



OIL-FIRED WATER AND STEAM BOILERS /
 NO. 2 OIL

Supplemental Installation and Operating Instructions

APPROVED OIL BURNERS AND SPECIFICATIONS

FOR KNOCKED-DOWN BOILERS AND KNOCKED-DOWN BOILER/BURNER UNITS ONLY
 NO. 2 FUEL ONLY

Approved Oil Burners and Specifications

For assembly and parts information for knocked-down boilers and knocked-down boiler/burner units, refer to Publication No. LD-41K.

For installation and operating instructions see publication LD-43K.

Use of an oil burner not approved by Slant/Fin voids the Liberty boiler warranty.

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Table 1: Specifications for Slant/Fin supplied burners only for boiler/burner units with full combustion chambers.

BOILER MODEL	BURNER MODEL	BURNER HEAD	FIRING RATE (GPH)	NOZZLES			OIL PUMP PRESSURE SETTING (PSIG) ‡	APPROXIMATE SETTINGS		
				SIZE (GPH)	ANGLE & TYPE	MFR.		AIR* SHUTTER	AIR* BAND	HEAD* SETTING
LD-20 WU	Beckett AFG	F.O.	.75	.75	80B	DELAVAN	100	8	CLOSED	N.A
LD-20 WU	Carlin 99FRD	Wrapped Shield	.75	.75	70A	DELAVAN	100	BLANK	45%	1-2
LD-30 WU & SU	Beckett AFG	F-4S	1.10	1.10	80° SS 80° W	HAGO DELAVAN	100	9	CLOSED	N.A.
LD-30 WU	Beckett AFG	F-4S	1.25	1.25	80° SS 80° W	HAGO DELAVAN	100	10	1	N.A.
LD-30 WU & SU	Carlin 99FRD 84467, See note 1	Wrapped Shield	1.10	1.10	70° SS 70° W	HAGO DELAVAN	100	BLANK	40%	4
LD-30 WU	Carlin 99FRD 84467, See note 1	Wrapped Shield	1.25	1.25	70° H 70° A	HAGO DELAVAN	100	BLANK	50%	5
LD-40 WU & SU	Beckett AFG	F-120	1.60	1.50	80° SS 80° W	HAGO DELAVAN	113	10	1/2	N.A.
LD-40 WU	Beckett AFG	F-120	1.80	1.75	80° SS 80° W	HAGO DELAVAN	105	10	3	N.A.
LD-40 WU & SU	Carlin 99FRD 84459, See note 2	Standard	1.60	1.50	70° SS 70° W	HAGO DELAVAN	113	FULL	40%	5
LD-40 WU	Carlin 99FRD 84459, See note 2	Standard	1.80	1.75	70° SS 70° W	HAGO DELAVAN	105	FULL	30%	8
LD-50 WU & SU	Beckett AFG	F-164	2.10	2.00	80° SS 80° W	HAGO DELAVAN	110	10	2	N.A.
LD-50 WU	Beckett AFG	F-164	2.35	2.25	80° SS 80° W	HAGO DELAVAN	109	10	3	N.A.
LD-50 WU & SU	Carlin 102CRD-3 87312, See note 3	Standard	2.10	2.00	70° SS 70° W	HAGO DELAVAN	110	FULL	20%	4
LD-50	Carlin 102CRD-3	Standard	2.35	2.25	70° SS	HAGO				

NOTE: 1. S.S. wrapped shield air-tube assembly 1051A 160B
Air shutter blank part # 1007-1
Dual slotted air band part # 1008
See figure 2B.
2. Standard air-tube part # 1051-5. (Figure 2A)
3. Standard air-tube and flange assembly part number 71142.

* To see how adjustments are made on CARLIN & BECKETT burners, see illustrations only on pages 11 & 12 of publication LD-40, but use values in table 1, above.

‡ All pump pressures may be 100 PSI but will fire at a slightly lower rate.

WU = water units
SU = steam units

Table 2: Field supplied burners for knocked down boilers with Slant/Fin supplied full combustion chambers.

BOILER MODEL	BURNER MODEL	BURNER HEAD	FIRING RATE (GPH)	NOZZLES			OIL PUMP PRESSURE SETTING (PSIG)	APPROXIMATE SETTINGS		
				SIZE (GPH)	ANGLE & TYPE	MFR.		AIR SHUTTER	AIR BAND	HEAD SETTING
LD-20 WKD	Beckett AFG	F.O.	.75	.75	80B	DELAVAN	100	8	CLOSED*	N.A
LD-20 WKD	Carlin 99FRD	Wrapped Shield	.75	.75	70A	DELAVAN	100	BLANK	45%	1-2
LD-30 WKD & SKD	Beckett AFG	F-6	1.10	1.10	80° W	DELAVAN	100	8.5*	CLOSED*	N.A.
LD-30 WKD	Beckett AFG	F-6	1.25	1.25	80° SS 80° B	HAGO DELAVAN	100	10*	1*	N.A.
LD-30 WKD & SKD	Carlin 99FRD 84467 See note 1	Wrapped Shield Kit # 65524	1.10	1.10	70° SS 70° W	HAGO DELAVAN	100	BLANK	40%*	4*
LD-30 WKD	Carlin 99FRD 84467 See note 1	Wrapped Shield Kit # 65524	1.25	1.25	70° H 70° A	HAGO DELAVAN	100	BLANK	50%*	5*
LD-30 WKD & SKD	Beckett AFG	F-4S	1.10	1.10	80° SS 80° W	HAGO DELAVAN	100	9*	Closed*	N.A.
LD-30 WKD	Beckett AFG	F-4S	1.25	1.25	80° SS 80° W	HAGO DELAVAN	100	10*	1*	N.A.
LD-30 WKD & SKD	ABC	FC-134	1.10	1.10	60° SS	HAGO	100	NONE	3/4"	3/16"
LD-30 WKD	ABC	FC-134	1.25	1.25	70° SS 70° W	HAGO DELAVAN	100	NONE	3/4"	3/8"
LD-30 WKD & SKD	Riello 40 Series	F-5	1.10	0.85	70° ES 70° B	HAGO DELAVAN	160	3.5	N.A.	2
LD-30 WKD	Riello 40 Series	F-5	1.25	1.00	70° ES 70° W	HAGO DELAVAN	160	4	N.A.	2.
LD-30 WKD	Wayne Blue Angel	HS† 10 Vane	1.25	1.25	80° A	DELAVAN	100	3.5	2 damper	3

NOTE: 1. S.S. wrapped shield air-tube assembly 1051A 160B
Air shutter blank part # 1007-1
Dual slotted air band part # 1008.
See figure 2B.

* To see how adjustments are made on CARLIN & BECKETT burners, see illustrations only on pages 11 & 12 of publication LD-40, but use values in table 2, above.
† Wayne blue angel part # 100-393 flame lock
Wayne blue angel part # 100-420 air cone with no holes
WU = water units
SU = steam units

Table 3: Field supplied burners for knocked down boilers with Slant/Fin supplied full combustion chambers.

BOILER MODEL	BURNER MODEL	BURNER HEAD	FIRING RATE (GPH)	NOZZLES			OIL PUMP PRESSURE SETTING (PSIG) §	APPROXIMATE SETTINGS		
				SIZE (GPH)	ANGLE & TYPE	MFR.		AIR SHUTTER	AIR BAND	HEAD SETTING
LD-40 WKD & SKD	Beckett AFG	F-60	1.60	1.50	80° W	DELAVAN	113	10*	1-1/2*	N.A.
LD-40 WKD & SKD	Beckett AFG	F-12	1.60	1.50	80° SS 80° A	HAGO DELAVAN	113	10*	0*	N.A.
LD-40 WKD	Beckett AFG	F-12	1.80	1.75	70° A	DELAVAN	105	10*	1-1/2*	N.A.
LD-40 WKD & SKD	Beckett AFG	F-120	1.60	1.50	80° SS 80° W	HAGO DELAVAN	113	10*	1/2*	N.A.
LD-40 WKD	Beckett AFG	F-120	1.80	1.75	80° SS 80° W	HAGO DELAVAN	105	10*	3*	N.A.
LD-40 WKD & SKD	Carlin 99FRD See Note 1	Wrapped Shield Kit # 65524	1.60	1.50	70° SS 70° A	HAGO DELAVAN	105	FULL	50%*	8*
LD-40 WKD	Carlin 99FRD See Note 1	Wrapped Shield Kit # 65524	1.80	1.75	70° SS	HAGO DELAVAN	100	10*	1*	N.A.
LD-40 WKD & SKD	Carlin 99FRD 84459, See note 2	Standard	1.60	1.50	70° SS 70° W	HAGO DELAVAN	113	FULL	30%*	5*
LD-40 WKD	Carlin 99 FRD 84459, See note 2	Standard	1.80	1.75	70° SS 70° W	HAGO DELAVAN	105	FULL	30%*	8*
LD-40 WKD & SKD	ABC	FC-134	1.60	1.50	60° ES 70° W	HAGO DELAVAN	113	NONE	Full & 2-3/4"	1/2"
LD-40 WKD	ABC	FC-234	1.80	1.75	70° ES 70° B	HAGO DELAVAN	105	NONE	Full & 1/2"	1/2"
LD-40 WKD & SKD	Wayne Blue Angel	HS‡ 10VANE	1.60	1.50	70° A	DELAVAN	113	5	2 damper	2
LD-40 WKD & SKD	Riello 40 Series	F-10	1.60	1.25	60° ES 70° B	HAGO DELAVAN	160	2.5	N.A.	1
LD-40 WKD	Riello 40 Series	F-10	1.80	1.35	70° ES 70° B	HAGO DELAVAN	180	3.5	N.A.	1

NOTE: 1. S.S. Wrapped shield air-tube assembly 1051A 160B.
Air shutter blank part # 1007-1
Dual slotted air band 1008.

2. Standard air-tube part number 1051-5.

WKD = Water knocked down.
SKD = Steam knocked down

* To see how adjustments are made on CARLIN & BECKETT burners, see illustrations only on pages 11 & 12 of publication LD-40, but use values in table 3, above.
‡ Wayne blue angel part # 100-393 flame lock
Wayne blue angel part # 100-389 air cone with 6 holes.
§ All pump pressures may be 100 PSI but will fire at a slightly lower rate except Riello.

Table 4: Field supplied burners for knocked down boilers with Slant/Fin supplied full combustion chambers.

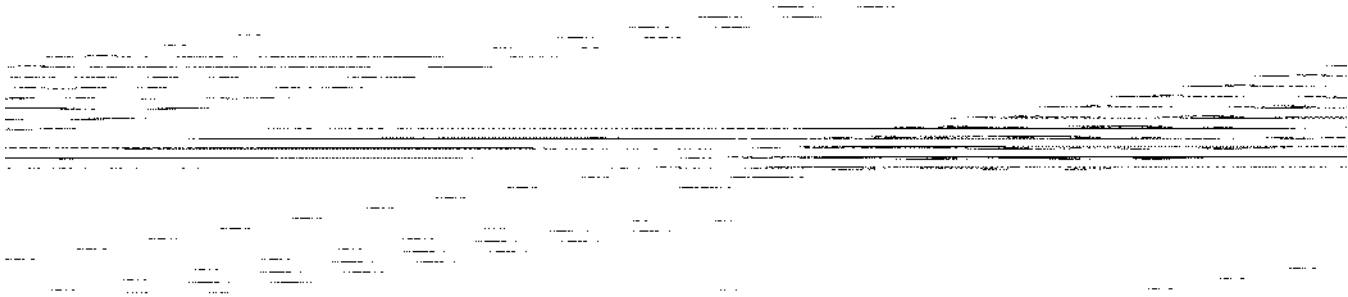
BOILER MODEL	BURNER MODEL	BURNER HEAD	FIRING RATE (GPH)	NOZZLES			OIL PUMP PRESSURE SETTING (PSIG) §	APPROXIMATE SETTINGS		
				SIZE (GPH)	ANGLE & TYPE	MFR.		AIR SHUTTER	AIR BAND	HEAD SETTING
LD-50 WKD & SKD	Beckett AFG	F-22	2.10	2.00	80° H 80° W	HAGO DELAVAN	110	10*	2*	N.A.
LD-50 WKD	Beckett AFG	F-12	2.35	2.25	80° SS 80° W	HAGO DELAVAN	109	1*	3*	N.A.
LD-50 WKD & SKD	Carlin 102 CRD Note 1	Standard	2.10	2.00	70° SS 70° W	HAGO DELAVAN	110	FULL	20%*	4*
LD-50 WKD	Carlin 102 CRD Note 1	Standard	2.35	2.25	70° SS 70° W	HAGO DELAVAN	109	FULL	50%*	5*
LD-50 WKD & SKD	Beckett AFG	F-164	2.10	2.00	80° SS 80° W	HAGO DELAVAN	110	10*	2*	N.A.
LD-50 WKD	Beckett AFG	F-164	2.35	2.25	80° SS 80° W	HAGO DELAVAN	109	10*	3*	N.A.
LD-50 WKD & SKD	Blue Angel Note 2	HS #10 Vane	2.10	2.00	80° H 80° W	HAGO DELAVAN	110	6.5	1.5 damper	5
LD-50 WKD	Blue Angel Note 2	HS #10 Vane	2.35	2.25	80° H	HAGO	109	7	1.5 damper	7
LD-50 WKD & SKD	Riello 40 Series	F-10	2.10	1.75 1.65	60° W 60° SS	DELAVAN HAGO	150 162	3.5 4.5	N.A. N.A.	3 4
LD-50 WKD	Riello 40 Series	F-10	2.35	1.75	60° W 60° ES	DELAVAN HAGO	170	4	N.A.	3
LD-50 WKD & SKD	ABC	FC-234	2.10	2.00	60° P 60° W	HAGO DELAVAN	110	NONE	FULL & 1"	1/2"
LD-50 WKD	ABC	FC-234	2.35	2.25	60° P 70° W	HAGO DELAVAN	109.	NONE	FULL & 2	1/2"

NOTE: 1. Standard air-tube part number 1251B-5.
 2. Wayne blue angel part number 100-393 flame lock.
 All pump pressures may be 100 PSI but will fire at a slightly lower rate except Riello.

* To see how adjustments are made on CARLIN & BECKETT burners, see illustrations only on pages 11 & 12 of publication LD-40, but use values in table 4, above.

WKD = Water knocked down
 SKD = Steam knocked down

Figure 1 Beckett AFG



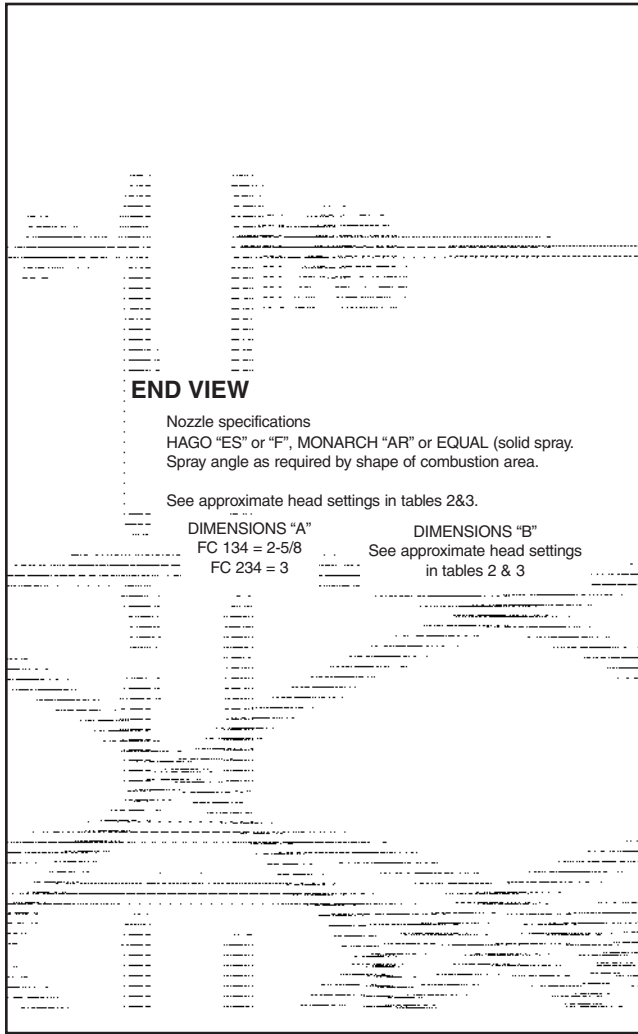
- Note 1: Extended head for only (F4S, F-120, & F-164 heads).
- Note 2: 2-3/4" static plate.
- Note 3: Insertion depth 2-5/32 for F4S & F120, 1-23/32 for standard heads. (F-6, F-60, F-12 and F-22).
- Note 4: Insertion depth 2-21/32 for F-164 head.
- Note 5: Boiler model L-50 does not use static plate. Remove plate if so equipped.

Figure 2A Carlin 99FRD Standard

Figure 2B Carlin 99FRD

**Figure 3 Wayne Blue Angel Burner
Gun Setting Gauge Instructions (for "HS" series burners only)**

Figure 4 ABC FC134 and FC234



ABC Sun Ray "FC" Series Burner Specifications

Burner Model	Motor		Fuel Unit Sundstrand & Webster	
	HP	RPM	Standard	Optional
FC-134	1/7	3450	One stage	Two stage
FC-234	1/7	3450	One stage	Two stage

Note: Specifications subject to change without notice.

Part No. H40071 Setting Gauge Available On Request

1. To install the nozzle, the firing assembly must be removed. Remove copper tubing from elbow connection. Remove lock screw on ignition transformer and open. Lift end of firing assembly slightly and carefully pull out. **Note:** Spring pressure will cause some resistance. **DO NOT** force or bend the pipe and/or cup.
2. Loosen clamp screw on cut bracket and remove from nozzle adaptor. Examine cup for distortion. A bent cup will alter the firing characteristics of the burner.
3. Inspect the nozzle adaptor seat for any defects. A loose or improperly seated nozzle will cause an oil leak and poor oil cut off. Use an "ideal" type nozzle wrench or two wrenches to remove or tighten the nozzle.
4. Reinstall the cup on the nozzle adaptor, with the leg having the part number between the electrodes. Slide the cup back against the adaptor shoulder and tighten clamp screw. Check that the cup bracket does not touch the electrode insulator.

5. Set electrodes as shown (5/16" above nozzle centerline, 1/32" from cup and 1/8" gap).
6. Reinstall firing assembly by reversing the procedure in paragraph no. 1.
7. Adjust cup to end-cone, dimension "B", to firing rate by turning the dial at rear (see below) clockwise. This will pull firing-assembly away from end-cone, while exposing a 4-division scale. The amount of scale exposed is the distance (dimension "B" the combustion head is back from the end cone. For optimum burner efficiency fine tune (forward/backward) the final firing assembly location.
8. Tighten all screws and copper tube fittings.
9. Check for leaks and oil cut off before leaving premises.

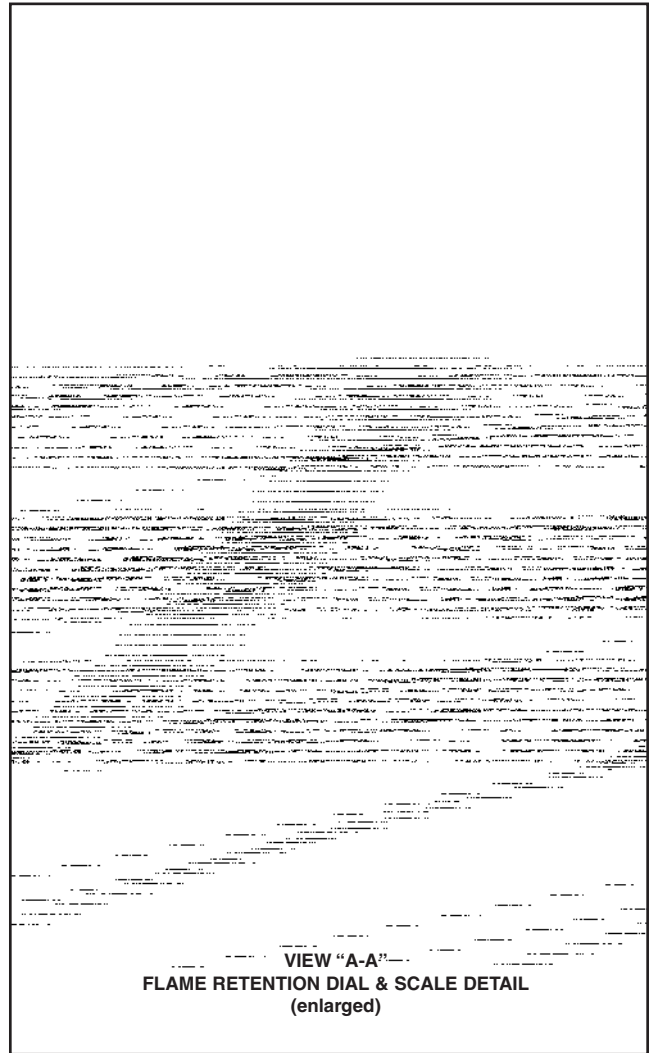


Figure 5A Riello 40 Series

**Model F-5
ELECTRODE SETTING**



Figure 5B

**RIELLO 40 SERIES
MODEL F-10
ELECTRODE SETTING**

Important: For proper insertion into chamber (see figure 8).

**NOTE: ELECTRODES ARE PRESET AT THE FACTORY.
REGULATION OF THE TURBULATOR AND AIR SHUTTER FOR
FOR PROPER COMBUSTION**

Turbulator Setting

1. Loosen nut, 1, then turn the screw, 2, until the index marker, 3, is aligned with the correct index number.
2. Retighten the retaining nut, 1.

TURBULATOR SETTINGS - RIELLO 40 SERIES

The numbers on the casting are there to denote the high and low end of the scale - in all cases the first mark is "Zero".

The air/oil ration depends on accurate setting of the turbulator disc. Be careful when making this adjustment as an incorrect setting will result in an unsatisfactory installation. See figures 6A, B.

Figure 6A

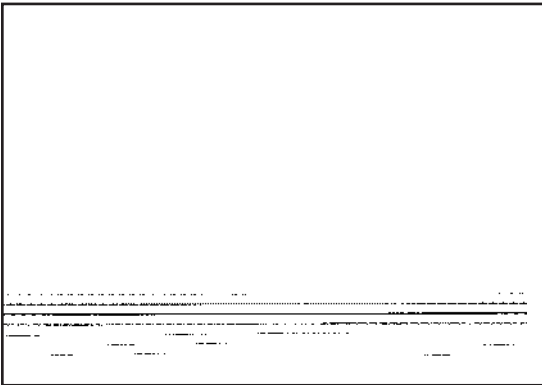
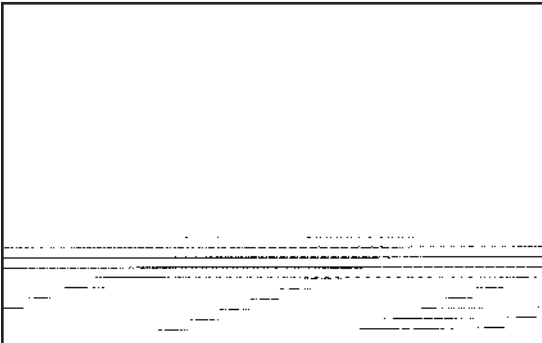


Figure 6B



SETTING THE AIR ADJUSTMENT PLATE (See figure 7)

1. The hydraulic AIR SHUTTER (A) is operated by the HYDRAULIC JACK (F), assuring complete opening of the combustion air intake. Regulation of the combustion air flow is made by adjustment of the manual AIR ADJUSTMENT PLATE (D) after loosening the FIXING SCREWS (C & E). The initial setting of the air adjustment plate should be made according to pages 3, 4 and 5.
2. The proper number on the manual AIR ADJUSTMENT PLATE (D) should line up with the SETTING INDICATOR (B) on the fan housing cover. Once set, the air adjustment plate should be secured in place by tightening SCREWS C and E. Manually open and release the hydraulic air shutter to ensure it has free movement.
3. The final position of the air adjustment plate will vary on each installation. Use instruments to establish the proper settings for maximum CO₂ and a smoke reading of zero.

NOTE: Variations in flue gas, smoke, CO₂ and temperature readings may be experienced when the burner cover is put in place. Therefore, the burner cover **must** be in place when making the final combustion instrument readings, to ensure proper test results.

Figure 7

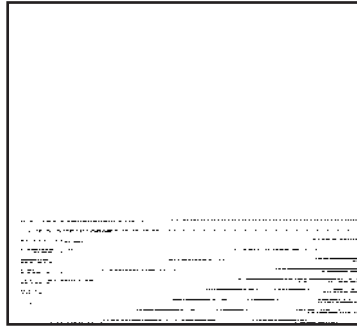


Figure 8

FOR PROPER INSERTION INTO COMBUSTION CHAMBER

