

VAF

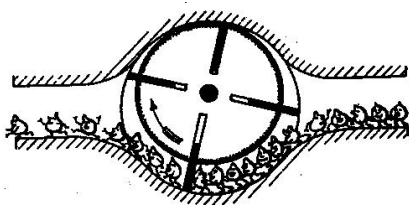
INSTRUMENTS

Mass flow

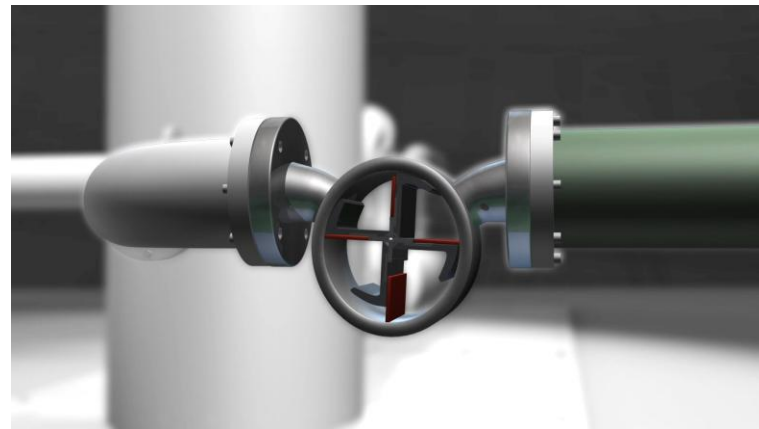
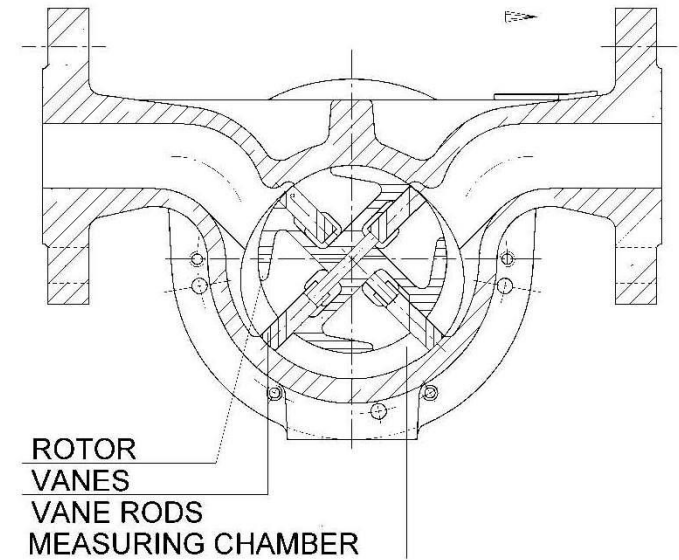
Positive displacement flowmeters + ViscoSense 3D

- Principle of operation
- Specifications
- Applications

- Positive displacement flowmeters
- Displaces a liquid
- Each revolution is a fixed volume
- Very accurate
- Simple, rugged design
- Experience from 1938



Principle of operation



Materials:

- ✓ Body and flanges ductile iron
- ✓ Rotor ductile iron
- ✓ Vanes carbon
- ✓ O-rings Viton A
- ✓ Bearings steel ball bearings

- Measuring accuracy within +/- 0,2% over full flow range
- Repeatability better than 0,05%
- Very large rangeability
- Low pressure drop
- Volumetric or mass readings

- Oil and petrochemical industry
- Process industry
- Power plants
- Maritime market



- Flow computer (FCM2) including ViscoSense[®]3D sensor
- Signal processing unit and touch screen display including ViscoSense[®]3D sensor

$$m = Q \times \rho$$

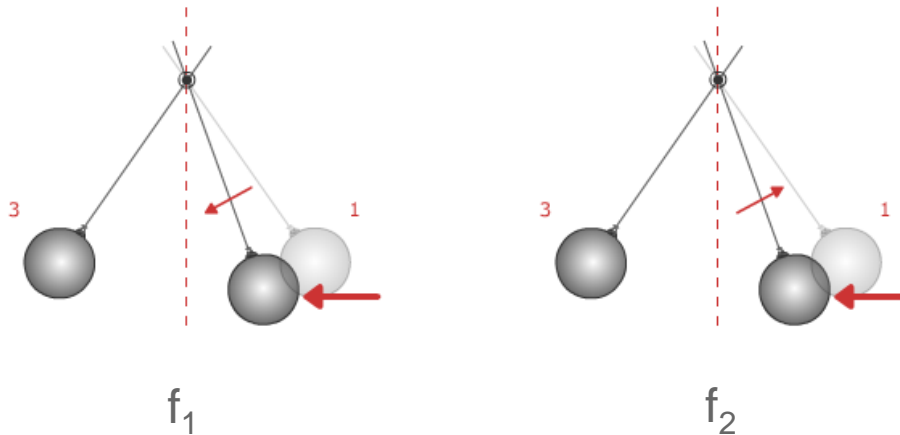
$$\frac{kg}{s} = \frac{m^3}{s} \times \frac{kg}{m^3}$$



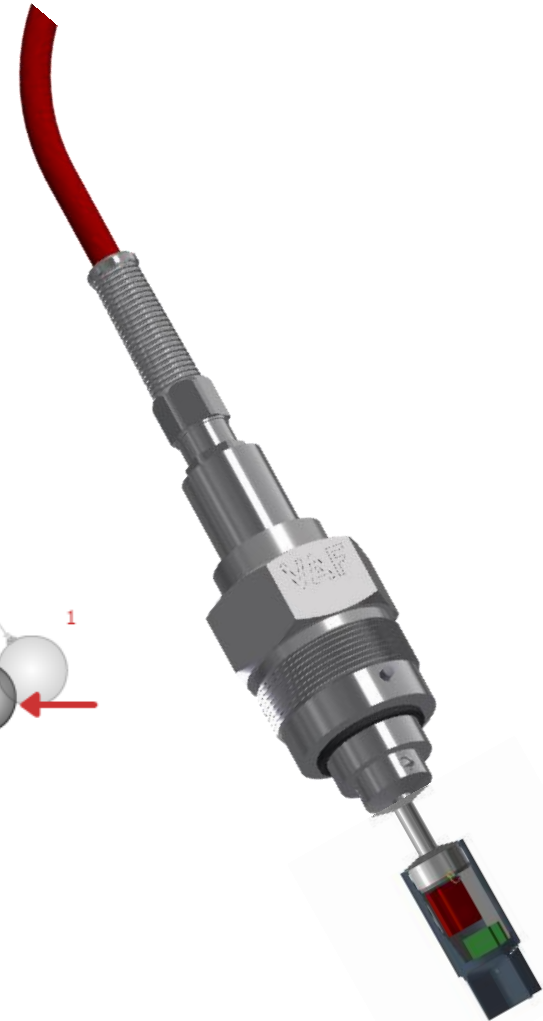
- Based on ViscoSense principle
- Viscosity and density measurement
- Standard density range 0.75 – 1.1 kg/l (others on request)
- Standard viscosity range 0 – 25 , 0 – 50 , 0 – 1000 cSt
- Accuracy +/- 0.1% on density
- Enabling mass flow
- Enables cappuccino detection



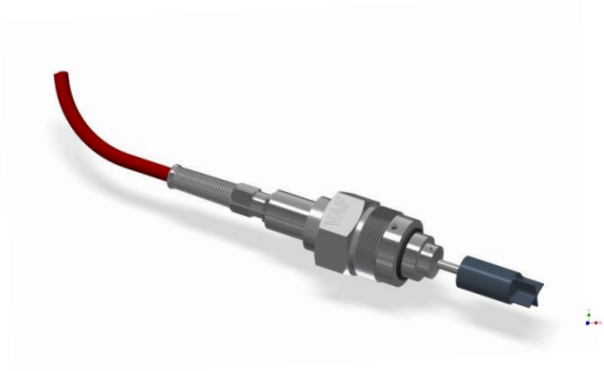
- $\sqrt{(\text{density} * \text{viscosity})} \sim (f_2 - f_1)$



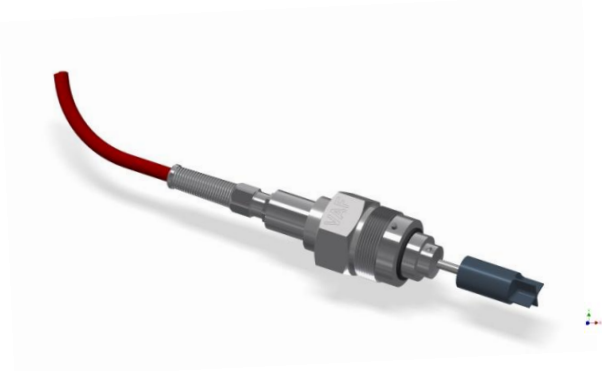
- density $\sim f = \frac{1}{2\pi} \sqrt{\frac{(G \cdot I_p)}{J}}$

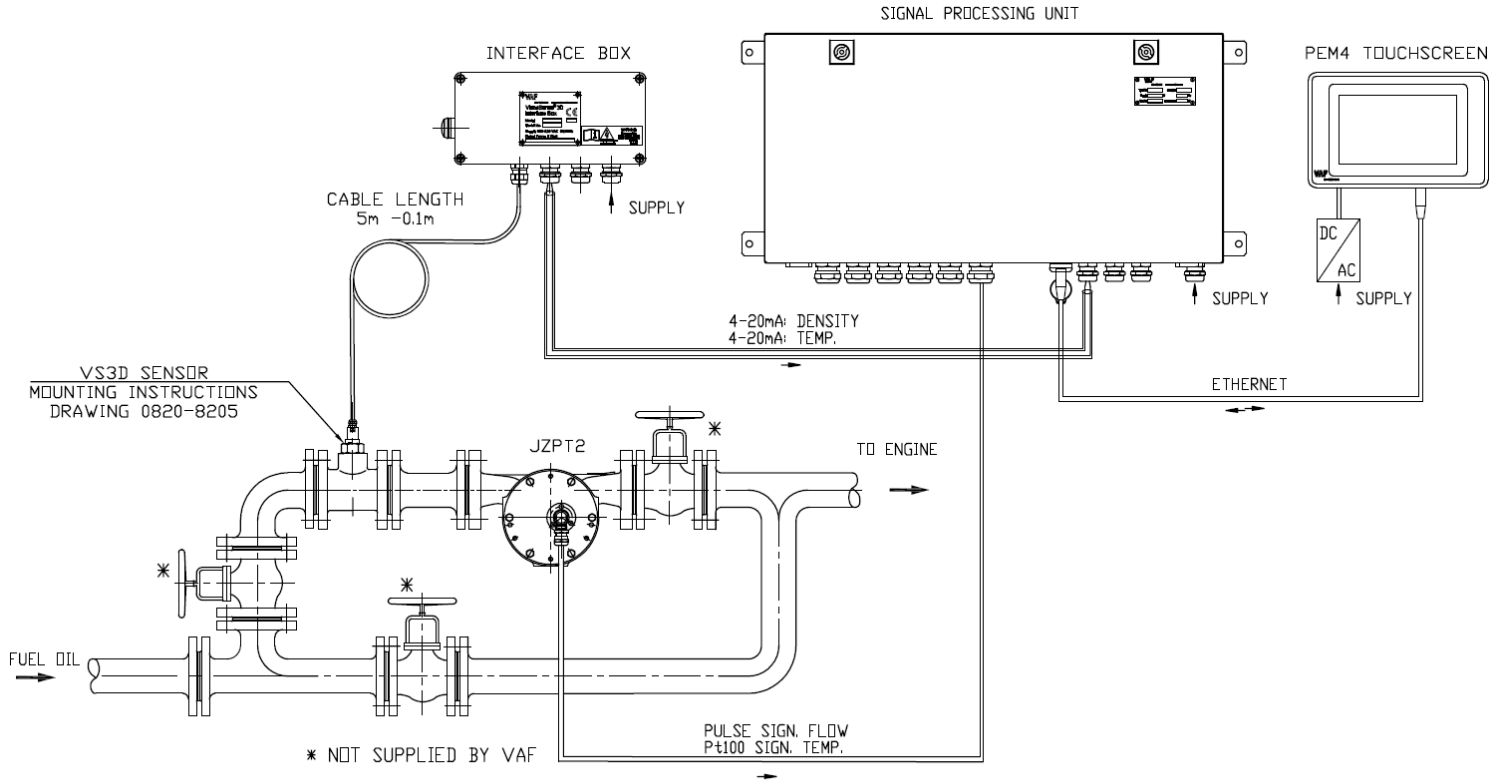


- One (1) or two (2) flowmeter configuration
- Input density via analog signal 4-20mA from ViscoSense®3D
- Remote output signals pulse, Modbus or analog 4-20mA



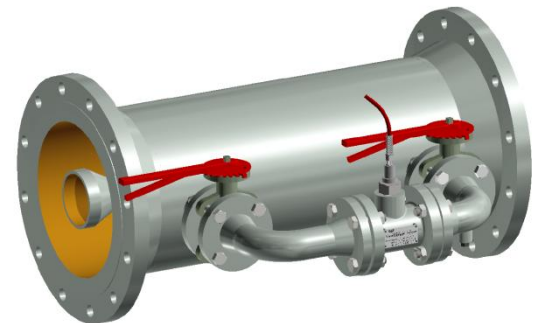
- Connection up to twelve (12) flowmeters
- Input density via analog signal 4-20mA from ViscoSense®3D
- Remote output signals Modbus (RS485)
- Customization possible





INSTRUMENTS

- Bunker price is per metric ton
- Cappuccino effect is caused due to added air or nitrogen
- Density and viscosity are key



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