Claims

1. A heating system comprising a heat pump system,

the heat pump system comprising a heat pump, operating with a primary fluid, a secondary fluid and a first sink heater, the heat pump being connected to the first sink heater,

wherein the first sink heater is configured to preheat a process medium,

the heating system further comprising a second sink heater,

wherein the second sink heater is configured to transfer heat to a second process medium,the heat pump system further comprising a heat exchanger being connected to the second sink heater and being configured to transfer heat from an exhaust medium of the second sink heater to the secondary fluid used to provide heating to the process medium,

characterized in that the heat pump is connected to the heat exchanger in a parallel configuration.

2. A heating system according to claim 1, wherein the primary fluid is an operating medium in a transcritical cycle, preferably comprising R744.

3. A heating system according to claim 1, wherein the process medium is an air stream.

4. A heating system according to claim 1, wherein the heat exchanger is a plate, fin-and-tube, shell and tube, dimple plate, or tube in tube heat exchanger.

5. A heating system according to claim 1, wherein the heating system is configured to be installed in a drying plant.

6. A heating system according to claim 5, wherein the drying plant comprises a spray drying apparatus.

7. A heating system according to claim 1, wherein the second process medium is the same as the process medium, the second sink heater is arranged after the first sink heater in the flow direction of the process medium and the second sink heater generates the exhaust medium.

8. A heating system according to claim 7, wherein the heat exchanger is configured to recover only sensible or sensible and latent heat from the exhaust medium leaving the second sink heater.

9. A heating system according to claim 1, wherein the heat pump system further comprises a control device for controlling by flow, pressure and/or temperature the connection of the heat exchanger with the first sink heater and the heat pump.

10. A heating system according to claim 1, wherein the heat exchanger comprises an inlet and an outlet, and the control device is a flow regulation device installed between the heat pump and the first sink heater, the heat pump system further comprising a first temperature sensor positioned at the outlet of the heat exchanger.

11. A heating system according to claim 10, wherein the control device is configured to operate such that a temperature of the first temperature sensor is in accordance with a predefined temperature setpoint.

12. A heating system according to anyone of claims 10 to 11, wherein the heat pump system further comprises a temperature transmitter connected with the first temperature sensor.

13. A heating system according to anyone of claims 10 to 12, wherein the heat pump comprises an inlet and an outlet, the heat pump system further comprising a second temperature sensor positioned at the outlet of the heat pump, wherein the control device is configured to operate such that a temperature of the first temperature sensor is in accordance with a temperature at the second temperature sensor.

14. A heating system according to any one of claims 6 to 13, wherein the first sink heater constitutes a preheater for drying gas to the spray drying apparatus, wherein the second sink heater constitutes a process gas heater for drying gas to the spray drying apparatus, and wherein the heat exchanger constitutes an economizer having an inlet connected to the outlet of the process gas heater and an outlet configured to be connected to the inlet of the preheater.

15. A heating system according to any one of claims 6 to 14, wherein the process

medium constitutes a gaseous stream, wherein the secondary fluid constitutes water and wherein the primary fluid of the heat pump comprises carbon dioxide.

16. A heating system according to any one of claims 6 to 15, wherein the heat pump system further comprises a circulation pump connected with the first sink heater and the heat pump.

17. A heating system according to any one of claims 6 to 16, wherein the heat pump is further connected to one or multiple heat sources, the heat source being connected to the heat pump via an ice or cold water circuit.

18. A heating system according to any one of claims 6 to 17, wherein the heat pump system comprises a fluid network and control devices, wherein the heat pump is connected to the fluid network, wherein the control devices can control the flow, flow direction, pressure and temperature of parts of the fluid network.

19. A method for integrating a heating system into a drying plant, the heating system comprising a heat pump system, the heat pump system comprising a heat pump operating with a primary fluid and a secondary fluid, a first sink heater and a heat exchanger, the method comprising the steps of

- connecting the heat pump with the first sink heater, wherein the first sink heater is configured to preheat a process medium,
- a second process medium entering a second sink heater,
- the second sink heater being configured to transfer heat to the second process medium,
- connecting the heat exchanger to the second sink heater such that the heat exchanger can transfer heat from an exhaust medium of the second sink heater to the secondary fluid used to provide heating to the process medium,
- connecting the heat pump to the heat exchanger in a parallel configuration, and
- controlling by flow, pressure and/or temperature the connection of the heat exchanger to the heat pump with a control device.

20. A method for integrating a heating system into a drying plant according to claim 19, wherein the drying plant comprises a spray drying apparatus and wherein the first sink heater constitutes a preheater for drying air to the spray drying apparatus,

wherein the second sink heater constitutes a process air heater for drying air to the spray drying apparatus, and wherein the heat exchanger constitutes an economizer having an inlet connected to the outlet of the process air heater and an outlet configured to be connected to the inlet of the preheater.