



VISC-4 VISCOSITY PROCESS ANALYZER: REAL-TIME VISCOSITY AND VI MEASUREMENT FOR MODERN INDUSTRY

In today's refining, lubricant blending, and chemical manufacturing sectors, staying competitive requires more than just high-quality raw materials and efficient production lines. Manufacturers must also be equipped with precise, real-time data to optimize operations, meet regulatory standards, and deliver consistent product performance. One of the most crucial parameters to monitor in many liquid processing applications is viscosity - and increasingly, the viscosity index (VI).

Have a look at the VISC-4 Viscosity Process Analyzer by BARTEC—a next-generation, online instrument that delivers continuous, highly accurate viscosity (also available as Viscosity Index ASTM compliant solution) data directly from the process stream. The VISC-4 sets a new benchmark in real-time process control, regulatory compliance, and operational simplicity.

The Importance of Viscosity in Industrial Processes

Viscosity plays a fundamental role in determining the flow characteristics, heat transfer, and mixing behavior of fluids in various applications. In refineries and lubricant production, viscosity is not only a product quality indicator but also a specification required by customers and regulators alike (e.g. Intermediate Fuel Oil Standards IFO380 acc. to ISO8217). Precise control of viscosity ensures that products meet required performance criteria, whether they're fuels, base oils, or specialty lubricants.

Traditional laboratory-based viscosity testing methods, while accurate, are limited by time delays and labor demands. In fast-paced production environments, this lag between sampling and results can lead to inconsistent quality, wasted material, and increased costs.

The solution? Online, real-time viscosity measurement - that's exactly what the VISC-4 delivers.

Overview of the VISC-4 Analyzer

The VISC-4 is a capillary-type viscometer that offers continuous, online measurement of kinematic viscosity. This physics-based approach ensures repeatable, traceable, and accurate viscosity measurements.

But the VISC-4 goes far beyond simple viscosity monitoring. It also incorporates:

- Integrated density measurement
- Real-time dynamic viscosity calculation
- Direct Viscosity index (VI) output possible



- ± 0.02 K temperature stability (acc. to ASTM D445 range)
- ASTM-compliant operation
- Reference temperature up to 135°C available (e.g. Bitumen application)
- Maintenance-free design
- Seamless network and fieldbus communication

Let's dive deeper into these features and how they benefit the end user.

Kinematic and Dynamic Viscosity – Continuously and Inline

At the core of the VISC-4 is its continuous measurement of kinematic viscosity, a property defined as a fluid's resistance to flow under gravity. In most applications (e.g., fuels, oils, solvents), kinematic viscosity is directly influenced by temperature and pressure.

The VISC-4 delivers accurate, online viscosity values without the need for sample extraction or lab testing. This reduces response time, enables tighter process control, and improves overall quality assurance.

Paired with its integrated density measurement, the VISC-4 is capable of automatically calculating dynamic viscosity - a crucial parameter for understanding a fluid's behavior under mechanical stress, such as in pumps, engines, or pipelines.

This combination of real-time kinematic and dynamic viscosity data supports more informed decision-making across process stages and enhances predictive maintenance strategies.

Introducing Viscosity Index (VI) Monitoring

One of the most significant advancements offered by the VISC-4 is its support for viscosity index (VI) evaluation. The viscosity index is a calculated number that indicates how much a fluid's viscosity changes with temperature, typically evaluated between 40 °C and 100 °C.

For lubricants and base oils, a high VI means the product maintains stable viscosity over a broad temperature range - an essential attribute for modern engine oils, hydraulic fluids, and industrial lubricants. Monitoring VI during production is vital for:

- Ensuring specification compliance
- Controlling formulation accuracy
- Optimizing blending processes

• Reducing reliance on post-production testing

With the VI-4 Viscosity Index Process Analyzer, this critical performance indicator can now be monitored in real time, online, as part of the production process—allowing producers to maintain target VI values, reduce off-spec batches, and shorten product release times.

Precision through Temperature Stability

One of the key factors in accurate viscosity measurement is temperature control. Since viscosity is highly temperature-dependent, even small fluctuations can skew results. The VISC-4 overcomes this challenge with a high-precision temperature control system that maintains stability within ± 0.02 K.

This level of precision not only improves measurement accuracy but also ensures reproducibility, giving operators and quality managers confidence in the data used to make critical process decisions.

Maintenance-Free by Design

Unlike traditional viscometers that require oil baths, moving parts, or periodic recalibration, the VISC-4 is designed with zero maintenance in mind. It contains:

- No oil bath
- No external pumps
- No moving parts

This greatly reduces the cost of ownership, lowers downtime, and eliminates many of the common failure points associated with conventional viscometers. For plants operating 24/7, this design translates directly into increased reliability and lower total lifecycle costs.

Compliance and Integration

In regulated industries such as oil refining and chemical manufacturing, compliance with industry standards is non-negotiable. The VISC-4 is an ASTM-compliant online capillary viscometer available today, offering peace of mind when it comes to quality audits and product certification.

The analyzer also features robust industrial connectivity, with support for network and communication protocols such as Modbus, Profibus, and Ethernet-based systems. This enables seamless integration into DCS and PLC environments, allowing viscosity and VI data to be monitored, recorded, and controlled in real time from centralized systems.

Application Areas

The VISC-4 is built for use in a wide range of industrial sectors, including:

- **Refineries:** For monitoring product streams such as diesel, jet fuel, and base stocks.
- **Bitumen production** for bitumen products acc. to different viscosity grades (norm. measured at 135°C ref. temperature).
- **Lubricant Blending Plants:** Ensuring correct viscosity index in automotive, industrial, and specialty oils.
- **Chemical Processing:** Measuring viscosity in solvents, polymers, resins, and other fluids where consistency and flow properties are critical.
- **Quality Control Laboratories:** As a reference-grade online analyzer that complements lab instrumentation.

Wherever fluid control, regulatory compliance, and product consistency matter, the VISC-4 delivers unmatched value.

Business Impact and ROI

Adopting the VISC-4 in your process environment has clear business advantages:

- **Improved Product Quality:** Real-time data enables proactive adjustments, reducing off-spec products.
- **Reduced Waste:** Accurate control minimizes overuse of additives or blending components.
- **Operational Efficiency:** Online data eliminates sampling delays and manual testing cycles.



- **Lower Maintenance Costs:** With no moving parts or consumables, downtime and servicing are minimized.
- **Faster Time to Market:** Online VI monitoring reduces batch approval times and speeds up quality assurance.

These benefits contribute directly to a stronger bottom line, making the VISC-4 not just a technical upgrade - but a strategic investment.

Typical amortization duration depend on local process layouts, however real life examples have shown duration of 2 to 7 months (depending on scope of supply ranging from single analyzer to total turn key solutions with protective cabinets and auxiliary systems).

Conclusion

In an era where quality, efficiency, and compliance are all mission-critical, the VISC-4 Viscosity Index Process Analyzer stands out as a comprehensive solution for real-time viscosity and viscosity index measurement. Combining ASTM compliance, unmatched accuracy, maintenance-free operation, and seamless integration, the VISC-4 empowers manufacturers to take control of their fluid processes like never before.

Whether you're in refining, lubricant blending, or chemical processing, the VISC-4 delivers the performance, insight, and simplicity you need to stay ahead.

For full specifications and application support, visit bartec.com.

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