

WATER PERMEABILITY OF CONCRETE TESTING INSTRUMENT

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Abstract – Instrument we mentioned for checking water permeability in concrete sounds super cool! It's designed with advanced technology and non-destructive testing methods to accurately evaluate how resistant concrete is to water. The instrument has End Cap Set, Booster Pump, Pressure Gauge, Pressure Cutoff Switch. Making it comprehensive and efficient for testing. And the best part? It provides real-time measurements and immediate results, saving time and improving accuracy. Plus, it's non-destructive, so it's safe for evaluating concrete structures already in use. This instrument has the potential to revolutionize the construction industry and help engineers, researchers, and construction professionals make informed decisions for more durable concrete structures.

Key Words: (Water permeability, Concrete, Durability, testing methods, booster pump, pressure cut of switch, end cap set, pressure Gauge)

1. INTRODUCTION

Concrete is one of the most broadly utilized development materials all around the world, esteemed for its solidarity, sturdiness, and flexibility. In any case, in spite of its many advantages, concrete isn't impenetrable to the entrance of water. Water entrance can prompt different issues like disintegration, erosion of installed steel fortifications, and at last underlying disappointment. In this manner, assessing the water porousness of cement is fundamental for guaranteeing the drawn out presentation and sturdiness of substantial designs.

Water porousness alludes to the capacity of water to enter through the substantial network under tension or by fine activity. It is a basic property to evaluate, particularly in applications where water openness is common, like scaffolds, dams, passages, and building establishments. The test for water porousness gives important data about

the nature of cement, its protection from water entrance, and its true capacity for sturdiness in help.

Key Objectives:

- 1) Quality control
- 2) Assess bond strength between reinforcement and concrete
- 3) Economical and sustainability
- 4) Long term durability
- 5) Research and development

2. LITERATURE REVIEW

The water penetrability test surveys substantial's protection from water infiltration, basic for strength. Studies recognize key variables influencing penetrability, including blend plan boundaries like water-concrete proportion and total evaluating. Restoring strategies, like temperature and term, fundamentally impact substantial's impermeability. Integrating advantageous materials like silica smoke or fly debris can additionally upgrade obstruction by altering pore structure. Research features the connection between concrete microstructure and porousness, underlining properties like porosity, pore size dispersion, and network. High level strategies like mercury interruption porosimetry and atomic attractive reverberation imaging help in breaking down pore structure and its effect on porousness. Developments like self-recuperating substantial proposition promising answers for alleviate porousness issues and guarantee durable substantial foundation.

3. METHODOLOGY

- Finding locally available material
- Think about the easiest way to perform the test
- Prepare the instrument in low cost
- Assembling the instrument.
- In this way we prepare a instrument for water permeability test on concrete.

4. RESULT

SR. NO.	NAME OF ELEMENT (concrete block) GRADE	WATER PENETRATION DEPTH (MM)		COMPRESSION STRENGHT (KN)
		CURING PERIOD		
		7 DAYS	14 DAYS	
SAMPLE 1	M 15 (1:2:4)	18	33	58
SAMPLE 2	M 20 (1:1.5:3)	19	35	63
SAMPLE 3	M 25 (1:1:2)	21	36	65

5. PHOTOGRAPHS OF TEST SPECIMEN



5. CONCLUSIONS

As we all know water permeability of concrete tests is a very crucial part of the construction field. To identify the strength, durability, and lifetime of any structure. We know that these tests are conducted in big laboratories. Which is a laboratory (Test) due to the transport of specimens, proper handling, etc. So, we have designed such an instrument that is made of locally available materials and which is economical to buy. Also, it is portable on any site because of its small size and weight. Further, you will get to know more about the assembly of instruments and testing of the concrete specimen.

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REFERENCES

1. Concrete Technology Textbook By M.S.Shetty
2. L. Tyler and B. Erlin. A Proposed Simple Test Method for Determining the Permeability of Concrete. Journal of the PCA Research and Development Laboratories, Sept. 1961, pp. 2-7.
3. Hewlett, P.C. (1999). "The Role of Water in Determining Concrete Performance" Proceedings of International Congress on Creating with Concrete University of Dundee, (ed. Dhir & McCarthy) pp. 63- 80.
4. Swamy, R.N. (1997). "Durable Concrete Structures - The Challenge to Design and Construction", Proc. 5th International Conference on Concrete Engineering & Technology (CONCET '97) pp. 1-17.