RAY ENTERPRISES

These rugged nozzle-mix burners have been used for many years on high temperature furnaces such as those for forging street, melting aluminium or brass, and reheating steel bars or ingots...and on low temperature ovens and air heaters.

Their sealed-in construction allows maximum efficiency through close control of air/gas ratio, furnace atmosphere, an furnace pressure...all contributing to better product quality. 414 FIRE-ALL Burners, as the name suggests, are appropriate for a wide variety of industrial heating applications. Nominal capacities range from 1 500 000 to 21 000 000 Btu/hr (see Table 1 below).

TIELS/INSTALLATION

Burner tiles are refractory rated for 2800 F furnace temperature.

They are replaceable in the field, except for the 414-10 whose mounting must be returned to factory for tile replacement (for
purchases a spare mounting plate with a tile cast onto it).

Burner tiles should be supported securely in the furnace wail by a
layer of castable refractory (not installation) at least 9" thick all round
the tile, extending back to the furnace shell and securely anchored to
it. (See supplement DF-M1).

For furnace walls thicker than the length of the tile, the tunnel beyond
the end of the tile should be flared 30-45* from the centerline, starting
at the OD of the tile. If this is physically impractical, consult CONTINENTAL THERMAL for specific recommendations.

Jacketed Tiles.414 Burners are available with support jackets around the title for applications where the tiles is not supported by furnace
refractory. Jackets are available in three different metals and have maximum
temperature ratings to each. They must be protected with sufficient
insulation so as not to exceed rated temperature. Maximum temperature rating for jacket metals depends upon frequency of heat-up/cool-down cycles. As an example, batch annealing furnaces
that are heated and cooled every day should use the "internet exposure"
ratings. Continuous annealing furnaces that remain at the same
temperature for months at a time, can use the higher "continuous"
rating.

Designation	Jacket Metal	Continuous max. temp.	Intermittent exposure
414- -LC	carbon steel	700 F	700 F
414- -L4	304 stainless	1600 F	1500 F
414- -L9	309 stainless	1900 F	1800 F

FLAME SUPERVISION

Flame safeguards are recommended for all installations. An ultraviolet cell will monitor pilot or main flame. Pilots must be interrupted after a preset ignition period (usually 15 seconds) so flame detectors monitor main flame only. Adapters for mounting flame detection devices on 4 14 Burners are tabulated on Bulletin 8832.

OPERATION

Control: Normally, air primary with a cross-connected, pressure
balance regulator. For maximum turndown, use a 7216 (biased) Regulator, or throttle gas only.

To protect burner from heat damage, do not set air pressure below 1 osi in a 1900 furnace or below 2 osi at 200 F (whether gas is on or off) Gas pressure requirement: About 1 osi at the burner for natural gas
on stoichoimetric ration; about 1/5 of the air pressure for coke oven
gas. Lighting: See reverse side for recommended premix pilot tips.

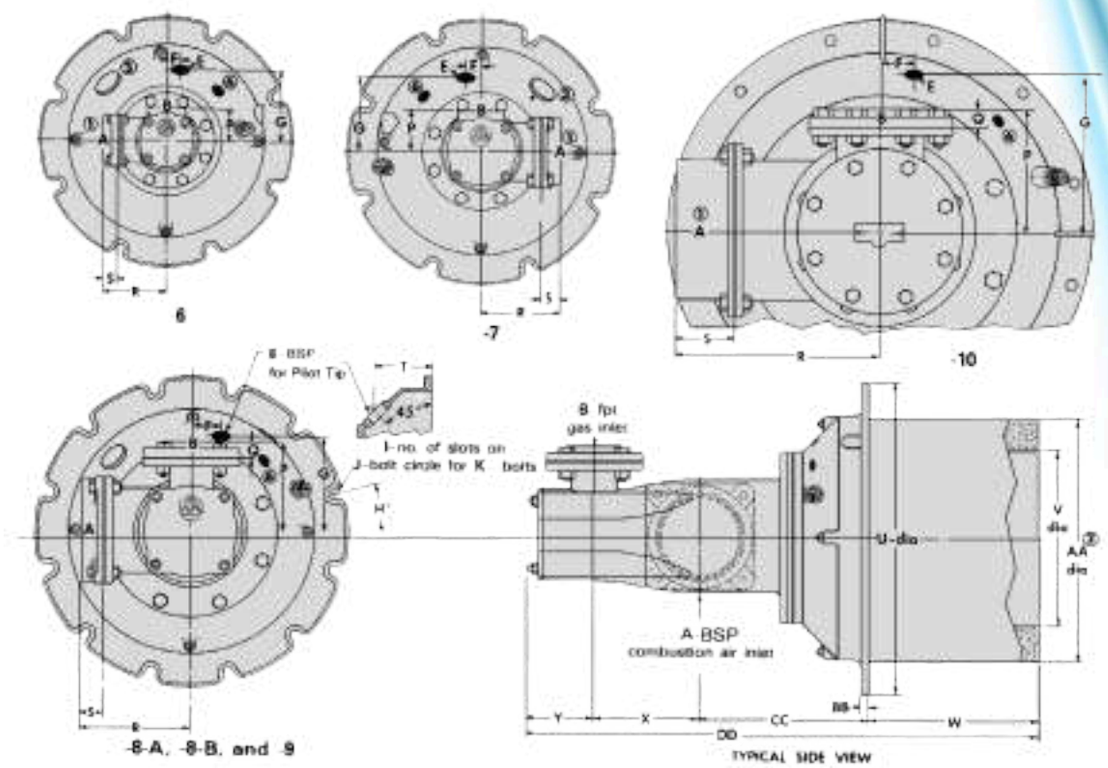
Preheated air: 414 Burners are suitable for some applications with air preheated to 700 F: consult CONTINENTAL THERMAL relimitations. DUAL FUEL 614 FIRE-ALL Burners are available for oil standby or combination
gas and oil firing. See Bulletin 614. 414 Gas Burners can be converted to 614 Dual-Feul Burners with an approximate conversion
kit. (see Parts List 414-2).

Table 1. COMBINATION AIR CAPACITIES

(for Btu/hr. multiply by 100)

Burner designation	air pressure drop across the burner in osi							approximate flame length stoichiometric ratio	available excess air ratio setting
	0.1	1	5	6	8	12	16	16 osi	
414-6	1180	3710	8300	9100	10500	12900	1490-0	4½ '	300%
414-7	1930	6100	13600	15000	17200	21000	24400	5'	650%
414-8-A	3350	10600	23700	26000	30000	36700	42400	8'	450%
414-8-B	5550	17600	39200	43000	49600	60500	70000	9'	250%
414-9	11600	36600	82000	89500	104000	127000	146000	16'	700%
4 14-10	17300	54500	122000	135000	154000	189000	218000	19'	350%

DIMENSIONS – Main air and gas connections can be rotated relative to one another and to the mounting plate. Drawings show connections as assembled at the factory. Arrangements shown reduce maintenance by minimizing dirt accumulation in pilots and flame supervisory devices. Pilot and main air connections cannot be aligned in the same direction.



DIMENSIONS SHOWN ARE SUBJECT TO CHANGE. PLEASE OBTAIN CERTIFIED PRINTS FROM CONTINENTAL THERMAL IF SPACE LIMITATIONS OR OTHER CONSIDERATIONS MAKE EXACT DIMENSION(S) CRITICAL.

Burner designation	common dimensions in inches for 414 and 414 - L															
	A	B	E	F	G	H°	I	J	K	P	Q	R	R_1	S	T	U
414-6	3	2	3/4	1	5 17/32	22 1/2	8	18	5/8	2 1/2	–	5 3/16	10 3/8	1 1/2	3 5/16	19 1/2
414-7	4	2 1/2	1 1/4	1 1/4	5 3/4	22 1/2	8	19	5/8	3 1/4	–	6 1/16	10 1/8	1 1/2	3 15/16	20 1/2
414-8-A	6	2 1/2	1 1/4	1 1/2	6 7/8	15	12	21 1/4	5/8	3 7/8	–	7 5/16	11 1/4	1 3/4	4 5/16	22 3/4
414-8-B	6	3	1 1/4	2 1/4	7 3/8	15	12	22 1/2	5/8	6 3/4	1 3/16	8 7/16	12 3/8	1 3/4	4 5/16	24
414-9	8	4	1 1/2	2 1/4	9 7/8	15	12	26 1/2	5/8	8 3/4	1 5/16	13 3/8	–	3 13/16	6 3/16	28
414-10	10	6	1 1/2	2 1/2	12 3/16	15	12	30 1/2	3/4	9 5/8	1 9/16	15 7/16	–	4 3/8	5 15/16	32 1/2

Burner designation	for both series					for 414 only			wt	for 414 - L only				wt	Pilot Tip
	V	W	X	Y	AA	BB	CC	DD	lb	AA	BB	CC	DD	lb	
414-6	10 3/8	9	3 15/16	2 11/16	15	5/8	8 5/16	23 15/16	160	16	3/4	8 7/16	24 1/16	185	4021-12
414-7	11 3/8	9	4 11/16	2 13/16	16	5/8	9 1/4	25 3/4	210	17	3/4	9 3/8	25 7/8	240	4025-0-T
414-8-A	12 3/8	10	6 5/16	3 3/8	17 3/4	5/8	12 7/8	32 9/16	300	18 3/4	3/4	13	32 11/16	335	4025-0-T
414-8-B	13 1/2	13	8 3/16	4 7/8	19	5/8	12 7/8	38 15/16	405	20	3/4	13	39 1/16	450	4025-0-T
414-9	16	13 1/2	11 5/16	5 3/4	23	5/8	14 11/16	45 1/4	700	24 1/4	13/16	14 7/8	45 7/16	750	4025-2-T
414-10	20 1/2	13 7/16	13 1/16	6 3/8	27 1/2	1/2	16 1/8	49	980	27 1/2	11/16	16 5/16	49 3/16	1010	4025-2-T

1 Flanged connection - - NA square threaded flange for sizes -6, -7, 08, but SW style inlet may be specified. SW inlet (suitable for slip-on or welded connection) is standard for -9 and -10 burners.
2 Opening in furnace shell or outer wall must be ½" larger than dimension "AA" to allow for mounting plate fillet and draft.
3 Blank boss (for optional uses with oil and dual-fuel models).
4 Applies when optional SW inlet is specified.
5 Flanged connection - - ANSI 125 psi threaded flange.
6 1" BSP for electrode or UV flame detector.
7 414-10 only is offered with a short (2") tile designated 414-10-S.

ANSI or SW flanges: Flat face companion flanges and full gaskets are supplied with this equipment. Do not use raised face flanges that may damage mating flange.

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