



# **Johnson Permeameter<sup>™</sup>**

## **Description Brochure**

### **Model JP-M2**

## **Measuring Saturated Hydraulic Conductivity (Coefficient of Permeability)**

**of**

## **Earthen Materials Above the Water Table (Vadose Zone)**

**Johnson Permeameter, LLC  
190 Whites Lake Boulevard  
Saluda, North Carolina 28773**

**Phone: (828) 749-3878  
Mobile: (828) 699-1488  
Email: [Ksat.lj@rsnet.org](mailto:Ksat.lj@rsnet.org)**

————— **Since 2000** —————

# Johnson Permeameter<sup>™</sup>

## Model JP-M2 (also applies to Model JP-K2)

### Description

- The Johnson Permeameter is a constant-head borehole permeameter that measures saturated hydraulic conductivity ( $K_{sat}$  or coefficient of permeability) of earthen materials in the zone above the water table (vadose zone) at a wide range of depths.
- The Johnson Permeameter incorporates a four-bar patented mechanical system (US Patent 6,938,461) that greatly increases the efficiency of its float/valve system allowing soil permeability testing at a wider range at depths (an order of magnitude greater) than permeameters based on the common single-lever or Mariotte siphon methods.
- The constant-head water control unit (WCU) is positioned at the bottom of an unlined borehole or suspended by cable at a selected height above the bottom of the borehole to establish a constant dynamic head of water. The rate of water flow into the soil is measured directly from graduated reservoirs located above the ground surface. Volume/time measurements are recorded manually or from water level data logger files (data logger is not included) and processed by computer.
- The  $K_{sat}$  of the earthen materials is determined by solving appropriate mathematical equations that incorporate the equilibrium height of water in the borehole, steady-state rate of water flow, depth to the water table or an impermeable soil layer, dimensions of the borehole, and water temperature.
- Testing standards, analytical solutions, and field/computer worksheets are provided for various soil conditions.  $K_{sat}$  can be determined in the range of  $10^{-6}$  to  $10^{-2}$  cm/sec (very low to very high). The testing depth capability of the JP-M2 and JP-K2 with the WCU-3 (three-inch diameter) constant head unit is 100 ft (30 m). The testing depth capability of both units with the WCU-2 (two-inch diameter) constant heat unit is 52.5 feet (16 m).
- The Johnson Permeameter can be set up on any landscape position where a borehole can be advanced with a hand auger or power equipment. It can be quickly assembled and disassembled in the field and is designed to be user-friendly.
- The Johnson Permeameter is a ruggedly-constructed testing instrument that will provide many years of trouble-free service. All materials consist of corrosion-resistant metals and high-strength plastics.
- The Johnson Permeameter can be effectively used for determining  $K_{sat}$  for various applications including but not limited to:
  - Stormwater infiltration and other low-impact development and ground water recharge practices;
  - Domestic and commercial on-site waste-water soil infiltration systems;
  - Assessing the potential of contaminant transport in the vadose zone from waste disposal sites;
  - Agricultural-related practices such as irrigation, drainage, and crop production and;
  - Academic research projects.
- Note that  $K_{sat}$  and infiltration rate are not the same entity. Infiltration Rate =  $K_{sat}$  x hydraulic gradient in accordance with Darcy's Law.  $K_{sat}$  is an intrinsic property of the soil. Hydraulic gradient is a characteristic of the soil stratigraphy, depth to water table, flow path, and properties of the installation.
- The Johnson Permeameter Models JP-M2 and JP-K2 come with a choice of the WCU-3 or WCU-2 (or optionally both) constant-head units.

# Johnson Permeameter™ Model JP-M2

## Basic Components of The Model JP-M2 (what is included in the basic package)

- Choice of either the WCU-3 or WCU-2 (or optionally both) constant-head units for establishing a constant dynamic head of water in the borehole. The optimal soil augers are the AMS (or equivalent) nominal size 3-1/4-inch auger (3.75" diameter borehole) and 2-1/4-inch auger (2.5" diameter borehole), respectively. Larger-diameter augers can also be used effectively.
- Two graduated reservoirs with 3.2 and 0.12 liter capacities for measuring water flow. The 0.12-liter reservoir can be mounted in tandem with the 3.2 liter reservoir at any time during the test and the flow can be switched between reservoirs using the quick-release connectors.
- Two supply hoses: (1) a 12.5 ft (3.8 m) primary hose that allows testing at depths up to 10 ft (3.0 m) and (2) a 15 ft (4.6 m) extension hose for testing at depths up to 25 ft (7.6 m). The testing depth can be increased to 100 ft (30 m) with addition of optional extension hoses and cables. All hoses are fitted with heavy-duty quick-release nickel-chrome-plated brass connectors.
- A heavy-duty surveyor's tripod for mounting of reservoirs and attachment of the cable reel and WCU. The 3.2-liter reservoir is attached to the tripod mounting base with the standard 5/8"-11 tripod mounting screw. The removable 0.12 liter reservoir can be mounted on the base of the 3.2 liter reservoir.
- A cable reel with thumb-screw cable lock. The reel is supplied with 33 ft (10 m) of nylon-coated stranded stainless steel cable for securing and suspension of the WCU in the borehole to achieve a desired H/r ratio or other ratio.
- A heavy-duty padded compartmented backpack carrying case for storing and transporting all equipment except the surveyor's tripod. The backpack has padded shoulder straps and padded back support for comfortable transportation to remote field locations.
- A USB Flash Drive containing the JP-M2 Instruction Manual, worksheets, standards, background information and technical references. The worksheets provide automatic graphing and water temperature correction capability. Analytical solutions are provided for each of the field conditions described in the JP Instruction Manual. Data averaging and alternate solution comparison worksheets are also provided.
- A field kit containing: (1) a metal-clad full-immersion Celsius thermometer with protective case and cable suspension ring, (2) a 16 ft (5 m) coated metal in/cm measuring tape, (3) silicon paste lubricant for quick-release O-rings, (4) spare O-rings, (5) a flat-bladed screw driver for disassembly/assembly of the WCU if required.
- The weight of the JP-M2 (case loaded with all equipment, excluding tripod) is 15.25 lb (6.92 Kg). The weight of the tripod is 9.75 lb (4.42 Kg).
- Optional additional hoses and cables for extending the testing depth up to 100 ft (30 m).
- Full telephone support for questions regarding operation of the Johnson Permeameter JP-M2.
- Five-year limited warranty on materials and workmanship.