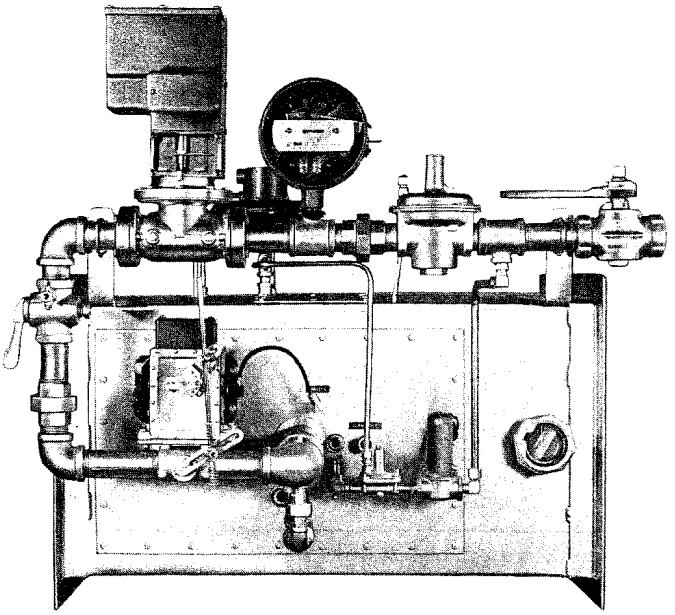
ECLIPSE AIR HEAT BURNER* DUCT UNITS

"AH-D" and "RAH-D"



120 AH-DP Duct Unit with FM Type Valve Train

- **Low NO_x, CO, and aldehydes.**
- **Fully packaged, easy to install and operate.**
- **Nozzle-mix design provides excellent stability with high turndown.**
- **Handles a wide range of duct velocities.**
- **Fresh air or recirculating models.**
- **For pressure or suction side of circulating fan.**
- **Heavy duty industrial construction.**
- **100% factory tested and adjusted.**

DESCRIPTION

Eclipse Duct Units are designed to produce large volumes of hot air for industrial processes such as drying, baking, or curing. Duct Units consist of an Eclipse "AH" or "RAH" Air Heat burner mounted in a duct section complete with an FM or IRI type gas valve train. Because they are completely packaged, Duct Units are easy to install, connect and operate.

CONFIGURATIONS

"AH-D" duct units are used in fresh air systems, while "RAH-D" units are used in recirculating air systems. Both types are available for use on the suction or pressure side of the circulating fan.

Sizes are available with maximum inputs from 400,000 to 6,000,000 Btu/hr. and a fuel turndown of at least 30:1. Larger units can be supplied on special order. Duct units are designed to burn natural gas. Contact Eclipse for information on using other fuels.

Each size of Duct Unit is available with a small or a large duct cross section. The larger duct allows greater air flows past the burner, producing air outlet temperatures from 80° to 200° F. The smaller duct can generate outlet temperatures from 200° to 600° F. Air inlet temperatures to recirculating (RAH) models must not exceed 500° F.

Standard Duct Units are arranged to fire horizontally with air flow from left to right when facing the gas piping. Other arrangements are available to fit your requirements.

Flame monitoring equipment supplied with these burners by Eclipse may or may not meet local safety and/or insurance requirements. The owner/user and/or his insurance underwriter must assume responsibility for the acceptance, use, and proper maintenance of flame supervision, limit controls, and other safety devices.

CONSTRUCTION

Duct shells are 10 gauge steel with 2" x 2" x 1/4" structural steel angle at duct inlet and outlet. End joints are welded down their full length to prevent air leakage.

The burner is mounted to a side plate which is bolted to the duct. An inspection plate provides for easy access to the spark plug and flame rod. Each unit has peepsights to view the main flame and pilot flame.

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Canadian Patent No. 743,782

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CAPACITIES — DIMENSIONS

(Refer to Drawings on Page 3)

Burner Number	Input BTU/Hr.	Combustion Blower H. P. [1]		"A" Gas Inlet Pipe Size [3] - NPT		
		"AH-D" Suction & Pressure Systems	"RAH-D"[2] Suction Systems Only	10 - 14" W. C. Gas Pressure	1/2 - 1 PSI Gas Pressure	5 - 25 PSI Gas Pressure
40	400,000	1/10	1/10	1	1	1
80	800,000	1/4	1/3	1	1	1
120	1,200,000	1/4	1/3	1-1/4	1	1
160	1,600,000	1/3	1/3	1-1/4	1-1/4	1-1/2
200	2,000,000	1/3	3/4	1-1/2	1-1/2	1-1/2
280	2,800,000	1/2	3/4	2	1-1/2	1-1/2
400	4,000,000	3/4	1-1/2	2-1/2	2-1/2	2
480	4,800,000	1	1-1/2	2-1/2	2-1/2	2
600	6,000,000	2	2	2-1/2	2-1/2	2

Burner Number	Dimensions - Inches									
	Large Ducts [4] (For Outlet Temperature of 80-200°F.)					Small Ducts [4] (For Outlet Temperatures of 200-600°F.)				
	B	C	D	E	Max. Cross-Sectional Free Area Sq. Ft. (Duct area minus Burner area)[5]	B	C	D	E	Max. Cross-Sectional Free Area Sq. Ft. (Duct area minus Burner area)[5]
40	30	30	36	18	2.70	18	22	36	18	0.52
80	30	30	36	18	4.80	18	22	36	18	1.43
120	38	38	36	18	8.20	20	28	36	18	2.10
160	44	44	40	18	11.10	20	34	40	18	2.60
200	48	48	40	20	13.10	20	40	40	20	3.10
280	54	54	40	20	16.80	22	52	40	20	4.70
400	68	72	48	20	28.50	24	72	48	20	7.70
480	68	86	54	20	33.40	24	86	54	20	7.40
600	68	104	60	15	40.70	24	104	60	15	8.90

[1] Standard motors are 115/1/60 for 1/10 through 1/2 hp and 220/440/3/60 for 3/4 hp and over. Other electrical characteristics available upon request.

[2] Combustion blower hp shown is for RAH-DS suction systems with –0.1" to –3.0" w.c. during cold condition.

For RAH-DS suction systems with –3.0" w.c. or higher suction during **cold** condition, combustion air blower can be omitted. This is based on no less than –1.5" w.c. suction at **hot** condition. Consult factory for further assistance if required.

For RAH-DP pressure systems, select blower as described on page 6 of Bulletin 140.

Blower selection for RAH-DS and -DP systems is based on a maximum duct differential pressure change of 50% from cold to hot condition.

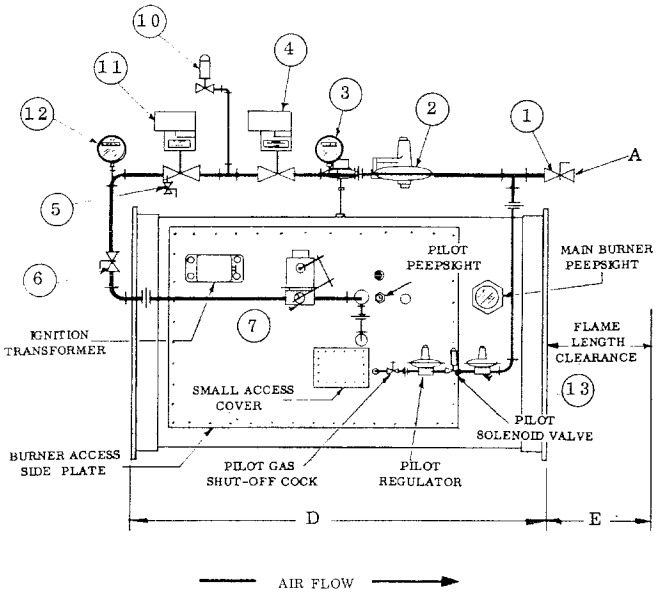
[3] Gas pressures refer to natural gas. For propane applications, consult factory. Inlet pipe size shown is the size of the inlet lubricated plug cock; other valves in the system may be larger or smaller since the valves are selected for the best pressure drop. If gas pressures less than 10" w.c. are required, consult factory.

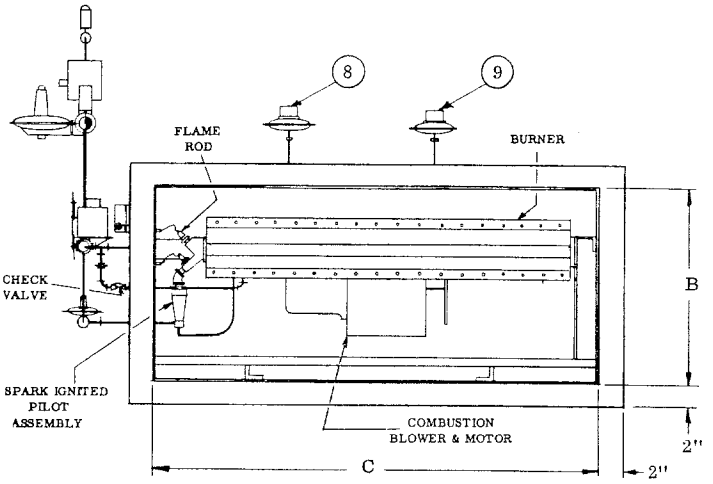
[4] In order to maintain average velocities of 1200 to 3000 fpm past the burner, two sizes of ducts are available for each input.

[5] This column lists the maximum cross sectional free area in square feet for each duct size available. The cross sectional free area may be reduced by adding a profile plate to obtain an optimum air flow of 1500 fpm. The area will be sized based on the circulating air volume past the burner.

FRESH AIR SYSTEMS

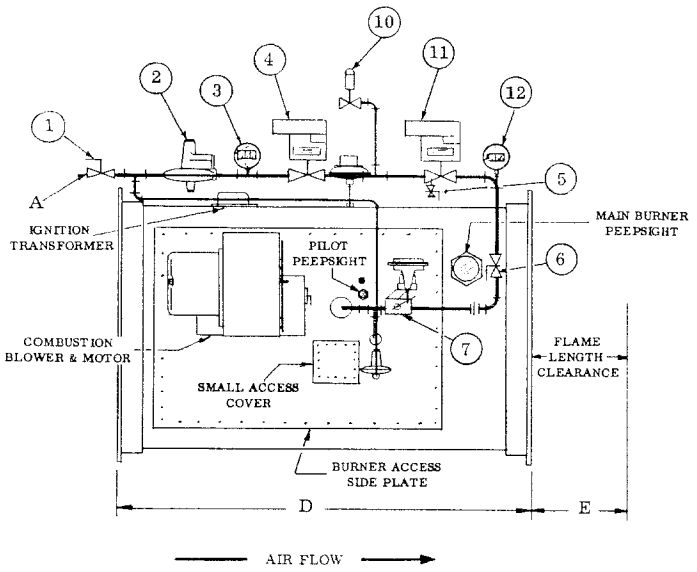
SERIES "AH-DS" AND "AH-DP"

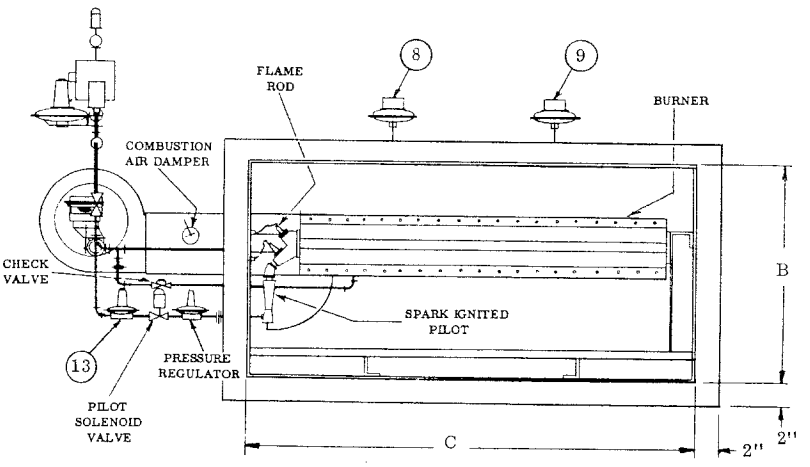




RECIRCULATING AIR SYSTEMS

SERIES "RAH-DS" AND "RAH-DP"





The following items apply to both *fresh air* and *recirculating systems* and are numerically keyed to both of the above drawings.

Components Included in FM Type Systems

1. Lubricated Plug Cock
2. Pressure Regulator
3. Low Gas Pressure Switch
4. Motorized Safety Shut-Off Valve
5. Checking Pet Cock
6. Checking Gas Cock
7. Gas Control Valve w/Operator
8. Air Flow Press. Switch for Combustion Air
9. Air Flow Press. Switch for Circulating Air

Additional Items Included for IRI Type Systems

10. Normally Open Vent Valve
11. Motorized Safety Shut-Off Valve
12. High Gas Pressure Switch

The Following Is Used Only When Gas Pressure Exceeds ½ PSIG

13. Second Pilot Regulator

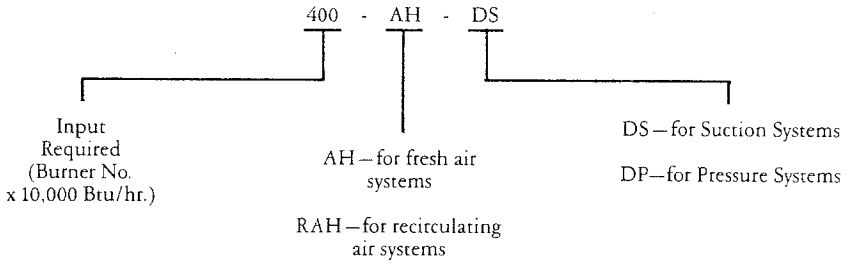
OPTIONAL FEATURES

1. Pneumatic motor operator can be substituted for the electric proportioning control motor on the gas control valve. The electric proportioning control motor can be replaced with a mechanically controlled temperature control valve.
2. Duct Units can be arranged to fire vertically up or down, or to fire horizontally from right to left when facing the gas piping (standard is left to right air flow).
3. Units available with low fire start.
4. Electrical components can be wired to an enclosed numbered terminal strip mounted on the Duct Unit.
5. Flame safety cabinets available.
   A. STANDARD FM TYPE CONTROL PANEL
      Panel No. CC1 consisting of:
      a. General Purpose Cabinet
      b. RA890E Flame Safety Relay
      c. Non-return of Ignition
      d. 24 Volt Control Motor Transformer
      e. Three (3) Lights
      f. On-Off Switch
      g. Motor Starter
      h. Fuse Block with Fuse
      i. Numbered Terminal Strip
   B. STANDARD IRI TYPE CONTROL PANEL
      Panel No. CC4 consisting of:
      a. General Purpose Cabinet
      b. RA890E Flame Safety Relay
      c. Non-return of Ignition
      d. Low Fire Start
      e. 0-5 Minute Adjustable Prepurge
      f. Alarm Silencing Relay and Push Button
      g. Alarm Horn (not mounted)
      h. 24 Volt Control Motor Transformer
      i. Five (5) Lights
      j. On-Off Switch
      k. Motor Starter
      l. Fuse Block with Fuse
      m. Numbered Terminal Strip

EQUIPMENT SELECTION

1. Choose Duct Unit catalog number as follows:

   Example: 4,000,000 Btu/hr. required using fresh air on suction side of fan. Required outlet air temperature is 350° F.



   Selection: 400 - AH - DS with small duct.

2. If "RAH-DP" is required, select proper blower as described on Page 6 of Bulletin H-100, or consult factory as necessary.
3. Select the duct size by maximum input and temperature requirements.

ORDERING INFORMATION

When ordering, the following should be specified on the face of the order to avoid delays in processing.

1. Duct Unit complete catalog number (i.e., 120 AH-DP) which indicates input desired, fresh or recirculating air system, and whether the Duct Unit will be located on the suction or pressure side of the circulating fan.
2. Type of gas available (natural, propane, or manufactured).
3. Gas Pressure available to the system.
4. Exact electrical characteristics (115/1/60; 220/3/60; 550/3/60; etc.)
5. Advise type of piping to be used, i.e., FM or IRI type.
6. Minimum and maximum *inlet* air temperature which will be supplied to Air Heat Burner Duct Unit.
7. Minimum and maximum *outlet* air temperature required from the Air Heat Burner Duct Unit.
8. Minimum and maximum suction or pressure on cold system before the circulated air is heated.
9. Cfm of circulated air past the burner.
10. Advise optional features desired.
11. If provision is to be made for the addition of insulation, please advise on the face of the order the thickness of the insulation which will be used.

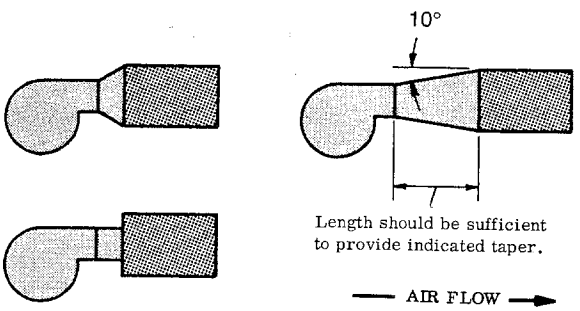
GOOD DUCT DESIGN

FOR UNIFORM AIR FLOW PAST THE BURNER

To eliminate or reduce the possibilities of creating turbulent air flow past the burners it is necessary to use good duct design practice. The sketches below show practices used to eliminate the effect of abrupt duct changes. The shaded portion of each sketch represents the Air Heat Burner Duct Unit.

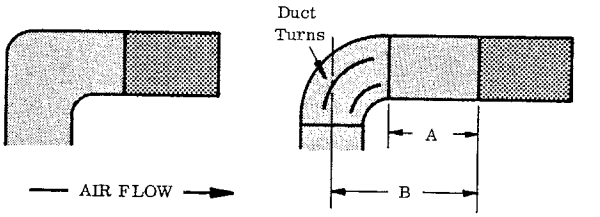
INLET TRANSITION
(In Relation to Burner Duct Unit)

Poor ——— Good



INLET ELBOW

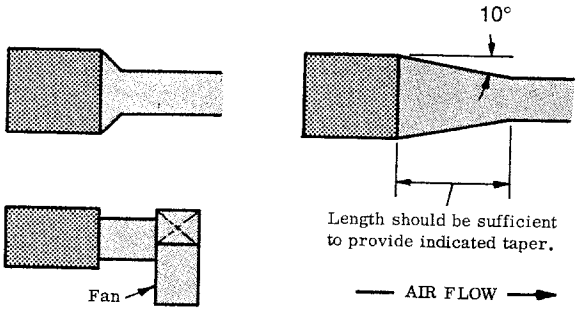
Poor ——— Good



40 - 400 AH A = 4' Min. B = 6'
480 - 600 AH A = 6' Min. B = 8'

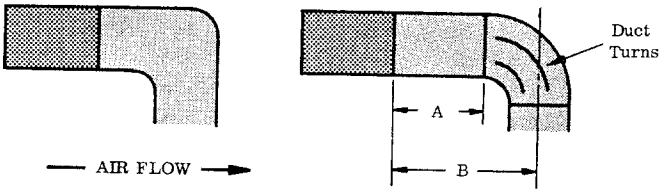
OUTLET TRANSITION
(In Relation to Burner Duct Unit)

Poor ——— Good

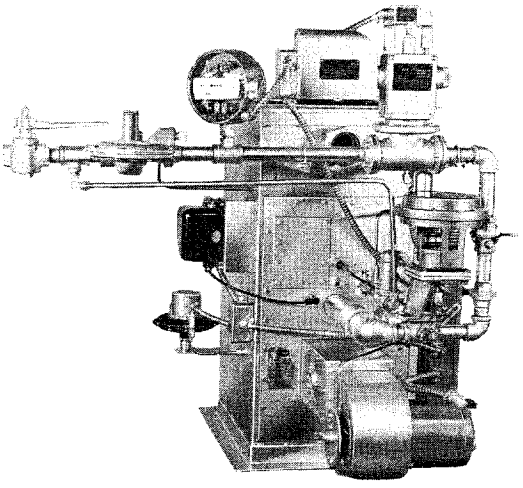


OUTLET ELBOW

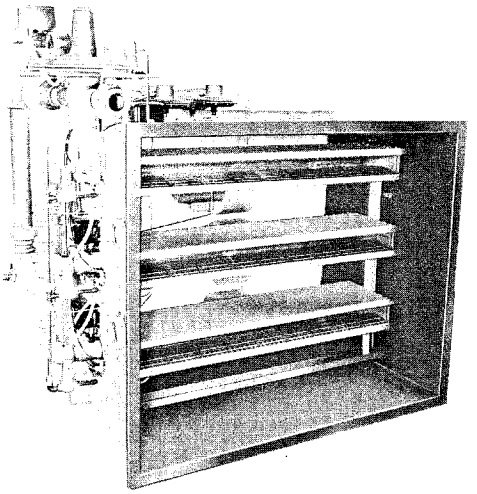
Poor ——— Good



40 - 400 AH A = 4' Min. B = 6'
480 - 600 AH A = 6' Min. B = 8'



80 RAH-DS Eclipse Special Air Heat Burner Duct Units located on suction side of fan. Recirculated air past the burner. Burner to fire vertically up. Input 800,000 Btu/hr. and FM type piping.



(3) 360 AH-DP Eclipse Special Air Heat Burner Duct Unit located on pressure side of fan. Fresh air past the burner. Unit includes three 360 AH Air Heat Burners. Input 10,800,000 Btu/hr. and FM type piping.

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