Hydraulic Conductance Flow Meter-HCFM-XP

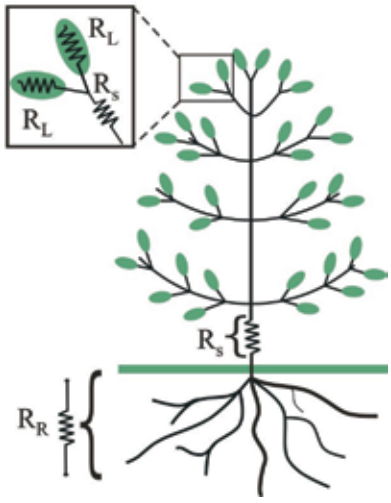
The complete HCFM-XP system is field portable with carrying case.

Operating the HCFM-XP is Easy

- Excise the shoot
- Prep the root or shoot
- Connect the HCFM-XP and select the flow range
- Turn on the system pressure
- Run analysis software on a portable PC
- Disconnect the HCFM-CP
- Go to the next sample

Applications

- Root conductance in the lab or field
- Conductance of shoots and petioles
- Root stress analysis on trees or crops
- Modeling root to shoot communication
- Transpiration models
- Hydraulic lift studies
- Root water status studies
- Absolute varietal statistics
- Mycorrhizae nutrient or water uptake enhancement
- Soil to root conductance statistics
- Crop conductance studies
- Root interconnection studies



The Hydraulic Conductance Flow Meter (HCFM) is designed to perform quantitative root and stem analysis without having to dig up roots or drag limbs back to the lab. In most cases, the analysis of a sample root or shoot is completed in as little as 10 minutes. You can quickly measure the major components of the hydraulic conductance in the soil-plantatmosphere continuum (reference # 70). The hydraulic architecture of a whole shoot or of a single leaf can be represented by a resistance diagram similar to the one on the left. One can measure the values of the individual hydraulic resistances, then compute the pattern of water flow and water potentials in the resistance network. Each hydraulic resistance element (R) equals the pressure difference driving flow through the element divided by the resulting flow (F) (reference # 82). In the HCFM method, the resistance of the root and shoot are measured separately by pressure perfusion and added together. The HCFM will help plant physiologists and agronomists look forward to those seasonal studies of root and shoot progression, water potential, or soil treatment effects.

The HCFM is Designed for Two Types of Numerical Analysis

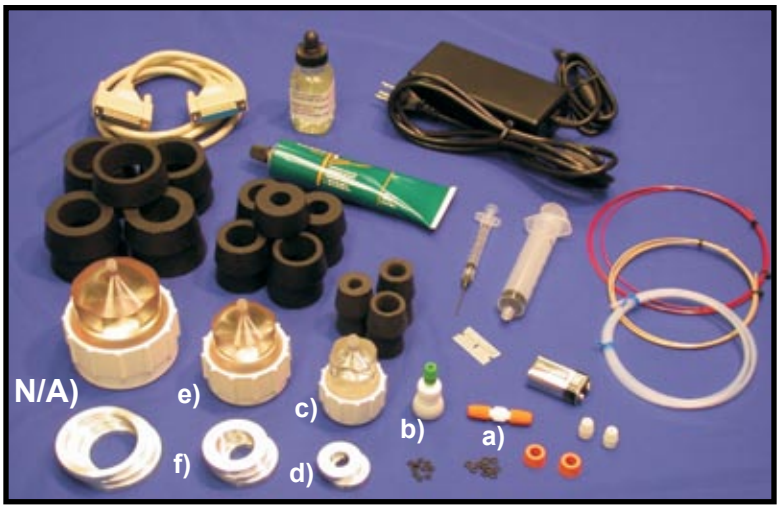
The first analysis is an in-situ transient analysis of hydraulic conductance. HCFM measures the flow as the water pressure increases while flowing into the root or shoot. The software then intelligently calculates the slope of the increased flow and pressure. That slope is the hydraulic conductance. The second analysis is a quasi-steady state, constant pressure and flow into the sample. This derives the flow pressure and conductance in a steady state environment.

Software

The HCFM comes with menu driven software that is easy to use and straight forward in its approach. The software also includes diagnostics and calibration modes to assure the user of correct readings. All data is saved to the PC hard drive for later analysis by your favorite spreadsheet and graphing packages.

DYNAMAX

HCFM-XP Specifications



Dynamax includes all the fittings and couplings you may require for analysis. These additional parts include high quality couplings machined out of Lexan for durability and easy viewing.

Compression Couplings to Plants

a) 1 - 4 mm stem / HPLC Coupling, with O-Rings
b) 4 - 10 mm stem / HPLC Coupling, with O-Rings
c) 10 - 20 mm stem / HPLC Coupling, 6 Rubber seals with
d) compression rings
e) 19 - 36 mm stem / HPLC Coupling, 9 Rubber seals with
f) compression rings

Components Included with the System

- Pressure bottle with 1,800 psi (12.5 MPa) pressure regulator
- Pressure safety valve
- Digital pressure display gauge
- 2 ft (0.6 m) high pressure hose
- 6 ft of FEP hose, 5 ft of HPLC hose with spare couplings
- 8-way manifolds, two each
- Micron filter
- Portable degassed water refill kit with quick disconnects
- Algicide
- Cutting tools
- Coupling lubricant
- Bleeding kit
- Manual & Software CD

Specifications

Stem Ranges
1 mm to 36 mm diameters

Flow Rates
0.01 to 100 grams/hr in 5 overlapping ranges

Conductance
7.7E-08 to 6.5E-04 Kg s-1 MPa-1

Electronic A/D
12-bit resolution dual Analog / Digital converters

Analog/Digital
One reading every two seconds

Data Interface
Standard Parallel Port (via 1.5 m cable)

Battery
12 VDC, 4 Amp hour

Charger
110 - 220 VAC, typical time - overnight

Dimensions
22” x 19” x 9” (61 x 48 x 23 cm)

Weight
37 lb (16.8 kg)

Capacity
24 oz. Degassed Water

Maximum Pressure
90 psi (620 kPa)

Air Gas Tank
6 cu.ft. (170 liter) with CGA-580 Valve & Connector

Ordering Information

HCFM-XP
Hydraulic Conductance Flow Meter - Xtra Portable

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