

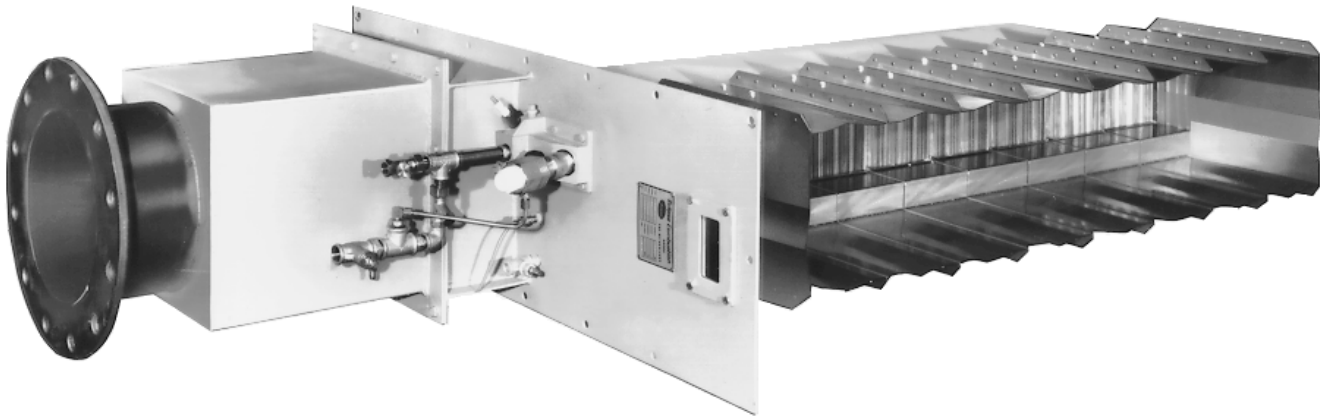
ECLIPSE MINNOX

LOW EMISSION AIR HEATING BURNER SYSTEM

Spec 158

6/94

Patent Pending



- **NO_x and CO emissions substantially below all global air quality standards.**
- **<20 ppm NO_x and <50 ppm CO (corrected to 3% O₂) are GUARANTEED (capable of lower emissions based on process conditions).**
- **Wide range of configurations available for use in fresh or recirculating air systems.**
- **Single burner inputs from 125 to 4000 kW (0.4 to 13.6 MM Btu/hr.).**
- **10:1 turndown on each burner.**
- **Complete packages include all necessary control and safety devices.**

The Burner System

Eclipse Minnox Burner Systems are designed for direct fired air heating where negligible amounts of NO_x and CO are required to fulfill legislative and process requirements. Emissions are less than 20 ppm NO_x and less than 50 ppm CO (corrected to 3% O₂), making the Minnox burner the ideal heat source for industrial drying processes, the food industry and make-up air systems.

Minnox burner systems are typically supplied as packaged units with the burner, mixer, and supply manifold mounted into a duct section or as a sideplate for insertion into the process ductwork. This design results in good temperature uniformity and heat distribution in a wide variety of duct sizes.

To ensure optimum emissions performance in your system, design and start-up assistance will be done by Eclipse.

The Burner

The Eclipse Minnox burner utilizes a premixed gas/air mixture with excess air; the resulting low flame temperature of 1200°C (2200°F) produces extremely low NO_x discharge from the burner head. A modular designed gas/air mixer is adapted to the burner manifold in various configurations. The flame is protected by a

stainless steel shroud which insures good combustion without being influenced by process air.

Burner capacities are available from 125 to 4000 kW (430,000 to 13.6 million Btu/hr.); higher capacities can be designed for special applications.

Gas-Air Ratio Control System

The burner system is provided with a Proportionator in the gas valve train. The Proportionator operates on impulse from combustion air, and the combustion air valve is controlled via temperature control from the process air stream.

Combustion Air Blower

The system is supplied with a blower based on duct pressures, as well as delivery losses to the burner. Blowers are shipped as separate items.

Valve Trains

The burner package includes valve trains designed to NFPA standards. Eclipse also offers other valve trains to comply with local codes and IRI.

Control Panels

Flame safety control panels are supplied with the burner package according to NFPA standards.



ECLIPSE COMBUSTION

Specifications

Emissions (@ 3% O₂)	NOx: Less than 20 ppm CO: Less than 50 ppm HCHO Aldehydes: No smell in undiluted flue gases (less than 0.17 ppm)
Input	Straight 6" Section: 125 kW (430,000 Btu/hr) Sections can be combined to a maximum of 4,000 kW (13.6 MM Btu/hr.).
Starting Input	15% of nominal capacity.
Turndown	10:1 in process conditions.
Fuels	Natural gas, propane, propylene & butane. Call Eclipse for information on using other fuels.
Nat. Gas Pressure Range (at Proportionator)	100 to 300 mbar (40" to 120" w.c.). For pressures on other fuels, call Eclipse.
Combustion Air*	Volume: 205 nm ³ /hr (120 scfm) per 125 kW (430,000 Btu/hr.) input Mixer Inlet Pressure (Neutral Chamber): 50 mbar (20" w.c.) Maximum Temperature: 40°C (100°F)
Process Air Conditions	Inlet Temperature: Up to 300°C (570°F) Outlet Temperature: Up to 500°C (930°F) Chamber Pressure: The system is designed to operate with ±10 mbar (4" w.c.) variations. For more extreme variations, consult Eclipse.
Velocity Past Burner**	Range: 2 to 20 m/s (390 to 3900 fpm) Recommended: 12 m/s (2400 fpm)
Piloting*** (Natural Gas)	Input: 15 kW (50,000 Btu/hr.) Minimum Pressure: 16 mbar (6.5" w.c.) Maximum Pressure: 28 mbar (11" w.c.)
High Fire Flame Length	Approximately 300 mm (12") from the burner head. The flame is contained within the stainless steel combustion shroud, which is part of the standard burner assembly.
Flame Monitoring	U.V. scanner.
Data Sheets	Data 158-1: Typical Systems Components and Pilot Options

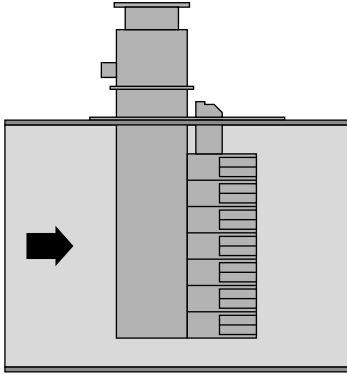
* Based on the air being filtered from a clean, fresh source.

** Velocity cannot be perpendicular to the flame.

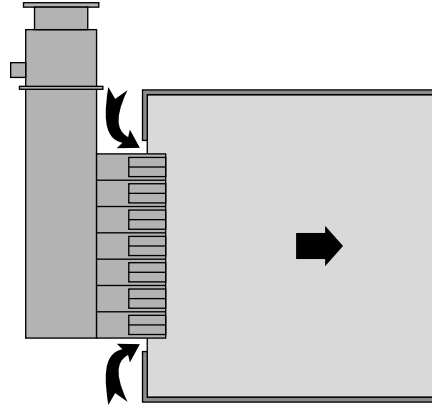
*** Integral spark ignited nozzle mix pilot with the ignition plug included.

Firing Arrangements

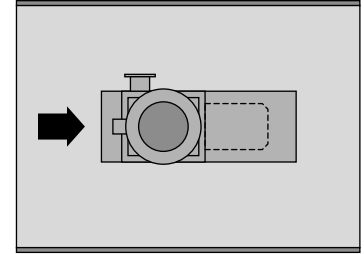
**Horizontal Mounting & Firing
(Top View)**



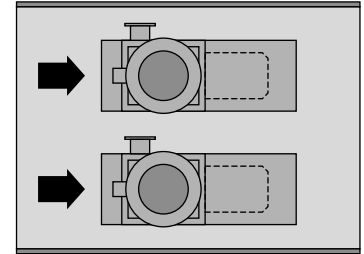
**Slot Firing
(Top View)**



**Horizontal Firing—Single Burner
(Side View)**



**Horizontal Firing—Multi-Burner
(Side View)**



Burners can be configured to fire vertically (up-down) or horizontally (left-right). Systems include complete duct sections with burner mounted inside duct; sideplate assemblies for insertion into an existing duct, and designs for slot firing into an existing duct.

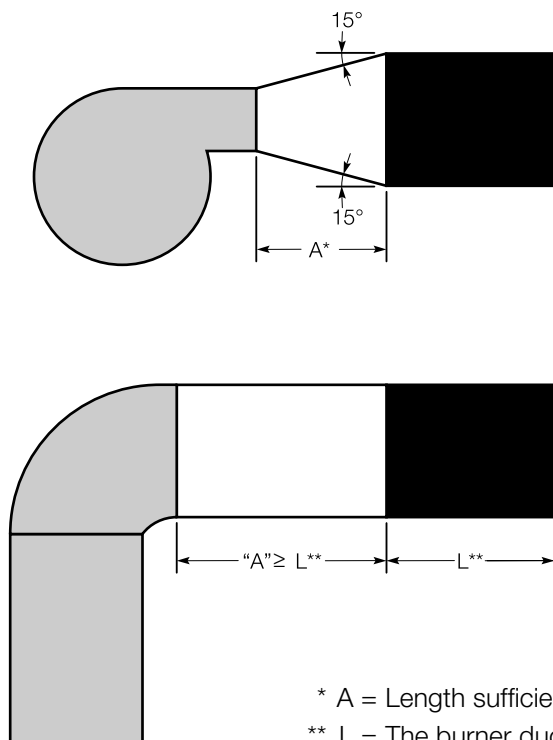
For increasing inputs or improving duct temperature uniformity

Good Duct Design

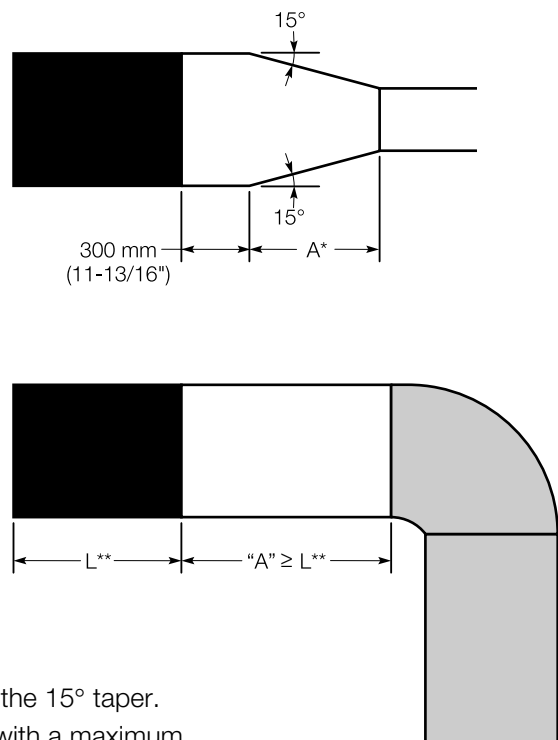
The Minnox duct/side plate unit must be properly installed in the process air duct system so that the process air velocity past the burner remains uniform.

The illustrations below represent good duct designs which will best maintain the process air velocity. The black boxes represent the Minnox burner.

Inlet Side

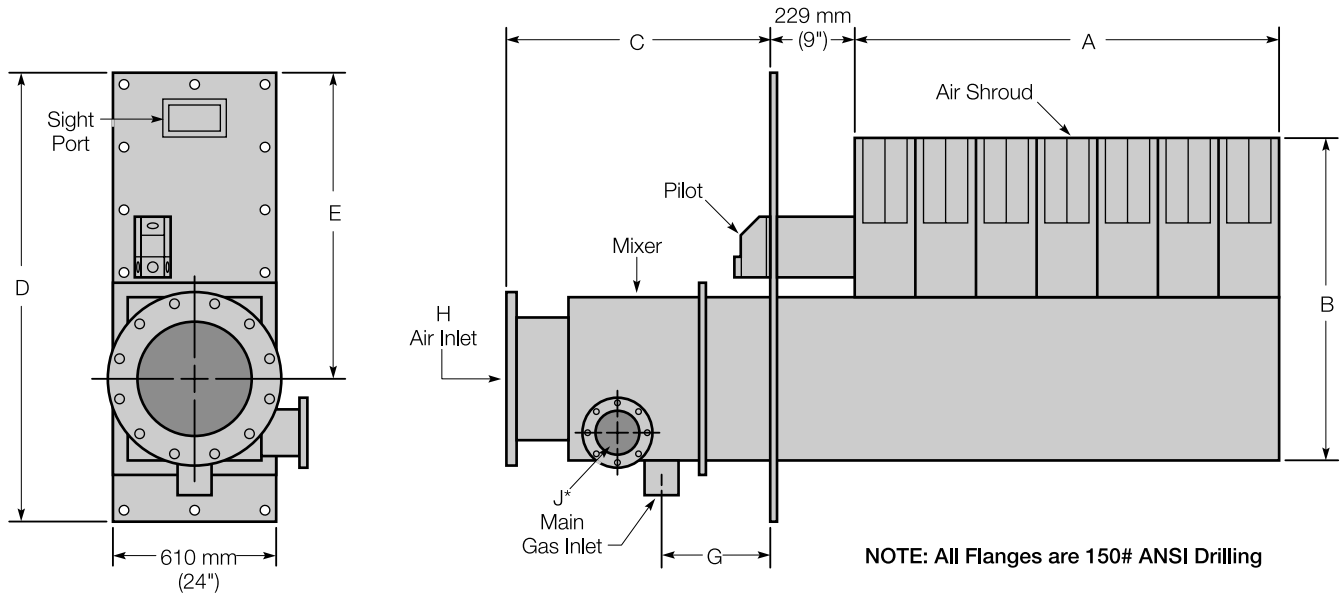


Outlet Side



- * A = Length sufficient to provide the 15° taper.
- ** L = The burner duct/side plate with a maximum length of 1300 mm (52").

Dimensions



Model	A		B		C		D		E		G		H (In.)	J* (In.)
	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.		
125	152	6	533	21	432	17	1016	40	610	24	229	9	4	1
250	305	12	533	21	432	17	1016	40	610	24	229	9	6	1
375	457	18	533	21	432	17	1016	40	610	24	229	9	6	1.5
500	610	24	533	21	432	17	1016	40	610	24	229	9	6	1.5
625	762	30	686	27	483	19	1016	40	686	27	254	10	10	1.5
750	914	36	686	27	483	19	1016	40	686	27	254	10	10	1.5
875	1067	42	686	27	483	19	1016	40	686	27	254	10	10	2
1000	1219	48	686	27	483	19	1016	40	686	27	254	10	10	2
1125	1372	54	686	27	483	19	1016	40	686	27	254	10	10	2
1250	1524	60	686	27	483	19	1016	40	686	27	254	10	10	2
1375	1676	66	838	33	483	19	1270	50	762	30	254	10	12	2
1500	1829	72	838	33	483	19	1270	50	762	30	254	10	12	2.5
1625	1981	78	838	33	483	19	1270	50	762	30	254	10	12	2.5
1750	2134	84	838	33	483	19	1270	50	762	30	254	10	12	2.5
1875	2286	90	838	33	483	19	1270	50	762	30	254	10	12	2.5
2000	2438	96	838	33	483	19	1270	50	762	30	254	10	14	2.5
2125	2591	102	838	33	483	19	1270	50	762	30	254	10	14	3
2250	2743	108	838	33	483	19	1270	50	762	30	254	10	14	3
2375	2896	114	965	38	533	21	1270	50	838	33	254	10	16	3
2500	3048	120	965	38	533	21	1270	50	838	33	254	10	16	3
2625	3200	126	965	38	533	21	1270	50	838	33	254	10	16	3
2750	3353	132	965	38	533	21	1270	50	838	33	254	10	16	3
2875	3505	138	965	38	533	21	1270	50	838	33	254	10	16	4
3000	3658	144	965	38	533	21	1270	50	838	33	254	10	16	4
3125	3810	150	1143	45	533	21	1499	59	838	33	254	10	16	4
3250	3962	156	1143	45	533	21	1499	59	914	36	254	10	16	4
3375	4115	162	1143	45	533	21	1499	59	914	36	254	10	16	4
3500	4267	168	1143	45	533	21	1499	59	914	36	254	10	16	4
3625	4369	172	1143	45	533	21	1499	59	914	36	254	10	16	4
3750	4521	178	1270	50	737	29	1499	59	991	39	254	10	18	4
3875	4674	184	1270	50	584	23	1499	59	991	39	254	10	18	4
4000	4826	190	1270	50	584	23	1499	59	991	39	254	10	18	4

* There are two main gas inlets shown—all model numbers below 2000 have the N.P.T. threaded inlet. All others have the flanged inlet.