fives north american

FLAME RETENTION GAS BURNER NOZZLES

Bulletin 4682

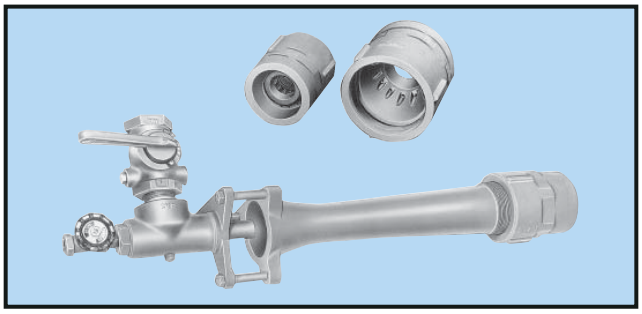
Ref: Bulletins 3065 and 3070

November 2008

4682 Burners are open fired nozzles fed an air-gas premixture by an aspirator or inspirator mixer. They produce a well defined, medium to high velocity blue flame when at high fire on stoichiometric ratio.

These nozzles are never sealed into a refractory wall, rather they provide stable combustion firing in the open or through a tunnel in the furnace wall.

A 4682 nozzle can have its own air-gas mixer; or a gang of nozzles can be fed by one mixer. Mixture pressures as high as 12"wc and as low as 0.25"wc imply available turndown of about 7:1. However, such is difficult to count on in the "real world:" Certain piping arrangements can cause low pressure pockets in the mixture line that allow flashback long before the 0.25"wc theoretical flashback point is reached at the mixer discharge.



4682 nozzles and a compressed air torch with a nozzle--torch is handy for many spot and preheating jobs.

4682 Burners can be run fuel rich if secondary air is available around the nozzle. This increases capacity and (in some cases) widens turndown available, but flames are longer and usually have less drive.

Combustion Air Capacities (see note below) scfh

Burner designation	Mixture Pressure in inches of water 1	2	5	6	7	10	12
4682-0-A/BO	200	280	440	480	520	640	670
4682-0-B/BO	250	350	560	610	660	790	860
4682-0-C/BO	280	400	640	700	750	900	990
4682-1-A/BO	350	490	790	860	920	1 120	1 210
4682-1-B/BO	440	620	990	1 070	1 160	1 390	1 520
4682-2-A/BO	560	790	1 260	1 370	1 480	1 770	1 930
4682-2-B/BO	650	920	1 460	1 590	1 720	2 060	2 240
4682-2-C/BO	780	1 100	1 750	1 910	2 060	2 460	2 680
4682-2-D/BO	880	1 240	1 980	2 150	2 320	2 780	3 020
4682-3-A/BO	980	1 380	2 200	2 390	2 590	3 100	3 380
4682-3-B/BO	1 200	1 690	2 690	2 930	3 170	3 800	4 120
4682-4-A/BO	1 500	2 120	3 360	3 660	3 960	4 760	5 150
4682-4-B/BO	1 900	2 680	4 270	4 650	5 000	6 000	6 550
4682-4-C/BO	2 050	2 890	4 610	5 000	5 400	6 500	7 050
4682-5-A/BO	2 450	3 450	5 500	6 000	6 500	7 750	8 450
4682-5-B/BO	2 900	4 100	6 500	7 100	7 650	9 200	10 000
4682-6-A/BO	3 200	4 510	7 200	7 800	8 450	10 100	11 000
4682-6-B/BO	3 850	5 450	8 650	9 400	10 200	12 200	13 200
4682-6-C/BO	4 250	6 000	9 550	10 300	11 200	13 400	14 600
4682-7-A/BO	4 750	6 700	10 600	11 600	12 600	15 000	17 000
4682-7-B/BO	6 000	8 450	13 400	14 700	15 800	19 000	20 600
4682-7-C/BO	7 050	9 950	15 800	17 200	18 600	22 200	24 200
4682-8-A/BO	10 500	14 800	23 500	25 600	27 700	33 200	36 200
4682-8-B/BO	13 000	18 400	29 200	31 800	34 400	41 300	44 900
4682-8-C/BO	18 000	25 500	40 400	44 000	47 600	57 000	62 000
4682-8-D/BO	21 500	30 200	48 100	52 500	57 000	68 000	74 000
4682-9/BO	37 700	53 000	84 500	92 000	99 500	—	—

NOTE: For Btu/hr, multiply air capacity by 100.

If secondary air is available around nozzle, burner can be run fuel rich and Btu/hr capabilities increased by factors in adjoining table.

% Combustion Air Through Burner	Multiply Capacity by
90	1.1
80	1.22
70	1.38

CONSTRUCTION/INSTALLATION

Standard 4682 nozzles are heat resistant cast iron that will take 950 F **nozzle temperature**--since burners normally are surrounded by relatively cool ambient air, they can fire furnaces or kilns as hot as 2000 F without being damaged, as long as tunnel configuration into which they fire protects them from excessive radiation.

For **nozzle temperatures** up to 1350 F, alloy nozzles (N) are available.

For best operation, use at least 4 pipe diameters between nozzle and nearest fitting or mixer.

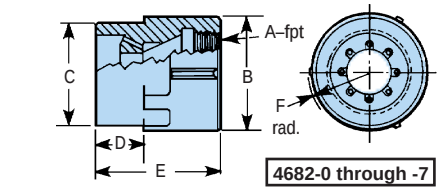
Conical mountings (MP) facilitate proper positioning of pilots and flame detectors, also help assure alignment of nozzle with firing tunnel in furnace wall.

Tiles of 3000 F dense castable material are available; or tunnels can be rammed into the furnace wall (see note below).

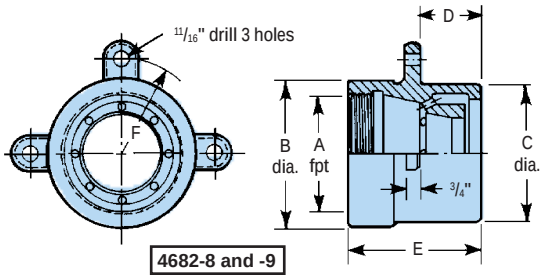
For 4682-0 through -7 sizes, order mountings and/or tiles as separate items. 4682-8 and -9 Burners can be ordered as separate pieces--nozzle, air register (with shutter to control secondary air), mounting plate, tile--or with all of these in an assembly.

Flame supervision can be accommodated--consult Fives North American for an arrangement appropriate for your application.

BURNER NOZZLE DIMENSIONS



4682-0 through -7

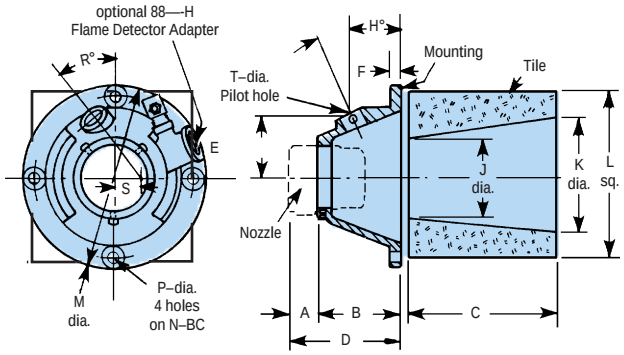


4682-8 and -9

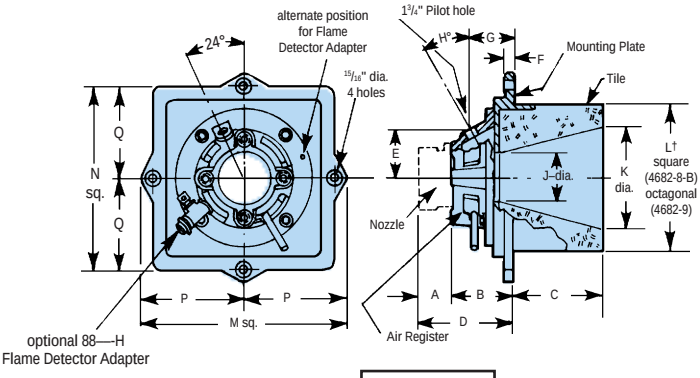
Nozzle designation	dimensions in inches A	B	C	D	E	F	Wt, lb
4682-0-A,-0-B,-0-C/BO	3/4	1 7/8	1 3/4	11/16	2 23/32	1 1/16	2
4682-1-A,-1-B/BO	1	2	1 13/16	13/16	2 23/32	1 1/8	2
4682-2-A,-2-B,-2-C,-2-D/BO	1 1/4	2 7/16	2 1/4	13/16	2 27/32	1 11/32	3
4682-3-A,-3-B/BO	1 1/2	2 3/4	2 9/16	1 1/16	3 1/32	1 1/2	3
4682-4-A,-4-B,-4-C/BO	2	3 1/8	2 15/16	1 3/8	3 9/16	1 11/16	5
4682-5-A,-5-B/BO	2 1/2	3 5/8	3 3/8	1 3/8	4 1/8	1 15/16	6
4682-6-A,-6-B,-6-C/BO	3	4 1/4	4 1/16	1 3/8	5 1/4	2 1/4	11
4682-7-A,-7-B,-7-C/BO	4	5 3/8	5 3/16	1 3/8	6 1/4	2 7/8	22
4682-8-A,-8-B,-8-C,-8-D/BO	6	7 3/4	7 3/8	3 5/16	7 1/8	5	32
4682-9/BO	8	9 7/8	9 7/16	6 1/16	8 5/8	6 1/4	50

For alloy nozzles, place "N" before "/", e.g. 4682-1-AN/BO.

MOUNTING & TILE DIMENSIONS



4682-0 through -7



4682-8 and -9

Mounting designation	dimensions in inches and degrees. A	B	C	D	E	F	G	H°	J	K	L†	M	N	P	Q	R°	S	T	Tile part numbers
4682-0-MP†	2 1/16	2 5/8	5 1/2	4 11/16	2 1/16	1/2	1 15/16	25	1 3/4	3	5	6	5 1/4	7/16	–	40	5/8	1 1/64	4-2653-1
4682-1-MP	1 15/16	2 5/8	7	4 9/16	2 1/16	1/2	1 15/16	25	2 5/16	4	6	6	5 1/4	7/16	–	40	5/8	1 1/64	4-2653-2
4682-2-MP	2 1/16	2 7/8	7	4 15/16	2 1/4	1/2	2 1/8	25	2 5/16	4	6	6 1/2	5 3/4	7/16	–	45	7/8	1 1/64	4-2653-2
4682-3-MP	2	3 9/16	8	5 9/16	2 5/16	1/2	2 13/16	30	2 3/4	4 1/2	7	7 1/2	6 3/4	7/16	–	40	1	1 1/64	4-2653-3
4682-4-MP	1 7/16	4	9	5 7/16	3	9/16	2 7/16	30	3 3/8	5 1/2	9	8 3/4	7 3/4	9/16	–	40	1 1/4	1 1/64	4-2653-4
4682-5-MP	1 13/16	4 5/16	9	6 1/8	3 3/8	9/16	2 11/16	30	4	6	9	9 3/4	8 3/4	9/16	–	40	1 3/8	1 1/64	4-2653-5
4682-6-MP	2 7/16	4 13/16	9	7 1/4	4	5/8	2 7/8	30	4	6	9	11	10	9/16	–	40	1 3/4	1 9/64	4-2653-5
4682-7-MP	2 1/2	5 3/4	10 15/16	8 1/4	4 13/16	11/16	3 1/16	30	6	11 7/16	15 1/8	13 1/2	12 1/4	9/16	–	40	2 5/16	1 9/64	3-0351-6
4682-8-MP	3 13/16	6 9/16	9	10 3/8	6	13/16	3 5/8	30	7 1/2	11 1/4	15 1/8	21 1/2	19 1/2	10 3/4	9 3/4	–	–	–	4-2156-1
4682-9-MP	2 9/16	9 1/16	8 3/4	11 5/8	7 13/16	7/8	4 3/16	26	9 1/2	14	18 5/8	26 1/4	23 3/4	13 1/8	11 7/8	–	–	–	4-2157-1

†4682-0 Nozzle uses 4682-1-MP Mounting.

If tunnels are to be rammed in furnace wall, use dimension "J" at entrance, and taper tunnel at least 15°. Space nozzle about 2" from outer face of wall.

DIMENSIONS SHOWN ARE SUBJECT TO CHANGE. PLEASE OBTAIN CERTIFIED PRINTS FROM FIVES NORTH AMERICAN COMBUSTION, INC.
IF SPACE LIMITATIONS OR OTHER CONSIDERATIONS MAKE EXACT DIMENSION(S) CRITICAL.

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