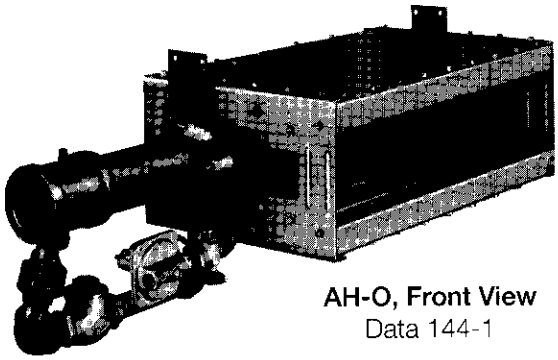
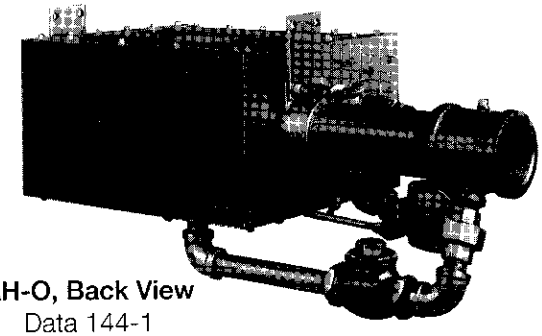
ECLIPSE AIR HEAT BURNERS

Series "AH-O" & "TAH-O"

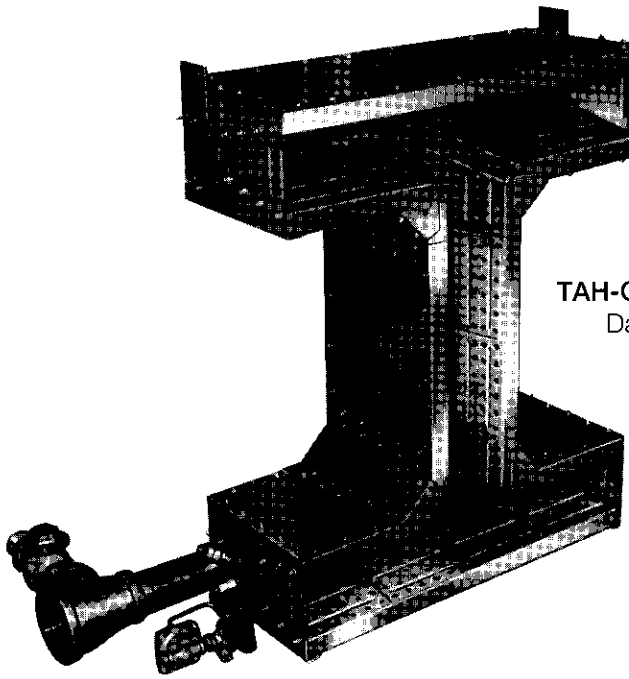
U.S. Reissue Pat. No. 26,244 Canadian Pat. No. 743,782



AH-O, Front View
Data 144-1



AH-O, Back View
Data 144-1



TAH-O, Front View
Data 144-2

Eclipse "AH-O" and "TAH-O"Air Heat Burners are line type burners ideal for generating large volumes of clean, hot air. They are designed for mounting in ducts where all of the oxygen required for combustion is available from the process airstream. Applications include ovens, dryers, fume incinerators, make-up air heaters, and similar industrial equipment.

Because these burners depend on the airstream for combustion air, a profile plate must be used to establish proper air velocity past the burner. Air temperatures can be as high as 450°F (250°C) upstream of the burner, and 1000°F (540°C) downstream.

- **Low NO_x, CO and aldehydes.**
- **Air temperatures up to 450° F (250° C) upstream of the burner.**
- **Inputs up to 1,000,000 Btu/hr. per lineal foot of burner (962 kW/m), depending on air velocity**
- **Wide range of configurations, packages, and accessories.**

Specifications

Inputs & Pressures:	See table below.
Fuels:	Natural gas or 100% propane vapor. Call Eclipse for information on using other fuels.
Airstream Temperatures:	Upstream of Burner: 450°F 250°C Downstream of Burner: 1000°F 540°C
Oxygen Level:	18% oxygen required in the process airstream.
Net Free Area:	10 sq. in. per lineal foot 212 sq. cm per lineal meter
Pilot Input:	Approximately 25,000 Btu/hr. (7.3 kW)
Piloting:	Integral spark-ignited pilot; ignition plug included.
Flame Monitoring:	Flame rod supplied. UV scanner adaptors are available. For UV scanners, Eclipse recommends a flame monitoring system that terminates the ignition spark and proves the pilot flame without spark prior to opening the main gas valves. CGA requires two flame rods on burners over 36" long (914 mm). Use a flame monitoring endplate (see Data 140-6) to mount a second flame rod on the end opposite the gas inlet.
Materials:	All portions of the burner exposed to flame are cast iron or #321 stainless steel.
Emissions:	Capable of operating at less than 35 ppm NO_x or less than 100 ppm CO, depending upon operating conditions. Emissions performance depends not only on the burner, but also other factors such as chamber temperature, chamber design, and heat loading. For estimates of emissions performance in your application, call Eclipse.
Packaging Options:	Available with complete valve trains and control systems. AH-O burners and systems can be supplied mounted on duct sections as specified by the customer. Call Eclipse for information on custom packaged systems.

Models:

Model	Description	Data Sheet
AH-O	Line-shape	Data 144-1
TAH-O	"I"-shape	Data 144-2

Related Information:

Flame monitoring accessories and endplates	Data 140-6
Ordering details and worksheet	Data 140-7

Inputs, Pressures, & Flame Lengths

Rated Input	Gas Pressure*		Flame Length**	Air ΔP Across Burner†	Air Flow Per Area of Opening††
	Nat. Gas	Propane			
550,000 Btu/hr/ft	1.2" w.c.	0.5" w.c.	18-24"	0.4" w.c.	13.6 scfm/in.^{2}
800,000 Btu/hr/ft	2.2" w.c.	0.9" w.c.	24-30"	0.7" w.c.	17.6 scfm/in.^{2}
1,000,000 Btu/hr/ft	3.5" w.c.	1.3" w.c.	40-46"	1.0" w.c.	21.5 scfm/in.^{2}
530 kw/m	3.0 mbar	1.2 mbar	46-61 cm	1.0 mbar	3.39 Nm^3/hr/cm^2
762 kw/m	5.5 mbar	2.2 mbar	61-76 cm	1.7 mbar	3.39 Nm^3/hr/cm^2
962 kw/m	6.2 mbar	3.2 mbar	102-117 cm	2.5 mbar	5.36 Nm^3/hr/cm^2

* Measured between the gas inlet and a tap on the duct wall 10" to 20" (25 to 50 cm) downstream of the burner.

** Flame length is a function of burner input, air ΔP and air flow across burner face. If flame length is not critical, then these figures may vary.

† Air at 70° F and sea level.

†† Required flow per unit area of combined profile opening and burner net free area to produce the corresponding air ΔP.

CAUTION: It is dangerous to use any fuel burning equipment unless it is equipped with suitable flame sensing devices and automatic fuel shut-off valves. Eclipse can supply such equipment or information on alternate sources.

Profile Plate Sizing

To calculate the open area between the burner perimeter and the edge of the profile plate opening, solve the following equation:

$$A_G = \frac{Flow_T}{Flow_R} - (A_{NF} \times L_F)$$

where

A_G = Area in of the gap between the profile plate and the burner.

$Flow_T$ = Total air flow around and through the burner.

$Flow_R$ = Air flow required per unit of open area to produce the specified pressure drop.

A_{NF} = Burner net free area, from page 2

L_F = Burner length.

Example–Size a profile plate for a seven foot long burner to fire at 800,000 Btu/hr. Air flow around and through the burner will be 60,000 scfm.

$Flow_T$ = 60,000 scfm

$Flow_R$ = 21.5 scfm per sq. in. (from page 2)

A_{NF} = 10 sq. in. per ft. (from page 2)

L_F = 7 ft.

$$A_G = \frac{60{,}000}{21.5} - (10 \times 7) = 2720 \text{ sq. in.}$$

Profile Plate Design & Mounting Guidelines

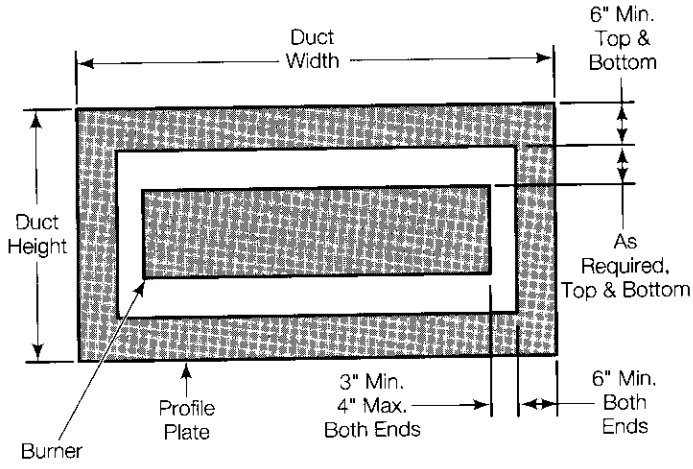
The profile opening must provide uniform air flow down the length of the burner.

If the exact air flow is in doubt, provide adjustable profile plates so that final settings can be made in the field.

Profile plates should be positioned flush with the firing end of the burner. If necessary the plates can be located up to l/2" back from the firing end, but **under no circumstances** should they be in front of the burner.

Center the burner in the duct.

Allow a minimum of 46" (1168 mm) from burner to nearest point of possible flame impingement at an input of 800,000 Btu/hr/ft (770 kW/m).

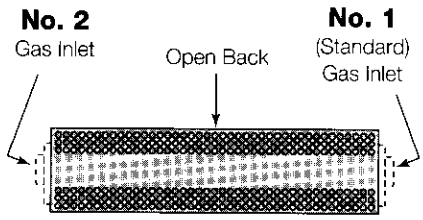


Burner Firing Arrangements

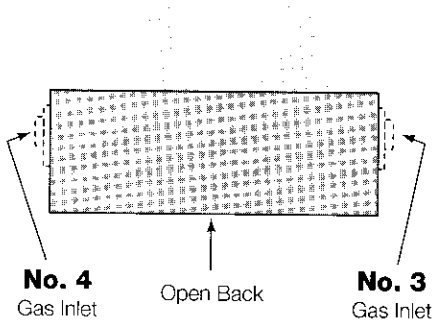
The AH Burner can fire in any direction. Flow through the burner's check valve, however, must be horizontal. A guide for identifying some standard arrangements is shown below.

Be sure to indicate the appropriate number arrangement when ordering. If no arrangement is indicated, No. 1 will be furnished as standard.

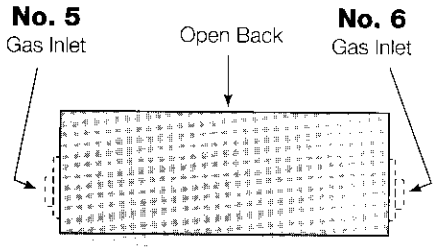
Horizontal Firing



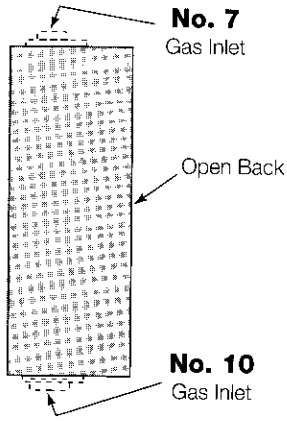
Vertical Firing Up



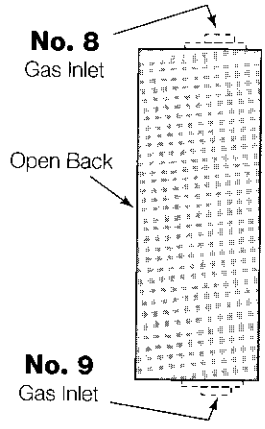
Vertical Firing Down



End Firing



End Firing



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