ECLIPSE INFORMATION GUIDE

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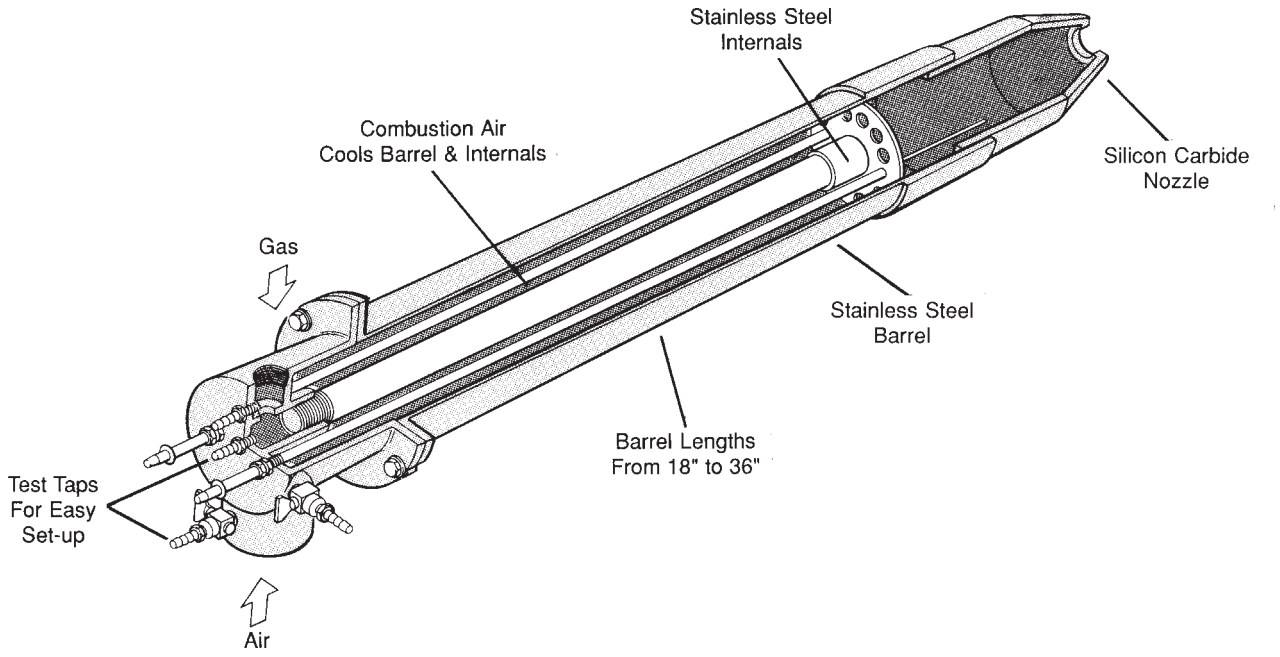
EXTENSO-JET SMALL BORE BURNERS



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Eclipse Combustion
ISO 9001 Registered

WARNING

The burners covered in this Guide are designed to mix fuel with air and burn the resulting mixture. All fuel burning devices are capable of producing explosions and fires when improperly applied, installed, adjusted, controlled, or maintained. This Guide will provide information for using these burners for their limited design purpose. Do not deviate from any instructions or application limits in this Guide without written advice from the Eclipse Combustion Division in Rockford, Illinois. Read this entire Guide before attempting to light burners. If you do not understand any part of the information in this Guide, contact your local Eclipse representative or Eclipse Combustion before proceeding further.

Important Notices About Safe Burner Operation

l. Store the burner inside. Exposure to the elements can damage the burner.

2. Adjustment, maintenance, and troubleshooting of the mechanical parts of this unit should be done by people with good mechanical aptitude and experience with combustion equipment.

3. Order replacement parts from Eclipse Combustion only. Any customer-supplied valves or switches should carry UL, FM , CSA, and / or CGA approval where applicable.

4. The best safety precaution is an alert and competent operator. Thoroughly instruct new operators so they demonstrate an adequate understanding of the equipment and its operation. Regular retraining must be scheduled to maintain a high degree of proficiency. The operator must have easy access to this Information Guide at all times.

1.0 Applications

Eclipse Extenso-Jet burners are nozzle-mixing medium velocity and high velocity burners with extended housings for firing kilns and furnaces with thick walls and crowns.

Conventional short block velocity burners have always been difficult to apply to thick-walled kilns, as illustrated in Figure 1a. The momentum of the burner products is largely dissipated by the time they exit the long firing tunnel in the wall, and the wall can be easily overheated and damaged by the combustion taking place within the tunnel.

Venturi blocks, as shown in Figure 1b, improved the effectiveness of the burners and alleviated wall overheating, but added to the complexity of the wall construction. They were also extremely difficult to suspend in the crowns of top-fired kilns.

Figure 1c illustrates how the Extenso-Jet burner addresses these problems by placing the firing nozzle at the hot face of the kiln wall or crown. The burner housing with its electrodes, pressure taps, and peepsight remains highly accessible on the outside of the wall.

Extenso-Jet burners have also proven useful on special applications where it is necessary for the point of heat generation to be remote from the burner housing. A good example is the curing and preheat of the channel lining in induction melting furnaces.

Extenso-Jet burners can be operated as on-ratio or excess air units.

Figure 1–Burner Comparison

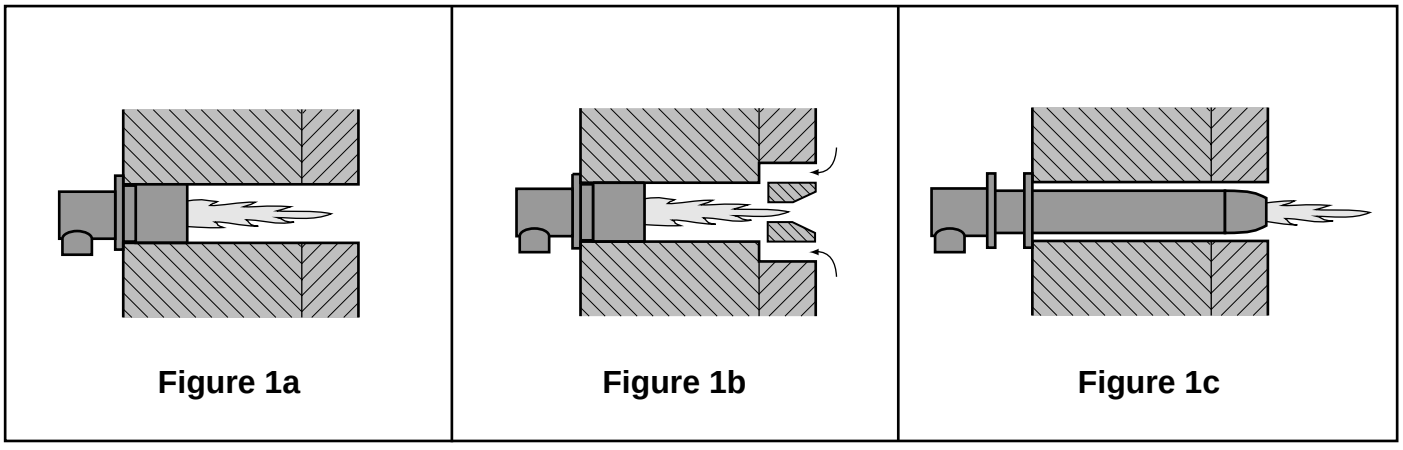


Figure 1a **Figure 1b** **Figure 1c**

2.0 Burner Operating Parameters & Requirements

2.1 Capacities and Supply Pressures

Table 1 lists capacities, supply pressures, air and gas flows and pressure drops, and flame lengths.

2.2 Combustion Chamber Conditions

Maximum chamber temperature: 2350°F
Maximum combustion air temperature: 600°F
Maximum and minimum combustion chamber pressures: Limited only by sealing method at burner mounting flange. If the gas and air flow and pressure control systems compensate for chamber pressure or suction, burner operation will be unaffected. Minimum oxygen content of combustion air: approximately 18%. At reduced oxygen levels, maximum burner input will decrease, and stability limits will be narrowed.

2.3 Fuels

Natural gas or propane vapor are the only acceptable fuels. Propane should contain no more than 5% propylene or other unsaturates (Grade HD-5 or equivalent). See Table 1 for gas pressure requirements at main gas connection.

2.4 Burner Environment

Ambient temperature limits are dictated by monitoring and control equipment such as flame scanners, automatic fuel shutoff valves and electrical wiring.

Protect burners from the weather.

Combustion air should be free of contaminants which might corrode or plug the blower or burner's internal passages. Eclipse strongly recommends the use of a combustion air filter suitable for the operating conditions.

To insure a reliable supply of fresh combustion air, provide room openings to the outdoors. Allow at least one square inch of opening for each 4,000 Btu / hr. of burner firing rate.

Provide access to the burners for inspection and maintenance.

Table 1–Capacities

With natural gas (0.65 S.G) and ambient air.

For preheated combustion air, multiply A–C air pressure drops by the following factors:

Combustion Air Temperature, °F	400	500	600
Pressure Drop Factor	1.65	1.85	2.04

For propane, multiply the B–D gas pressure drops by 0.4 to obtain equivalent Btu/hr. input.

82E MVTA (Medium Velocity)

	Combustion Air Flow in SCFH	750	1000	2000	3000	4000
On-Ratio Operation	Static Air Press. at Tap “A,” "w.c.	0.4	0.8	2.5	4.8	10.1
	Air ΔP Between Taps “A” & “C,” "w.c.	0.3	0.6	1.0	2.6	6.4
	Static Gas Press. at Tap “B,” "w.c.	0.3	0.5	2.0	4.6	8.3
	Gas ΔP Between Taps “B” & “D,” "w.c.	0.15	0.25	1.0	1.9	3.5
	Capacity in 1000’s Btu/Hr.	75	100	200	300	400
	Approx. Flame Length, Inches	18	18	20	24	24
Excess Air Operation	Minimum Gas Flow, SCFH	20	25	50	75	80
	% Excess Air	275	300	300	300	400

82E HVTA (High Velocity)

	Combustion Air Flow in SCFH	750	1000	2000	3000	4000
On-Ratio Operation	Static Air Press. at Tap “A,” "w.c.	0.6	1.1	4.0	7.9	16.4
	Air ΔP Between Taps “A” & “C,” "w.c.	0.3	0.6	2.0	2.4	6.7
	Static Gas Press. at Tap “B,” "w.c.	0.5	0.8	2.5	4.6	14.5
	Gas ΔP Between Taps “B” & “D,” "w.c.	0.1	0.2	1.0	1.9	3.5
	Capacity in 1000’s Btu/Hr.	75	100	200	300	400
	Approx. Flame Length, Inches	12	12	15	18	18
Excess Air Operation	Minimum Gas Flow, SCFH	20	25	50	75	80
	% Excess Air	275	300	300	300	400

Table 1–Capacities (continued)

83E MVTA (Medium Velocity)

	Combustion Air Flow in SCFH	1000	2000	3000	4000	5000	6000
On-Ratio Operation	Static Air Press. at Tap "A," "w.c.	0.35	1.5	1.5	7.0	11.0	17.2
	Air ΔP Between Taps "A" & "C," "w.c.	0.25	0.8	1.05	4.0	7.0	13.0
	Static Gas Press. at Tap "B," "w.c.	0.3	1.0	1.8	4.5	7.0	10.3
	Gas ΔP Between Taps "B" & "D," "w.c.	0.1	0.6	0.85	2.0	2.4	3.4
	Capacity in 1000's Btu/Hr.	100	200	300	400	500	600
	Approx. Flame Length, Inches	24	24	24	24	24	24
Excess Air Operation	Minimum Gas Flow, SCFH	20	40	60	90	125	140
	% Excess Air	400	400	400	350	300	330

83E HVTA (High Velocity)

	Combustion Air Flow in SCFH	1000	2000	3000	4000	5000	6000
On-Ratio Operation	Static Air Press. at Tap "A," "w.c.	0.25	2.0	3.2	8.0	11.0	20.3
	Air ΔP Between Taps "A" & "C," "w.c.	0.2	1.0	1.0	4.5	6.0	12.2
	Static Gas Press. at Tap "B," "w.c.	0.3	2.0	3.8	6.5	9.5	14.2
	Gas ΔP Between Taps "B" & "D," "w.c.	0.1	0.5	0.8	1.5	2.0	3.3
	Capacity in 1000's Btu/Hr.	100	200	300	400	500	600
	Approx. Flame Length, Inches	18	18	18	18	18	24
Excess Air Operation	Minimum Gas Flow, SCFH	20	50	75	100	125	140
	% Excess Air	400	300	300	300	300	330

84E MVTA (Medium Velocity)

	Combustion Air Flow in SCFH	1500	3000	5000	7000	9000
On-Ratio Operation	Static Air Press. at Tap "A," "w.c.	0.55	2.5	5.5	12.0	20.8
	Air ΔP Between Taps "A" & "C," "w.c.	0.4	1.8	4.0	7.5	15.8
	Static Gas Press. at Tap "B," "w.c.	0.7	2.5	6.0	11.0	18.6
	Gas ΔP Between Taps "B" & "D," "w.c.	0.15	1.0	2.0	2.5	5.2
	Capacity in 1000's Btu/Hr.	150	300	500	700	900
	Approx. Flame Length, Inches	24	24	24	24	24
Excess Air Operation	Minimum Gas Flow, SCFH	50	85	125	170	250
	% Excess Air	200	250	300	310	260

84E HVTA (High Velocity)

	Combustion Air Flow in SCFH	1500	3000	5000	7000	9000
On-Ratio Operation	Static Air Press. at Tap "A," "w.c.	1.0	2.5	7.0	14.0	23.8
	Air ΔP Between Taps "A" & "C," "w.c.	0.4	1.3	4.0	7.5	14.4
	Static Gas Press. at Tap "B," "w.c.	0.8	3.0	7.5	13.0	22.9
	Gas ΔP Between Taps "B" & "D," "w.c.	0.1	0.5	2.0	2.5	5.1
	Capacity in 1000's Btu/Hr.	150	300	500	700	900
	Approx. Flame Length, Inches	24	24	24	24	24
Excess Air Operation	Minimum Gas Flow, SCFH	50	85	125	170	250
	% Excess Air	200	250	300	310	260

3.0 Control System Requirements

3.1 Control Method

Extenso-Jet burners can be operated with straight on-ratio control systems (cross-connected Proportionators), constant air, fuel-only control excess air systems, or variable excess air systems (near stoichiometric at full air, excess air at minimum air rate).

3.2 Control Motor Requirements

High-low or modulating. Timing is not critical.

3.3 Piloting

Direct spark ignition of main or bypass low fire gas with extended spark electrode. Extenso-Jet burners can be ignited at any stable firing rate or gas / air ratio. See Figure 3 for part numbers of spark igniters.

Ignition transformer output should be 6000 VAC minimum at 120 VA. Portable battery-powered spark generators do not provide reliable ignition.

3.4 Flame Supervision

Flame rods and UV scanners are used for flame supervision. See Figure 3 for installation locations and flame rod part numbers.

Recommended scanner adapters are listed in Figure 3. If pipe fittings are substituted, make the adapter assembly as short as possible to insure the best possible field of view.

Scanner cooling air is not required unless the burners operate on preheated combustion air, or ambient temperatures exceed the scanner limits.

3.5 Fuel Valve Trains

Gas must be supplied to the burner inlet through a valve train which complies with NFPA standards and all applicable local codes. Eclipse offers FM and IRI type gas valve trains as options. IRI-type trains meet or exceed NFPA standards. Each valve train can be supplied with or without a gas regulator. See Eclipse Bulletin M-700.

3.6 Limit Controls

Limit controls and safety equipment should comply with current NFPA Standard 86 and all applicable local codes and / or standards. NFPA Standards are available from:

National Fire Protection Association
Batterymarch Park
Quincy, Massachusetts 02269

WARNING

Failure to use suitable flame sensing devices and automatic fuel shut off valves can cause explosions and fires.

If Extenso-Jet burners are operated with self-piloting—also known as bypass pilots—Eclipse Combustion strongly recommends that main and pilot gas lines be equipped with approved automatic shutoff valves interlocked to close in the event of flame or limit failure.

UV scanners may be energized by reflected ultraviolet radiation from the spark electrode. Eclipse Combustion strongly recommends the use of an ignition system that prevents the main fuel valve from being opened while the ignition spark is energized.

Flame sensing equipment should be UL, FM and/or CSA approved.

Refer to Eclipse Information Guide P-30 for specific details on the installation and use of flame monitoring equipment.

IMPORTANT: The owner/user and/or his insurance underwriter must assume responsibility for the acceptance, use, and proper maintenance of the limit controls and other safety devices included with this burner, the flame supervision provided in the control panel, and the interfacing of all electrical equipment and sequencing of burner operation between the control panel and the burner.

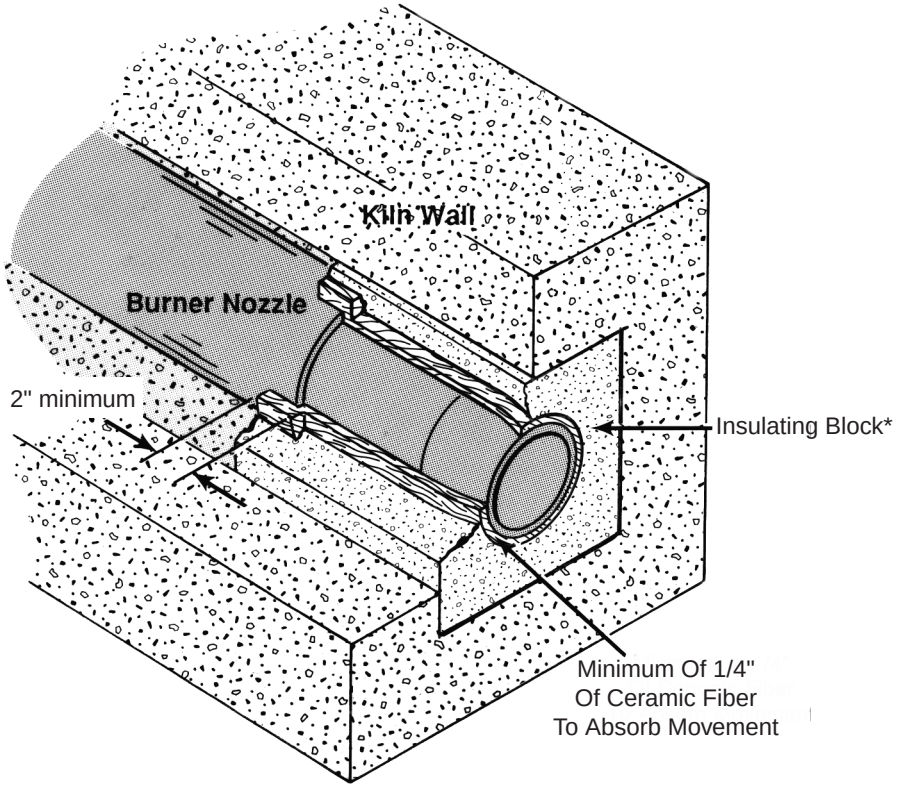
Figure 2 - Burner Mounting

Burner Centered In Wall Opening - Peferred Mounting

Customer-supplied insulating block (insulating firebrick or castable refractory) surrounds nozzle and extends back over alloy burner tube at least 2”.

Maximum chamber temperature:

- 2350°F with the insulating block

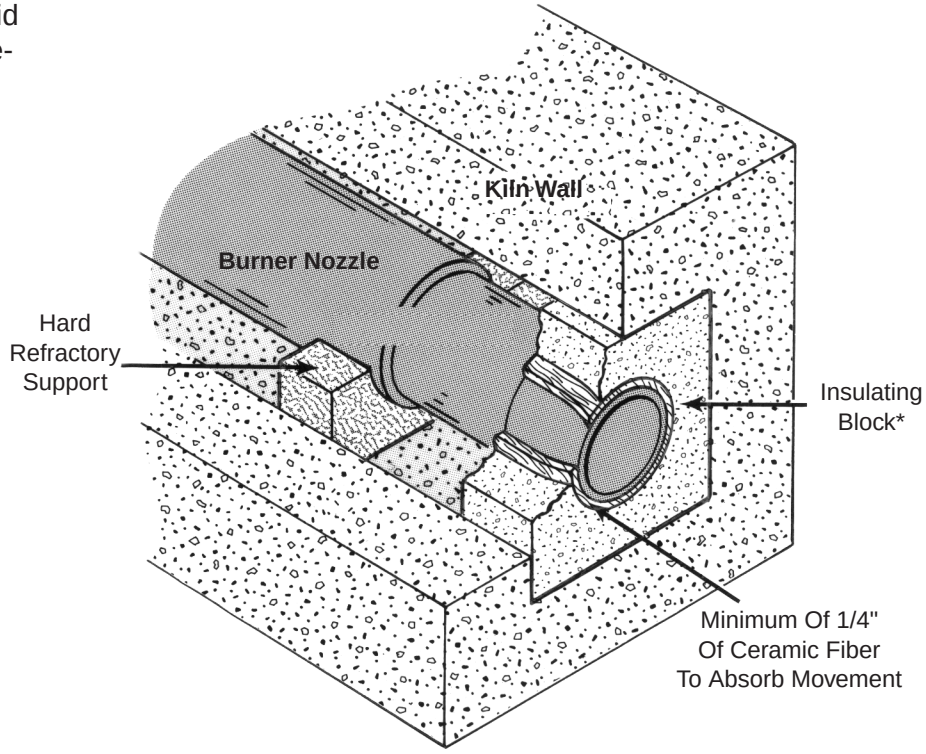


Burner Centered In Wall Opening - Acceptable Mounting

Customer-supplied insulating block surrounds silicon carbide nozzle and rigid hard refractory or other suitable material provides support underneath he alloy burner tube.

Maximum chamber temperature:

- 2350°F with the insulating block
- 1200°F without the insulating block



*** The burner flange must be spring mounted to the kiln wall as shown in Figure 2a.**

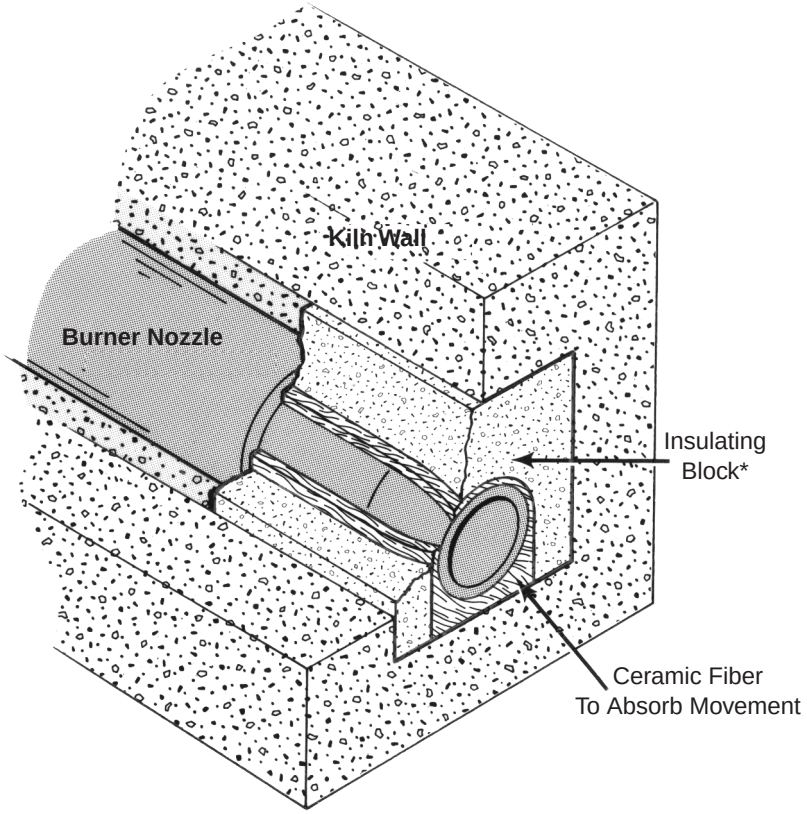
Figure 2 - Burner Mounting

Alloy Burner Tube Lying On Floor Of Wall Opening

Customer-supplied insulating block (insulating firebrick or castable refractory) surrounds nozzle. Weight of burner is supported by the wall opening floor.

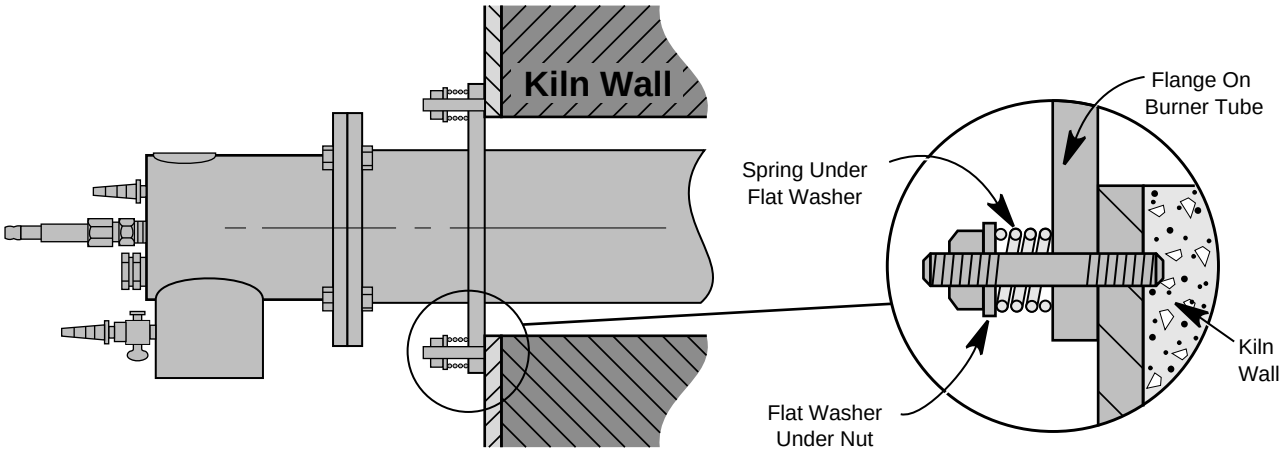
Maximum chamber temperature:

- 2350°F with the insulating block
- 1200°F without the insulating block



*** The burner flange must be spring mounted to the kiln wall as shown in Figure 2a.**

2a. Detail of Wall Mounting Bolts



4.0 Installation

WARNING

If improperly adjusted or operated, burners are capable of producing toxic concentrations of gases, including carbon monoxide. Venting these products into confined, poorly ventilated areas is dangerous. To avoid this situation:

- **Vent the appliance to the outdoors wherever feasible. Refer to the appliance manufacturer's instruction manual for flue and stack design guidelines.**
- **Where equipment location or other considerations prevent outside venting, be sure that the building has adequate volume and fresh air make-up to dilute any potentially harmful combustion products down to safe levels as defined by OSHA or other authorities having jurisdiction.**

4.1 Burner Inspection

Make a thorough inspection of the burner when uncrating and before installing it. If any parts appear broken, bent, or damaged, contact your Eclipse representative or the Eclipse factory before installing the burner.

4.2 Burner Mounting

Two suggested mounting methods are shown in Figure 2. Other methods can be used also, but these rules must be observed:

1. If the kiln or furnace temperature exceeds 1200°F, provide an insulating block or shield around the nozzle and front end of the burner tube. This will shield the tube from furnace heat.
2. **Do not** support the front end of the burner by the silicon carbide nozzle, or the nozzle will crack. Instead, provide support under or around the alloy burner tube.
3. Heat will cause the burner to expand along its length. If the burner is rigidly constrained at both the housing and nozzle ends, the nozzle will crack. Allow for controlled expansion by installing compression springs between the mounting flange and its retaining nuts, as detailed in Figure 2.
4. Support air and gas piping independently of the burner, and use flexible air and gas connections at all burners.
5. For vertical installation, contact Eclipse for mounting suggestions.

4.3 Air Piping

Use flexible nipples on all air connections. All Extenso-Jet burners have 2" combustion air inlets. However, combustion air line to these burners should be sized to keep line losses to a minmium.

The following air line sizes are recommended:

Burner Size Designation	Air Supply Line Size
82	2"
83	2-1/2"
84	3"

4.4 Gas Piping

To insure minimum piping pressure losses and good flow distribution, gas line size to each Extenso-Jet, regardless of burner size, should be 1".

Use flexible nipples on all gas connections. Solid piping may restrain the burner from normal thermal expansion and damage the burner or its piping components. Do not use the burner assembly to support the piping.

All valves must be installed so that the arrow on the side of the valve body points in the direction of flow. If the handle of a manual plug type gas cock is removable, be sure that the handle is properly installed. When the valve is in the “off” position, the handle must be 90° or at a right angle to the line of flow through the valve.

Gas piping must comply with American National Standard “National Fuel Gas Code” (NFPA No. 54 or ANSI Z223.1)*, or must be acceptable to the authority having jurisdiction.

4.5 General Wiring Suggestions

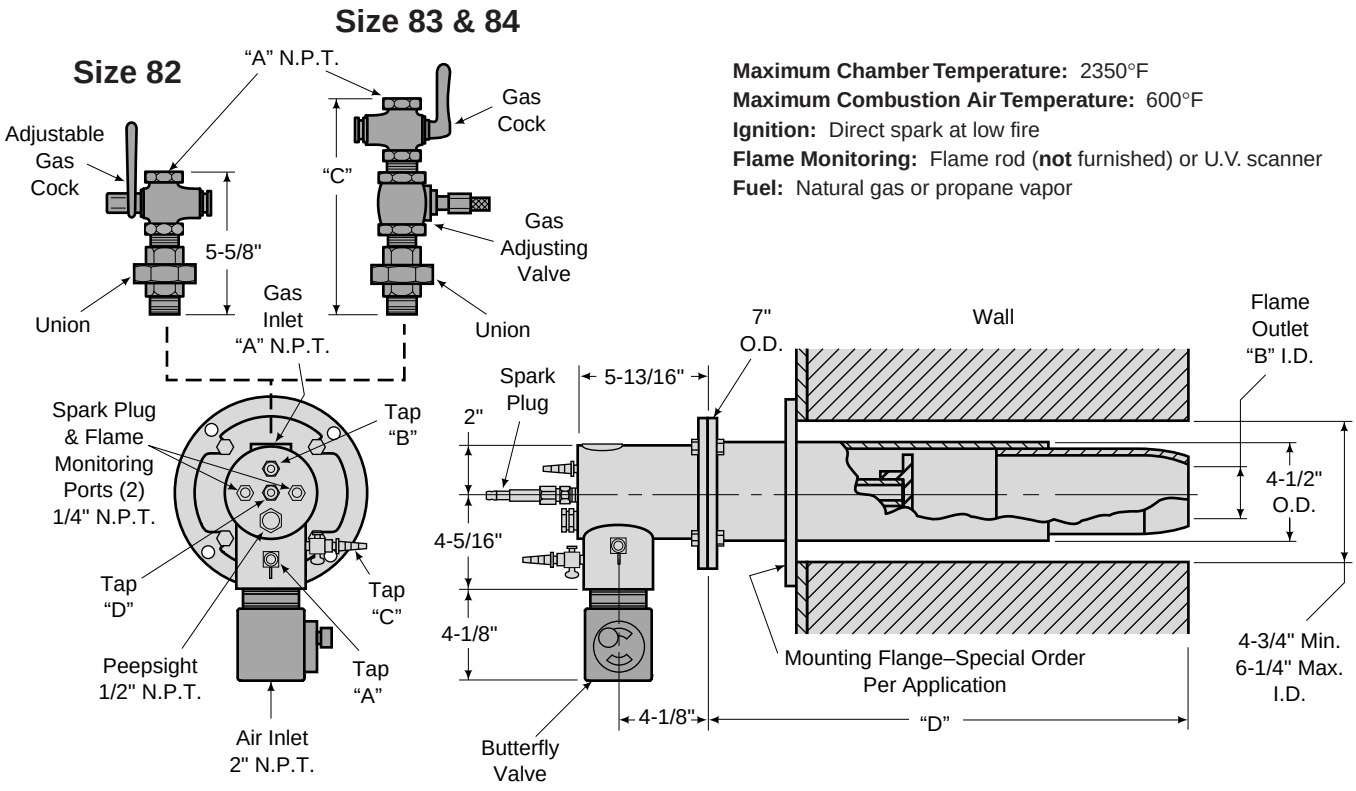
Electrical wiring must comply with the National Electric Code*, (NFPA Std. 70 or ANSI-CI 1981), or must be acceptable to the authority having jurisdiction.

*Available from:

National Fire Protection Association
Batterymarch, Park
Quincy, MA 02269

American National Standard Institute
1430 Broadway
New York, NY 10018

Figure 3 - Dimensions



Maximum Chamber Temperature: 2350°F
Maximum Combustion Air Temperature: 600°F
Ignition: Direct spark at low fire
Flame Monitoring: Flame rod (**not** furnished) or U.V. scanner
Fuel: Natural gas or propane vapor

Basic burner assembly. Includes a spark plug, but not a flame rod.

Additional items included with complete assembly.

Dimensions

Burner Size	Assembly Number Prefix				"A" Gas Inlet	"B" Flame Outlet		"C" Valve Length	"D" Burner Length
	MVTA		HVTA						
	Basic	Complete	Basic	Complete		MV	HV		
82 E	117407-	117414-	117400-	117411-	1/2	1-7/8	1-7/16	5-1/8	See Below
83 E	117409-	117415-	117403-	117412-	3/4	2-1/4	1-7/8	9-1/2	
84 E	117410-	117416-	117405-	117413-	1	2-3/4	2-1/4	10	

Dimensions are in inches.

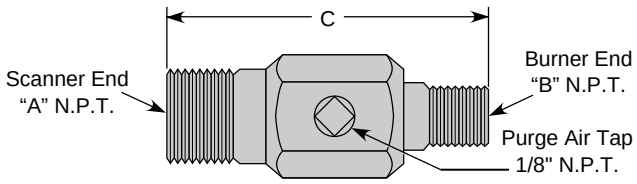
MVTA=Medium Velocity
HVTA=High Velocity

Dimension D, Spark Plugs & Flame Rods*

Assembly Number Suffix	"D" Length	Flame Rod Number	Spark Plug Number
-4	18	100602-2	150000-27
-5	21	100602-3	150000-19
-6	24	100602-4	150000-49
-7	27	100602-5	150000-79
-8	30	100602-6	150000-10
-9	33	100602-7	150000-13
-10	36	100602-8	150000-16

* Spark plug included with burner. Flame rod, however, must be ordered separately.

U.V. Scanner Adaptors



Assembly Number	Dimensions In Inches		
	A	B	C
103004	1/2	1/4	2-3/4
103002	3/4	1/4	3

5.0 Air & Fuel Flow Measurement

5.1 Combustion Air Flow

Set combustion air flow through the burner by measuring the differential pressure between taps "A" and "C" in Figure 3. The graphs in Figure 4 correlate air flow to measured differential pressure.

5.2 Gas Flow

Set gas flow through the burner by measuring the differential pressure between the taps "B" and "D" in Figure 3.

5.3 Burner Ratio Adjustment Curves

For convenience in setting kiln and furnace burners at predetermined fuel / air ratios, use the appropriate graph fom Figure 4.

Figure 4 - Natural Gas & Air Set-up Curves
Various Air/Gas Ratios For 82E MVTA & HVTA Burners

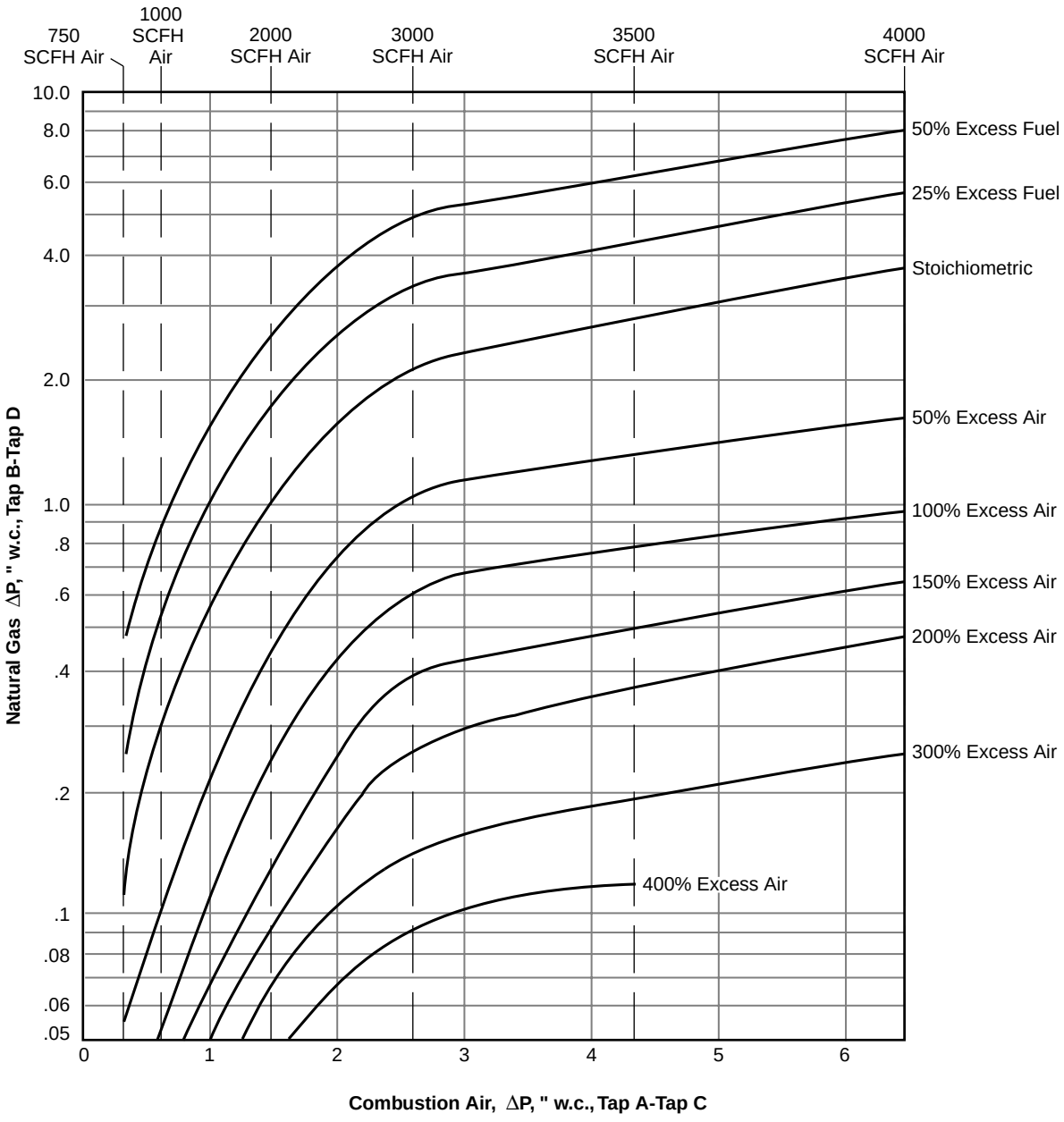
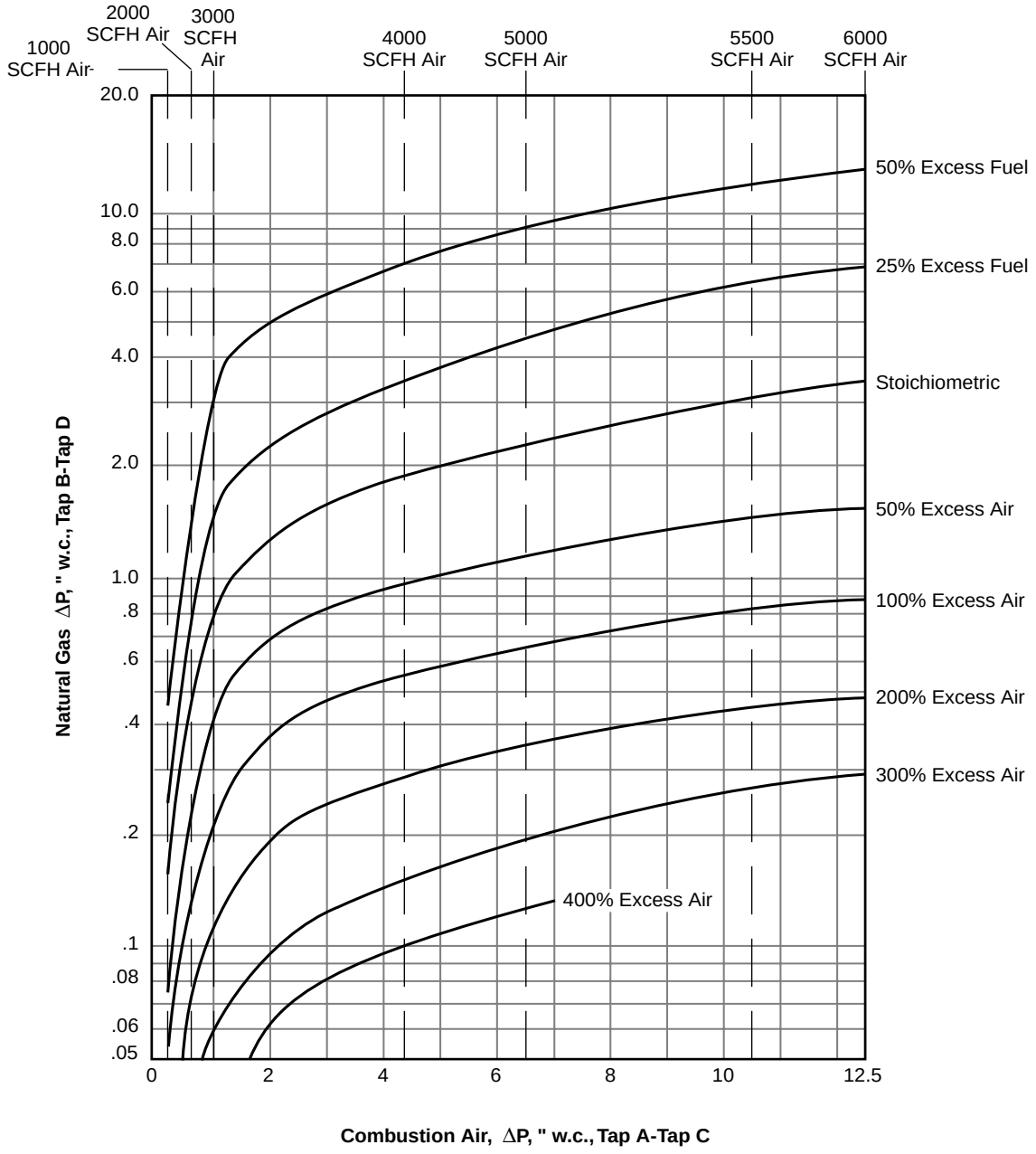


Figure 4 - Natural Gas & Air Set-up Curves (continued)
Various Air/Gas Ratios For 83E MVTA & HVTA Burners



Air & Gas Pressure Tap Locations

A = Upstream Air
B = Upstream Gas
C = Downstream Air
D = Downstream Gas

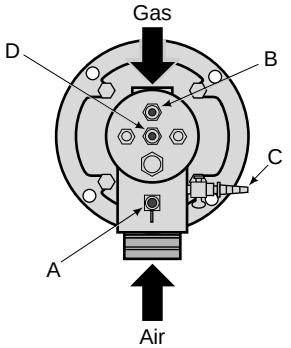
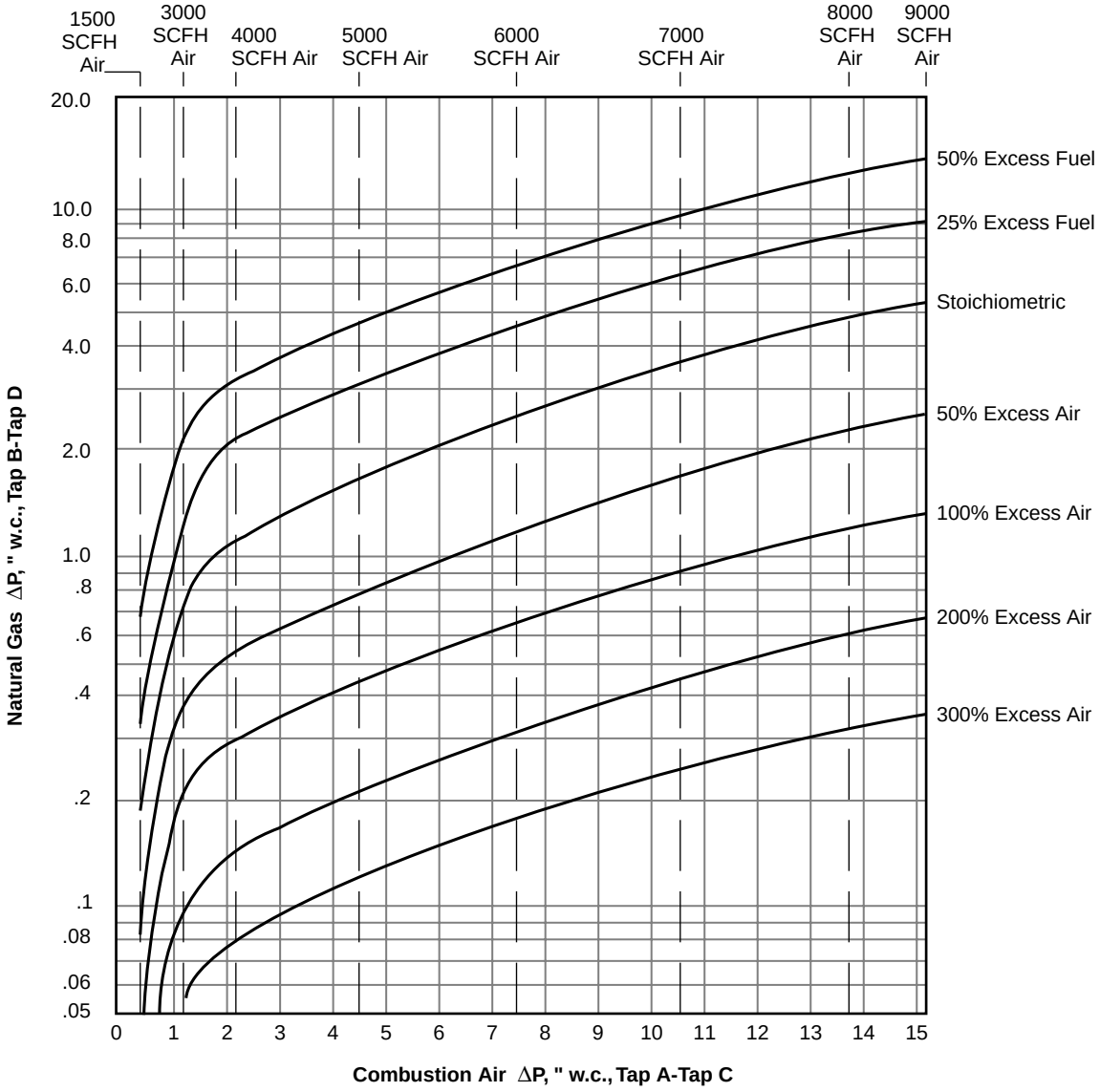
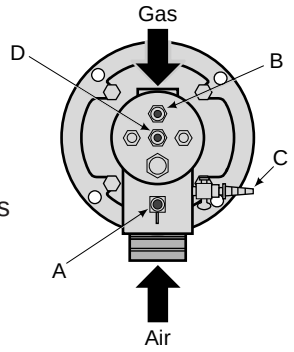


Figure 4 - Natural Gas & Air Set-up Curves (continued)
Various Air/Gas Ratios For 84E MVTA & HVTA Burners



Air & Gas Pressure Tap Locations

A = Upstream Air
B = Upstream Gas
C = Downstream Air
D = Downstream Gas



6.0 Start-Up & Adjustment

6.1 Close Gas Valves
Close all manual and automatic gas valves including the gas balancing valves, pilot adjusting valves, and pilot shutoff cocks.

6.2 Start the Combustion Air Blower
Start the combustion air blower. Visually confirm that the fan or impeller is rotating in the correct direction. If rotation is wrong, have a qualified electrician correct the wiring to the blower motor.

6.3 Set Low Fire Air
Drive the air valve control motor to its low fire position. Adjust the linkage between the motor and valve to produce the desired low fire air pressure at the burner(s).

6.4 Set High Fire Air
Drive the air valve control motor to its high fire position. Adjust the valve linkage to produce the desired high fire air pressure at the burner(s). This adjustment may change the low fire setting. If so, make alternating high and low fire adjustments until satisfactory pressures are obtained at both ends of the motor travel.

6.5 Light Pilot (If burners are not equipped with bypass pilots, proceed to step 6.7)
Drive the control motor to low fire and energize the ignition transformer and pilot solenoid valve. Open the pilot gas cock. Remove the cap from the pilot cock and adjust the internal screw—counterclockwise to increase flow, clockwise to decrease—to set the pilot gas for the minimum flow giving reliable ignition and a steady flame signal.

6.6 Light Main Gas (Piloted Burners)
With the pilot lighted and the motorized control valve in the low fire position, open all manual and automatic gas valves upstream of the gas limiting orifice valve. Measuring gas flow as described in section 5 of this Guide, gradually open the limiting orifice gas valve until the burner lights. Do not open the valve past the point required for burner ignition.

6.7 Light Main Gas (Non-Piloted Burners)
With the motorized control valve in the low fire position, energize the ignition transformer, and open all manual and automatic gas valves upstream of the gas limiting orifice valve. Gradually open the limiting orifice gas valve until the burner lights. Do not open the valve past the point required for burner ignition.

6.8 Drive Burner To High Fire
Drive the air control valve to the high fire position. Check to be sure the burner remains lit.

6.9 Adjust High Fire Gas Flow
Adjust the gas limiting orifice valves to provide the desired high fire gas flow.

6.10 Adjust Low Fire Gas Flow
Drive the air control valve to the low fire position. If the fire appears too rich (excess fuel) or too lean (excess air), make a corresponding adjustment to the gas control valve or gas proportionator to produce the minimum gas flow that will generate a steady flame detector signal of sufficient strength.

6.11 Check High And Low Fire
Cycle the burner from high to low fire several times to check repeatability of settings.

If combustion chamber or duct pressure changes coming to operating temperature, re-check burner settings hot and readjust as necessary.

6.12 Shutdown
Do not turn the blower off until the chamber temperature is below 600°F. Gas temperatures over 600°F can damage the burner and blower during backflow.

The combustion air control valve must be in the low fire position. This position provides sufficient air flow to cool the burner internals without thermal shock to the hot refractories.

7.0 Trouble-Shooting

CAUTION

Trouble shooting of panels and electrical circuits should be done by qualified plant electricians, technicians, or engineers experienced in all facets of this type of combustion equipment.

PROBLEM	CAUSE(S)
Pilot fails to light.	1. On initial start-up, gas line may be filled with air. Repeat ignition trial several times to purge. 2. No power to ignition transformer or pilot solenoid. 3. Open circuit between ignition transformer and spark plug. 4. Spark plug needs cleaning. 5. Spark plug center electrode grounded against burner. 6. Spark plug improperly grounded. Do not use pipe dope on ignition plug threads. 7. Pilot gas cock screw closed. 8. Insufficient gas pressure into or out of pilot regulator.
Main flame fails to light or goes out as burner cycles to high fire.	1. Pilot set too lean, becoming unstable as air increases. 2. Insufficient pressure into or out of main gas regulator. 3. Main gas adjusting valve not open enough. 4. Marginal air pressure switch setting.
Low fire flame is weak or unstable.	1. Gas flow is insufficient. Readjust gas proportionator spring.
Burner behaves erratically, does not respond to adjustment.	1. Burner internals loose, dirty or burned out. If any of these problems exist, contact your Eclipse representative or the Eclipse factory for service. 2. Proportionator has broken diaphragm or dirty valve.
Main flame is too long and yellow on high fire.	1. Gas flow is too high. Gas limiting orifice valve is open too far, or main regulator spring is screwed in too far.
Main flame is too short at high fire.	1. Gas flow is too low. Gas limiting orifice valve is closed too far, or main gas regulator spring is screwed out too far.
Low fire (pilot) flame is long, soft or yellow.	1. Too much gas flow. Close pilot cock adjustment partway, or back out regulator spring. 2. Insufficient air flow due to dirty blower filter or impeller.

8.0 Maintenance

8.1 A sound preventative maintenance program, carried out by qualified individuals, will greatly increase equipment reliability and productivity. Frequency of maintenance checks should reflect the duty cycle of the heating equipment and conditions such as dirt and temperature. Any maintenance program should include at least the following steps:

1. Check the burner's high and low fire air and gas settings.
2. Examine and, if necessary, clean or replace air and gas filter elements.
3. Check all piping connections for leaks.
4. Check the ability of the flame supervision system to function properly by simulating system failures:
   a. Simulate burner flameout by manually shutting off the gas.
   b. Trip out pressure switches and other limit interlocks.
   c. Try to light the burner before the purge and other timers have finished their cycles. If simulated limit or flame failures do not shut down the fuel system within an acceptably short period of time, immediately take the equipment out of service and correct the problem.
5. Leak test automatic and manual reset fuel valves per insurance company procedures.
6. Check all bolts and screws for tightness.
7. Check the area around the burner mounting flange for signs of overheating. Insulation repairs may be necessary.

8.2 Ignition Plug & Flame Rod Replacement

Ignition plugs and flame rods wear out over long periods of normal burner operation. Eclipse recommends that the user keep at least one of each in stock at all times to prevent nuisance shutdowns.

Electrodes are normally shipped separate from the burners to reduce the chance of breakage in transit. For initial installation, disconnect the burner air and gas lines. Remove the burner body and internals from the firing tube. Make sure the igniter and flame rod holes in the air diffuser align with the tapped holes in the burner body (see Figure 5). If they are not aligned, loosen the diffuser setscrew and rotate the diffuser to the correct position. Then retighten the set screw.

Thread the compression fittings into the back of the burner housing. Then slip the ignition plug and flame rod through these fittings and the openings in the diffuser. Position the tips of the electrodes' insulators 5/16" in front of the face of the diffuser (see Figure 6) and tighten the compression nut onto the electrode sheath. **Do not overtighten. This may crack the electrode insulator.**

When it becomes necessary to replace an ignition plug or flame rod, save time by first marking the sheath of the old electrode where it enters the compression nut. Then loosen the nut and remove the electrode. Lay the new electrode alongside the old and mark its sheath the same distance from the end. Carefully insert the new electrode into the burner until the mark is flush against the compression nut. Then retighten the nut.

Handle the electrodes with care at all times. They are fragile and can be broken easily.

Figure 5 - Aligning Openings

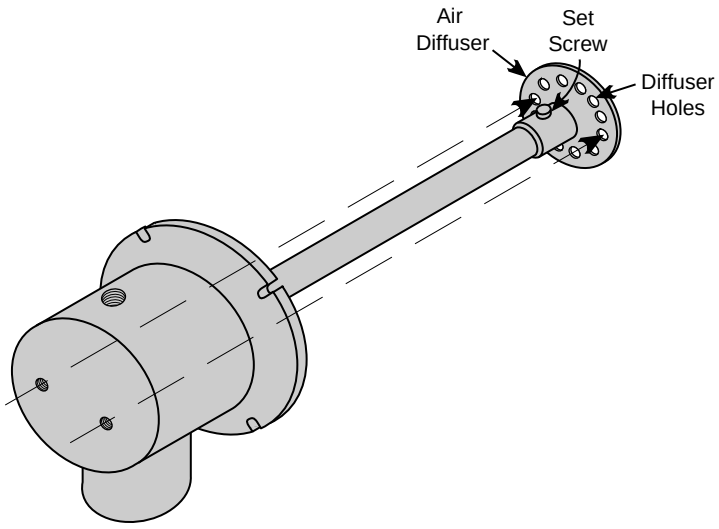
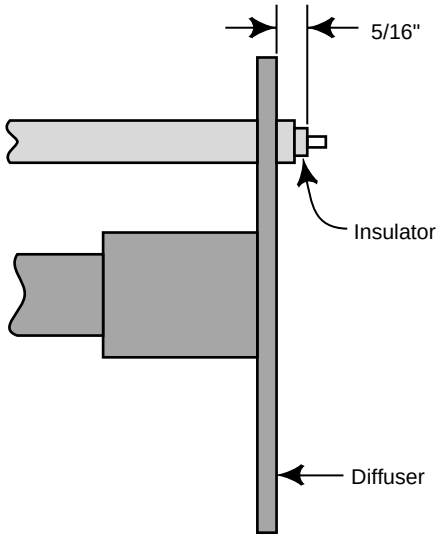


Figure 6 - Electrode Position



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