

# North American Combustion Burners



## 4485 Tempest® SE Gas Burner

- Low NOx - DMC Mode capable to achieve Ultra Low NOx emissions
- NPT or BSP air/gas inlets, adjustable in 90° increments
- Low air pressure requirement
- 500,000 to 1,500,000 Btu/h HHV
- Multiple tile options for medium and high velocity
- Flame rod or UV flame detection
- Direct spark ignition

# The North American Tempest® SE Gas Burner

The legacy of the North American brand continues with the new Tempest® SE.

Built with the quality people have trusted for nearly 100 years, the new Tempest® SE is a direct fire, nozzle-mix burner that performs. This burner features temperature uniformity, product quality, and system efficiency through an intense stream of hot gases.

The Tempest® SE is available in 4 sizes, with capabilities ranging from 500,000 Btu/h HHV (132 kW, LHV) to 1,500,000 Btu/h HHV (396 kW, LHV) and can be adapted to ambient or preheated combustion air.

## NEXT LEVEL HIGH VELOCITY FLAME

### New Level Fuel and Control

The Tempest® SE gives you the choice of pulse firing, excess air, or stoichiometric.

### Wide Turndown Range

With the Tempest® SE you can count on high velocity benefits and efficiencies by means of a wide turndown range with high excess air.

### Direct Spark

The Tempest® SE delivers the ability to light anywhere through a spark ignition system.

The Tempest® SE features components pre-engineered to meet your specific requirements. With the Tempest® SE you choose the capacity range, tile type, fuel type, thread type and flame sensing components to fit your needs.

## TYPES OF APPLICATIONS

- Periodic kilns
- Tunnel kilns
- Forge furnaces
- Heat treat furnaces
- Galvanizing baths
- Scrap preheaters
- Carbon baking furnaces
- Cupolas
- Pipe coaters
- Portable refractory dry out
- Preheat equipment
- Tempering furnaces
- Reheating furnaces
- Hardening furnaces
- Fluidized bed dryers
- Thermal oxidizers
- Non-ferrous melting
- Ladle/tundish, glass lehrs

## PERFORMANCE BENEFITS

- Low NOx emissions
- Direct spark ignition
- Integral air and gas metering orifices
- Sturdy cast construction
- Wide operating limits
- Low air pressure requirement
- Four tile types, two velocity options
- Lightweight



# North American Tempest® Gas Burner Performance Data

- **Combustion Air Requirement:** 16-17.5"w.c. (4.0-4.4 kPa) at maximum input, maximum preheat 400°F (204°C)
- **Fuel:** Natural Gas, Propane.
- **Flame Supervision:** Flame rod or UV detector. Flame rods can be used up to 2200°F (1204°C) operating temperature. UV detectors can be used to maximum operating temperature. Consult National Safety Standards and insurance underwriters for specific flame supervision requirements.
- **Ignition:** Direct spark (no pilot) with 6000 V transformer. Full-wave spark transformer required, one per burner.
- **Control:** Excellent performance with all control systems; on-ratio and thermal turndown.
- **Relight:** Tempest® SE burners require spark for re-ignition. They will not relight from a hot tile or furnace.
- **Piping:** For cross-connected systems, maximum gas pressure at the burner can be adversely impacted by excessive pressure drop in the gas line between the ratio regulator and the burner. The design, selection, and installation of these systems must take into account the gas pressure required at the burner to achieve the desired heat release (i.e. gas flow).

## 4485 NATURAL GAS PERFORMANCE DATA

Burner Size	-5A	-5B	-6A	-6B
Maximum Input, Btu/h (kW) <sup>①</sup>	500,000 (132)	750,000 (198)	1,000,000 (264)	1,500,000 (396)
Minimum Input On-Ratio, Btu/h (kW) <sup>①</sup>	50,000 (13)	75,000 (20)	100,000 (26)	150,000 (40)
Minimum Input Fixed Air, Btu/h (kW) <sup>①</sup>	10,000 (3)	15,000 (4)	20,000 (5)	30,000 (8)
Gas Inlet Pressure Required, "w.c. (mbar)	16.2 (40)	13.8 (34)	12.5 (31)	14.5 (36)
Air Inlet Pressure Required "w.c. (mbar) 15% Excess Air at Maximum Input	16.7 (42)	16.0 (40)	16.5 (41)	17.5 (44)
High Fire Flame Length, inches (mm)	25 (635)	28 (711)	33 (835)	38 (965)
Approximate Flame Velocity, ft/s (m/s) 15% Excess Air at Maximum Input <sup>②</sup>	540 (165)	480 (146)	630 (192)	680 (207)
Maximum % XSA at Maximum Input	50	50	50	50
Maximum % XSA at Minimum Input	7,500	7,500	7,500	7,500

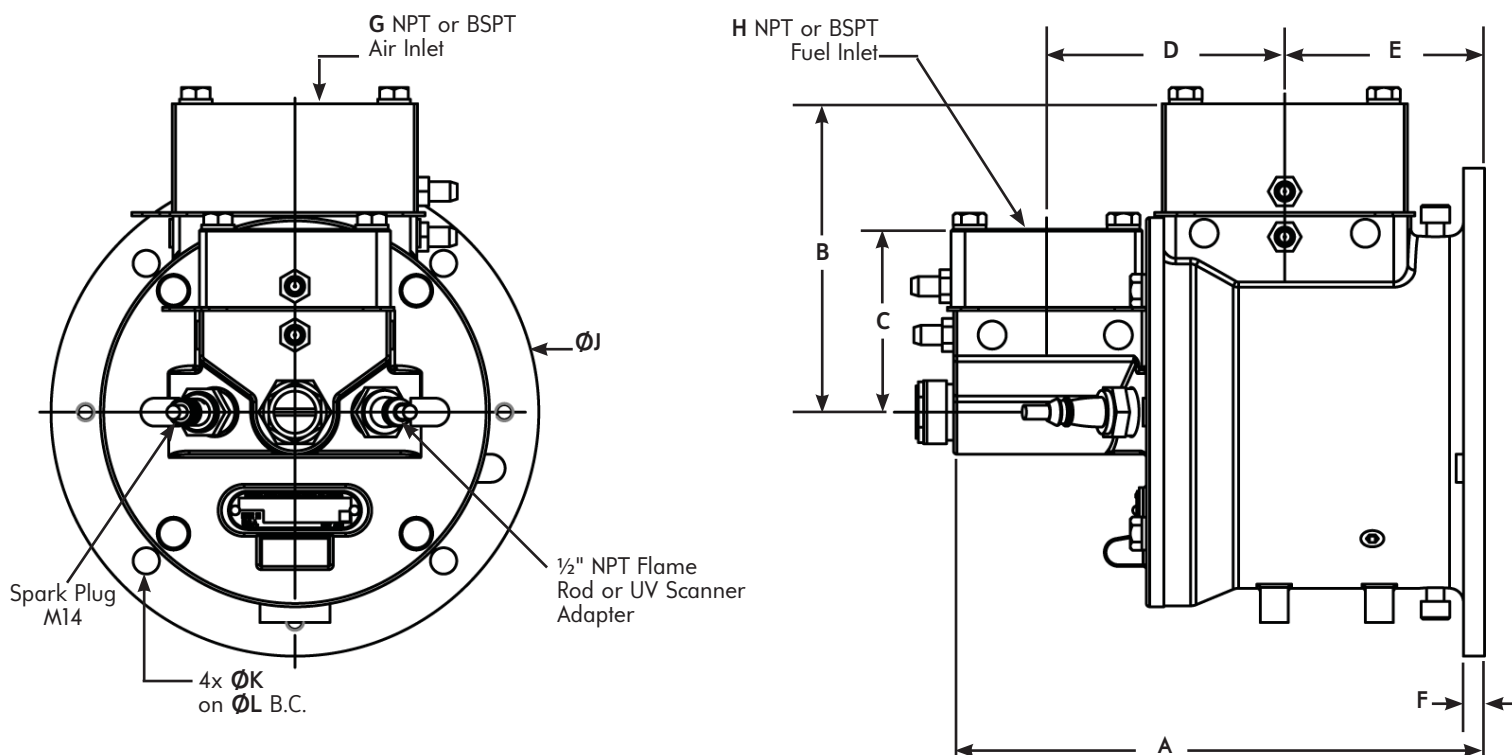
<sup>①</sup>Imperial inputs based upon gross calorific values (HHV). All metric inputs based on net calorific values (LHV).

<sup>②</sup>Velocity noted references high velocity tile option

DIMENSIONS and SPECIFICATION

BURNER HOUSING

DIMENSIONS, inches (mm)



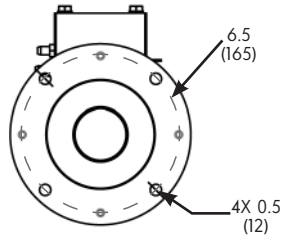
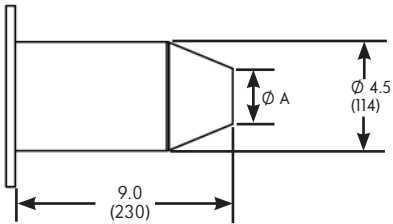
5A/5B Burner weight less tile: 28 lbs. (12.7 Kg)  
6A/6B Burner weight less tile: 39 lbs. (17.7 Kg)

dimensions in inches (mm) or NPT (BSPT)											
Part Number	A	B	C	D	E	F	G	H	J	K	L
4485-5A	8.4 (214)	5.1 (129)	3.1 (78)	3.7 (93)	3.4 (87)	0.4 (9)	2½	1	7.5 (190)	0.5 (12)	6.5 (165)
4485-5B	8.4 (214)	5.1 (129)	3.1 (78)	3.7 (93)	3.4 (87)	0.4 (9)	2½	1	7.5 (190)	0.5 (12)	6.5 (165)
4485-6A	9.5 (240)	5.5 (140)	3.2 (81)	4.1 (105)	3.6 (92)	0.4 (10)	3	1½	8.7 (220)	0.5 (12)	7.5 (190)
4485-6B	9.5 (240)	5.5 (140)	3.2 (81)	4.1 (105)	3.6 (92)	0.4 (10)	3	1½	8.7 (220)	0.5 (12)	7.5 (190)

Dimensions are nominal. Please obtain certified prints from Fives North American Combustion, Inc. If space limitations or other considerations make dimension(s) critical.

TILES

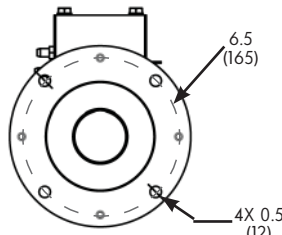
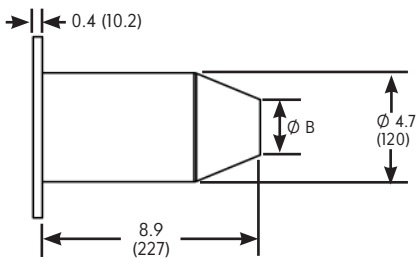
5A/5B DIMENSIONS, inches (mm)



**310 Alloy Tile:**

5A/5B weight: 2.7 lb (1.2 kg)

Maximum chamber temp: 1750°F (950°C)

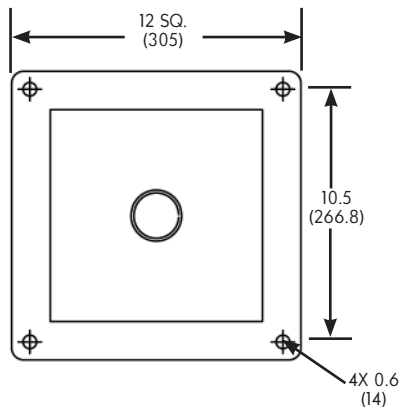
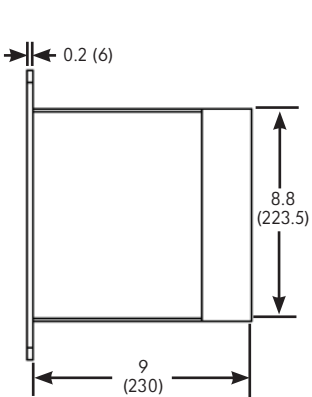


**Silicon Carbide Tile:**

5A/5B weight: 5 lb (2.3 kg)

Maximum chamber temp: 2500°F (1371°C)

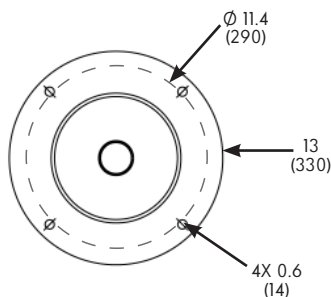
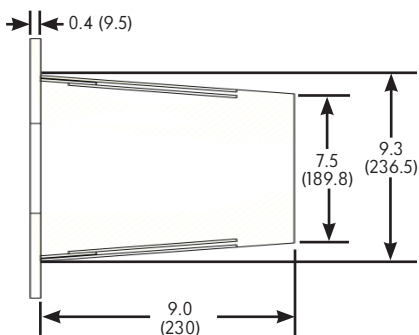
Dimensions	High Velocity 5A/5B	Medium Velocity 5A/5B
$\varnothing A$	1.8/2.3 (45/58)	2.2/3.1 (57/78)
$\varnothing B$	2.0/2.5 (51/64)	2.5/3.3 (64/84)



**Square Refractory Tile:**

5A/5B weight: 69 lb (31.3 kg)

Maximum chamber temp: 2800°F (1535°C)



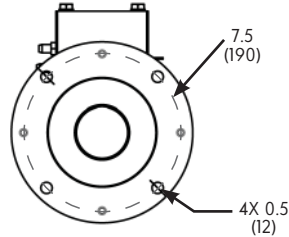
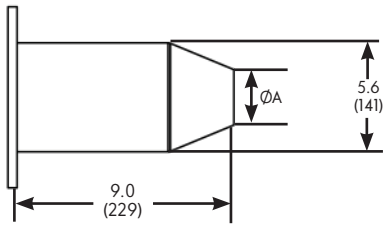
**Round Refractory Tile:**

5A/5B weight: 54 lb (24.5 kg)

Maximum chamber temp: 2800°F (1535°C)

TILES

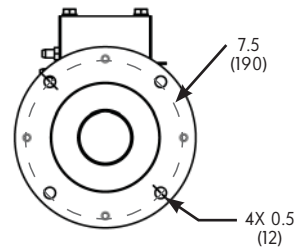
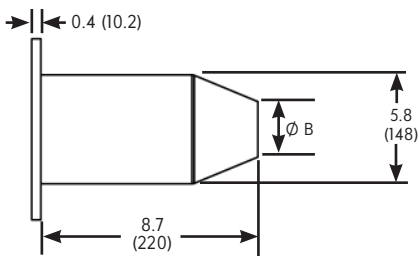
6A/6B DIMENSIONS, inches (mm)



**310 Alloy Tile:**

6A/6B weight: 3.1 lb (1.4 kg)

Maximum chamber temp: 1750°F (950°C)

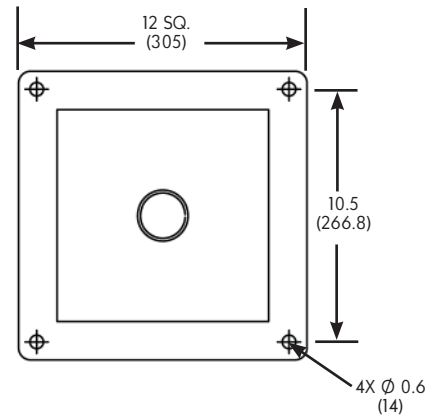
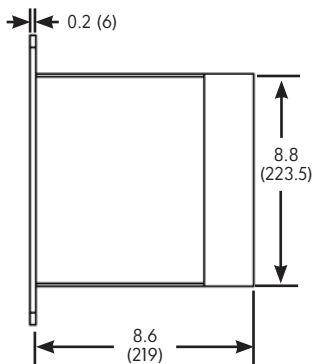


**Silicon Carbide Tile:**

6A/6B weight: 6 lb. (2.7 kg)

Maximum chamber temp: 2500°F (1371°C)

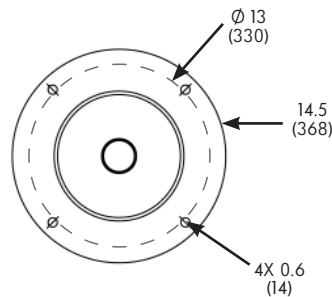
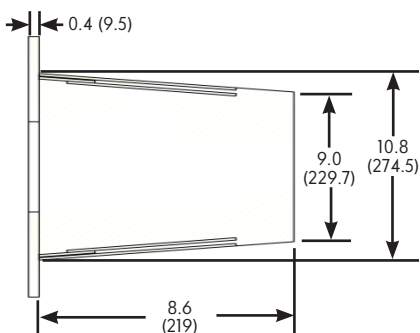
Dimensions	High Velocity 6A/6B	Medium Velocity 6A/6B
Ø A	2.3/2.6 (58/67)	3.2/3.7 (80/93)
Ø B	2.5/2.9 (64/74)	3.4/3.9 (87/99)



**Square Refractory Tile:**

6A/6B weight: 62 lb (28.1 kg)

Maximum chamber temp: 2800°F (1535°C)



**Round Refractory Tile:**

6A/6B weight: 37 lb (30.4 kg)

Maximum chamber temp: 2800°F (1535°C)

## TILE OPTIONS

Tile materials and shapes to suit your specific needs.

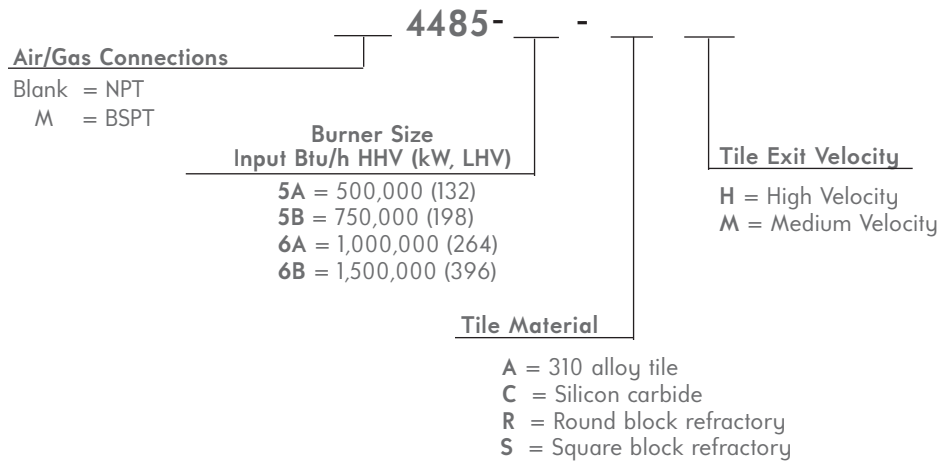
**“A” Tile (standard)** — 310 SST alloy tile for applications up to 1750F (954C).

**“C” Tile** — Silicon carbide tile for fiber wall and most applications up to 2500°F (1371°C).

**“R” Tile** — Round refractory block for applications to 2800°F (1535°C). **Note: Recommended only for installation in solid wall construction furnaces/kilns.**

**“S” Tile** — Square refractory block for applications to 2800°F (1535°C). **Note: Recommended only for installation in solid wall construction furnaces/kilns.**

## ORDERING INFORMATION



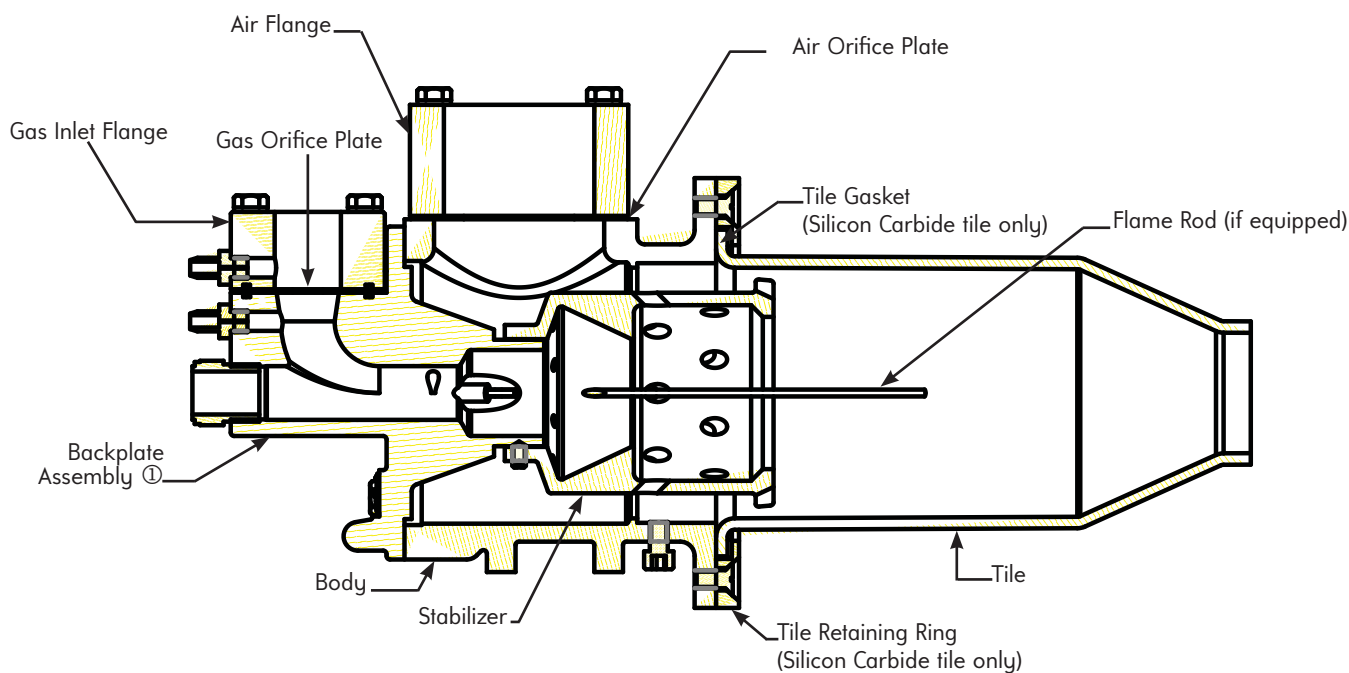
### Examples:

4485-6A-AH – 1,000,000 Btu/h HHV (264 kW LHV) capacity burner with NPT air/gas connections, 310 alloy tile and high velocity tile outlet.

M4485-5B-CH – 750,000 Btu/h HHV (198 kW LHV) capacity burner with BSPT air/gas connections, silicon carbide tile and high velocity tile outlet.

4485-6B-CM – 1,500,000 Btu/h HHV (396 kW LHV) capacity burner with NPT air/gas connections, silicon carbide tile and medium velocity tile outlet.

4485 SPARE PARTS LIST



Part Name	5A	5B	6A	6B
Burner only (less tile) -NPT	4485-5A-BO	4485-5B-BO	4485-6A-BO	4485-6B-BO
Burner only (less tile) -BSP	M4485-5A-BO	M4485-5B-BO	M4485-6A-BO	M4485-6B-BO
Body	4-55362-1	4-55362-1	4-55491-1	4-55491-1
Air inlet flange ③	4-55633	4-55633	4-55634	4-55634
Gas inlet flange ③	4-55364	4-55364	4-55493	4-55493
Stablizer	4-55523-1	4-55369-1	4-55498-1	4-55498-1
Backplate assembly ①③	4-55659	4-55660	4-55661	4-55662
Air orifice plate	4-55522-1	4-55367-1	4-55496-1	4-55526-1
Gas orifice plate	4-55521-1	4-55365-1	4-55494-1	4-55524-1
310 SST Alloy tile (High Velocity)	4-55635-1	4-55360-1	4-55490-1	4-55520-1
310 SST Alloy Tile (Medium Velocity)	4-55360-1	4-55730-1	4-55731-1	4-55732-1
Silicon carbide tile (High Velocity)	4-55528-1	4-55373-1	4-55507-1	4-55532-1
Silicon carbide tile (Medium Velocity)	4-55373-1	4-55720-1	4-55721-1	4-55722-1
Silicon carbide tile assembly (High Velocity)②	4-55663-1	4-55664-1	4-55665-1	4-55666-1
Silicon carbide tile assembly (Medium Velocity)②	4-55664-1	4-55757-1	4-55728-1	4-55729-1
Round refractory block tile (High Velocity)	4-55542-1	4-55499-1	4-55640-1	4-55642-1
Round refractory block tile (Medium Velocity)	4-55499-1	4-55751-1	4-55752-1	4-55753-1
Square refractory block tile (High Velocity)	4-55530-1	4-55537-1	4-55540-1	4-55543-1
Square refractory block tile (Medium Velocity)	4-55537-1	4-55743-1	4-55744-1	4-55745-1
Tile retaining ring	4-55374-1	4-55374-1	4-55508-1	4-55508-1
Tile gasket	4-55375-1	4-55375-1	4-55509-1	4-55509-1
Spark plug	4-55370-1			
Flame rod	R240-2750			

① Backplate assembly includes backplate, gas inlet flange, gas orifice plate, pressure taps and o-ring.  
 ② Assembly includes tile, tile retaining ring and tile gasket  
 ③ Use "-1" suffix for NPT, "-2" for BSPT.





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