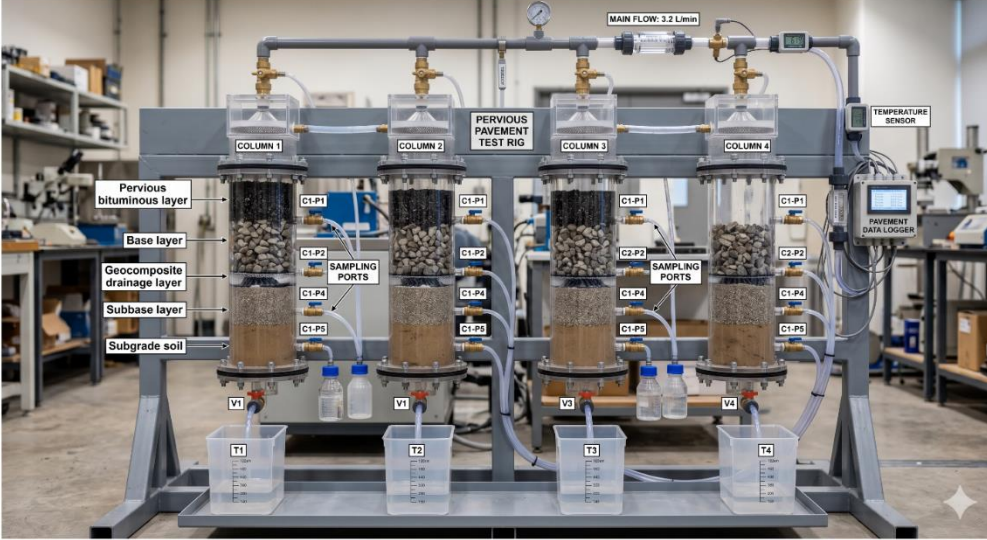


Specifications of Equipment for Tender Bid cum Quotation

Name of Equipment/ Assembly	Column Test Apparatus for Pervious Pavement Section
Related Standards to be accorded	Customized Equipment
Features/capabilities /Specifications	The equipment shall consist of a loading frame with the following characteristics:  A reference image of equipment (sample AI generated image for better visualization) A. System Overview • 4 identical vertical columns mounted on a rigid frame • Internal diameter: 105 mm (ID) • Total height: ~1000 mm (effective specimen height) • Modular segments: 5 × 200 mm sections (detachable) • Layering capability: subgrade → geocomposite → subbase → geocomposite/geotextiles → base → geocomposite → pervious bitumen • Features: ○ Intermediate drain/sampling ports at each segment (near the bottom junction) ○ Top rainfall/inflow head control ○ Bottom outlet + collection ○ Flow and head difference measuring system B. Column Body (Modular Acrylic Design) 1) Material & Geometry • Material: Clear cast acrylic • Internal Diameter (ID): 105 ± 0.5 mm • Wall thickness: 10-12 mm (avoid bowing under head/compaction) • Segment height: 200 mm each (×5 = 1000 mm) 2) Segment Ends (Flanged & Sealed) Purpose: Allows layer-by-layer assembly/compaction without disturbing the whole column. C. Base & Top Assemblies

NIRMA UNIVERSITY
Institute of Technology
Civil Engineering Department

1) Bottom Plate (Base)

- Material: SS plate (8-10 mm) or thick acrylic with SS insert
- Features:
 - Perforated support plate (or SS mesh 1–2 mm opening)
 - Geotextile separator disc above mesh
 - Central outlet port
 - Side sampling port
- Quick-connect to collection bottle / flow sensor

2) Top Head Assembly

- Inlet distribution cap with:
 - Perforated diffuser plate (uniform rainfall)
 - Removable splash plate
 - Nozzle to create rainfall simulation
- Inlet port (connected to reservoir/pump)
- Air vent: small port to avoid air locking
- Attach a constant head tank to make sure the continuous supply of water throughout the test

D. Intermediate Drainage & Sampling (Key Feature)

At selected interfaces (e.g., base-geocomposite, geocomposite-subbase):

1. Provide radial sampling ports:

- Location: Intermediate drain/sampling ports at each segment (near the bottom junction)
- Internal fitting:
 - SS perforated mini-sleeve or short porous insert to avoid clogging
- External:
 - Mini valve (needle valve) for controlled sampling

Allows:

- Leachate collection from specific layers
- Study of pollutant attenuation across layers

E. Internal Layer Support & Compaction

To enable compaction without damage:

- Provide a removable compaction collar/ring for each segment
- Use a steel tamping rod with a guide (to avoid eccentric loading)

F. Structural Frame (4-Column Setup)

Frame Design:

- Material: MS square section (powder-coated) or aluminium profile
- Capacity: 4 columns side-by-side
- Height: ~1.6 m
- Features:
 - Adjustable clamps/brackets to hold each column
 - Bottom platform with collection trays
 - Top beam for inlet manifold mounting

G. Hydraulic System (Inflow Control)

- Nozzles
 - Precise inflow rates
 - Simulates rainfall intensity

H. Measurement

1. Flow measurement (per column):
 - Low-flow rotameter OR
 - Digital inline flow sensor (range ~0.1–5 L/min)
2. Head measurement:
 - Scale + point gauge

I. Measurement Capabilities

NIRMA UNIVERSITY
Institute of Technology
Civil Engineering Department

	System should allow: • Darcy permeability (k) of the full system • Layer-wise hydraulic drop • Clogging behaviour over cycles • Leachate quality • Storage + delay characteristics Provide separate quotations for equipment to facilitate (i) testing for 02 samples and (ii) testing for 04 samples simultaneously. Amount shall include packaging, transportation/delivery, and installation charges.
Make	• Clear mention Make in the bid
Electrical Supply Requirement	• Electricity supply requirements (voltage and phase) shall be clearly mentioned • Mention in case of the requirement of UPS (Uninterrupted Power Supply) with capacity
Size and weight	• Detachable/ Assemblable Units: The equipment shall be dismantlable as placed in the available infrastructure. The maximum dimensions of the door are given below. • The dimension of any unit/ part of the apparatus shall not exceed 2.7 meters (L) x 1.5 meters (W) x 1.9 meters (H). • Mention the area required for the positioning of equipment. • Mention the total weight of the equipment. • Mention the specific requirements of the foundation/pedestal for resting the equipment, if any. • Mention the need of vibration isolated, if needed
Water and air supply requirements	• Mention the requirement to supply compressed air, if any. • Mention the requirement and arrangement of water supply, if any.
Compatibility of parts	• In case of accessories from make from the make of equipment, compatibility shall be checked and certified by the bidder.
Calibration Certificates, technical manual and SOP	• The calibration certificates shall be provided with the equipment and accessories. • Validity of calibration certificate for all devices shall not be less than one year.
	• Technical manual and Standard Operating Procedure documents shall be provided.