

# PRODUCT DATA

PD28HE-6

## 28HE Series Steam Boilers High Efficiency Pressurized Wet Base Boiler/Burner Unit

Designed to provide the highest efficiencies possible with forced draft firing. This product line of cast iron boilers is available in fifteen basic sizes, with gross output ratings from 931 to 4,622 MBH. Series 28HE boilers may be used in steam systems, and may be fired with light oil, gas or gas/light oil.

### STANDARD FEATURES

- Up to 85.8% thermal efficiencies
- Cast iron wet base sections tested for 80 psi working pressure, 15 psi steam working pressure
- Heat Transfer Rods
- Insulated metal jacket (R11.7)
- Burner mounting plate with insulation block
- Front and rear flame observation ports
- Steel angle floor rails
- Ceramic fiber rope seal between sections
- Graphite port connectors
- Flue brush
- Manual reset hi-limit
- Operating control
- Stack Thermometer



### ADDITIONAL FEATURES FOR STEAM BOILERS

- A.S.M.E. side outlet safety valve, 15 psi
- Gauge glass with cocks and guards

## Ratings, Burner Capacities

Designed and tested to the A.S.M.E. boiler and pressure vessel code, section IV for maximum allowable working pressure, steam 15 PSIG.

| Boiler Number (Note 1) | Boiler Horse-power | Gross Output (MBH) | Net Ratings (Note 2) |      |                  |                  | Heating Surface (Sq. Ft.) | Furnace Volume (Cu. Ft.) | Water Contents (Gals.) | Prox. Working Weight (Lbs.) | Thermal Efficiency |      | Combustion Efficiency |      |
|------------------------|--------------------|--------------------|----------------------|------|------------------|------------------|---------------------------|--------------------------|------------------------|-----------------------------|--------------------|------|-----------------------|------|
|                        |                    |                    | Steam                |      | Burner Capacity  |                  |                           |                          |                        |                             | Oil                | Gas  | Oil                   | Gas  |
|                        |                    |                    | Sq. Ft.              | MBH  | Oil GPH (Note 3) | Gas MBH (Note 4) |                           |                          | Steam                  |                             |                    |      |                       |      |
| †28HE-S-4              | 27                 | 931                | 2908                 | 698  | 7.9              | 1143             | 81.2                      | 12.04                    | 102.8                  | 4215                        | 83.9               | 81.4 | 86.2                  | 83.6 |
| †28HE-S-5              | 35                 | 1194               | 3733                 | 896  | 10.2             | 1458             | 105.3                     | 16.14                    | 125.8                  | 5038                        | 84.4               | 81.9 | 86.2                  | 83.6 |
| †28HE-S-6              | 43                 | 1458               | 4625                 | 1110 | 12.2             | 1773             | 129.4                     | 20.24                    | 147.8                  | 5861                        | 84.8               | 82.2 | 86.1                  | 83.5 |
| †28HE-S-7              | 51                 | 1722               | 5542                 | 1330 | 14.4             | 2088             | 153.5                     | 24.34                    | 169.8                  | 6684                        | 85.0               | 82.5 | 86.1                  | 83.5 |
| †28HE-S-8              | 59                 | 1985               | 6421                 | 1541 | 16.6             | 2403             | 177.6                     | 28.44                    | 191.8                  | 7507                        | 85.2               | 82.6 | 86.1                  | 83.5 |
| †28HE-S-9              | 67                 | 2249               | 7275                 | 1746 | 18.8             | 2718             | 201.7                     | 32.54                    | 213.8                  | 8331                        | 85.3               | 82.7 | 86.1                  | 83.5 |
| †28HE-S-10             | 75                 | 2513               | 8129                 | 1951 | 21.0             | 3033             | 225.8                     | 36.64                    | 235.8                  | 9169                        | 85.4               | 82.8 | 86.1                  | 83.5 |
| †28HE-S-11             | 83                 | 2776               | 8979                 | 2155 | 23.0             | 3348             | 249.9                     | 40.74                    | 257.8                  | 9992                        | 85.5               | 82.9 | 86.0                  | 83.5 |
| †28HE-S-12             | 91                 | 3040               | 9833                 | 2360 | 25.5             | 3663             | 274.0                     | 44.84                    | 279.8                  | 10,815                      | 85.6               | 83.0 | 86.0                  | 83.5 |
| †28HE-S-13             | 98                 | 3304               | 10,688               | 2565 | 27.5             | 3978             | 289.1                     | 48.94                    | 301.8                  | 11,649                      | 85.6               | 83.0 | 86.0                  | 83.5 |
| †28HE-S-14             | 106                | 3567               | 11,538               | 2769 | 29.5             | 4293             | 322.2                     | 53.04                    | 323.8                  | 12,467                      | 85.7               | 83.1 | 86.0                  | 83.5 |
| †28HE-S-15             | 114                | 3831               | 12,392               | 2974 | 32.0             | 4608             | 346.3                     | 57.14                    | 345.8                  | 13,511                      | 85.7               | 83.1 | 86.0                  | 83.4 |
| †28HE-S-16             | 122                | 4095               | 13,246               | 3179 | 34.0             | 4923             | 370.4                     | 61.24                    | 367.8                  | 14,375                      | 85.7               | 83.2 | 86.0                  | 83.4 |
| †28HE-S-17             | 130                | 4358               | 14,100               | 3384 | 36.5             | 5238             | 394.5                     | 65.34                    | 398.8                  | 15,239                      | 85.8               | 83.2 | 86.0                  | 83.4 |
| †28HE-S-18             | 138                | 4622               | 14,954               | 3589 | 38.5             | 5553             | 418.6                     | 69.44                    | 411.8                  | 16,103                      | 85.8               | 83.2 | 86.0                  | 83.4 |

(Note 1) Important Ordering information

(†) Add Prefix for type of fuel to be burned. "LO" for light oil, "G" for Gas or "GO" for gas/oil.

Example: LO-28HE-S-6 is the model no. for a six section steam boiler firing light oil.

(Note 2) Net Ratings for steam boilers are based on piping and pick-up factor as follows:

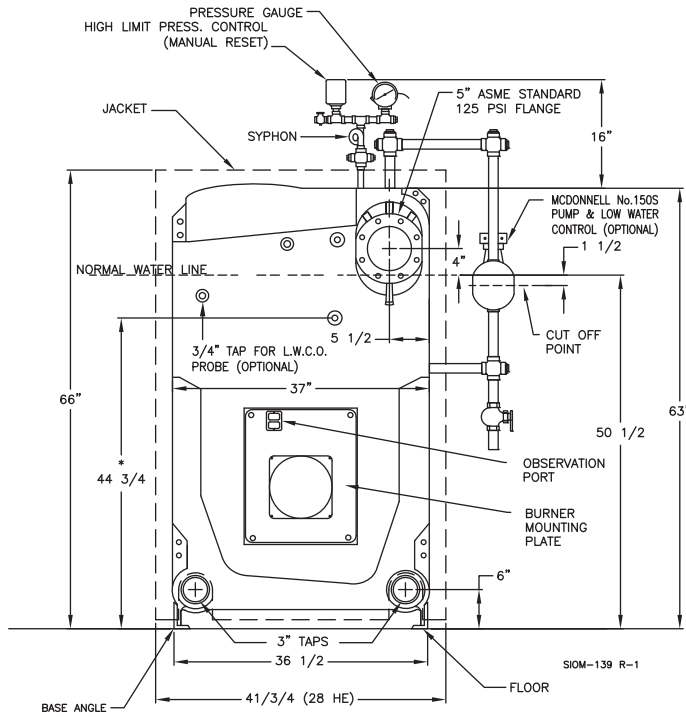
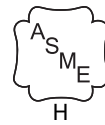
4 and 5 section = 1.333 6 section = 1.305 8 section and larger = 1.288

(Note 3) Light oil having a heat content of 140,000 BTU/Gal.

(Note 4) Gas having a heat content of 1,000 BTU/Cu. Ft., 0.60 specific gravity.

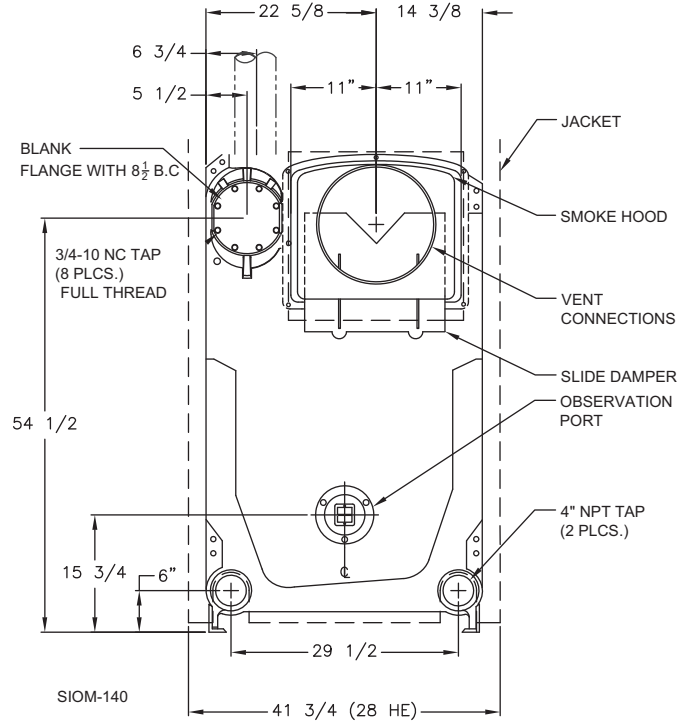


# 28HE Series

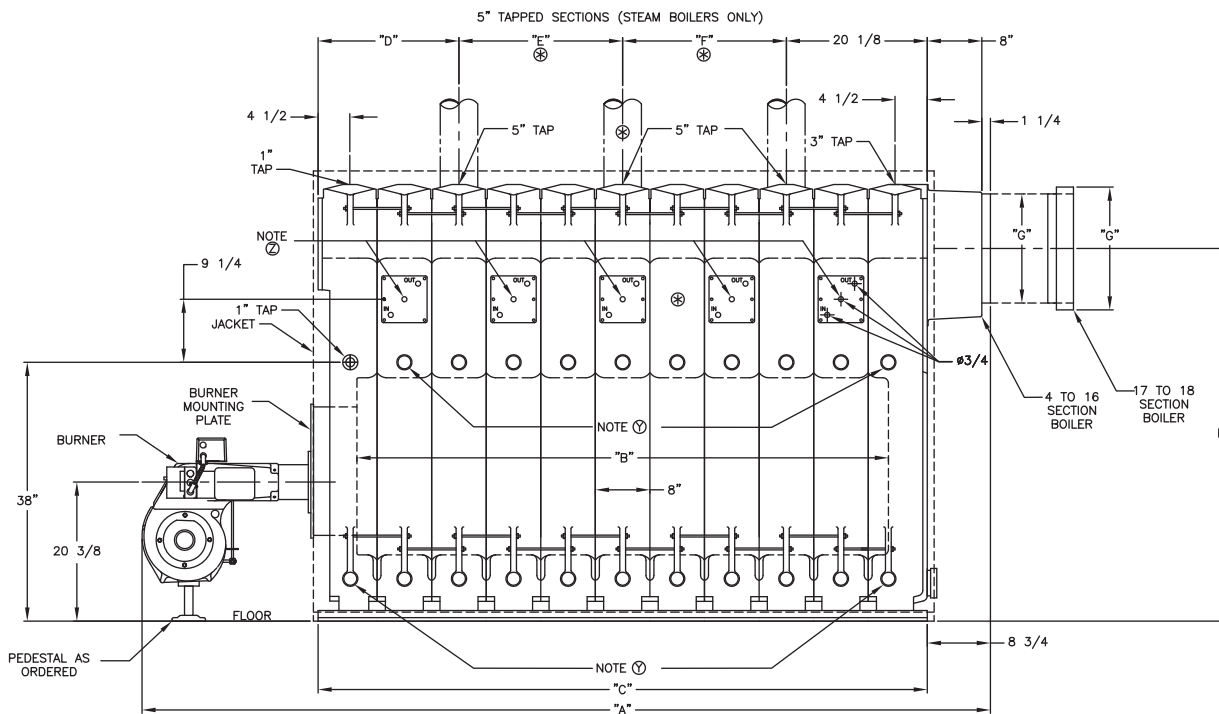


\* LOWEST PERMISSIBLE WATER LINE

FRONT VIEW (Steam Boiler)



REAR VIEW



⊗ When 5th heater is required-relocate steam uptake and dimensions "E" = 32 in. and "F" = 16 in.

SIDE VIEW

(Note Y) 1-1/2" inspection tappings when ordered.

(Note Z) Tankless heater sections when ordered. Allow 36" clear space for heater withdrawal.

# Dimensions (Inches)

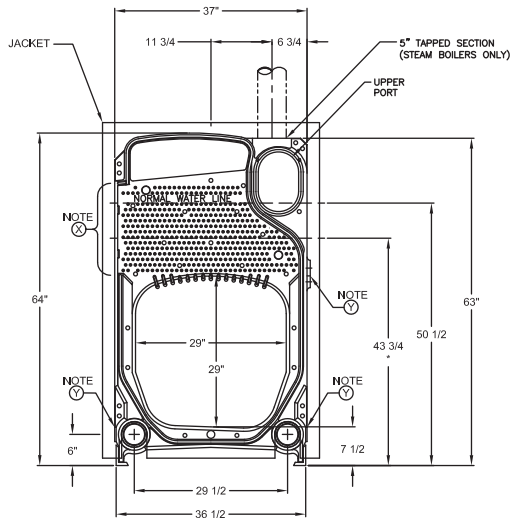
| Boiler Number<br>(Note 1) | Overall Length — "A"            |                                 |                                 | Opt. Packaged Base Dimensions   |                                 |                                 |                                 | Furnace Length<br>"B"           | Boiler Length<br>"C" | Steam Uptake Locations<br>(Note 9) |     |     | Draft Loss Ins.<br>W.C. | Firebox Press Ins.<br>W.C.†† | Dia. Vent Conn.<br>"G" | (Note 7)<br>Height Vent Conn.<br>"H" |
|---------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------|------------------------------------|-----|-----|-------------------------|------------------------------|------------------------|--------------------------------------|
|                           | (Note 8)                        |                                 |                                 | Carlin & Beckett                |                                 | Power Flame                     |                                 |                                 |                      | "D"                                | "E" | "F" |                         |                              |                        |                                      |
|                           | Carlin                          | Beckett                         | Power Flame                     | "J"                             | "K"                             | "J"                             | "K"                             |                                 |                      |                                    |     |     |                         |                              |                        |                                      |
| †28HE-Ø4                  | 62 <sup>1</sup> / <sub>4</sub>  | 64                              | 71 <sup>5</sup> / <sub>8</sub>  | 54 <sup>1</sup> / <sub>4</sub>  | 83 <sup>1</sup> / <sub>4</sub>  | 54 <sup>1</sup> / <sub>4</sub>  | 91 <sup>1</sup> / <sub>4</sub>  | 23 <sup>1</sup> / <sub>2</sub>  | 33                   | 12 <sup>1</sup> / <sub>2</sub>     | —   | —   | .40                     | .50                          | 10                     | 57 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø5                  | 70 <sup>1</sup> / <sub>4</sub>  | 72                              | 83 <sup>5</sup> / <sub>8</sub>  | 62 <sup>1</sup> / <sub>4</sub>  | 91 <sup>1</sup> / <sub>4</sub>  | 62 <sup>1</sup> / <sub>4</sub>  | 104 <sup>1</sup> / <sub>4</sub> | 31 <sup>1</sup> / <sub>2</sub>  | 41                   | 20 <sup>1</sup> / <sub>2</sub>     | —   | —   | .42                     | .52                          | 10                     | 57 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø6                  | 80 <sup>5</sup> / <sub>8</sub>  | 80 <sup>1</sup> / <sub>4</sub>  | 91 <sup>1</sup> / <sub>8</sub>  | 70 <sup>5</sup> / <sub>8</sub>  | 99 <sup>1</sup> / <sub>8</sub>  | 70 <sup>5</sup> / <sub>8</sub>  | 112 <sup>2</sup> / <sub>8</sub> | 39 <sup>1</sup> / <sub>2</sub>  | 49                   | 12 <sup>1</sup> / <sub>2</sub>     | 16  | —   | .44                     | .54                          | 10                     | 57 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø7                  | 88 <sup>5</sup> / <sub>8</sub>  | 88 <sup>5</sup> / <sub>8</sub>  | 99 <sup>1</sup> / <sub>8</sub>  | 78 <sup>5</sup> / <sub>8</sub>  | 107 <sup>1</sup> / <sub>8</sub> | 78 <sup>5</sup> / <sub>8</sub>  | 120 <sup>3</sup> / <sub>8</sub> | 47 <sup>1</sup> / <sub>2</sub>  | 57                   | 12 <sup>1</sup> / <sub>2</sub>     | 24  | —   | .46                     | .56                          | 12                     | 56 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø8                  | 96 <sup>5</sup> / <sub>8</sub>  | 96 <sup>1</sup> / <sub>4</sub>  | 107 <sup>1</sup> / <sub>8</sub> | 86 <sup>1</sup> / <sub>2</sub>  | 115 <sup>1</sup> / <sub>4</sub> | 86 <sup>1</sup> / <sub>2</sub>  | 128 <sup>1</sup> / <sub>2</sub> | 55 <sup>1</sup> / <sub>2</sub>  | 65                   | 12 <sup>1</sup> / <sub>2</sub>     | 32  | —   | .48                     | .58                          | 12                     | 56 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø9                  | 108 <sup>5</sup> / <sub>8</sub> | 104 <sup>3</sup> / <sub>4</sub> | 115 <sup>5</sup> / <sub>8</sub> | 96 <sup>1</sup> / <sub>2</sub>  | 123 <sup>1</sup> / <sub>4</sub> | 94 <sup>1</sup> / <sub>2</sub>  | 136 <sup>1</sup> / <sub>2</sub> | 63 <sup>1</sup> / <sub>2</sub>  | 73                   | 12 <sup>1</sup> / <sub>2</sub>     | 40  | —   | .52                     | .62                          | 14                     | 55 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø10                 | 116 <sup>5</sup> / <sub>8</sub> | 116 <sup>5</sup> / <sub>8</sub> | 128                             | 102 <sup>5</sup> / <sub>8</sub> | 135 <sup>1</sup> / <sub>4</sub> | 102 <sup>5</sup> / <sub>8</sub> | 144 <sup>5</sup> / <sub>8</sub> | 71 <sup>1</sup> / <sub>2</sub>  | 81                   | 20 <sup>1</sup> / <sub>2</sub>     | 40  | —   | .53                     | .63                          | 14                     | 55 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø11                 | 125 <sup>5</sup> / <sub>8</sub> | 124 <sup>3</sup> / <sub>8</sub> | 137 <sup>1</sup> / <sub>8</sub> | 110 <sup>5</sup> / <sub>8</sub> | 143 <sup>1</sup> / <sub>4</sub> | 110 <sup>5</sup> / <sub>8</sub> | 157 <sup>1</sup> / <sub>8</sub> | 79 <sup>1</sup> / <sub>2</sub>  | 89                   | 20 <sup>1</sup> / <sub>2</sub>     | 24  | 24  | .55                     | .65                          | 14                     | 55 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø12                 | 133 <sup>5</sup> / <sub>8</sub> | 132 <sup>1</sup> / <sub>2</sub> | 145 <sup>5</sup> / <sub>8</sub> | 118 <sup>3</sup> / <sub>4</sub> | 151 <sup>3</sup> / <sub>4</sub> | 118 <sup>3</sup> / <sub>4</sub> | 165 <sup>3</sup> / <sub>4</sub> | 87 <sup>1</sup> / <sub>2</sub>  | 97                   | 20 <sup>1</sup> / <sub>2</sub>     | 24  | 32  | .57                     | .67                          | 14                     | 55 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø13                 | 141 <sup>1</sup> / <sub>8</sub> | 140 <sup>1</sup> / <sub>2</sub> | 153 <sup>5</sup> / <sub>8</sub> | 126 <sup>3</sup> / <sub>4</sub> | 159 <sup>3</sup> / <sub>4</sub> | 126 <sup>3</sup> / <sub>4</sub> | 173 <sup>3</sup> / <sub>4</sub> | 95 <sup>1</sup> / <sub>2</sub>  | 105                  | 20 <sup>1</sup> / <sub>2</sub>     | 32  | 32  | .59                     | .69                          | 14                     | 55 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø14                 | —                               | —                               | 161 <sup>1</sup> / <sub>8</sub> | —                               | —                               | 134 <sup>1</sup> / <sub>8</sub> | 181 <sup>1</sup> / <sub>8</sub> | 103 <sup>1</sup> / <sub>2</sub> | 113                  | 20 <sup>1</sup> / <sub>2</sub>     | 32  | 40  | .61                     | .71                          | 16                     | 54 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø15                 | —                               | —                               | 169 <sup>5</sup> / <sub>8</sub> | —                               | —                               | 142 <sup>1</sup> / <sub>8</sub> | 189 <sup>1</sup> / <sub>8</sub> | 111 <sup>1</sup> / <sub>2</sub> | 121                  | 20 <sup>1</sup> / <sub>2</sub>     | 40  | 40  | .63                     | .73                          | 16                     | 54 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø16                 | —                               | —                               | 177 <sup>1</sup> / <sub>8</sub> | —                               | —                               | 150 <sup>5</sup> / <sub>8</sub> | 198                             | 119 <sup>1</sup> / <sub>2</sub> | 129                  | 20 <sup>1</sup> / <sub>2</sub>     | 48  | 40  | .66                     | .76                          | 16                     | 54 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø17                 | —                               | —                               | 191 <sup>1</sup> / <sub>8</sub> | —                               | —                               | 159                             | 206                             | 127 <sup>1</sup> / <sub>2</sub> | 137                  | 20 <sup>1</sup> / <sub>2</sub>     | 48  | 48  | .69                     | .79                          | 18                     | 54 <sup>5</sup> / <sub>8</sub>       |
| †28HE-Ø18                 | —                               | —                               | 199 <sup>1</sup> / <sub>8</sub> | —                               | —                               | 167 <sup>1</sup> / <sub>8</sub> | 214 <sup>1</sup> / <sub>4</sub> | 135 <sup>1</sup> / <sub>2</sub> | 145                  | 20 <sup>1</sup> / <sub>2</sub>     | 56  | 48  | .70                     | .80                          | 18                     | 54 <sup>5</sup> / <sub>8</sub>       |

(Note 7) When unit is assembled or packaged, add 6" to heights for 4-14 sect., 8" to heights for 15-18 sect.

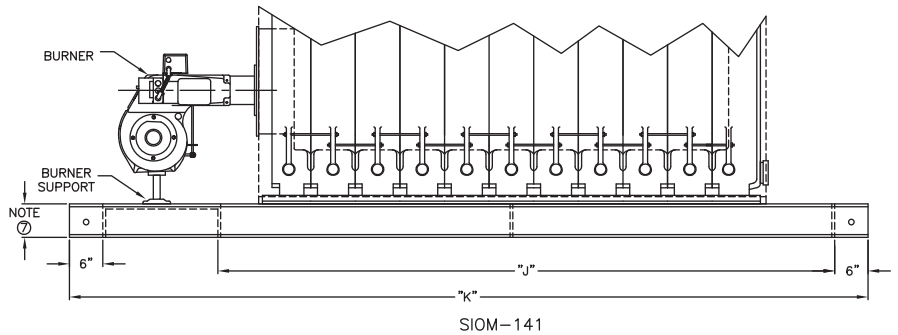
(Note 8) Add 2-3/4" to sect. 17 & 18 for smoke hood adaptor.

(††) Based on 0.10 ins. W.C. pressure at boiler outlet. If vent sizing results in a back pressure greater than 0.10 ins. W.C., consult Smith

(Note 9) These measurements are approximate. The Smith representative should be consulted before selecting boilers for installation having unusual piping and pick-up requirements, such as intermittent system operation, extensive piping systems, etc. The boiler ratings have been determined under previous governing forced draft units.



INTERMEDIATE VIEW

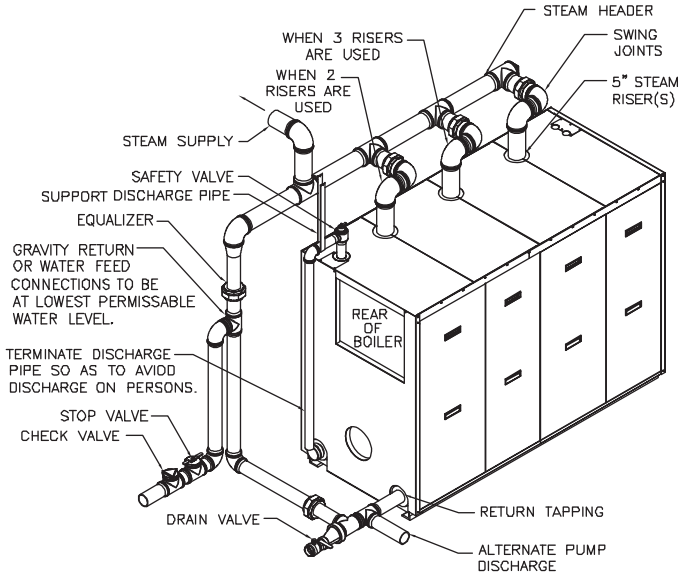


ASSEMBLY – SIDE VIEW

(Note X) Flue cleanout opening. Allow 36" clear work space for using flue brush, and for the removal of the heat transfer rods.

(Note Y) 1-1/2" inspection tappings when ordered.

## Recommended Steam Piping Diagram



| Boiler Section    | No. of    |        |           |
|-------------------|-----------|--------|-----------|
|                   | 5" Risers | Header | Equalizer |
| 28HE-S-4 & 5      | 1         | 5"     | 2-1/2"    |
| 28HE-S-6 & 7      | 2         | 5"     | 2-1/2"    |
| 28HE-S-8 thru 10  | 2         | 6"     | 4"        |
| 28HE-S-11 thru 18 | 3         | 8"     | 4"        |

## Burner Specifications

| Boiler Number | Burners - Light Oil |       |                  |      | Burners - Gas        |       | Burners - Gas/Oil    |       |           |       |
|---------------|---------------------|-------|------------------|------|----------------------|-------|----------------------|-------|-----------|-------|
|               | Carlin (Note 5)     |       | Beckett (Note 5) |      | Power Flame (Note 6) |       | Power Flame (Note 6) |       |           |       |
|               | Model No.           | H.P.  | Model No.        | H.P. | Model No.            | H.P.  | Model No.            | H.P.  |           |       |
| †28HE-Δ-4     | 702CRD              | 1/2   | CF1400           | 1/2  | C1-0                 | 1/2   | J50A-15              | 1/3   | C1-G0-12  | 1/2   |
| †28HE-Δ-5     | 702CRD              | 1/2   | CF2300A          | 3/4  | C1-0                 | 1/2   | J50A-15              | 1/2   | C1-G0-12  | 1/2   |
| †28HE-Δ-6     | 801CRD              | 3/4   | CF2300A          | 3/4  | C2-0A                | 1     | J50A-15              | 1/2   | C2-G0-15  | 1     |
| †28HE-Δ-7     | 801CRD              | 3/4   | CF2300A          | 3/4  | C2-0A                | 1     | J50A-15              | 1/2   | C2-G0-15  | 1     |
| †28HE-Δ-8     | 801CRD              | 3/4   | CF2500A          | 3/4  | C2-0B                | 1     | C2-G-20A             | 3/4   | C2-G0-20A | 1     |
| †28HE-Δ-9     | 1050FFD             | 1     | CF2500A          | 3/4  | C2-0B                | 1 1/2 | C2-G-20B             | 1     | C2-G0-20B | 1 1/2 |
| †28HE-Δ-10    | 1050FFD             | 1     | CF2500           | 2    | C2-0B                | 1 1/2 | C2-G-20B             | 1     | C2-G0-20B | 1 1/2 |
| †28HE-Δ-11    | 1150FFD             | 1 1/2 | CF3500           | 2    | C3-0                 | 2     | C3-G-20              | 1 1/2 | C3-G0-20  | 2     |
| †28HE-Δ-12    | 1150FFD             | 1 1/2 | CF3500           | 2    | C3-0                 | 2     | C3-G-25              | 1 1/2 | C3-G0-25  | 2     |
| †28HE-Δ-13    | 1150FFD             | 1 1/2 | CF3500           | 2    | C3-0                 | 2     | C3-G-25              | 1 1/2 | C3-G0-25  | 2     |
| †28HE-Δ-14    | —                   | —     | —                | —    | C3-0                 | 2     | C3-G-25              | 1 1/2 | C3-G0-25  | 2     |
| †28HE-Δ-15    | —                   | —     | —                | —    | C3-0B                | 3     | C3-G-25B             | 3     | C3-G0-25B | 3     |
| †28HE-Δ-16    | —                   | —     | —                | —    | C3-0B                | 3     | C3-G-25B             | 3     | C3-G0-25B | 3     |
| †28HE-Δ-17    | —                   | —     | —                | —    | C4-0A                | 3     | C4-G-25              | 3     | C4-G0-25  | 3     |
| †28HE-Δ-18    | —                   | —     | —                | —    | C4-0A                | 5     | C4-G-25              | 3     | C4-G0-25  | 5     |

(Note 5) Burner operation: Low-High-Low (4-13 sect.).

(Note 6) Burner operation: Low-High-Low, (4-9 sect.); Modulation (10-18 sect.).