

Application**brief**

- Eclipse Product:** Recirculating Indirect Fired Air Heater
- Submitted by:** Paul Wild for Eclipse Combustion Ltd and Exothermics Inc.
- Application:** Spray Dryer for Food and Flavorings
- Description:**

A supplier of particle drying equipment, offering; Spray Dryers, Flash Dryers, Ring Dryers, and Spray Fluid Bed Dryers approached Eclipse to provide a solution for their Flavoring Drying Plant in Slovenia. The dryer required an indirect heated air stream with variations of flow and temperature, for the purpose of drying both artificial and natural food flavorings.

Here the challenge was to provide an indirectly heated air stream, at a controlled high temperature lift of 20°C (68°F) to 225°C (437°F) max, while maintaining a thermal efficiency of over 80% gross. The same design theory may be used for temperature lifts up to 400°C (752°F).

The Exothermics Recirculating Indirect Air Heater is a compact indirect air heater package, which is the combination of two Eclipse Brands: Eclipse Combustion and Exothermics. Eclipse Combustion supplied the combustion system utilizing a RatioMatic packaged burner, hot gas fan and a cascading control panel. Only the gasses input by the burner are exhausted; Exothermics supplied the SP-VT plate type heat exchanger, utilizing an LU flow pattern; with the process air on the U pass and products of combustion (hot gas) counter flow on the L pass. The Exothermics heat exchanger has been sized to match the combustion gas flow and provide the optimum heat transfer rate.

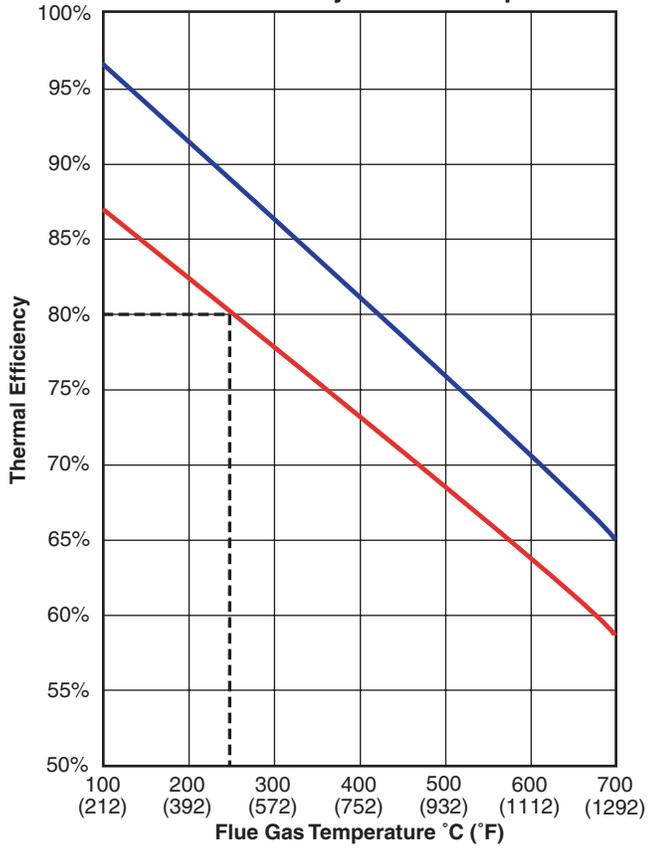
Two identical ER Systems were purchased as a result of the successful performance of this system. Two further ER Systems of the same size and configuration have been sold to new customers as a result of the availability of standardized information to assist the sale.

The Appliance thermal efficiency is based on the CV of the fuel being used, gross or net calculations, fuel temperature, exhaust temperature and the amount of excess air used for combustion. See Thermal Efficiency vs Flue Temperature chart on page 2.



Recirculating Indirect Fired Air Heater

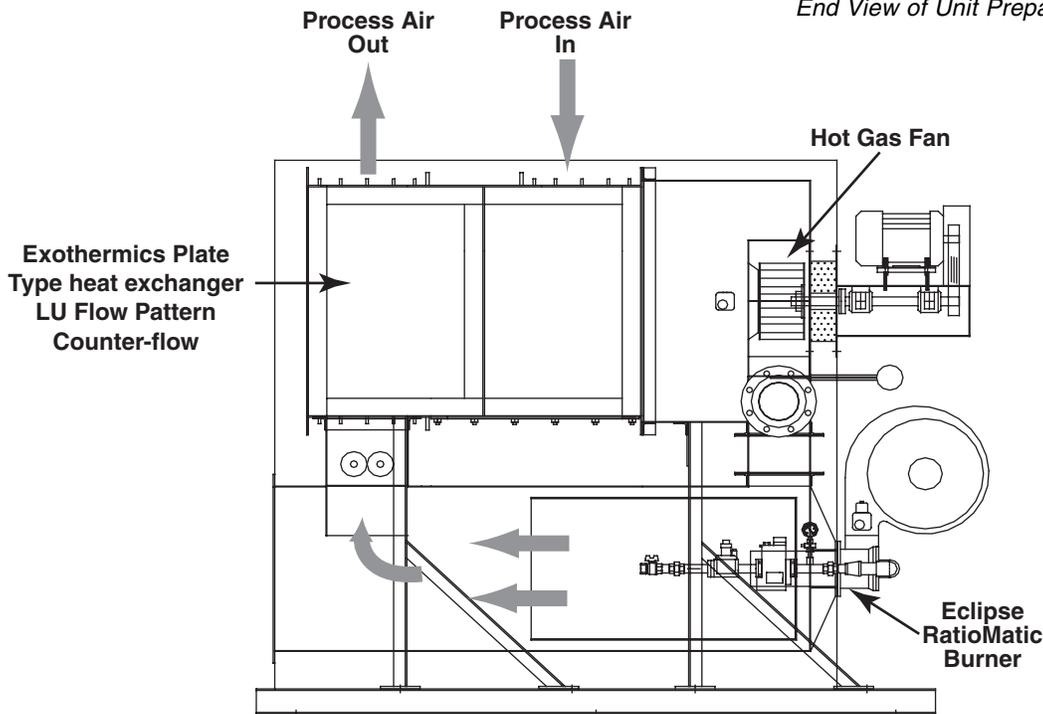
Thermal Efficiency vs Flue Temperature



Based on 20% XS Air, 20°C Combustion Air 50% RH, UK Natural Gas



End View of Unit Prepared for Insulation on Site



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