MICROTRAC
a VERDER company

DISPERSIBILITY & STABILITY ANALYZER

TURBISCAN DNS

A unique platform for dispersibility and stability: The Turbiscan DNS comes with cutting-edge technology that offers a comprehensive solution for measuring the dispersibility and stability of emulsions, suspensions, and foams.

With its advanced optical system and sensitive detectors, powered by Static Multiple Light Scattering (SMLS), the TURBISCAN DNS can accurately detect and quantify changes in the physical properties of these complex systems over time. The measurement of the dispersibility and stability is done via two functions:

- Measurement while processing the formulation or dispersion (online or mixing directly in measurement vials) → dispersibility studies
- At rest, without any additional forces → fast and quantitative stability and shelf-life studies

All measurements are done without dilution on the native sample to provide a clear and reliable measurement of the dispersion state and its evolution. This powerful instrument enables researchers and manufacturers to optimize their formulations, identify stability issues early on, and ensure consistent product quality. Whether you are developing new products or improving existing ones, the DNS provides the insights you need to make informed decisions and stay ahead of the competition.

* Image shows new product design – available starting April 2024

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TURBISCAN DNS

THE WORLD LEADER IN STABILITY ANALYSIS

- For dispersibility and stability studies, using the unique SMLS technology
- Online particle size determination on native samples and without any dilution at high frequencies (up to 10 measurements per second)
- Accelerated destabilization detection – up to 1,000 x faster than visual observation
- Temperature can be set up to 60°C
- Quantitative measurements of dispersion stability and shelf-life, migration velocity, particle size diameter, and other parameters
- Easy and repeatable redispersion measurements
- TLOOP and TMIXmodules provide two possibilities for online measurements: either connect the DNS to your process via TLOOP or use vials as mini reactors by equipping them with specific blades (TMIX)
- Click & analyze: The TURBISCAN DNS is a fully integrated platform – everything is included and perfectly aligned

DISPERSIBILITY & STABILITY ANALYZER TURBISCAN DNS

TYPICAL APPLICATIONS

Whenever you are working with suspensions, emulsions, colloids, or foam, the TURBISCAN is your ideal characterization companion. The TURBISCAN series is used in various industries such as pharmaceuticals, cosmetics, food and beverage, paints and coatings, oil and gas, batteries, agrochemicals, chemistry, and much more.

emulsions

- Cosmetic creams and lotions
- Dairy products and beverages, flavor emulsions
- Pharmaceutical parenteral and topical forms
- Metalworking fluids
- Agrochemical: fertilizers, pesticides, ...
- Petroleum emulsion

suspensions

- Paints, inks, and coatings
- Drug & vaccine suspension
- Make-up and sunscreen
- Chemical & polymer industry
- Ceramics and catalysts
- Battery slurries
- Electronic slurries

colloids & nanoparticles

- Drug delivery system: LNP, Liposomes, ...
- Research on nanoparticles and nanoparticle suspension
- Polymer and biopolymer dispersion

... and many more!

APPLICATION EXAMPLES

HOW CAN PARTICLE DISPERSIBILITY MEASUREMENT HELP YOU?

CHEMISTRY – RAW MATERIAL SELECTION

Dispersibility corresponds to uniformly dispersing particles into liquids and with a particle size as close as the primary particle size. Being crucial to match product specifications and get the most value out of the used raw material, dispersibility is impacted by the particle-to-particle interaction and must, as stated in ISO/TS22107:2021, be measured while processing the particle into the liquid and native sample (no dilution, no mechanical stress).

Thanks to the online capabilities of the TURBISCAN DNS, it is the first ready-to-use instrument to investigate particle dispersibility and helps the operator to formulate safe and cost-effective higher-performance formulations. Please take a look at our numerous applications and measurement examples to find the right raw materials, optimize processes, and look for alternative solvents.

FAST DETECTION OF SETTLING PARTICLES

SEDIMENTATION

The TURBISCAN technology offers a significantly faster (up to 1,000 times) and more reliable detection of sedimentation compared to visual observation. Furthermore, naked-eye observation makes it

difficult to calculate the migration rate and is prone to error and misinterpretation. In contrast, the TURBISCAN technology provides a fast and non-destructive way to detect and quantify sedimentation and particle size over time and can detect even small changes in highly concentrated samples without any dilution or mechanical stress. This makes it ideal for analyzing complex suspensions and formulations, and getting a quicker, reliable, and more accurate answer on sedimentation monitoring.

FAST DETECTION OF DROPLET MIGRATION

CREAMING OF EMULSIONS

When it comes to measuring droplet migration and creaming behavior in emulsion systems, the TURBISCAN technology has several advantages for formulators. On one hand, it provides a fast measurement (up to 1,000 times faster than visual observation) of native samples and a non-destructive way to detect and measure droplet migration. On the other hand, the migration rate can easily be determined and helps the formulator to compare formulas, making it ideal for analyzing complex emulsions with a wide range of droplet sizes and concentrations. Additionally, the TURBISCAN technology provides insights into the mechanisms driving droplet migration, which can be used to improve formulation and processing conditions. Overall, the use of TURBISCAN technology in emulsion analysis leads to faster, more accurate, and more reliable results compared to traditional methods.

SAVE TIME TO MEASURE PHYSICAL STABILITY

FORMULATION: STABILITY MEASUREMENT AND SHELF-LIFE ESTIMATION

The TURBISCAN has been extensively used to measure the physical stability of formulations and colloidal systems. This technology helps the formulator to save time and precisely rank and quantify the samples' stability in different trials or batches. It applies to native samples, even on very highly concentrated formulations. Not only saving time, the TURBISCAN also provides destabilization speed and metrics as well as robust analytics to make shelf-life predictions. The TURBISCAN technology follows ISO/TR 13097:2013's recommendations and is ideal when it comes to quickly and accurately measuring stability. Stop the guesswork and make decisions based on facts!

RECONSTITUTION AND REHYDRATION STUDIES

DEHYDRATED PRODUCTS AND POWDERS

Dehydrated powders are used in various industries – such as the food, cosmetics and pharmaceutical industries – to maintain the quality and shelf-life of products. However, the reconstitution and rehydration of these powders can pose several challenges, such as ensuring the homogeneity, stability and functionality of the reconstituted product. It is therefore of utmost importance to investigate the factors that influence the reconstitution and rehydration behavior of dehydrated powders and optimize the conditions to achieve the best performance. Thanks to the "online" and "at rest" measurements you can study the ability of the powder to rehydrate, as well as the stability of the reconstituted product, in a single experiment and with a single device. For more information, please read our application note on reconstitution of milk powder.

PLANT PROTEIN SOLUBILIZATION,
EMULSIFICATION, AND STABILITY PROPERTIES

FOOD

Plant proteins are increasingly popular in the food industry, as they offer various health, environmental, and ethical benefits compared to animal proteins. However, incorporating plant proteins into food products poses some challenges, as they have different physicochemical and functional properties than animal proteins. One of the main issues is the solubilization of plant proteins: due to their poor solubility, the solubilization affects their emulsification and stability properties. There are no methods to characterize the overall plant protein performances and chemists have to utilize multiple experiments and instruments in order to have a complete understanding of plant protein performances. Thanks to the TURBISCAN DNS solubilization speed and quality, emulsification and stabilization properties can be measured with the very same instrument and in a single experiment.

To find the best solution for your particle characterization needs, visit our application database

DISPERSIBILITY AND STABILITY AT A GLANCE

TURBISOFT FOR TURBISCAN DNS

Data acquisition, interpretation, and export are done with TURBISOFT, the dedicated and intuitive software for the TURBISCAN range. TURBISOFT has been developed for and is continuously optimized towards more intuitive and straightforward data analysis, hence saving time and helping users to get the results they need in a few clicks.

- 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, and more
- Ideal for very fast kinetic or variation measurements: Data acquisition with up to 10 measurements per second
- Stay up to date: free license – free software updates
- Need to use multiple computers? This multi-user software has you covered
- Data export as easy as copy-paste
- Video recording of sample destabilization for up to 6 samples
- Fully guided calibration check-up procedure
- Multi-language support: English, Spanish, French, Chinese, Japanese, German, and more

DISPERSIBILITY & STABILITY ANALYZER TURBISCAN DNS

ACCESSORIES AND OPTIONS

The TURBISCAN DNS comes with all you need to perform dispersibility and stability studies:

TMIX

Thanks to the mixing module of the Turbiscan DNS (TMIX), mixing and agitation can be applied inside the measurement vials. This setup has multiple advantages:

Adjust the formulation by changing the pH, adding stabilizers / destabilizers, adding salt ... play with the formulation and directly measure the impact on the dispersion state – particle size

Apply shear inside the measurement vials, hence studying the powder hydration process, reconstitution of lyophilized products reconstitution, protein solubility, dispersibility studies ...

TLOOP

The TLOOP module creates a circulation loop from a process or an outside batch to the measurement vials via a peristaltic pump. The liquid is pumped from the outside vessels to the measurement chamber, and back to the vessel. It measures the efficiency of dispersion processes such as pigment dispersion, emulsification studies, polymer dissolution, etc.

Standard Vials (20 ml)

Cylindric 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 temperature. These vials are meant to reproduce your visual stability test.

On-Demand Adaptors (for Syringes, 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.

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 an "OK" signal. The test and results are saved, and the instrument checking procedure can be tracked.

Particle Size Distribution

The TURBISIZE software can measure the distribution of particle size (ISO13317) and the distribution of migration speed for any data obtained with a TURBISCAN, without any need to dilute, prepare, or modify the sample.

TURBISCAN DNS

TECHNICAL DATA

Acquisition scan step	20 µm
Automatic sample recognition (bar-code)	Yes
CE Certified	Yes
Dimensions	70 x 63 x 52 cm
Standards	ISO/TR 13097:2013, ISO/TR 18811:2018, ISO/TS 22107:2021, ISO/TS 21357:2022
Maximum acquisition speed	0.1 seconds (in fixed mode)
Maximum sample concentration	95% v/v
Measured size range	10 nm - 1 mm
Wavelength	880 nm
Measurement type	At rest and under mixing conditions
Measuring Principle	Static Multiple Light Scattering (SMLS)
Particle size distribution	Yes (additional software required)
Number of Samples	1
Reproducibility / Repeatability on latex standards	0.1% / 0.05%
Sample volume at rest	4 or 20 mL
Sample volume under mixing conditions	10mL up to Liters
Software	TurbiSoft + TurbiSoft Fast
Temperature range	RT - 60°C
Weight	30 kg

www.microtrac.com/turbiscan-dns