a convection section comprising hydrocarbon feedstock super heating means for superheating the hydrocarbon feed stock, and steam superheating means for superheating the steam, and

cooling means for cooling the cracked gas from the radiant section;

hydrocarbon feedstock vaporizing means external of the steam cracking furnace, for vaporizing the hydrocarbon feedstock before the superheating of the feedstock in the hydrocarbon feedstock superheating means of the steam cracking furnace, the hydrocarbon feedstock vaporizing means being connected to the hydrocarbon feedstock superheating means.

13. The steam cracking system according to claim 12, wherein the hydrocarbon feedstock vaporizing means comprise:

a hydrocarbon feedstock pump for pressurizing hydrocarbon feedstock;

a first heat exchanger connected to the pump, and

a medium pressure distillation column connected to the heat exchanger for distilling the heated hydrocarbon feedstock at medium pressure in a range of 0.7 to 1.2 MPa.

14. The steam cracking system according to claim 12, wherein the hydrocarbon feedstock vaporizing means comprise a multi stage heat exchange exchanging means for preheating and vaporizing the hydrocarbon feedstock.

15. The steam cracking system according to claim 14, wherein the multistage heat exchanging means or multistage heat exchanger comprises at least one of a first heat exchanger stage using low pressure steam, a second heat exchanger stage using medium pressure steam, a third heat exchanger stage using high pressure steam.