

# EXCESS AIR OIL BURNER

# SAIFEE

## 5172 SERIES

## COMBUSTION EQUIPMENT

**SAIFEE SERIES 5172 OIL BURNERS** are sealed-in, nozzle mix burners for distillate oil (100 SSU viscosity maximum) that are stable with excess air or up to 50% excess fuel (provided additional air for complete combustion is in the furnace near the burner).

**TEMPERATURE UNIFORMITY** Excess air can improve temperature uniformity by avoiding hot spots in front of burners, by churning furnace atmosphere to reduce stratification, and by creating positive furnace pressure to eliminate cold air infiltration.

**FURNACE VERSATILITY** Excess air can give very high effective burner turndown. Thus a furnace used for high temperature work (such as heat treating at 1050°C) with the burners firing on stoichiometric oil/air ratio, can also be used for low temperature jobs (e.g., drawing or drying at 300°C) with the burners firing on lean ratio.

**OPERATION** Burners can be lit at rich, lean, or correct oil/air ratio, then immediately turned to high fire. Required oil pressure at the burner is nearly zero, but a pressure drop of about 10 psi should be taken across the Sensitrol™ Valve. If furnace temperatures after shutdown exceed 1050°C, pass some air through the burner to prevent overheating.

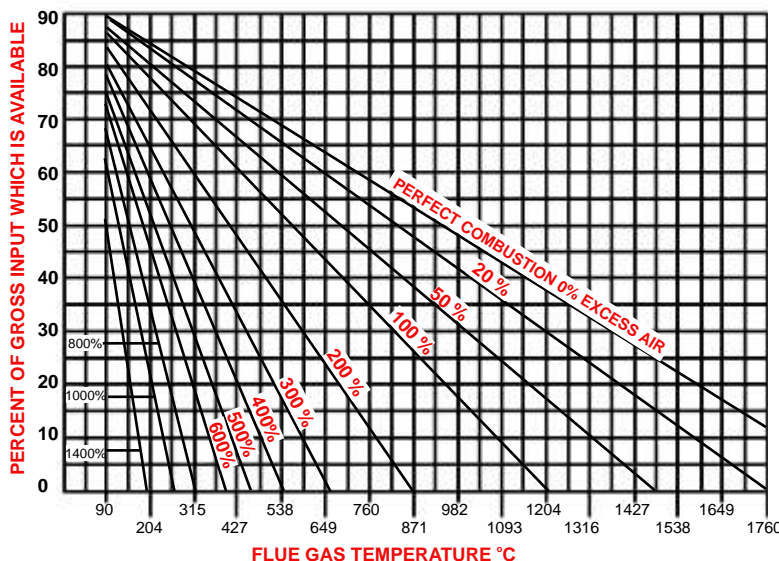
**FLAME SAFETY** An ultraviolet cell can be mounted in place of observation port to monitor pilot, then main flame. For maximum safety, We recommend interrupted pilot when flame safeguards are used - pilot should be on only for a preset ignition period (usually 15 seconds), after which flame supervision detects main fire only.



**CONSTRUCTION FEATURES** Fabricated mounting plates are standard on -2 through -6 burners. Cast mounting plates are standard on -7A and -7B and are available at extra cost on smaller sizes, designated 5172F. Standard tiles are 9" long, but 5" tiles are available for -2 through -6 sizes. Extension tiles are not required but can be used in a thick wall. Warning: for convenience, the mounting plate and tile can be separated from the burner body during furnace construction but tile must be set in the wall with notches for pilot and flame rod properly positioned relative to desired air pipe direction. Quick-disconnect oil atomizers can be withdrawn easily. Air and gas inlets can be rotated in 90° intervals, but air and gas pipes should be brought in from top or side to prevent oil dripping into them.

An observation port is furnished unless a flame safety device is ordered which mounts in place of the port. A lighter hole cover is supplied if a pilot is not ordered. positions of the pilot and safety device are inter changeable except on the 5172-7A and -7B.

**JACKETED TILES:** Series 5172L Burners have a carbon steel support jacket around the tile for furnace walls with no refractory around the tiles where temperatures surrounding the jacket do not exceed 430°C. Special alloy jackets are available for higher temperatures.



PERCENT AVAILABLE HEAT WITH VARIOUS FLUE GAS TEMPERATURES AND VARIOUS AMOUNTS OF EXCESS AIR. This chart is only applicable to cases in which there is no unburned fuel in the products of combustion. The average temperature of the hot mixture just beyond the end of the flame may be read at the point where the appropriate % excess air curve intersects the zero available heat line.

**TABLE 1: COMBUSTION AND ATOMIZING AIR CAPACITIES in cfh. (For Btu/hr, multiply by 100)  
For total capacity, add combustion air and atomizing air.**

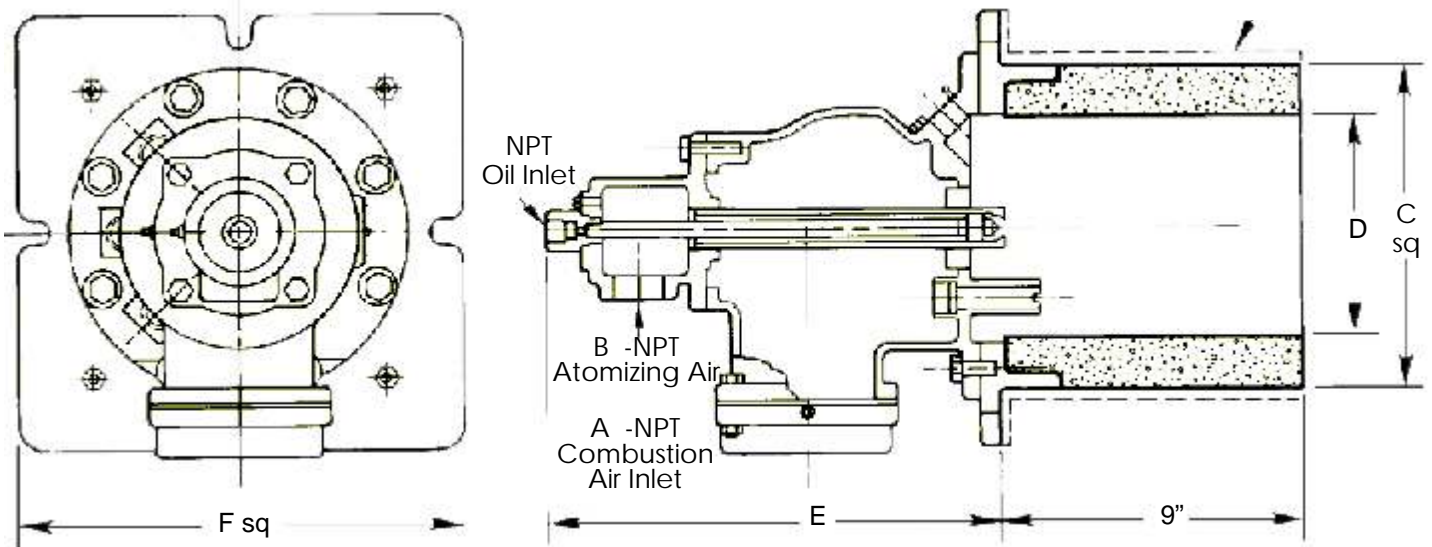
BURNER MODEL	COMBUSTION AIR PRESSURE AT BURNER IN OSI							ATOMIZING AIR PRESSURE AT BURNER IN OSI					
	0.1	1	5	6	8	12	16	14	16	18	20	22	24
5172-2	160	520	1,160	1,270	1,470	1,800	2,100	500	520	560	600	620	650
5172-3	280	890	1,980	2,160	2,500	3,050	3,550	500	520	560	600	620	650
5172-4	460	1,450	3,240	3,540	4,100	5,000	5,800	500	520	560	600	620	650
5172-5	750	2,370	5,300	5,800	6,700	8,150	9,450	800	850	910	950	1000	1050
5172-6	1,180	3,700	8,300	9,100	10,500	12,900	14,800	800	850	910	950	1000	1050
5172-7A	2,070	6,550	14,600	16,000	18,500	22,700	26,200	870	930	990	1040	1100	1150
5172-7B	2,580	8,150	18,200	19,900	23,000	28,200	32,600	870	930	990	1040	1100	1150

- Atomizing air rates for 5172-7A and 7B are with no oil flow through the burner. At constant pressure, atomizing air flow decreases up to 40% with increasing oil flow.

**TABLE 2: MAXIMUM EXCESS AIR RATES IN %**

COMBUSTION AIR PRESSURE AT BURNER	5172-2	5172-3	5172-4	5172-5	5172-6	5172-7A	5172-7B
1 osi	-	200	500	50	150	150	150
8 osi	400	500	800	200	400	300	700
14 osi	500	650	900	300	550	450	800

Above excess air rates apply when pilot is not lighted with 14-22 osi atomizing air at the burner.



BURNER MODEL	A	B	C	D	E	F	APPROX. FLAME LENGTHS WITH 16 OSI MAIN AIR (IN OPEN FURNACE)	SENSITROL OIL VALVE	WT IN KG
5172-2	1 1/4	3/4	8 1/2	5	10 11/16	12	2	1813-02A	28
5172-3	1 1/2	3/4	8 1/2	5	10 11/16	12	2	1813-02A	28
5172-4	2	3/4	8 1/2	5	10 11/16	12	2 1/2'	1813-02A	28
5172-5	2 1/2	1	8 1/2	5	10 11/16	12	2 1/2'	1813-02A	28
5172-6	3	1	8 1/2	5	10 11/16	12	4	1813-02B	28
5172-7A	4	1 1/4	10	7	12 5/8	13 1/2	6	1813-02C	55
5172-7B	4	1 1/4	10	7	12 5/8	13 1/2	6	1813-02C	55
5172-8A	6	2	10	7	12 5/8	13 1/2	6	1813-02D	57

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