



Sttar Lab Technologies LLP

MECHANICAL | CHEMICAL | NDT | DURABILITY | BITUMEN | SOIL | R & D

Civil Engineering Material Testing Laboratory

GSTIN : 27ADWFS8826R1ZL



TC-14083

TEST REPORT WATER PERMEABILITY

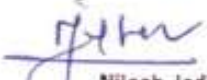
Report No. :	ST/M/110225/05576-01	Inward No	ST02505576
ULR No.	TC140832500004614F	Report Issue date	04-03-2025
Issue To:	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701	Date of Receipt	11-02-2025
		Date of Start	13-02-2025
		Date of Completion	03-03-2025
		Condition of Sample	Good
Letter Reference	Letter Dated : 11.02.2025		
Sample Description/ID Mark:	Concrete Cube		
Size/Brand/Grade:	M-40		
Discipline :	Mechanical Testing	Group :	Building Material
Age Of Cube :	30	Days	Date Of Casting : 14-01-2025
Test Method : EN 12390-8 & Valenta Equation			

Results And Observations :

Sr.No	ID Mark	Cube Weight in Wet Condition (gm)	Cube Weight in Dry Condition (gm)	Apply Pressure Bar	Avg. Depth of Penetration (mm)
1	Control Mix- Without ACI Crystalline Liquid	8181.7	8153.3	5	16.74
2	With ACI Crystalline Liquid After 4 Cycle with 5 Bar Pressure	7832.0	7819.7	5	0.96

Remark :

1. Test report shall not be reproduced except in full without consent of Sttar Lab Technologies LLP.
2. Any correction invalidates this report.
3. The results apply to the sample as received
4. The results relate only to the items tested.


Nilesh Jadhav
Asst. Technical Manager
Reviewed By




Ashok Raut
Technical Manager
Authorised Signatory





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Civil Engineering Material Testing Laboratory

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TEST REPORT COEFFICIENT OF WATER PERMEABILITY

Report No. :	ST/M/110225/05576-01		Inward No	ST02505576			
ULR No.	TC140832500004614F		Report Issue date	05-03-2025			
Issue To:	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701		Date of Receipt	11-02-2025			
			Date of Start	13-02-2025			
			Date of Completion	04-03-2025			
			Condition of Sample	Good			
Letter Reference	Letter Dated : 11.02.2025						
Letter Reference	Concrete Cube						
Sample Description/ID Mark:	M-40						
Discipline :	Mechanical Testing			Group :	Building Material		
Age Of Cube :	30	Days		Date Of Casting :	14-01-2025		
Test Method : EN 12390:8 & Valenta Equation							
Results And Observations :							
Sr.No	ID Mark	Cube Weight in Wet Condition	Cube Weight in Dry Condition	Apply Pressure Bar	Water Penetration (mm)	Water Permeability Coefficient $k=e^c/2ht$	(% Reduction in water permeability)
1	Control Mix- Without ACI Crystalline Liquid	8181.7	8153.3	5	16.74	6.94E-13	93.40
2	With ACI Crystalline Liquid After 4 Cycle with 5 Bar Pressure	8177.3	8152.7	5	0.96	4.57E-14	

Note :

1. Specimen cast as per EN 12390:8 & Valenta Equation is found satisfactory.
2. Reduction coefficient of water permeability is 93.4% valenta equation Compare With Control Concrete.

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Nilesh Jadhav
Asst. Technical Manager
Reviewed By




Ashok Raul
Technical Manager
Authorised Signatory

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MD : +91 97656 88099

Lab : Unit No. B58/59/60 Plot No.6, G-20 to G-24, Part A & B, MIDC Tloja, Platinum Springs, Panvel, Navi Mumbai-410 208. UDYAM - MH-33-0155263

Reg No: Q-2495080





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Civil Engineering Material Testing Laboratory

GSTIN : 27ADWFS8B26R1ZL



TC-14083

TEST REPORT			
RAPID CHLORIDE PENETRATION TEST			
Report No	ST/M/110225/05576-02	Inward No.	ST02505576
ULR No.	TC140832500004615F	Report Issue Date	11-03-2025
Issue To	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701	Date of Receipt	11-02-2025
		Date of Start	13-02-2025
		Date of Completion	10-03-2025
		Condition of Sample	Good
Letter Ref. :	Letter Dated : 11.02.2025		
Sample Description/ID Mark:	Concrete Cube		
Size/Brand/Grade:	M-40		
Discipline :	Mechanical Testing	Group :	Building Material
		Date Of Casting :	14-01-2025
Test Method: ASTM C 1202 : 2022			
Sr. No.	ID mark	Charge Passed in Coulombs	Average
1	Control Mix- Without ACI Crystalline Liquid	2021	2115
2		2214	
3		2109	
1	With ACI Crystalline Liquid After 4 Cycle with 5 Bar Pressure	712	695
2		679	
3		695	
Specification :			
Chloride Ion Penetrability as per ASTM C 1202 : 2022			
Charge passed (Columbs)		Chloride Ion Penetrability	
Less than 100		Negligible	
100-1000		Very Low	
1000-2000		Low	
2000-4000		Moderate	
More than 4000		High	
Remark :			
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3. The results apply to the sample as received			
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TC-14083

TEST REPORT									
RAPID CHLORIDE MIGRATION TEST									
Report No	ST/M/110225/05576-04					Inward No.	ST02505576		
ULR No.	TC14083250004617F					Report issue Date	11-03-2025		
Issue To	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701					Date of Receipt	11-02-2025		
						Date of Start	13-02-2025		
						Date of Completion	10-03-2025		
						Condition of Sample	Good		
Letter Ref. :	Letter Dated : 11.02.2025								
Sample Description/ID Mark:	Concrete Cube								
Size/Brand/Grade:	M-40								
Discipline :	Mechanical Testing					Group	Building Materials		
						Date Of Casting	14-01-2025		
Test Method: NT Build 492									
Sr. No.	ID mark	Specimen Dimension mm	Applied Voltage V	Initial Current (mA)	Final Current (mA)	Initial Temp °C	Final Temp °C	Depth Of Penetration in mm	Non-Steady-State Migration Coefficient (10 ⁻¹² m ² /s)
1	Control Mix- Without ACI Crystalline Liquid	100.00	50	30.24	41.9	22.3	23.6	7.93	2.08E-12
2		100.00	50	31.98	37.9	23.1	24.2	8.06	2.12E-12
3		100.00	50	35.68	39.8	23.5	23.4	8.14	2.14E-12
Average									2.11E-12
Sr. No.	ID mark	Specimen Dimension mm	Applied Voltage V	Initial Current (mA)	Final Current (mA)	Initial Temp °C	Final Temp °C	Depth Of Penetration in mm	Non-Steady-State Migration Coefficient (10 ⁻¹² m ² /s)
1	With ACI Crystalline Liquid After 4 Cycle with 5 Bar Pressure	100.00	50	33.6	43.1	22.1	23.2	4.91	1.22E-12
2		100.00	50	30.1	38.1	22.5	23.4	5.17	1.30E-12
3		100.00	50	33.1	41.9	22.4	23.5	5.10	1.28E-12
Average									1.27E-12
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Reg.No: Q-240508001





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Civil Engineering Material Testing Laboratory

GSTIN : 27ADWF58826R1ZL



TC-14083

TEST REPORT						
WATER ABSORPTION						
Report No.	ST/M/110225/05576-06			Inward No.	ST02505576	
ULR No.	TC140832500004619F			Report Issue Date	11-03-2025	
Issue To	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701			Date of Receipt	11-02-2025	
				Date of Start	13-02-2025	
				Date of Completion	10-03-2025	
				Condition of Sample	Good	
Letter Reference	Letter Dated : 11.02.2025					
Sample Description/ID Mark:	Concrete Cube					
Size/Brand/Grade:	M-40					
Discipline :	Mechanical Testing			Group :	Building Materials	
				Date Of Casting :	14-01-2025	
Test Method: BS 1881 Part 122 -1983						
Sr. No.	ID mark	Oven Dry Weight After 72 Hrs.(kgs)	Weight of Immersion in Water after 30 Minutes (kgs)	Water Absorption (%)	Average Water Absorption %	Water Absorption after Correction Factor %
1	Control Mix- Without ACI Crystalline Liquid	8.429	8.492	0.75	0.67	1.34
2		8.491	8.534	0.51		
3		8.457	8.521	0.76		
Sr. No.	ID mark	Oven Dry Weight After 72 Hrs.(kgs)	Weight of Immersion in Water after 30 Minutes (kgs)	Water Absorption (%)	Average Water Absorption %	Water Absorption after Correction Factor %
1	With ACI Crystalline Liquid After 4 Cycle with 5 Bar Pressure	8.591	8.612	0.24	0.27	0.54
2		8.614	8.637	0.27		
3		8.603	8.629	0.30		
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Reg.No:Q 24058801



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Civil Engineering Material Testing Laboratory

GSTIN : 27ADWFS8826R1ZL



TC-14083

TEST REPORT						
APPARENT CHLORIDE DIFFUSION COEFFICIENT						
Report No. :	ST/M/110225/05576-07			Inward No	ST02505576	
ULR No:	TC14083250004620F			Report Issue date	19-04-2025	
Issue To:	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701			Date of Receipt	11-02-2025	
				Date of Start	13-02-2025	
				Date of Completion	19-04-2025	
				Condition of Sample	Good	
Letter Reference :	Letter Dated : 11.02.2025					
Sample Description/ID Mark :	Concrete Cube					
Size/Brand/ Batch No. :	M-40					
Discipline :	Chemical Testing			Group	Building Material	
Age Of Cube :	30	Days		Date Of Casting	14-01-2025	
Test Method : ASTM C1556-Part 4						
Results And Observations :						
Control Mix- Without ACI Crystalline Liquid						
Sr.No	Depth, X (mm)	Measured Value (%)	Calculated Value (%)	Cs (%)	Cl (%)	Chloride Diffusion Coefficient
1	1	0.424	0.450	0.297	0.100	4.89 E-11
2	3	0.387	0.390			
3	5	0.328	0.340			
4	7	0.302	0.240			
5	10	0.188	0.210			
6	13	0.155	0.100			
With ACI Crystalline Liquid Admixture						
Sr.No	Depth, X (mm)	Measured Value (%)	Calculated Value (%)	Cs (%)	Cl (%)	Chloride Diffusion Coefficient
1	1	0.121	0.095	0.085	0.020	9.16 E-12
2	3	0.118	0.055			
3	5	0.082	0.040			
4	7	0.076	0.030			
5	10	0.069	0.015			
6	13	0.041	0.010			
Tested as per ASTM C 1556 Part 4 Calculated and found that there is a Reduction of 53.84 in the Penetron Read Admixture Concrete As Compared to Control Concrete. Remark: 1. Test report shall not be reproduced except in full without consent of Sttar Lab Technologies LLP. 2. Any correction invalidates this report. 3. The results apply to the sample as received 4. The results relate only to the items tested.						
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Civil Engineering Material Testing Laboratory

GSTIN : 27ADWFS8826R1ZL



TC-14083

TEST REPORT					
ALKALI SILICA REACTIVITY					
Report No. :	ST/M/110225/05576-09			Inward No	ST02505576
ULR No:	TC140832500004622F			Report Issue date	14-03-2025
Issue To:	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701			Date of Receipt	11-02-2025
				Date of Start	13-02-2025
				Date of Completion	13-03-2025
				Condition of Sample:	Good
Letter Reference	Letter Dated : 11.02.2025				
Sample Description/ID Mark:	Concrete Prism				
Size/Brand/ Batch No.:	M-40				
Discipline :	Mechanical Testing		Group :	Building Material	
Age Of Cube :	30	Days	Date Of Casting	14-01-2025	
Test Method : ASTM C 1293-20					
Results And Observations :					
Age in NaOH	0	5	10	14	28
Age of Testing	2	7	12	16	30
Reference Bar	0.10	0.10	0.10	0.10	0.10
Average Control Mix - (Without ACI Crystalline Liquid Admixture) =Length Change	0.000	0.016	0.029	0.048	0.071
Average Mix ACI Crystalline Liquid Admixture =Length Change	0.000	0.009	0.013	0.024	0.027
Sr.No	ID Mark	Observation			
1	Concrete Prism	No Internal Expansion With Penetron Road Admixture			
Note : From the above result observation, there is no length change observed in concrete mortar with Penetron Road Admixture.Hence there is no expansion Remark: 1. Test report shall not be reproduced except in full without consent of Sttar Lab Technologies LLP. 2. Any correction invalidates this report. 3. The results apply to the sample as received 4. The results relate only to the items tested.					
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GSTIN : 27ADWFS8826R1ZL



TC-14083

TEST REPORT

Resistance to Sulphate

Report No. :	ST/M/110225/05576-10		Inward No	ST02505576
ULR No.	TC140832500004623F		Report Issue date	14-03-2025
Issue To:	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701		Date of Receipt	11-02-2025
			Date of Start	13-02-2025
			Date of Completion	13-03-2025
			Condition of Sample	Good
Letter Ref. :	Letter Dated : 11.02.2025			
Sample Description/ID Mark:	Concrete Prism			
Size/Brand/ Batch No.:	M-40			
Discipline :	Mechanical Testing		Group :	Building Material
Age Of Cube :	30	Days	Date Of Casting :	14-01-2025

Test Method : ASTM C-1012-12

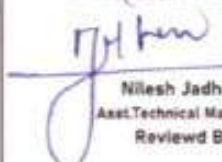
Results And Observations :

Sr.No	Age Of Testing (Days)	Date of Testing	Change In Length %	
			% Length Change Of Cement mortar (Control Mix) Without ACI Crystalline Liquid Admixture	% Length Change Of Cement mortar (With ACI Crystalline Liquid Admixture)
1	0	13-02-2025	0.000	0.000
2	3	16-02-2025	0.005	0.003
3	7	20-02-2025	0.019	0.006
4	14	27-02-2025	0.029	0.011
5	21	06-03-2025	0.035	0.014
6	28	13-03-2025	0.041	0.019

Observation at 28 days : No internal expansion under Sulphate attack has been observed as per ASTM 1012-12 compared to control sample.

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Civil Engineering Material Testing Laboratory

GSTIN : 27ADWFS8826R1ZL



TC-14083

TEST REPORT Reduction In Shrinkage

Report No. :	ST/M/110225/05576-12	Inward No	ST02505576
ULR No:	TC140832500004625F	Report Issue date	10-04-2025
Issue To:	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701	Date of Receipt	11-02-2025
		Date of Start	13-02-2025
		Date of Completion	10-04-2025
		Condition of Sample	Good
Letter Reference :	Letter Dated : 11.02.2025		
Sample Description/ID Mark :	Concrete Prism		
Size/Brand/ Batch No.:	M-40		
Discipline :	Mechanical Testing	Group :	Building Material
Age Of Cube :	30 Days	Date Of Casting	14-01-2025

Test Method: ASTM C-1012-12

Results And Observations :

Sr.No	Age Of Testing (Days)	Date of Testing	Reduction in Shrinkage %	
			% Length Change Of Cement mortar (Control Mix ACI Crystalline Liquid Admixture)	% Length Change Of Cement mortar (With ACI Crystalline Liquid Admixture)
1	7	20-02-2025	0.059	0.049
2	14	27-02-2025	0.074	0.057
3	21	06-03-2025	0.109	0.091
4	28	13-03-2025	0.134	0.113
5	56	10-04-2025	0.165	0.119

Note : The Reduction Shrinkage Test of Specimen Was Found That There is a Resuction of 24.85 % in the Penetron Road Admixture Concrete As Compared to Control Mix Concrete.

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Civil Engineering Material Testing Laboratory

GSTIN : 27ADWFS8826R1ZL



TC-14083

TEST REPORT

Compatibilty of Admixture With Cement - Marsh Cone Test

Report No.:	ST/M/110225/05576-13	Inward No	ST02505558
ULR No:	TC140832500004626F	Report Issue date	15-02-2025
Issue To:	M/s. Add Chem Industries 506, Prisha Apartment, Rabale, Behind Kamala Arcade, Navi Mumbai-400701	Date of Reciept	11-02-2025
		Date of start	13-02-2025
		Date of Completion	14-02-2025
		Condition of Sample	Good
Letter Ref.:	Letter Dated : 11.02.2025		
Enviromental Condition	Ambient Temperature $27 \pm 2^\circ\text{C}$ and Humidity $65 \pm 5\%$		
Admixture Used for Compatibility	Admixture -Add Crystalline Liquid Admixture, Cement : Ultratech OPC 53		
Test Method Used	IS 10262 : 2019 & ASTM D 6910-04		

Observation of Marsh Cone Test:

Sr.No.	W/C	Cement (Kg)	Admixture Quantity (gm)	Admix/Cement Dosage (%)	Marsh Cone Flow Time in Sec @ (0 Min)	Marsh Cone Flow Time in Sec @ (60 Min)
1	0.36	2.00	8.00	0.40	259	228
2	0.36	2.00	12.00	0.60	222	179
3	0.36	2.00	16.00	0.80	198	159
4	0.36	2.00	20.00	1.00	178	138
5	0.36	2.00	22.00	1.10	166	128
6	0.36	2.00	24.00	1.20	169	117
7	0.36	2.00	26.00	1.30	173	121
8	0.36	2.00	28.00	1.40	176	125

Retention Periods : 1 Hours

Temperature of Slurry : $25 \pm 3^\circ\text{C}$

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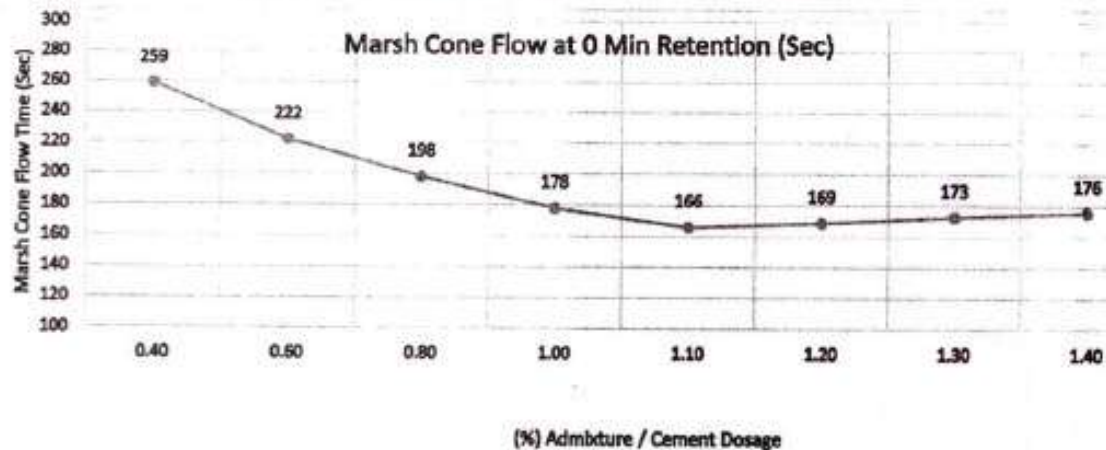
Lab : Unit No. B58/59/60 Plot No.6, G-20 to G-24, Part A & B, MIDC Tloja, Platinum Springs, Panvel, Navi Mumbai-410 208. UDYAM - MH-33-0155253

Reg.No:Q-24050801

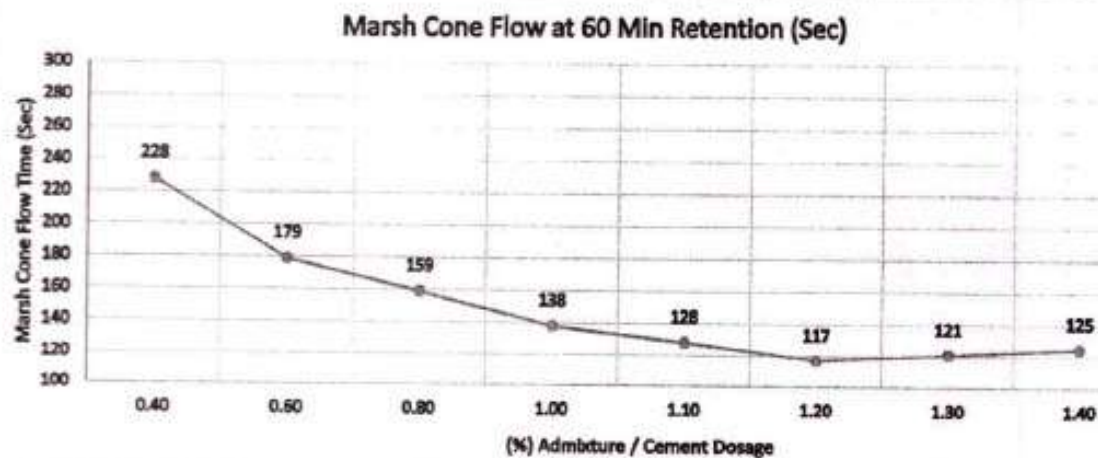




Graph 1. Analysis of Marsh Cone Test Results



Results : On the basis of Saturation Point Optimum Dosage is 1.1% With ACI Crystalline Liquid Admixture @ (0 Min Retention).



Results : On the basis of Saturation Point Optimum Dosage is 1.2% With ACI Crystalline Liquid Admixture @ (60 Min Retention).

Note : However dosage for concrete may be changed based on Water Cement Ratio/Admixture.

Remark:

1. Test report shall not be reproduced except in full without consent of Sstar Lab Technologies LLP.
2. Any correction invalidates this report.
3. The results apply to the sample as received
4. The results relate only to the items tested.

Nilesh Jadhav
Asst. Technical Manager
Reviewed By



Ashok Raut
Technical Manager
Authorized Signatory



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Civil Engineering Material Testing Laboratory

GSTIN : 27ADW 8826R1ZL

1.0. Evolution of Self-Healing Test on Crystalline Admixture

Date of Receipt: 11-02-2025

Inward No : ST02505576

Test Report No : ST/M/110225/05576-10

Customer Name : M/s.Add Chem Industries
506,Prisha Apatment, Rabale, Behind Kamala Arcade, Navi
Mumbai-400701

Letter Reference : Letter Dated : 11.02.2025

Product Details : ACI Crystalline Liquid
(Control + Sample)

Admixture Name : ACI Crystalline Liquid

Date of Casting : 14-01-2025

Date of Start : 13-02-2025

Date of Completion : 03-03-2025

Grade of Concrete : M 40

Sample Submitted By : Customer

Test Method : ST/SOP/CHEM/025

Condition of Sample : Good

Equipment Detail : SEM Quanta 200 –EDX System



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Civil Engineering Material Testing Laboratory

GSTIN : 27ADWF38826R1ZL

1.1 Background

STTAR Technologies is NABL Accredited Laboratory has been assigned by **ACI Chem Industries** (hereafter referred to as the client) to carry out a comparative analysis between self-healing properties of concrete with and without **ACI Crystalline Liquid**.

Three samples without **ACI Crystalline Liquid** and three samples of the same concrete mix design with **ACI Crystalline Liquid** Crystalline Admix were received at Lab.

The client requested one sample of concrete without **ACI Crystalline Liquid** Crystalline Admix and two samples of concrete with **ACI Crystalline Liquid** Crystalline Admix to be subjected to a self-healing test.

The test procedure requested is described below:

1. Split the sample in half using a splitting indirect tensile strength configuration to create an artificial crack
2. Clamp the two halves back by assuring a target 0.50 mm crack width as measured with a reference 0.50 mm thick steel sheet on the face exposed to water flow
3. Seal the lateral faces of the samples along the artificially induced crack to prevent lateral leakage and to force all water through the crack's wall
4. Place a graduated cylindrical plastic flask so that the crack lies approximately along the flask's diameter
5. Seal the flask's open bottom onto the cube's face by using silicon to avoid leakage of water during testing
6. Apply 0.04 bar pressure (1.0 litre volume and 0.4 m height) by filling periodically the cylindrical flask and check the time required to empty it.
7. End test when rate of flow through the cracks becomes negligible
8. At the end of the test split again the samples in half
9. Observe the split halves of the samples treated with Crystalline Admix and report formation of secondary products responsible for the self-healing.





1.2 Test Setup Photos

Water Flow Test: The water flow test measure the change in the flow rate through the cracks, and quantitatively assess the degree of self-healing by changing the flow rate over the time.



Fig 03. Control Sample



Fig 04. Crystalline Sample.

1.3 SEM-Microscopic Observation

SEM microscope with magnification of up to 8000X has been used in reflected light to observe the surface of the samples with Admix after reaching the "zero flow" condition. Detailed microphotographs at different magnifications are presented in photos as follows:



SEM QUANTA 200 – EDX SYSTEM
Secondary Electron Microscope
High Resolution 3.5mm, Imaging up to
100,000x Magnification.





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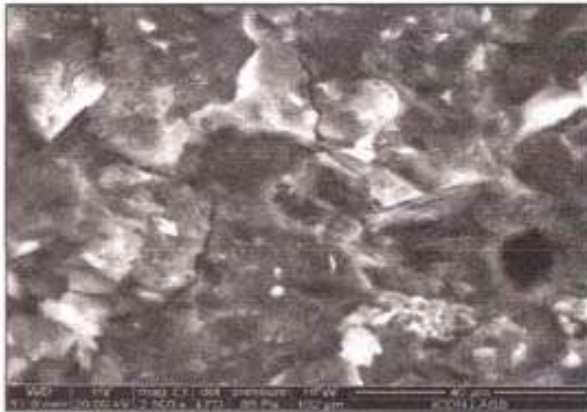


Fig.1 at Crystals Not Progress in Control Samples



Fig.1 at 200- μ m Crystals Group was identified With ACI Crystalline Liquid.



Fig.2 at 100- μ m Clear Crystals Group was identified With ACI Crystalline Liquid.





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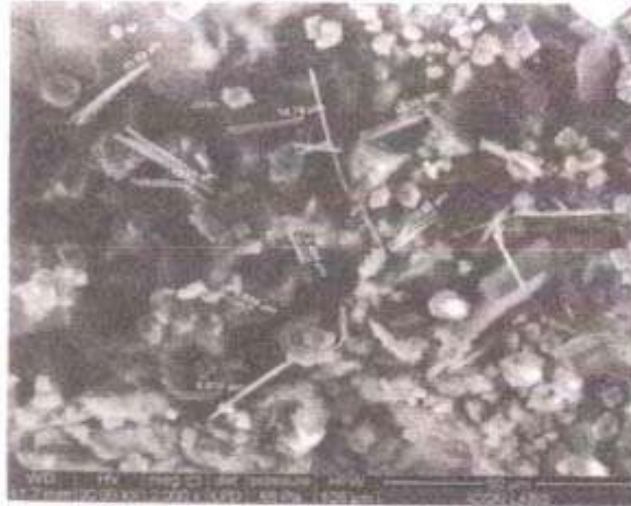


Fig.3 at 50-μm Measurable Size of Crystals

1. Observation:

2. We have checked time required for the testing to reach the zero flow condition, in to the prepared crack's width. After zero flow found in to the concrete.
3. In control, sample water flow is very fast compared to the crystalline sample and not achieving zero flow condition.
4. We have gone through SEM analysis for crystalline sample, In Scanning Electron Microscopic; we observe that at 12.8μm found 620nm size crystal in the concrete.
5. It can be concluded that the clusters of needle-like crystals are observed in the sample, also
6. Clearly seen pattern of hydrated microstructure of C-S-H. In addition, seen progress of polymerization of C-S-H Structure with growth of crystal.

Ashok Raut
Technical Manager
Authorized Signatory

