

The NEXT STEP[®] in Dispersion Analysis

Dispersion Analyser LUMiSizer®

The All-in-One Dispersion Analyser

Stability Demixing Consolidation Particle Sizing

_UMiSizer

Dispersion Analyser

LUMiSizer[®] using STEP-Technology[®] Allowing you to have a look

Allowing you to have a look at the whole sample

The High-End Dispersion Analyser LUMiSizer[®],

a microprocessor controlled analytical photocentrifuge, is your complete dispersion lab, all in one instrument. The quick characterization of any demixing phenomena, like sedimentation, flotation or consolidation and the calculation of the velocity distribution in the centrifugal field as well as of the particle size distribution makes the LUMiSizer[®] the instrument of choice for research, development and QA/QC.

The patented cutting-edge STEP-Technology permits to obtain **S**pace- and **T**ime-resolved **E**xtinction **P**rofiles over the entire range of up to 12 different samples in situ recorded simultaneously with high accuracy. Parallel near infrared or blue light ¹ illuminates the entire sample cell ² and the transmitted light is detected by more than 2000 detectors of the CCD-line ³. Transmission is converted into extinction and particle concentration may be calculated ³.

The multisample analytical photocentrifuge is ideally suited for characterization and optimization of dispersion stability and shelf-life as well as particle-particle interactions, compressibility of particles and flakes, the structural stability and elastic behaviour of sediment and gels.

Demixing phenomena are quantified regarding clarification velocity and instability index, sedimentation and flotation velocity of particles, residual turbidity, separated phase volume (liquid or solid), sediment consolidation or dewaterability.

POSITION

FRANSMISSION

LIGHT SOURCE
SAMPLE [0.1-2.0 ml]
SENSOR [2500 detectors]
S 6 7 KINETICS OF

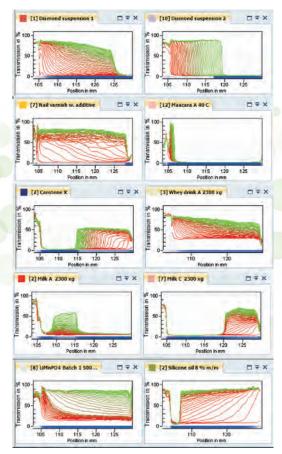
TRANSMISSION / EXTINCTION PROFILES

Principle of the STEP-Technology[®].



your window to dispersion analysis

- Windows 7 based with Ribbon User Interface
- Plug & play, pack & go
- Simultaneous instability index analysis for 12 samples in real-time.
- Individual user customization.
- Full SOP concept (Creation, capture, data analysis)
- Seven different tools to understand (quantify) even the most complicated dispersion:
 - + Time lapse measurement replay
 - + Dispersion fingerprint
 - + Instability index
 - + Clarification
 - + Phase separation
 - + Sedimentation and creaming velocities
 - + Particle size distribution
- Windows Explorer based data management
- Comprehensive database security and full audit log
- PC and server based editions.
- Complies with 21 CFR Part 11.

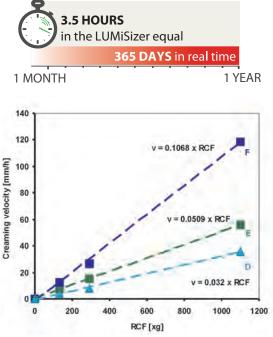


Online separation process of up to 12 samples at a glance.

Stability Shelf Life and Consolidation

With the LUMiSizer, stability tests are up to 5000x faster than performed in a test tube under earth gravity by naked eye. Fast stability ranking and shelf-life determinations of dispersions in original concentration are done in minutes/hours instead of months/years. The obtained results correlate well with the sample behaviour at normal gravity.

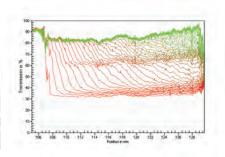
The consolidation behavior of sediment and particle networks can easily be determined.



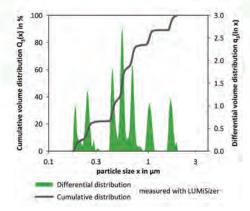
Shelf life of alcoholic milk beverages (cream liquors).

Particle Sizing

and Particle Size Distributions



Transmission profiles of a bi-modal Silica suspension.



Volume-weighted particle size distribution of a 7-modal silica suspension (150 - 1550 nm).

Distributi	on: Averag	e Distribution					2	
Settings			Statistics					
Volume Weighted Distribution			Quant	iles				
Analysis Mode: Constant Position			10% of De	tribution 5	265 nm			
Start Point: 104.73 mm			16% of Dis	tribution 5	286 nm			
			50% of De	tribution ≤	630 nm			
				tribution s				
				stribution s				
			Distrib	ution P	aramet	ers		
			Median x3					
			Harmonic Mean: 533 nm					
			Standard Deviation: 537 nm Span (x90-x10)/x50:2.5727					
						392 dami		
			Anthmetic Avg. Volume Diameter: 392 nm Weighted Avg. Volume Diameter: 803 nm					
			Volume Specific Surface Area: 0.0113 1/nm Sauter Diameter: 533 om					
	eighted Distri	bution Q3(x) /	Sauter Die a3(In x) Average Die		m	_		
Volume W	Q3(x)	x3m	q3[in x] Average De			nize percent	4	
Volume W x3 in nm	Q3(x) in %					nize percent		
Volume W r3 in nm 200.32	Q3(x) in % 0.00	x3m in nm	q3(in x) Average Dr q3(in x)		Custon Start:	a	-	
Volume W r3 in nm 200.32 204.32	Q3(x) in % 0.00 0.50	x3m in nm 202.31	q3(In x) Average Dr q3(In x) 0.252985		Custon		-	
Volume W x3 in nm 200.32 204.32 206.51	Q3(x) in % 0.00 0.50 1.00	x3m in nm 202.31 205.41	q3(in x) Average Dr q5(in x) 0.252985 0.468244		Custon Start:	a		
Volume W k3 in nm 200.32 204.32 206.51 206.51 208.84	Q3(x) in % 0.00 0.50 1.00 1.50	x3m in nm 202.31 205.41 207.67	q3(In x) Average Dr q3(In x) 0.252985 0.468244 0.446600		Custon Start: End:	0. 100. 5		
Volume W k3 in nm 200.32 204.32 204.32 206.51 208.84 209.97	Q300 in % 0.00 0.50 1.00 1.50 2.00	x3m in nm 202.31 205.41 207.67 209.40	q3(In x) Average Dr q3(In x) 0.252985 0.468244 0.446600 0.925252		Custon Start: End:	ŭ 100		
x3 in nm 200.32 204.32 206.51 208.84 209.97 211.77	Q3(x) in % 0.00 0.50 1.00 1.50 2.00 2.50	x3m in nm 202.31 205.41 207.67 209.40 210.87	q3(In x) Average Dr q3(In x) 0.252885 0.466244 0.46600 0.925252 0.586081		Custon Start: End:	0. 100. 5		
Volume W x3 in nm 200.32 204.32 206.51 208.84 209.97 211.77 212.83	Q3(x) in % 0.00 0.50 1.00 1.50 2.00 2.50 3.00	x3m in nm 202.31 205.41 207.67 209.40 210.87 212.30	q3(In x). Average Dr q3(In x). 0.252885 0.466244 0.46600 0.925252 0.586081 0.988275		Custon Start: End:	0. 100. 5		
Volume W x3 in nm 200.32 204.32 206.51 208.84 209.97 211.77 212.83 213.49	Q3(x) in % 0.00 0.50 1.00 1.50 2.00 2.50	x3m in nm 202.31 205.41 207.67 209.40 210.87	q3(In x) Average Dr q3(In x) 0.252885 0.466244 0.46600 0.925252 0.586081		Custon Start: End:	0. 100. 5		
Volume W x3 in nm 200.32 204.32 206.51 208.84 209.97 211.77 212.83 213.49 214.51	Q300 in % 0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50	x3m in nm 202.31 205.41 207.67 209.40 210.87 212.30 213.16	q3(In x).4verage Dr q3(In x). 0.252985 0.466244 0.466500 0.925252 0.586581 0.988755 1.615962		Custon Start: End:	0. 100. 5		
Volume W x3 in nm 200.32 204.32 206.51 208.84 209.97 211.77 212.83 213.49 214.51 216.37	Q300 in % 0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00	x3m in nm 202.31 205.41 207.67 209.40 210.87 212.30 213.16 214.00	q3(in x). Average Dr q3(in x) 0.2522865 0.468244 0.46500 0.925252 0.586081 0.982375 1.615902 1.64529		Custon Start: End:	0. 100. 5		
Volume W x3 in nm 200.32 204.32 206.51 208.84 209.97 211.77	Q300 in % 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50	x3m in nm 202.31 205.41 207.67 209.40 210.87 212.30 213.16 214.00 215.44	q3(In x). Average Dr q3(In x). 0.252985 0.468244 0.446500 0.998375 0.586081 0.988375 1.615502 1.046528 0.580043		Custon Start: End:	0. 100. 5	4 9 9 9	

Comprehensive PSA Statistics.

Particle size distribution and velocity distribution are calculated on the basis of the two analysis modi "constant Position"- Concentration detection over time at one positionand the unique "constant Time"- Concentration detection over the entire sample length at least for one time.

Comprehensive information is provided with respect to the multimodality or polydispersity of dispersed particles. The software animation tool displays the recorded measurement data with programmable playback parameters for easy recognition & identification of complex separation phenomena.

The modular and object oriented design of the software provides easy extension and customizing opportunities on customer's request, i.e. for special R&D or QC tasks.

Velocity Distribution Qv(v), qv(v)

- + Direct measurement no calibration / no material properties
- + Always available fast information for quality control
- + Qualitative information about particle size and polydispersity

Intensity Weighted Particle Size Distribution QInt(x), qInt(x)

+ Quantitative information about particle size distribution

Volume Weighted Particle Size Distribution Q3(x), q3(x)

- + Quantitative information about particle size and volume fraction of each class
- + Conversion into mass or number distribution

Benefits

- Universal high-end analyser for science, R & D and QA/QC
- Direct, fast and objective characterization of any demixing phenomena
- Information within minutes and hours instead of months and years
- Reliable stability information up to 5000 times faster than by other methods
- Particle size information without material properties
- Particle susceptibility through superposition with magnetic fields
- For concentrated or diluted suspensions and emulsions
- For a large sample viscosity range
- Minimal sample volume required
- Various accessories and customizing options to fit your application
- Easy operation, comprehensive database solution

Applications

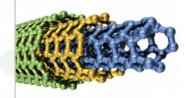
1. Characterization of:

- + also very slow separation processes (months till years).
- + very stable, very high viscous dispersions with very high concentrations.
- + very small particles and droplets.
- 2. Determination of separation stability, velocity and particle size distribution or consolidation in one measuring step.

3. Particle characterization:

- + particle size distribution
- + particle-particle interactions
- + hydrodynamic density
- + magnetic susceptibility
- 4. Measurement of carbon black, ink, food, fine chemicals, abrasives, polymers, color pastes, sludges, slurries, cosmetics, pharmaceutical dispersions, biocells, carbon nanotubes and much more materials.
- 5. Tasks requiring high sample throughput.
- 6. Determination of particle size distribution according to ISO 13318-2.











Specifications

Accelerated phase separation Particle size distribution Consolidation measurements Observation time Conformity

5 - 2300 times compared to gravity 20 nm to 100 μm concentrated dispersions and sediments 1 s to 99 h ISO 13318-2; CFR 21 Part 11

Samples up to Volume 0.05 r Concentration 0.01 V Density up to Viscosity 0.8 – Particle size 10 nn

up to 12 simultaneously 0.05 ml to 2.0 ml 0.01 Vol% - 90 Vol% up to 22 g/cm³ 0.8 – 10⁸ mPas 10 nm to 1000 μm

Light source	multi-wavelength
Temperature control	4 °C to 60 °C, +/- 1K
Cells	different material and optical path
Dimensions (WxHxD)	37 x 27 x 60 cm
Weight	40 kg
Power sup-	100 V/ 120V / 230 V, 50/60Hz





Version LS 610 Temperature control 4 °C - 40 °C

Version LS 611 Temperature control 4°C - 60 ℃

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