Data sheet DS/FPD320–EN

FPD320 flow nozzles
Differential pressure – primary flow element

Robust steam flow measurement

Better Measurement
Better Outcomes

Simplified installation
— tapping points are integrated within the carrier

Designed to ISO 5167 or ASME PTC-5 and PTC-6 (depending on nozzle variant)
— other designs available on request

Range of carrier designs and orifice plates available
— designs available for most orifice plate applications

Extensive range of construction materials available
— from carbon and stainless steel to specialist alloys

McMENON

FPD320 flow nozzles
Differential pressure – primary flow element

Introduction

The flow nozzle is used for high velocity flow measurement where erosion or cavitation would wear or damage an orifice plate. It does not rely on a sharp edge (that can degrade over time) for accuracy, therefore offering excellent long-term accuracy and it is often used for flow testing on steam-raising plant. The discharge coefficient of a flow nozzle is such that a nozzle can measure approximately 55 % higher flow rates than an orifice plate with a similar beta ratio and design differential pressure. In the case of steam measurement, the pressure loss may not be significant as the effect is to beneficially heat the steam slightly.

McMenon supply flow nozzles to the following design standards:

ISA1932 nozzle

— the inlet profile is a quarter-circle with a cylindrical throat, for use with corner tappings.

Fig. 1: Typical flow nozzle

Long radius nozzle

— the inlet profile is a quarter-ellipse with a cylindrical throat. The ellipse can have one of two aspect ratios (low or high), depending on the beta ratio. Tappings are typically 1 pipe diameter (D) upstream and 1/2 D downstream of the inlet, but the downstream tapping position on some low ratio versions can differ.

Throat tap nozzle

— the inlet profile is a quarter-ellipse with a cylindrical throat. The upstream tapping is in the pipework, 1 D from the inlet; the downstream tapping is within the cylindrical throat and the connection to it is on the circumference of the nozzle ring. The design is usually conforms to ASME PTC-6, with the nozzle mounted within a run of pipework, the upstream section of which includes a flow straightening element.

McMenon flow nozzles are available in designs for clamping between flanges (within the bolt circle), as weld-in units or mounted within pipe runs.

The features and benefits of McMenon FPD320 flow nozzles include:— Mature, established technology
— Available in sizes from DN50 to DN600 (2 to 24 in.)
— Maintains long-term performance
— No moving parts – virtually maintenance-free
— Performance of device can be calculated from measurement of key dimensions alone
— Available in a wide range of materials to suit the process fluid and the working conditions

Specification

Pipeline size range (standard)
50 to 600 mm (2 to 24 in.)

Nozzle variants
— ISA 1932
— Long radius
— ASME throat tap nozzles (PTC-6)

Accuracy
Typical discharge coefficient uncertainty is between ±0.8 and ±2 %, depending on nozzle design and beta ratio.
These values apply when within Reynolds Number limits specified in ISO 5167-3:2003; uncertainty is greater if outside of these limits.
Flow calibration is available for certain meter-run designs (for example, PTC-6 version).

Repeatability
±0.2 %

Pressure loss
Typically 45 to 95 % of differential head, depending on the beta ratio and plate design

Beta ratios
0.2 to 0.8 (depending on construction)
To determine beta ratio and differential pressure, refer to McMenon SolveDP sizing software or contact your local McMenon office

Process connection
— Weld-in
— Within metering pipe sections
— Between flanges, including:
  — ANSI/ASME Classes 150 to 2500 (raised face)
  — ANSI/ASME Classes 300 to 2500 (ring-type joint)
  — DIN PN10 to PN100 (raised face)

Contact McMenon for additional end connection ratings and formats

Impulse connections
Several standard options are available for the connection of the meter to the transmitter:
— Threaded (female or male)
— Nipolet
— Nipoflange (B16.5)
— Socket weld

Other connection types may be possible – contact McMenon
Depending on the pipe size and design, up to 4 sets of tappings can be supplied

Materials of construction
Standard
Stainless steel
Optional (but not limited to):
— Duplex and super duplex steels
— Chrome-Moly steels

Certification and testing
A wide range of certification and testing options are available at extra cost. For example:
— Material certifications to BS EN 10204 3.1 or 3.2
— Material certifications to NACE MR0175 or MR01013
— Positive material identification (NITON XRF)
— Pressure Equipment Directive (PED)
— Impact testing
— Hardness survey
— 100 % dimensional check

Full details of any testing / certification requirements must be supplied at the time of enquiry / quotation

Welding
Pressure retaining welds are completed following the ASME Section IX code and also meet PED specifications

Temperature and pressure rating
Dependent on the design, the materials of construction and the process and / or tapping connection rating

Minimum straight pipe requirements

For standard uncertainty, without the use of flow straighteners:

Upstream

Typically between 10 and 46 D (but can be up to 80 D) from the nozzle inlet face

Downstream

Typically between 4 and 8 D from the nozzle inlet face

Actual requirements are depending upon the upstream fitting combination and the beta ratio.

Refer to EN ISO 5167-4 for detailed information. Alternatively, contact McMenon.

Contact us

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