SONIC FLOW® Nozzles for AMERICAN Critical Flow Provers

☐ MAXIMUM WORKING PRESSURE 1000 PSIG

☐ COMPATIBLE WITH 2-INCH CRITICAL FLOW PROVER HOLDER

CALIBRATED ACCURACY

±0.15% - Standard Time in Seconds
Nozzle Flow Time for 1 cubic foot of air at 60°F and 24.696 psia

EXCELLENT PRESSURE RECOVERY

For Test at lower line pressure.
Test gas often can be returned to line.

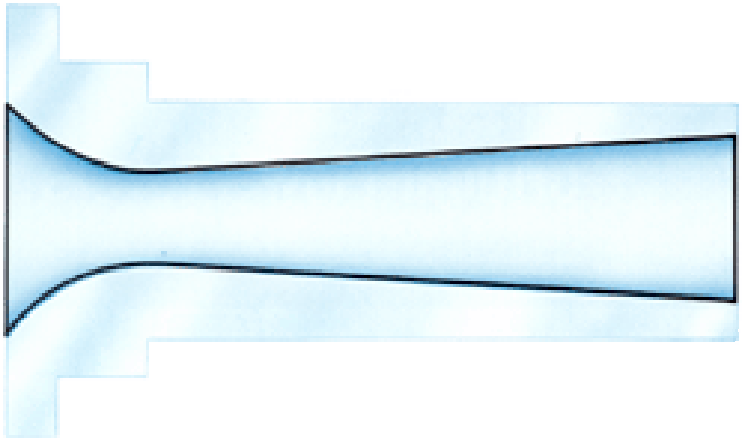
DURABLE

The stainless steel Nozzles are not as susceptible to damage as orifice discs

LOWER NOISE LEVEL

Than when using critical flow orifices.

AMERICAN® METER COMPANY
Measurement Engineers Since 1836



SONIC FLOW Nozzles are designed to be used in the AMERICAN Critical Flow Prover Holders.

SONIC FLOW Nozzles were developed from those proposed by Smith and Matz in 1962. To improve pressure recovery the exit cone angle was reduced and the length of cone was made a function of the throat

TEST PRESSURE RANGE 3.6 to 1000 psig. Because of the excellent pressure recovery SONIC FLOW Nozzles can be used for testing at the low pressure of 3.6 psig (18.3 psia). The Critical Flow Prover Holder is fabricated from extra-heavy seamless steel tubing and is suitable for test pressures to 1000 psig.

PROOF CALCULATIONS NATURAL GAS

Two methods for calculating the proof are available. Method "A" is similar to the method for AMERICAN Critical Flow Provers using oriface discs. Method "B" requires a more detailed knowledge of the composition of the gas used in testing. (Method "B" is recommended for higher pressures and a wider temperature range than Method "A").

Refer to AIM-211

METHOD	TEMPERATURE RANGE	MAXIMUM PRESSURE
A	20°F to 100°F	500 psig
B	0°F to 200°F	1000 psig

CALCULATION METHOD
ALSO GIVEN FOR AIR

CERTIFICATE of ACCURACY for SONIC FLOW NOZZLE SET

SONIC FLOW NOZZLE STANDARD TIME The Standard Time for SONIC FLOW Nozzles is defined as the Time, in seconds, required for one cubic foot of air to pass through the nozzle at 60°F and a 10 psig (24.696 psia) inlet pressure.

The Standard Time and the serial number are stamped on the nozzle. The nozzles are stamped on the flat surface of the exhaust end, or on the exhaust cylinder. The suffix of the serial number indicates the size code.

TEST TIME The Test Time for each run should not be less than one hundred seconds.

TEST VOLUME The Test Volume, determined by (Volume=cf) must be equal to one or more revolutions of the proving hand of the index.

When two or more SONIC FLOW Nozzles are used in parallel, the volume will equal the sum of the volumes for each nozzle.

ACCURACY CERTIFICATION

Each SONIC FLOW Nozzle is tested in our proving facility at Philadelphia and the accuracy of the Standard Time is certified.

TEST FLOW RATES A SONIC FLOW Nozzle establishes the flow rate for the test run. It is recommended that tests should be conducted at three flow rates – 10% to 20%, about 50%, and 80% to 100% of meter capacity. When testing diaphragm meters, do not exceed the recommended index rate of the meter.

For testing, select nozzles that approximate the three desired flow rates. For selection, five standard sizes provide flow rates from 250 to 6000 cfh. Four special intermediate sizes are available on request. For higher flow rates two or more nozzles can be used in parallel.

SONIC FLOW NOZZLES

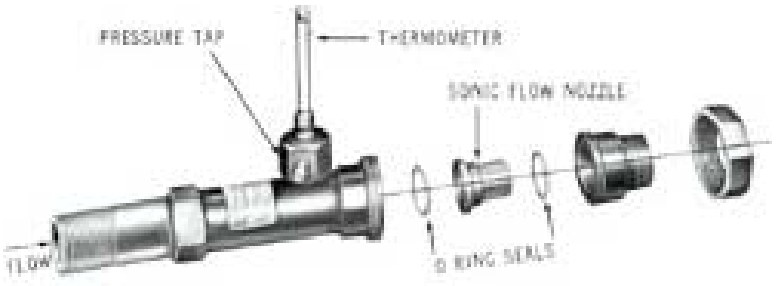
SIZE	THROAT	STANDARD TIME*	APPROXIMATE INDEX FLOW RATE	
			DRY AIR†	GAS††
	INCHES	SECONDS	scfh	scfh
A**	0.094**	36.00	100	125
B	0.125	18.00	200	250
C**	0.188**	8.000	450	562
D	0.250	4.500	800	1000
E**	0.312**	2.880	1250	1560
F	0.375	2.000	1800	2250
G**	0.438**	1.470	2450	3060
H	0.500	1.130	3200	4000
J	0.625	0.750	4800	6000

* STANDARD TIME – Time in seconds required for 1 scf of air to flow through nozzle, at 60°F and in let pressure 10 psig (24.696 psia).

** Special size available on request.

† Air sp gr = 1.00, 14.73 psia Base Pressure

†† Gas sp gr = 0.64, 14.73 psia Base Pressure



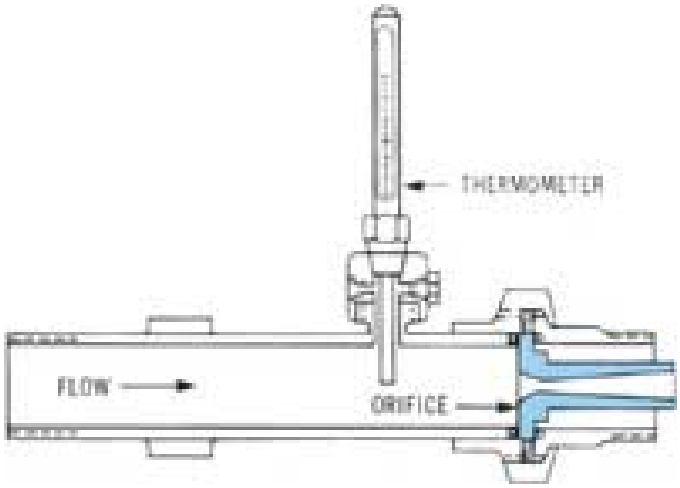
EXPLODED VIEW

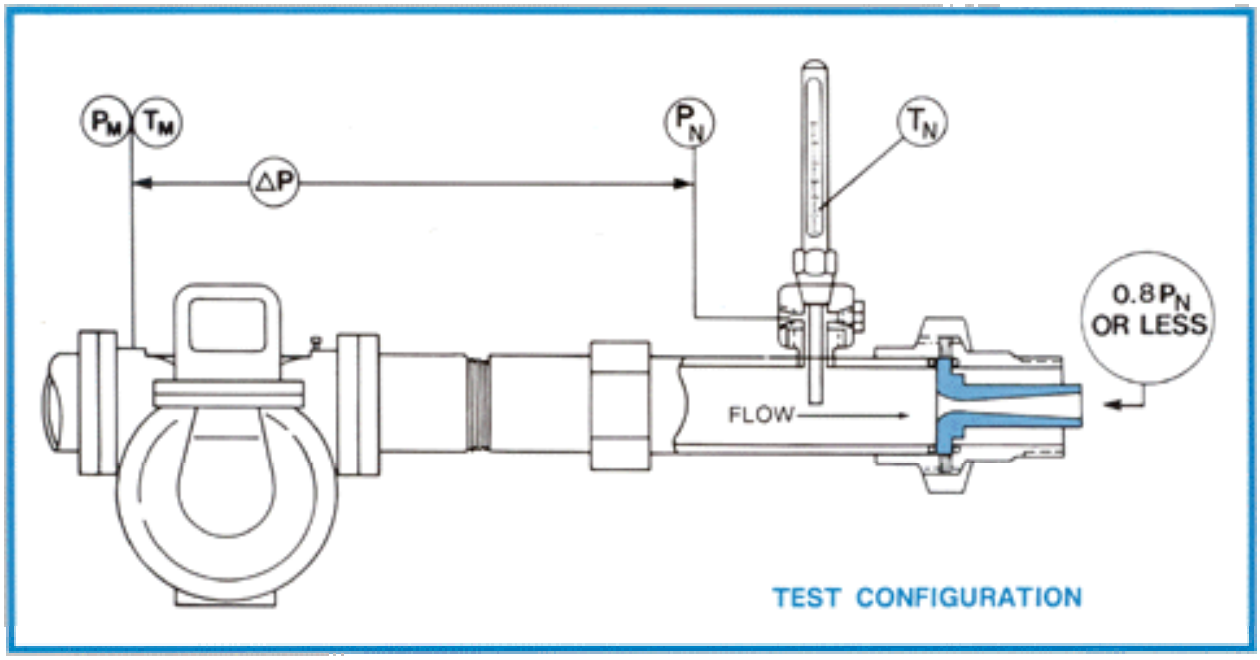
ASSEMBLY

The long cone of the SONIC FLOW Nozzle must face downstream. Some nozzles extend downstream beyond the exhaust of the Critical Flow Prover. O-ring seals are placed on each side of the SONIC FLOW Nozzles Flange.

The thermometer retaining nut is tapped in two places - 180° apart. One tap is used for the static pressure connection and the other is plugged.

Two available connections facilitate the installation of the pressure connection away from the large nut of the Critical Flow Prover.





MAINTENANCE

The SONIC FLOW Nozzles are made of stainless steel and are less susceptible to damage than the oriface discs. With reasonable care, the calibrated standard time will not change. When in use the nozzles should be handled carefully. After each use, examine the throat of the nozzle and be sure no foreign matter has collected in the throat. When not in use, the nozzle should be kept in the case.

Nozzles which have corrosion, abrasion or damage should be replaced or recalibrated.

ORDERING INFORMATION

1. Standard Set SONIC FLOW Nozzle
2. Additional Special Nozzles
3. Critical Flow Prover Holders
4. Stopwatch and Thermometer

AMERICAN METER COMPANY
Measurement Engineers Since 1836

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