



SAO nozzles (Smooth Approach Orifice) are designed as inlet nozzles for high flow rate measurement of air – especially when low pressure loss is indicated.

- Excellent stability
- High accuracy measurement
- Minimal pressure loss

Product Description

Application:

Thanks to a high-efficiency pressure recovery design SAO nozzles experience a very low remaining pressure loss depending on the make of the inlet form and the opening angle of the outlet cone. In contrary to other DP-flow elements almost no straight upstream and only short downstream paths are needed. Following the principles of the Bernoulli equation the mass flow through a SAO is a function of the square root of the DP and density.

To achieve high accuracy rates it is recommended to use a flow computer with averaging mode and online evaluation. This way the SAO nozzle can be applied as a calibration standard for critical flow venturi calibration in CVS test benches with an accuracy of $\pm 0.5\%$ of reading.

Construction and Design:

As a standard SAO will be manufactured machined mechanically to achieve the required coarse values and accuracy. The SAO consists of a machined and polished body with a connection flange welded on the outlet. It consists of a radial inlet section, a bore in cylinder form and an outlet formed as a cone.

Differential-Pressure Measurement:

Positive pressure measurement is against atmosphere and negative pressure tapping takes place in the tube wall of the bore cylinder each through one or several single bores. It is recommendable to connect them with a circuit.

Materials:

Manufacturing of the nozzle body and flanges is possible in different usual material like Aluminium or Stainless Steel and other special materials.

Material Certificates:

Material certificates i.e. according to EN 10204 can be supplied for the used materials.

Calibration:

Any SAO nozzle should be calibrated from 10% to 100% of the differential pressure range of the specified flow rate. In case of calibration a factory or DAkkS calibration report will be supplied with.

Specifications

Nominal Pressure:

PN 6 up to PN 16

Nominal Diameter:

DN 10 up to DN 500

Bore Diameter d:

The calculation of the bore diameter will be done from the supplied data considering the relevant standards like DIN ISO EN 5167 and regulations like VDI/VDE2041 and is part of the scope of deliveries.

Pressure Loss:

The pressure loss depends on the opening ratio and the opening angle and is approx. 10-25% of dP.

Pressure Tap:

12 mm pipe with G1/8"i or acc. customer specification.

Identification:

On inlet side marked: +, Tag-No., PN, D, d and material.

Connection type:

The installation takes place with flange at the outlet. Preferred connection types are flanges according DIN. But also different types of flanges and sealings can be manufactured according customer specification.

Installation:

Directly on the entrance of a pipe.

Installation Lengths

Due to the determined opening angle α (6 ... 12°) of the outlet cone the overall-length depends mainly on the restriction diameter d and the connecting line diameter D. It is normally between 200 and 1200 mm. The opening ratio $\beta = d/D$ should be within 0,4 and 0,8.

Straight In- and Outlet Section:

Minimum requirement 5xD on outlet.

Ordering Information

Please determine for quotation request

- Flow range(s)
- Pipe nominal diameter
- Material
- Operation condition Pressure / Temperature
- Allowed pressure loss
- Accuracy
- Environment conditions