

EXCESS AIR GAS BURNER



WESMAN COMBUSTION EQUIPMENT

SERIES 4422

EXCESS AIR GAS BURNERS are widely used on heat treatment and non-ferrous melting furnaces: kilns, ovens, air heaters, dryers, chemical process equipment, and other applications where superior temperature uniformity is required. For higher temperatures, use Wesman 4425 burners.

These sealed-in, nozzle-mix burners are stable on stoichiometric ratio, with large amounts of excess air, or with up to 50% excess fuel (provided that additional air for combustion is in the furnace near the burner).

OPERATION

Burners can be lighted at rich, lean, or correct air/fuel ratio, then immediately turned to high fire. Required gas pressures are low 1 psi at burner for coke oven gas, less for natural gas.

The most common ratio control system for 4422 burners uses a cross-connected regulator. When appropriate for the application, fully metered flow systems and fuel-only control (see "Excess Air") are very satisfactory. After burner shutdown, if furnace temperatures rise above 1000°C, pass air through the burner to prevent overheating.

CONSTRUCTION FEATURES

Air and gas inlets can be rotated in 90° intervals. Mounting plates are cast iron. Tiles are 9" long.

For furnace walls thicker than tile length, the tunnel beyond the end of the tile should be flared at least 30° included angle, starting at the tile OD. Extension tiles are not recommended.

Mounting plate and tile assembly can be separated from the burner body for installation convenience, but assembly must be set in the wall with pilot and flame detector notches in proper location relative to intended burner body position.

JACKETED TILES

4422 burners are available with support jackets around the tile for applications where the tile is not supported by furnace refractory. Jackets are available in three different metals and have maximum temperature ratings for each. They must be protected with sufficient insulation so as not to exceed rated temperature.

Designation	Jacket Metal	Max. Temperature
4422-LC	carbon steel	350°C
4422-L4	304 stainless	750°C
4422-L9	304 stainless	1000°C



LIGHTING AND FLAME SUPERVISION A 4011 Pilot Set normally is used to light 4422 burners. Direct spark ignition of the burner is also available. A manual torch can be used in some applications.

A flame rod (5" long from outer mounting surface) or ultraviolet (UV) flame detector can be installed in one of three holes in the mounting plate.

When using flame supervision, an interrupted pilot is required do not use constant or intermittent pilots. If using direct spark ignition, turn off spark after burner is lit.

UV scanners allow lighting with up to 14 psi main air. However if flame rods are used, 4422-2 through -6 burners must be lit at 1 psi or less main air.

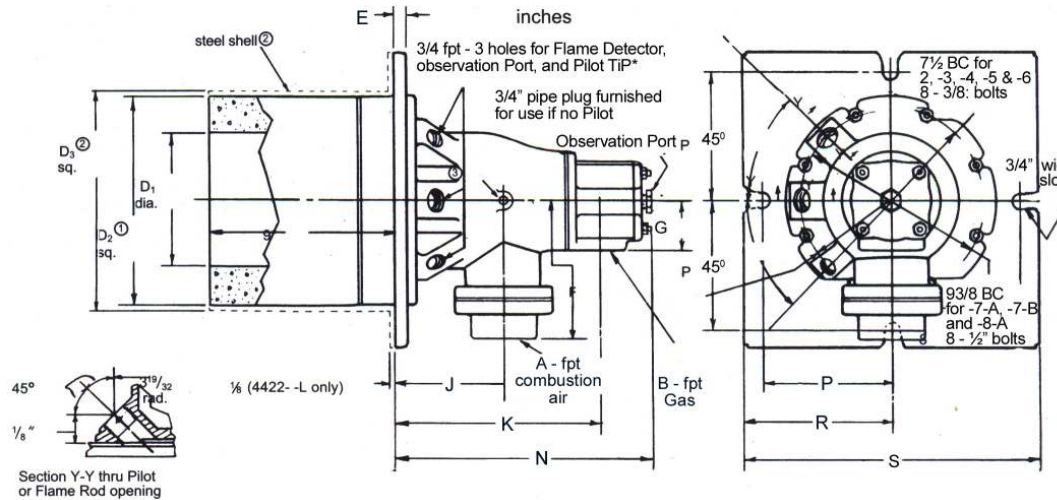
EXCESS AIR

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.

Excess air can give very high burner turndown. Thus a furnace used for high temperature work (such as heat treating at 1000°C) with burners firing on stoichiometric air/fuel ratio can also be used for low temperature jobs (such as drawing or drying at 300°C) with burners firing on lean air / fuel ratio.

BURNER MODEL	COMBUSTION AIR CAPACITIES, scfh (for Btu/hour, multiply by 100) air pressure at burner in osi						MAX % EXCESS AIR air pressure at burner in osi				approx flame length with 16 osi main air (in open furnace)
	0.2	1.0	4.0	8.0	12.0	16.0	1	4	8	16	
4422-2	200	420	910	1270	1500	1920	850	1750	860	1250	1½'
4422-3	360	810	1800	2450	3100	3600	1500	2000	1780	1675	2'
4422-4	560	1320	2600	3820	4500	5500	1400	1500	1100	1500	2½'
4422-5	750	2050	4350	6300	7650	9050	620	570	490	460	3'
4422-6	1600	3100	7200	10300	12700	14750	730	1080	730	410	4'
4422-7A	3100	7250	14000	20200	23100	27000	2000	4000	1000	450	5'
4422-7B	3650	8150	16600	23550	28000	32500	2700	1200	875	500	6'
4422-8A	4800	11000	22600	31500	37700	43500	2000	2460	2210	1350	7'

DIMENSIONS



Note: For 442-8A, the air and gas connections cannot be piped in the same plane, as shown on other side, because the "flowerpot" type air connection flange would interfere with the 2½" gas line.

Burner Model	A	B	D ₁	D ₂	D ₃	E	F	G	J	K	N	P	R	S	WEIGHT KG
4422-2	1¼	1	5	8½	9½	½	5¼	2	4¾	8¾	10 5/8	5¼	6	12	35
4422-3	1½	1	5	8½	9½	½	5¼	2	4¾	8¾	10 5/8	5¼	6	12	35
4422-4	2	1¼	5	8½	9½	½	5¼	2	4¾	8¾	10 5/8	5¼	6	12	35
4422-5	2½	1½	5	8½	9½	½	5¼	2	4¾	8¾	10 5/8	5¼	6	12	35
4422-6	3	1½	5	8½	9½	½	5 9/16	2	4¾	8¾	10 5/8	5¼	6	12	35
4422-7A	4	2½	7	10	11	9/16	6 15/16	2 5/8	5 7/8	11	14 1/16	6 1/8	6¾	13 ½	60
4422-7B	4	2½	7	10	11	9/16	6 15/16	2 5/8	5 7/8	11	14 1/16	6 1/8	6¾	13 ½	60
4422-8A	4	2½	7	10	11	9/16	10 11/16	2 5/8	5 7/8	11	14 1/16	6 1/8	6¾	13 ½	60

- 1) Opening in furnace shell should be about ½" larger than dimension D2 to allow for fillets and draft on mounting plate.
- 2) For 4422- -LC and -L9 burner only. Opening in oven shell should be about 1/4" larger than dimension D3.
- 3) 1/4" air pressure tap on -2, -3, -4, -5, and -6.
- 4) "Flower pot" type flange for -8A. Note larger F dimension.
- 5) Pilot, Flame Detector, and Observation Port positions are interchangeable as long as pilot and Flame Detector are in adjacent holes.

FIBRE LINED FURNACES

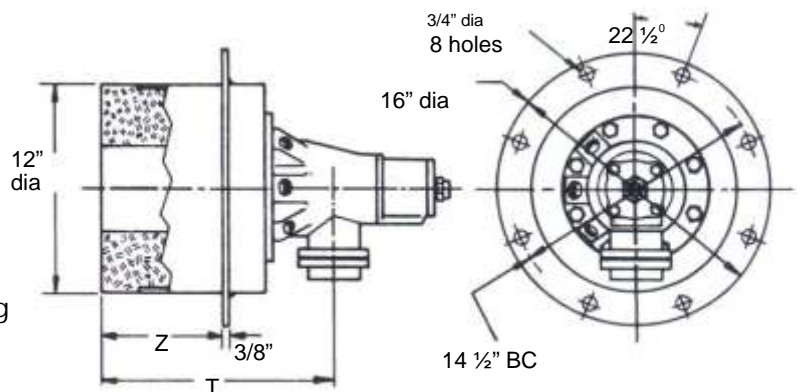
Special construction is available for furnaces with ceramic fiber insulation:

12" diameter tiles, Jacketed in RA330 expanded metal (for all but 2" of their length);

a circular mounting flange, factory-installed 2" to 9 ("Z" dimension) from hot face of tile.

Customer specifies "Z" dimension to nearest 0.5" so tile face is flush with inside furnace wall. The expanded metal jacket should be insulated to prevent temperatures over 1000°C from reaching the jacket.

T = 13 3/8 for 4422-2 to -6, and 14 7/8 for -7A to -8A



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