

Product Overview | Metering Orifice

8697 and M8697 Metering Orifices accurately measure gas flows to industrial burners. They are compact, inexpensive, and can be installed in individual burner gas lines to expedite adjustment of air/fuel ratio. They allow easy checking of operation while burners are firing.

Individual metering orifices are a great convenience on multi-burner furnaces, facilitating setting all burners the same or in desired gradients. Some installations add a larger 8697 Metering Orifice (upstream of the individual units) for continuous metering of total gas consumption in a zone or for the whole furnace.

Many plants also use 8697 Metering Orifices in burner air lines to enable precise matching flows of combustion air and gas.

FEATURES

8697 Sizes: ½" through 4" pipe size
M8697 Sizes: ½" through 2" in ISO 7-Rp

Nominal flows: 90 cfh to 15,700 cfh natural gas
(2.5 m³/h to 444.6 m³/h)

Body material: Cast iron

Maximum design pressure: 25 psig
Maximum design temperature: 150°F
Minimum design temperature: -20°F

Flexibility: Each orifice holder offers a choice of seven or eight plates that can be exchanged without removing holder from pipe. This allows convenient on the job tailoring of the meter to fit its requirements.

INSTALLATION

10 Straight clean pipe diameters upstream, 4 diameters downstream, without valves or fittings.

For maximum accuracy, readings must be corrected for:
gas (or air) line pressure
gas (or air) temperature
barometric pressure
Sheets 8697-3 and 8697-5 deal with correction factors

Observe straight pipe run requirements.

Pressure taps should be on top or side of pipe to reduce problems with dirt or condensate collecting in taps or manometer hose.

When pressure is over 3 psi (207 mbar), remove hose barbs and install tube fittings to use metal tubing, rather than hose, between metering orifice and manometer.

When metering oxygen, use specially cleaned pipe and oxygen approved differential-pressure gauges and equipment.

Models:

8697--A: Standard meter for air and fuel gases up to 25 psi (1.7bar)* pressure.

8697--C: Meter specially cleaned for oxygen service up to 25 psi (1.7bar)pressure.

SELECTING AN ORIFICE

1. Determine high fire air flow rate at the burner.
2. Determine corresponding gas flow rate: (For typical natural gas, divide air flow by 11 to determine gas flow.) See table below for other air/gas volume ratios.
3. Select next smaller orifice plate capacity from Table B1 (realize that the plate capacity is offered in a number of different pipe size holders).

* Maximum allowable pressure is 3 psig on all 8697A series orifice holders manufactured prior to October 2011.

Fuel Gases	Air/gas volume ratios (10% XSAir and typical fuels)
natural gas	11
propane	26.2
butane	33.6
coke oven gas	5.3

Example:

1. A 4422-7-A Burner passes 27,000 cfh air at 16 osi (assuming 16 osi represents "high fire" for this example).
2. Corresponding natural gas flow is 2455 cfh.
3. A #2000 plate is preferred because its higher required pressure drop--approximately 5.3"wc--means **low fire** readings will be easier and more accurate.

The 4422-7-A Burner has a 2½" gas connection; a #2000 plate is offered in the 8697-5 (2½") holder (as well as in the -3 [1½"] and -4 [2"] units), so an 8697-5-A2000 Metering Orifice may be the most convenient for this job.