

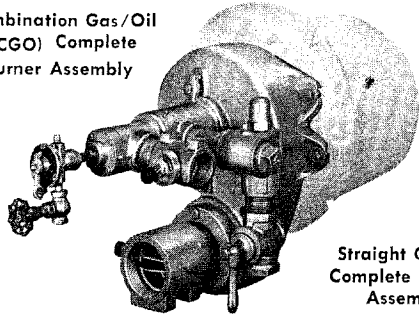
# ECLIPSE CONVECTO-FLAME® BURNERS

Bulletin 243

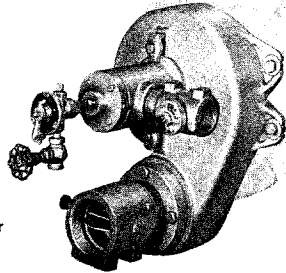
8/87

Series "LCF" & "HCF"  
For Oil or Combination Gas/Oil

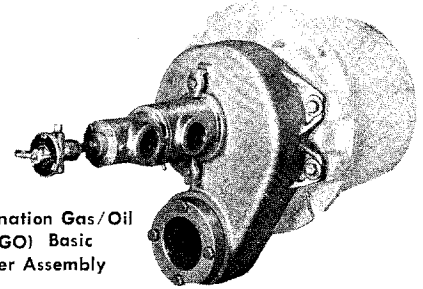
Combination Gas/Oil  
(CGO) Complete  
Burner Assembly



Straight Oil (O)  
Complete Burner  
Assembly



Combination Gas/Oil  
(CGO) Basic  
Burner Assembly



Eclipse Convecto-Flame Burners are dual fuel, nozzle mixing, sealed burners designed for use on forges, smelters, billet heaters, heat treat furnaces, ovens and kilns. They will fire any clean commercially available fuel gas and depending upon burner model selected, light and/or heavy oil. Seven sizes are available with maximum capacities ranging from 120,000 Btu/hr. to 13,860,000 Btu/hr. and turndown ratios up to 4 to 1.

## ASSEMBLIES

Convecto-Flame burners in the "LCF" series are for gas or light oil while "HCF" Series burners can be used for gas and light or heavy oil. All burners, except the 42 LCF-CGO, can be supplied as straight oil (LCF-O), or combination gas/oil (LCF-CGO). The 42 LCF-CGO is available only as a combination gas/oil burner.

The Basic burner assembly consists of the burner body and an oil flow control valve.

The Complete burner consists of the Basic burner plus butterfly valves for flow control of combustion and atomizing air, a manual oil valve, and, on -CGO models, an adjustable limiting gas orifice and a manual gas cock.

The 3216 HCF-O and -CGO are catalogued as Basic burners. The 42 LCF-CGO is furnished as a Complete and includes the burner head, combustion air butterfly valve, adjustable orifice valves for gas and atomizing air flow control, an oil strainer, a manual oil valve, an oil pressure gauge and combustion air, atomizing air and gas pressure checking fittings with shutoff cocks.

*Because of the variety of combustion block and block with wrapper options available for Convecto-Flame Burners, no one block is considered standard and included with the burner. All Block and holder assemblies must be ordered separately. See page 5 for block and holder options available.* The block is mounted in a flanged block holder which is drilled and tapped for a scanner, peepsight and pilot. Gas, oil and atomizing air inlets can be rotated 360° to ease connection of the piping to the burner.

## DESIGN FEATURES

Convecto-Flame burners have several design features that make them excellent general purpose burners.

The versatility of dual fuel makes it possible to provide a variety of chamber atmospheres by firing up to 10% excess fuel on gas or oil, up to 100% excess air on gas or up to 300% excess air on oil. Dual fuel also makes it possible to continue operation despite fuel supply problems. In addition to gas and light oil, the HCF Series burners can fire the less expensive heavy oils, including Bunker "C", with the same atomizing air pressure as is required for light oil. For

proper operation it is necessary that oils have a viscosity of 100 S.S.U. or lower at the burner. Anytime the viscosity is greater than 100 S.S.U., it is necessary to preheat the oil.

Atomizing and combustion air maximum pressure requirements are the same, simplifying modulation of the burner firing rate and making it unnecessary to oversize the blower for atomizing air pressure.

The combustion air housing is designed to produce a turbulent air stream. By having air and fuel mix in conditions of high turbulence, mixing is more complete, flame retention is improved and the spinning action created by the turbulence improves convection heat transfer within the furnace.

Convecto-Flames can be purchased as straight oil models and converted to combination gas/oil at a later date.

## ADVANTAGES

- • • Dual fuel
- • • Able to burn light and/or heavy oils
- • • Easily modulated
- • • High convection heat transfer rate
- • • Excellent flame retention
- • • Low pressure atomizing air
- • • Wide variety of block materials

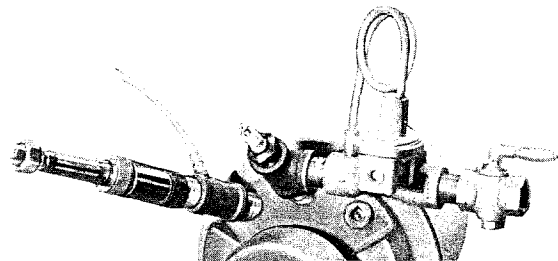
## IGNITION AND FLAME MONITORING

Tapped openings are provided in the mounting flange for peepsight, pilot and flame monitoring equipment.

Ignition can be accomplished by manual lighter torch or by a manually or electrically ignited pilot.

It is recommended that an ultraviolet scanner be used for main flame monitoring on both gas and oil. A flame rod or UV scanner can be used to monitor the gas pilot flame.

**CAUTION:** It is dangerous to use any fuel burning equipment unless it is equipped with suitable flame sensing device(s) and automatic fuel shut-off valve(s). Eclipse can supply such equipment or information on alternate sources.



Recommended ignition and flame monitoring equipment consists of spark ignited pilot and UV scanner with heat block and purge line.



ECLIPSE COMBUSTION

# CAPACITIES

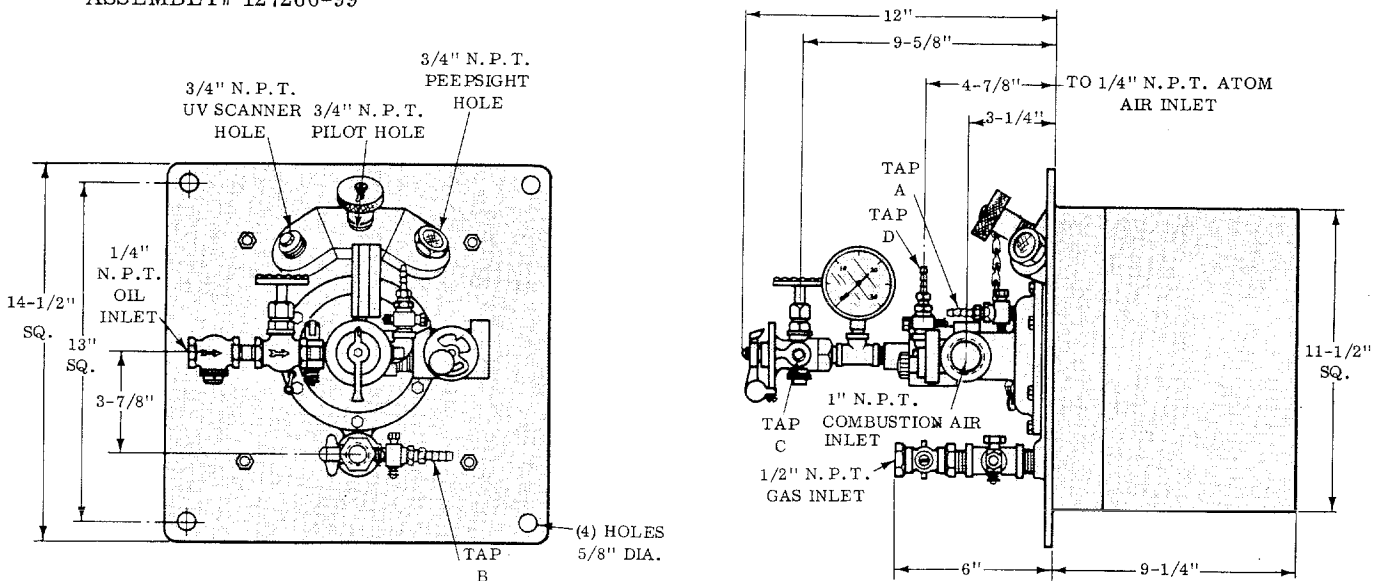
| MAIN AIR PRESSURE AT BURNER — " W.C. |                            |                         |                                   |                           |                                     |                       |                                     |                       |                                     |                       |  |                       |  |
|--------------------------------------|----------------------------|-------------------------|-----------------------------------|---------------------------|-------------------------------------|-----------------------|-------------------------------------|-----------------------|-------------------------------------|-----------------------|--|-----------------------|--|
|                                      |                            | 3.2                     |                                   | 6.0                       |                                     | 14.2                  |                                     | 25.5                  |                                     | 40.0                  |  | 57.2                  |  |
| BURNER MODEL                         | FUEL                       | CFH-GAS OR G.P.H.-OIL   | BTU/HR.                           | CFH-GAS OR G.P.H.-OIL     | BTU/HR.                             | CFH-GAS OR G.P.H.-OIL | BTU/HR.                             | CFH-GAS OR G.P.H.-OIL | BTU/HR.                             | CFH-GAS OR G.P.H.-OIL | BTU/HR.                                | CFH-GAS OR G.P.H.-OIL | BTU/HR.                                |
| 42 LCF-CGO                           | GAS<br>LT. OIL             | 30<br>—                 | 30,000<br>—                       | 40<br>.3                  | 40,000<br>40,000                    | 60<br>.43             | 60,000<br>60,000                    | 80<br>.57             | 80,000<br>80,000                    | 100<br>.71            | 100,000<br>100,000                     | 120<br>.86            | 120,000<br>120,000                     |
| MAIN AIR PRESSURE AT BURNER — " W.C. |                            |                         |                                   |                           |                                     |                       |                                     |                       |                                     |                       |  |                       |  |
|                                      |                            | .5*                     |                                   | 1.0                       |                                     | 6.0                   |                                     | 14.0                  |                                     | 28.0                  |  | 38.0                  |  |
| 63 LCF-CGO                           | GAS<br>LT. OIL             | 65<br>.5**              | 65,000<br>70,000                  | 105<br>.6**               | 105,000<br>85,000                   | 235<br>1.4            | 235,000<br>195,000                  | 340<br>2.0            | 340,000<br>280,000                  | 455<br>3.1            | 455,000<br>435,000                     | —                     | —                                      |
| 84 LCF-CGO                           | GAS<br>LT. OIL             | 140<br>1.0**            | 140,000<br>140,000                | 200<br>1.3**              | 200<br>180                          | 415<br>2.5            | 415,000<br>350,000                  | 585<br>3.6            | 585,000<br>505,000                  | 810<br>5.1            | 810,000<br>715,000                     | —                     | —                                      |
| 126 HCF-CGO                          | GAS<br>LT. OIL<br>HVY. OIL | 640<br>4.0**<br>3.6**   | 640,000<br>560,000<br>550,000     | 720<br>4.9**<br>4.5**     | 720<br>685<br>690                   | 1,180<br>7.4<br>6.8   | 1,180,000<br>1,035,000<br>1,050,000 | 1,700<br>10.5<br>9.4  | 1,700,000<br>1,470,000<br>1,450,000 | 2,250<br>14.2<br>12.2 | 2,250,000<br>1,985,000<br>1,900,000    | 2,570<br>15.9<br>14.3 | 2,570,000<br>2,225,000<br>2,200,000    |
| 168 HCF-CGO                          | GAS<br>LT. OIL<br>HVY. OIL | 1,230<br>6.4**<br>6.7** | 1,230,000<br>895,000<br>1,030,000 | 1,495<br>7.8**<br>9.7**   | 1,495,000<br>1,085,000<br>1,485,000 | 2,475<br>15.4<br>13.0 | 2,475,000<br>2,370,000<br>2,000,000 | 3,375<br>20.0<br>17.0 | 3,375,000<br>2,800,000<br>2,615,000 | 4,375<br>25.6<br>22.6 | 4,375,000<br>3,580,000<br>3,480,000    | 4,600<br>30.2<br>25.5 | 4,600,000<br>4,225,000<br>3,925,000    |
| 2412 HCF-CGO                         | GAS<br>LT. OIL<br>HVY. OIL | —<br>—<br>—             | —<br>—<br>—                       | 1,975<br>17.8**<br>14.1** | 1,975<br>1,975<br>1,875             | 1,980<br>17.8<br>14.1 | 1,980,000<br>2,490,000<br>2,170,000 | 3,860<br>28.0<br>22.5 | 3,860,000<br>3,900,000<br>3,465,000 | 6,600<br>36.5<br>31.5 | 6,600,000<br>5,110,000<br>4,850,000    | 7,150<br>44.8<br>41.7 | 7,150,000<br>6,270,000<br>6,420,000    |
| 3216 HCF-CGO                         | GAS<br>LT. OIL<br>HVY. OIL | —<br>—<br>—             | —<br>—<br>—                       | 2,350<br>***<br>***       | 2,350,000<br>***<br>***             | 6,720<br>48<br>44.5   | 6,720,000<br>6,720,000<br>6,720,000 | 9,590<br>68.5<br>64   | 9,590,000<br>9,590,000<br>9,590,000 | 11,900<br>85<br>79    | 11,900,000<br>11,900,000<br>11,900,000 | 13,860<br>49<br>92    | 13,860,000<br>13,860,000<br>13,860,000 |

- NOTES:**
- Gas and Oil Pressure Requirements — To achieve maximum capacity, 42 LCF requires 3.8" w.c. gas pressure at Tap "B" and 11.5 psig oil pressure at Tap "C". 63 thru 3216 LCF & HCF require 2" w.c. gas pressure at the burner inlet and 25 psig oil pressure at the oil control valve. Oil viscosity must not exceed 100 SSU. Preheat if necessary.
  - Atomizing Air Requirements — 42 LCF requires 4% of total air at minimum of 48" w.c.; 63 & 84 LCF & 3216 HCF require 20% of total air at minimum of 28" w.c.; 126, 168 and 2412 HCF require 20% of total air at minimum of 38" w.c. For high fire gas operation, a minimum of 8" w.c. atomizing air pressure should be maintained to cool the nozzle.
  - Combustion Air Requirements — Gas Operation; divide Btu/hr. by 100 for cfh air for on-ratio. Light Oil — multiply G.P.H. by 1470 cfh (provides for 5% excess air). Heavy Oil — multiply G.P.H. by 1710 cfh (provides for 10% excess air).
  - For low fire on gas — Main air pressure can be reduced to .2" w.c. providing gas flow and atomizing air flow are reduced correspondingly.
  - For cold light off on oil — 2" w.c. minimum main air pressure required for 63 thru 168 HCF. 3" w.c. required for 2412 HCF.
  - Low fire and cold light off main air pressure is 3.5" w.c. for 3216 HCF on both light and heavy oil. Light oil flow is 21 gph (2,898,000 Btu/hr.), heavy oil flow is 19.5 gph (2,925,000 Btu/hr.).

| CATALOG BURNER NUMBER | FLAME LGTH. IN FEET, OIL ONLY OPERATION | % EXCESS FUEL GAS OR OIL OPERATION | % EXCESS AIR GAS ONLY OPERATION | % EXCESS AIR OIL ONLY OPERATION |
|-----------------------|---|------------------------------------|---------------------------------|---------------------------------|
| 42 LCF-CGO            | 1/2                                     | 20                                 | 30                              | 350                             |
| 63 LCF-CGO            | 2 to 3                                  | 10 to 15                           | 70                              | 300                             |
| 84 LCF-CGO            | 2-1/2 to 3-1/2                          | 10 to 15                           | 120                             | 350                             |
| 126 HCF-CGO           | 5 to 6                                  | 10 to 15                           | 100                             | 330                             |
| 168 HCF-CGO           | 8 to 9                                  | 10 to 15                           | 110                             | 290                             |
| 2412 HCF-CGO          | 10 to 11                                | 10 to 15                           | 120                             | 300                             |
| 3216 HCF-CGO          | ---                                     | ---                                | 300                             | 300                             |

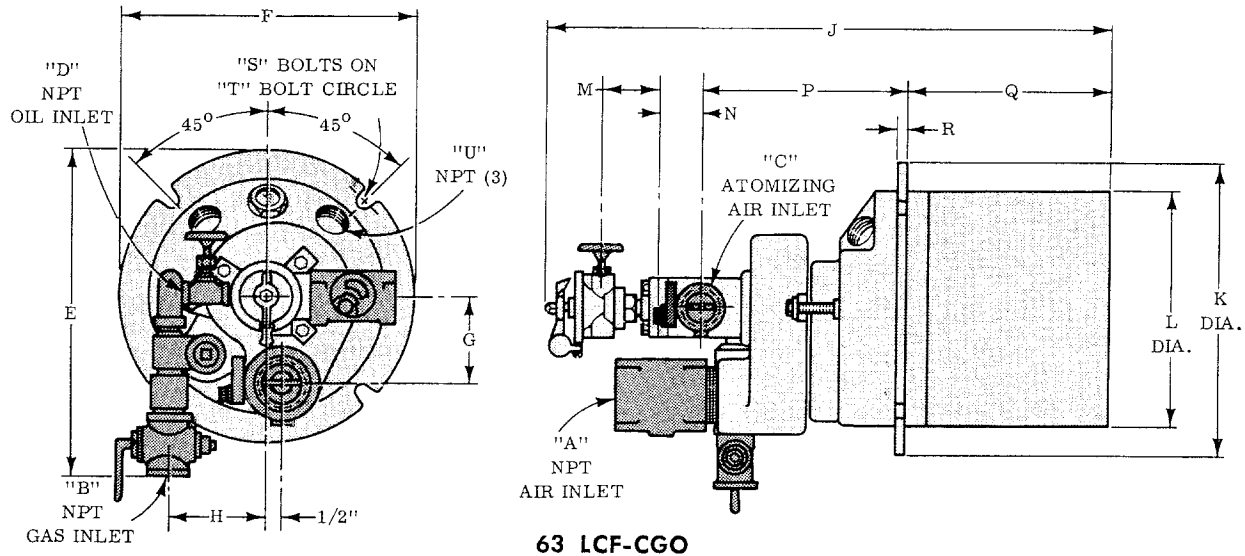
## DIMENSIONS 42 LCF-CGO

ASSEMBLY# 127260-99

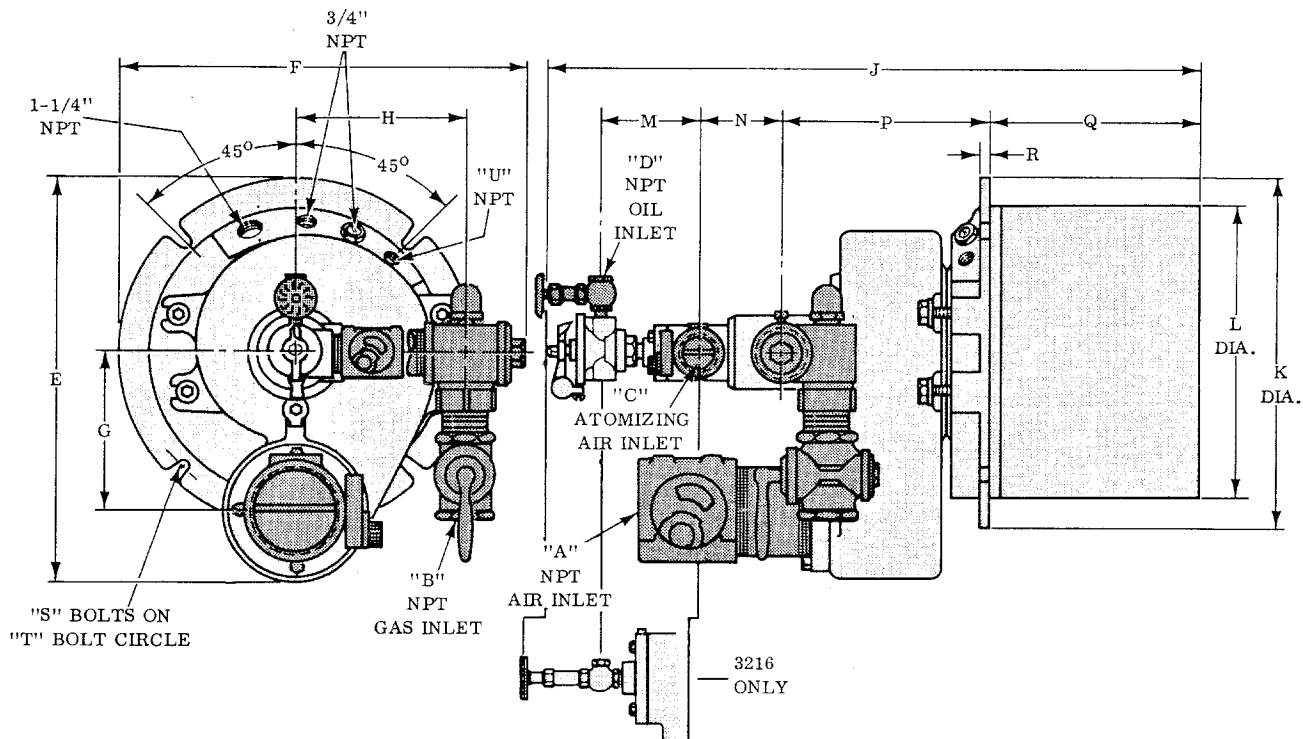


NOTE: Block and holder assembly is illustrated as part of the burner and is required for the burner to be operational. However, block and holder assembly must be ordered as a separate item. (See page 5.)

## DIMENSIONS COMBINATION GAS/OIL BURNERS



**63 LCF-CGO**



**84 LCF-CGO THRU 3216 HCF-CGO**

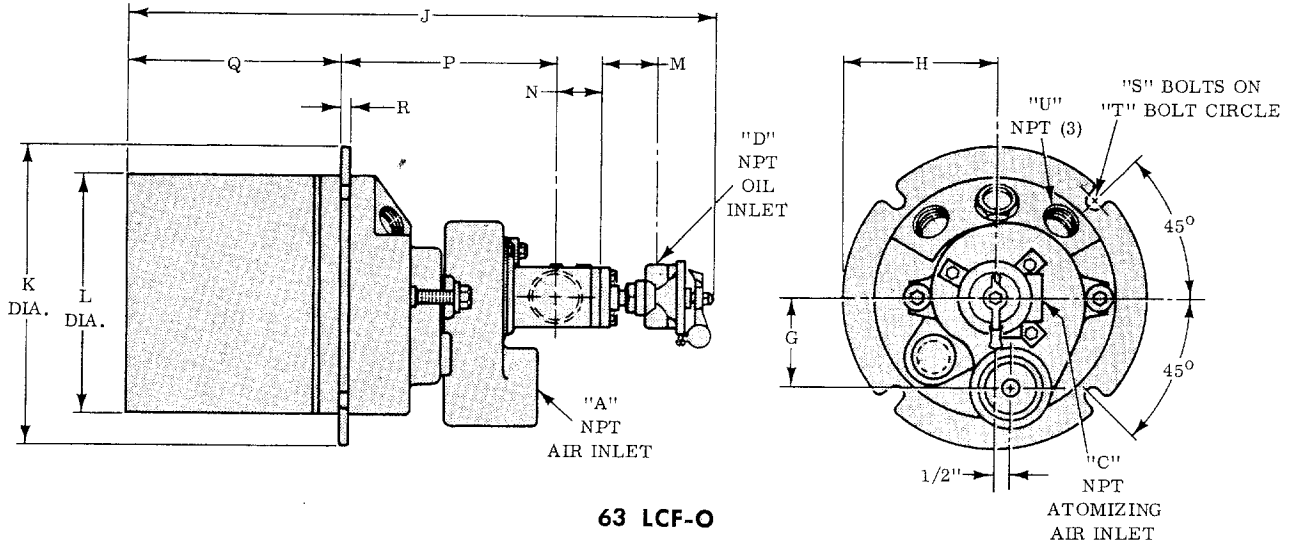
- Basic Burner. The block and holder assembly is illustrated as part of the basic burner and is required for the burner to be operational. However, the block and holder must be ordered as a separate item. (See page 5.)
- Additional components included with complete burner.

| BURNER NUMBER | ASSEMBLY NUMBERS |                 | DIMENSIONS (IN INCHES) |       |       |     |        |        |        |         |        |
|---------------|------------------|-----------------|------------------------|-------|-------|-----|--------|--------|--------|---------|--------|
|               | BASIC BURNER     | COMPLETE BURNER | A                      | B     | C     | D   | E      | F      | G      | H       | J      |
| 63 LCF-CGO    | 127195-00        | 127195-99       | 1-1/2                  | 3/4   | 1     | 1/4 | 12-1/4 | 10-1/2 | 3      | 3-1/4   | 19-7/8 |
| 84 LCF-CGO    | 127176-00        | 127176-99       | 2                      | 1     | 1     | 1/4 | 13-1/8 | 15-5/8 | 4      | 6-5/8   | 22-1/2 |
| 126 HCF-CGO   | 127173-00        | 127173-99       | 3                      | 1-1/2 | 1-1/2 | 3/8 | 19     | 19-5/8 | 7-5/8  | 8-13/16 | 32     |
| 168 HCF-CGO   | 127175-00        | 127175-99       | 4                      | 2     | 1-1/2 | 3/8 | 20-1/2 | 21-1/8 | 8      | 9       | 33     |
| 2412 HCF-CGO  | 127179-00        | 127179-99       | 6                      | 3     | 2-1/2 | 3/8 | 28-5/8 | 40     | 10-1/2 | 12-5/16 | 40-1/4 |
| 3216 HCF-CGO  | 127261-99        | - - -           | 8                      | 4     | 3     | 3/8 | 35     | ---    | 13-3/4 | ---     | 52-3/4 |

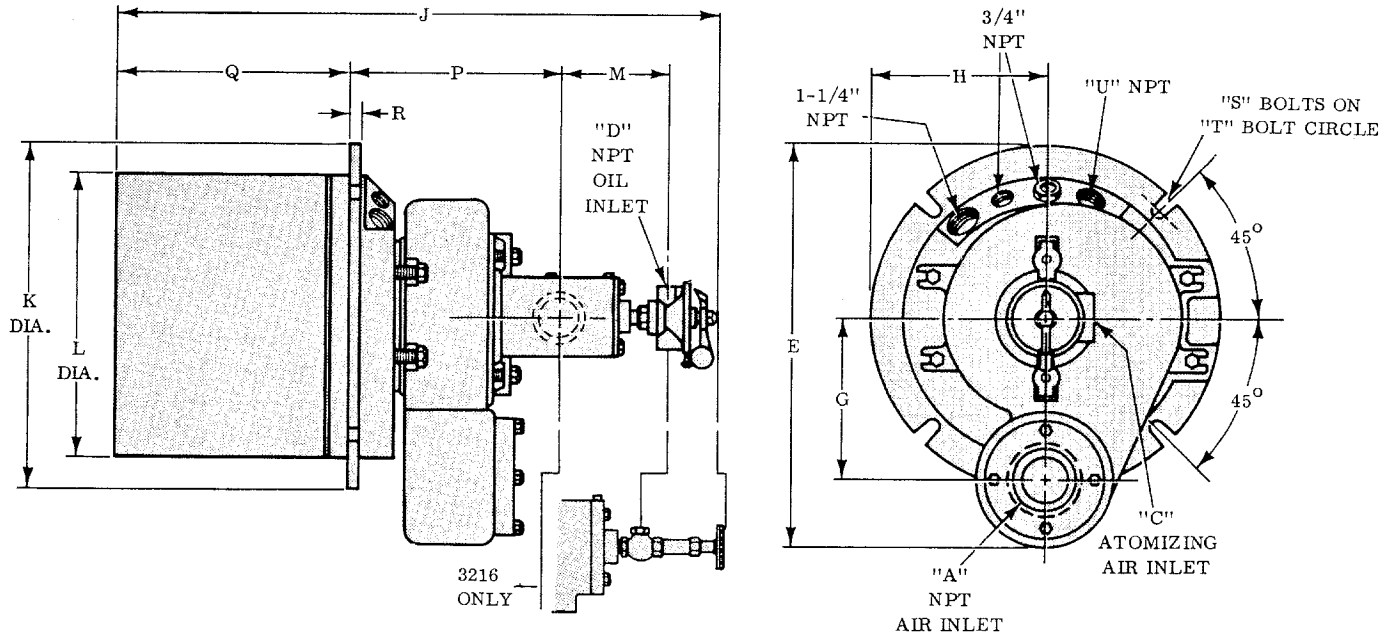
| BURNER NUMBER | DIMENSIONS (IN INCHES) |        |         |        |        |        |     |         |        |       |       | APPROX. SHPG. WT. IN LBS. |  |
|---------------|------------------------|--------|---------|--------|--------|--------|-----|---------|--------|-------|-------|---------------------------|--|
|               | K                      | L      | M       | N      | P      | Q      | R   | S       | T      | U     | BASIC | COMPLETE                  |  |
| 63 LCF-CGO    | 10                     | 8      | 2       | 1-3/8  | 6-7/8  | 7      | 3/8 | (4) 3/8 | 9-1/4  | 3/4   | 105   | 130                       |  |
| 84 LCF-CGO    | 13-1/4                 | 9-5/8  | 3-13/16 | 2-9/16 | 5-7/8  | 7      | 3/8 | (4) 1/2 | 12     | 1     | 125   | 150                       |  |
| 126 HCF-CGO   | 16-1/2                 | 13-3/4 | 4-9/16  | 3-3/4  | 9-3/4  | 11     | 1/2 | (4) 3/8 | 14-1/2 | 1     | 210   | 240                       |  |
| 168 HCF-CGO   | 18                     | 15-1/8 | 4-9/16  | 4      | 10-7/8 | 11     | 1/2 | (4) 3/8 | 16     | 1     | 260   | 290                       |  |
| 2412 HCF-CGO  | 26-3/4                 | 23     | 5-7/16  | 6      | 12-3/8 | 18-1/2 | 1/2 | (4) 3/8 | 24-3/4 | 1-1/4 | 625   | 675                       |  |
| 3216 HCF-CGO  | 28-13/16               | 24-3/4 | 5-3/8   | 6-1/2  | 18     | 18-1/2 | 1/4 | (8) 3/4 | 26-3/4 | 1-1/4 | ---   | ---                       |  |

Note: Drawings represent general appearance. Your burner may vary.

**DIMENSIONS  
STRAIGHT OIL BURNERS**



**63 LCF-O**



**84 LCF-O THRU 3216 HCF-O**

Note: Drawings show "Basic Burner" only. "Complete Burner" includes the components shown plus manual air valves, oil shut-off valve and necessary pipe fittings.

| BURNER NUMBER | ASSEMBLY NUMBERS |                 | DIMENSIONS (IN INCHES) |       |     |        |        |        |         |          |
|---------------|------------------|-----------------|------------------------|-------|-----|--------|--------|--------|---------|----------|
|               | BASIC BURNER     | COMPLETE BURNER | A                      | C     | D   | E      | G      | H      | J       | K        |
| 63 LCF-O      | 117195-00        | 117195-99       | 1-1/2                  | 1     | 1/4 | ---    | 3      | 5      | 19-7/8  | 10       |
| 84 LCF-O      | 117176-00        | 117176-99       | 2                      | 1     | 1/4 | 13-1/8 | 4      | 6-5/8  | 19-1/32 | 13-1/4   |
| 126 HCF-O     | 117173-00        | 117173-99       | 3                      | 1-1/2 | 3/8 | 19     | 7-5/8  | 8-1/4  | 28-1/2  | 16-1/2   |
| 168 HCF-O     | 117175-00        | 117175-99       | 4                      | 2     | 3/8 | 20-1/2 | 8      | 9      | 30      | 18       |
| 2412 HCF-O    | 117179-00        | 117179-99       | 6                      | 3     | 3/8 | 28-5/8 | 10-1/2 | 13-1/4 | 34-3/8  | 26-3/4   |
| 3216 HCF-O    | 117261-99        | ---             | 8                      | 3     | 3/8 | 35     | 13-3/4 | 14-3/8 | 46      | 28-13/16 |


| BURNER NUMBER | DIMENSIONS ( IN INCHES ) |       |       |        |        |     |         |        |       |       | APPROX. SHPG. WT. IN LBS. |  |
|---------------|--------------------------|-------|-------|--------|--------|-----|---------|--------|-------|-------|---------------------------|--|
|               | L                        | M     | N     | P      | Q      | R   | S       | T      | U     | BASIC | COMPLETE                  |  |
| 63 LCF-O      | 8                        | 2     | 1-3/8 | 6-7/8  | 7      | 3/8 | (4) 3/8 | 9-1/4  | 3/4   | 100   | 120                       |  |
| 84 LCF-O      | 9-5/8                    | 3-3/8 | ---   | 5-7/8  | 7      | 3/8 | (4) 1/2 | 12     | 1     | 120   | 145                       |  |
| 126 HCF-O     | 13-3/4                   | 5-1/4 | ---   | 9-3/4  | 11     | 1/2 | (4) 3/8 | 14-1/2 | 1     | 200   | 230                       |  |
| 168 HCF-O     | 15-1/8                   | 5     | ---   | 10-7/8 | 11     | 1/2 | (4) 3/8 | 16     | 1     | 245   | 275                       |  |
| 2412 HCF-O    | 23                       | 5-3/4 | ---   | 12-3/8 | 13-1/2 | 1/2 | (4) 3/8 | 24-3/4 | 1-1/4 | 600   | 650                       |  |
| 3216 HCF-O    | 24-3/4                   | 5-3/8 | ---   | 17-3/4 | 18-1/2 | 1/4 | (8) 3/4 | 26-3/4 | 1-1/4 | ---   | ---                       |  |

NOTE: Drawings represent general appearance. Your burner may vary.

NOTE: Block and holder assembly is illustrated as part of the burner and is required for the burner to be operational. However, block and holder assembly must be ordered as a separate item. (See page 5.)

## BLOCK AND HOLDER OPTIONS

| BURNER<br>CAT. NO | BLOCK & HOLDER<br>ASSY. NO | AVAILABLE OPTIONS |    |    |    |    |    |    |    |
|-------------------|----------------------------|-------------------|----|----|----|----|----|----|----|
|                   |                            | 01                | 02 | 31 | 32 | 61 | 62 | 71 | 72 |
| 42 LCF CGO        | 187260                     | X                 | X  | X  | X  | X  | X  | X  | X  |
| 63 LCF O & CGO    | 187195                     | X                 | X  | X  | X  | X  | X  | X  | X  |
| 84 LCF O & CGO    | 187176                     | X                 | X  | X  | X  | X  | X  | X  | X  |
| 126 HCF O & CGO   | 187173                     | X                 | X  | X  | X  | X  | X  | X  | X  |
| 168 HCF O & CGO   | 187175                     | X                 | X  | X  | X  | X  | X  | X  | X  |
| 2412 HCF O & CGO  | 187179                     | X                 | X  | X  | X  | X  | X  | X  | X  |
| 3216 HCF O & CGO  | 187261                     | —                 | —  | —  | —  | X  | X  | X  | X  |

 These options should not be used with heavy oils.

## MATERIAL DESIGNATIONS

| Dash No. | Trade Name and Description  | % Alumina | Max. Recommended Chamber Temp. °F |
|----------|---|-----------|-----------------------------------|
| -01      | Morocast 3000 HS, hydraulic setting castable                                    | 53        | 2800                              |
| -02      | Morocast 90 HS, hydraulic setting castable                                      | 90 +      | 3000                              |
| -31      | Morocast 3000 HS hydraulic setting castable with 446 Stainless Ribtec OS fibers | 53        | 2400                              |
| -32      | Morocast 90 HS hydraulic setting castable with 446 Stainless Ribtec OS fibers   | 90        | 2400                              |
| -61      | Morocast 3000 HS with RA 330 Stainless Block Wrapper, cast in wrapper           | 53        | 1400                              |
| -62      | Morocast 90 HS with RA330 Stainless block Wrapper, cast in wrapper              | 90+       | 1400                              |

## ORDERING EXAMPLE

127175-99 168 HCF-CGO Burner complete with  
187175-01 Block and Holder assembly

Use assembly for desired burner, i.e. assembly number 127175-99 for a 168 HCF-CGO complete burner and assembly number 187175-01 for a Morocast 3000 HS Block and Holder assembly.



**Offered By:**

Power Equipment Company  
2011 Williamsburg Road  
Richmond, Virginia 23231  
Phone (804) 236-3800  
Fax (804) 236-3882

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[www.peconet.com](http://www.peconet.com)