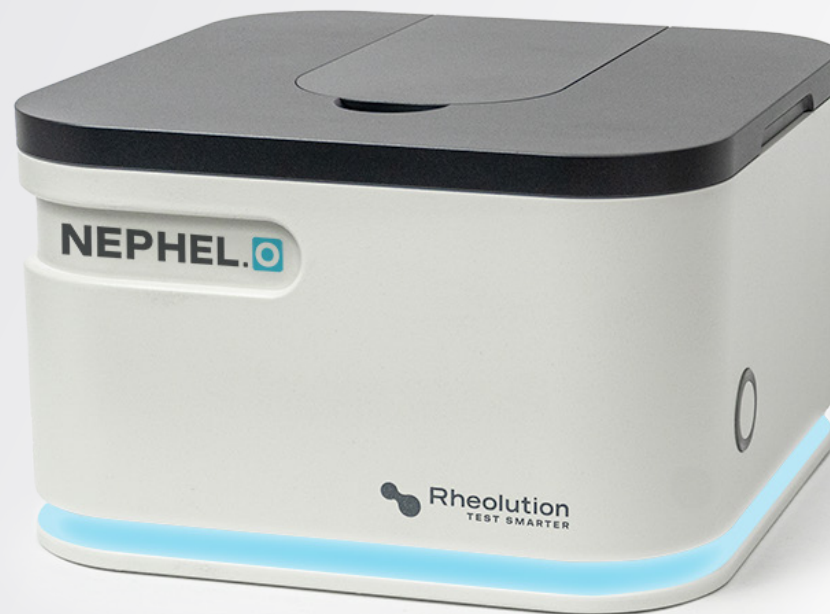




Product Book

NEPHEL.

The Modular, Data-Driven Nephelometer by Rheolution



**WE DESIGN IoT-ENABLED
MODULAR LAB INSTRUMENTS FOR
MODERN DATA-DRIVEN SCIENCE.**



ABOUT RHEOLUTION

Our mission is to empower scientists in their quest for innovation, quality and efficiency with our unique Data-Driven Science platform. Our cutting-edge and highly modular analytical instruments reproduce real-life environments to capture the dynamic evolution of materials. We design simple-to-use, customizable, scalable and data-driven analytical instruments that offer unmet testing capabilities to scientists and innovators in Life Sciences and Agri-Food.

GET THE FULL PICTURE OF YOUR MATERIAL

We design our products and software adopting IoT (Internet of Things) principles to provide a high level of modularity, flexibility and connectivity to our community of users. These unique features support the powerful concept of Data-Driven Science that guides our product development philosophy. It consists of data-driven hardware and software tools that capture the complexity of materials and their environment from multiple perspectives: chemical, biological, physical, mechanical, physiological and functional.

**WE ARE ENGAGED IN CREATING
INSTRUMENTS AND SOFTWARE TO
ENABLE DATA-DRIVEN SCIENCE.**



NEPHEL.O™

NEPHEL.O™ is the latest innovation in nephelometry measurement, providing a fully customizable, adaptable, scalable, connectable, actionable and data-driven nephelometer. The device uses interchangeable cartridges at different wavelengths, allowing you to easily and accurately measure turbidity at different scales.

As part of our CASCAD.S™ range of instruments, the NEPHEL.O™ is compatible with a wide variety of interchangeable optical cartridges that fit with your specific application.

The NEPHEL.O™ is operated by our Soft Matter Analytics™ App that captures the evolving turbidity of a solution in real time and builds custom, actionable databases.

MODULAR

Take advantage of the high modularity of the NEPHEL.O™ to build the nephelometer that meets exactly your needs.

- Select and use the emitter or receiver optical cartridge that meets your specific application;
- Place and remove interchangeable emission and reception optical cartridges with specific wavelengths;
- Order new optical cartridges as your applications evolve with time;
- Use the sample holder that suits your specific application: 2, 4 or 10 mL vials, cuvette, or PCR-tube;
- Place your NEPHEL.O™ under a flow hood and operate it remotely using the wireless communication of the tablet;
- Benefit from the unique data acquisition and processing capabilities of the Soft Matter Analytics™ App;



SCALABLE

Simply pair, at any time, new NEPHEL.O™ instruments to your existing units to scale your testing systems and extend your capabilities.



**CONNECT AND OPERATE UP TO 5
NEPHEL.O™ INSTRUMENTS FROM
THE SAME CONTROL TABLET.**

Thanks to the capabilities of Internet of Things (IoT), up to five (05) NEPHEL.O™ units can be controlled from a single tablet using a wireless communication.

You can, at any time, scale your system as your needs evolve or to meet a demanding and high throughput workload.

ACTIONABLE

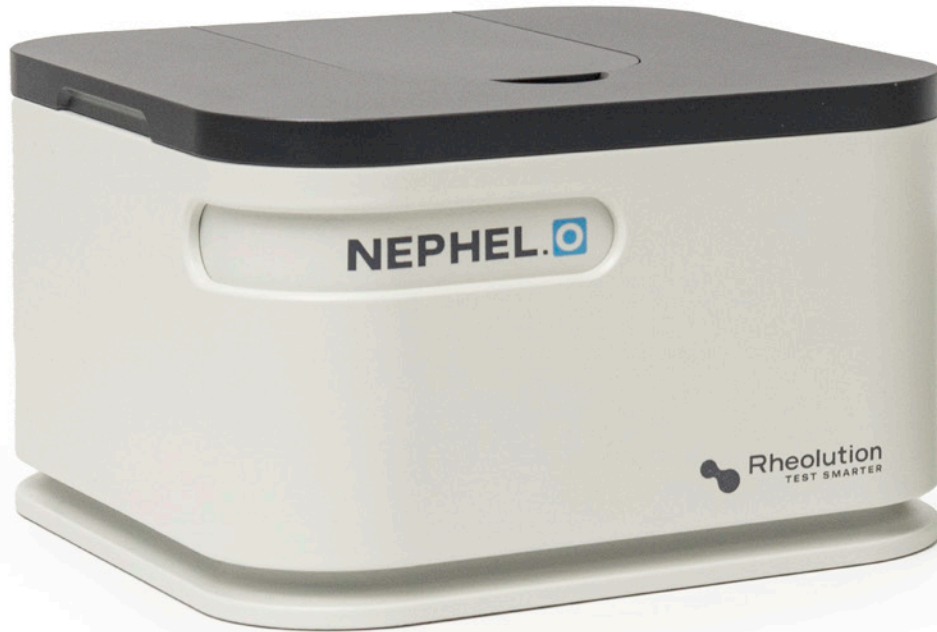
Easily augment your system at any time with additional optical cartridges that fit your current and future applications.

VERSATILITY FOR CAPEX SAVINGS

No need to acquire a new nephelometer if your needs change. You can simply order new cartridges to cover new applications and demand.

INTERCHANGEABLE CARTRIDGES

Easily change the type and wavelength of the optical cartridges of your NEPHEL.O™ as your applications and needs evolve.



FLEXIBLE

Use on the NEPHEL.O™ the sample holder that meets the best your specific application.



CARTRIDGES

Connect to the NEPHEL.O™ the emission or reception optical cartridge that fits your specific applications and industry needs. Invest in new cartridges rather than new instruments and save.

- Selectable wavelengths ;
- Application specific cartridges ;
- Extensible set of cartridges - Scale as you grow ;
- CapEx Savings : Invest in new cartridges rather than instruments.



OPTICAL EMISSION CARTRIDGE

A long standing controlled laser emitter that **generates** light at a specific wavelength.



OPTICAL RECEPTION CARTRIDGE

A long standing optical receiving diode that **measures** scattered light.

Cartridge name	Type of cartridge (technology)	Wavelength
Emitt.850	Emission optical cartridge (laser)	850 nm
Emitt.635	Emission optical cartridge (laser)	635 nm
Emitt.520	Emission optical cartridge (laser)	520 nm
Emitt.405	Emission optical cartridge (laser)	405 nm
Receiv.ViS	Reception optical cartridge	400 nm to 1,000 nm

HOW DOES THE NEPHEL.O™ COMPARE WITH OLD GENERATION LAB NEPHELOMETERS?



NEPHEL.O™



**Old generation lab
nephelometers**

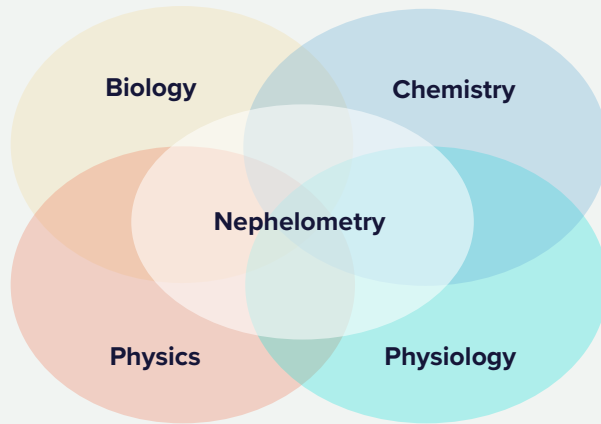
NEPHEL.O™

Old generation lab nephelometers

Measurement range	0 to 100 FTU	0 to 200 FTU
Can it operate at multiple wavelengths?	✓ An emission cartridge with the desired wavelength may be inserted at any time.	✗ Only one wavelength is available per instrument. It is necessary to acquire a new instrument to operate at a different wavelength.
Can it measure time evolving kinetics?	✓ The NEPHEL.O™ measures and displays sample's turbidity as a function of time to capture rapid time kinetics.	✗ Old generation nephelometers usually don't measure time kinetics.
Can it accept multiple sample holders?	✓ You can select between Vials (1, 4 or 10 mL), Cuvette (2 mL) or PCR-Tube (250 µL).	✗ Instruments accept a single sample holder with a fixed volume of sample.
Can it adapt to meet specific applications?	✓ A NEPHEL.O™ may be augmented with different optical cartridges to cover new applications.	✗ User has to acquire a new nephelometer with specific features to meet new applications.
Can it integrate into a scalable network of multiple nephelometers?	✓ Multiple NEPHEL.O™ units can be paired to the same operating tablet to form an integrated testing system.	✗ Each single instrument operates in silo. It is not possible to connect multiple instruments to form a testing system.
Does it connect with multiple instruments?	✓ Multiple NEPHEL.O™ units can simultaneously and remotely communicate test data with a single control tablet.	✗ Each nephelometer operates on its own. Data and results are not shared.
Is it a data driven instrument?	✓ Data are measured or collected on a single App to form a comprehensive and usable database.	✗ Data are displayed in alphanumeric screens or exported in spreadsheets.

DATA-DRIVEN

Using the Soft Matter Analytics™ App of the NEPHEL.O™, you can customize, build and analyze your experimental database to understand and master the dependencies between the turbidity of your sample and its chemical, biological, physical or biochemical properties.



1. Personalize your Database

Create your own list of parameters to store the chemical, biological, physical and physiological properties of your sample.

2. Customize and Capture your own Descriptive Parameters

Create custom buttons in the Soft Matter Analytics™ App to enter and record descriptive parameters that describe how your sample is made and how it behaves.

3. Build your Database

Store the descriptive parameters of each sample you test on the NEPHEL.O™ to correlate the nephelometric measurements to the relevant descriptive properties you have decided to collect and analyze.

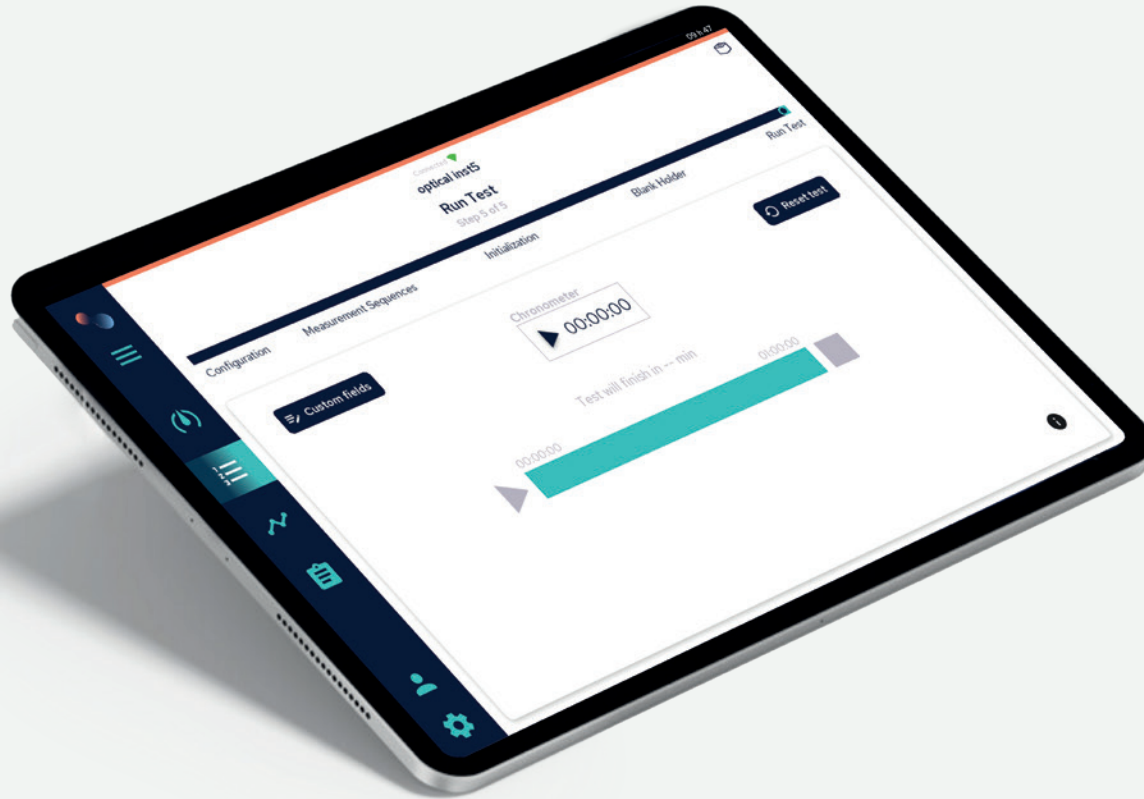
4. Analyze and Extract Knowledge

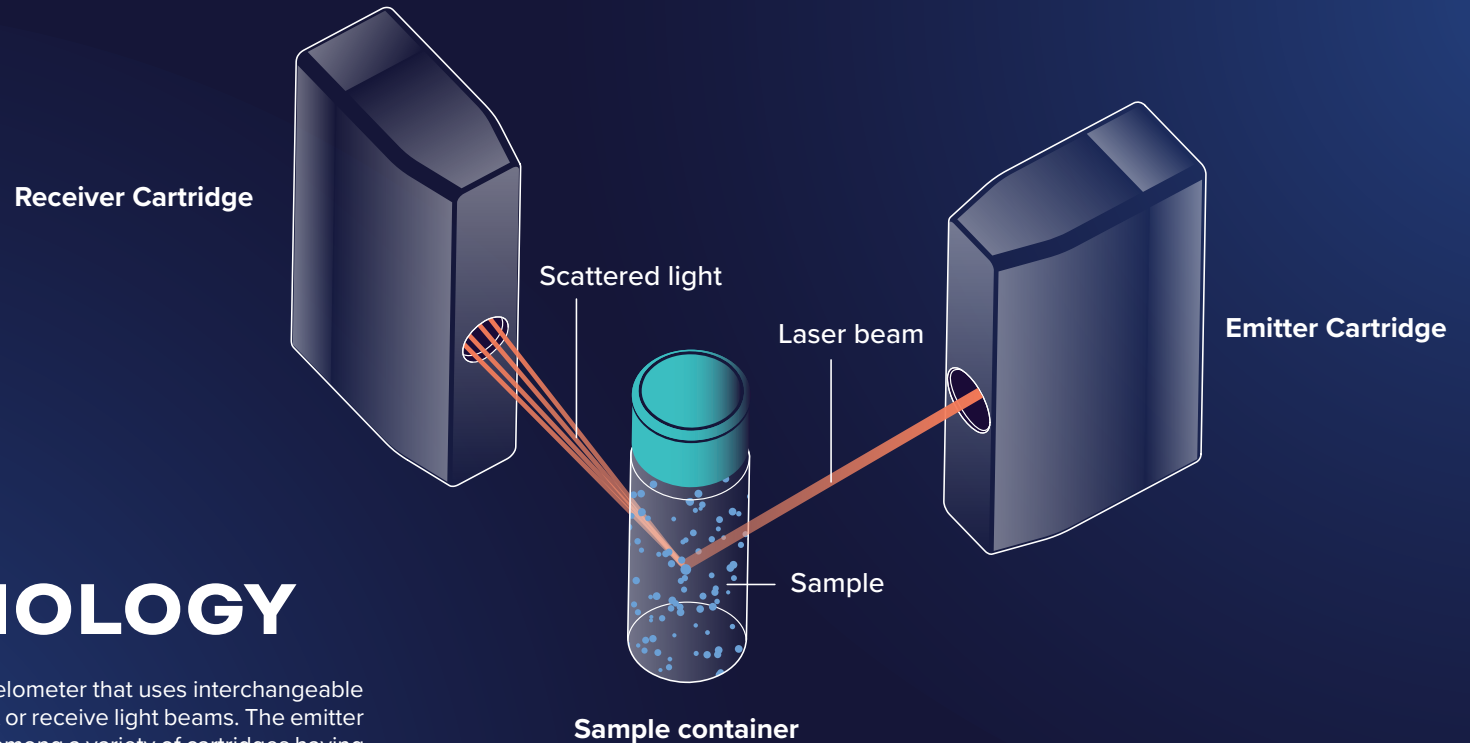
Analyze your database by filtering and correlating the recorded turbidity and the descriptive parameters to highlight complex dependencies between the turbidity and the chemical, biological, physical or physiological properties of your sample.

5. Generate Reports

Generate and export personalized reports that summarize the measured turbidity data and the collected descriptive parameters.

SOFT MATTER ANALYTICS™ APP





TECHNOLOGY

The NEPHEL.O™ is a nephelometer that uses interchangeable optical cartridges that emit or receive light beams. The emitter cartridge can be selected among a variety of cartridges having different wavelengths, depending of the target application and industry. A receiving cartridge measures the light scattered by the sample at 90° compared to the emitting cartridge. The emitter cartridge of the NEPHEL.O™ can be easily changed to perform measurements at different wavelengths depending on the intended use or application.

The background is a solid teal color. A thin, white, wavy line starts from the top left corner, curves downwards and to the right, then curves back up and to the right, ending near the top right corner. The word "APPLICATIONS" is written in white, bold, uppercase letters in the lower right quadrant of the image.

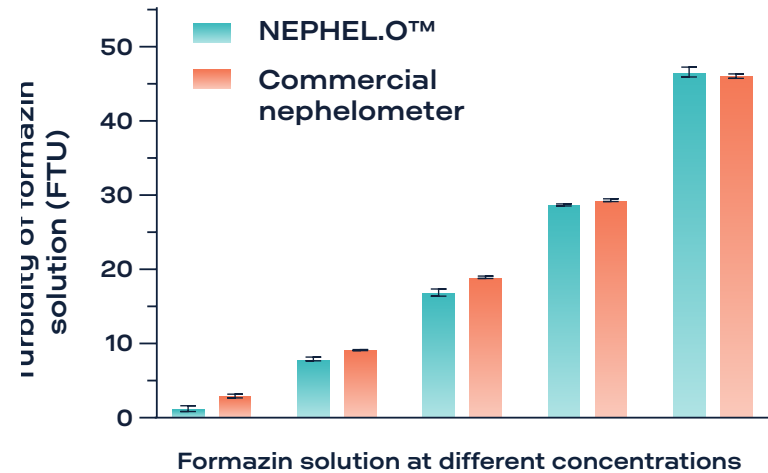
APPLICATIONS

NEPHEL.O™ PROVIDES PRECISE AND REPEATABLE DATA ON LOW TURBIDITY SOLUTIONS

The NEPHEL.O™ nephelometer compares well to established and marketed nephelometers. The instrument consistently measures low turbidity solutions with good repeatability.



Comparison between NEPHEL.O™ and commercial nephelometer



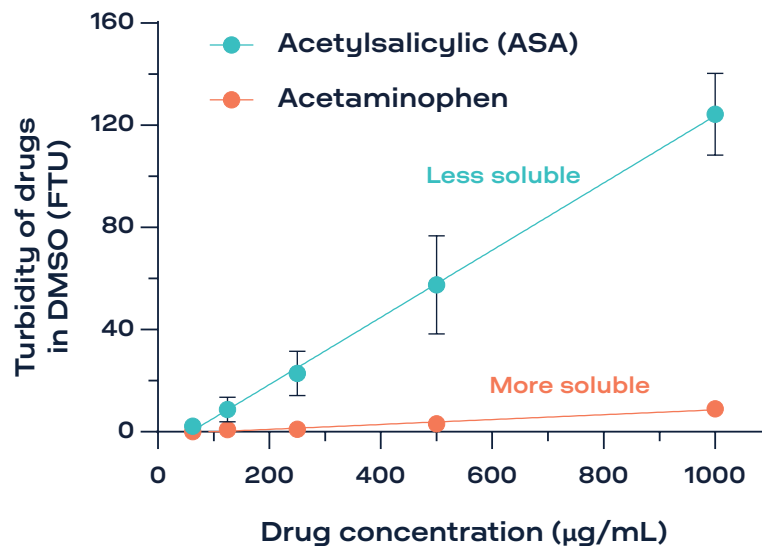


TESTING THE DISSOLUTION OF DRUGS USING NEPHEL.O™

Optimizing solubility is crucial for drug development, formulation, and quality control of pharmaceutical compounds as it affects bioavailability, efficacy, and toxicity. Poor solubility can lead to low concentrations and inconsistent dosing, while high solubility can cause toxicity.

NEPHEL.O™ measures the solubility of drugs based on the scattered light when a laser beam is directed through the sample. Drugs that are less soluble (e.g. Acetylsalicylic, ASA) have a higher amount of particulates in the sample which scatters more the light when compared to more soluble drugs (e.g. acetaminophen).

Solubility of commercial drugs in DMSO



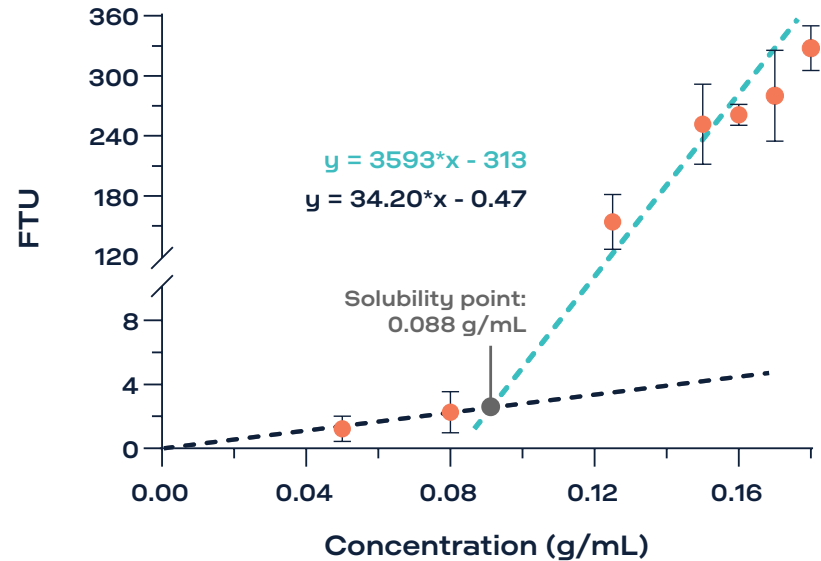
MEASURING THE SOLUBILITY POINT OF COMPOUNDS IN LIQUIDS WITH NEPHEL.O™

Solubility of drug compounds determines their absorption, bioavailability, safety, and quality and therefore, this characterization is crucial for drug development and quality control.

NEPHEL.O™ can measure the solubility of drugs based on the scattered light when a laser beam is directed through the sample. Drugs that are less soluble (e.g. acetylsalicylic, ASA) have a higher amount of particulates in the sample which scatters more the light when compared to more soluble drugs (e.g. acetaminophen).



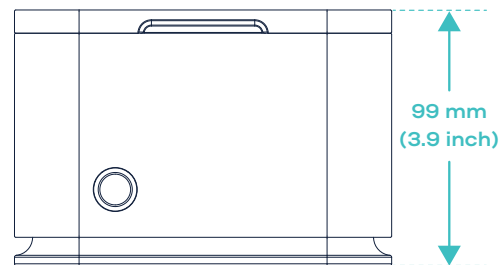
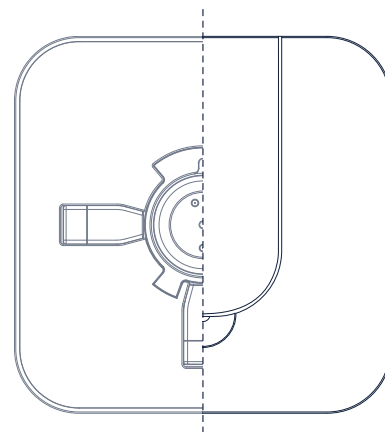
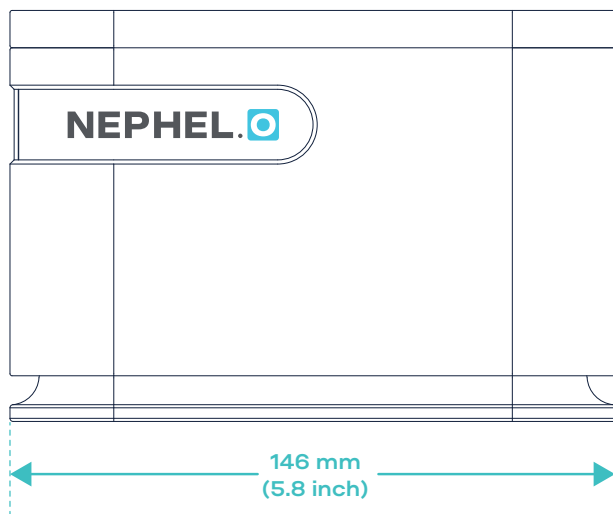
Sodium bicarbonate in distilled water



NEPHEL.O™

TECHNICAL SPECIFICATIONS

Range nephelometry	0 FTU to 100 FTU
Light Source / Light Detector	Laser / Si PhotoDiode
Wavelengths	Emission cartridges: 850 nm, 635 nm, 520 nm and 405 nm (cartridge can be changed)
Measuring mode	Kinetics over time or single point measurement.
Sample volume range	Vials: 1, 4 or 10 mL, Cuvette: 2 mL, PCR-Tube: 250 µL.
Custom time steps between measurements	7 seconds to 60 minutes
Custom total measurement time	10 seconds to 240 hours
Environment	15°C to 30°C; max 95% RH non-condensing
Power Supply	100-240 VAC (±10%), 50 – 60 Hz, 1.5 A max
Dimensions	146 mm x 146 mm x 94 mm (W x D x H)
Weight	~1.6 Kg (3.5 lbs) (depends on configuration)
10.5" Windows tablet with protective cover	245 mm x 175 mm x 8 mm
Operating software	Soft Matter Analytics™ software





Contact us today to start your Data-driven Science journey

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