Accutube Averaging Pitot Tubes

meriam
A SCOTT FETZER COMPANY

While other companies who are newer to the industry changed their tube shapes to Bullet, Diamond, or Flat-Face with assertions that each is better than the other; Meriam lets our customers decide, with thousands of successful installations worldwide in over 50 years.

The Meriam Accutube brand is field proven to be the most robust and accurate design, from your simplest application to the most difficult. Each Accutube is pneumatically pressure tested to ensure no leak paths are present.

Why Select an Accutube

meriam
A SCOTT FETZER COMPANY

- Meriam has more than 50 years experience designing and manufacturing averaging pitot tubes
- Thousands of installations worldwide
- Install with any brand of DP or Multivariable transmitter
- Factory calibration with transmitter for best system accuracy
- Third party testing by Utah Research Laboratory, Utah State University and the University of Michigan against NIST Standards
- Made in America
- Meriam Quality Assurance
  - ISO 9001:2008
  - Certificates of Conformance
  - Material Certifications
  - Welding by ASME Section IX Certified Welders
  - Pressure testing ensures zero leak paths
  - X-ray and dye penetrant testing available

Why Select an Accutube

- True double averaging Design
- Accuracy - up to ±0.5% of span when factory calibrated and better than ±1% uncalibrated
- 0.1% Repeatability regardless of upstream /downstream pipe diameters
- Tested and Certified by Independent Labs
- Flow rate turndown typically 10:1 (100:1 of DP). Can be increased depending upon the resolution of the DP transmitter selected
- Bi-directional flow measurement using a single transmitter
- Mass Flow output available when combined with multivariable transmitter and integrally mounted RTD

Why Select an Accutube

meriam
A SCOTT FETZER COMPANY

- Generates very low permanent pressure loss
- Flow Straighteners available for short pipe run installations
- Inexpensive to buy, install and maintain
  - Wet Tap models enable installation without system shut-down
  - No calibration required
- Long-term accuracy
- No drift in co-efficient ensures long term stability
- Options Include:
  - Gear drive or jack screw for retracting flow sensors
  - Three-valve manifold for direct transmitter mounting
  - Integral RTD mounting
  - High pressure, high temperature designs
  - Exotic materials such as Monel, Inconel and Hastelloy available for corrosive processes

Largest Selection Available

meriam
A SCOTT FETZER COMPANY

- Four Mounting Configurations

Wet Tap

Insertion

Flanged

Inline

Wet Tap Accutube - 70H

Model 70H with Gear Drive

- Integral 3- valve manifold and optional RTD for direct mount DP or Multivariable transmitters
- High pressure - 1000 PSIG @ 800°F
- Available for 6” through 42” line sizes
- Reduces insertion and retraction time under full system pressure without process shutdown
- SS worm gear and lifting screw
- Single and double mount available
- Hand wheel, jack screw or motorized drive
- Positive gear lock

Wet Tap Accutube - 37L

Model 37L with Gear Drive

- Direct mount DP transmitter
- High pressure - 1000 PSIG @ 800°F
- Available for 2” through 72” line sizes
- Reduces insertion and retraction time under full system pressure without process shutdown
- SS worm gear and lifting screw
- Hand wheel, jack screw or motorized drive
- Positive gear lock

Wet Tap Accutube - 33T

- Low pressure - 150 PSIG @ 190°F
- Threaded or flanged
- 316 SST probe with either 316 SST or brass head
- Standard line sizes up to 30”
- Reduces insertion and retraction time under full system pressure without process shutdown

Insertion Accutube - 20T & 21T

- High pressure - 1500 PSIG @ 800°F
- 20T for moderate velocity flows
  - Standard line sizes 1” to 30”
  - Single-mounted support
- 21T for high velocity flows
  - Standard line sizes 3” to 42”
  - Double mount support
- Standard 316 SST probe with brass head.
- Optional 316 SST Probe and head

Insertion Accutube - 22L & 23L

meriam
A SCOTT FETZER COMPANY

- High pressure - 1500 PSIG @ 800°F
- 22L for moderate velocity flows
  - Standard line sizes 2” to 42”
  - Single-mounted support
- 23L for high velocity flows
  - Standard line sizes 2” to 72”
  - Double mount support
- Standard 316 SST probe and head

Insertion Accutube - 40H to 43H

meriam
A SCOTT FETZER COMPANY

- High pressure - 1500 PSIG @ 800°F
- Integral 3-valve manifold for convenient transmitter mounting
- Available also as flanged models
- 40H Single mount
  - Standard line sizes 6” to 42”
- 42H Single mount
  - Standard line sizes 6” to 42”
  - Integral RTD
- 41H Double mount
  - Standard line sizes 6” to 72”
- 43H Double mount
  - Standard line sizes 6” to 72”
  - Integral RTD

Flanged Accutube - 24D & 25D

- High pressure and temperature
- Standard 150# ANSI flange. 300#, 600#, 900# and 2500# options available
- 24D Single mount
  - Standard line sizes 2” to 72”
- 25D Double mount
  - Standard line sizes 2” to 72”

Inline Accutube 10A & 11A

- Body material available in brass, steel, type K copper, PVC threaded or PVC plain ends
- Pressure
  - 1000 PSIG @ 750°F (316 SST)
  - 250 PSIG @ 250°F (Brass & Steel)
  - 120 PSIG @ 100°F (PVC)
- 10A Inline mount
  - Standard line sizes ½" to 3"
  - Threaded Schedule 40 pipe nipples (except for the type "K" copper)
- 11A Inline mount
  - Standard line sizes ½" to 3"
  - Threaded schedule 80 pipe nipples (except for the PVC plain end type)

Industries Served

- Oil production
- Oil refining
- Chemical
- Petrochemical
- Pharmaceutical
- Power generation
- Building services
- Pulp & Paper
- Nuclear
- Food
- Water distribution
- Water treatment
- Gas processing
- Gas transmission
- HVAC
- Automotive

Applications

- Natural gas
- Flue gas
- Nitrogen gas
- Hydrocarbon gas
- Methane gas
- Combustion gas
- Sour gas
- Exhaust gas
- Coke oven gas
- Carbon dioxide gas
- Ventilation air
- Compressed air
- Hot air
- Solvent laden air
- Saturated air
- Saturated steam
- Superheated steam
- Sea water
- Cooling water
- River water
- Waste water
- Potable water
- Liquid oxygen
- Crude oil
- Nitric acid
- Liquid petroleum

Flow Turndown

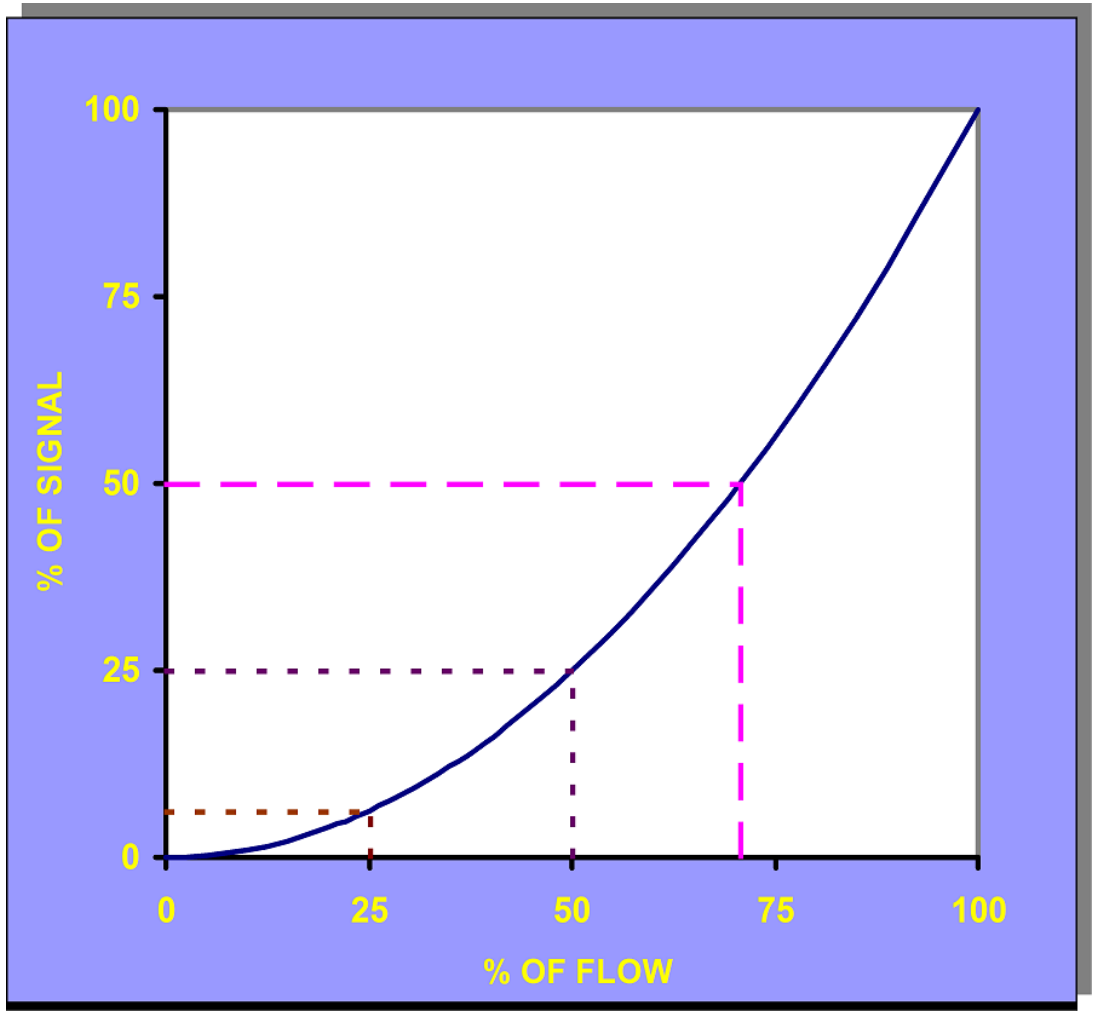
"The ratio of the highest to the lowest flowrates which can be accurately measured"

As the DP transmitter covers the range of output from the Accutube, the DP turndown (TD_h) can be defined as the ratio of the highest measured DP to the lowest. Due to the square root relationship, the DP turndown is equal to the square of the flow turndown (TD)

$$TD_h=[TD]^2 \text{ or } TD = \sqrt{TD_h}$$

i.e. for a 10:1 flow turndown, the DP turndown is 100:1. Therefore, a high flowrate that generates 50 in.WC will have a DP of 0.5 in.WC at the minimum flowrate

Flow Turndown



System Accuracy

The combined error of the Accutube and DP transmitter over the operating range is determined by using the “square root of the sum of the squares” rule

$$\%\ \text{System Error} = \sqrt{E_p{}^2 + E_s{}^2}$$

E_p= percent error in flow due to primary

E_s = percent error in flow due to secondary

Example

Tag#1: Water (μ=1cP) between 200 and 600 GPM in a 6" line. DP at maximum flow $\mathrm{h_{max}}$ is 18.4812 $\mathrm{in.\,H_20}$ (from flow calculations). DP Transmitter has accuracy of 0.04% of span

DP min flowrate $\mathrm{h_{min}}$ $TD_h=[TD]^2$

$$TD = \frac{600}{200} = 3 \therefore TD_h = 9$$

$$\mathrm{h_{min}} = \frac{\mathrm{h_{max}}}{TD_h} = \frac{18.4812}{9} = 2.053\ in.H_20$$

Example

Calculated Percent System Error:

$$E_s = \%\, E_f\ (DP) = \left(\sqrt{1 + \frac{\%E_{fs}}{100}\ TD^2} - 1\right) x\ 100\ = \left(\sqrt{1 + \frac{0.04\%}{100}\ 9} - 1\right) x100 = 0.36\%$$

$$\%\ \text{System Error} = \sqrt{E_p{}^2 + E_s{}^2}$$

Where E_p =1%

$$\%\ \text{System Error} = \sqrt{1^2 + 0.36^2} = 1.06\%$$