# TVA Target Variable Area Flowmeter

## for saturated and superheated steam


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*First for Steam Solutions*

EXPERTISE | SOLUTIONS | SUSTAINABILITY

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# TVA FLOWMETER

***First for Steam Solutions***

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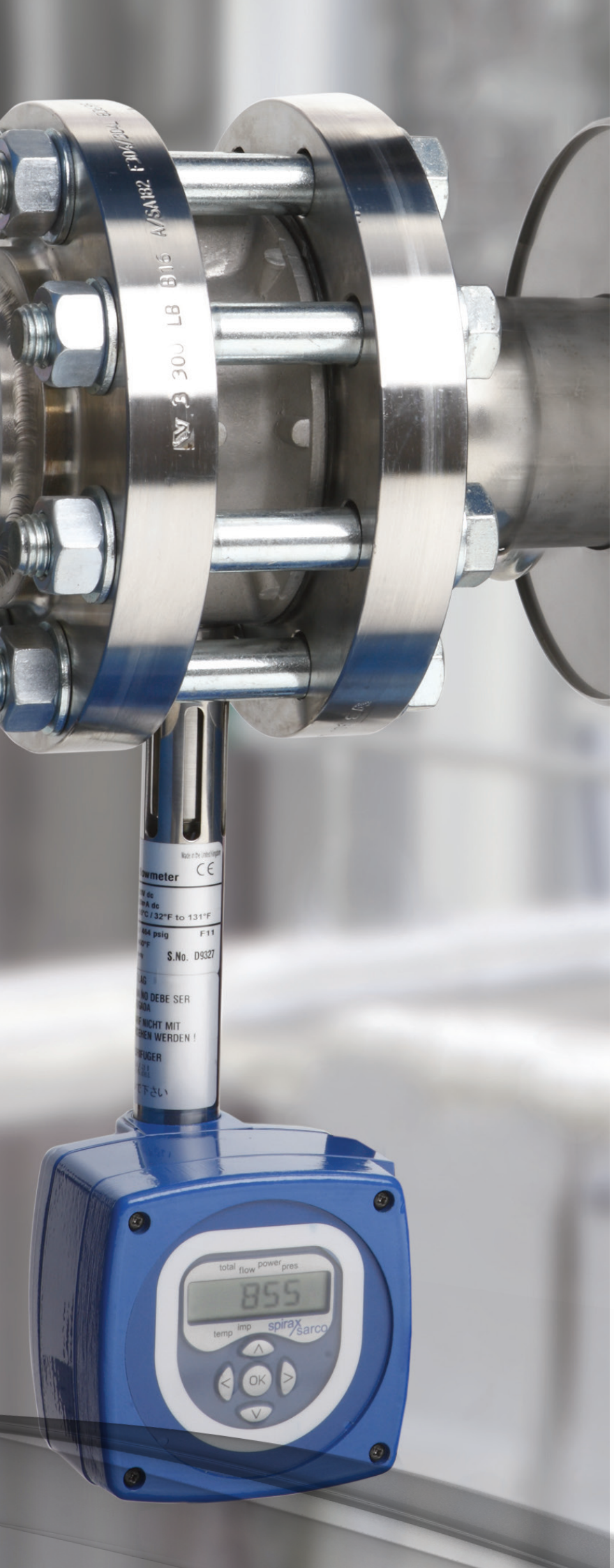



spiraxsarco.com/flowmetering

## Accurate and reliable measurement of your entire steam flow

Unlike alternative technologies, the TVA Flowmeter allows you to measure the complete flow range. Capturing all steam used within your maximum and minimum flowrate, allowing accurate and comprehensive steam energy management.

**Measures your entire steam flow range** - 50:1 turndown at best practice steam velocities

**Highly accurate** - measurement helps to identify energy saving and waste reduction opportunities.

**Easy integration and installation** - within host control system and existing pipework

**Long operating life** - well proven and highly robust design gives excellent reliability

**Low cost of ownership -** with quick installation combined with excellent reliability.

## Accurate measurement of your entire steam usage

### The TVA Flowmeter meets the challenges of metering your entire steam flow range

Steam applications often have widely fluctuating loads due to seasonal or process variations. Accurately measuring steam under these conditions presents two distinct challenges.

**Challenge 1:** *Measuring your minimum and maximum flowrates (turndown) to give greater accuracy and coverage of your steam usage.*

**Solution:** 50:1 turndown metering capability

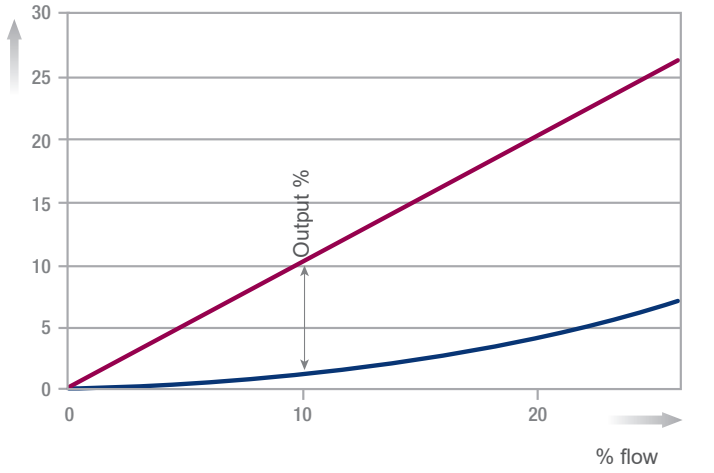
For many technologies their low flow measuring capability is a problem due to the drop off in signal, consequently steam can be consumed but not measured.

The TVA outperforms these devices, generating a large output signal and measuring steam flow where other technologies cannot. The TVA has the ability to measure the minimum flow and has almost three times the range of its nearest competitor.

As shown in the graph, at low flows a typical DP meter suffers form a drop off in accuracy due to the square rate relationship between differential pressure and flow rate.

Thanks to the variable area design, the TVA has a linear relationship between output signal and flow rate, which results in accuracy being maintained at lower flow rates.

TVA output compared to a typical differential pressure device




Typical DP type meter

**Challenge 2:** *Compensating for fluctuations in steam density.*

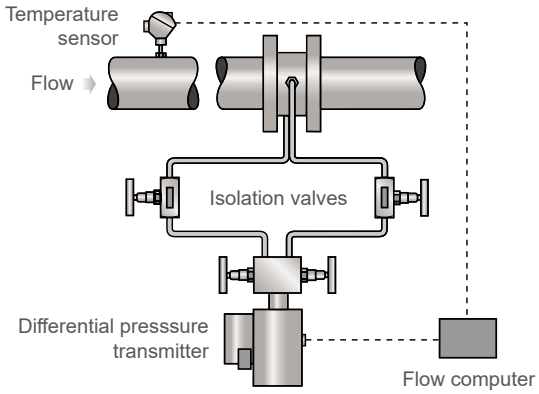
Steam density alters with pressure changes caused by varying process loads. This can significantly affect the accuracy of the measured flow results.

**Solution:** In-built automatic in-line density compensation.

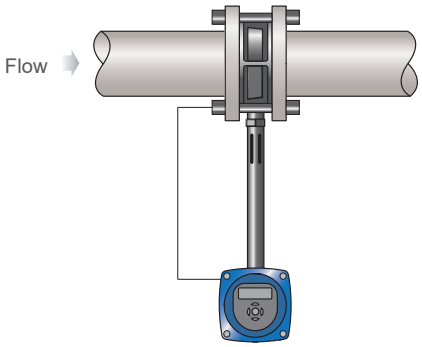
The TVA Flowmeter has in-built density compensation which allows for fluctuations in steam pressure, maintaining accurate metering throughout the process range.

There is no need to bolt-on costly additional ancillary equipment or make extra installations in the pipework. The integrated electronics of the TVA provide a single point of pipe entry, making installation easy, fast and low cost.

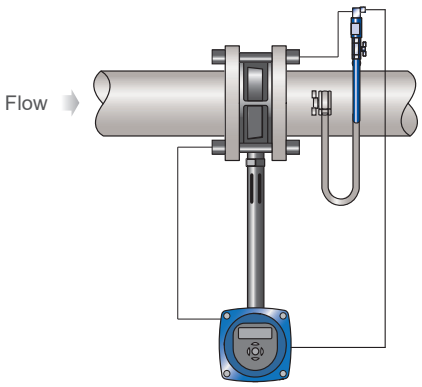

Traditional steam flowmetering installation




Integrated TVA Flowmetering System for saturated steam measurement; simple, easy and quick to install




Integrated TVA Flowmetering System with pressure sensor for superheat steam




The TVA can also measure the flowrate of superheated steam by fitting the required additional ancillary equipment. For more information about upgrading for TVA superheat contact us now.

### Did you know?

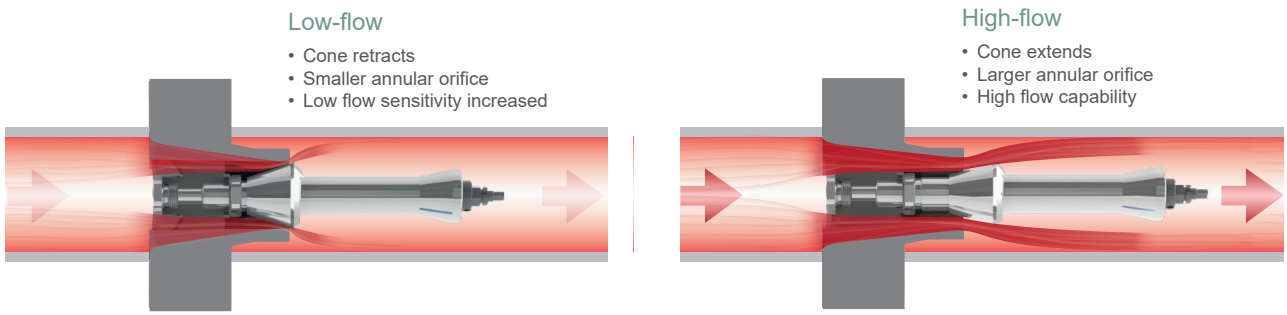
To provide accurate measurement and performance the profile of the flow-stream should be undisturbed as it enters and leaves the flowmeter. This is done by installing a minimum length of straight pipe upstream and downstream, the precise length of which depends on the technology employed.

## Innovative robust design

Highly reliable Innovative design gives increased reliability and reduces cost of ownership.

## Designed for steam by steam experts

The innovative moving cone design not only provides exceptional flow range capability, it also reshapes the flow profile to allow installation within short pipe runs.
Its large surface area also disperses the high impact energy of wet steam, making it very resistant to erosion and reliable in the long-term. Once calibrated the TVA rarely needs adjusting.




## Easy, low cost installation and commissioning

Access pipework previously unsuitable for flowmeters.

The central cone design enables the TVA to flatten the flow profile within just 6 diameters upstream to create accurate metering within previously unsuitable pipe line areas.

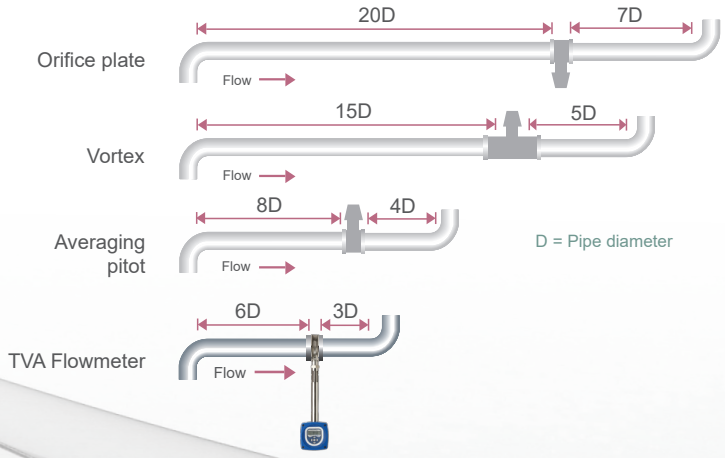
• Install in existing pipe network - no need to carry out expensive pipe line changes

• Installation and commissioning are made easy with a choice of outputs and intuitive menu driven LCD display / keypad.

The integrated electronics of the TVA provide a single point of pipe entry, making installation easier, faster and lower cost.

### Comparision of pipe requirements for different flow technologies on saturated steam

The TVA requires only six pipe diametres of straight pipe upstream and three downsteam, making it an ideal choice for installation in confined spaces.




### Did you know?

Turndown or Rangeability =
Maximum Flow ÷ Minimum Flow

You could be missing large amounts of your steam usage simply due to insufficient turndown of your current flowmetering solution.

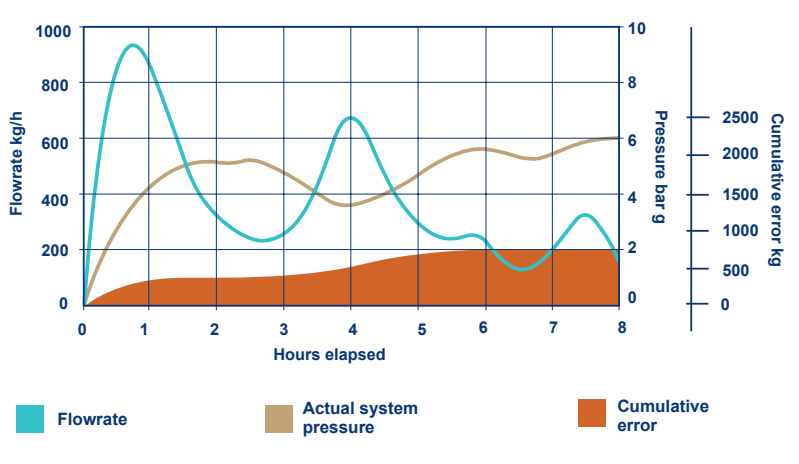
You can't manage what you can't measure.

# The technical section...

| | |
|---|---|
| Turndown: | 50:1 |
| Fluid: | Saturated and superheated steam |
| Sizes: | DN50, DN80 and DN100 |
| Accuracy: | ± 2% measured value from 10% to 100% maximum flowrate<br>±0.2% FSD, from 2% to 10% maximum flowrate |
| Maximum steam operating conditions: | Horizontal 32 bar g @ 239°C<br>Vertical 7 bar g @ 170°C |
| • NOTE: See the Technical Information sheet TI-P192-01 for further information | |

## The importance of density compensation

Steam density alters with pressure changes caused by varying process loads. An uncompensated volumetric steam flowmeter calibrated to operate at 5.0 bar g will over-read by 14.4% when used at 4.2 bar g. See example below.




In the example above, a simple non-compensated flowmeter is set for 5 bar g. The actual pressure in the system varies through the day and unless this is allowed for, by the end of the day, very significant errors can arise. This can be avoided with a density compensating meter, such as the TVA.

## ISO 17025 Accredited

Every TVA Flowmeter is calibrated on our internationally accredited calibration rig to guarantee accuracy.
UKAS accredited calibration laboratory 0714

UKAS CALIBRATION 0714

**Turndown ratio comparison of flow technologies on saturated steam**

Measuring both minimum and maximum flowrates (turndown)

TVA 50:1

Vortex 15:1

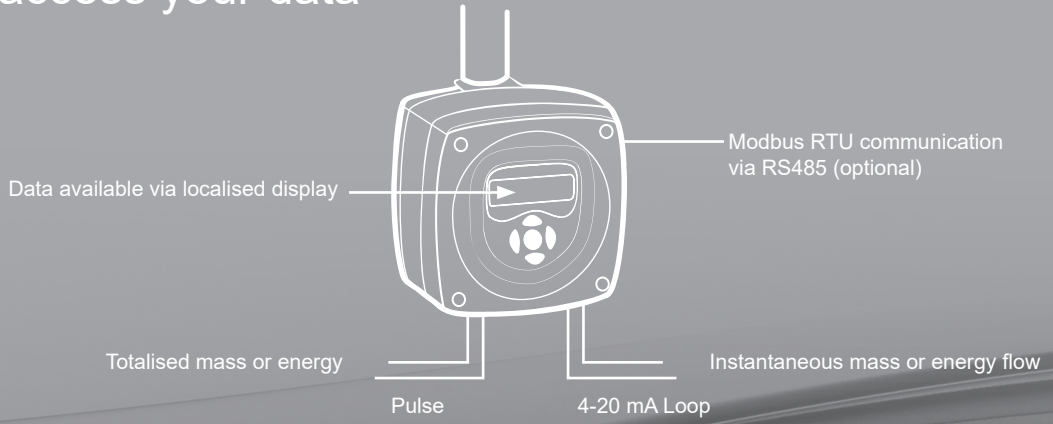
Typically up to 15 within best practice steam flow velocity of 35 m/s

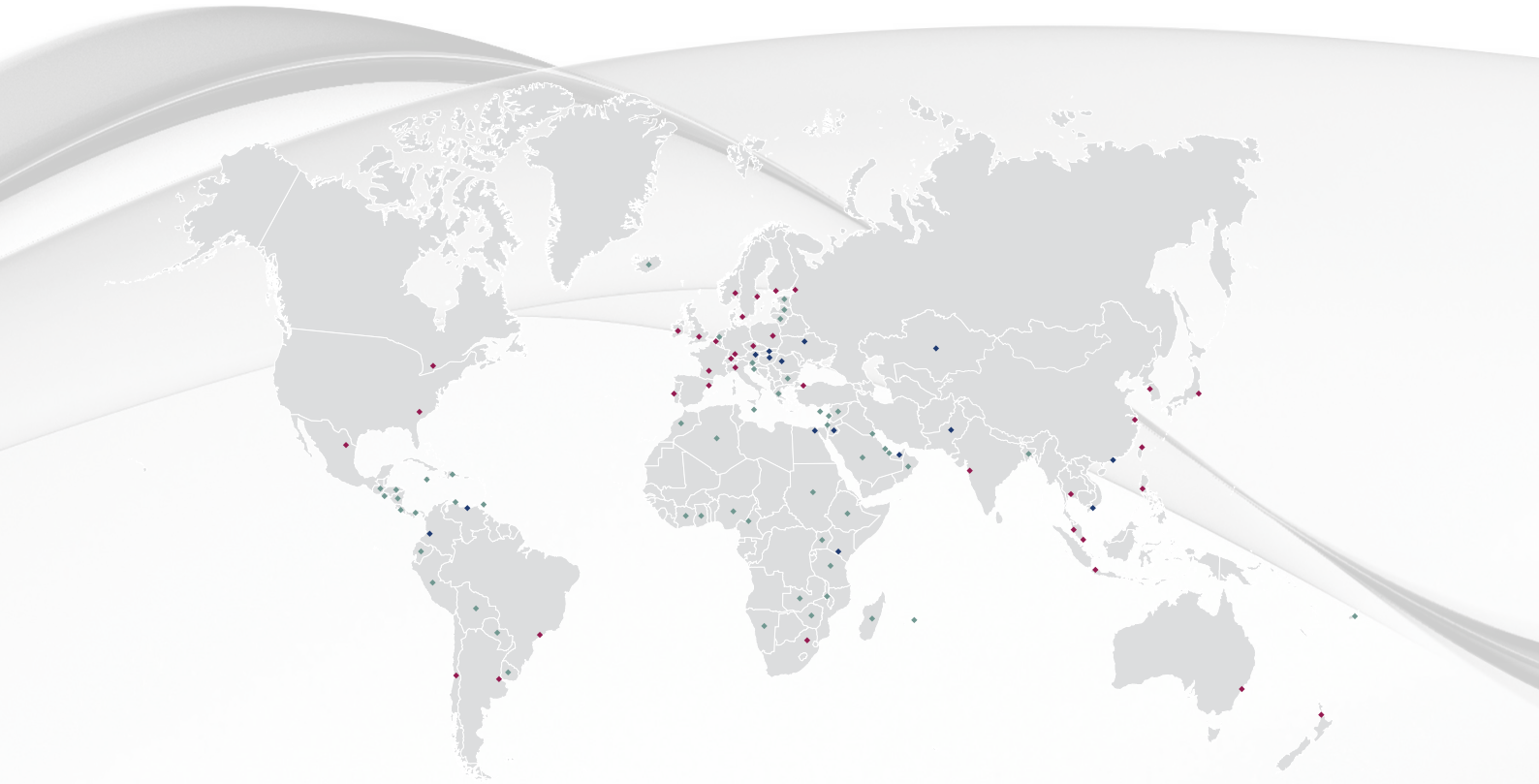
Pilot tubes 7:1

Orifice 4:1

TFA 10:1

## How to access your data





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