ACCESSORIES

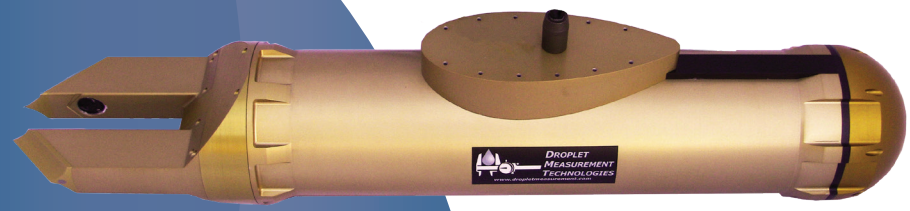
» PADS software and laptop

HOW TO ORDER

Contact DMT for pricing or more information:
customer-contact@dropletmeasurement.com
+1.303.440.5576.

CPSPD

CLOUD PARTICLE SPECTROMETER WITH POLARIZATION DETECTION



DROPLET MEASUREMENT TECHNOLOGIES

DROPLET MEASUREMENT TECHNOLOGIES

OVERVIEW

The Cloud Particle Spectrometer with Polarization Detection (CPSPD) is an aircraft-mounted probe that measures cloud droplets, ice crystals, volcanic ash and other airborne particles. CPSPD measures optical diameter of aerosol particles from approximately .65 to 30 micrometers. The data gives forward-scattering and two polarized back-scattering measurements.

APPLICATIONS

» Cloud and ice crystal studies
» Aerosol-cloud interactions
» Volcano emissions research

ADVANTAGES

» Provides valuable insight into particle shape and composition
» Offers particle-by-particle data
» Allows open-path, in-situ measurements
» Features anti-shatter tips for accurate counting and sizing
» Records extensive data on system operating conditions to ensure optimum performance
» Allows user to select sampling rate
» Reduces particle coincidence issues by measuring scattering off of laser axis

PARTICLE-BY-PARTICLE (PBP) DATA FEATURE

PBP data provide precise information on particle scattering intensity and inter-arrival times. PBP data are useful when investigating small-scale cloud structure to identify mixing and entrainment, drop breakup and coalescence, and micro-scale turbulence. PBP data also give the most accurate per-particle polarization information.

Photo at right: the CPSPD mounted on the SAFIRE Falcon 20.

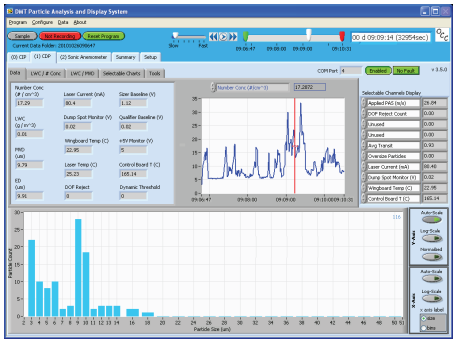
HOW IT WORKS

The CPSPD measures three components of light scattered by cloud and aerosol particles that pass through a focused laser beam: forward-scattered light and parallel and perpendicularly polarized back-scattered light. Separate optical systems collect and direct the light onto individual detectors.

Particle size is inferred from the intensity of the forward-scattered light, while a particle's deviation from a spherical shape is derived from the comparison of the two components of back-scattered light. The refractive index of spherical particles is estimated from the relationship between the forward and back-scattered light (Baumgardner et al., 1996).

SOFTWARE

The Particle Analysis and Display System (PADS, shown at right) is optional software that provides a user-friendly virtual instrument panel. PADS allows the user to control the CPSPD and display real-time data and logs. For instance, the program enables the user to do the following tasks:



» Sample and record data
» View particle volume and number concentrations, as well as Median Volume Diameter (MVD) and Effective Diameter (ED)
» Monitor instrument parameters like CPSPD laser current and various electronics voltages
» Play back data for post-flight viewing
» Reprocess data with new parameters for additional analysis

INCLUDED ITEMS

» Instrument
» Shipping case
» Operator manual
» One-year warranty
» One day of training at DMT facility
» Email and phone technical support

CPSPD SPECIFICATIONS

Measured Parameters	» Forward-scattered light » Back-scattered light » Polarization state
Derived Parameters	» Particle diameter » Particle number concentration » Liquid water content (LWC) » Effective diameter (ED) » Median volume diameter (MVD) » Polarization ratios
Particle Size Range	0.65 - 30 µm
Number Conc. Range	20,000 particles per second
Typical Sample Area	0.17 mm^2
Number of Size Bins	20, non-linearly spaced
Air Speed Range	10 - 250 m/sec
Sampling Frequency for Histogram Data	Selectable, 0.04 to 20 seconds
Refractive Index	Calibrated for 1.33 (the industry standard for water)
Light Collection Angles	Forward Scatter: 13° - 47° Back Scatter: 133° - 167°
Laser	658 nm, 50 mW
Data System Interface	RS-422 serial interface
Calibration	Glass beads and Polystyrene Latex Spheres
Routine Maintenance	Window cleaning and glass bead calibration check
Recommended Service	Annual cleaning and calibration at DMT service facility

CPSPD SPECIFICATIONS, CONT.

Software	Optional Particle Analysis and Display System (PADS) software
Power Requirements	» System Power: 115 VAC at 100W » Anti-ice Power: 115 VAC at 450W
Environmental Operating Conditions	» Temperature: -40 to 40 °C » Relative Humidity: 0 - 100%, non-condensing » Altitude: 0 - 50,000 feet (0 - 15,000 meters)
Weight	~10 kg
Probe Dimensions	39” L x 7” Diameter

Specifications are preliminary and subject to change without notice. The CPSPD is a Class 3B Laser Product.

Rev A

November 21, 2013

DROPLET MEASUREMENT TECHNOLOGIES

2545 Central Avenue
Boulder, Colorado, USA 80301
www.dropletmeasurement.com
ph: 303-440-5576, fax: 303-440-1965