



LIQUID DENSITY AND VISCOSITY METER

DEVIL® is a breakthrough liquid sensing technology that monitors density, viscosity, specific gravity and temperature in real time. With a small footprint, it is ideal for OEM applications, such as being embedded into liquid analytical instruments or fluid metering systems. Electrically approved for hazardous areas, it can be used in process applications. Rugged patented MesoScale® all metal construction provides unrivaled sensitivity, integrity and dynamic response to changes in liquid composition.

DEVIL® applications range from hydrocarbon liquids found in LPG, fiscal transfers of oil and fuels, chemical blending, binary concentration measurement, lubricant quality monitoring, blend composition monitoring and bio-tech process monitoring. The meter can also be used in the surveillance of remote fuel storage to prevent contamination and adulteration.

DEVIL® is flexible in these possible application configurations :

- > Off-line, as a flow through sensor
- > On-line, embedded in process piping
- > In-situ, embedded in a process vessel
- > Laboratory, as a benchtop instrument

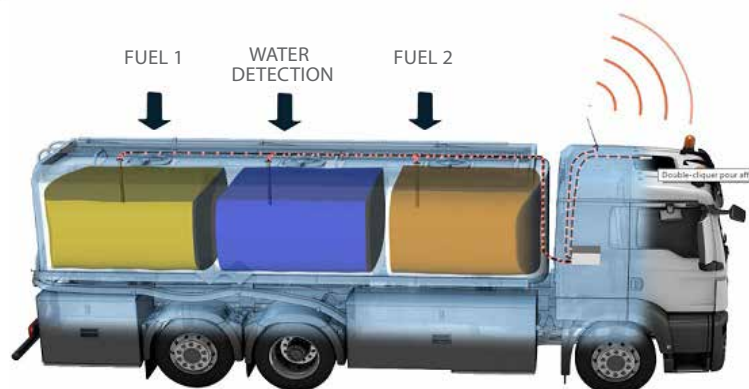
DENSITY
VISCOSITY
SPECIFIC GRAVITY
CONCENTRATION
TEMPERATURE



DEVIL® LIQUID DENSITY AND VISCOSITY SENSOR

DEVIL® is a breakthrough technology that miniaturizes the measurement of liquid density and viscosity making these measurements available for applications previously though impossible. It is the only sensor in the market that combines density and viscosity measurement in a package rugged enough for mobile vehicle applications.

DEVIL® is the first viable solution for monitoring the quality of fuels from the terminal, shipment on the truck and at the fuel dispenser to the customer. With low power requirements, electrical safety approvals, digital communication and flexible mounting it can be integrated into GSM/GPRS communication module for autonomous power and measurement.



DEVIL® IS ONLY CHOICE FOR COMBINED LIQUID DENSITY AND VISCOSITY MEASUREMENT IN ONE INSTRUMENT

HIGH PERFORMANCE IN A SMALL PACKAGE

DEVIL® benefits from precision machining technology resulting in the smallest integrated density, viscosity and temperature meter on the market.

MESOSCALE® AND SELFBALANCIT® TECHNOLOGIES

MesoScale® design is used to reduce the internal volume of the sensing element to less than 1 cc resulting in a simple, cleanable flow path, making DEVIL® easy to apply, and tolerant to particles and material deposition. Selfbalancit® technology provides ASTM-compliant measurements by compensating for changes in pressure and temperature that exist in all real world processes.

THE ROBUST CHOICE FOR HAZARDOUS AREAS

Robust design and ease of use are key elements to satisfactory meteorological performance.

DEVIL® is constructed from corrosion resistant metals and is certified for use in electrically hazardous areas.



PERFORMANCES

Calibration ranges

(The calibration range can be selected for a specific density span)

Density: 650 kg/m³ - 1350 kg/m³
Viscosity: 0.3cP ... 100cP
Temperature: 0°C ... 85°C

Accuracy (typical)

(Calibration accuracy performance is obtained under reference operating conditions)

Density: 0.0045 g/cc
Viscosity: 2% F.S.
Temperature: 0.5°C

Repeatability

Density: 0.001 g/cc
Viscosity: 0.5% F.S.
Temperature: 0.1°C

SPECIFICATIONS

Calibrated outputs

Density (kg.m³), Viscosity (cP - cSt), Temperature (°C)

Operating conditions

Temperature: -40°C ... 85°C (-40°C ... 85°C for safe areas and explosion hazardous areas)
Pressure: Atm ... 10.0 bar (optional 40 bar)

Mechanical integration

Base plate: 1/8", 1/4", 1/2" and 1" NPT, Nessi
Screw in on pipes: G1/2"
Others on demand

Communication options

RS232 TTL, USB, RS485 (ModBus RTU),
4-20mA, 0-10V, Frequency output,

Acquisition frequency

1Hz

Sealing ring

Viton® (standard), Kalrez® (optional)

Wetted parts

316L Stainless steel

Weight

320g

Dimensions

NeSSI dimintions: 38.2 x 38.2 x 74.6. Dimensions can be modified for OEM

Certifications

CE, ATEX - II 1G Ex ia IIC T4, IECEX Exia IIC T4 Ga, (FM/CSA Class I, Div 1 under preparation)

Specifications are subject to change. For further specifications, please consult the Avenisense Web site (www.avenisense.com) or the Avenisense technical literature

APPLICATION EXAMPLES

- > Hydrocarbon pipeline interface detection
- > Refined fuels quality control
- > Fuel tank farms
- > Volume to mass flow conversion
- > Retail fuel dispenser quality monitoring
- > Jet fueling density measurement
- > Flash, pour point and FTIR analyzers
- > BRIX measurement
- > Alcohol concentration measurement
- > Acid and base concentration measurement
- > Slurry density measurement
- > Binary liquid composition measurements
- > Diesel, HFO engines
- > Marine power generation
- > Viscosity index measurement
- > Crude oil characterization
- > Heavy oil viscosity measurement



(DIMENSIONS IN mm.)

Technical drawing of the 3000 Series Gas Valve showing front, side, and top views with dimensions.

Dimensions:

- Front View:
 - Overall Height: 42.5
 - Overall Width: 32.5
 - Top Flange Thickness: 10.2
 - Bottom Flange Thickness: 23.3
- Side View:
 - Overall Height: 42.5
 - Overall Width: 32.5
- Top View:
 - Overall Width: 32.5
 - Overall Depth: 42.5

Thread Specifications:

- NPT 1/8" 1/4" 3/8" 1/2" 1"
- or GAS 1/8" 1/4" 3/8" 1/2" 1"

FLANGE MOUNTING

Used for integration into pipes,
mounting onto tanks

Technical drawing illustrating the Flange Mounting assembly. The main view shows the assembly mounted on a pipe or tank. Dimensions are provided:

- Overall height: 218
- Height of the mounting bracket: 15 < L < 110
- Height of the mounting bracket (on demand): L > 110 on demand
- Flange mini : PN40 DN15 (Ø 95 ext)
- Bottom flange diameter: Ø 17.5

Additional views show the assembly mounted on a pipe and a perspective view of the mounting bracket.

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