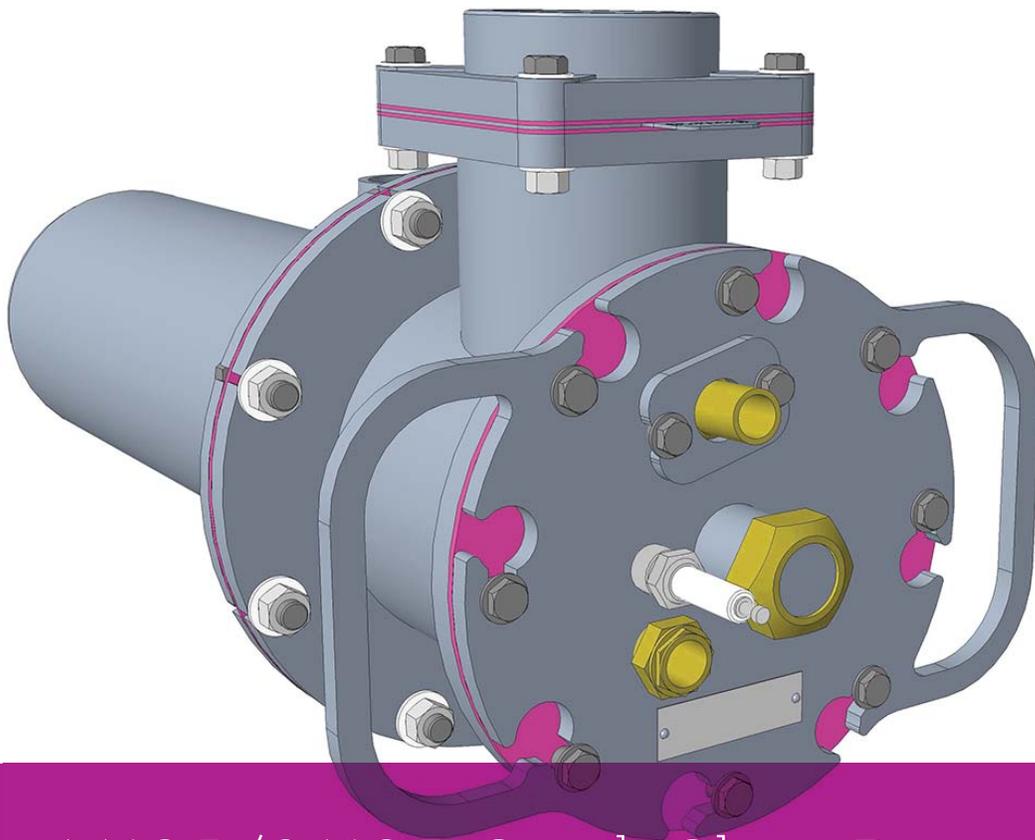




## North American Low Emissions Quick Clean Burner



### 4419A/6419A Quick Clean Burner

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

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# Features | Quick Clean Burner

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## **MULTIPLE HEARTH FURNACES**

The 4419 Series 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 Series 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 flame 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 flame detector, 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 series 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 igniter and igniter ground leg are easily replaced without special tools. It's always a good idea to stock a few spare igniters and ground legs.

## **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 the 4419 Series Burners. When burning #2 fuel 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 series has an internally purged flame detector 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 UV 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 Series UV flame detector is a 1/2" MPT fitting. Refer to Bulletin 8832 for choices of UV flame detectors and adapters.

# Features & Capacities | Quick Clean Burner

## DUAL FUEL OPTION and OPERATION

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

When operating with #2 fuel 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 series 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 fuel 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

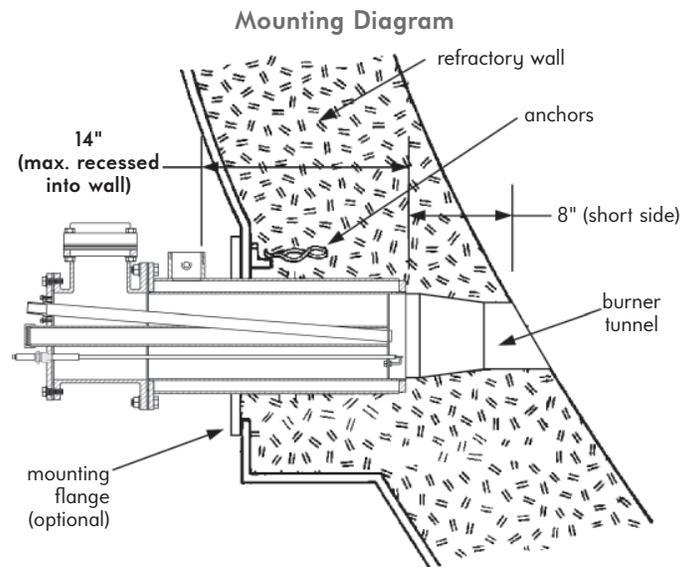
The burner body, backplate and flanges are made from steel, and the body tubes and flame stabilizer from stainless steel. The gas inlet coupling can be rotated independently of the air connection in 45° increments to aid in gas piping.

## 4419A/6419A UPDATED DESIGN

4419 series burners built after mid 2020 have an updated design and are designated as 4419A/6419A. Several parts have been simplified, but all the input connection dimensions and capacities are the same as the previous design.

The updated parts include:

- Inner and outer body tubes combined into one assembly
- UV swivel mounting plate
- 14 mm igniter with single electrode
- Replaceable igniter ground rod assembly
- Relocated body air pressure tap



## 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	
4419A-6-A	1,400	1,950	5,350	8,300	11,000	5.9" w.c.
4419A-6-B	2,700	3,800	7,600	10,750	16,000	10.4" w.c.
4419A-7-A	3,800	6,700	11,320	16,250	26,300	9.2" w.c.
4419A-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
4419A-6-A	600 (100)	30 (30)	4 (4)
4419A-6-B	400 (100)	20 (30)	4 (5)
4419A-7-A	600 (100)	20 (30)	5 (6)
4419A-7-B	800 (100)	15 (30)	6 (6)

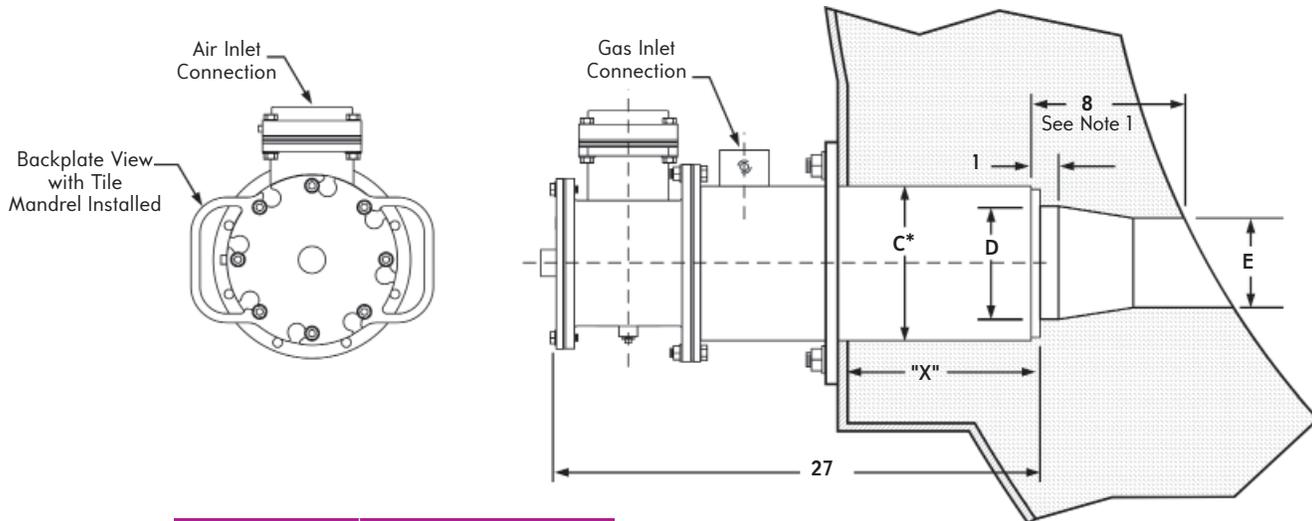
Burner Air Pressure	4419/6419 Minimum Natural gas flow (cfh) for lighting at low fire			
	-6-A	-6-B	-7-A	-7-B
1.7" w.c.	40	60	80	100
0.4" w.c.	20	35	50	75

4419 and 4419A burners have the same capacity and performance.



# Installation Instructions | Quick Clean Burner

## REFRACTORY DIMENSIONS inches



4419/6419 Series	C*	D	E
-6-A, -6-B	6 <sup>5</sup> / <sub>8</sub>	4 <sup>23</sup> / <sub>32</sub>	3 <sup>1</sup> / <sub>2</sub>
-7-A, -7-B	8 <sup>5</sup> / <sub>8</sub>	6 <sup>5</sup> / <sub>16</sub>	5

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

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.

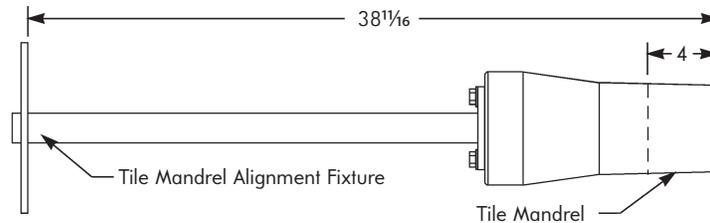
## INSTRUCTIONS

- 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 6 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

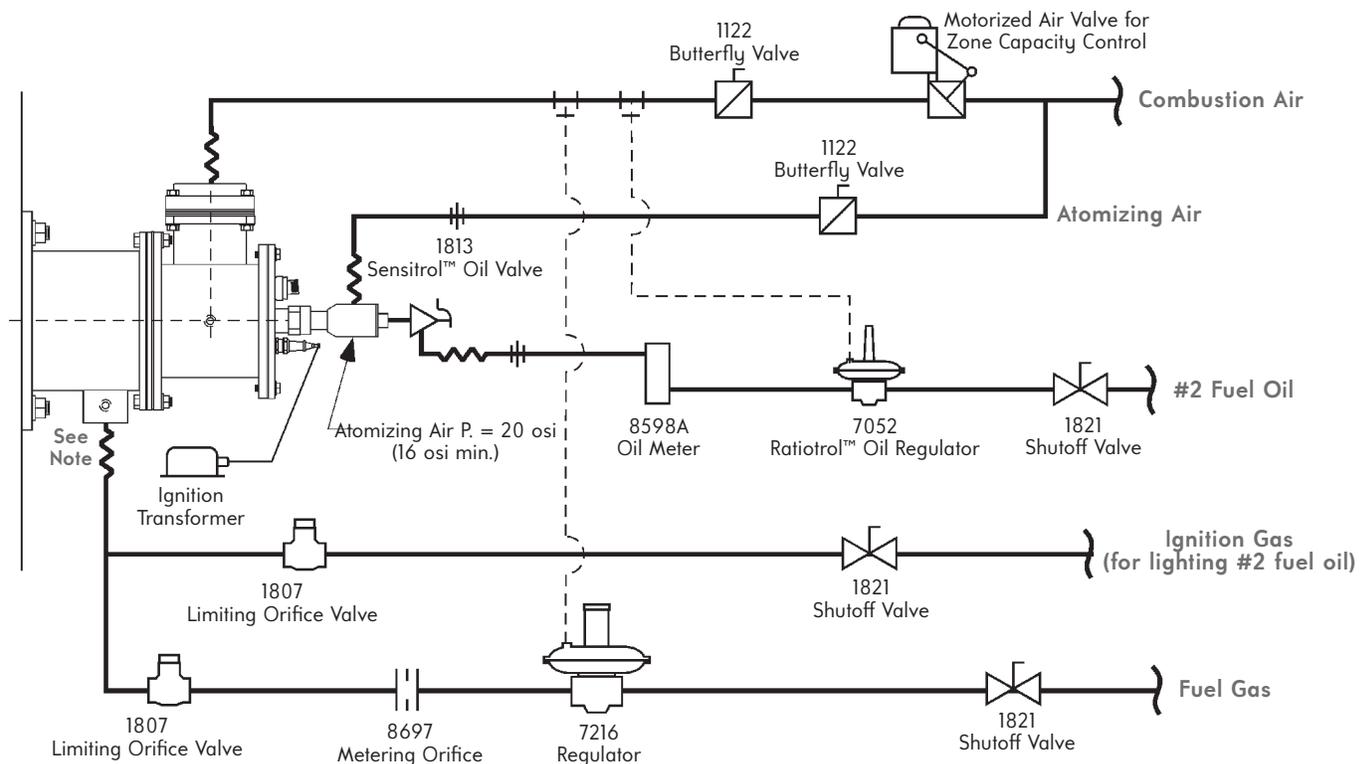
The 4419/6419 series burner requires a tile that is formed by ramming or pouring refractory around a mandrel in the furnace wall. Fives North American can supply an alignment fixture with a nickel plated aluminum mandrel. The alignment fixture holds the mandrel in the correct location relative to the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



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

## TYPICAL RATIO CONTROL SCHEMATIC

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

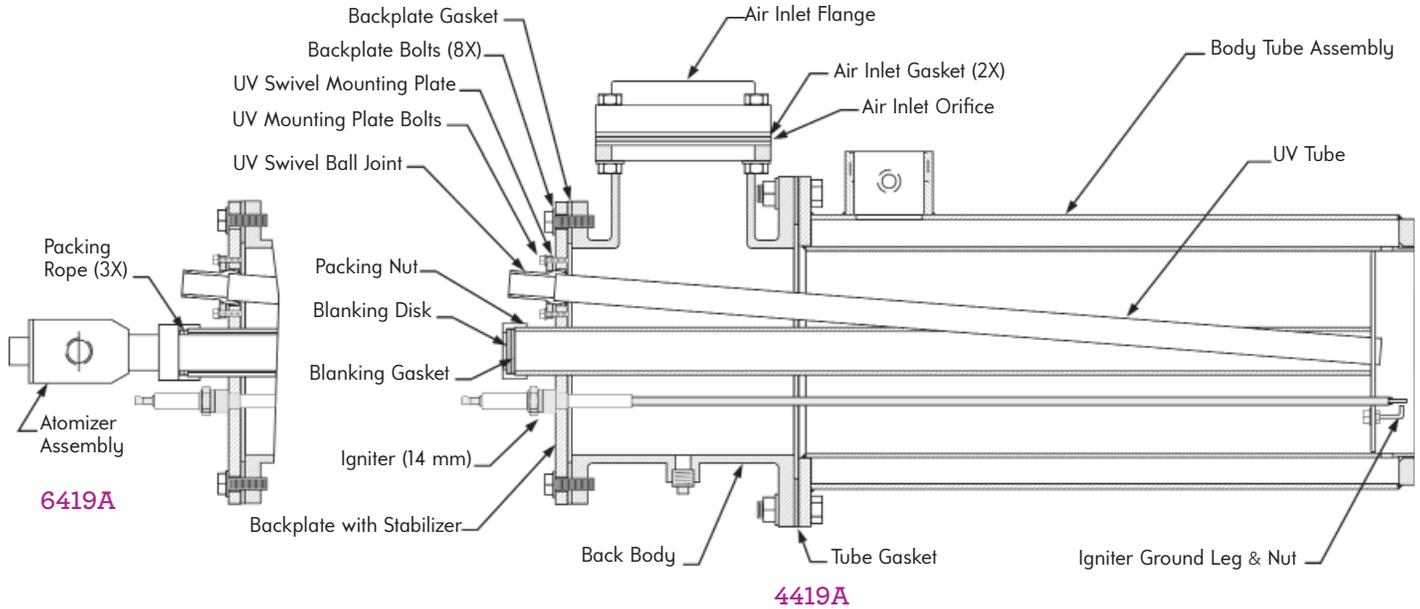


**NOTE:** Gas connection is shown at bottom for clarity. Whenever possible gas and air connections should not be located at the bottom of the burner on dual fuel applications.

# Ordering Information & Parts List | Quick Clean Burner

Fuel Selection	419A -		Size Code	Air capacity	
				Air Inlet	at 27.7" w.c. (16 osi)
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: 4419A-6-A Gas Only 11,000 cfh Air at 27.7" w.c. (16 osi)  
 6419A-7-A Dual Fuel 27,500 cfh Air at 27.7" w.c. (16 osi)



Part Name	4419A/6419A Series 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 (Air Inlet)			4-33088-1	
Backplate with Stabilizer	4-57850-1	4-57850-1	4-57850-1	4-57850-1
Backplate Bolt (8 req'd)			R069-2500-C	
Backplate Gasket			4-33081-1	
Blanking Disk (4419 only)			4-33080-1	
Blanking Disk Gasket (4419 only)			4-33079-1	
Body Tube Assembly (Gas Inlet)	4-57858-1	4-57858-1	4-57858-1	4-57858-1
Igniter (14mm Thread)			4-56298-5	
Igniter Ground Leg & Nut			4-57868-1	
Observation Port			8790-0	
Oil Atomizer Assembly (6419 only)			3-20358-1	
Packing Nut			4-33072-1	
Packing 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 Ball Joint			4-32717-1	
UV Swivel Mounting Plate			4-57865-1	
UV Swivel Mounting Plate Bolt (2 req'd)			R069-2620-C	
UV Detection Tube	4-33090-1	4-33090-1	4-42642-1	4-43642-1

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

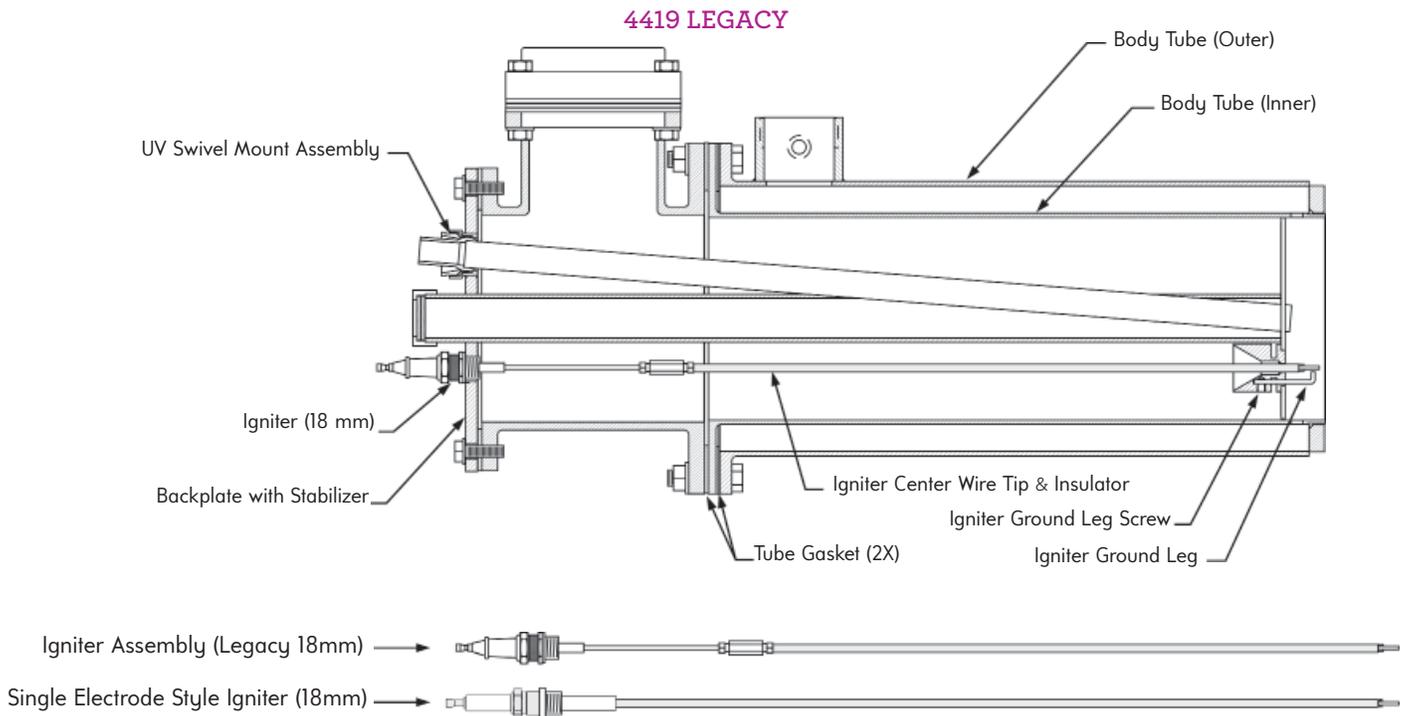
# 4419 Legacy & Parts List | Quick Clean Burner

## 4419 LEGACY DESIGN

4419 series burners use a common air inlet body and uniform body tube length. This allows parts to be shared across burner sizes. 4419 Legacy burners built between 2004 mid 2020 have the same basic design and dimensions as the newer 4419A, but a few parts are different. The list below shows parts unique to the older 4419 legacy design.

## 4419 IGNITER OPTIONS

The 4419 Legacy burners used an older 18mm igniter multi part electrode design, while the newer 4419A uses a 14mm design with a single electrode, fully covered with a ceramic insulator. The new style igniter can be used with the older 4419 Legacy burners by ordering part number 4-57882-1. It includes a 18 X 14 mm adapter and a slightly longer electrode to compensate for the extra adapter length.



Legacy Part Name	-6-A	4419 /6419 Legacy Burner designation -6-B	-7-A	-7-B
Backplate with Stabilizer	4-33082-1	4-33082-1	4-33083-1	4-33083-1
Body Tube (Inner)	4-33075-1	4-33075-1	4-33074-1	4-33074-1
Body Tube (Outer) with Gas Inlet	4-41784-1	4-41784-1	4-41783-1	4-41783-1
Igniter Assembly (Legacy 18mm)			4-33009-1	
Igniter Center Wire Tip & Insulator			4-33009-2	
Igniter Ground Leg			R4-33073-1	
Igniter Ground Leg (¼" longer)			4-33073-2	
Igniter Ground Leg Screw			R776-2030-B	
Single Electrode Style Igniter (w/18mm adapter)			4-57882-1	
UV Swivel Mount Assembly			4-32740-1	

**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.

## CONTACT

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