

## Precise standard volume flow measurements with classic venturi tubes

We, METRA Energie-Messtechnik GmbH, a 100% subsidiary of Bopp & Reuther Messtechnik GmbH from Speyer / Germany, are proud to report on another successful project. As a recognized specialist for differential pressure flow measurements, we recently received a major order from an automobile manufacturer to supply precise air measuring sections in nominal widths of 500 and 800.

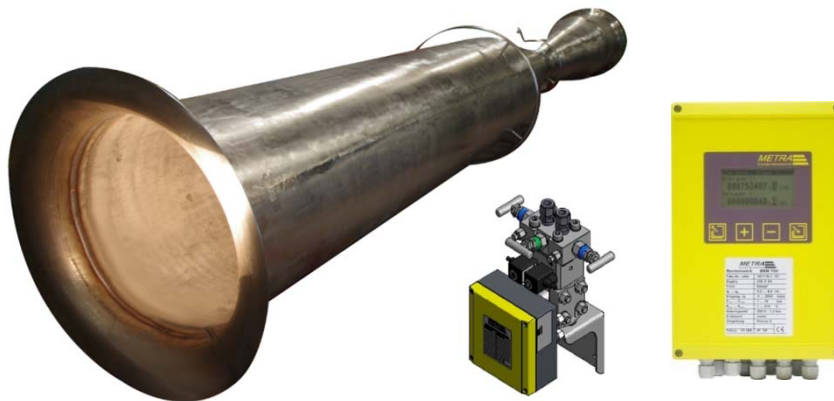
### Customer requirements:

Our customer, a well-known automobile manufacturer in Germany, has designed a completely new test stand for performance testing of fans under various pressure and temperature conditions. Two venturi tubes in DN 500 and DN 800 including the necessary conversion technology were used to measure and record the volume flows in order to cover a wide volume flow range.

Important selection criteria for the customer were the professional development of an optimal metrological solution with emphasis on low pressure loss and high measuring accuracy. It was precisely this complete package that we were finally able to supply to the customer from a single source.

### Solution:

We designed and delivered a tailor-made solution for the measurement of standard volume flows in a pressure range of 1.05 to 1.10 bara and a temperature range of approx. 15-20°C. The nominal flow rate range is 1300-10000 Nm<sup>3</sup>/h for the DN 500 venturi tube and 4000-3000 Nm<sup>3</sup>/h for the DN 800 venturi tube. The differential pressure, the absolute pressure and the temperature of the air, averaged over 4 x Pt1000 sensors, are recorded and, in conjunction with our zero adjustment module and a common ERW 700 flow computer, can guarantee an accuracy of <math>\pm 1\%</math> (v. measured value) for the entire measuring chain.



### Special features:

The primary element is a classic flow venturi tube in DN 500 and DN 800 including inlet section with integrated inlet funnel, which is designed for a very low pressure loss. The entire system is designed in accordance with ISO 5167, so that the user can quickly and easily check the plausibility and accuracy of the measurement - compared to other measuring methods - at any time, even during operation, since it is a standardized measuring principle. This is a decisive criterion for many operators when selecting a suitable measuring method. The flow computer is of 2-channel design and thus transmits all instantaneous values of both measuring sections via a PROFIBUS DP interface to the customer's control system.

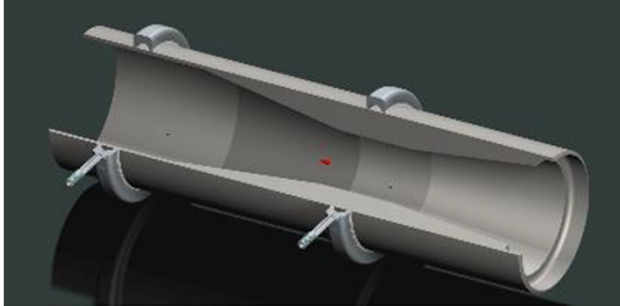
### Discover more under:

<https://www.metra-emt.de/en/products/meter-according-to-the-differential-pressure-method/>

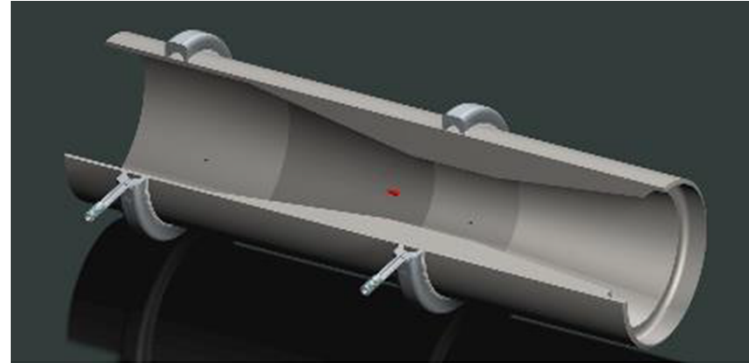
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## Principle sketch of the solution:

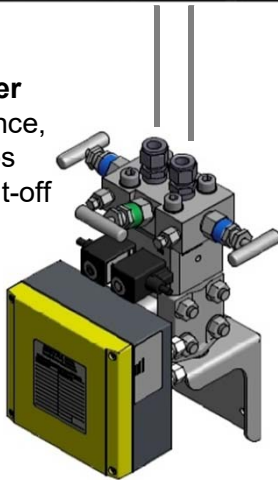
Venturi tube DN 500



Venturi tube DN 800



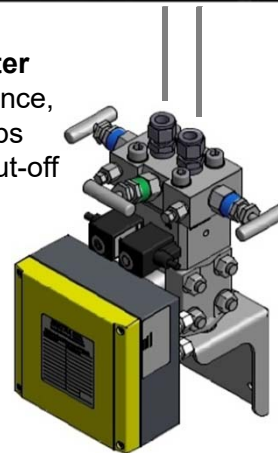
**$\Delta p$ -Transmitter**  
with zero balance,  
integrated Pabs  
and 3-way shut-off  
device



**Temperature  
sensor**  
Pt1000 (4x)



**$\Delta p$ -Transmitter**  
with zero balance,  
integrated Pabs  
and 3-way shut-off  
device



**Temperature  
sensor**  
Pt1000 (4x)



**Energy Flow Computer  
ERW 700A**  
with PROFIBUS DP module  
for conversion in Nm<sup>3</sup>/h



PROFIBUS DP  
Interface

Control System of the customer