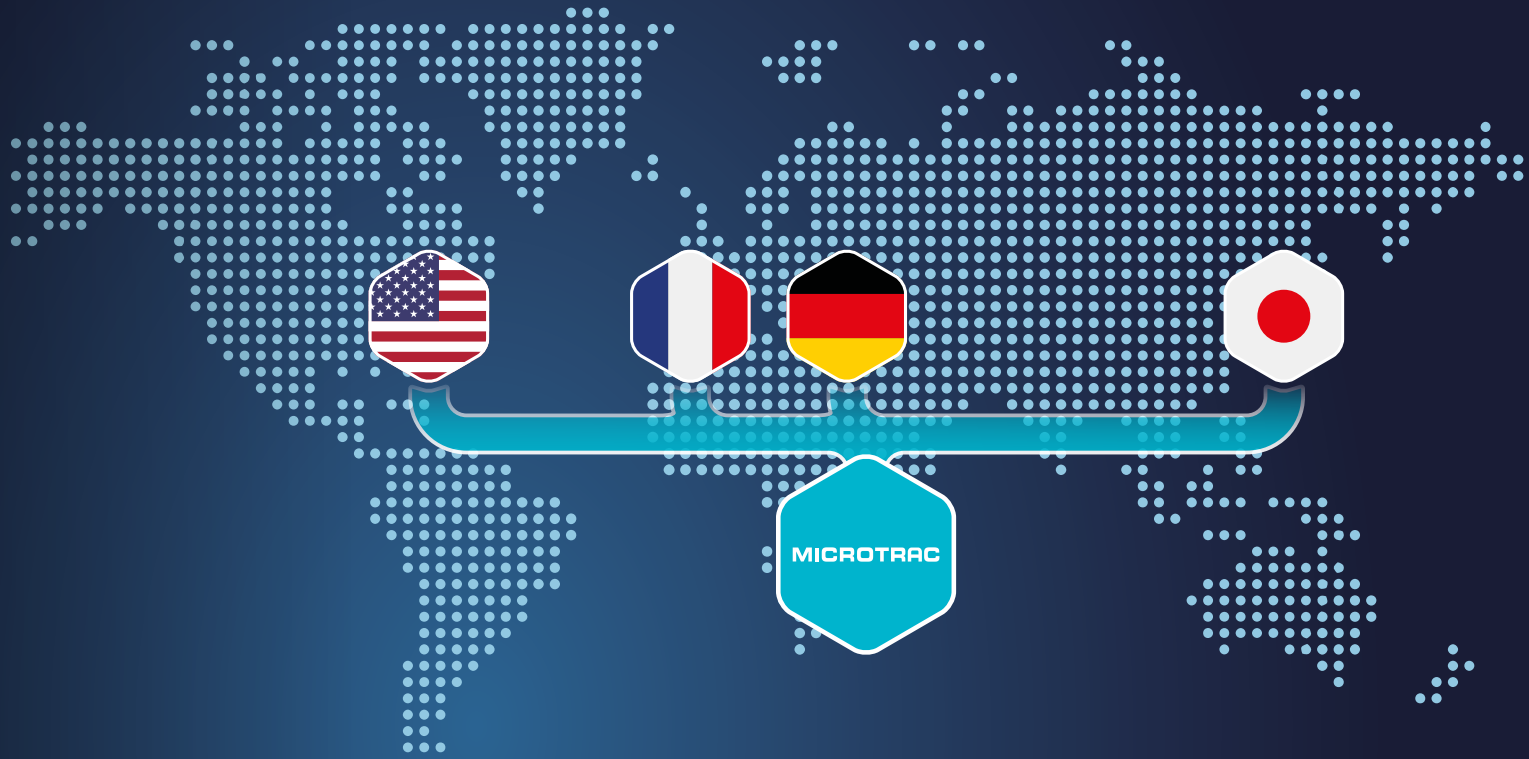
MICROTRAC
a VERDER company



TURBISCAN
RANGE

SHELF-LIFE & DISPERSIBILITY ANALYZERS

THE WORLD REFERENCE STABILITY ANALYZER BY STATIC MULTIPLE LIGHT SCATTERING



MICROTRAC

PARTICLE CHARACTERIZATION AT ITS BEST

MICROTRAC is your preferred partner for the comprehensive characterization of particulate systems. We provide our customers with advanced technologies to obtain consistently reliable results. Innovation and quality are at the core of everything we do.

As part of Verder, we provide worldwide support through a network of subsidiaries and distributors.



SHELF-LIFE AND DISPERSIBILITY ANALYZERS | TURBISCAN

Three Centers of Excellence

MICROTRAC: A SINGLE-SOURCE SOLUTION PROVIDER FOR PARTICLE CHARACTERIZATION

PARTICLE SIZE & SHAPE FOR PARTICLE ANALYSIS



Size & Distribution | Shape

Our expertise in particle size distribution and shape analysis ensures optimal product quality control and supports advanced research efforts. At the core of our technology are **Dynamic Image Analysis (DIA) used on the Camsizer** and a combination of **Laser Diffraction (LD) and Dynamic Image Analysis used on the SYNC** systems. These two technologies cover all your needs for particle size analysis, ranging from 10 nm to 135 mm, whether for dry or wet samples. Our unique size & shape analysis technology utilizes advanced light scattering, state-of-the-art cameras, and sophisticated computational software to deliver outstanding accuracy and repeatability.

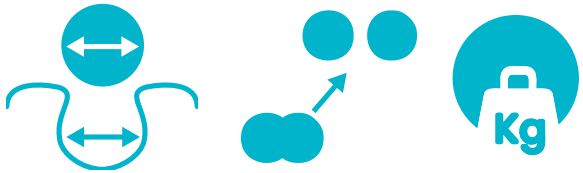
COLLOIDS AND FORMULATIONS CHARACTERIZATION



Particle size | Zeta potential | Stability & Shelf-Life

When working with colloids or formulations, the three main parameters to consider are **particle size, zeta potential and stability/shelf-life.** At MICROTRAC, we address all these needs with our comprehensive technology platforms: **NANOTRAC, STABINO, and TURBISCAN**. Our solutions analyze these critical factors to ensure rapid R&D and quality control for the highest product quality. Utilizing **Dynamic Light Scattering (DLS), Static Multiple Light Scattering (SMLS), and Zeta Potential (ZP),** our systems offer unique features such as non-dilution, high accuracy, and fast measurement—enabling you to make fast decisions based on reliable data.

GAS ADSORPTION FOR MATERIALS CHARACTERIZATION



Surface Area & Pore size | Catalysis | Density

We offer advanced solutions for measuring surface area, porosity, and catalytic properties of materials. The MICROTRAC analyzers, celebrated for their precision in **gas and vapor adsorption measurements,** determine BET surface area and pore size distribution for both porous and non-porous materials. These analyzers employ cutting-edge gas adsorption technology and are widely used in various sectors, including Research and Development, Quality Control, and Quality Assurance. These tools are trusted worldwide, reflecting the renowned craftsmanship and quality of Japanese engineering, with comprehensive support provided by our competence centers in Japan (Osaka), Germany (Haan), USA (Newtown, PA) and France (Toulouse). The **BELSORP** and **BELPORE** analyzers are essential for achieving accurate gas and vapor adsorption analysis.

TURBISCAN RANGE

THE WORLD LEADER IN SHELF-LIFE AND STABILITY ANALYSIS

SAVE TIME

Up to 1,000 times faster compared to a conventional visual stability test

DETECT & QUANTIFY

Sedimentation, phase separation, aggregation, coalescence, coagulation, creaming...

All destabilizations are detected and quantified

OBJECTIVE & RELIABLE

Instrumental method, no dilution, no external stress, measure the sample as is – analysis you can trust

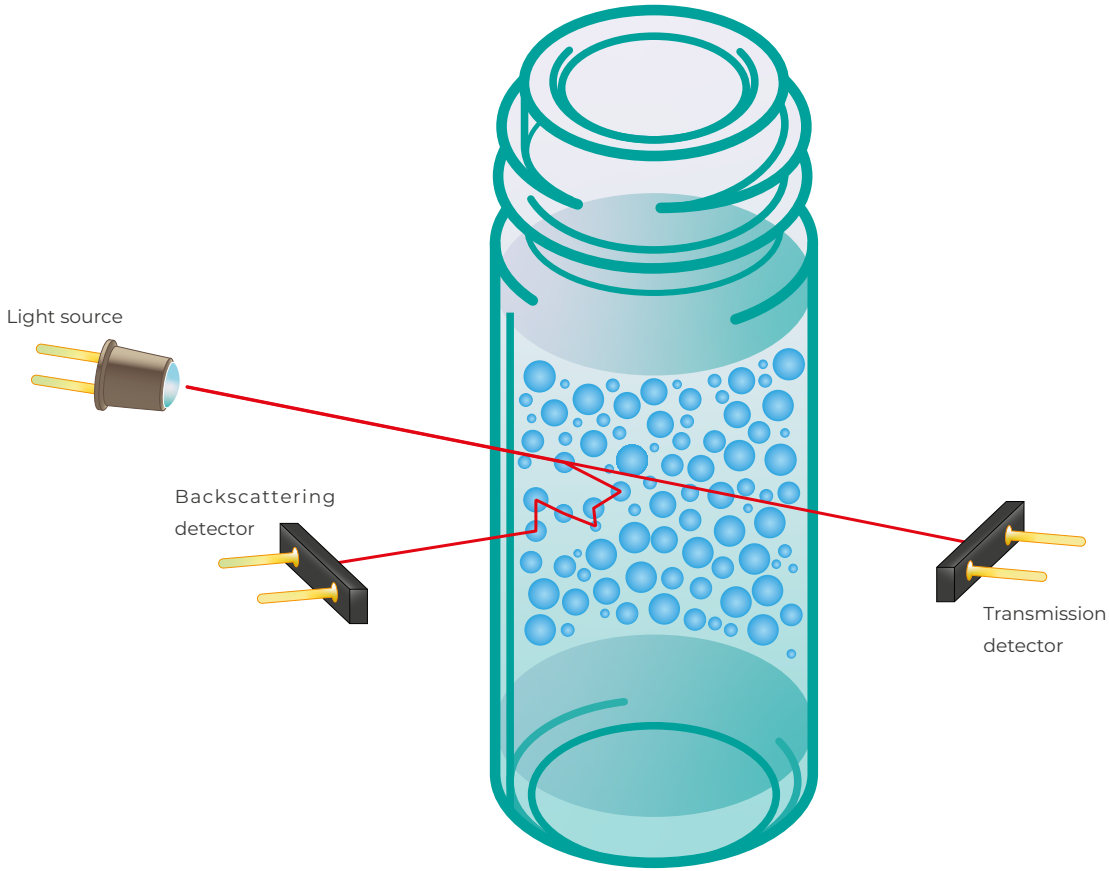
WIDE RANGE OF APPLICATIONS

Suspensions, emulsions, foams, from low to high concentrations (10^{-4} - 95% v/v), opaque, clear, coloured samples, from nano to macro (10 nm to 1 mm).



STATIC MULTIPLE LIGHT SCATTERING (SMLS)

CUTTING-EDGE STABILITY AND DISPERSIBILITY TECHNOLOGY COUPLED WITH SMART DATA ANALYSIS



Turbiscan is based on the **Static Multiple Light Scattering (SMLS)** technology, the most suitable method to characterize liquid dispersions, directly, in their native state.

In most emulsions, suspensions and formulations the concentrations are too high to be analyzed “as is” with light scattering and their characterization requires dilution or mechanical stress, altering their state and structure. SMLS offers the ability to investigate the **dispersion state** and its **evolution over time, without any dilution,** even on highly concentrated samples.

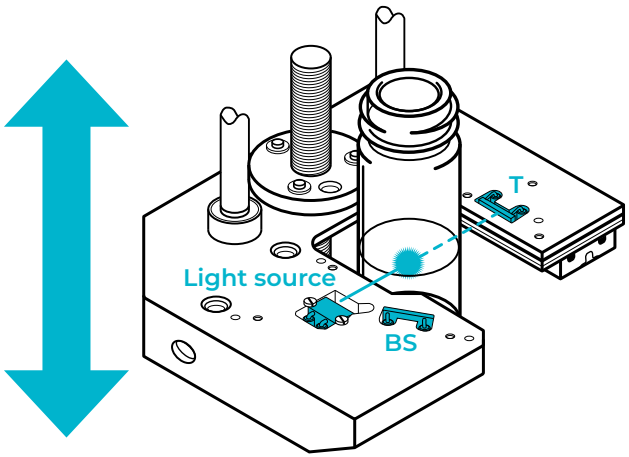
SMLS offers extraordinary resolution to detect **size and concentration** variation occurring in complex formulations and in a very wide range of applications and industries. As a direct optical method that does not require sample preparation (such as dilution), SMLS is in perfect agreement with ISO norms regarding shelf-life and stability measurements (ISO/TR 13097:2013, ISO/TR 18811:2018).

Standards: ISO/TS 21357:2022 for particle size, and ISO 13317 for particle size distribution

TURBISCAN RANGE

HOW DOES IT WORK

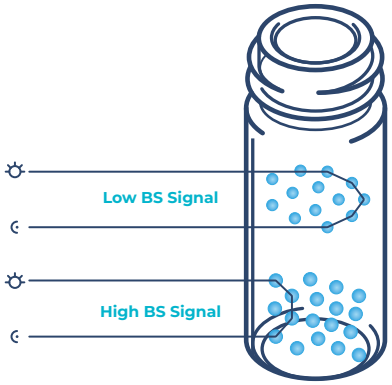
SCANNING READING HEAD



$$T = T_0 \, exp \, (\frac{-3r_i \, \phi Q_e(d)}{d})$$

d	mean particle size
ϕ	particle concentration
ri	cell radius
Qe	extinction efficiency
α, β	gain and offset

$$BS = \alpha \sqrt{\frac{3\phi(1-g(d)Q_e(d)}{2d}} + \beta$$



ADVANTAGES

- Sensitive to the slightest variation of particle size and concentration
- Non-dilution, native samples
- High space resolution: 20 µm scanning
- Single technique, huge possibilities:
  From: 10 nm to 1 mm
  From: 10-4 up to 95% v/v
- Works on any dispersion : suspensions, emulsions and foams
- Fast stability measurement

STATIC MULTIPLE LIGHT SCATTERING (SMLS)

SMLS consists of sending photons (NIR light source, 880 nm) into the sample.

These photons, after being scattered many times by the particles (or droplets) in the dispersion, emerge from the sample and are detected by two synchronous detectors:

- **Backscattering** is measured at 135° for **opaque samples**
- **Transmission** at 0° from the light source for **transparent samples.**

HIGH RESOLUTION TO THE SMALLEST VARIATION OF PARTICLE SIZE VARIATION AND MIGRATION

Backscattering (BS) and Transmission (T) intensities are directly related to particle size (d) and particle concentration (ϕ) and are extremely sensitive to the smallest variation.

SCANNING MODE

Backscattering (BS) and Transmission (T) are acquired every 20 microns along the sample height. Scans are repeated to detect any variation of the concentration (migration) or particle size variation (aggregation, flocculation) in function of time.

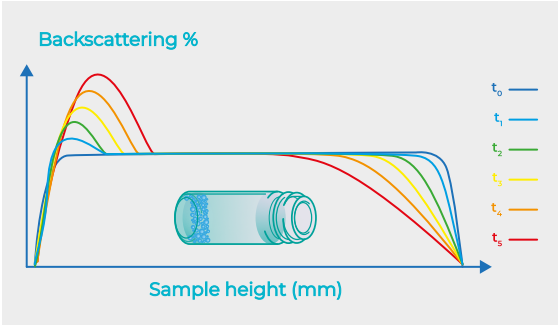
STATIC MULTIPLE LIGHT SCATTERING (SMLS)

DATA AT A GLANCE



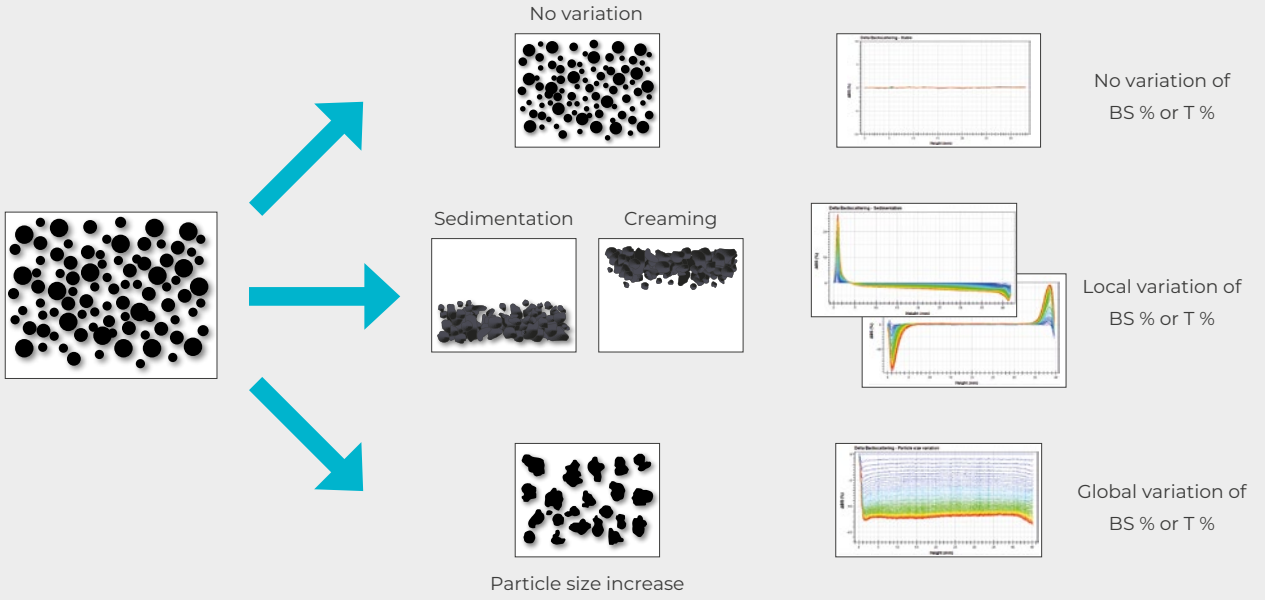
DATA REPRESENTATION

Scans are overlaid on the same graph and in function of sample height. Each scan has a specific colour from blue - first scan to red - last scan to easily understand signal variations in function of time.



DESTABILIZATION DETECTION

In the case of destabilization, deviations in scans are detected as a function of sample height. Due to the high sensitivity of the SMLS technology, destabilizations are detected in their very early stage and **up to 1,000 times faster** than visual observation.



TURBISCAN SMART ANALYSIS

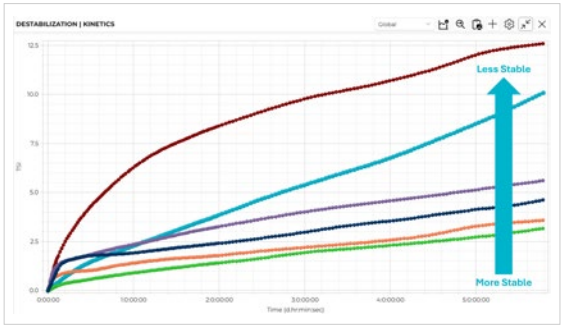
ON-BOARD TECHNOLOGY FOR ONE-CLICK RESPONSE

TURBISCAN STABILITY INDEX – TSI

Turbiscan Stability Index (TSI) sums all the signal variations along the entire sample height and therefore, takes into account all destabilizations occurring. Thanks to the TSI, sample comparison is easy as the higher the TSI, the lower the stability.

The key points of the TSI: it is “one-click” and fully automatic, operator-independent, and does not require any data input.

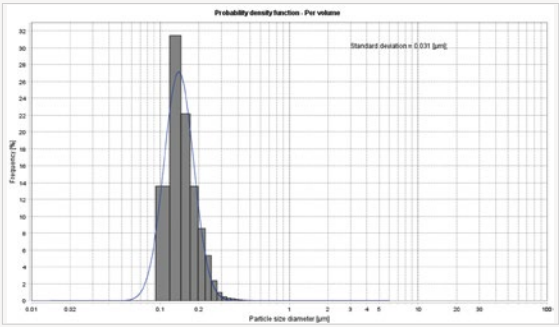
The TSI is used in R&D labs for formula stability comparison and optimization, Quality Control as well as for academic research and quickly becoming the stability criteria.





PARTICLE SIZE & DISTRIBUTION

Particle size distribution is determined from migration profiles and migration velocities and offers to investigate size and its distribution in native samples and without any pumping, dilution or mechanical stress. Standard: ISO 13317.





SHELF-LIFE & DISPERSIBILITY ANALYZER TURBISCAN

THE BEST TECHNOLOGY FOR FAST & NON-INVASIVE STABILITY ANALYSIS

NUMBER OF SAMPLES 1

TEMPERATURE RANGE RT-60 °C

TURBISCAN STABILITY INDEX TSI

PARTICLE SIZE DISTRIBUTION



TURBISCAN LAB

THE WORLD REFERENCE STABILITY ANALYZER

TURBISCAN LAB enables rapid, sensitive detection of destabilization phenomena such as creaming, sedimentation, flocculation, and coalescence. Its temperature-controlled chamber allows both stability studies at defined conditions and accelerated analysis up to 60 °C.

Designed for R&D and QC use, it supports formulation development and routine quality control with fast, quantitative stability assessment.

FEATURES

- Static Multiple Light Scattering (SMLS) Technology
- 1 sample position
- Temperature range: from **RT to 60 °C**
- Accelerated destabilization detection **up to 1,000× faster** than visual observation
- **Real stability:** No dilution (10-4 up to 95% v/v) No mechanical stress
- Destabilization quantification: migration velocity, particle size
- One click stability ranking with the **Turbiscan Stability Index** (TSI)
- Bar code reader for easy sample management
- Convenient: plug & play, free license software, multiple computers, limited footprint
- Standards: ISO/TR 13097:2013, ISO/TS 22107:2021, ISO/TS 21357:2022, ISO 13317
- 21 CFR Part 11–ready software with IQ/OQ validation support

TURBISCAN TRILAB

ANALYZE MORE, FASTER.

Turbiscan TRILAB is a multi-sample stability analyzer enabling fast, reliable shelf-life studies of emulsions, suspensions, and foams. It analyzes up to 3 samples simultaneously and independently, improving efficiency and saving time.

With a temperature range from **20 °C to 60 °C**, it supports accelerated stability testing and ISO-compliant studies. The non-invasive measurement preserves sample integrity while delivering quantitative insight into destabilization phenomena-up to 1,000× faster than visual methods.

NUMBER OF SAMPLES 3

TEMPERATURE RANGE 20–60 °C

TURBISCAN STABILITY INDEX TSI

PARTICLE SIZE DISTRIBUTION



FEATURES

- Static Multiple Light Scattering (SMLS) Technology
- **3 independent sample positions**
- Temperature range: from **20 °C to 60 °C**
- Accelerated destabilization detection **up to 1,000×** faster than visual observation
- **Real stability:** no dilution (10-4 up to 95% v/v) – No mechanical stress
- Destabilization Quantification: migration velocity, particle size
- One click stability ranking with the **Turbiscan Stability Index** (TSI)
- Sample management via bar code & LCD screen with measurement status and stability results
- Convenient: plug & play, free license software, multiple computers, limited footprint
- Standards: ISO/TR 13097:2013, ISO/TR 18811:2018, ISO/TS 22107:2021, ISO/TS 21357:2022, ISO 13317
- 21 CFR Part 11–ready software with IQ/OQ validation support



The measurement cell is placed directly in the trap door's sample holder.



TURBISCAN TOWER

POWER YOUR STABILITY STUDIES.

TURBISCAN TOWER is the flagship stability analyzer for fast, precise, and quantitative analysis of emulsions, suspensions, and foams. With **6 independent positions**, it enables simultaneous sample comparison and high-throughput workflows.

Operating from **4 °C to 80 °C**, it supports accelerated and ISO-compliant stability studies. Its non-invasive measurement preserves sample integrity while detecting and quantifying destabilization phenomena, up to 1,000× faster than visual methods. Results are clearly displayed with an intuitive color-coded readout for rapid decision-making.



FEATURES

- Static Multiple Light Scattering (SMLS) Technology
- **6 independent sample positions**
- Temperature range: from **4 °C to 80 °C**
- Accelerated destabilization detection up to 1,000× faster than visual observation
- **Real stability:** no dilution (10^{-4} up to 95% v/v) No mechanical stress
- Destabilization Quantification: migration velocity, particle size
- One click stability ranking with the **Turbiscan Stability Index** (TSI)
- Sample management via bar code & LCD screen with measurement status and stability results
- **Convenient: plug & play, free licence software, multiple computers, limited footprint**
- Standards: ISO/TR 13097:2013, ISO/TR 18811:2018, ISO/TS 22107:2021, ISO/TS 21357:2022, ISO 13317
- 21 CFR Part 11–ready software with IQ/OQ validation support

NUMBER OF SAMPLES 54

TEMPERATURE RANGE RT-60 °C

TURBISCAN STABILITY INDEX TSI

PARTICLE SIZE DISTRIBUTION



TURBISCAN AGS

AUTOMATE YOUR STABILITY WORKFLOW.

Turbiscan AGS is a high-throughput stability analyzer designed to accelerate time-to-market and streamline quality control of emulsions, suspensions, and foams.

Combining **SMLS** technology with fully automated sample handling, it operates 24/7 with a capacity of up to **54 samples** across **3 temperature-controlled racks** (up to 60 °C). It delivers fast, quantitative stability analysis—up to 1,000× faster than visual methods—while smart software manages measurement and reporting without human intervention.

FEATURES

- Static Multiple Light Scattering (SMLS) Technology
- 3 independent thermoregulated racks of 18 samples for a total of **54 samples**
- Temperature range: from **RT to 60 °C**
- Accelerated destabilization detection **up to 1,000× faster** than visual observation
- **Real stability:** no dilution (10-4 up to 95% v/v) No mechanical stress
- **Fully automated r**obotic station working 24/7
- Destabilization quantification, migration velocity, particle size diameter...
- One click stability ranking with the **Turbiscan Stability Index** (TSI)
- **Convenient:** free licence software, multiple computers, limited footprint
- Standards: ISO/TR 13097:2013, ISO/TR 18811:2018, ISO/TS 22107:2021, ISO/TS 21357:2022, ISO 13317



TURBISCAN DNS

FROM DISPERSION TO STABILITY, FULLY UNDERSTOOD.

TURBISCAN DNS is an advanced analyzer designed to characterize both dispersibility and stability of emulsions, suspensions, and foams. Using **SMLS** technology, it provides precise, quantitative monitoring of dispersion state and its evolution over time—directly on native samples, without dilution.

It uniquely combines two complementary approaches: in-process dispersibility studies (including mixing directly in the measurement vial, aligned with ISO/TS 22107:2021) and stability analysis at rest, without external stress. This dual capability enables a deeper understanding of formulation behavior from development to final performance, helping optimize processes, detect instability early, and ensure consistent product quality.

FEATURES

- Static Multiple Light Scattering (SMLS) Technology
- Temperature range: **from RT to 60 °C**
- Accelerated destabilization detection **up to 1,000× faster** than visual observation
- **Real stability:** no dilution (10-4 up to 95% v/v)
  No mechanical stress
- Destabilization quantification, migration velocity, particle size diameter...
- One click stability ranking with the **Turbiscan Stability Index** (TSI)
- Mixing and circulating function
- **Ultra-fast measurement**
  (up to 10 measurements per second).
- **Convenient:** plug & play, free licence software, multiple computers, limited footprint
- Standards: ISO/TR 13097:2013, ISO/TR 18811:2018, ISO/TS 22107:2021, ISO/TS 21357:2022, ISO 13317



DIMENSIONS TS
FOR TURBISCAN

DATA INTERPRETATION MADE SIMPLE

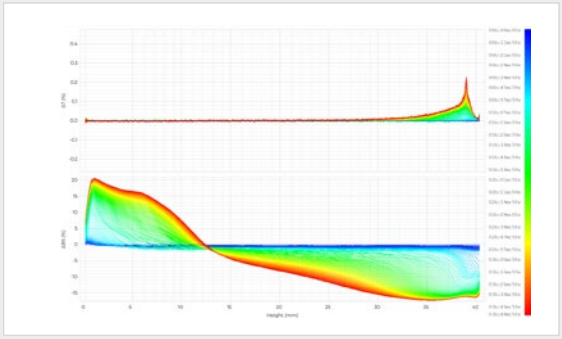


- Intuitive and straightforward navigation
- Fast and robust stability comparison thanks to the TSI algorithm
- Advanced calculation for deep data analysis: migration rate, mean particle size evolution, phase separation...
- Stay up to date: Free license – Free software updates
- Multi-user software
- Easy data export
- Sample destabilization movies
- Fully guided calibration check-up procedure
- Multi-language software
- 21 CFR Part 11–ready software with secure data integrity and traceability
- Centralized control of multiple TURBISCAN instruments from a single computer

DIMENSIONS TS FOR TURBISCAN

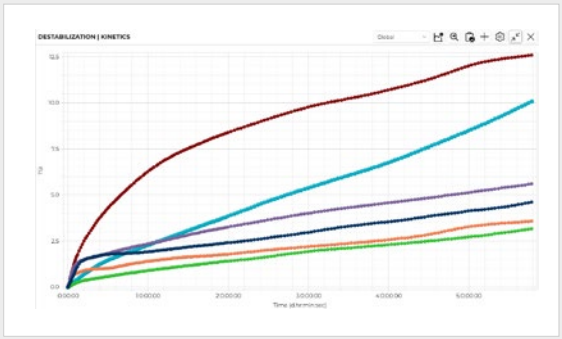
SELECTED FUNCTIONS

Data acquisition, interpretation, and export are done with the **DIMENSIONS TS**, the dedicated software for the Turbiscan range. **DIMENSIONS TS** is continuously optimized towards more intuitive and straightforward data analysis, hence saving time, and helping users get the results they need in a few clicks.



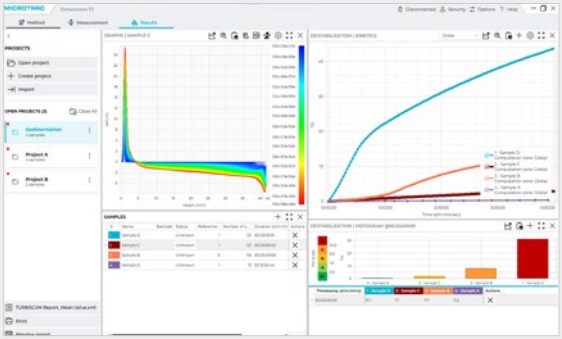
Transmission and backscattering in function of the sample height

Destabilization visualization is made simple via automatic color code (first scan in blue, last in red) and sample height detection.



Turbiscan stability index In function of time

Turbiscan Stability Index is computed fully automatically, without any input and in just a single click.



Video representation of the destabilization

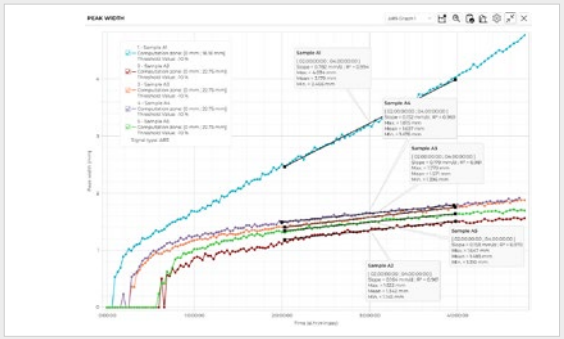
DIMENSIONS platform brings all essential information together on a single page, with a fully customizable view and a clear overview at a glance using the TILE display.





Sample ranking via TSI value

Histogram sample ranking upon their TSI value at one time, and a color code is associated with regards to the destabilization importance .



Advanced calculation and phase separation thickness kinetic

Advanced calculation allows the user to go deeper in the understanding of the destabilization processes: phase separation kinetics, migration speed, particle size....

Free license and multi-computer – **DIMENSIONS TS** gives the flexibility you need to acquire, share, and analyze data on separate computers. If you are changing your operating system, the newest version of the software is free.

Data export is available for all on-screen graphs, ensuring secure handling in compliance with 21 CFR Part 11.

APPLICATIONS

EXPLORE OUR WIDE RANGE OF APPLICATIONS

Turbiscan technology (SMLS) can analyze a very wide variety of samples: opaque or clear, highly concentrated and very diluted, from nanoparticles to large flocs (mm), emulsions, suspensions, colloids, foams... The application field of the Turbiscan is limitless.

Turbiscan is used today in research & development, quality control as well as in the academic research field and is the reference technique for shelf-life studies and stability measurement.

KEY BENEFITS

- Time saving
- Detect & Quantify
- Objective and real stability



SPECIALTY CHEMICALS & POLYMERS

- Surfactants, stabilizers, polymers and bio polymers, fillers and pigments, latexes, solvents....



PHARMACEUTICALS

- Injectables, parenterals, vaccines, drug delivery systems, skin treatments, inhalers, cough syrups, ophthalmic suspensions,...



FOOD & BEVERAGES

- Soft drinks, flavor emulsions, beverages, milk and dairy products, vegetable drinks, plant protein, wine & beers, additives, gums and stabilizers...



HOME & PERSONAL CARE

- Creams & lotions, moisturizers, sunscreens, detergents, fragranced formulations, cleansers, foundations, make up, nail polishes...



COATINGS, PAINTS & INKS

- Water-based, solvent-based, resins, varnishes, inks, primers, protective and special coatings...



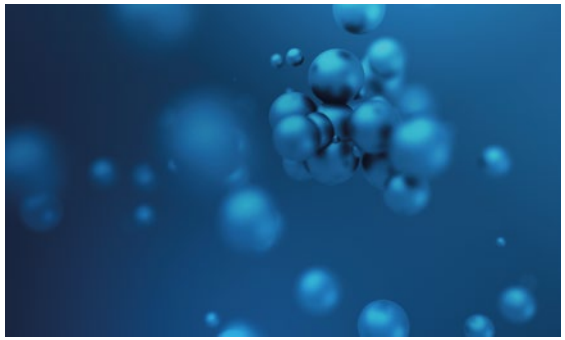
OIL & LUBRICANTS

- Water-in-oil demulsification, enhanced oil recovery, drilling fluids, crude oils, heavy fuels, fuel & oil additives, metal working fluids, lubricating agents...



BATTERY & ELECTRONICS

- Anode & cathode slurries, CMP slurries, multilayer capacitors, LCD and LED display...



AND MANY MORE

- Agrochemicals, building materials, colloidal suspensions, nanoparticles...



SHELF-LIFE AND DISPERSIBILITY ANALYZ

VISIT OUR APPLICATIONS DATABASE

Interested to hear more about applications in each industry, visit the MICROTRAC website

START EXPLORING!

www.microtrac.com/applications



SHELF-LIFE & DISPERSIBILITY
ANALYZERS TURBISCAN

ACCESSORIES AND OPTIONS



STANDARD VIALS (20 ML)

Cylindrical glass vials have a recommended volume of approximately 20 mL. They are disposable to avoid chemical or bacterial contamination and decrease labor costs for washing and drying. The vials are closed thanks to a cap and a disposable PTFE seal to prevent evaporation in case of elevated temperatures. These vials are meant to reproduce your visual stability test.



SMALL VOLUME (4 ML)

Small sample volume? No problem. Small-volume vials and specific adapters are available. The measurement can be done with as few as 2 mL. Another benefit: the sample can be fully recovered, Turbiscan measurement is non-contact/non-destructive.



ON-DEMAND ADAPTERS (FOR SYRINGE TYPE, PRESSURIZED VIALS, ...)

You have special needs, and we understand this! Our development team loves challenges: on-demand adapters can be offered (pre-filled syringes, pressurized vials,...). Perfect to study the stability in specific conditions (pressure) or for Quality Control.



OPEN-BOTTOM CELLS – FOR VISCOUS AND FRAGILE SAMPLES

Some samples are not easy to transfer or are too fragile to be poured. The coring vials set helps to go around this problem. With its open-bottom (closed manually with a stopper), a sticky sample or foam can easily be sampled with the coring vials.



CALIBRATION STANDARDS

Each Turbiscan comes with a set of standards to check instrument calibration. The Turbiscan software (Turbisoft) guides you step-by-step and once the procedure is finished, the software gives a thumbs up. Test and results are saved, and instrument-checking procedure can be tracked.

TECHNICAL DETAILS

SPECIFICATIONS AT A GLANCE



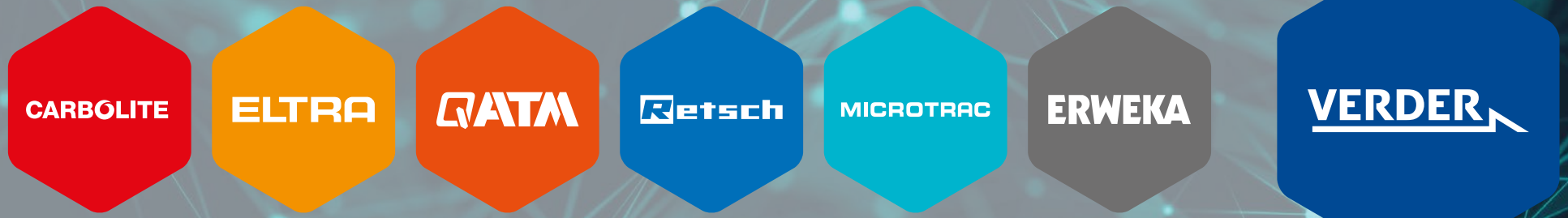




System	TURBISCAN LAB	TURBISCAN TRILAB	TURBISCAN TOWER	TURBISCAN AGS	TURBISCAN DNS
Measuring principle	Static Multiple Light Scattering (SMLS)				
Measurement type	Stability & Shelf Life Studies				Dispersiblity & Stability
Particle Size Distribution	Yes (additional software required)				
Sample volume	2 -20 mL			20 mL	2 - 20 mL
Temperature range	RT – 60°C	20 – 60°C	4 – 80°C	RT – 60°C (3 racks)	RT – 60°C
Number of samples	1	1 – 3	1 – 6	54	1
Sample concentration	0.0001 – 95% v/v				
Reproducibility / repeatability on latex standards	+/-0.05%/0.05%			+/-0.1%/0.05%	
Scan step resolution	20 µm	20 µm	20 µm	40 µm	40 µm
Automatic sample recognition (barcode)	✓	✓	✓	✓	✓
Standards	ISO/TR 13097:2013, ISO/TR 18811:2018, ISO/TS 22107:2021, ISO/TS 21357:2022, ISO 13317				
Mixing function	–	–	–	–	Up to 2,000 rpm
Circulation function	–	–	–	–	Up to 1,000 Cps / 1,000 mPas
Software	DIMENSIONS TS	DIMENSIONS TS	DIMENSIONS TS	Turbisoft AGS	TurbiSoft DNS & TS-Fast
FDA 21 CFR Part 11 compliant security features	✓	✓	✓	–	–
Dimensions	26 x 28 x 25 cm	38 x 48 x 58 cm	38 x 45 x 90 cm	145 x 75 x 85 cm	70 x 63 x 52 cm
Weight	8 kg	35 kg	50 kg	80 kg	30 kg
CE Certified	✓	✓	✓	✓	✓

VERDER – ENABLING PROGRESS

MICROTRAC is part of Verder, the scientific division of the Verder Group. Five more companies are part of the scientific division: Retsch, Carbolite Gero, QATM, Eltra and Erweka. Together we set new standards in the development and manufacturing of lab and analysis equipment, as well as sample preparation tools, which are used in areas such as quality control, research and development.



For more details about the extensive MICROTRAC product portfolio please visit our website: **www.microtrac.com**

MICROTRAC
a VERDER company



Microtrac Inc.
3230 N. Susquehanna Trail
York, PA 17406 · USA

Phone: +1 888 643 5880
marketing@microtrac.com

MicrotracBEL Corp.
8-2-52 Nanko Higashi, Suminoe-ku
Osaka 559-0031 · Japan

Phone: +81 6 6655 0360
info@microtrac-bel.com

Microtrac Retsch GmbH
Retsch-Allee 1-5
42781 Haan · Germany

Phone: +49 2104 2333 300
info@microtrac.com

Microtrac Formulaction SAS
5 rue Paule Raymondis
31200 Toulouse · France

Phone: +33 (0)5 62 89 29 29
contact.fr@mtf.verder.com

www.microtrac.com

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