

North American Low Emissions Quick Clean Burner



4419 Quick clean, low emissions gas burner

- Quick cleanout
- Direct spark ignition
- Dual fuel version available
- Multiple hearth furnaces
- Aluminum tower melters

Features | Quick Clean Burner

MULTIPLE HEARTH FURNACES

The 4419 Quick Clean burner was designed specifically to meet the requirements of multiple hearth furnaces. The Quick Clean burner enhances the circulation of furnace gases and eliminates or reduces many common problems found in sludge burning incinerators and carbon regeneration furnaces. It is well suited for modernization projects and new multiple hearth furnace installations.

ALUMINUM TOWER MELTER

The 4419 Quick Clean burner is ideal for the aluminum tower melter applications where material from the chamber can find its way into the burner tile. The ability to gain access into the burner tile without disconnecting the air and gas piping shortens the maintenance time required to get the furnace back into production. The medium velocity flame enhances heat transfer to the aluminum charge. The burner is designed for new or retrofit applications on melting furnaces.

RECESSED CONSTRUCTION

The burner body is recessed into the wall so that the flame initiation is 8" from the inside of the furnace chamber instead of the usual 18-24" typical for tangential firing. As a result, the furnace outer shell and the back of the burner operate at lower temperatures, reducing shell overheating problems and stress on UV detectors, ignition transformers and cables.

Because a mounting flange can be welded anywhere on the extension tube, the burner can be adapted to various wall constructions. The tile itself is formed in the field by the installer with a mandrel and becomes an integral part of the refractory wall. Various mounting flanges are available as options to fit individual applications.

MINIMIZED PLUGGING PROBLEMS

To minimize plugging problems, the burner refractory tile is tapered to a small discharge port which provides a medium velocity flame. There is no shelf or wide opening as with a conventional tile exit. The discharge velocity of the burner, combined with the small opening into the furnace, discourages the build up of material in front of or within the burner tile.

SUPERIOR STIRRING ACTION

The reduced port tile increases the velocity of the products of combustion exiting the tile. This causes a significant increase in turbulence and encourages entrainment of more furnace gases into the flame envelope. The mixing on the hearth increases while tempering the flame, which results in more uniform heat release without hot spots.

QUICK CLEANOUT and INSPECTION

If cleanout of the burner tile is required, the burner body design allows for quick and easy access to the burner internals. Disconnect the ignition cable and UV cell, and loosen the eight hex-head bolts that hold the backplate in place. Rotate the backplate a few degrees with the built-in handles and the burner internals can be pulled out, leaving a clear passage to the burner tunnel for easy maintenance and cleaning.

The main air and gas piping connections do not need to be disconnected to gain access to the burner tunnel. On the dual fuel version of the burner, the small oil and atomizing air lines must also be removed, so quick connect fittings are recommended.

DIRECT SPARK IGNITION

The 4419 incorporates direct spark ignition, eliminating the need for gas pilots, mixers and other premix pilot support parts. Maintenance of the burner is also reduced with fewer components to adjust and maintain. The ground wire and the igniter tips on the 4419 are easily replaced without special tools, and without requiring the purchase of a new igniter plug body.

LIGHTING ARRANGEMENTS

The burner air should be turned to low fire, and the spark turned on, before opening the burner gas valve. After the burner is lit, the spark must be turned off for proper burner operation. During the ignition period, a continuous 6000 volt (minimum) spark is required. Spark distributor systems cannot be used with 4419 Burners. When burning #2 oil, the burner should be lit with a small amount of gas first, which is turned off after the oil lights.

FLAME SUPERVISION

The North American 4419 has an internally purged flame supervision tube that runs from the backplate to the stabilizer. The sight line of the tube is angled to minimize the sensing of flame outside the tile by the U.V. flame detector. It is recommended that the UV connection be located at the 12 o'clock position for most installations. To optimize the flame signal during low fire oil applications, it may be necessary to have the UV tube sight line point to the "short side" of the angled wall as shown in Figure 1. The connection on the 4419 U.V. tube is a ½" male fitting. Refer to Bulletin 8832 for choices of U.V. flame detectors and adapters.

Features & Capacities | Quick Clean Burner

DUAL FUEL OPTION and OPERATION

The North American 6419 is the dual fuel version of the Quick Clean burner for firing #2 fuel oil or gas. The gas only 4419 Quick Clean burner can be easily converted to a 6419 in the field by adding an atomizer and an 1813 Sensitrol™ Oil Valve.

When operating with #2 oil, the atomizer should be operated with a constant 35" w.c. air pressure. During gas operation, use at least 4 psi atomizing air to cool atomizer (full atomizing air may be used); or for extended periods of operation on gas, the atomizer can be partially retracted or completely removed and stored: Use a blanking disk and gasket to seal the burner if the atomizer is removed (see page 7). Use the stop collar on the atomizer assembly to return the atomizer to the correct position when reinstalling the atomizer.

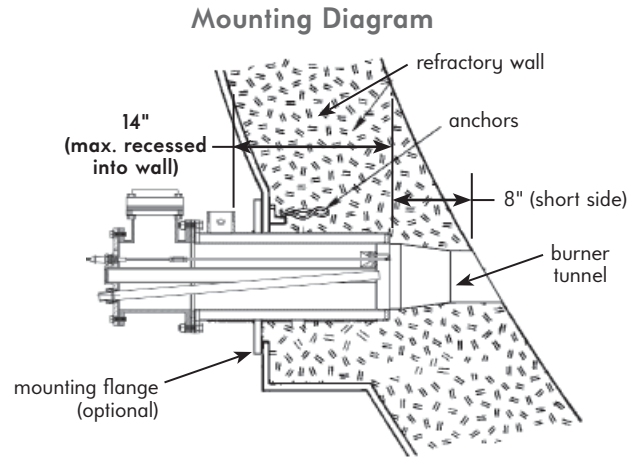
RATIO CONTROL and OPERATION

The 4419 burner fuel/air ratio can be controlled with a simple cross connected ratio regulator such as the North American 7216 for gas or the 7052 Ratiotrol for oil. Accurate fuel / air flows can be determined by using 8697 Metering Orifices in the fuel gas and air lines.

If furnace temperatures after shutdown rise above 1600°F, pass air through burner to prevent overheating.

CONSTRUCTION

The burner body, backplate and flanges are fabricated of steel, the extension tubes and flame stabilizer from stainless steel. The gas inlet coupling on the extension tube can be rotated independently of the air connection flange in 45° increments to aid in gas piping.



Oil Atomizer Pressure/Flow Data

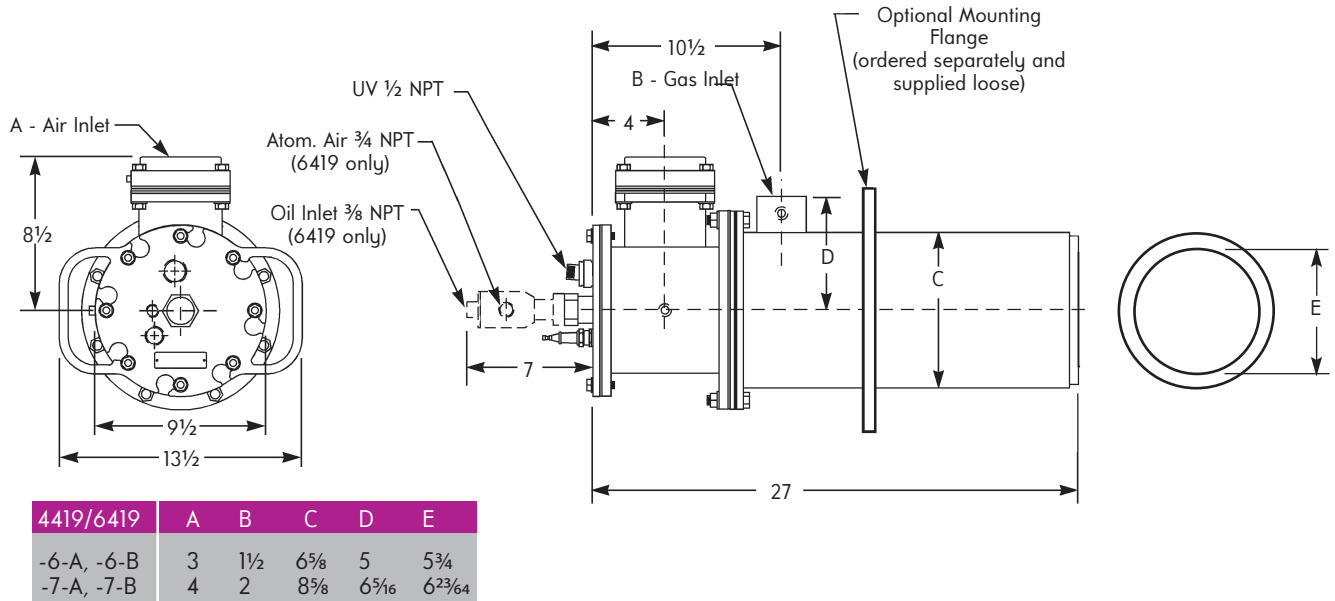
Burner Size	Main Air Capacity (scfh) at various Air Pressures "w.c.					Natural Gas Pressure at 27.7" w.c., 10% XSA
	0.9	1.7	7.0	15.6	27.7	
4419-6-A	1,400	1,950	5,350	8,300	11,000	5.9" w.c.
4419-6-B	2,700	3,800	7,600	10,750	16,000	10.4" w.c.
4419-7-A	3,800	6,700	11,320	16,250	26,300	9.2" w.c.
4419-7-B	7,200	8,150	15,800	24,500	36,000	12.3" w.c.

Oil Flow gal/hr	Oil Press. psi	Atom. Air at 35" w.c. scfh
28	5.9	255
26	5.4	280
24	4.8	285
22	4.3	320
20	3.9	345
18	3.3	360
16	2.9	370
14	2.4	385
12	2.1	395
10	1.8	410
8	1.5	420
6	1.3	435
5	1.1	435
4	1.0	445
3	0.9	450
2	0.8	460
1	0.65	470

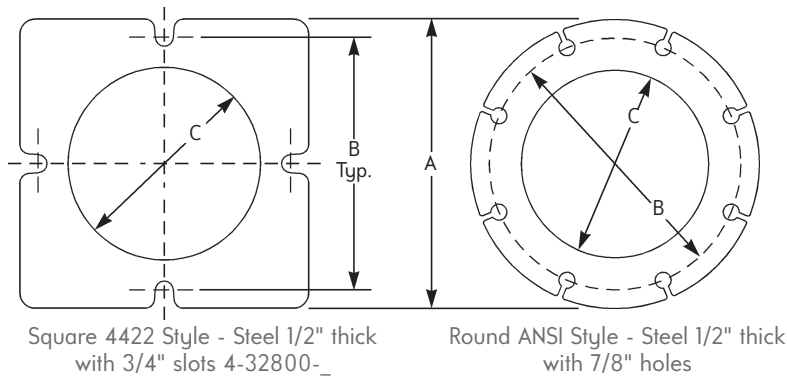
Burner Size	%Excess Air Limits for Gas and (#2 Oil)	%Excess Fuel Limits, Gas and (Oil) 27.7" w.c.	Flame Length Gas and (Oil) Feet 27.7" w.c. Air P. 10% XSA
4419-6-A	600 (100)	30 (30)	4 (4)
4419-6-B	400 (100)	20 (30)	4 (5)
4419-7-A	600 (100)	20 (30)	5 (6)
4419-7-B	800 (100)	15 (30)	6 (6)

Dimensions | Quick Clean Burner

BURNER DIMENSIONS inches

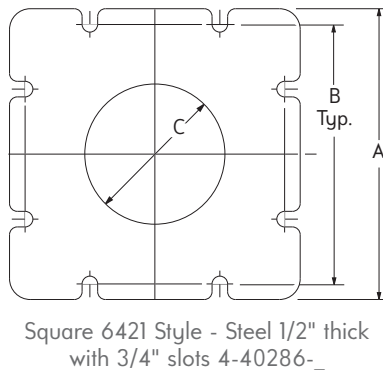


OPTIONAL MOUNTING FLANGES



	A	B	C	
Square	4-32800-1	12	10 1/2	6 3/4
	4-32800-2	12	10 1/2	8 3/4
	4-32800-3	13 1/2	12 1/4	6 3/4
	4-32800-4	13 1/2	12 3/4	8 3/4

	A	B	C	
Round	8767E-8	11	9 1/2	6 1/16
	4-33071-1	13 1/2	11 3/4	6 1/16
	8767E-9	13 1/2	11 3/4	8 3/4

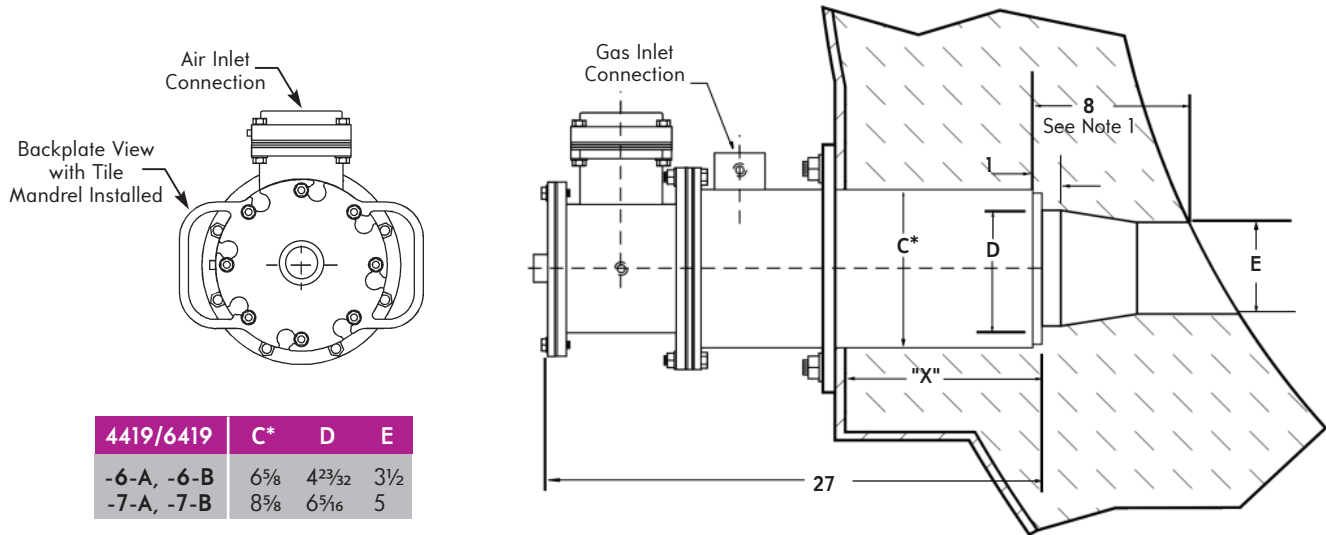


	A	B	C	
Square	4-40286-1	14	12 1/2	6 3/4
	4-40286-2	14	12 1/2	8 3/4
	4-40286-3	16	14 3/4	6 3/4
	4-40286-4	16	14 3/4	8 3/4

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.

Installation Instructions | Quick Clean Burner

REFRACTORY DIMENSIONS inches



* C = diameter of outer burner tube (becomes part of mandrel during installation).

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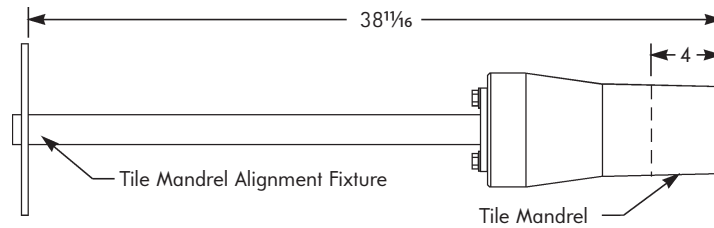
INSTRUCTIONS

- It is important to maintain the 8" tile dimension as shown in illustration above.
- Determine burner insertion dimension "X", taking into consideration actual wall thickness and making allowance for required 8" tile dimension.
- Attach burner mounting studs to furnace casing and provide burner access hole in furnace casing using burner mounting flange as a template.
- Secure burner mounting flange to outer burner tube as required to provide insertion dimension "X" determined above.
- Insert burner into furnace casing access hole, engaging the mounting flange and studs as required to provide the desired location of gas inlet connection.
- Position the air inlet connection as desired by removing the burner body hardware and rotating the burner body as required. Re-attach the burner body using the hardware just removed and the tube gasket shipped loose with the burner.
- Loosen the eight flange-head hex bolts that secure the burner backplate to the body. Rotate the burner backplate counterclockwise until the bolt heads are aligned with the enlarged portion of the backplate mounting holes. Carefully withdraw the backplate assembly and store in a safe location.
- Install mandrel assembly shown on page 2 and secure mandrel mounting plate to burner body by re-tightening the eight flange-head hex bolts from step 7.
- With the tile mandrel properly secured to and aligned with the burner, the burner tile can be formed by the application of a suitable refractory material (usually cast or rammed) around the tile mandrel.
- To provide a suitable transition between the burner and tile, the cast or rammed refractory should penetrate far enough into the opening around the burner to engage several inches of the outer burner tube, effectively utilizing the outer burner tube as part of the mandrel. (See dimension "C".)
- Make sure that a suitable mold release agent (Penreco® Cream, Crete-Lease®, etc.) is applied to all wetted surfaces to assist in mandrel and burner removal once the refractory sets up.
- When re-inserting the backplate assembly, rotate so the UV connection is at 12 o'clock unless otherwise required for low fire oil applications. (See "Flame Supervision" section on page 2.) The backplate gasket is shipped loose with the burner to be installed when re-inserting the backplate assembly.

Installation Instructions | Quick Clean Burner

OPTIONAL TILE MANDRELS FOR RAMMED AND POURED WALLS

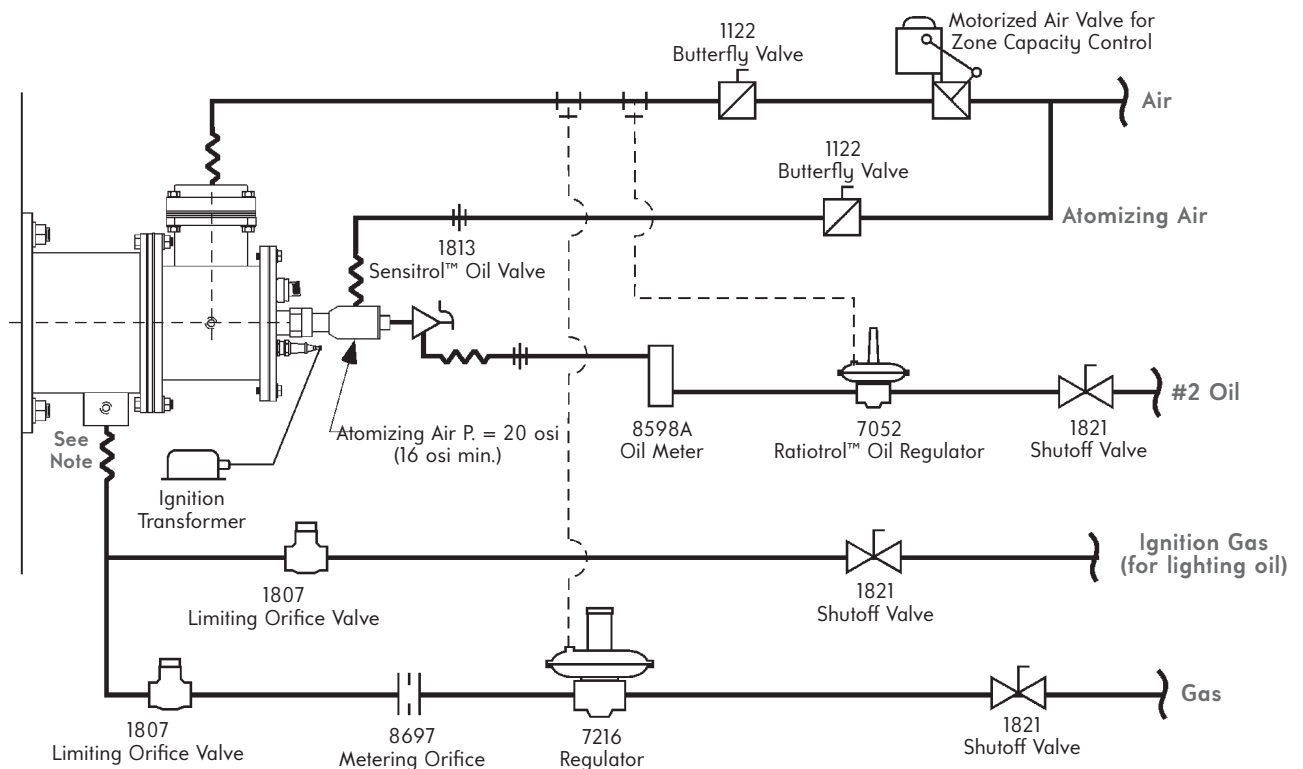
The 4419/6419 MHF burner requires a tile that is formed by ramming or pouring refractory around a mandrel in the furnace wall. North American can supply an alignment fixture with a nickel plated aluminum mandrel. The alignment fixture holds the mandrel in the correct location relative to the burner exit. The nose of the mandrel also has 4" of extra length to accommodate curved wall construction.



4419/6419	-6-A, -6-B	-7-A, -7-B
Tile Mandrel	4-33092-1	4-33093-1
Tile Mandrel Alignment Fixture	4-33094-1	
Tile Mandrel Assembly	4-32490-1	4-42129-1

TYPICAL RATIO CONTROL PIPING SCHEMATIC

Does not include gas train components. Atomizing air and oil lines are not used on the 4419 gas only version.

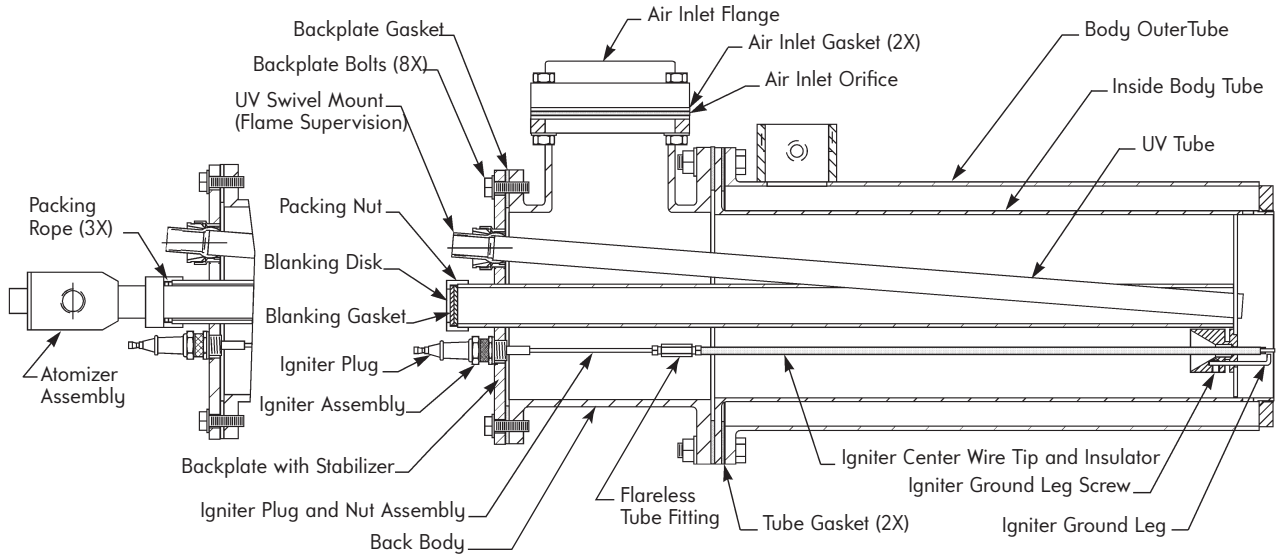


NOTE: Gas connection is shown at bottom for clarity. Whenever possible gas and air connections should not be located at the bottom of the burner on dual fuel applications.

Ordering Information & Parts List | Quick Clean Burner

419 -		Size Code	Air Inlet	Air capacity at 27.7" w.c.
Fuel Selection	4 for Gas Only	-6-A	3"	11,000 scfh
	6 for dual Fuel (Gas and #2 Oil)	-6-B	3"	16,000 scfh
		-7-A	4"	26,300 scfh
		-7-B	4"	36,000 scfh

Examples: 4419-6-A Gas Only 11,000 cfh Air at 27.7" w.c.
6419-7-A Dual Fuel 27,500 cfh Air at 27.7" w.c.



Part Name	Burner designation			
	-6-A	-6-B	-7-A	-7-B
Air Inlet Flange	4-1695-4	4-1695-4	4-1695-5	4-1695-5
Air Inlet Gasket			4-5371-3	
Air Inlet Orifice	4-33089-1	4-33089-2	4-33089-3	4-33089-4
Back Body			4-33088-1	
Backplate with Stabilizer	4-33082-1	4-33082-1	4-33083-1	4-33083-1
Backplate Bolts			R069-2500-C	
Backplate Gasket			4-33081-1	
Blanking Disk (4419 only)			4-33080-1	
Blanking Disk Gasket (4419 only)			4-33079-1	
Body Outer Tube	4-41784-1	4-41784-1	4-41783-1	4-41783-1
Flareless Tube Fitting			R916-7500-B	
Igniter Assembly (complete)			4-33009-1	
Igniter Plug and Nut Assembly			4-33009-3	
Igniter Center Wire Tip and Insulator			4-33009-2	
Igniter Ground Leg			4-33073-1	
Igniter Ground Leg Screw			R776-2030-B	
Inside Body Tube	4-33075-1	4-33075-1	4-33074-1	4-33074-1
Observation Port			8790-0	
Oil Atomizer Assembly (6419 only)			3-20358-1	
Packing Nut			4-33072-1	
Packing Rope 3 x 3½" (6419 only)			R540-0120	
Sensitrol™ Oil Valve (6419 only)*	1813-02-A	1813-02-B	1813-02-C	1813-02-C
Tube Gasket			OA3-2302-25F4	
UV Swivel Mount Assembly			4-32740-1	
UV Tube	4-33090-1	4-33090-1	4-42642-1	4-42642-1

* Recommended 1813 Sensitrol Valve is not included as part of burner assembly and must be ordered separately.



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