

technical catalog bulletin

FR-A-7

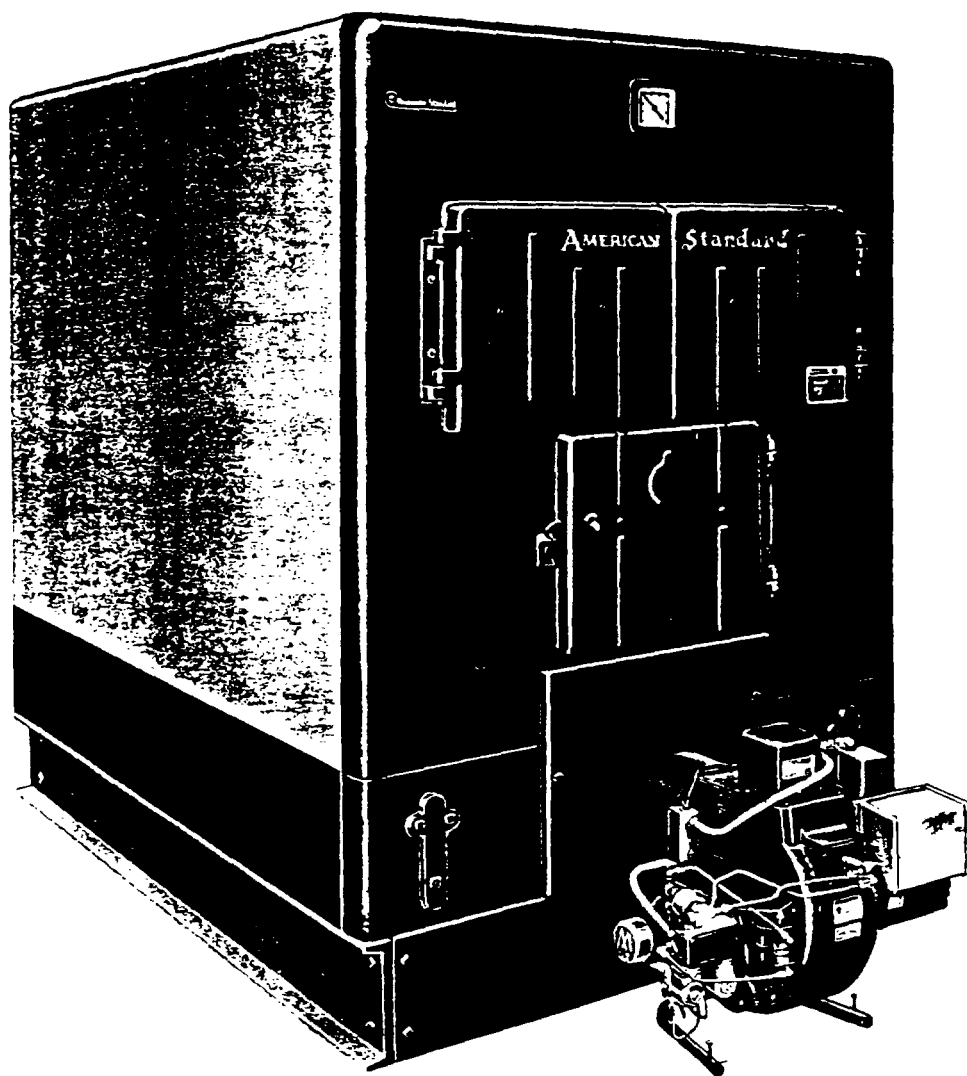
flame retention oil heating units

hot water or steam

AMERICAN-STANDARD

PLAINTIFF'S EXHIBIT

ASI-1162



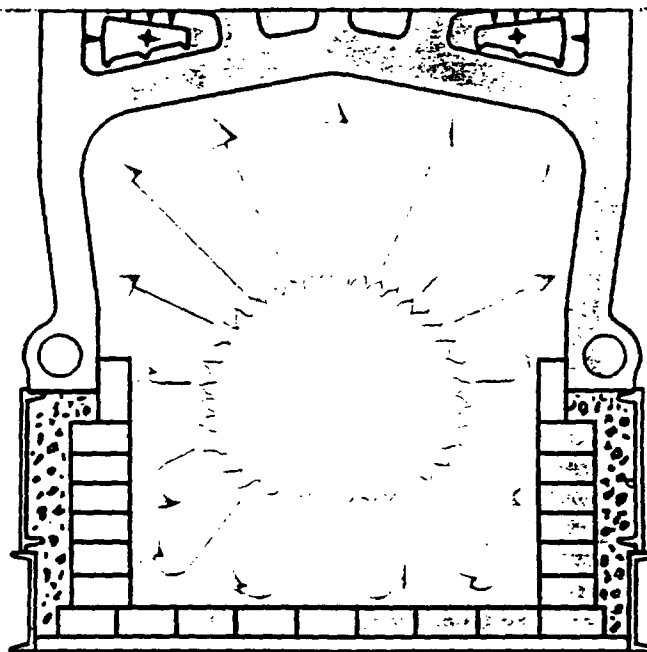
July, 1966

The new American-Standard FR-A-7 oil heating unit operates at greater efficiency and with higher outputs than comparably sized conventional boilers—yet it costs no more to buy and install! The superior flame retention burner and improved interior design make it possible. The new FR-A-7 unit is available

in 9 sizes for steam, forced circulation and gravity hot water. With an I=B=R approved output range of 1,160,000 to 3,000,000 Btuh, it's ideal for installation in most commercial and industrial buildings. For higher outputs — without paying higher costs — make it the FR-A-7 on big oil jobs!

Flame Retention Burner—uses a high speed fan in the housing and a special 12-blade spinner at the nozzle to produce an air-oil mixture so finely vaporized that every drop of fuel is burned. The flame is steady, quiet and concentrated into a well-defined pattern. More heat is generated; efficiency is improved; ratings are higher.

On FR-A-7 units, the concentrated flame pattern of the burner and the fact that the combustion chamber is primarily for base insulation permits the combustion chamber to be smaller than in conventional boilers. This exposes more section area directly to the burner flame, resulting in greater efficiency and higher outputs.



American-Standard features—

- Lifetime cast iron sections tested at $2\frac{1}{2}$ times normal operating pressure
- Sturdy steel jackets, attractive gray finish, fully insulated
- Light-sensing primary controls
- External arrangement for domestic hot water



FR-A-7 ratings

unit numbers		gross I=B=R output (Btu/hr)	net I=B=R ratings		water (sq. ft.)	I=B=R burner • capacity (gph)	I=B=R allowance for piping Δ	chimney		water content full (gallons)
steam	water		water & steam (Btu/hr)	steam (sq. ft.)				size (in.)	height (ft.)	
FR-A-706-SO-B	FR-A-706-WO-B	1,160,000	870,200	3626	5801	10.55	1.333	16x16	30	167.3
FR-A-707-SO-B	FR-A-707-WO-B	1,376,000	1,041,600	4340	6944	12.30	1.321	16x20	35	189.5
FR-A-708-SO-B	FR-A-708-WO-B	1,580,000	1,211,700	5049	8078	14.15	1.304	16x20	35	211.6
FR-A-709-SO-B	FR-A-709-WO-B	1,812,000	1,403,600	5848	9357	16.35	1.291	20x20	40	233.7
FR-A-710-SO-B	FR-A-710-WO-B	2,020,000	1,568,300	6535	10455	18.15	1.288	20x20	45	255.9
FR-A-711-SO-B	FR-A-711-WO-B	2,228,000	1,729,800	7208	11532	20.20	1.288	20x20	55	277.9
FR-A-712-SO-B	FR-A-712-WO-B	2,440,000	1,894,400	7893	12629	21.95	1.288	20x24	60	302.5
FR-A-713-SO-B	FR-A-713-WO-B	2,720,000	2,111,800	8799	14079	24.10	1.288	20x24	70	327.1
FR-A-714-SO-B	FR-A-714-WO-B	3,000,000	2,329,200	9705	15528	26.30	1.288	24x24	80	351.7

■ FR-A-7 is tapped for external heater arrangement.

• For complete information on flame retention burners (nozzle sizes, etc.), refer to chart on back page.

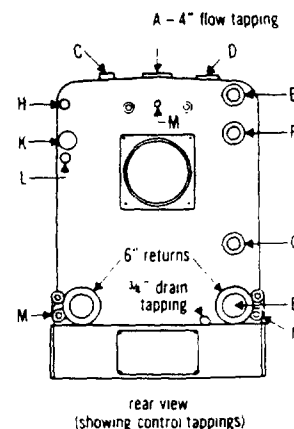
▲ American-Standard should be consulted before selecting an FR oil heating unit for installations having unusual piping and pick up requirements.

Note: FR-A-7 oil heating unit furnished with Pressuretrol for steam, Aquastat limit control for water.

American-Standard FR oil heating units are designed and built to comply with the American Society of Mechanical Engineers' Code and bear their approval symbol. Ratings have been approved by the Institute of Boiler and Radiator Manufacturers.

control tappings

location on unit	size (inches)	steam	water
A	4	—	water heater—external type
B	6	water heater—external type	water heater—external type
C	1	—	—
D	2½	A.S.M.E. safety valve	A.S.M.E. relief valve
E	3	blow-off or pop safety valve	water heater—external type
F	3	water heater—external type	water heater—external type
G	3	water heater—external type	water heater—external type
H	¾	steam pressure limit control	water temperature limit control
K	2½	internal low water cut-off	—
L	¾	water temperature control, domestic hot water	water temperature control, domestic hot water
M	1½	nipple port inspection tapping	nipple port inspection tapping

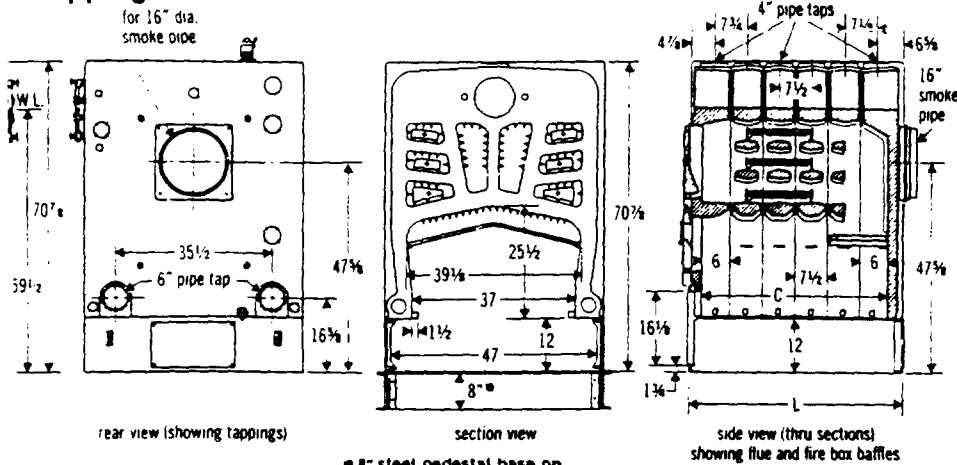


Note: Special tapping, 6 inches below water line, provided on front section for connecting low water cut-off when required.

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flame retention oil heating units

and tappings



dimensions (inches)		number and size of tappings (inches)	
D	L	flow	return
2 1/8	49	(3)-4	(2)-6
3 5/8	56 1/2	(3)-4	(2)-6
7 1/8	64	(3)-4	(2)-6
13 5/8	71 1/2	(4)-4	(2)-6
21 1/8	79	(4)-4	(2)-6
35 5/8	86 1/2	(4)-4	(2)-6
41 1/8	94	(5)-4	(2)-6
45 5/8	101 1/2	(5)-4	(2)-6
51 1/8	109	(5)-4	(2)-6

assemblage of sections

FX, C, CX, C, RC, BX
FX, C, C, CX, C, RC, BX
FX, FC, C, CX, C, RC, RC, BX
FX, FC, CX, C, C, CX, RC, RC, BX
FX, FC, CX, C, C, CX, C, RC, RC, BX
FX, FC, FC, CX, C, C, CX, RC, RC, RC, BX
FX, FC, FC, CX, C, C, CX, C, RC, RC, RC, BX
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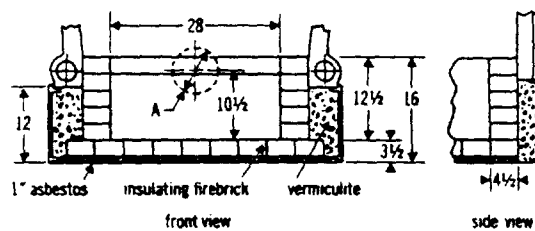
legend

FX—front connecting section
C—center section
CX—center connecting section
FC—front center section
RC—rear center section
RCX—rear center connecting section
BX—back connecting section

other dimensions (inches)

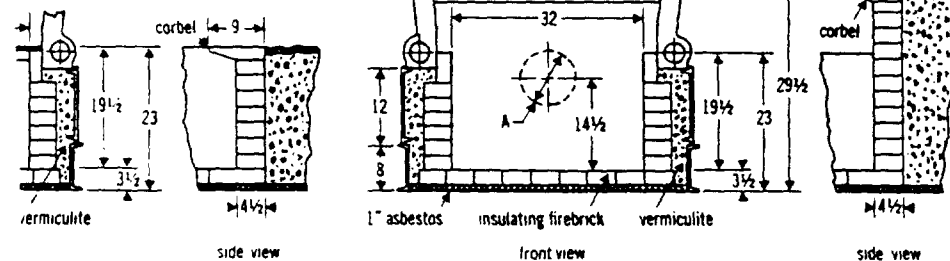
r	A diameter (inches)	inside chamber length (inches)
6	6 1/2	35
7	6 1/2	42 1/2
8	6 1/2	38
9	7 1/8	41
10	7 3/8	44
11	7 3/8	47
12	7 3/8	50
13	7 3/8	53
14	8 3/8	56

FR-A-706 and FR-A-707



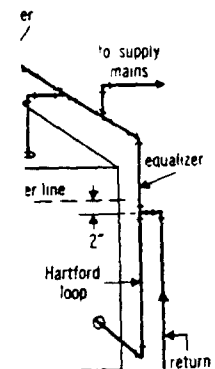
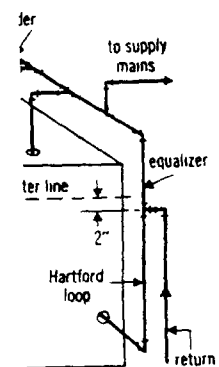
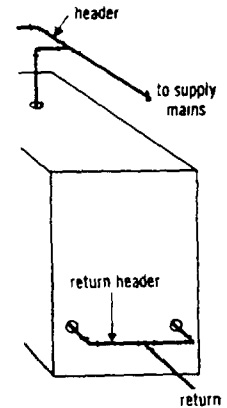
FR-A-711 through FR-A-714

through FR-A-710



on oil heating units

ings are intended solely to piping locations and general .lual piping details should ce with standard engineer.



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flame retention oil heating units

flame retention burner specifications (2-stage fuel unit)

unit number	burner number	I=B=R burner capacity (gph)	nozzle data				mount
			number required	gph each	spray angle	type	
FR-A-706	96A-M-7543-B	10.55	two	(1)-5.00 (1)-5.50	80° 80°	solid solid	pedestal
FR-A-707	96A-M-7543-B	12.30	two	(2)-6.00	80°	solid	pedestal
FR-A-708	96A-T-7935-K*	14.15	three	(2)-6.00 (1)-2.00	90° 90°	solid solid	pedestal
FR-A-709	96A-T-7937-K*	16.35	three	(2)-6.50 (1)-3.00	90° 90°	solid solid	pedestal
FR-A-710	970-8111-B	18.15	two	(2)-9.00	70°	solid	pedestal
FR-A-711	970-8111-B	20.20	two	(2)-10.00	70°	solid	pedestal
FR-A-712	97A Hi-Lo-7673-EΔ	21.95	three	(2)-6.00 (1)-10.00	80° 80°	solid solid	pedestal
FR-A-713	97A Hi-Lo-7673-EΔ	24.10	three	(2)-6.00 (1)-12.00	80° 80°	solid solid	pedestal
FR-A-714	98A Hi-Lo-7773-EΔ	26.30	four	(2)-9.00 (2)-4.00	80° 80°	solid solid	pedestal

*Electronic flame safeguard control: RA890E Protectorelay and Q270A base, C7013A photocell. Provides 15-second trial-for-ignition and 15-second flame-failure-shutdown.

Available with optional controls to meet Factory Mutual Approval: RA890E Protectorelay, W415A panel (includes Q270A base and R488F switching relay), C7013A photocell. Provides 15-second trial-for-ignition and 2- to 4-second flame-failure-shutdown.

ΔR4150A Electronic flame safeguard programming panel, C7013A photocell. Provides 10-second trial-for-ignition and 2- to 4-second flame-failure-shutdown.

Other listed burners are furnished with factory-installed cad cell, bracket and leads. R8184B light-sensing constant ignition primary control in accord with UL requirements as follows:

primary control no.	burner nozzle capacity	flame-failure shutdown
R8184B1204	3 to 7 gph	30 seconds
R8184B1196	7 to 20 gph	15 seconds

Oil burners regularly furnished with light-sensing primary are available with electronic flame safeguard controls to meet UL and Factory Mutual Approval. See current price book for description.

APPROVAL: American-Standard flame retention oil burners (115 and 230 volt/60 cycle) are listed with Underwriters' Laboratories, Inc. for No. 1 and No. 2 grades of fuel oil, whether obtained by distillation or catalytic cracking process. They are approved by the New York City Board of Standards and Appeals, the State Fire Marshal of the Commonwealth of Massachusetts, and the Department of State Police, State of Connecticut.

sample specification for FR-A-7 oil heating unit

Contractor shall furnish and install, as indicated on plans, FR-A-7..... oil heating unit(s) having a firing rate of..... gph and an I=B=R gross output of.....Btuh. Boiler(s) shall be constructed of cast iron in accordance with A.S.M.E. requirements for low pressure heating boilers and bear the A.S.M.E. symbol. Each section shall be factory tested at 2½ times maximum working pressure of 50 lbs. for water. Boiler(s) shall have I=B=R ratings. Contractor shall furnish where required (on 8 through 14 section sizes) 8-inch channel steel pedestal base under regular 12-inch cast iron base as manufactured and recommended by boiler manufacturer. Boiler sections shall be so constructed that

the water line for steam boilers shall be above the bottom of top nipple ports to insure proper water circulation between sections. Rear section shall have external water heater tapings as provided by the manufacturer. Boiler flue passages shall be horizontal, finned type, baffled as recommended by manufacturer, with flue travel along both side passages from rear to front and back through center passages to rear and smoke collar connection. Water or steam trim as required. Oil burners shall include controls as herein described. (Note: Include description of controls as required and other burner features as desired.)



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