# CCM-200 *plus*

# Chlorophyll Content Meter

A lightweight hand-held device for the accurate and easy determination of chlorophyll content

- Non-destructive
- Accurate, reliable and proven
- Storage of 160,000 data sets
- Data averaging
- Graphic display
- Lightweight battery portable
- Designed for rapid screening


## Reliable chlorophyll content determinations

The CCM-200 *plus* is the world's most advanced chlorophyll content meter providing fast, accurate and reliable determinations on intact plant leaves and crops.

The CCM-200 *plus* is a second generation chlorophyll content meter offering many advantages in performance, data storage and data handling compared with earlier devices

## Non-destructive and battery portable

The battery portable CCM-200 *plus* provides chlorophyll content determinations in the field without the need for destructive laboratory sampling. Specifically designed for fast field screening each measurement takes only 2-3 seconds to perform.

Chlorophyll content is expressed in CCI (Chlorophyll Content Index) units. Published documentation is available advising how CCI units can be converted into actual chlorophyll concentrations within the leaf.

## Data averaging

Data may be made as:

- Single measurements
- 30 measurements averaged (with graphing)
- 30 measurements averaged with applied sigma 2 standard deviation to exclude rogue data points (with graphing).

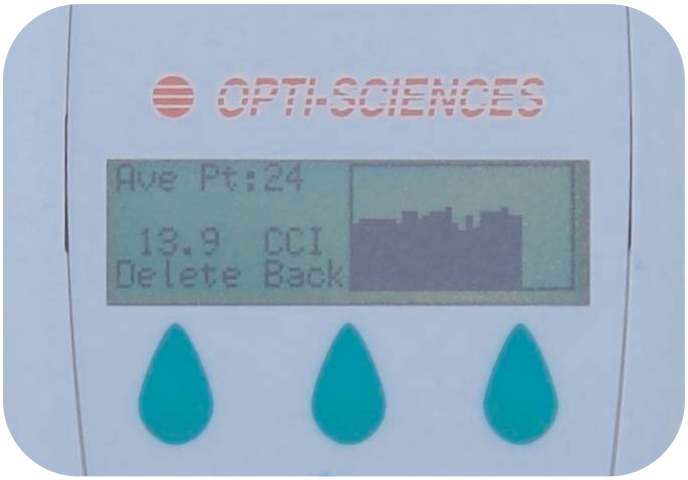
### Applications include:

- Environmental stress
- Nutrient requirements/management
- Nitrogen studies
- Leaf senescence
- Herbicide activity

## Large integral data storage

Up to 160,000 chlorophyll content measurements can be stored in the internal memory. There is no requirement for an external data logger, computer or frequent returns to the laboratory to download data. Stored data can be reviewed, in the field, on the display.

Once back in the laboratory data is quickly and easily transferred to a PC via USB or RS232.




## Proven scientific principles

Chlorophyll has distinct optical absorbance characteristics that the CCM-200 *plus* exploits to non-destructively measure relative chlorophyll concentrations. Strong absorbance bands are present in the blue and red regions but not the green or infrared bands, hence the green appearance of a leaf.

By measuring the amount of energy absorbed in the red band an estimate of the amount of chlorophyll present in the tissue is possible. Absorbance in the infrared band can be used to quantify and account for leaf thickness, so providing a more accurate CCI value.

The CCM-200 *plus* employs new precision LED technology to further enhance measurement accuracy and repeatability.

## Technical Specifications

**Measured parameters:** Optical absorbance in two different wavebands: 653nm (Chlorophyll) and 931nm (Near Infra-Red) providing CCI value

**Measured area:** 1cm diameter circle

**Resolution:** 0.1 CCI unit

**Repeatability:** +/- 1 %

**Sampling acquisition time:** 2-3 seconds

**Source:** Custom 2 wavelength LED module

**Detectors:** Two silicon photodiodes with integral amplifiers for absorbency measurements, power monitoring and temperature compensation

**Data modes:** Single point, 30 point average and a statistical 30 point protocol that disregards data beyond a 2 sigma standard deviation

**Storage capacity:** Up to 160,000 measurements

**User Interface:** 128 x 32 pixel graphic display, 8 keys for measurements, data manipulation, beep signal status and warnings

**Output:** USB 1.1 and RS232

**Operating temperature range:** 0-50$^{O}$C

**Temperature compensation:** Temperature compensated source and detector circuitry for minimal drift over full range

**Battery:** 9V alkaline battery

**Auto off interval:** 4 minutes (with no key press or download)

**Dimensions:** 152 x 82 x 25 mm

**Weight:** 162g

ADC BioScientific Ltd.
1st Floor Charles House
Furlong Way
Great Amwell
Herts. SG12 9TA
UK
Tel: +44 (0)1920 487901 Fax: +44 (0)1920 466289
sales@adc.co.uk www.adc.co.uk