



Gordon-Piatt Energy Group

MODEL F & FL BURNER INSTALLATION INSTRUCTIONS

1	F	30-11	Rev 1
10-85	Replaces	2-83	

GENERAL INSTRUCTIONS - FOR FIREBOX, HRT & CAST IRON BOILERS

These instructions include illustrations of typical "F" and "FL" burner installations in various kinds of boilers. They should be carefully read and the example selected that most nearly fit the job before attempting an installation. The combustion chamber illustrations are general in nature and show approximate chamber dimensions and recommended types and thickness of insulating materials. The furnace or boiler should be thoroughly cleaned if necessary. The heating surfaces, breeching and stack should have all scale, soot and ashes removed.

FIRING RATE BTU/HR MILLION	FLOOR			WALLS	
	(A) STD #1 FIREBRICK	(B) INSULATING FIREBRICK	(C) INSULATING BLOCK	BACKWALL	SIDEWALL
	INCHES	INCHES	INCHES	INCHES	INCHES
2.8 to 14	2-1/2	2-1/2	1	9	6-1/2
14.2 to 21	2-1/2	5	2	13	6-1/2
21.2 & UP	5	5	2	18	9

Figure 1 RECOMMENDED THICKNESS OF INSULATING MATERIALS BY FIRING RATE

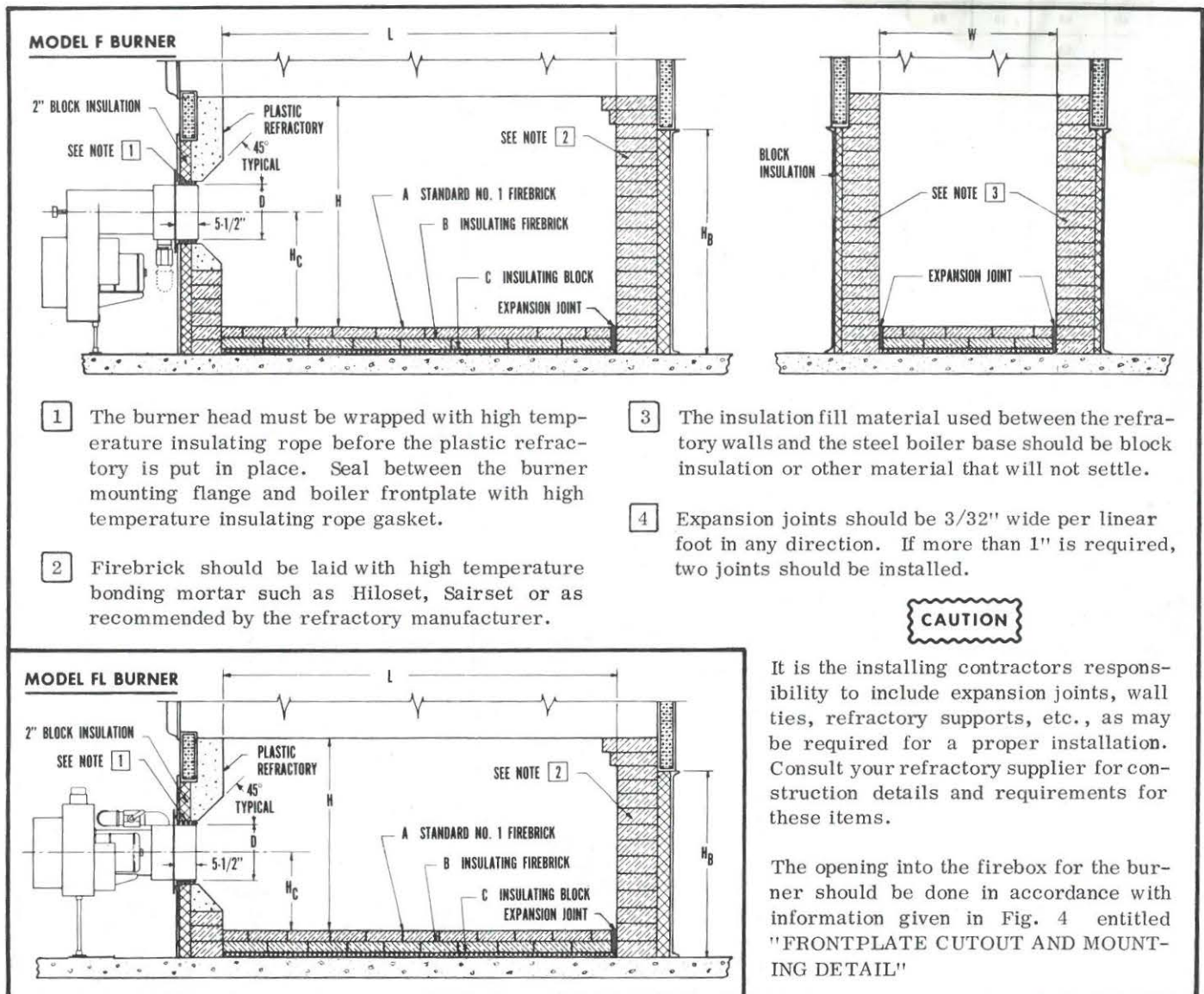


Figure 2 TYPICAL TYPE "F" BURNER INSTALLATION IN FIREBOX BOILER FIRING THROUGH FRONT OF BASE

GAS BURNERS

When the burner will be firing **ONLY** on gas, the length, L, may be 80% of dimension shown in Fig. 3. The "Hc" centerline dimension shown in the various illustrations may be one-half the burner head diameter plus one inch. In cases on an extremely low burner base, the burner head may be located up against the boiler water leg. Other than these exceptions, the dimensions in Fig. 3 for oil firing also apply to gas.

OIL OR GAS-OIL BURNERS

When installing a burner that will be firing on oil, or alternately on oil and gas, the "Hc" centerline dimension above the combustion chamber floor should be maintained as shown in Fig. 3 or higher. The height is based upon recommended practice for efficient oil combustion.

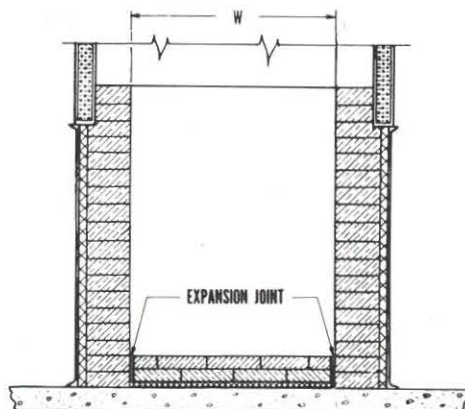
The Fig. 3 table shows minimum combustion chamber dimensions necessary for the correct installation of the various size burners in firebox, HRT or cast iron boilers. Compare these dimensions to your burner firing rate to be sure that adequate clearances and base heights exist.

HEAVY OIL	NO. 2 OIL	RECOMMENDED MINIMUM DIMENSIONS FOR COMBUSTION CHAMBER (Inches)				MINIMUM BASE HEIGHT (Inches)		
		LENGTH	WIDTH	HEIGHT	HEIGHT	F MODEL	FL MODEL	
		L	W	H	H _C	H _B	H _B	H _{BP}
18	20	51	29	28	14	34	28	21
23	25	54	32	30	15	34	29	21
28	30	59	35	32	16	34	30	21
33	35	64	38	36	18	34	32	21
37	40	68	40	38	18	36	32	21
42	45	73	44	42	20	37	35	22
47	50	78	45	44	21	37	36	22
51	55	82	48	46	22	37	37	22
56	60	86	50	48	23	46	38	22
60	65	90	52	50	24	46	40	25
65	70	94	54	52	25	46	41	25
70	75	96	56	54	26	46	42	25
75	80	98	58	56	27	46	43	25
85	90	103	60	58	28	47	45	26
95	100	108	62	60	29	47	46	26
100	110	115	65	62	30	51	51	26
115	125	130	70	67	32	53	53	26
140	150	145	77	74	35	56	56	27
165	175	160	79	76	36	60	60	29
190	200	170	85	82	39	63	63	29
210	225	180	90	87	42	66	66	29

H_B - Minimum base height without pitting combustion chamber.
H_{BP} - Minimum base height with combustion chamber pitted.
L - Minimum length combustion chamber (normally made full length of boiler firebox).

NOTE

Combustion chamber width and length dimensions may vary from the Dimension Table to fit job conditions. The floor area may be reduced to a minimum of 70 sq. inches per GPH of oil or 50 sq. inches per 100 MBh input, at some sacrifice of refractory life. Floor area increases are permissible, but reduce combustion chamber temperatures. Combustion chamber length should be no less than 1-1/3 times the width. Combustion chamber height should be approximately twice the nozzle height of the burner from the floor. A lower height may be used at reduced efficiency with tendency toward smoke and flame impingement on the floor which may cause carbon buildup.



TYPICAL FL BURNER WITH PITTED COMBUSTION CHAMBER

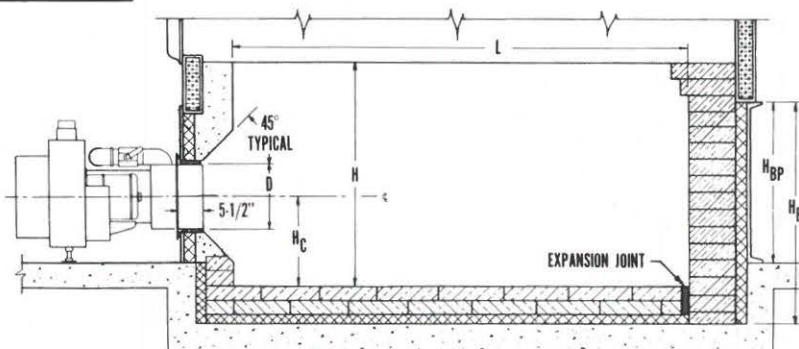


Figure 3 DIMENSIONS REQUIRED FOR OIL FIRING

FRONTPLATE CUTOUT AND MOUNTING DETAIL

In instances where the frontplate is not supplied with the burner, the burner opening size and mounting stud locat-

ions should be determined from the appropriate boiler frontplate cutout and mounting dimensions, Fig. 4.

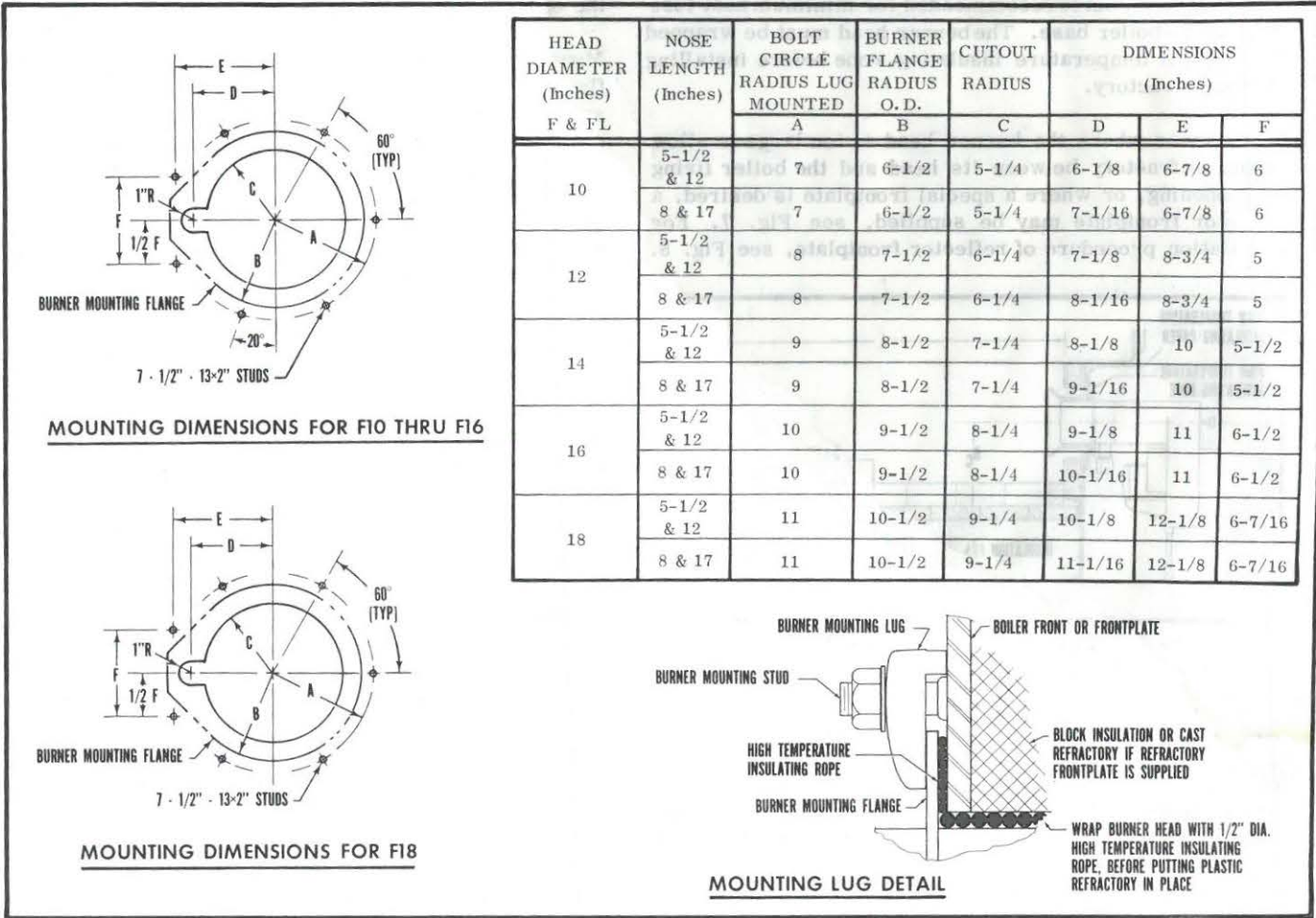


Figure 4 MOUNTING DETAILS

FIRING FIREBOX BOILER THROUGH THE FIRING DOOR "Through the Firedoor" installations are recommended where conditions allow. This method will prevent the need for expensive pitting when insufficient base height is available to permit the installation of a standard combustion chamber, or when it is desired to fire over a stoker which is used as the standby fuel burner. See Fig. 5.

In some cases, it may be desirable to provide a new access opening in the side or rear of the boiler firebox to avoid having to remove the burner to get into the firebox, particularly if there is only one firedoor for the boiler.

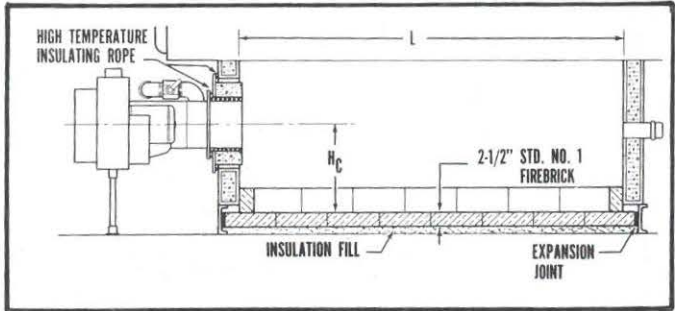


Figure 5 TYPE "FL" BURNER INSTALLATION FIRING FIREBOX BOILER THROUGH THE DOOR

Fig. 6 shows an "F" burner which is designed for use where clearance is sufficient to permit installation.

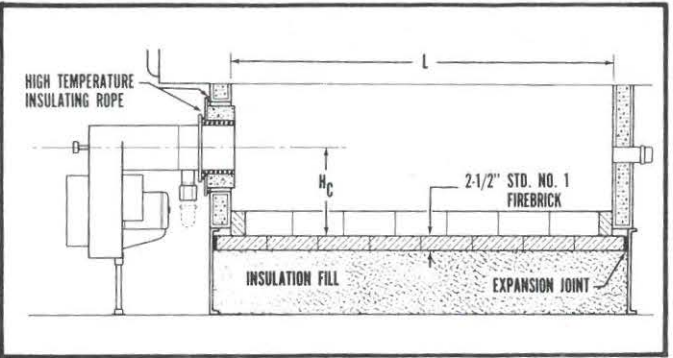


Figure 6 TYPE "F" BURNER INSTALLATION FIRING FIREBOX BOILER THROUGH THE DOOR

The refractory chamber floor is to be A. P. Green green-cast-97-L (3300°F) or equal castable refractory on top of high temperature block insulation. Super duty fire clay brick P.C.E. cone 33-34 A. P. Green "Clipper" or equal may be used in lieu of castable refractory. Use A. P.

Green "Sairset" or equal high temperature mortar with firebrick. All exposed brick surfaces must be scrubbed with thin wash before setting. Loose insulating fill is not a requirement, but is recommended for minimum heat loss through the boiler base. The burner head must be wrapped with high temperature insulating rope before installing plastic refractory.

In instances where the burner head is too large to allow proper refractory between its head and the boiler firing door opening, or where a special frontplate is desired, a reflector frontplate may be supplied, see Fig. 7. For installation procedure of reflector frontplate, see Fig. 8.

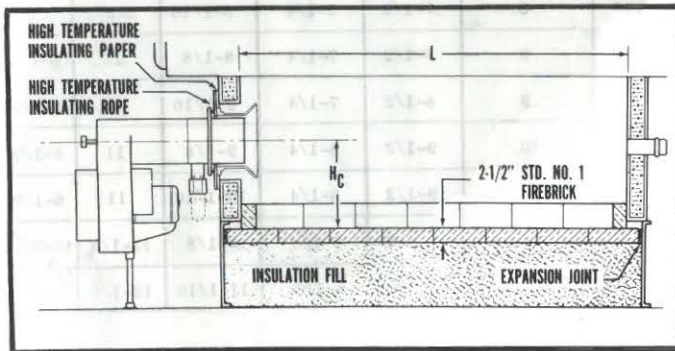


Figure 7 TYPE "F" BURNER INSTALLATION WITH REFLECTOR FRONTPLATE

REFLECTOR FRONTPLATE INSTALLATION

Before installation of the reflector frontplate can be made, the existing boiler firing door and frame must be removed. The reflector frontplate and cone are shipped as an assembled unit and may be installed as a unit. In instances where the reflector cone diameter is larger than the opening, the reflector cone must be detached from the frontplate, with

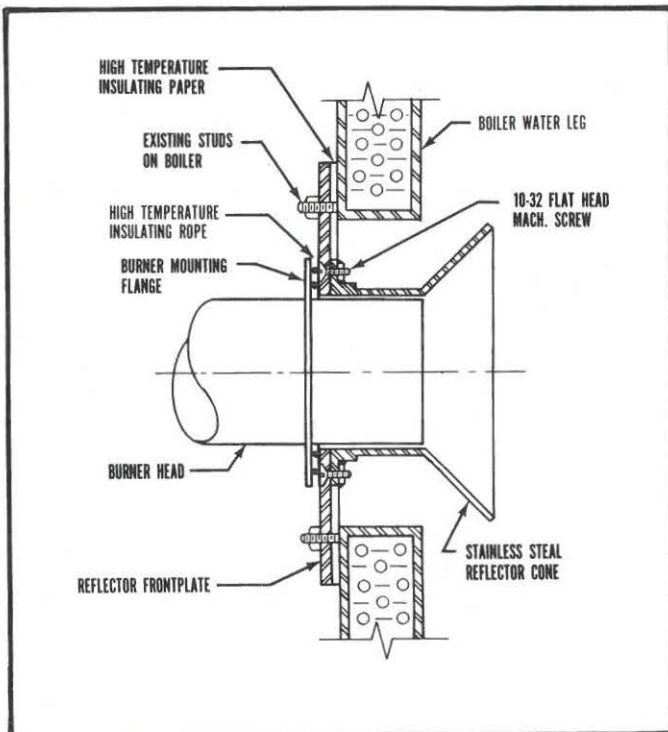


Figure 8 REFLECTOR FRONTPLATE INSTALLATION BOILER WITH SINGLE FIRING DOOR

the removal of the 10-32 flat head machine screws, Fig. 8. A cord is attached to the reflector cone for use in retrieving the cone for mounting. The cone is then placed through the opening and inside the boiler.

Mounting holes are then drilled in the frontplate mounting flange, as required to fit the existing door frame mounting studs. With the high temperature insulating paper in position, bolt the frontplate to the mounting studs. The reflector cone, if detached, is repositioned on the frontplate and mounted with the 10-32 flat head machine screws. A high temperature insulating gasket is placed between the burner mounting flange and the reflector frontplate, and the burner mounted in place.

FIRING FORCED DRAFT BOILER

The burner installation in a firebox type boiler designed for forced draft firing requires no refractory other than in the floor of the firebox and the boiler frontplate, Fig. 9. The refractory floor is normally furnished with the boiler and the refractory frontplate may or may not be with the burner. The burner centerline height ("Hc" dimension) above the refractory floor should be approximately the same as those shown in Fig. 3.

All pressurized or forced draft fired boilers require a high temperature insulating gasket seal between the boiler and the refractory-lined frontplate and between the refractory-lined frontplate and the burner mounting flange to prevent leakage of high temperature combustion gases at this point. In the absence of high temperature insulating gasket, high temperature insulating rope may be used for sealing.

CAUTION

When used, high temperature insulating rope must be wrapped around the burner head, inside the mounting studs, to provide a complete gas tight seal. Wrapping the rope around the outside diameter of the mounting studs will allow leakage around the stud openings in the frontplate. Damage to the burner, due to high temperature gas leakage, will not be covered by the warranty.

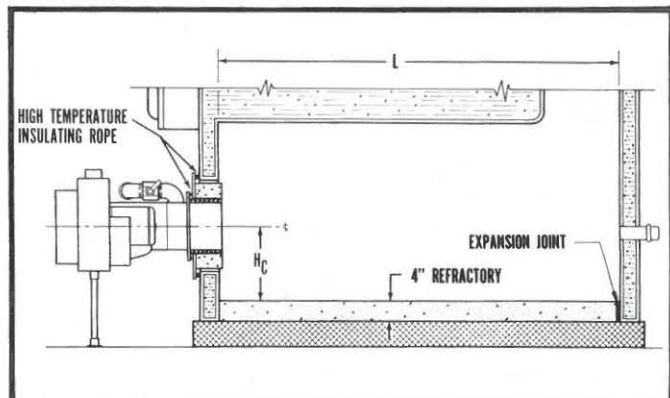


Figure 9 TYPE "FL" BURNER INSTALLATION FIRING FORCED DRAFT BOILER

FIRING CAST IRON BOILERS

Cast iron boilers having openings with low center lines require "FL" burners as shown in Fig. 10.

CAUTION

Significant flame impingement on cast iron sections can cause damage to the sections.

NOTE

Cast iron boilers with low crowns fired through the door may require mounting the burner angled down to prevent crown impingement.

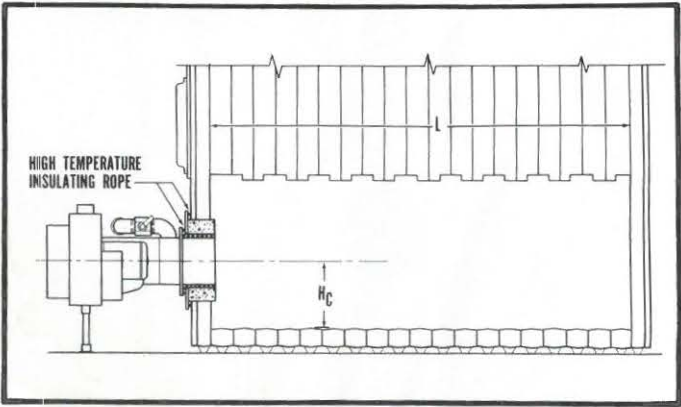


Figure 10 TYPE "FL" BURNER INSTALLATION FIRING CAST IRON BOILER

FIRING HRT BOILER

When installing an "F" burner in an HRT boiler, Fig. 11, the minimum combustion chamber dimensions H_c , L and W must be maintained as given in Fig. 3. The existing side and rear walls may be reused if in good condition and equal to 18 inches of standard No. 1 high duty firebrick. All expansion joints are to be filled with a compressible insulating material and must be kept free of material that will not compress.

It is recommended that the combustion chamber floor be raised to obtain the minimum H_c dimension and the area below filled with insulating fill material, reducing heat loss to a minimum. It is possible, that when replacing a stoker, the combustion chamber floor may be laid on top of the existing grates, if the minimum H_c dimension may be obtained.

CAUTION

The bridgewall must not be directly under a girth seam or girth seam leakage may result. The girth seams located within the combustion zone must be protected by an inverted refractory arch.

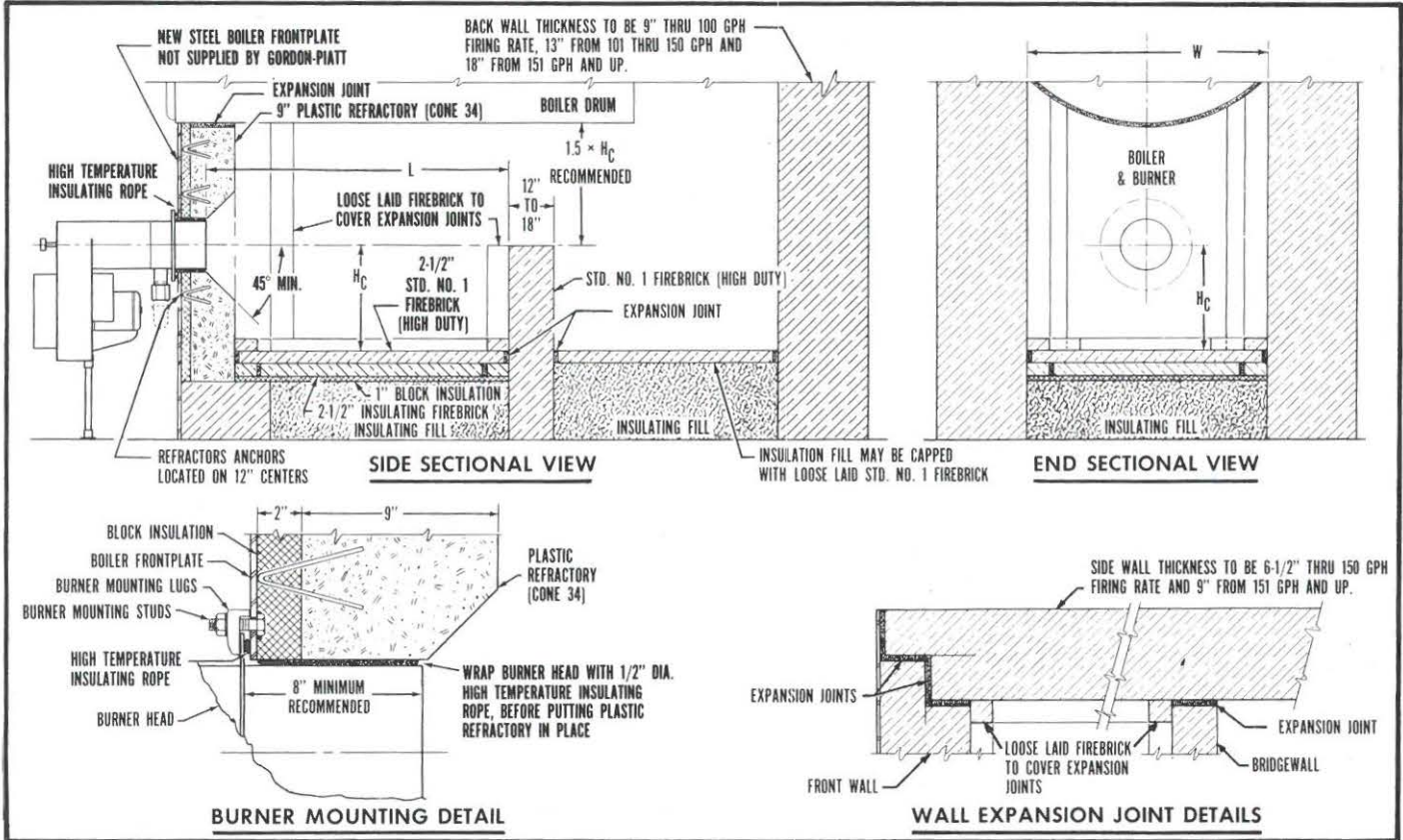


Figure 11 TYPE "F" BURNER INSTALLATION IN AN HRT BOILER