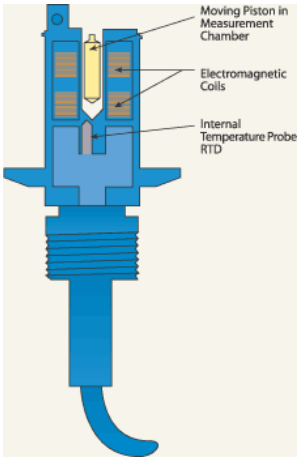
# BAGGI BA-VSC
## Online Process Viscometer
## (Fuel Oil Application)

The BAGGI BA-VSC is part of the **BAGGI BASE® Instruments Series**. They are the result of combining the latest state-of-the-art-technology with over 50 years of industry experience.


The BA-VSC is an online process viscometer for continuous, reliable and accurate measurements. It has been specifically designed for **fuel oil** monitoring in an explosive atmosphere (**ATEX**) environment. Combustion efficiency and emissions are directly impacted by the fuel characteristics and how it is atomized. Heavy fuel oil is a special challenge. It is the least-refined thus the least expensive oil. Unfortunately, it also has the most variation, depending on the characteristics of the oil field it was from and how it was processed. Therefore the fuel viscosity must be tightly controlled in order to control fuel atomization, and thus burn efficiency and emissions.




The instrument is flexible, being software driven and controlled by an easy- to-use menu. It is able to measure, display, transmit remotely and archive the following quantities:

- Viscosity
- Temperature
- Temperature-compensated viscosity
- Density (optional)

The sensor technology uses only one moving part, a piston, driven electromagnetically through the fluid in a small measurement cell. A deflector, positioned over the piston, moves the fluid into the measurement cell, while two coils move the piston back and forth at a constant force. The relevant circuitry analyzes its two-way travel time to measure absolute viscosity. All wetted parts are stainless steel and the piston is in constant motion, so the sampling area is continually scrubbed clean; there is no need for frequent calibration. The measurement capability has a range from 0.2 to 20,000 cp. In addition, each viscometer includes a built-in temperature detector that senses the actual temperature in the measurement cell in order to determine a temperature-compensated viscosity (TCV). Please refer to the figure on the left.

As outlined, the BA-VSC is a complete solution built to operate in a potentially explosive atmosphere, due to the possible presence of gas. The ATEX protection is achieved by the pressurized enclosure method. That is, all the devices that could be ignition sources are isolated within a pressurized enclosure filled with a protective gas (air or nitrogen).
The electrical signals and power are interconnected externally by means of appropriate junction boxes.
The related marking is typically the following:

**II 3 G Ex pz IIB T3 IP66**

Due to the physical characteristics of fuel oil, the BA-VSC is also in charge of heating the relevant pipes. Typically, the oil temperature is kept constant at 100 °C within the system. Of course, care is taken to maintain the electronic components at their correct working temperature. The cabinet containing the electronics is pressurized by instrument air, while the one containing the heat exchanger is pressurized by nitrogen.
Summarizing, the system comes into AISI 316L SS pressurized cabinets, linked together, and is composed by the functional blocks listed hereafter:



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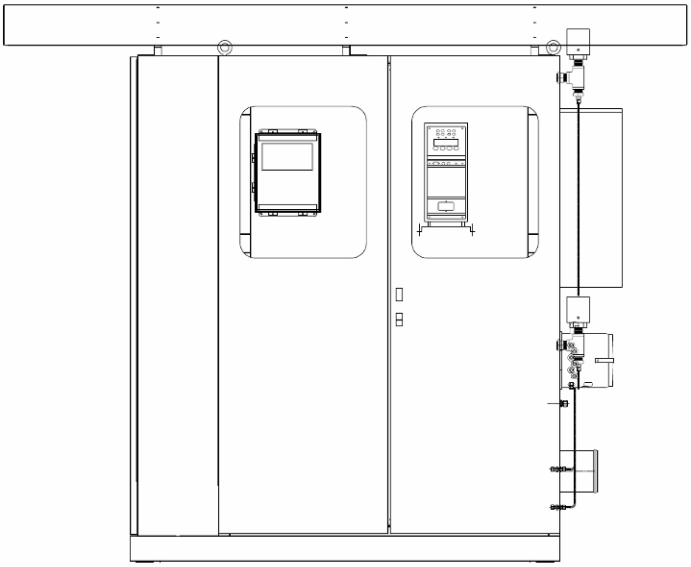
- Sample probe (material: AISI 316 SS) to be inserted in the process duct
- ATEX certified pump in the sample fast loop
- Two absolute filters (one on-line, the other in backup condition)
- Flow-meter: its reading allows to determine whether the on-line absolute filter needs cleaning
- Removable cartridge to take away a portion of the sample for laboratory analysis
- Oil heating subsystem: thermal bath, thermal bath controller, heating lines, thermostat
- Viscometer sensor and viscometer control unit
- Air conditioner to protect the electronic devices
- Pressurization subsystem: air and nitrogen inlets, protective pressure indicator



The figure on the left illustrates the cabinets front end.
The windows allow to visually check the viscometer control unit and the heat exchanger control unit.
The pipes are the exhaust vents for the nitrogen and the instrument air used to pressurize for ATEX protection.
From top to down, on the right side:

- the air conditioner to keep the internal temperature at 20 °C
- the protective pressure indicator
- a junction box

The inlets of nitrogen and instrument air, and the inlet/outlet of the process sample are in the back side.
An additional inlet is reserved for the cleaning fluid of the cross flow filter.

| Specifications | |
|---|---|
| **Range** | 0,2 – 20.000 cP |
| **Accuracy** | +/- 1% Full Scale |
| **Viscosity units** | cP, cSt, cup sec, SSU (user selectable) |
| **Maximum sensor pressure** | 68 BAR |
| **Maximum sensor temperature** | 190 °C |
| **Power** | 100 – 240 VAC |
| **Wetted components** | 316L Stainless Steel |
| **Analog outputs (4…20 mA)** | - Viscosity<br>- Temperature<br>- Temperature compensated Viscosity<br>- Viscosity control signal (proportional-integral) |
| **Digital outputs** | - Fault<br>- Pressure alarm<br>- Temperature alarm |
| **Environmental conditions** | From - 25 °C to +50 °C |
| **Enclosure protection** | IP66 |
| **Compliances** | - EN 61326, EN 61010-1<br>- ATEX II 3 G Ex pz IIB T3 |

All the specifications subject to change without notice

For specific requirements, please contact the e-mail address below:
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