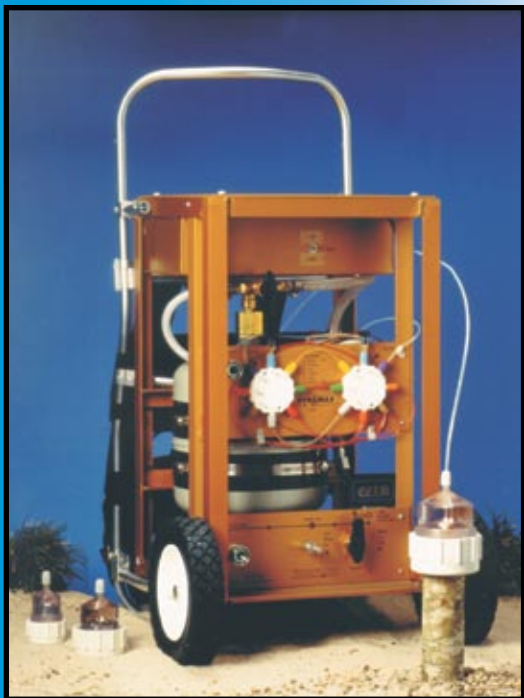


High Pressure Flow Meter - HPFM

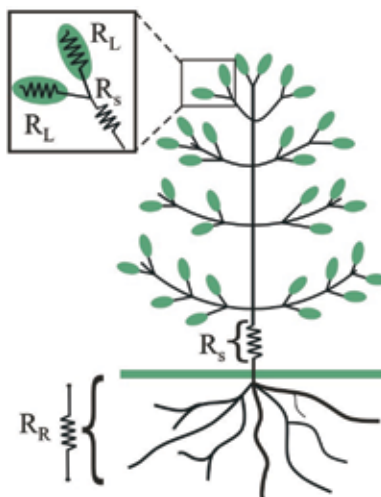


The complete HPFM-C system is field portable with detachable wheels and backpack. Operating the HPFM is Easy

- Excise the shoot
- Prep the root or shoot
- Connect the HPFM and select the flow range
- Turn on the system pressure
- Run analysis software on a portable PC
- Disconnect the HPFM
- 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 High Pressure Flow Meter (HPFM) 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-plant-atmosphere 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

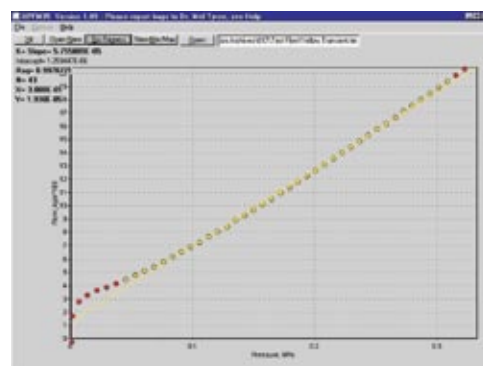
the values of the individual hydraulic resistances, then compute the pattern of water flow and water potentials in the resistance network. Each hydraulic resistance element (R) equals the pressure difference driving flow through the element divided by the resulting flow (F) (reference # 82). In the HPFM method, the resistance of the root and shoot are measured separately by pressure perfusion and added together. The HPFM will help plant physiologists and agronomists look forward to those seasonal studies of root and shoot progression, water potential, or soil treatment effects.

The HPFM is Designed for Two Types of Numerical Analysis

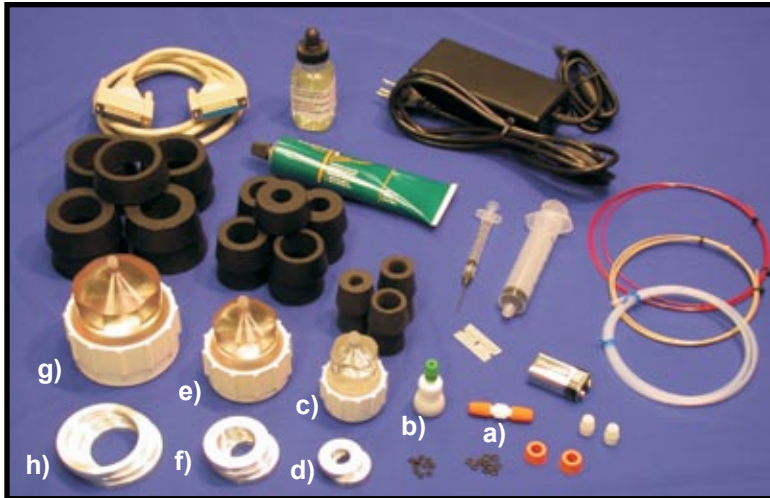
The first analysis is an in-situ transient analysis of hydraulic conductance. HPFM measures the flow as the water pressure increases while flowing into the root or shoot. The software then intelligently calculates the slope of the increased flow and pressure. That slope is the hydraulic conductance. 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 HPFM comes with menu driven software that is easy to use and straightforward 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.



Hydraulic Conductance Meter 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 compression rings
- d) 19 - 36 mm stem / HPLC Coupling, 9 Rubber seals with compression rings
- e) 36 - 55 mm stem / HPLC Coupling, 9 Rubber seals with compression rings
- f) 19 - 36 mm stem / HPLC Coupling, 9 Rubber seals with compression rings
- g) 36 - 55 mm stem / HPLC Coupling, 9 Rubber seals with compression rings
- h) 36 - 55 mm stem / HPLC Coupling, 9 Rubber seals with compression rings

Components Included with the System

- Pressure bottle with 2,000 psi (14 mPa) pressure regulator
- Pressure safety valve
- Digital pressure display gauge
- 6 ft (2 m) high pressure hose with disconnects
- 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 55 mm diameters

Flow Rates

0.01 to 1,000 grams/hr in 6 overlapping ranges

Conductance

$7.7E-08$ to $6.4E-03$ 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

21" x 13" x 12" (54 x 33 x 30 cm)

Weight

35 lb (15.9 kg)

Capacity

2.1 gal. (8 liter) Degassed Water

Maximum Pressure

85 psi (585 kPa)

Ordering Information

HPFM-C

High Pressure Flow Meter - Complete Package

HPFM-P

High Pressure Flow Meter - Portable Package

HPFM-L

High Pressure Flow Meter - Laboratory Package

HPFM-WIN

Windows software upgrade. CD-ROM for HPFM and manual

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