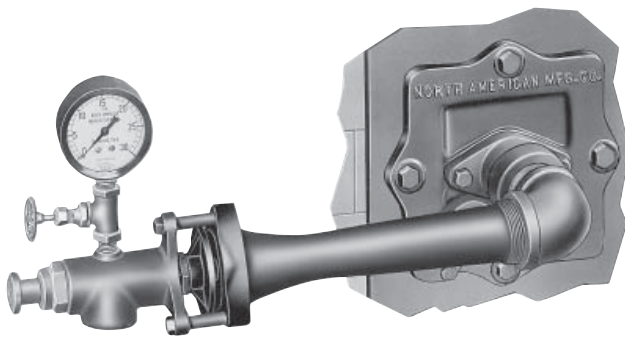


North American Inspirators for Low Btu Gases

Sheet 3080-1

Series 3080 and 3088 Inspirators for Coke Oven Gas (Series 3071 Inspirators for Producer Gas--on page 4)



Series 3080 Inspirator includes clean-out feature shown, but does not include gauge, valve, elbow, or burner.

INSPIRATORS

North American Inspirators use a gas jet to inspire primary air from the atmosphere, thus forming an air-gas mixture for combustion in North American open or sealed-in premix burners. The air/gas ratio is set basically by the size of the gas orifice in the spud, but can be modified by adjusting the air disc to reduce the quantity of air inspired. The inspirator will give a constant air/gas ratio throughout the range of firing rates, provided furnace pressure is atmospheric.

Machining of throats and careful aligning of internals ensures identical performances from all North American Inspirators. The convex inner surface of the inspirator at the approach to the throat follows natural air flow pattern--this superior design by North American results in greater capacity from a more compact inspirator. Capacity tables (on last two pages) are based on atmospheric furnace pressure and 100% primary air, meaning all air for combustion is supplied through the inspirator.

FOR COKE OVEN GAS

North American's Series 3080 Inspirator for dirty coke oven gas has a handy clean-out feature--a push on the plunger at the rear of the inspirator drives a clean-out tip through the gas orifice in the spud, effectively removing any tarry deposits that have accumulated. (If a special spud size is required, the diameter of the clean-out tip must be revised, at extra cost.) The same inspirator without the clean-out feature is designated Series 3088. Size either inspirator by matching or exceeding required cfh of gas (or Btu) in capacity table on 3rd page, using column corresponding to available gas pressure. Read corresponding columns further left for mixture pressure, spud drill, and mixer size. For example, if 400 cfh of gas is required and available pressure is 6 psi, select a 3080-4-1/8" (or 3088-4-1/8") Mixer. Spud drill is 1/2" and mixture pressure 1.14" w.c.

% Air through Inspirator	Capacity factor	Orifice area and mixture pressure factor
90	1.2	1.2
80	1.44	1.44
70	1.76	1.76

Capacities are increased, as shown in above table, if free air in the furnace partially supports combustion so less than 100% primary air need be inspired. To redo the example above, but inspiring 70% primary air, divide the required capacity of 400 cfh by the factor 1.76 and use the answer, 227 cfh, for sizing inspirator, picking this time a 3080-3-40 (or 3088-3-40). The factor 1.76 times the area of a No. 40 drill gives approximately the area of a No. 30 drill which should be specified, and 1.76 times the mixture pressure 0.96 gives 1.69" w.c. as the mixture pressure for this special case.

To prevent flashback, do not operate with mixture pressures lower than 0.4" w.c. at correct air/gas ratio. In general this means the -4 and all smaller sizes should not be operated on ratio with less than 3 psi gas pressure.

Valves: For Series 3080 Inspirator, use a Series 1824K all iron gas valve. For Series 3088, use Series 1826 brass globe valves unless the gas is corrosive to brass, in which case use same as for Series 3080.

FOR PRODUCER GAS

The back page describes the Series 3071 Inspirator for clean, cold producer gas. Sizing of inspirator and use of factors less than 100% primary air is similar to procedure outlined for manufactured gas inspirators.

Metric Conversions	
1 scfh	= 0.028 26 m ³ /h = 0.026 86 nm ³ /h
1 Btu/hr	= 0.2522 kcal/h
1 psi	= 0.0703 kg/cm ²
1" w.c.	= 25.40 mm H ₂ O
1"	= 25.40 mm
1 lb	= 0.4536 kg
1 Btu/ft ³	= 8.899 kcal/m ³
1 osi	= 43.94 mm H ₂ O = 0.004 39 kg/cm ²