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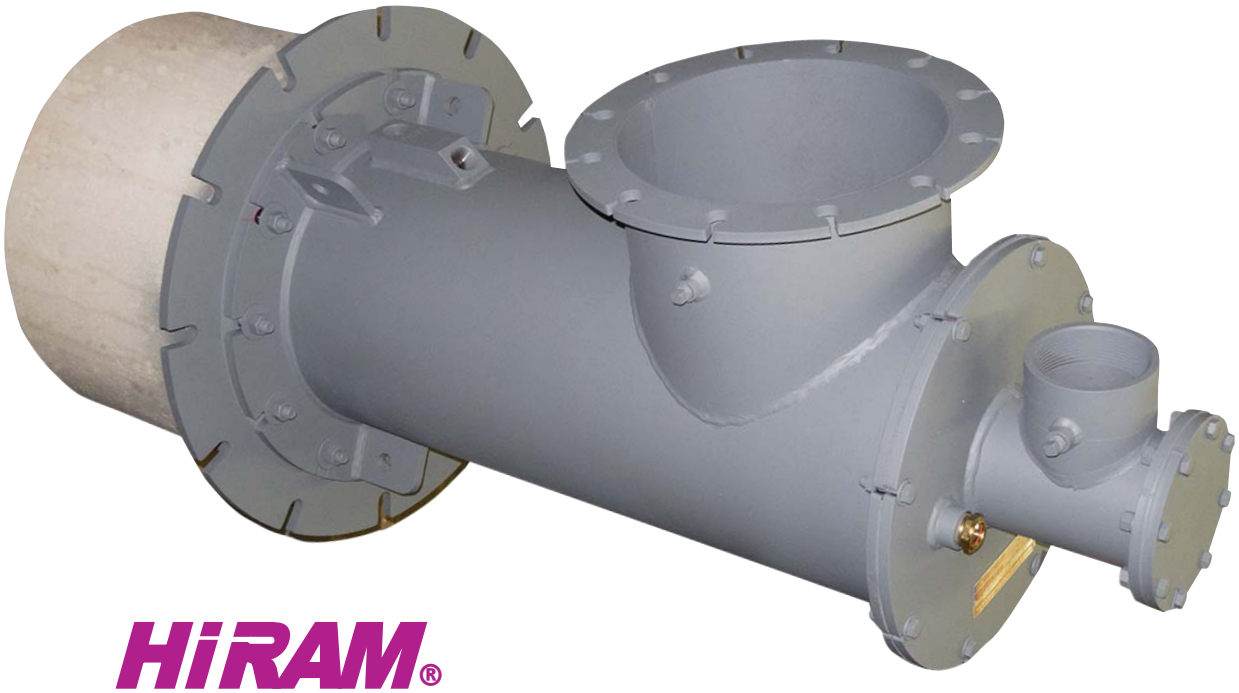
North American 4575 HiRAM®



HiRAM®

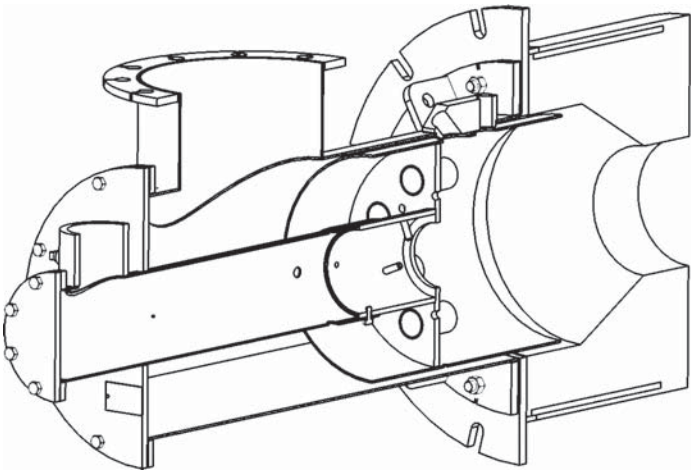
The quality and performance of our Tempest®, but bigger.

- Low NOx burner
- High Velocity - High Turndown
- Inputs to 4 - 25 million Btu/hr
- Direct Spark or Pilot Lighting
- Furnace temperatures up to 2400°F
- Simple cross-connectable regulator ratio control
- 6575 version for gas and light oil

Product Overview | HiRAM®

Like the smaller Tempest® burner, the 4575 HiRAM® Burner's true high velocity results from exceptionally high copacity rates relative to the reduced tile discharge areas. Velocities ranging from 500 to 750 feet per second (340 to 510 mph) drive heat into a furnace load, creating tremendous momentum while entraining and recirculating 7-10 cubic feet of furnace gases for every cubic foot of burner product.

The benefit of high velocity entrainment is excellent temperature, uniformity, and thermal efficiency. 4575 HiRAM® Burners are ideal for installations where entrainment penetration, and temperature uniformity is important.



TYPES OF APPLICATIONS

- Aluminum melters
- Ladle heaters
- Soaking pits
- Rotary kilns
- Heat treat furnaces
- Fluidized bed
- Dryers
- Variety of other applications

PERFORMANCE BENEFITS

- High velocity
- Low NOx emissions
- High excess air
- Direct spark or pilot ignition
- Wide operating limits
- Cross-connected regulator ratio control
- Available dual-fuel operation

SPECIAL ENGINEERED OPTIONS

- Metal alloy tiles
- Medium velocity tiles
- LNI injector mounting plate
- Refractory tiles with metal jackets
- Backplate swing bolts
- High back-pressure designs

Capacity | HiRAM®

North American HiRAMs are particularly applicable to aluminum melters, ladle heaters, soaking pits, rotary kilns, heat treat furnaces, fluidized bed and dryers: Any installation where high velocity entrainment, penetration, and recirculation can benefit temperature uniformity and thermal efficiency.

The HiRAM Burner's true high velocity results from exceptionally high Btu/hr input rates relative to its reduced tile discharge area. Velocities ranging from 500 to 750 feet per second (340 to 510 mph) drive heat into a furnace load, creating tremendous momentum while entraining and recirculating 7-10 cubic feet of furnace gases for every cubic foot of burner product.

HiRAMs are suitable for furnace temperatures up to 2400°F. They can be used with preheated air up to 600°F. The reduced tile discharge opening also protects burner internals from radiant heat and from melting furnace splash. Standard burners include 3000°F dense castable tiles.

Burner tile installation should be made in accord with instructions on Supplement DF-M1 for hard refractory lined furnaces or DF-M2 for fiber lined furnaces. It is generally not necessary to use a metal jacketed tile in fiber lined furnaces with 4575 burners.

The Hi-RAM burners can be used with a variety of control systems including pressure-balanced or electronic fuel/air ratio systems. The gas pressure requirement is approximately 0.7 that of the combustion air when firing on stoichiometric ratio.

System pressure drops should be checked to make sure that adequate gas pressure will be available at the burner. In order to avoid any potential combustion driven oscillations which can produce excessive noise or vibration, it is imperative that a limiting orifice valve be installed within 5 pipe diameters (5D) of the gas connection. HiRAM burners are not designed for fuel rich operation. Prolonged fuel rich operation may damage the burner.

A gas pilot or direct spark ignition can be used for lighting. Torch lighting is not recommended because of high tile pressures. See Sheet 4000-2 for general details concerning direct spark ignition. If spark igniters are installed in the ignition port, they must be removed before the backplate with attached internals are disassembled from the main body.

4575 burners (except the -8-A and -14 sizes) are available in dualfuel (gas/light oil) models--see Bulletin 6575. A gas pilot is required for lighting with oil.

HiRAMs are an extension upward of the North American Tempest® High Velocity Burner line. For capacities less than 3,000,000 Btu/hr, consider 4441 or 4445 Tempest Burners.

Flame Detection: UV for all sizes or flame rod for -9 to -14.

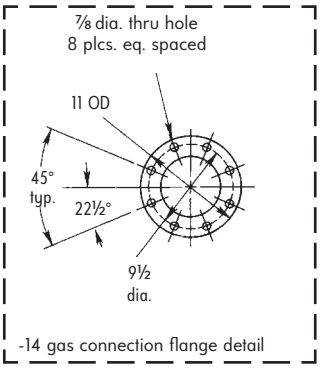
COMBUSTION AIR CAPACITIES
scfh
(for Btu/hr, multiply by 100)

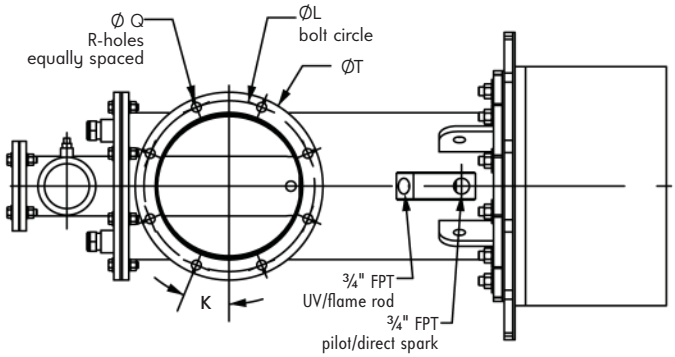
Burner designation	combustion air pressure drop across the burner in osi (inch w.c.) 0.2 (.35)	1 (1.73)	4 (6.9)	9 (15.6)	16 (27.7)	Flame length (stoichiometric ratio, 16 osi air)
4575-8-A	4 400	9 400	19 600	31 000	41 500	5′
4575-8-B	5 250	13 300	29 500	43 600	62 000	6′
4575-9	9 200	21 000	44 000	64 000	89 000	9′
4575-10-A	10 600	23 800	47 600	72 500	101,000	9′
4575-10-B	12 500	28 000	57 500	85 000	119 000	10′
4575-12	19 100	42 700	81 500	118 000	164 000	10′
4575-14	34 000	64 000	124 000	188 000	250 000	17′

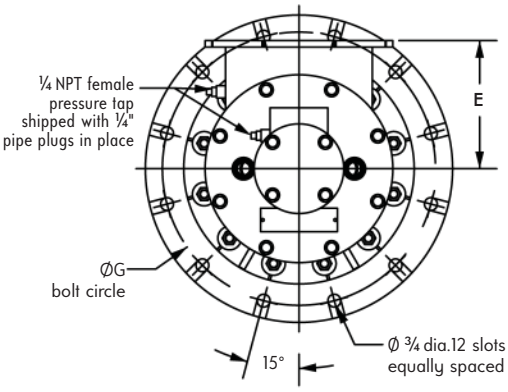
Burner designation	Maximum excess air rates in %① combustion air pressure, osi 1	9	16	Air capacities not burning, scfh (use to size blowers) 16 osi	Pilot set	Direct spark igniter	approx. net weight pounds
4575-8-A	325	400	350	55 000	4011-12	4055-E	195
4575-8-B	650	500	750	81 000	4011-12	4055-E	195
4575-9	800	900	1200	116 000	4011-12	4055-E	200
4575-10-A	675	800	900	145 000	4011-12	4055-E	280
4575-10-B	1100	1300	1200	177 000	4011-12	4055-E	280
4575-12	1500	1200	1000	199 000	4011-12	4055-E	280
4575-14	1200	1200	1200	388 000	4011-12	4055-E	695

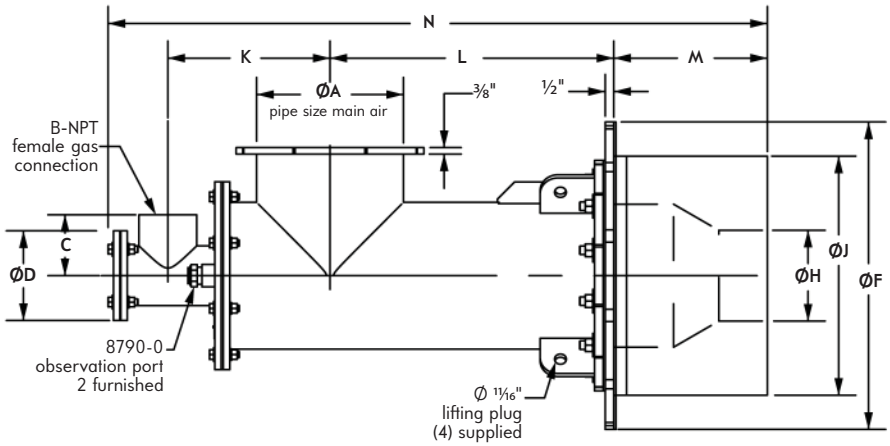
① Do not operate fuel rich. (consider a 4821-R for rich high velocity operation)

Dimensions | HiRAM®









Burner designation	dimensions in inches and degrees																	
	A	B	C	D	E*	F	G	H	J	K	L	M	N	P°	Q	R	S	T
4575-8-A	6	2½	3¾	5¼	7½	18	16	4⅛	14	9½	16⅝	9	38⅝	22½	⅝	8	7⅞	9
4575-8-B	6	2½	3¾	5¼	7½	18	16	4⅝	14	9½	16⅝	9	38⅝	22½	⅝	8	7⅞	9
4575-9	8	2½	3¾	5¼	7½	18	16	5⅝	14	9½	16⅝	9	38⅝	22½	⅝	8	10	11
4575-10-A	10	3	4¾	6¼	10½	22	20	6¼	18	11⅛	20⅝	12	47⅜	15	¾	12	12¼	14
4575-10-B	10	3	4¾	6¼	10½	22	20	6½	18	11⅛	20⅝	12	47⅜	15	¾	12	12¼	14
4575-12	12	3	4¾	6¼	10½	22	20	7	18	11⅛	20⅝	12	47⅜	15	¾	12	14¼	16
4575-14	14	6†	12⅝	8¼	12	26	24	9¾	22	16	24⅜	18	64	15	¾	12	16¼	18

†6" - 150 lb ANSI Gas Inlet (see detail in upper left-hand corner).
*SW style inlet (optional--see parts list, Sheet 6575-2) will add 4⅜" to the dimension "E" shown.

4575-8-A	Main Air Pressure, osi (inch w.c.) 0.2 (.35)	1 (1.73)	4 (6.9)	9 (15.6)	16 (27.7)
Main Air Flow, not burning, scfh	—	—	—	—	54 000
Main Air Flow, burning, stoich., scfh	4 400	9 400	19 600	31 000	41 500
Maximum %XSAir with flame signal (UV)	200	325	400	400	350
Maximum %XSFuel	30	30	30	30	30
Flame Length, stoich., ft.	3	3.5	4	4.5	5
Flame Diameter, stoich., in.	9	12	12	12	18
Gas Pressure, stoich., osi	0.1	0.5	1.9	4.2	7.4
Tile Pressure, stoich., osi	0.1	0.5	1.8	4.0	7.1
Maximum %XSAir, ignition--pilot	200	325	400	400	350
Maximum %XSAir, ignition--direct spark	125	325	250	250	300

4575-8-B	Main Air Pressure, osi 0.2	1	4	9	16
Main Air Flow, not burning, scfh	—	—	—	—	81 000
Main Air Flow, burning, stoich., scfh	5 250	13 300	29 500	43 600	62 000
Maximum %XSAir with flame signal (UV)	425	650	500	500	750
Maximum %XSFuel	30	30	30	30	30
Flame Length, stoich., ft.	3.5	4	4.5	5	6
Flame Diameter, stoich., in.	10	12	16	18	20
Gas Pressure, stoich., osi	0.14	0.75	2.9	6.3	10.7
Tile Pressure, stoich., osi	0.1	0.5	1.9	4.1	7.0
Maximum %XSAir, ignition--pilot	425	650	500	300	—
Maximum %XSAir, ignition--direct spark	—	75	250	300	100

4575-9	Main Air Pressure, osi 0.2	1	4	9	16
Main Air Flow, not burning, scfh	—	—	—	—	116 800
Main Air Flow, burning, stoich., scfh	8 900	20 600	43 400	67 000	89 000
Maximum %XSAir with flame signal (UV)	450	800	900	900	1 200
Maximum %XSFuel	30	30	30	30	30
Flame Length, stoich., ft.	4.5	6	6.5	7	8
Flame Diameter, stoich., in.	12	18	18	18	24
Gas Pressure, stoich., osi	0.1	0.7	2.5	6	11.1
Tile Pressure, stoich., osi	0.1	0.4	1.5	3.3	5.8
Maximum %XSAir, ignition--pilot	—	—	—	—	—
Maximum %XSAir, ignition--direct spark	700	—	500	—	—

4575-10-A	Main Air Pressure, osi 0.2	1	4	9	16
Main Air Flow, not burning, scfh	—	—	—	—	145 000
Main Air Flow, burning, stoich., scfh	10 600	23 800	47 600	72 500	101 000
Maximum %XSAir with flame signal (UV)	500	675	850	800	900
Maximum %XSFuel	30	30	30	30	30
Flame Length, stoich., ft.	2	3	4	5	6
Flame Diameter, stoich., in.	8	9	12	14	16
Gas Pressure, stoich., osi	0.2	0.6	2.1	4.6	7.9
Tile Pressure, stoich., osi	0.1	0.5	1.9	4.1	7.1
Maximum %XSAir, ignition--pilot	500	675	850	800	900
Maximum %XSAir, ignition--direct spark	500	675	850	800	900

4575-10-B	Main Air Pressure, osi (inch w.c.) 0.2 (.35)	1 (1.73)	4 (6.9)	9 (15.6)	16 (27.7)
Main Air Flow, not burning, scfh	—	—	—	—	177 000
Main Air Flow, burning, stoich., scfh	12 500	28 000	57 500	85 000	119 000
Maximum %XSAir with flame signal (UV)	1 300	1 100	1 500	1 300	1 200
Maximum %XSFuel	25	25	25	25	25
Flame Length, stoich., ft.	6	7.5	6.5	7.5	10
Flame Diameter, stoich., in.	18	24	24	24	30
Gas Pressure, stoich., osi	0.2	0.6	2.4	5.3	9.2
Tile Pressure, stoich., osi	0.2	0.6	2.3	5.0	8.6
Maximum %XSAir, ignition--pilot	1 300	1 100	1 500	1 300	1 200
Maximum %XSAir, ignition--direct spark	1 300	1 100	1 500	1 300	1 200

4575-12	Main Air Pressure, osi 0.2	1	4	9	16
Main Air Flow, not burning, scfh	—	—	—	—	199 000
Main Air Flow, burning, stoich., scfh	19 100	42 700	81 500	118 000	164 000
Maximum %XSAir with flame signal (UV)	800	1 500	1 500	1 200	1 000
Maximum %XSFuel	30	30	30	30	10
Flame Length, stoich., ft.	6	7	8	8.5	10
Flame Diameter, stoich., in.	14	14	16	18	18
Gas Pressure, stoich., osi	0.1	0.9	3.0	6.3	11.1
Tile Pressure, stoich., osi	0.1	0.5	1.4	3.0	5.0
Maximum %XSAir, ignition--pilot	300	700	1 000	1 000	—
Maximum %XSAir, ignition--direct spark	—	100	300	400	400

4575-14	Main Air Pressure, osi 0.2	1	4	9	16
Main Air Flow, not burning, scfh	—	—	—	—	388 000
Main Air Flow, burning, stoich., scfh	39 500	68 500	125 700	186 000	251 400
Maximum %XSAir with flame signal (UV)	1 500	1 500	1 500	1 500	1 250
Maximum %XSFuel	15	15	15	15	15
Flame Length, stoich., ft.	8	10	13	16	18
Flame Diameter, stoich., ft.	2.5	3	3	3	3.5
Gas Pressure, stoich., osi	—	—	2.1	—	8.0
Tile Pressure, stoich., osi	—	—	—	—	3.6
Maximum %XSAir, ignition--pilot	750	1 000	—	—	—
Maximum %XSAir, ignition--direct spark	500	500	—	—	—

Ordering Information | HiRAM®

4575- ____ (Arrangement - ____ ____) Configured Options

4575 Capacities
scfh (Nm3/h) air
@ 27.7"w.c. = 16 osi = 6.9 mbar

4575 Burner Size:

8-A	41,5000	(1,175)
8-B	62,000	(1,755)
9	89,000	(2,520)
10-A	101,000	(2,890)
10-B	119,000	(3,370)
12	164,000	(4,644)
14	250,000	(7,079)

Ignition/Flame detection position:
1: 3 O-Clock
2: 6 O-Clock
3: 9 O-Clock
4: 12 O-Clock

Gas connection position:
a: 12 O-Clock
b: 3 O-Clock
c: 6 O-Clock
d: 9 O-Clock

To order, specify: 4575-(capacity code)-(A or B if applicable)
(specify Arrangement Designators -- see sketch).
Example 1: 4575-9 Burner complete, Arrangement 4c

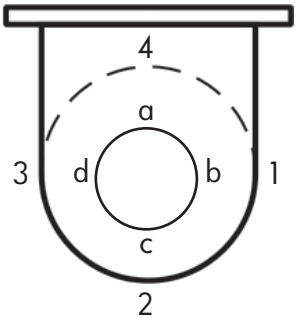
Arrangement Designators are specified relative to the main air connection at 12 o'clock and should be listed for ignition/flame detection and gas connection in that order.

Good practice dictates that the ignition/flame detection NOT be on the bottom of the burner.

NOTE: Position #4 may not be suitable for some flame scanners due to interference with the main air connection.

Contact North American for custom 4575 configurations. Common special features include:

- Metal alloy tiles
- Straight refractory tiles for reduced velocity flames
- 4575 burners supplied with LNI injector mounting plate
- Refractory tiles with metal jackets
- Burners built with the classic 4575 swing bolts on the backplate



Igniton/Flame detection position 1-2-3-4

Gas connection position a-b-c-d

Example 1:
4575-9 Arrangement 4c

Example 2:
4575-9 Arrangement 4a

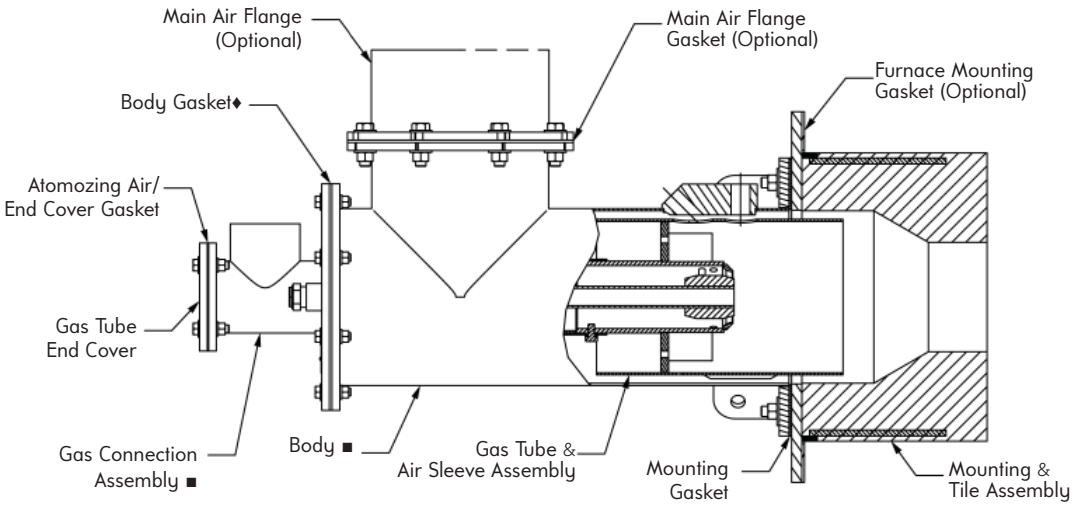
Example 3:
4575-9 Arrangement 1d

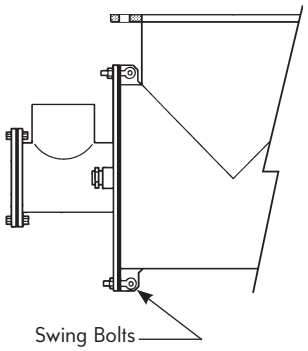
Changing the gas inlet arrangement

If the gas connection is rotated to a new position in the field without re-orienting the "Gas Tube & Air Sleeve Assembly", the ignition and flame supervision ports will be blocked.

To re-orient the "Gas Tube & Air Sleeve Assembly"
— Remove the spark plug and flame rod, if equipped, to prevent damage
— Remove the bolts that connect the gas connection assembly to the burner body
— Pull the burner internal assembly out of the burner body
— Remove the two bolts that secure the Gas Tube & Air Sleeve Assembly to the Gas Connection Assembly
— Rotate the Gas Tube & Air Sleeve Assembly so that its' ignition and flame supervision holes line up with the ports on the body when the gas connection is in the new arrangement rotation.
— Reverse the procedure to finish the re-orientation.

Spare Parts List | HiRAM®





Part Name	Burner Size -8-A	-8-B	-9*	-10-A	-10-B	-12	-14
Mounting & Tile Assembly	3-6916-1	3-6816-1	3-6453-1	3-6836-1	3-6784-1	3-6431-1	4-12287-1
Body Assembly	4-54712-1	4-54801-1	4-54886-1	4-54673-1	4-54673-1	4-54622-1	4-54895-1
Gas Tube & Air Sleeve Assembly†	4-7953-1	4-7901-1	3-12127-1	3-6835-1	3-6846-1	4-23824-1	4-23827-1
Gas Connection Assembly	4-54713-1	4-54713-1	4-54888-1	4-54623-3	4-59623-3	4-54623-3	4-54898-1
Gas Tube End Cover	4-7618-1	4-7618-1	4-7618-1	4-7643-2	4-7643-2	4-7643-2	4-10349-1
Mounting Gasket	3-6462-1	3-6462-1	3-6462-1	3-6443-1	3-6443-1	3-6443-1	4-10368-1
Body Gasket♦	4-54657-1	4-54657-1	4-54657-1	4-54656-1	4-54656-1	4-54656-1	4-55039-1
Atomizing Air/End Cover Gasket	3-6464-1	3-6464-1	3-6464-1	3-6441-2	3-6441-2	3-6441-2	4-10366-1
Parts for burners with Swing Bolts and extra body gussets (SB)							
SB Body Assembly	3-6915-1	3-6637-1	3-6454-2	3-12877-1	3-12877-1	3-6439-2	4-12283-1
SB Gas Connection Assembly	3-6456-1	3-6456-1	4-22788-1	3-6435-3	3-6435-3	3-6435-3	4-10347-1
SB Body Gasket	3-6463-1	3-6463-1	3-6463-1	3-6442-2	3-6442-2	3-6442-2	4-10366-1
Options							
Blower Sleeve	2947-8	2947-8	2947-9	2947-10	2947-10	2947-12	2947-14
Clamp (qty)	R120-2425(2)	R120-2600(2)	R120-2600(2)	R120-2600(2)	R120-2600(2)	R120-2425(4)	R120-2425(2) R120-2600(2)
Flame Rod	—NA—	—NA—	4-25432-4	4-25432-4	4-25432-4	4-25432-12	4-25432-11
Main Air Flange	3-8569-1	3-8569-1	3-8569-2	3-8569-5	3-8569-5	3-8569-4	3-8569-6
Main Air Flange Gasket	OA3-2302-24F4	OA3-2302-24F4	OA3-2302-25F4	OA3-2302-26F4	OA3-2302-26F4	OA3-2302-27F4	OA3-2302-28F4
Furnace Mtg. Gasket▲	4-28284-1 4-28284-2	4-28284-1 4-28284-2	4-28284-1 4-28284-2	4-28285-1 4-28285-2	4-28285-1 4-28285-2	4-28282-1 4-28282-2	4-28286-1 4-28286-2

† Gas Tube, Air Sleeve, Air Tube Disc, Gas Stabilizer, and Air Tubes are an Integral Assembly and must be purchased as a unit called "Gas Tube and Air Sleeve Assembly".

* -9 Burners sold prior to S.O.#GK 3600 (September 1997) should have spare part numbers verified by Engineering before ordering.

♦ Gasket Note: This part number for burners equipped with a through bolt connnection. For burners equipped with swing bolt connection use SB Body Gasket.

▲ If needed use... -1 gasket for furnace shell temperatures up to 825°F. Use -2 for furance shell temperatures up to 975°F.

■ If body is equipped with swing bolt connection, use "SB" parts or consult engineering.

WARNING: Situations dangerous to personnel and property may exist with the operation and maintenance of any combustion equipment. The presence of fuels, oxidants, hot and cold combustion products, hot surfaces, electrical power in control and ignition circuits, etc., are inherent with any combustion application. Components in combustion systems may exceed 160°F (71°C) surface temperatures and present hot surface contact hazard. Fives North American Combustion, Inc. suggests the use of combustion systems that are in compliance with all Safety Codes, Standards, Regulations and Directives; and care in operation.

fives ultimate machines ultimate factory

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