

Aurora™ NE series Integrating Nephelometers

CLASS-LEADING AEROSOL MONITORING
& MEASUREMENT SOLUTION



acoem
CREATING ENVIRONMENTS OF POSSIBILITY



Deeper insight into the role of aerosols

When it comes to a holistic understanding of climate change, scientists are looking beyond greenhouse gases, employing advanced technologies to look at airborne particles (aerosols) that are impacting ecosystems and human health.

Atmospheric aerosols can emerge from natural or manmade sources like dust storms, volcanic eruptions, forest fires, industrial smokestacks or vehicle emissions. They disrupt the earth's radiative balance and weather systems. On the ground they can aggravate respiratory conditions by adversely impacting air quality.

Aurora™ at the Amazon Tall Tower Observatory

Image: Jsaturno, CC BY-SA 4.0, via Wikimedia Commons



Aurora has been used in aeroplane studies flying over the Amazon canopy and through volcanic ash clouds in Europe



Global standard in aerosol monitoring, from surface to stratosphere

Aurora™ integrating nephelometers by Acoem have been the global standard for leading environmental scientists and global research institutes for decades.

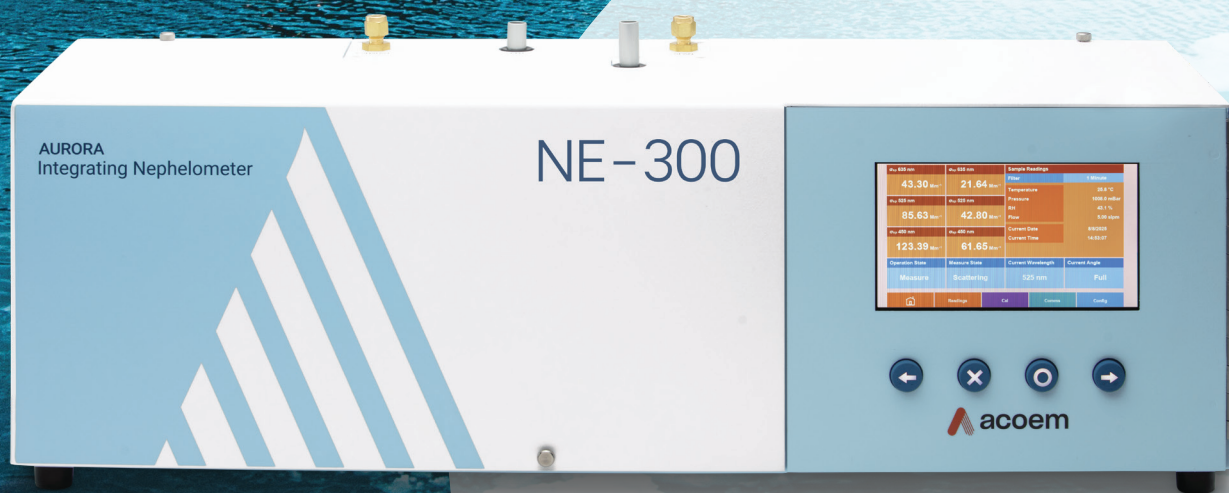
By measuring the light scattering coefficient of ambient aerosol particles with high sensitivity and time resolution, the Acoem range of Aurora™ instruments has allowed scientists to see aerosols in a new light and make informed decisions on mitigating measures.

With a global reputation for being the best-in-class integrating nephelometers on the market, environmental agencies around the world rely on Aurora™ instruments for their precision, accuracy, flexibility and durability under extreme monitoring conditions.



The Aurora™ integrating nephelometer is used by major research institutions and climate monitoring networks including Global Atmospheric Watch (GAW) – part of the World Meteorological Organization (WMO) – and Aerosols, Clouds & Trace Gases Research Infrastructure (ACTRIS).

Aurora™ delivers precise measurements in harsh environments



Taking on air quality & climate change research at sea



Reliable performance in extreme conditions

Scientists go to great lengths to track, monitor & measure aerosols, often travelling to remote locations under extreme conditions.

That is why, for a decade, they have relied on Aurora™ as a world-class, reliable aerosol monitoring & measurement system to perform in the toughest environment and take precise readings. Whether it is the searing desert heat, soaring altitudes of up to 15,000 m, the humid Amazon jungle climate or unforgiving, sub-zero arctic temperatures – the Aurora™ has been deployed in extreme conditions around the globe.



Monitoring wildfires in North America



Performing analysis for the CSIRO, international research expeditions and permanent stations in Antarctica.



Monitoring ash levels over Iceland's Eyjafjallajökull volcanic eruption



Early warnings for dust storms in the Gobi Desert, China

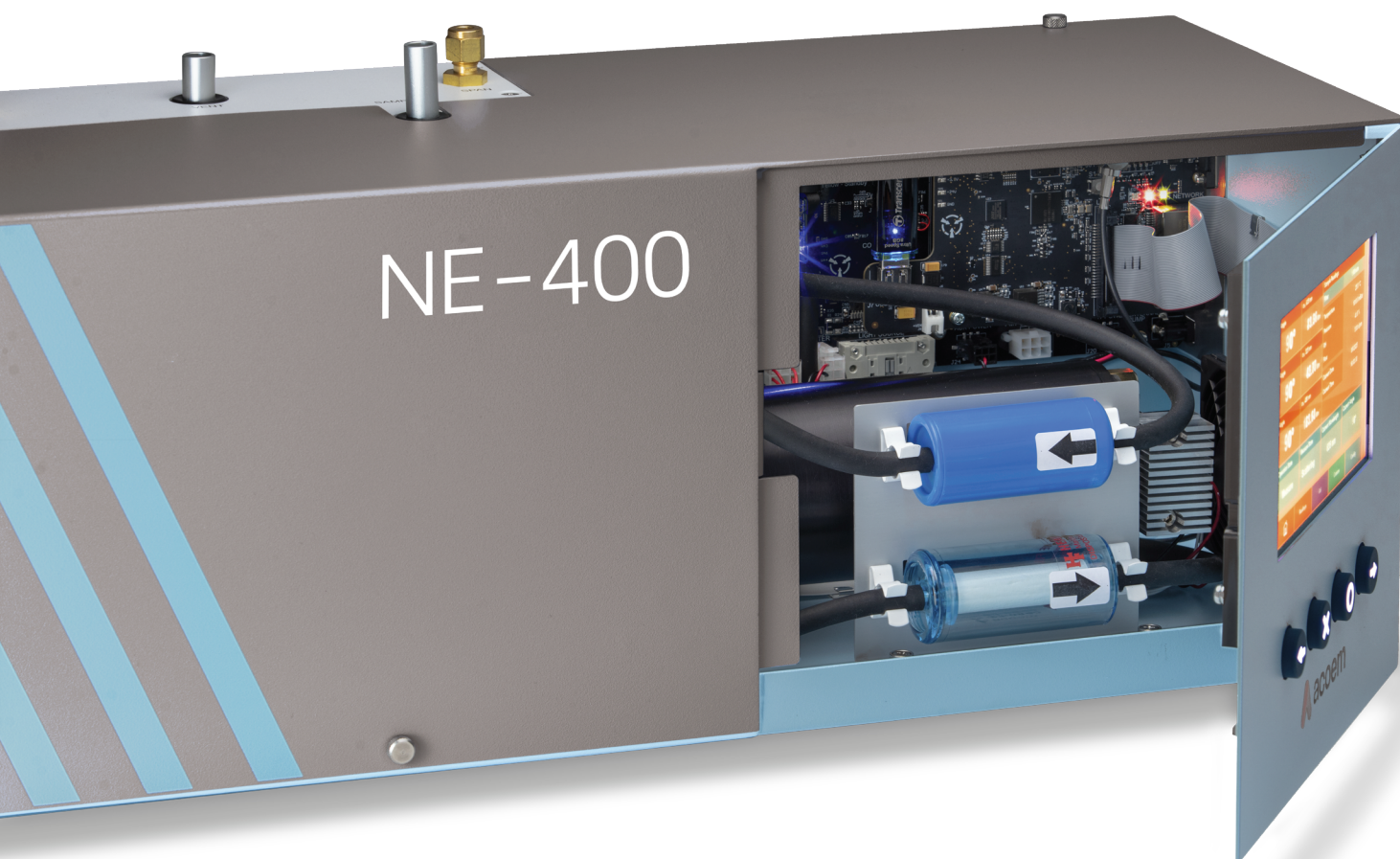
Aurora NE series

An evolution in integrating nephelometers

Acoem has raised the benchmark in atmospheric aerosol monitoring and measurement with the introduction of the Aurora™ NE series of integrating nephelometers – benefiting environmental protection agencies and the scientific research sector now and well into the future.

The next generation of Aurora™ integrating nephelometers has evolved from the needs of climate scientists and incorporates a range of enhanced features and capabilities.

Upgrading standard Aurora™ features was a priority, including the incorporation of the external optional components into the body of the new generation nephelometer. The NE series retains the high level of instrument reliability of the original Aurora™ while reducing the complexity of routine maintenance and simplifying the user experience.



Best-in-class aerosol monitoring & measurement just got better



POWER

with greater reliability & expandability

The new, more powerful microprocessor significantly improves signal processing capabilities, speeds up operations and establishes a platform for greater future expandability.



SPEED

with real-time remote monitoring

Broader communication protocols give you greater choice and flexibility. Aurora™ features a standard network TCP/IP port, micro-SD card, USB port and RS232. On-board data logging and vastly increased data collection.



ACCESSIBILITY

with data at a touch

A new seven-inch, full colour touchscreen display provides access to an intuitive menu system that can clearly display the status of your instrument at any time. When required, the touchscreen hinges open to give direct and easy access to filters located behind it. The process of removing the cell for routine cleaning has also been simplified with easy access to internal instrument components.



RELIABILITY

with flow improvements to eliminate sample contamination

The internal ball valve is seamlessly integrated into the instrument for the first time. This ensures the sample is isolated during calibration. The internal sample pump has a more controllable flow making volumetric control possible. Experience a shorter and easier calibration process due to a change in the way the instrument plumbs the span and zero gas into the cell.



ACCURACY

with reduced truncation angle and lower noise

The truncation angle of the cell has been reduced, a next generation improvement Acoem customers identified as being particularly important. Instrument noise has also been lowered, as well as wall scattering from internal reflections, while light source intensity has been increased.

Advanced range of integrating nephelometers

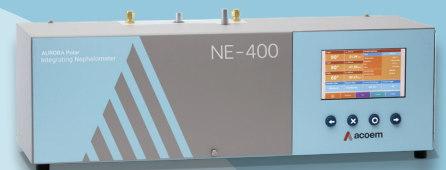
Aurora™ NE series sets a new benchmark for research grade aerosol monitoring and measurement with three new instruments:



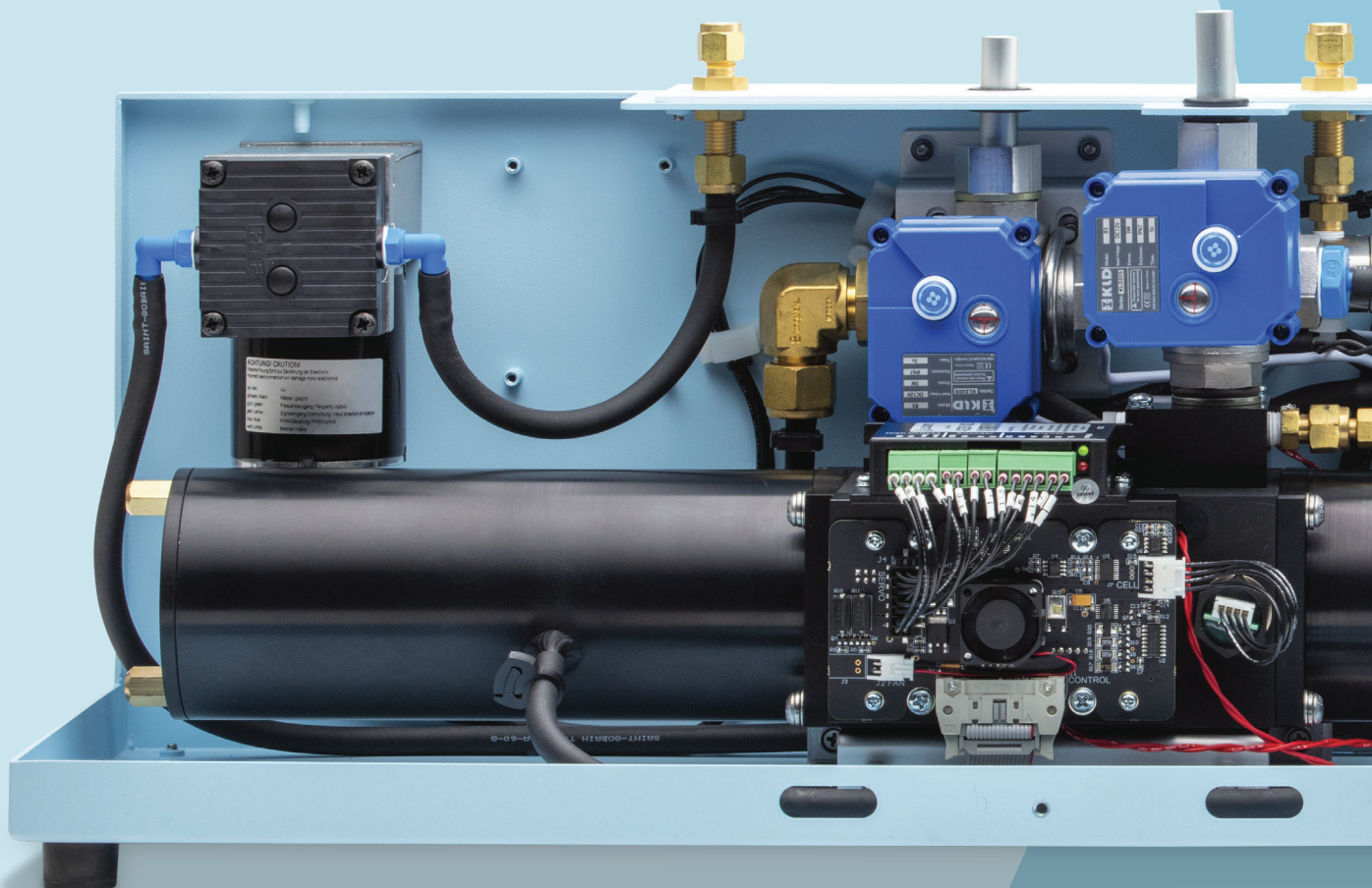
Aurora™ NE-100



Aurora™ NE-300



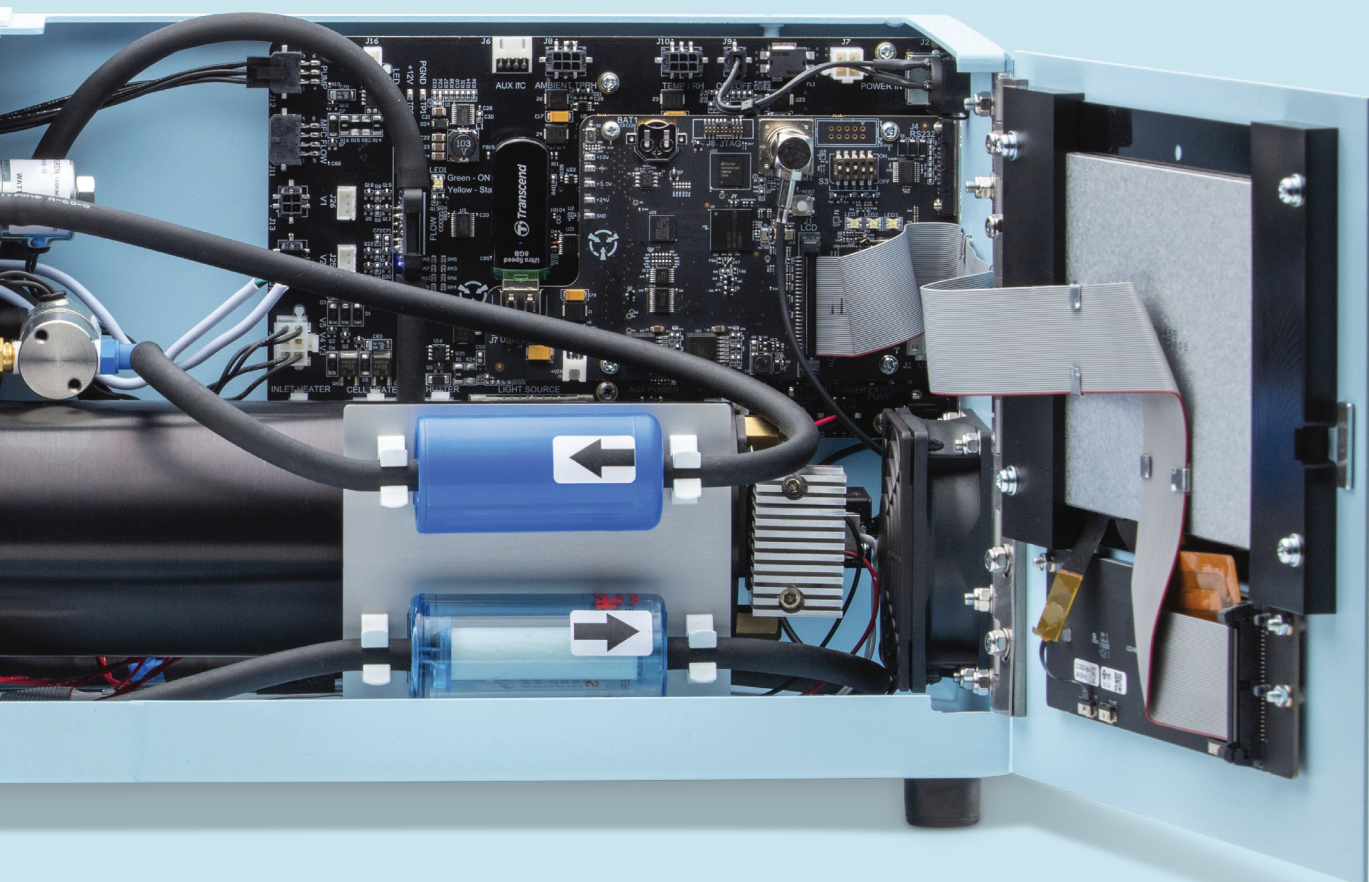
Aurora™ NE-400 Polar



Light scattering in remote locations

The Aurora™ range is widely used for research in remote and unattended locations, including:

- In the Mediterranean Basin by the Institute of Environmental Assessment and Water Research (IDAEA-CSIC) in Montseny, Spain
- In projects across Indonesia, Chile, Vietnam & Kenya
- By the Paul Scherrer Institute (PSI) as part of the project
- At high altitude in Puy De Dôme, France by Observatoire de Physique du Globe.

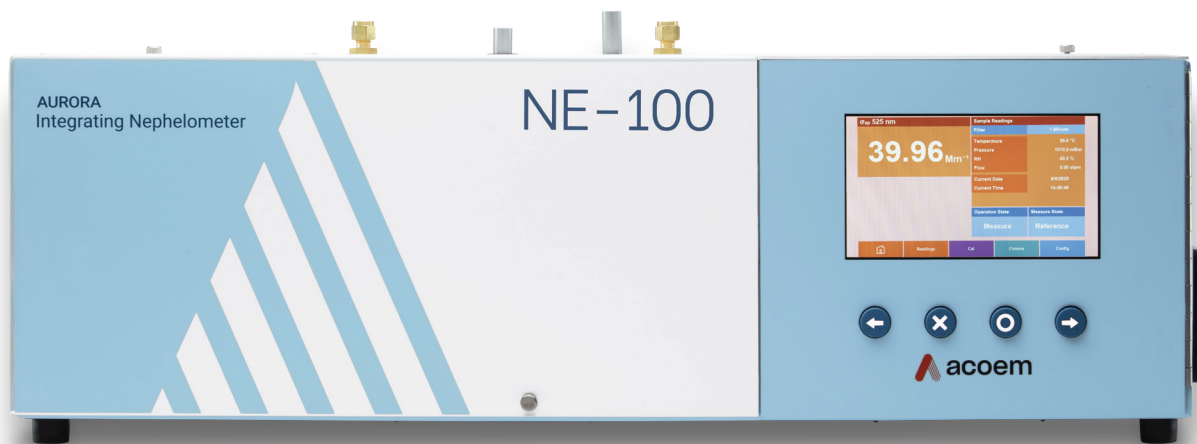


AFFORDABLE EXCELLENCE

Aurora™ NE-100

SINGLE WAVELENGTH FOR ENVIRONMENTAL COMPLIANCE

Easy to use and maintain, the Aurora™ NE-100 delivers affordable excellence for aerosol light scattering, visibility and particulate monitoring instrumentation. It uses a single wavelength LED for light scattering coefficient and visibility measurements.



FEATURES:

- Single wavelength, available in 450 nm, 525 nm or 635 nm
- Wide measurement range (0.3 to 20,000 Mm⁻¹)
- Fully automatic calibration using internal valves
- Ideal for remote locations.



Aurora™ NE-300

VERSATILE THREE WAVELENGTH WITH BACKSCATTER FUNCTIONALITY

The Aurora™ NE-300 is the favoured choice of researchers as it facilitates simultaneous measurement across three wavelengths, enabling wide and in-depth analysis of the interaction between light and aerosols. It integrates measurements of full scatter and backscatter, making it a perfect instrument for climate change research.



FEATURES:

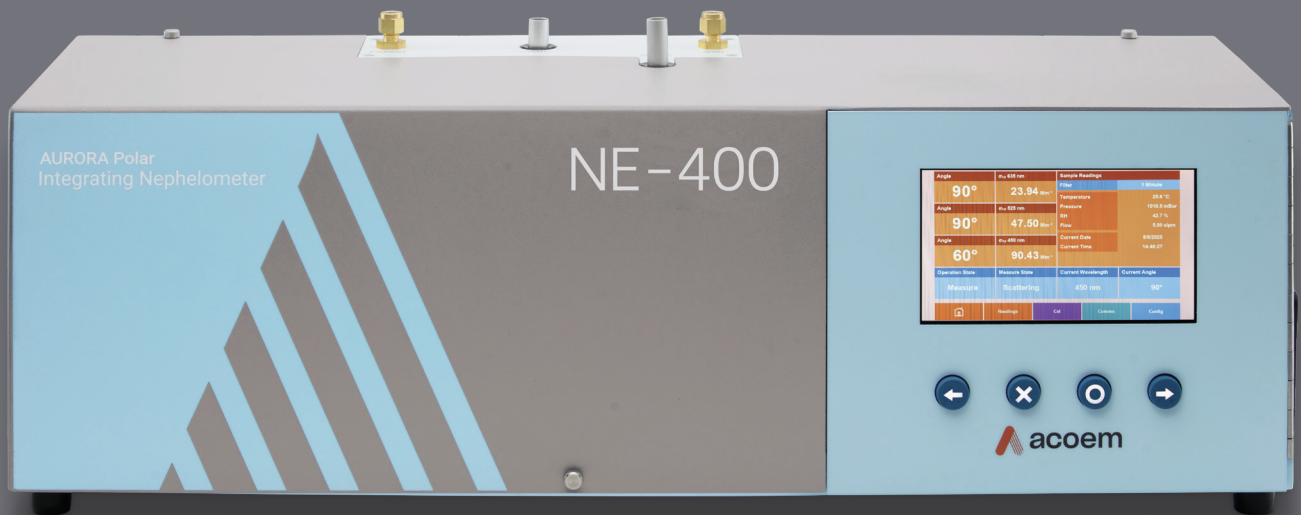
- Multi-wavelength LED light source for long-term stable measurements at 635 nm, 525 nm & 450 nm
- Integrates measurements of full scatter & backscatter
- Can be used in conjunction with the ACS™ 1000 for a light scattering enhancement factor measurement (optional)
- An automatic ball valve protects against contamination of a common sampling manifold, bypassing the instrument during calibration
- Mass flow control enables flow to be controlled in conjunction with an internal pump.

BEST-IN-CLASS

Aurora™ NE-400 Polar

FLAGSHIP THREE WAVELENGTH POLAR INTEGRATING NEPHELOMETER

The Aurora™ NE-400 Polar builds on the same three wavelength capabilities as the Aurora™ NE-300. It provides measurements of light scattering in up to 18 user-selectable angular sectors, using varied backscatter shutter positioning. This can help in determining the phase function of aerosols, which is crucial to climate research and modelling.



FEATURES:

- Wide measurement range (0.1 to 20,000 Mm⁻¹)
- 18 angular sectors fully-integrated scattering, plus integrated scattering of up to 17 different angular sectors from 10° to 90° through to 170°
- Automatic bypass ball valve protects against contamination of a common sampling manifold during calibration
- Mass flow control enables flow to be controlled in conjunction with an internal pump.



ACS™ 1000

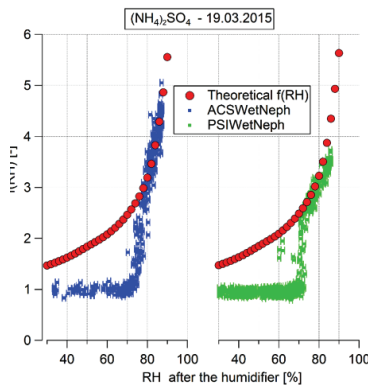
INNOVATION IN HYGROSCOPIC STUDIES

The Acoem Aerosol Conditioning System (ACS™ 1000) was designed to be used with the Aurora™ series and other aerosol monitoring instruments, adjusting relative humidity with minimal particle loss to measure the effect of water uptake on the properties of aerosols.

ACS™ 1000 simultaneously controls differing relative humidity levels in two sample channels, allowing real-time measurement by parallel instruments for comparison.

FEATURES:

- User-configurable sample conditioning scheme
- Sample RH controllable between 40 % & 90 % with minimal particle loss
- Customisable flow & humidograms
- Autoranging power supply 110–250 VAC, 50/60 Hz
- Controls RH within $\pm 0.2\%$ (1σ)



Ammonium sulfate particles light scattering enhancement ($f(RH)$) calculated (red markers) and measured by the ACS™ 1000 (blue dots) and the WetNeph developed by the Paul Scherrer Institute (green dots). The errors bars represent the precision of the RH measurements according to the manufacturer.

Laborde et al. 2015





Training & support

There's a lot more to our Aurora™ range and ACS™ 1000 system than what comes in the box. Acoem offers continuous support for its customers around the world.

Our in-house scientists and engineers can always be called upon for advice, knowledge and practical assistance, and they are available in any time zone.

We also facilitate user group meetings throughout the year, enabling a forum for researchers to share experiences and receive guidance from Acoem experts as well as peers.

Our website is the hub of a virtual network, offering firmware and software updates.

Owning an Aurora™ instrument means we are partners in your environmental monitoring journey.



Options & accessories

		Aurora™ NE-100	Aurora™ NE-300	Aurora™ NE-400 Polar
Roof Flange	Part # E010130	✓	✓	✓
Rain Cap	Part # E010131	✓	✓	✓
PM ₁₀ Inlet (3 lpm)	Part # H020449	✓	✓	✓
PM _{2.5} Inlet (3 lpm)	Part # H020450	✓	✓	✓
1/2" Sample Inlet Tube, 0.8 m, Insulated	Part # H020320	✓	✓	✓
1/2" Sample Inlet Tube, 1.0 m, Uninsulated	Part # H020322	✓	✓	✓
1/2" Sample Inlet Tube, 1.5 m, Uninsulated	Part # H020323	✓	✓	✓
1/2" Sample Inlet Tube, 2.0 m, Uninsulated	Part # H020324	✓	✓	✓
Black Silicone Carbon Tubing 1.0 m	Part # T010031	✓	✓	✓
Calibration Kit	Part # H020331	✓	✓	✓
Wall Mounting Bracket	Part # E010112	✓	✓	✓
Wide Bandwidth PMT for 630 nm Measurements for NE-100	Part # E010200	✓	†	†
20 lpm Mass Flow Control Option	Part # E010110	✓	✓	✓
External Pump for MFC Option	Part # P030004 (240 VAC) Part # P030005 (110 VAC)	✓	✓	✓
Service Kit, 12 Month	Part # E010120	✓	✓	✓
Aerosol Conditioning System (ACS™ 1000)	Contact Acoem	X	✓	✓
Aerosol Dryer	Part # E010009	X	✓	✓
Low Dew Point Air Source	Part # E040035	X	✓	✓
Aurora NE Series User Manual (Printed Copy)	Part # M010068	✓	✓	✓
Ambient Temperature & RH Sensor	Part # E010111	✓	✓	✓

† The selected Aurora™ comes standard with this feature

About Acoem

At Acoem, we **create environments of possibility** – helping organisations find the right balance between progress and preservation – safeguarding businesses and assets, and maximising opportunities while conserving the planet’s resources. We deliver unrivalled, interoperable AI-powered sensors and ecosystems that empower our customers to make enlightened decisions based on accurate information.

Together with 220 distributors, our 850+ employees work across 28 offices, 6 manufacturing facilities and 5 R&D centres in 9 countries, to provide trusted, holistic data solutions for customers worldwide.

Acoem links possibilities with protection.

For more information visit acoem.com



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