

**Eclipse Products:** Winnox Burners with Enhanced Ratio Control

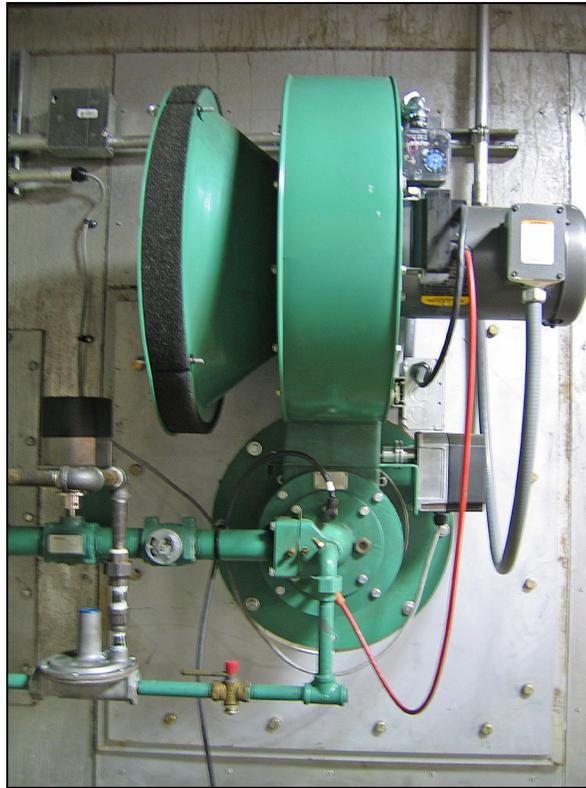
**Submitted by:** Barry Fogal Senior Sales Representative, Eclipse, Inc. New England

**Application:** Drying Oven for the Formed Fiber Industry

### *Electronic Ratio Control Minimizes Excess Air While Maintaining Low NOx Emissions*

**Description:** In order to meet rigid customer specifications, a manufacturer of ultra efficient drying ovens for the formed fiber industry required low NOx burners for a recent project. The application required closely controlling air volumes both in and out of the dryer. The precise control of the required excess air from the low NOx burners over their full operating range was a prime concern in the project as overall operating efficiencies were an important factor for the customer.

**Eclipse Solution:**



*Eclipse Winnox Burner Fitted with Siemens Actuators.*

Eclipse was contacted with the project requirements. The Winnox burner was proposed because of its ultra low NOx capabilities. In order to fully comply with the project specifications, a ratio control circuit utilizing the Siemens LMV ratio controller was proposed as a way to minimize the excess air and still maintain the low NOx qualities of the burner. The goal was to maintain 40% excess air throughout the firing range.

For this project, Eclipse provided a complete combustion solution including: three Winnox burners (WX100, WX200 and WX300); a Siemens LMV 51 ratio controller; air and gas actuators; valve trains and a

burner management system (BMS) control panel. The combustion system was first test fired in Eclipse's Combustion Laboratory in the Rockford, IL facility. Each burner was monitored for emission levels as the burner ratio was set at all points from low to high fire.

The Eclipse-designed gas trains included Siemens SKP 25 regulating actuators to insure constant gas pressure to the burner throughout the firing range. This insured consistent repeatable burner operation under all load conditions.

**Results:**

Testing verified that the burners could be operated from low to high fire with a maximum of 40% excess air and still meet the NOx requirements. After successful operation in the test chamber the burners were sent to the field for installation in the dryer. The dryer was commissioned and placed in production. The burner systems have been operating successfully after field set up and commissioning. The dryer performance can be analyzed knowing the thermal input and excess air levels of each burner. The advantage of this system over the standard ratio regulator control system is the ability to maintain 40% excess air at low fire. The Siemens LMV 51 system with individual gas and air characterized flow control valves allow precise ratio control at all input levels.

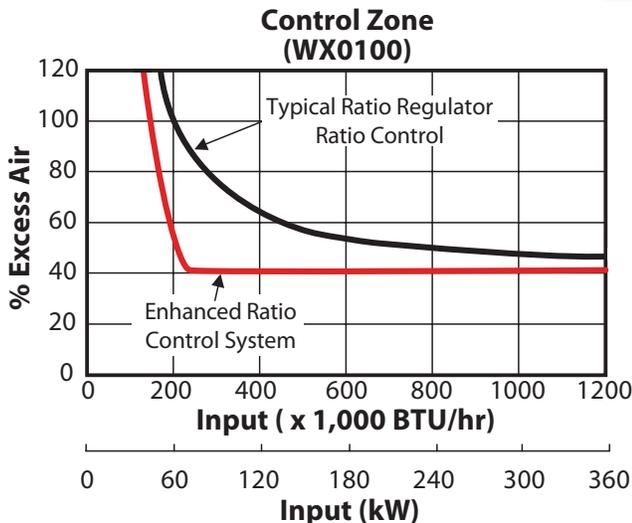
The enhanced ratio control scheme, in combination with the Winnox burner offered unique capabilities to meet the demands of this special application. This enhanced ratio control scheme would also work quite well with other Eclipse burners including the RatioMatic, RatioAir and MK IV burners with similar results.



*Close up of the gas train.*



*Eclipse WX0300 installed with enhanced ratio control system*



*Enhanced ratio control system vastly improves burner operating efficiency especially at mid to low fire.*

