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Applicationreport

Eclipse Product: AH-MA Burner, Linnox Burner and Plate Type Heat Exchanger

Submitted by: Meinrad Greishaber, Sales Mgr. Germany (European Industrial Drying Mgr.)

Application: Mineral Fiber Board Dryer

Customer Profile: A Leading Global Supplier of Building Materials

Clean heat, clean air, low NO_X technology and heat recovery: A perfect fit.

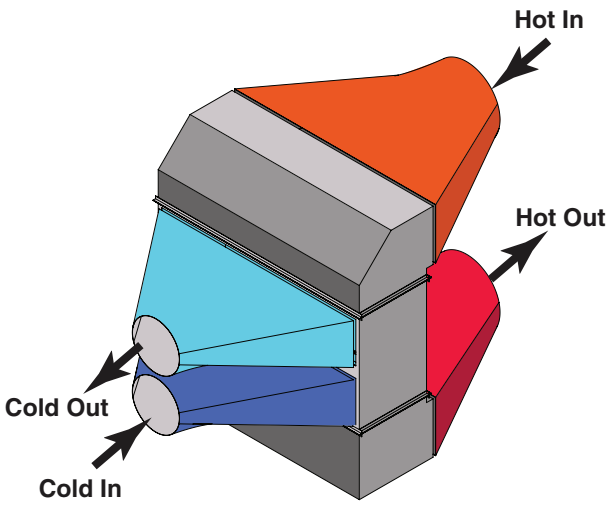
Description:

An Eclipse end user contacted their OEM to help achieve energy savings on an existing mineral fiber board dryer. The dryer is 120 meters long, contains eight decks, and includes thirty-one zones with three dryer exhausts, and a total of fifty-four Eclipse Linnox burners. The total capacity of the dryer is 20 MW.

Eclipse Solution:

To conform to the application needs and achieve the maximum heat recovery for combustion preheating, two separate exhaust streams of the dryer were selected to support two separate heat exchangers. One large central combustion air blower with two selectable filter units would provide the fresh air stream to the two heat exchangers.

After the heat exchanger, the preheated combustion air goes to a combustion air preheater unit. This consists of an Eclipse AH-MA Air Make-Up burner mounted in the duct to preheat the combustion air during cold start-up. The goal was to design and supply a unit which would be easy to operate and maintain by the customer. To minimize dirt in the heat exchanger, the upstream dryer air flows from the top, down through the unit. To provide easy access, the inspection openings to the heat exchangers were supplied as doors. Plate spacing of the heat exchanger was increased to 20 mm to help prevent the unit from becoming clogged with mineral fiber particles. For easy access and maintenance, an electrical lift was included. The complete combustion air piping was replaced and one air regulation valve per zone, designed for preheated combustion air, was installed.



Flow Diagram

Front Side of Heat Exchanger With Inspection Doors Closed

Note: See page 2 for additional information

Customer Benefits:

In addition to the combustion preheating, the blower was designed with a frequency controller. In accordance with the required dryer capacity, the combustion air pressure is regulated via the frequency controller on the blower. This provides an additional savings in electrical energy, depending on actual dryer capacity of about 10% - 20%.

- **Heat exchanger 1:**
  - Hot air stream in: 20.000 nm^3/h
  - Hot temperature in: 180 °C
  - Humidity in: 350 mg/kg dry air
  - Max. cold air stream in: 12.600 nm^3/h
  - Cold in: 20 °C
  - Warm out: 126 °C
  - Calculated heat recovery: 452 kW

- **Heat exchanger 2:**
  - Hot air stream in: 20.000 nm^3/h
  - Hot temperature in: 200 °C
  - Humidity in: 350 mg/kg dry air
  - Max. cold air stream in: 12.600 nm^3/h
  - Cold in: 20 °C
  - Warm out: 144 °C
  - Calculated heat recovery: 529 kW

The above performance resulted in a savings of more than 600,000 to 650,000 nm^3 of natural gas per year.

Heat Exchanger With Combustion Air Connection Ducts

Heat Exchanger With Open Inspection Doors

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