



42 Burners are widely used on heat treat and nonferrous melting furnaces, kilns, ovens, air heaters, dryers, chemical process equipment, and other applications where superior temperature uniformity is required.



These sealed-in, nozzle-mix burners are stable over a wide range of oil/gas rations from large amounts of excess air, to stoichiometric (chemically correct air/gas ratio), up to 50% excess fuel (provided additional air for combustion is supplied to the furnace near the burners). Burners can be ignited at rich, lean or correct air/gas ratio, then immediately turned to high fire. NOx emissions are low for all air/gas ratios.

The most common ratio control system for 42 Burners uses a cross-connected regulator. When appropriate for the application, fully metered flow systems and fuel only control are very satisfactory. Required gas pressures are low: 1 psi at burner for coke oven gas, less or natural gas (approximately 0.3 psi).

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 temperature work (such as heat treating at 1900 F) with burners firing on stoichiometric air/gas ratio can also be used for low temperature jobs (such as drawing or drying at 600 F) with burners firing on lean (excess air) air/gas ratio.

There is a potential increase in fuel consumption because of heating extra air. The benefits, such as better products from improved heating, far outweigh the small increase in fuel costs. Consult your Contitherm field engineer for an analysis of your application.

The 42 burners can be used with chamber temperatures up to 2000 F. If furnace temperature could rise above 1900 F after shutdown, some air should be maintained through the burner to prevent overheating. For higher temperature service (>2000 F), see Bulletin 425.

Burner bodies are heat resistant cast iron with Inconel air tubes. Mounting plate and tile assembly can be separated from the burner body for installation convenience. Air and gas connection orientation can be rotated in 90° intervals. When reassembling the burner, the pilot and flame detector notches in the tile and mounting must be in proper alignment with the pilot and the flame detector connections on the burner body (applies to 42-2 through 42-6 sizes). Burner is complete with cast iron mounting plate and 9" long 3200 F castable burner tile which must be supported and sealed in a hard refractory furnace wall. (See page 2 for optional construction suitable for fiber lined furnaces). When the furnace wall is thicker than the tile length, the tunnel beyond the end of the burner tile should be flared at a 30° or greater included angle, starting at the OD of the tile. Extension tiles are not recommended.

Burner designation	Combustion Air Capacities, scfh (for Btu/hr, multiply by 100)						Approx. flame length with 16 psi main air (in open furnace)	Maximum percent excess air* (at 16 psi & direct spark)
	0.2	1.0	4.0	8.0	12.0	16.0		
42-2	200	420	910	1270	1500	1920	1½ feet	300
42-3	360	810	1800	2450	3100	3600	2	450
42-4	560	1320	2600	3820	4500	5500	2½	450
42-5	750	2050	4350	6300	7650	9050	3	500
42-6	1600	3100	7200	10300	12700	14750	4	500
42-6-B	1900	3400	8100	12100	15000	17300	5	600
42-7-A	3100	7250	14000	20200	23100	27000	5	2000
42-7-B	3650	8150	16600	23550	28000	32500	6	2000
42-8-A	4800	11000	22600	31500	37700	43500	7	2000

\*Excess air pressure drop across the burner in psi

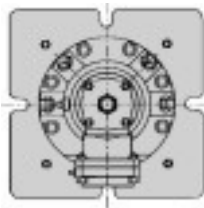
Burner, connections are provided for mounting pilot or direct spark igniter, and flame detector. Burners are shipped with pipe plugs in the openings. Burners flame may be seen through the rear observation port. (Observation port is not to be used for mounting to flame detector.) Burner air pressure can be measured at the tap location provided. For additional construction information refer to Dimensions & Parts List 42-2.

A 411 Pilot Set is normally used to light 42 Burners. A manual torch can be used in some applications. The burner can be direct spark ignited with either the 455 Direct Spark Igniter (455-D for 42-2 through 6 and 455-B for 42-7 and -8 sizes) or the 451-D Air Assisted Igniter. The 451 Air Assisted Igniter is recommended because it ignites the burners over a wider operating range. If using direct spark ignition of main flame, use standard 6000 volt transformer. Half-wave ignition transformers can be used only with the 455.

A flame rod or ultraviolet (UV) detector can be installed in one of three holes in the body, using an adapter listed in Bulletin 832. UV scanners allow igniting with up to 14 psi main air. If flame rods are used, 42-2 through -6 Burners must be ignited at 1 psi or more main air. Do not apply flame rods to -7 and -8 size burners. When using flame supervision, an interrupted pilot is required--do not use constant or intermittent pilots.

Startup and Adjustment: Refer to Bulletin GB-M1 for startup and adjustment of a nozzle-mix burner with ratio regulator air/fuel ratio control.

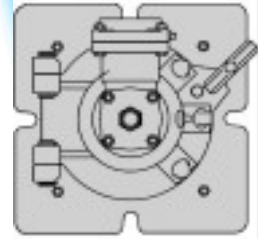
The 42 is offered in any physical arrangements to accommodate installation and operating requirements.



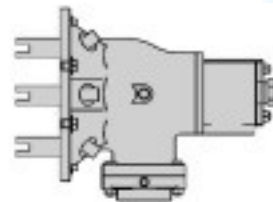
This special burner body has two sets of connections for mounting pilot or spark igniter and flame detector. This permits a variety of piping arrangements or redundant pilots and flame detectors. It is available only in -2 through -6-B burner sizes and is otherwise identical to a standard burner. For dimension information refer to Dimensions & Parts List 42-5.

There is a hinge between the cast mounting plate and burner body. The hinge provides easy access to the burner tunnel for cleaning deposits that may result from the process (incineration is an example). During operation, a latch firmly holds the burner body against the mounting plate. The burner is available with the hinge on either the right or the left side. Pilot and flame detector connections are located opposite the hinge.

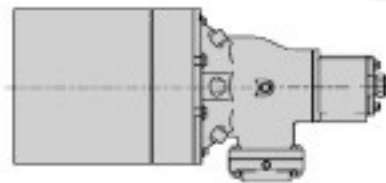
**To specify hinge location** When looking at the rear of the burner with the air pipe entering from above (12 O' clock position) "HL" specifies the hinge on the left side (shown in drawing) while "HR" specifies the hinge on the right side. For dimension information refer to Dimensions & Parts List 42-6.



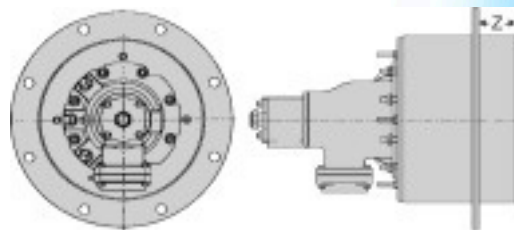
**42HL**



The burner can be ordered without the tile and mounting plate. This is useful where a mounting plate and tile already exist or for special construction furnaces. Refer to Dimensions & Parts List 42-2.



Used in furnace construction where there is no steel shell, only refractory. Identical to standard burners except no mounting flange. For dimension information refer to Dimension & Parts list 42-4. Only available with the standard burner or double boss option.



This construction can be used to locate the tile face flush with your furnace wall. Because the round tile is encased in RA330 expanded metal for all but 2" of its length, it is particularly suitable for fibre-lined furnaces or other applications where the tile is not supported and contained. The tile should be insulated to prevent temperature over 1800 F from reaching the metal. Specify the mounting flange "Z" dimension between 2" and 9" to the nearest 0.5" to locate the tile face flush with your inside furnace wall.

For dimensions information refer to Dimensions & Parts List 42-7.



## TILE SUPPORT JACKETS (42-LC, 42-L4, 42-L9)

42 Burners with the standard 9" long square tiles are also available with support jackets for applications such as air heaters where frequently the tile is not supported by refractory. They also can be mounted in furnaces when desired. Jackets are available in three different metals and maximum temperature ratings. 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 "intermittent exposure" ratings. Burners in a continuous annealing furnace 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
<b>42-LC</b>	carbon steel	700 F	700 F
<b>42-L4</b>	304 SST	1600 F	1500 F
<b>42-L9</b>	309 SST	1900 F	1800 F

For additional construction information refer to Dimensions & Parts List 42-2.

## OTHER EQUIPMENT OPTIONS

For application of burners to chamber temperature over 2000 F, see Bulletin 425.

For 42/425 burners with slotted discharge tiles that produce a fishtail shape flame, see Sheet 425-2

For application of 42/425 burners to high combustion chamber pressures (up to 1000 F air) and 485 (up to 1200 F air).

For Burners with larger heating capacity, refer to Bulletin 414 or consult your Contitherm field office.

For firing oil and/or gas (dual fuel) refer to Bulletins 52 and 642/25.

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examples are given for smallest to largest burner sizes

### Standard Burner

42-2-BO	through	42-8-ABO	burner only
42-2	through	42-8-A	burner complete w/9" tile

### Standard Burner With Tile Jacket

42-2-LC	through	42-8-ALC	burner complete w/9" tile and steel jacket
42-2-L4	through	42-8-AL4	burner complete w/9" tile and 304 SST jacket
42-2-L9	through	42-8-AL9	burner complete w/9" tile and 309 SST jacket

### Burner With Double-Boss Body

42D-2-BO	through	42D-6-BBO	burner only w/double-boss body
42D-2	through	42D-6-B	burner complete w/9" tile and double-boss body
42D-2-LC	through	42D-6-BLC	burner complete w/9" tile and double-boss body and steel jacket
42D-2-L4	through	42D-6-BL4	burner complete w/9" tile and double-boss body and 304 SST jacket
42D-2-L9	through	42D-6-BL9	burner complete w/9" tile and double-boss body and 309 SST jacket

### Burner with Hinged Burner Body

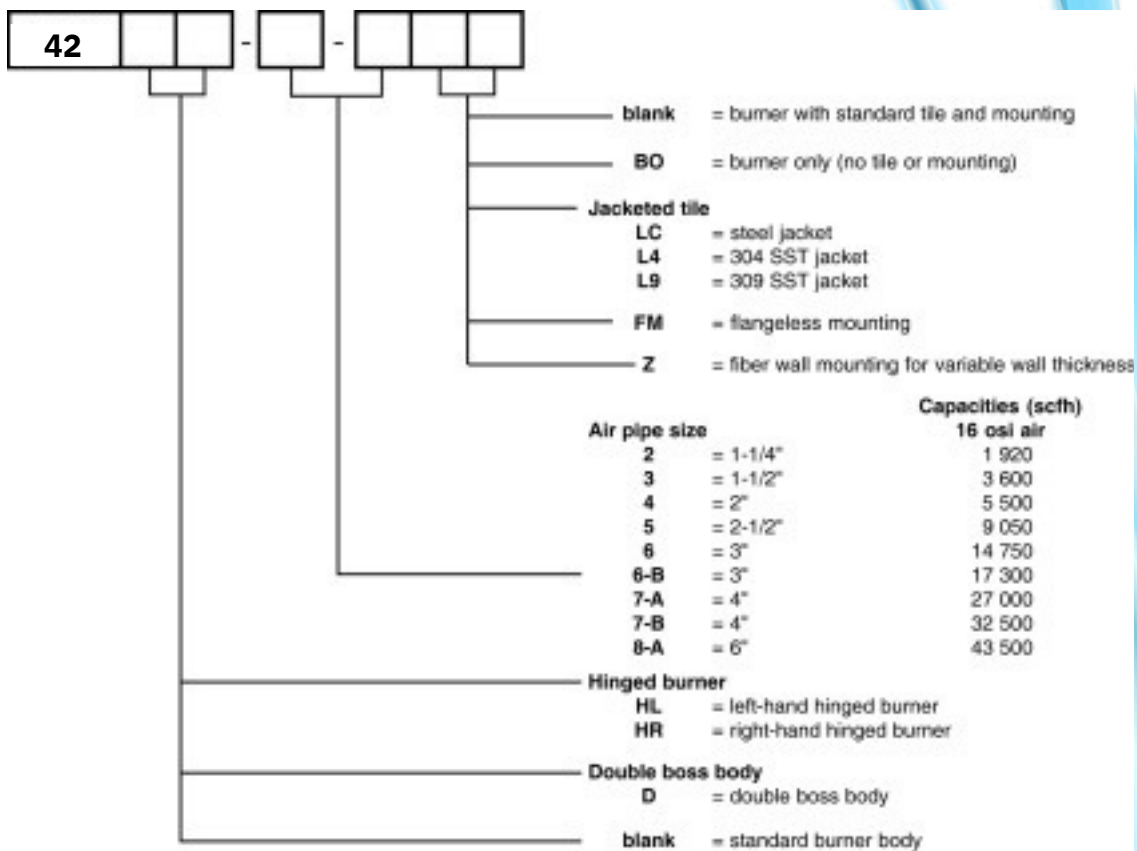
42HR-2-BO	through	42HR-8-ABO	burner only w/right-hand hinged body
42HL-2-BO	through	42HL-8-ABO	burner only w/left-hand hinged body when main air is at 12 O' clock
42HR-2	through	42HR-8-A	burner only w/9" tile and right-hand hinged body when main air is at 12 O' clock
42HL-2	through	42HL-8-A	burner only w/9" tile and left-hand hinged body when main air is at 12 O' clock
42HR-2-LC	through	42HR-8-ALC	burner only w/9" tile and steel jacket with left-hand hinged body when main air is at 12 O' clock
42HL-2L4	through	42HL-8-AL4	burner only w/9" tile and 304 SST jacket with left-hand hinged body when main air is at 12 O' clock
42HL-2L4	through	42HL-8-AL4	burner only w/9" tile and 304 SST jacket with left-hand hinged body when main air is at 12 O' clock
42HR-2-L9	through	42HR-2-AL9	burner only w/9" tile and 309 SST jacket with left-hand hinged body when main air is at 12 O' clock
42HL-2-L9	through	42HL-8-AL9	burner only w/9" tile and 309 SST jacket with left-hand hinged body when main air is at 12 O' clock

### Fiber Wall Mounting Burners

42-2-Z	through	42-8-AZ	burner complete w/"Z" dimension (2" to 9" round)
42D-2-Z	through	42D-6-BZ	burner complete w/double-boss body and "Z" dimension (2" to 9" round)

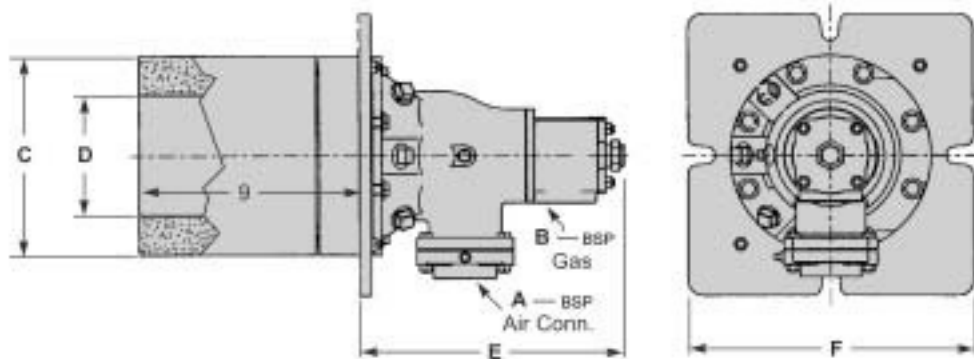
### Flangeless Burners

42-2-FM	through	42-8-AFM	burner complete w/9" tile and flangeless mounting
42D-2-FM	through	42-D-6-BFM	burner complete w/9" tile, double-boss body and flangeless mounting.



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inches



Burner designation	A	B	C	D	E	F	Std. burner weights, lb
42-2	1 <sup>1</sup> / <sub>4</sub>	1	8 <sup>1</sup> / <sub>2</sub>	5	10 <sup>5</sup> / <sub>8</sub>	12	75
42-3	1 <sup>1</sup> / <sub>4</sub>	1	8 <sup>1</sup> / <sub>2</sub>	5	10 <sup>5</sup> / <sub>8</sub>	12	75
42-4	2	1-1/4	8 <sup>1</sup> / <sub>2</sub>	5	10 <sup>5</sup> / <sub>8</sub>	12	75
42-5	2 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	5	10 <sup>5</sup> / <sub>8</sub>	12	75
42-6	3	1 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	5	10 <sup>5</sup> / <sub>8</sub>	12	75
42-6-B	3	1 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	5	10 <sup>5</sup> / <sub>8</sub>	12	75
42-7-A	4	2 <sup>1</sup> / <sub>2</sub>	10	7	14 <sup>1</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>2</sub>	130
42-7-B	4	2 <sup>1</sup> / <sub>2</sub>	10	7	14 <sup>1</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>2</sub>	130
42-8-A	6	2 <sup>1</sup> / <sub>2</sub>	10	7	14 <sup>1</sup> / <sub>16</sub>	13- <sup>1</sup> / <sub>2</sub>	130

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