



EIE INSTRUMENTS PVT. LTD.

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Organization's ISO 9001:2015 Certificate



 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 2 of 12

Forward

Dear valued customer,

We are thankful of you for your keen interest in our company products. We hope you enjoy using them and find them to be helpful and reliable. We greatly appreciate your business and the opportunity you have provided us to assist you. You have joined a selected group of customers who have switched to the technologically superior and quality enhanced laboratory testing products.

Time has changed, so does the technology. Your purchase lists you on the cutting edge of the 21st century technology. To help you get the most out of your EIE Instruments Pvt. Ltd. products, we have created this instruction manual that is an excellent way of expressing and maintaining your trust in EIE's - superior quality testing products. Our continued efforts and commitment are to provide you with the best and efficient services after sales, prompt attention and the highest level of customer satisfaction. If for any reasons, you have questions or comments, we are delighted to hear from you. We welcome your feedback for further improvement in our product(s). We would be happy to help you in any way we can. You can contact us on **+91-9909903582** or send us an email at **service@eieinstruments.com/kunal@eieinstruments.com**. You can expect us to respond to your call or email within 24-48 working hours.

Once again, we would like to thank you for your trust and kind patronage. We look forward to serve you better in the future.

Yours sincerely,

EIE Instruments Private Limited


 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 3 of 12

Table of Contents

Organization's ISO 9001:2015 Certificate	2
Forward	3
Table of Contents	4
List of Figures	4
1 Introduction	5
1.1 Scope	5
1.2 Principle	5
2 Location of Machinery	5
3 Packing List	5
4 Name of Manufacturer (Brand/Make)	6
5 Detail of Service Centre	6
6 Delivery and Uncrating of Apparatus	6
6.1 How to Make Instrument Ready for Use?	6
7 Apparatus	7
8 Sampling	7
9 Component Diagram	8
10 Standard Operating Procedure	8
11 Precaution	10
Warranty Certificate	11

List of Figures

Figure 1: Component diagram of concrete permeability tester	8
Figure 2: Sample placement	9
Figure 3: Ball valve	9

1 Introduction

A concrete structure is considered to be of adequate durability if it performs in accordance with its intended level of functionality and serviceability over an expected or predicted life cycle. Concrete durability depends largely on the ease (or difficulty) with which fluids (water, carbon dioxide, oxygen) in the form of liquid or gas can migrate through the hardened concrete mass. Concrete is a porous material. Therefore, moisture movement can occur by flow, diffusion, or sorption. We are concerned with all three, but generally the overall potential for moisture in concrete by these three modes is referred to as its permeability. It is defined as the property that governs the rate of flow of a fluid into a porous solid.

1.1 Scope

This standard procedure covers the method for determining the permeability of cement mortar and concrete specimens either cast in the laboratory or obtained by cutting out from existing structures.

1.2 Principle


- Permeability of concrete is important when dealing with durability of concrete particularly in concrete used for water retaining structures.
- Permeability tests measures the ease with which liquids, ions and gases can penetrate into the concrete.
- The test done by subjecting the mortar or concrete specimens of known dimensions, contained in a specially designed cell, to a known hydrostatic pressure from one side, measuring the depth of penetration of water in the concrete.

2 Location of Machinery

It is advised that the instrument must be installed at a proper hygiene and clean location at least 5 feet to 6 feet away from the wall. The instrument must be installed at a location that must be free from vibration.

3 Packing List

1. Concrete permeability tester
2. 3 HP air compressor with 60 litres tank
3. NABL calibration certificate

 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 5 of 12

4 Name of Manufacturer (Brand/Make)

TECHMECH TM-139

5 Detail of Service Centre

Designated Person: Heerak Parikh

Company Name: AIC Lab Equipments Pvt. Ltd.

Address: 210, Kamaldeep Industrial Estate, Sonawala Cross Road No. 2, Goregaon (East), Mumbai – 400063, Maharashtra, India.

Contact Number: +91 22 66998074, +91 22 66998075, +91 22 66998076, +91 22 42668074


Contact Number (Mobile): +91 9821153332

6 Delivery and Uncrating of Apparatus

1. Inspect equipment and shipping crate immediately upon receipt. If any damage is apparent, immediately discuss it with the delivery person and contact the transportation company immediately. Make notes of any damages on the bill of landing.
2. Retain all shipping material for later inspection.
3. Check packing slip carefully and ensure all materials have been received as indicated in packing slip.
4. Remove packing strip from surroundings of the instrument and all its accessories. Please inspect and note whether any part of the instrument is damaged or any accessory is missing according to packing slip? If it is so, then immediately make note of it and report to the manufacturer.
5. Due to the vibration incurred during shipping and handling, it is possible that mechanical connection could become loose. Inspect all connection to ensure that they are secure.
6. After visual inspection, if everything is found to be okay, transit the instrument to suitable safe place where it is intended to install. **CAUTION: Handle with care.**
7. Recycle the packing material. Do not throw it away for environment protection.

6.1 How to Make Instrument Ready for Use?

- 1) Keep the equipment in well ventilated place.
- 2) Place the equipment on a plane, even and sturdy surface leaving approximately 12" inch space away from the wall.
- 3) Do not install the unit in a corrosive environment. A corrosive environment may lead to poor performance and deterioration of unit.

 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 6 of 12

- 4) Keep instrument away from draft, sunlight, water or near a place of equipment, which emits heat as well as electromagnetic conduction emission.
- 5) Keep the standard operating manual handy while operating the apparatus.

7 Apparatus

1. Permeability cell
2. Water reservoir
3. Pressure lines

8 Sampling

Suitability Testing: For suitability testing, the specimens must be prepared using a mould and taking into account the property of concrete to be determined.


The concrete shall be mixed from the materials intended for use in the actual structure. Their origin and the concrete composition shall be recorded.

Quality Testing and Testing of Hardened Concrete: For quality testing and testing of hardened concrete, sampling and specimen preparation are generally carried out on site, the samples being taken from the concrete intended to be used for a particular structural member.

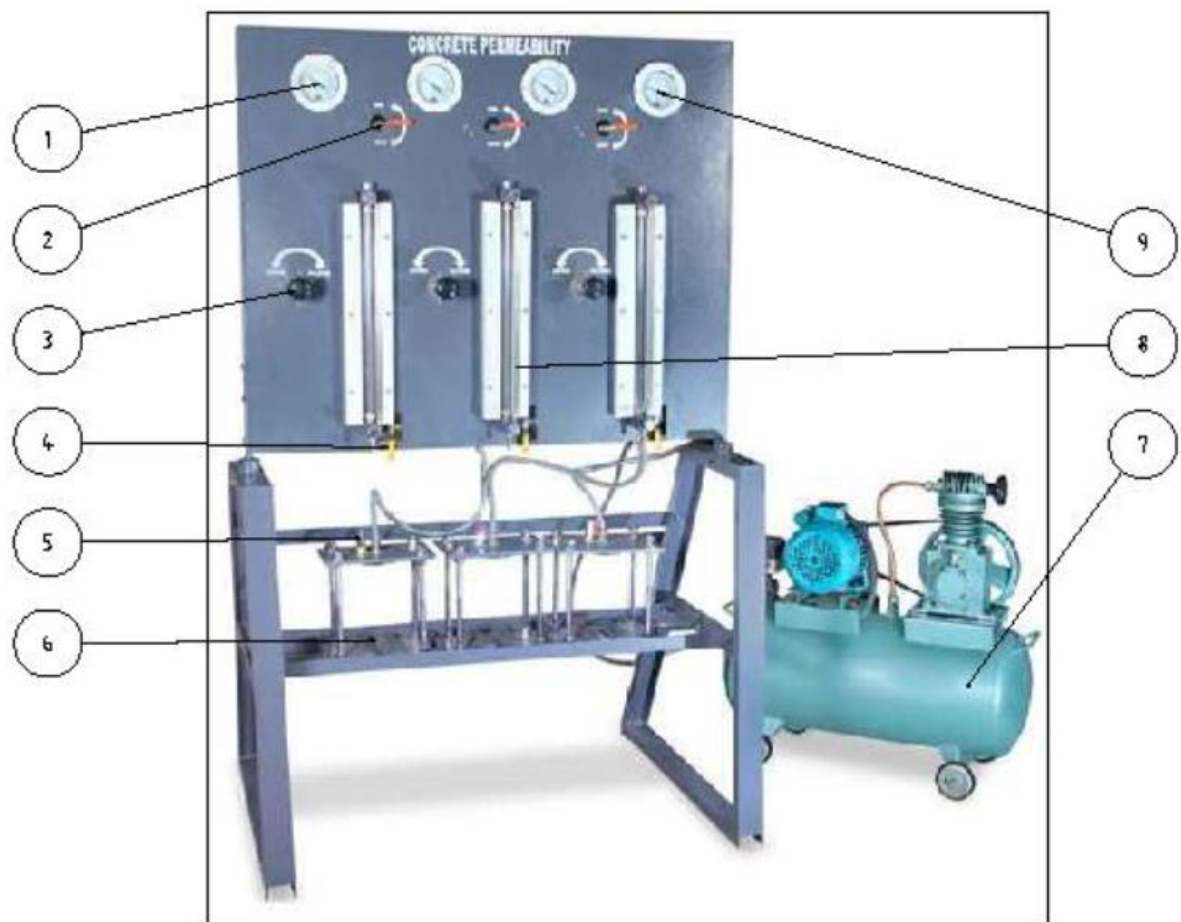
Number of Specimens: Unless otherwise specified in the specification, three specimens are to be prepared for each test.

Shape and Size of Specimens: The minimum specimen dimensions must be at least equal to four times the maximum aggregate particle size. Up to a maximum aggregate particle size of 32 mm, the specimens used for determining the water permeability should preferably be slabs 150 X 150 X 150 mm in size.

Curing of Specimens: Immediately after demoulding the specimens, the circular areas (100 mm or 150 mm) to be subjected to water pressure shall be roughened by wire brushing and the specimens then placed on gratings and cured in water at a temperature of 15 to 22°C until testing.

 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 7 of 12

9 Component Diagram




ID	DESCRIPTION	ID	DESCRIPTION
1	Cell Pressure Gauge	6	Sample Holder
2	Air (Open/close) valve	7	Air Compressor
3	Pressure Control Valve	8	Scale for reading
4	Water (Open/close) valve	9	Air compressor gauge
5	Over flow Valve	10	

Figure 1: Component diagram of concrete permeability tester

10 Standard Operating Procedure

1. Connect the output of the compressor to the inlet that supplies compressed air to the entire system which is mounted with a master gauge and 3 separate gauges for each cell.
2. Place the sample on the sample holder of size 150 mm x 150 mm x 150 mm and fix it tightly with gaskets to reduce leakage.

 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 8 of 12

NOTE: Top surface of the sample must be roughened using wire brush.

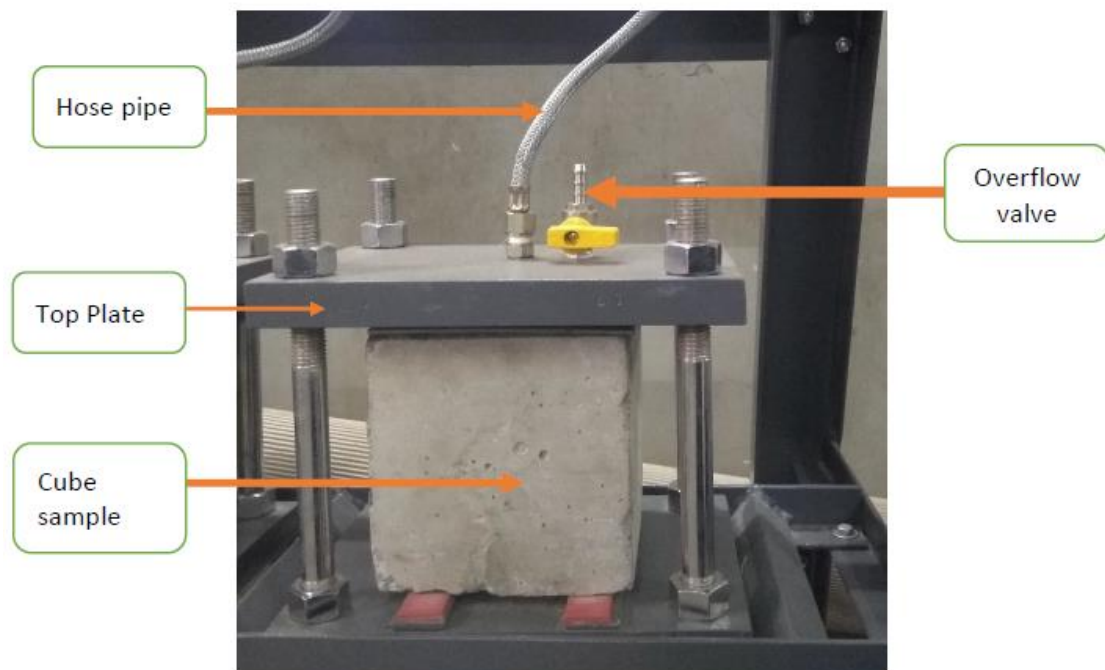


Figure 2: Sample placement

3. First of all, open the regulating control valve completely open as indicated and also open the vent valve (placed on top of sample holding plate) simultaneously.




Figure 3: Ball valve

4. Open the ball valve that is connected to the reservoir for supply of compressed air to remove the air traps before starting of actual test.
5. After that open the water valve and wait until the water flows out from the vent valve as indicated in figure. Immediately close the vent valve when water starts flowing.

NOTE: Above steps are compulsory, to remove air traps in the system.


6. Now using the regulating valve, adjust the pressure in all the 3 cell pressure gauge to 5kg/cm².
7. The permeability test gives a measures of the resistance of the concrete against the penetration of water excreting pressure.

 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 9 of 12

8. A concrete specimen is exposed from above to a water pressure of 5 Kg/cm² (0.5 N/mm²) acting normal to the mould filling direction for a period of three days. This pressure must be kept constant throughout the test. If penetrates starts through the underside of the specimen, the test may be terminated and the specimen rejected as failed.
9. It shall be checked whether and when the unexposed specimen faces show signs of water permeation. Immediately after the pressure has been released, the specimen shall be removed and split down from the center, with the face which was exposed to water facing down.
10. When the split faces show signs of drying (after about 5 to 10 minutes), the maximum depth of penetration in the direction of slab thickness, shall be measured, in mm, which gives us the extent of water permeation established in the concrete.

11 Precaution

1. The seal around the specimen shall be effective. Leakage through it can give rise to entirely misleading results. Obtaining a good seal is a matter of experience and only a general guidance can be provided.
2. It is important that the air content of the water entering the specimen should not exceed about 0.2 %. Excessive amounts of dissolved air can result in air locks in the specimen and apparent reduction in permeability. Periodical sample shall be drawn from the cell drain cock and the dissolved air determined. The system shall be drained and replenished with fresh de-aired water, as soon as the air content exceeds the above limit.
3. The flow should be permitted to attain the steady state before the coefficient of permeability is calculated. Examination of the inflow and outflow rate data or suitable graphs of the same may be used to determine the establishment of the steady state.
4. The observation of outflow from the specimen is liable to be influenced by evaporation of the percolate during collection. The collection bottle may be housed in a humid chamber, or alternatively, blank observations on a similar bottle containing water should be made and the necessary correction for evaporation loss applied. The inflow measurement provides an additional check.
5. It is very important that the specimen surface is carefully prepared by sand blasting or chiselling, as even a thin highly impervious skin can result in considerable underestimation of the permeability.

 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 10 of 12

Warranty Certificate

Your EIE product is guaranteed to be free from defects in materials and workmanship for one (1) year under normal use from the date of purchase. This warranty does not apply to any product damaged by accident, misuse, mishandling, abuse, negligence, transit, improper line voltage, drop, fire, flood or if the products were altered or repaired by anyone other than the qualified service personnel. The liability of EIE Instruments is limited to repair or replacement and under no circumstances shall EIE be liable for any collateral consequential damages or loss. This guarantee specifically excludes the expendables and consumables. All warranty claims must be directed to your corresponding purchase organization that is responsible for the sale of this equipment. The users are responsible for shipping expense. The warranty cards which are not signed and stamped by the actual user will be treated as void. The warranty card should accompany the defective products sent for repair, without which no claims would be entertained. Please detach the below warranty card from following cut-line.

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Attributes	Details
Name of the company	
Address	
Telephone number	
Mobile number	
Email address	
Date of purchase	
Product model	
Serial Number	
Bill or cash memo number	

This card should be detached, filled in properly and posted within 15 days from the date of purchase otherwise the warranty becomes invalid.

	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 11 of 12

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If you have any note or queries,

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Calibration Laboratory

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 EIE INSTRUMENTS PVT. LTD.	Operation & Maintenance Instruction Manual	
	Equipment Name: Concrete Permeability Tester	Equipment Serial Number:
	Document Number: EIE/OM/CPT/03	Page Number: 12 of 12