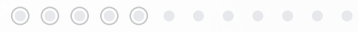# Prometheus

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The new gold standard for challenging stability characterizations

Prometheus has been **chosen by the scientific community** because it **consistently delivers high-resolution data** that reveals liabilities in drug candidates missed by other technologies. No other system offers **simultaneous, multi-parameter characterization throughout the entire thermal ramp** — measuring thermal unfolding, particle sizing, and aggregation — as well as chemical denaturation for a stability profile of unmatched detail.

Prometheus consistently delivers trustworthy, high-resolution stability characterization

Get precise, high-resolution data and reliable results every time

Measuring with precision matters when there are tiny differences between your candidates. Prometheus delivers the kind of stability data you need to clearly see those differences and makes it easier to decide which candidates are best to work with moving forward.

Perform simultaneous measurements with the same samples throughout the entire run

Since you're doing multi-parameter characterization on the same samples in the same run, you gain a deeper understanding of your molecule's behavior when correlating your conformational and colloidal stability results.

Choose your throughput, and then choose manual or automated

Be prepared to handle any project that comes your way. Characterizing stability at different checkpoints in your workflow calls for flexible throughput — early development stages require characterizing more candidates than later, during formulation. Choose to run any number of samples from 1 to 48 or 24 at a time. Add automation and do 1536 before having to reload.

Measure label-free under native conditions

Prometheus detects intrinsic fluorescence so you don't have to introduce dyes and risk interference. It gets better — no need for sample dilution or special buffer conditions means very little or no sample prep. And, have viscous samples? No problem.

Where Prometheus is making a difference

Scientific areas

● Drug discovery & development

Use every time stability needs to be characterized and monitored to rank molecule candidates

● Structural biology

Maximize protein solubility and stability before crystallization to dramatically increase its probability of crystallization

● Gene therapy

Differentiate viral vectors serotypes during development and manufacturing based on their thermal stability profiles

Workflows

● Biologics discovery and development

Evaluate target-ligand complexes before affinity-based screening

Developability assessment

Pre-formulation and formulation

Production & downstream process development

Comparability studies

● Protein expression & purification

Monitor the stability of recombinant proteins during selection of expression clones and chromatographic isolation and purification

Techniques

● Thermal shift assays

Screen compounds during drug development for shifts in thermal unfolding to eliminate compounds that decrease stability

● Chromatography

Monitor stability of recombinant proteins during chromatographic isolation and purification

The best technologies give you the high-quality data you need for stability characterization

Prometheus uses **nanoDSF** to characterize thermal unfolding, **DLS** for particle sizing, **SLS** for aggregation, and **backreflection** for turbidity onset of proteins with the high resolution you need. Each one tells a different story about your protein's stability, and are used for a variety of applications. But they have one thing in common — **they are all label-free**.
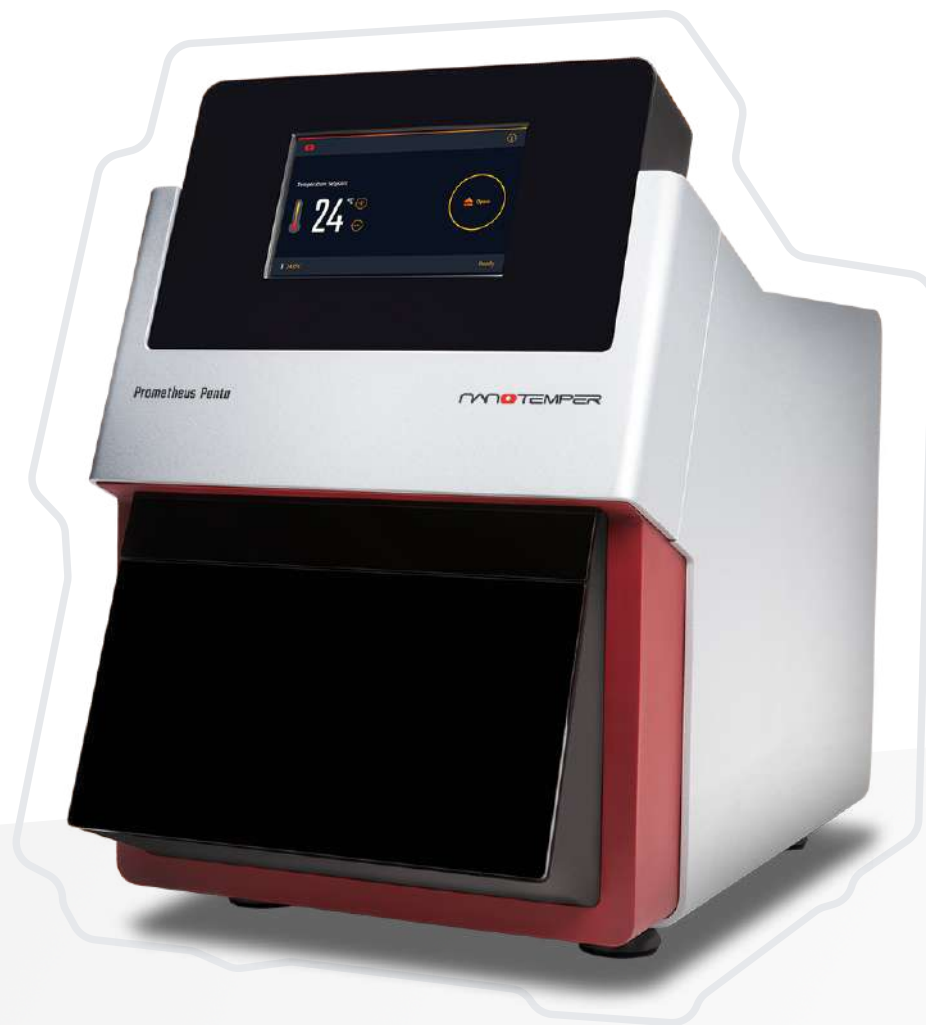
nanoDSF

Prometheus characterizes thermal and chemical unfolding under native conditions using nanoDSF technology. nanoDSF precisely measures the intrinsic fluorescence of a protein while it's being subjected to either chemical or thermal denaturation. The fluorescence intensity at a single wavelength (350 or 330 nm) or the F350/330 ratio are plotted against increasing temperature or concentrations of a chemical denaturant to determine the T_m or C_m of a protein.

Use it to
- Monitor protein purification
- Evaluate target-ligand complexes before affinity-based screening
- Monitor stability in biologics workflow during formulation, developability, production, and manufacturing
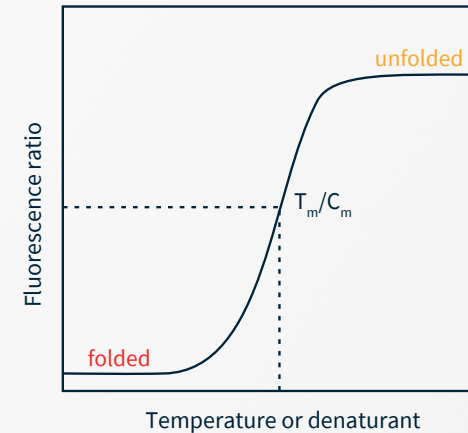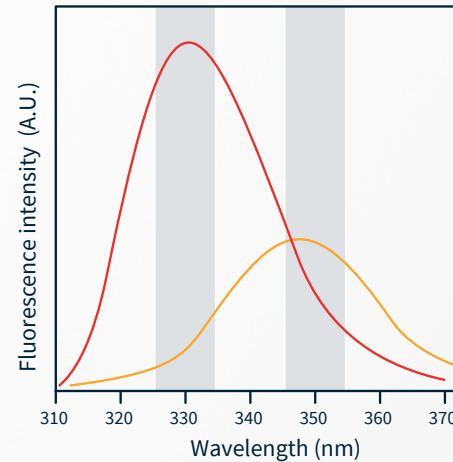
Dynamic Light Scattering (DLS)

Of all the Prometheus instruments, Prometheus Panta is the one that uses DLS to detect molecule aggregates and determine the size of proteins over a wide concentration range.

Use it to
- Screen recombinant proteins expressed from different constructs
- Screen for biologics formulations
- Optimize samples for biophysical assays
- Characterize self-interactions

Sample	r_H	PDI
NIST mAb	5.5 ± 0.02	0.07
BGG	6.9 ± 0.3	0.2
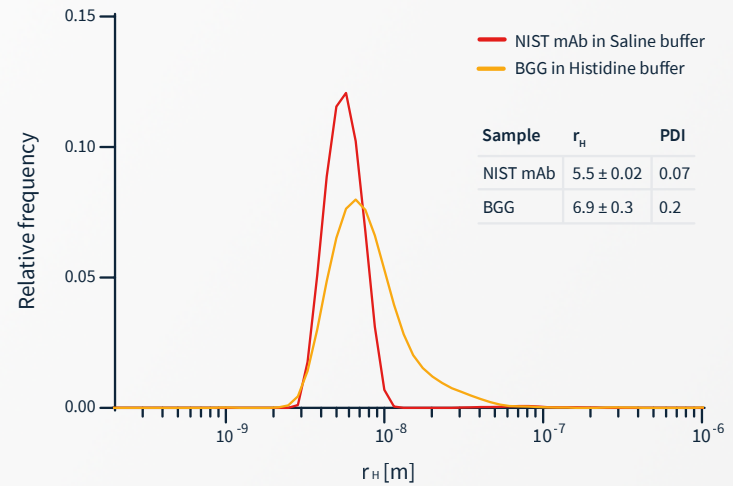
Compare size distribution, mean r_H, and PDI to identify optimal buffer conditions for your sample and assess sample homogeneity before performing other time-consuming biophysical assays.
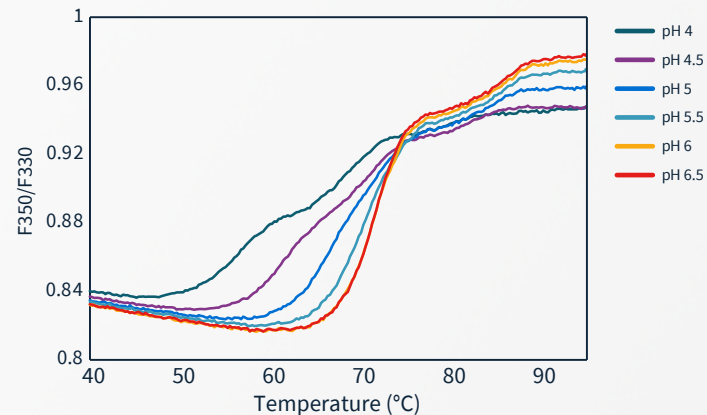
Backreflection

Prometheus uses backreflection to determine aggregation or colloidal stability by measuring loss of light intensity due to scattering.
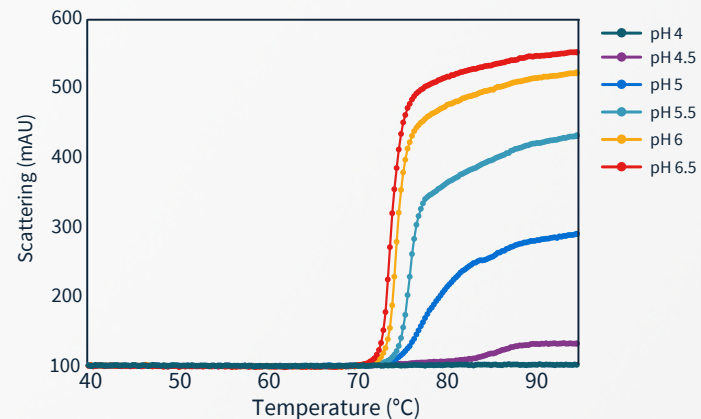
Because thermal unfolding or conformational stability doesn't always correlate with colloidal stability, use backreflection simultaneously with nanoDSF for the most precise characterization.

See how thermal unfolding and aggregation are affected by buffer formulations. Use the data to select the one that ensures the best environment for your biologic.

Thermal unfolding with nanoDSF

Legend: pH 4, pH 4.5, pH 5, pH 5.5, pH 6, pH 6.5

Y-axis: F350/F330
X-axis: Temperature (°C)

Aggregation with backreflection

Legend: pH 4, pH 4.5, pH 5, pH 5.5, pH 6, pH 6.5

Y-axis: Scattering (mAU)
X-axis: Temperature (°C)

A system for every one of your needs, present or future

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It's important to take into account your evolving needs for stability characterization and throughput. Choosing fully-featured Prometheus Panta gives you the peace of mind of knowing you'll be ready for projects that demand simultaneous, multi-parameter characterization. If having a path to automation is what you and your stakeholders have in mind, go with the Prometheus NT.Plex.

Prometheus Panta

Choose Prometheus Panta if you want everything under the sun in stability characterization, including thermal unfolding, particle sizing, chemical denaturation, and aggregation.

Prometheus NT.48

Start here for thermal unfolding and chemical denaturation with optional backreflection for aggregation evaluation.

Automated operation for unattended stability characterization

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Prometheus Panta plus NT.Robotic Autosampler

Add the NT.Robotic Autosampler to transform your Prometheus Panta into a system that increases your throughput with unattended operation.

It's a stand-alone, all-inclusive system with a robotic arm, enclosure, computer, and monitor. Load up to four 384-well plates with 1,536 samples for hands-free characterization of thermal unfolding, colloidal stabiliy, and chemical denaturation of all your protein targets and therapeutic candidates. Plate temperature control keeps your samples at 4 to 20 °C while they wait in the queue.

Future-proof your lab with a high-throughput ready Prometheus Panta + NT.Robotic Autosampler, and get more information with less hands-on time.

You're in Control with software that gives you clear and actionable results

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Panta Control

Prometheus Panta measures multiple stability parameters simultaneously, and Panta Control software is built with the highest functionality and intuitive user experience. Get automatic determination of the parameters you care about the most.

Panta Control supports size analysis measurements with DLS; thermal unfolding measurements with DLS, nanoDSF, and backreflection simultaneously; chemical unfolding measurements; and isothermal stability measurements. Find the self-association parameters and molecular weight associated with your samples.

When you measure multiple parameters, queue them in your preferred order for flexibility that adapts to your schedule. It's easy to get started with a clean and intuitive interface.

PR.ThermControl

With PR.ThermControl, precisely determine at which temperature 50% of your protein unfolds (T_m) and when turbidity appears (T_{turb}). Set up your samples, annotate, and view the results as they populate in real time.

21 CFR Part 11

Prometheus PR.ThermControl supports 21 CFR Part 11 compliance for regulated environments. This 21 CFR Part 11 compliant software provides electronic signatures, an audit trail with record of all activities, and user permission/access management.

PR.ChemControl

Use PR.ChemControl when you want to evaluate the chemical stability of a protein. Get data on the energetics of folding (ΔG) and the denaturant concentration at which 50% of the protein is unfolded (C_m).

PR.TimeControl

Customize your thermal treatment assay conditions is one of the best reasons to use it. Choose isothermal measurements, incremental temperature cycling or temperature stepping for advanced protein stability measurements.
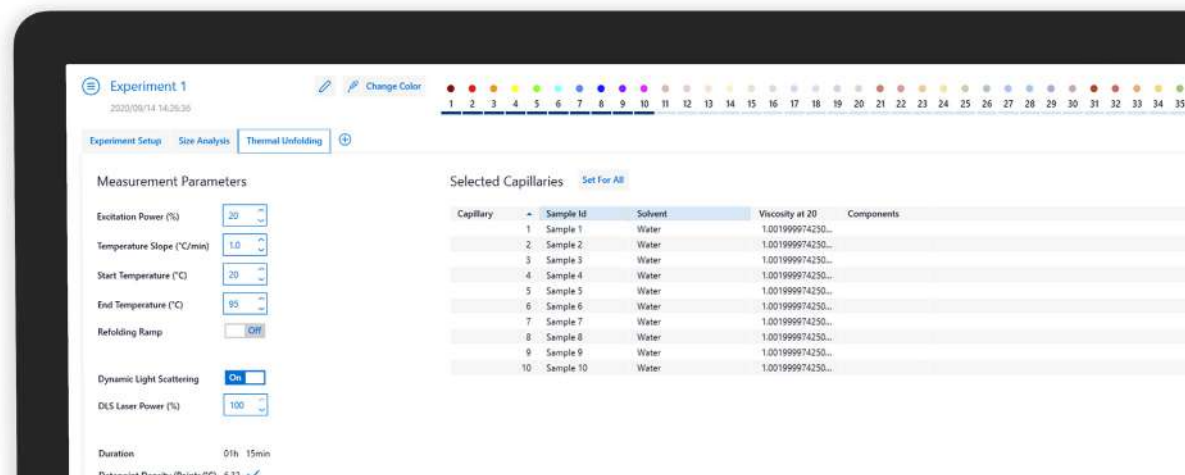
Have confidence in your results and conclusions with Analysis software

Panta Analysis

Merge data, compare runs from different data sets, and get all the output parameters you need from Panta Analysis software. This easy-to-use software enables you to pull out the most important information about the conformational and colloidal stability of your proteins. Get an in-depth look at the properties of your samples, exclude outliers or bad samples, and export all the information for presentations or reporting.

PR.Stability Analysis

Make precise, detailed conclusions about the thermal stability of your proteins in no time with PR.Stability Analysis software. Visualize and identify any key trends by sorting, filtering or plotting data as you need. Choose to merge replicates or compare runs. Create analysis templates for your preferred parameters of interest. Export your results in ready-made formats for bookkeeping, presentation, or publication.
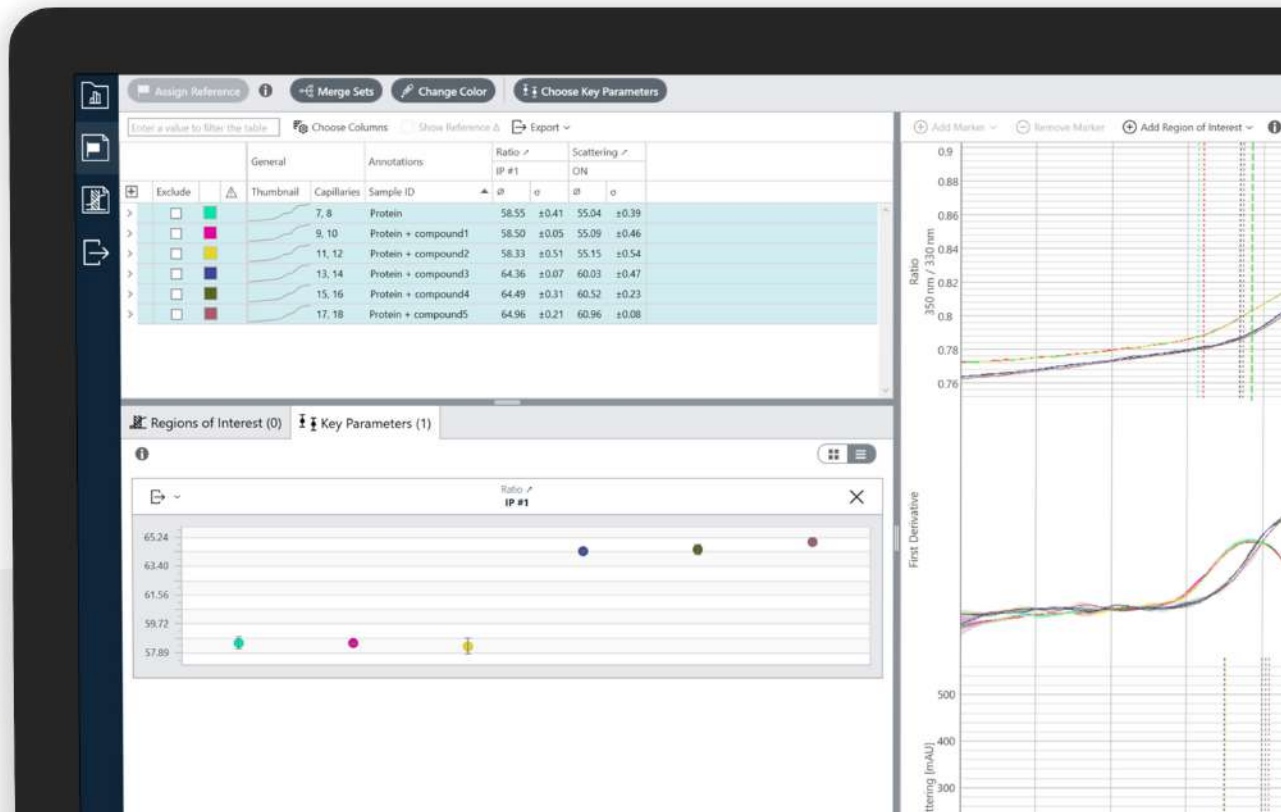
Get consistency with high performance consumables

You don't have to worry about a long list of consumables to run your stability assays. All you'll need is capillaries—but not just any capillaries, because only high quality consumable will deliver consistent results. Prometheus capillaries are manufactured using the same stringent protocols used for diagnostic-grade capillaries to ensure the best results. They come as individual capillaries for manual loading of up to 48 individual samples. Or in chips—each with 24 capillaries—for your Prometheus Panta and PR.Plex.

Because you need to know all the details

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	Prometheus Panta	Prometheus NT.48
nanoDSF	Included	Included
Measurement parameters	ratio: T_{onset}, T_m, E_a, reversibility of unfolding 330 nm, 350 nm: T_m Excitation: 280 nm	
Concentration range	0.005 mg/mL - 250 mg/mL	
Inflection point precision @ 75 °C	± 0.1 °C	
Initial ratio repeatability	0.008	
DLS	Included	N/A
Measurement parameters	$T_{scattering}$, T_{size}, r_H, PDI, k_D	
Laser wavelength	405 nm ± 5 nm	
Concentration range (DLS/SLS)	0.5 mg/mL for a 15 kDa protein, up to 40% w/v	
Size resolution	Down to 0.5 nm - 2 µm	
SLS	Included	N/A
Measurement parameters	$T_{scattering}$, average scattering intensity, molecular weight, B_{22}	
Measurement accuracy	≤ 10% molecular weight	
Backreflection	Included	Optional
Measurement parameters	$T_{turbidity}$	
Size resolution	Larger than 12.5 nm radius	

	Prometheus Panta	Prometheus NT.48	Prometheus Panta + NT. Robotic Autosampler
Sample volume	10 µL		
Sample handling format	Individual capillaries or capillary chip	Individual capillaries	Capillary chip
Throughput in one run	Up to 48 capillaries or 24 in capillary chip	Up to 48 capillaries	64 capillary chips (1536 samples) before need to reload
Temperature range	15-110 °C		15 - 110 °C
Heating rate range	0.1-7 °C/min		
Precision of 1 °C/min thermal ramp	± 0.1 °C		
Optional upgrades		Aggregation detection optics	
Optional automation	Yes	No	
21 CFR part 11 ready software	No	Yes	No
Dimensions	35 cm W x 51 cm H x 52 cm D		110 cm W x 188 cm H x 90 cm D (stand-alone enclosure)
Weight	35 kg	30 kg	200 kg

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www.nanotempertech.org/prometheus