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Your Ref: P.O. NO: 0383
Dated 25/09/00

Our Ref: K 2218/YCL

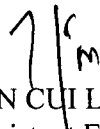
Date: 25/10/00
Page 1 of 2

TEST REPORT

(This Report is issued subject to the conditions set out overleaf)

- Subject** : Determination of Coefficient of Water Permeability on Hardened Concrete samples submitted by M/s Integral Concrete Technology (M) Sdn Bhd on 21/09/00.
- Tested For** : **M/S INTEGRAL CONCRETE TECHNOLOGY (M) SDN BHD**
No. 44, Jalan TPP 5/2
Taman Perindustrian Puchong
Seksyen 5
47100 Puchong
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Attn: Mr. Tony Lee
- Test Method** : Coefficient of Water Permeability – Based on Darcy’s Law (cell Method). Refer to Appendix 1.
- Sample Description** : Six (06) nos. of 150mm concrete cube were received. One core specimen 100mm diameter and 50mm length were extracted from each of the 150mm cube for the Coefficient of Water Permeability Test. The concrete cubes were referenced as follows:

<u>Sample Reference</u>	<u>Marking</u>	<u>Quantity (nos.)</u>
<i>XYPEX Treated</i>	MF 030XP2 036559	03
<i>NORMAL Control</i>	MF 030XP2 036558	03


YIN CUI LEE
Assistant Engineer

Ms28/k2218


WILLIAM LIM
Manager

Results :**Table 1: Determination of Coefficient of Water Permeability Test**

Sample Reference	NORMAL Control			XYPEX Treated		
	1	2	3	1	2	3
Specimen Reference						
Water Pressure during Permeability Test (kgf/cm ²)						
Average Diameter (mm)	100.10	100.05	100.05	100.10	99.90	100.10
Average Length (mm)	48.70	49.20	50.00	49.30	50.15	50.20
Cross-section Area, A (m ²)	7.8697 x 10 ⁻³	7.8618 x 10 ⁻³	7.8618 x 10 ⁻³	7.8697 x 10 ⁻³	7.8383 x 10 ⁻³	7.8697 x 10 ⁻³
Hydraulic gradient across sample, I	1026.69	1016.26	1000.00	1014.20	997.01	996.02
Constant Flow Rate, Q (cc/hr)	0.3805	0.4175	0.3400	0.0301	0.0338	0.0264
* Coefficient of Permeability, k (m/sec)	1.0569 x 10 ⁻¹⁰	1.1600 x 10 ⁻¹⁰	9.4444 x 10 ⁻¹¹	8.3611 x 10 ⁻¹²	9.3889 x 10 ⁻¹²	7.3333 x 10 ⁻¹²
Average Coefficient of Permeability, k (m/sec)	1.3081 x 10 ⁻¹¹	1.4519 x 10 ⁻¹¹	1.2013 x 10 ⁻¹¹	1.0476 x 10 ⁻¹²	1.2014 x 10 ⁻¹²	9.3557 x 10 ⁻¹³
		1.3204 x 10 ⁻¹¹			1.0615 x 10 ⁻¹²	

Note : ‘*’ See Typical Values of concrete permeability and related properties – Table 1 on Appendix.

(Source : Concrete society, Technical Report No. 31, Permeability Testing of Site concrete, Page 75)

K 2218/YCL

APPENDIX

A. Table 1 : Typical value of concrete permeability and related properties

Test Method	Unit	Concrete Permeability/Absorption/Diffusion		
		Low	Average	High
Coefficient of permeability to water	m/s	< 10 ⁻¹²	10 ⁻¹² - 10 ⁻¹⁰	> 10 ⁻¹⁰

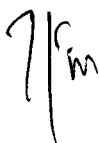
B. Coefficient of Water Permeability Test (Adopted from Taywood Method)

Test Procedures under 3.0 or 5.0 kgf/cm² Water Pressure :

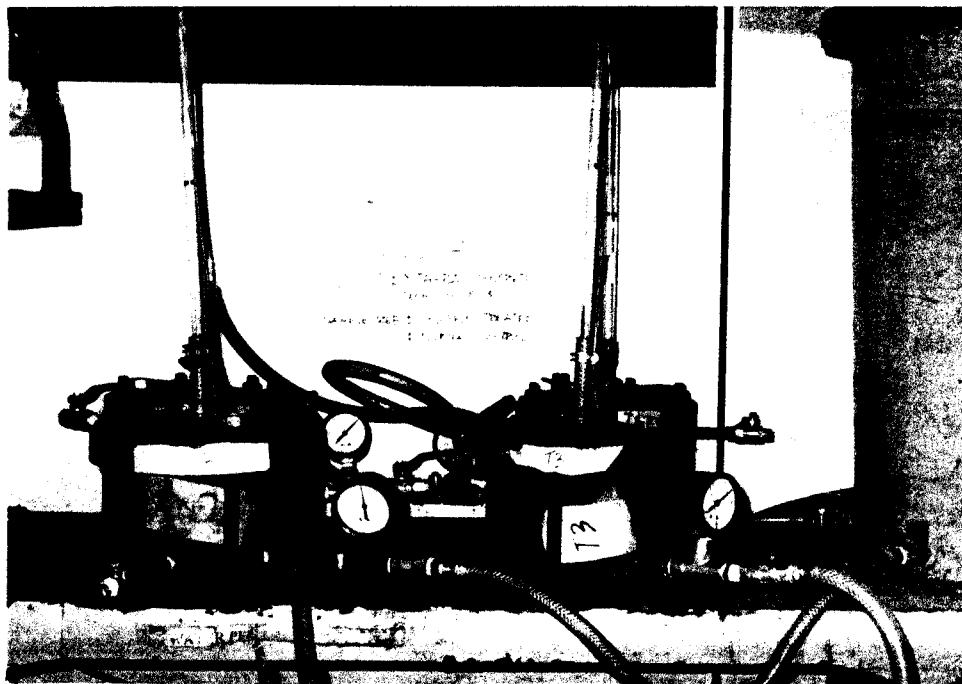
1. A cylinder specimen of 100mm diameter was placed into a metal cell. The annular space between the sides of the concrete test cylinder and the metal cell was sealed with an epoxy adhesive. The test assemblies were allowed to set in air room temperature for approximately 24 hours.
2. The space between the both faces of the test cylinder and the flange of the metal cell was filled with water to the brim. A metal cap was placed over the flange and tightened to the metal cell. Entrapped air in the cell was removed by filling in with excess water until it overflows from the cap.
3. The upper of the cell connected to a graduated manometer tube while the bottom of the cell was connected to a pressure gauge, which is connected the pressure tank.
4. The graduated tube was filled with excess until the water level was approximately 10cm high. Entrapped air was removed from the tube by tapping it lightly with the finger.
5. The free end of the tube was covered with plastic to avoid evaporation of water. A test pressure of 3.0 or 5.0kgf/cm² was applied and maintained on the test specimens. The water level in the manometer tube was noted and recorded.
6. The increase in water level was recorded until a constant rate of flow achieved i.e. when the difference between the highest and lowest readings of the 4 consecutive reading taken a specified total did not excess 3mm.
7. The coefficient of permeability was calculated from the following equation and recorded :

$$i) \quad k = \frac{Q}{A_i}$$

Where k – Coefficient of permeability, m/sec
 Q – volume of water flowing per unit time, m³/sec
 A – cross-section area of specimen, m²
 i – hydraulic gradient across specimen, m head of water/m




APPENDIX



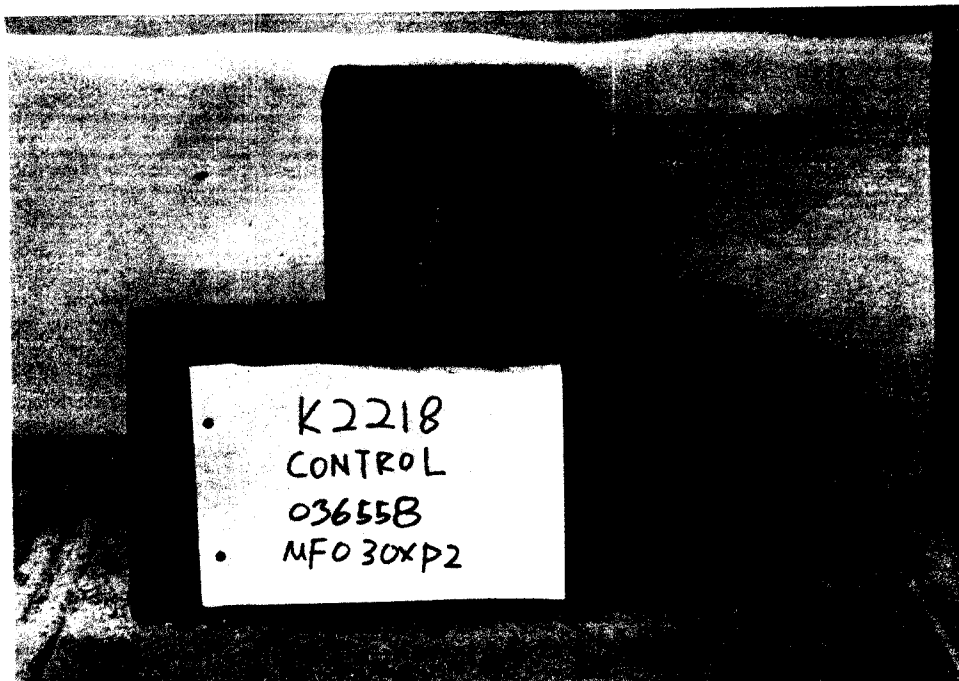
Photograph 5 : Testing is in progress.

7/13



K 2218/YCL

APPENDIX



Photograph 1 : Sample as received.



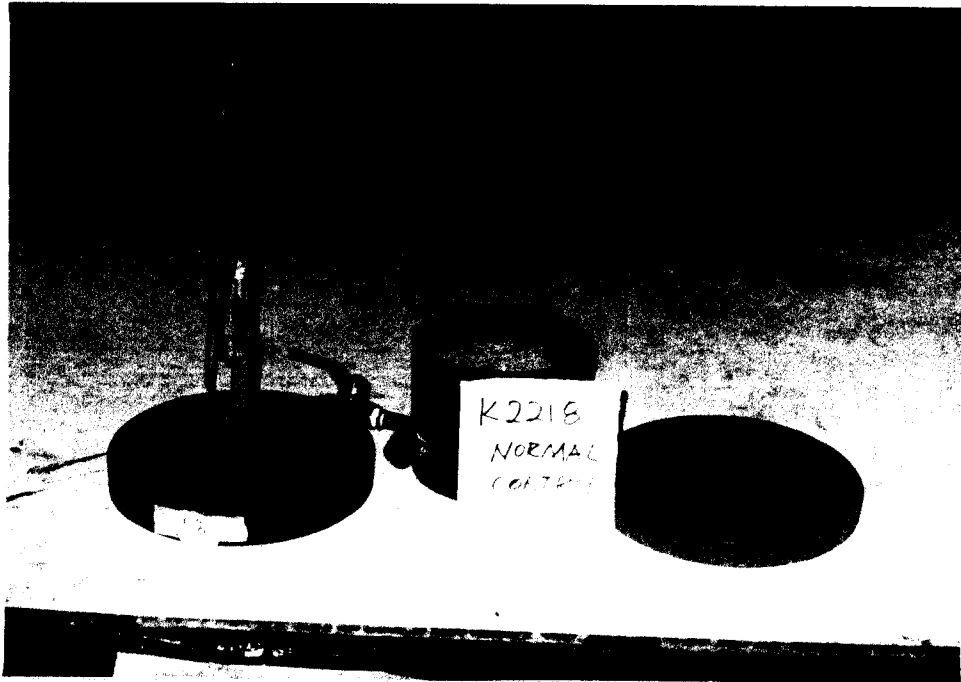
Photograph 2 : Sample as received.

7/5/02

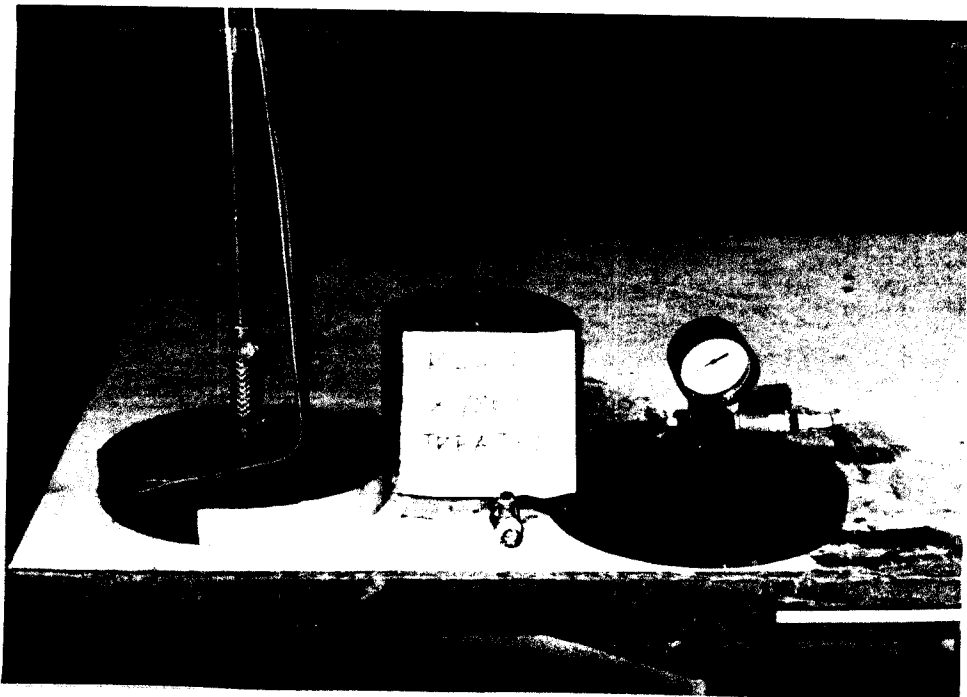


K 2218/YCL

APPENDIX



Photograph 3 : Preparation of sample before testing.



Photograph 4 : Preparation of sample before testing.

7/13

