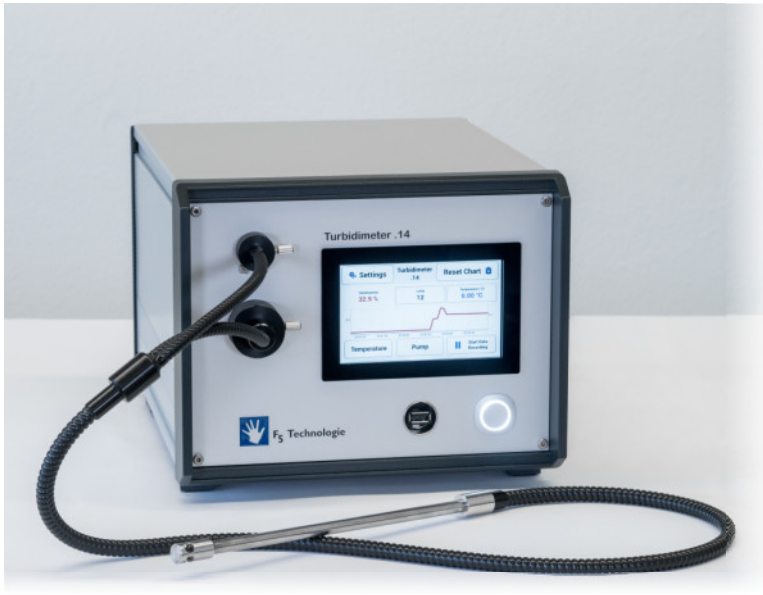


# Turbidimeter System

## for research on precipitation processes



- High-sensitive particle and tarnish detection, even in undiluted crude oil
- Probes for high temperatures and pressures available (200 °C, 700 bar)
- For lab, process and field applications (in-line)
- Stand-alone or computer controlled operation
- Expandable to a complete, automated measuring site including titration pump, stirrer and thermostat

Detecting particles, opacity and tarnish in fluids is a common task in a wide variety of industries and fields of research.

Developed for customers in the oil industry, the Turbidimeter made by F5 Technologie is able to detect particles (e.g. flocculation point of asphaltenes) in any petroleum product, even very dark fluids as undiluted crude oils.

The instrument is intended primarily as a laboratory diagnostic tool for research on oilfield chemicals (e.g. asphaltene inhibitors) and estimating the colloidal stability or compatibility parameters of asphalt, asphalt cross blends, aged asphalt, pyrolyzed asphalt, crudes and heavy oil, or residuum. Compatibility influences important physical properties of these materials as well as the formation of coke which causes fouling in refining processes.

This ergonomic instrument is equipped with a colour touch screen and a front side USB port for data storage directly on a memory stick.

The Turbidimeter combines a very sensitive optical sensor with a special broad band light source. The light diffraction problems of optical laser systems are not an issue for our instrument.

Various probes up to pressures of **700 bar** (10,000 psi) and **200 °C** (400 °F) are available and make the F5 Turbidimeter a system to detect particles in heated and pressurized systems under live crude oil conditions with live crude oil injection or pressurization with SNG (synthetic natural gas).

An **ex-proof** in-line version is available.

### Applications:

- Inhibitor testing, e.g. asphaltenes in crude oil or scale in water based samples
- ASTM D 6703 (automated Heithaus titrimetry)
- Wax testing in crude oils
- Oilfield chemical development
- Tarnish detection in chemical reactions

### Characteristics:

- High-sensitive optical detection system
- Special broad-band light source
- No diffraction problems as with laser systems
- Very high measurement accuracy
- Shortest setup time, easy handling
- Small sample volumes sufficient
- For process, lab and field applications

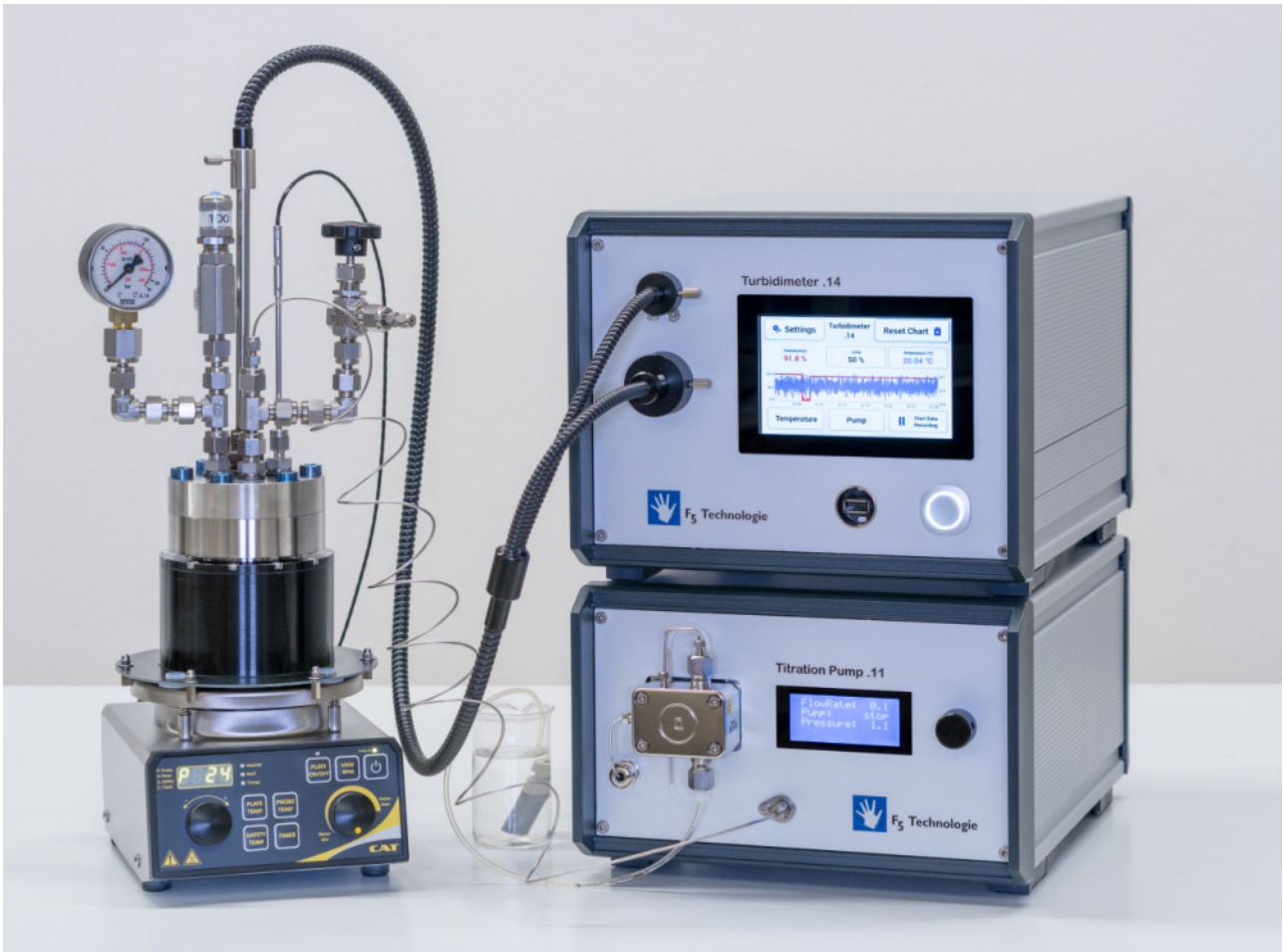


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For use in a laboratory environment, the system can be expanded to a complete, computer controlled **Flocculation Titrimeter** site, including a temperature controlled pressure vessel, high pressure titration pump, stirrer and thermostat. This provides full control over temperature as well as pressure.

All components of this **automated stand-alone system** are controlled by the Turbidimeter, and the front side USB port provides data storage on a memory stick.

Additionally, the complete system can be operated from a Windows PC via the included Windows software. Just one free USB port is required on the PC to connect the complete system. And the same applies for the power supply: Only one mains power socket provides power to the complete system through the Turbidimeter unit.

A variety of scalable sample vessel designs are available, as well as in-line flow-through cells together with exchangeable sensors. Of course we can do custom designs.

The system can be expanded easily and is highly modular. For example, our titration pumps can be run stand-alone as well and thus are available for alternative lab applications. The same applies to the other external devices as stirrers, thermostats, etc.



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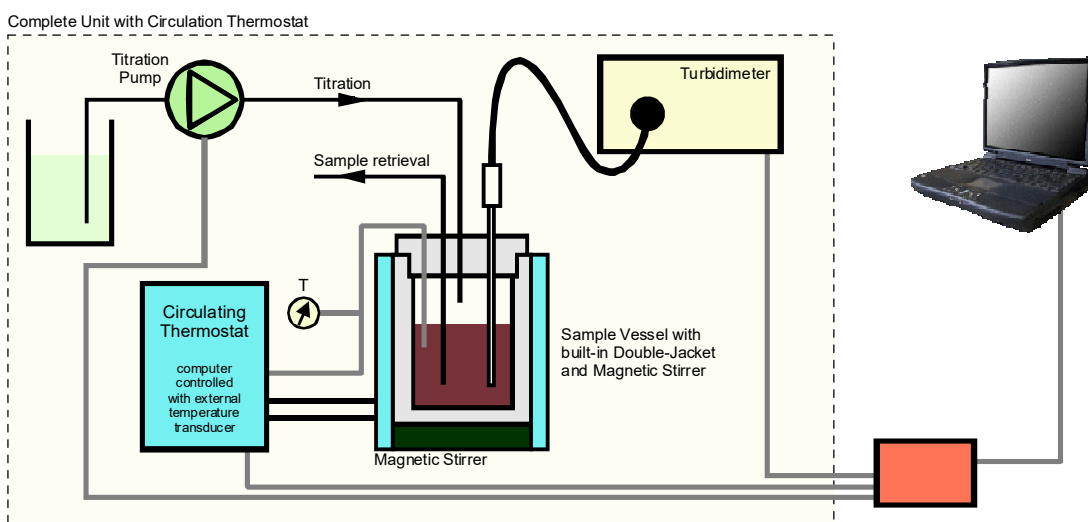
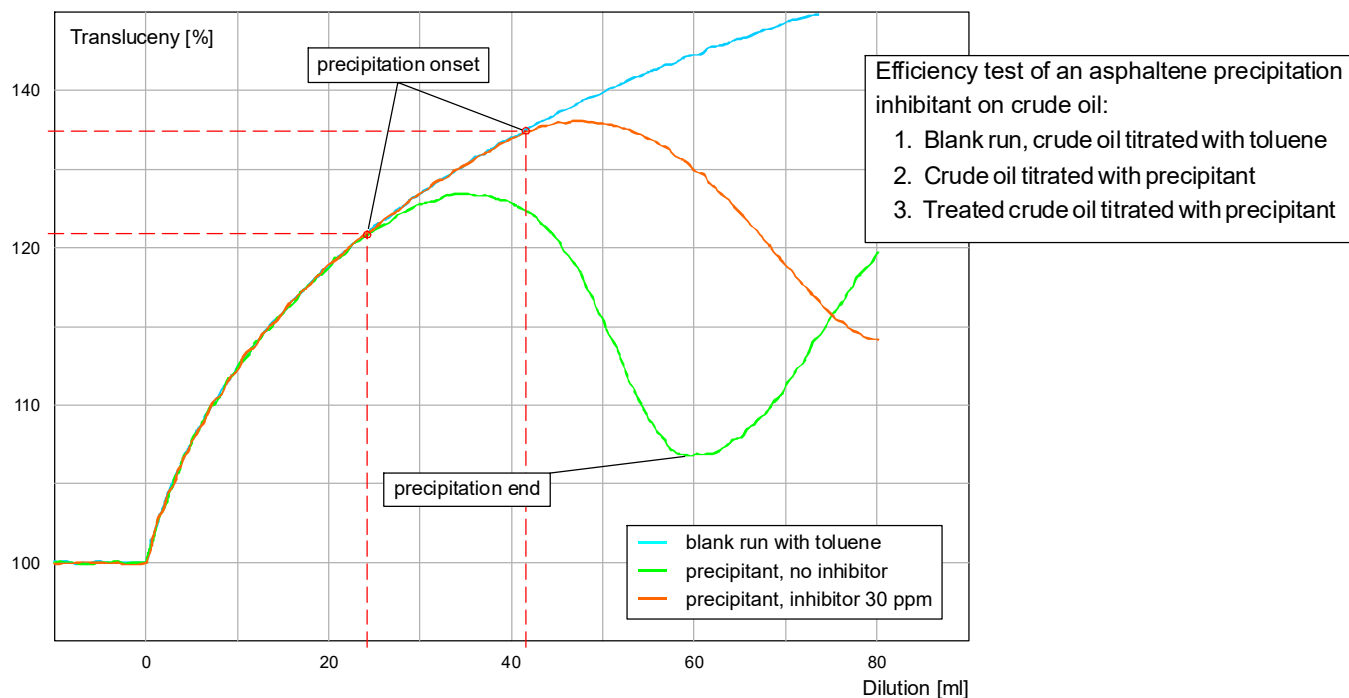
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## Asphaltene Precipitation in Crude Oil

Blank run and with precipitor, with and without inhibitor



**Technical data:**

- Temperature range: -40 °C to +200 °C, resolution: 0.1 °C, accuracy: 0.1 °C (alternative temperature ranges available)
- Sensitivity: 5 mLux
- Measuring principle: Relative light transmission (translucency)
- Measuring frequency: 2 per second
- Operation: Stand-alone or by Windows analysis software (USB interface)
- Power supply: 100..240 VDC or 13..28 VDC (in-line process version)



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