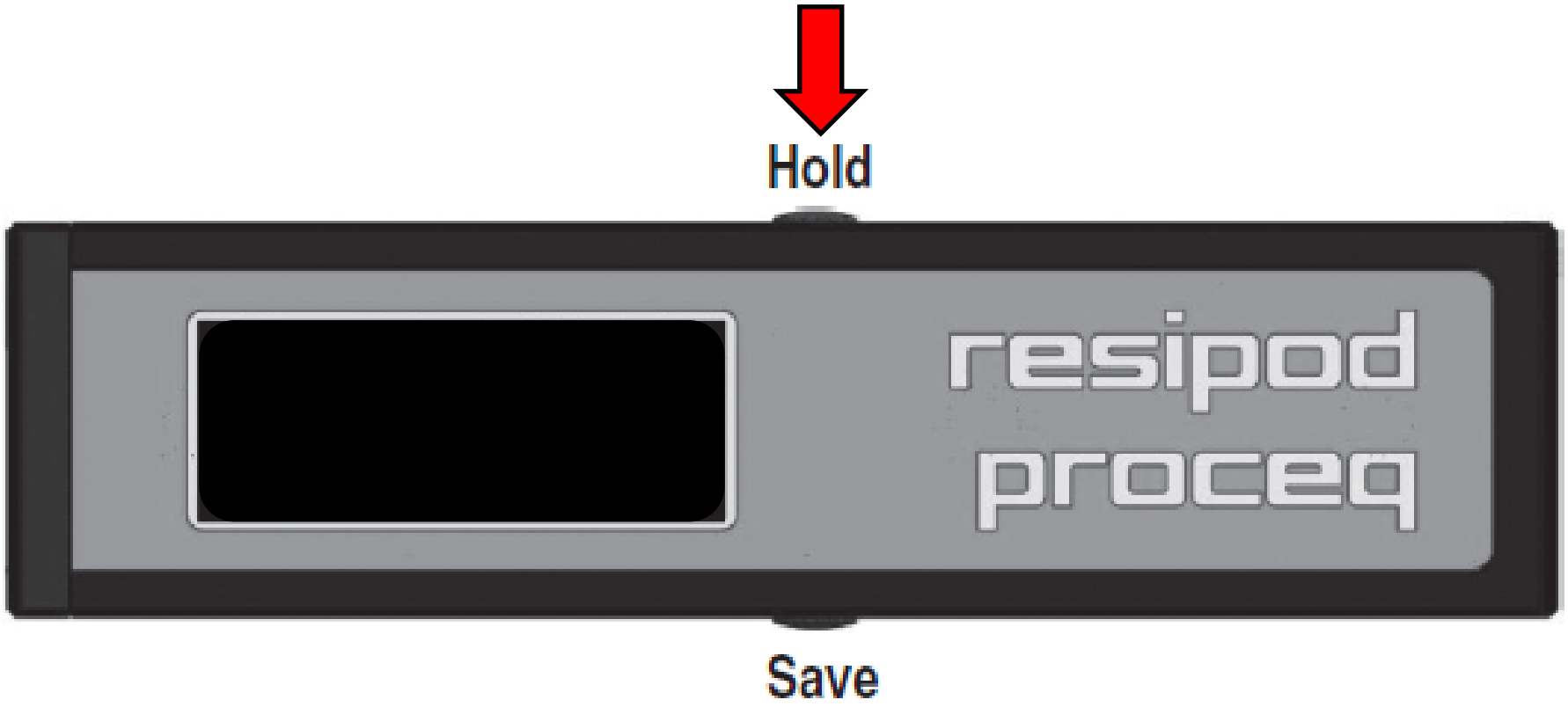
Surface Resistivity Training

Resipod Operating Instructions

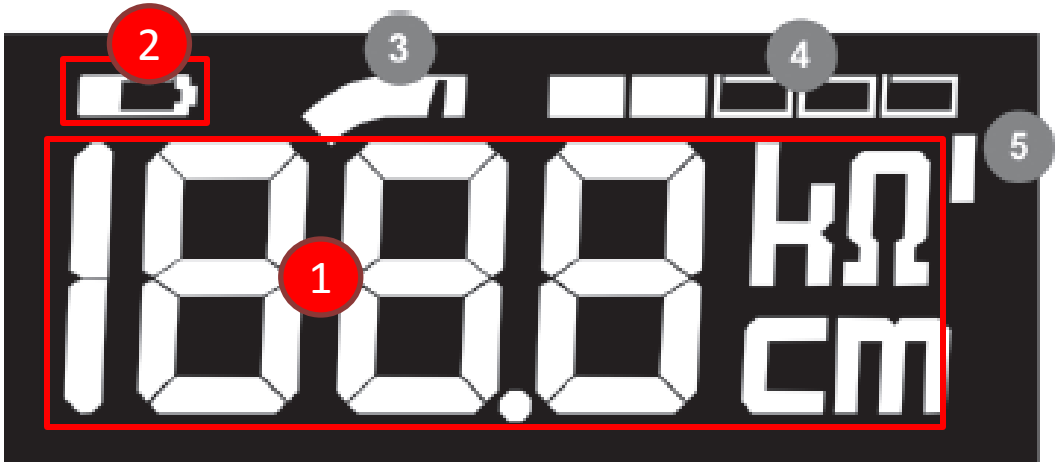
Only TWO buttons!



Press “Hold” button once to turn on.

Press and hold for 2 seconds to turn off.

Resipod Display

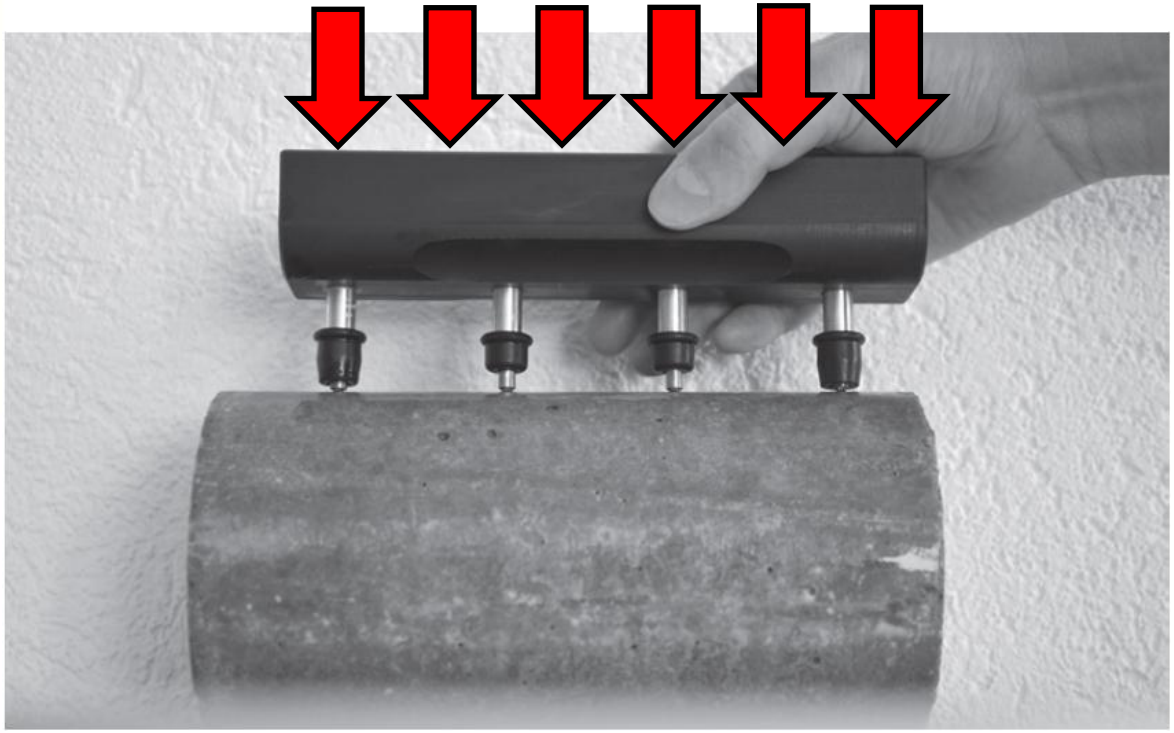


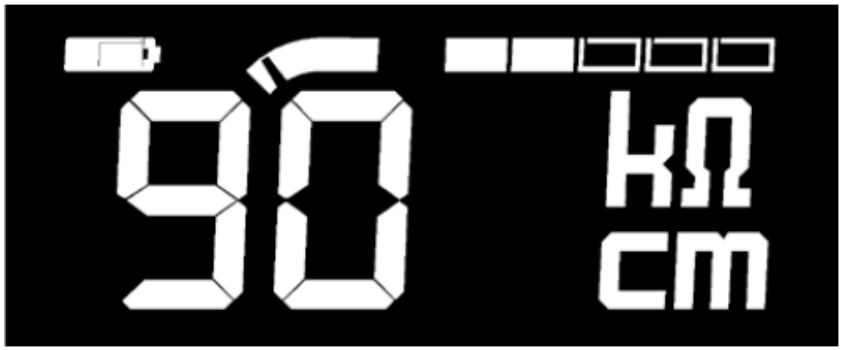
1. Measured resistivity
2. Battery status
3. Range indication
4. Current indication
   20%, 40%, 60%, 80%, 100%
5. Indication of scaled reading

Taking a Measurement

Meter will read 0L when not touching a surface.

Place meter on surface and press down to depress springs.





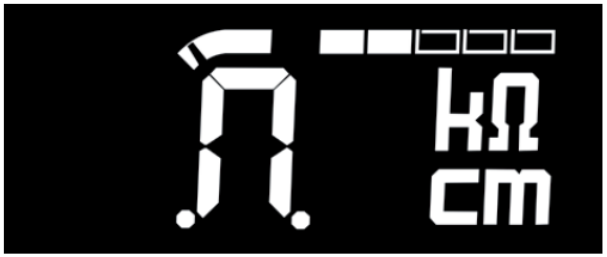
Display will update within seconds.

Push “Hold” button once while pressing down to freeze value on screen.

Remove device and record value.

Indication of Poor Connection

“Open Line” indication
Bad connection of the two outer probes to the concrete surface. No measurement possible.

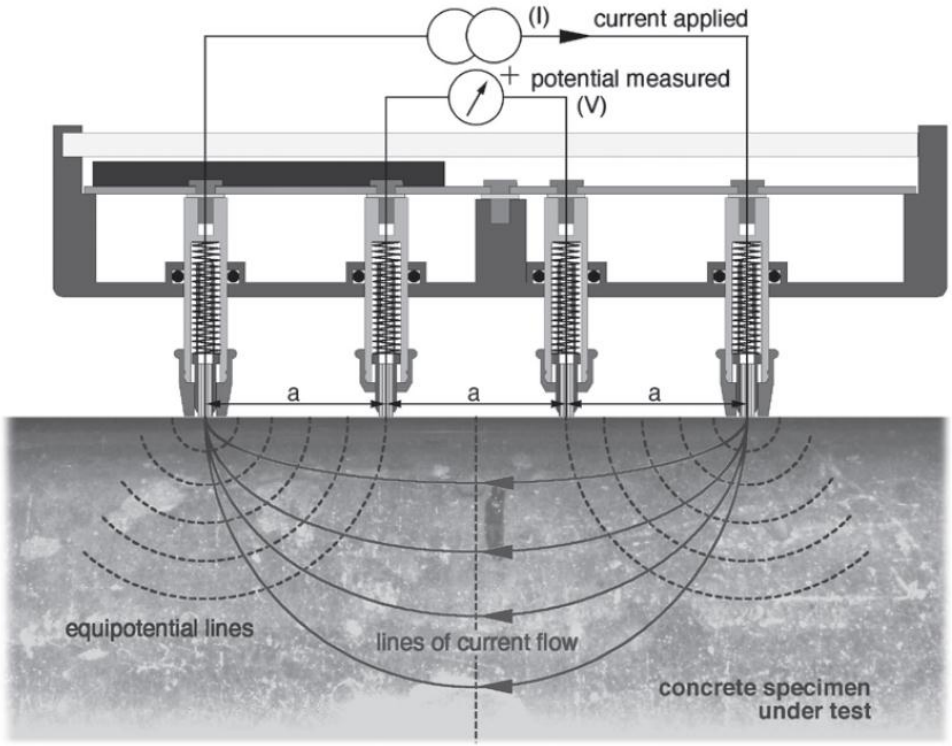


Inner two probes are not making contact.
(check for holes or dry spots on the specimen)

Overflow
The measured resistivity is out of range. This limit is dependent on the spacing, but it is typically a resistivity of >1000 kΩcm.

DOTD TR 233

Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration



Equipment

- Surface Resistivity Meter
- Specimen holder
- Permanent Marker
- Marking Stencil
- Towel
- Shallow Pan

Sample Set

- Minimum of three (3) specimens
- Roadway:
  - 4 in. diameter cores from test slabs or large diameter cylinders
  - 4 in. diameter cast cylinders
  - 6 in. diameter cast cylinders
- Structure:
  - 4 in. diameter cylinder cast and cured on field site
  - 6 in. diameter cylinder cast and cured on field site

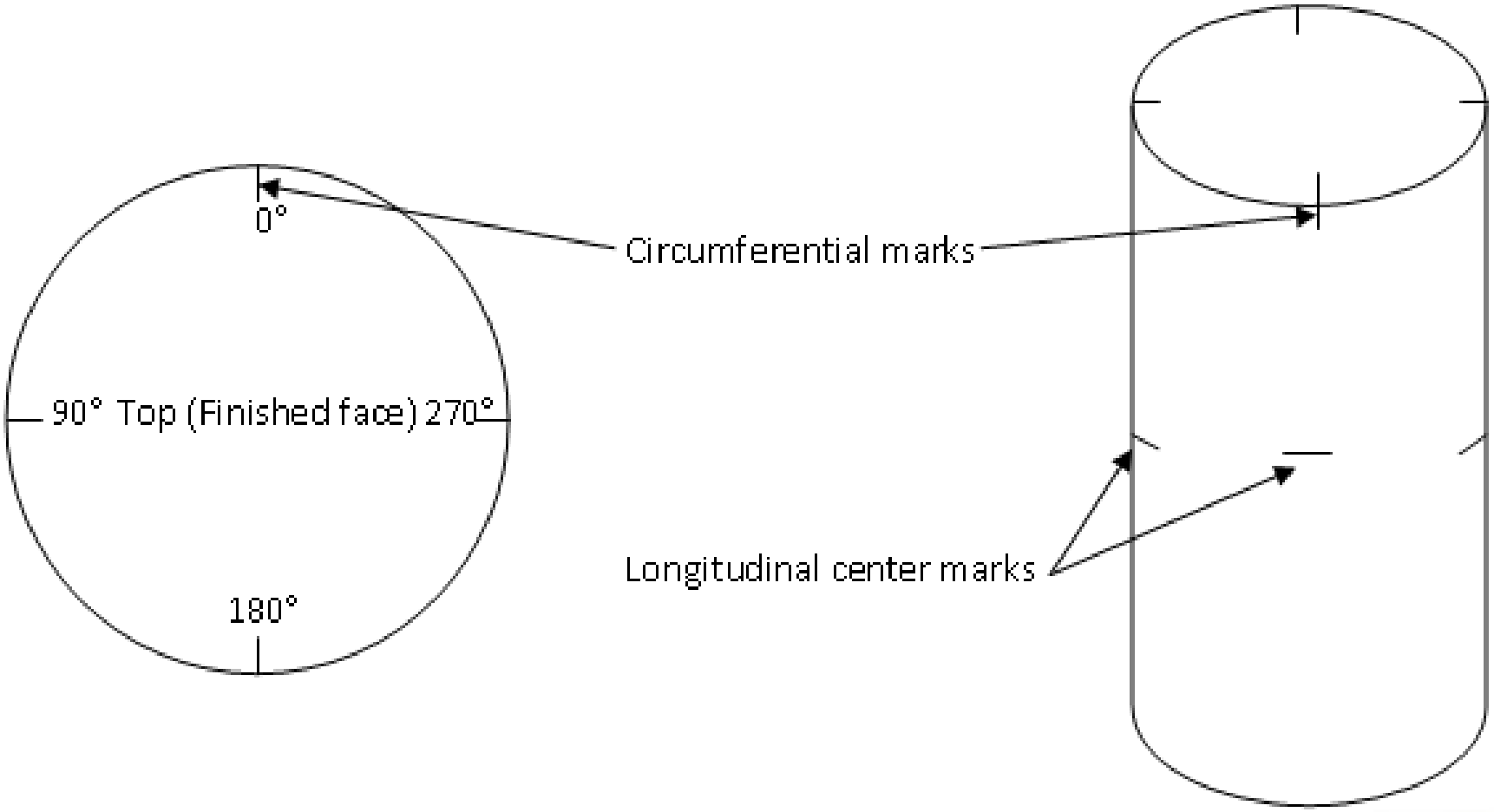
Transport and Preparation

- Transport field cured cylinders to lab in moist condition in sealed (tied) plastic bags.
- Use proper packaging if shipping.
- Use boxes.
- Remove any textures, curing compound, seals, or surface treatments using end grinder.

Marking

- Immediately mark after specimen removal from mold.
  - Four (4) marks on top (finished face) circular face at 0, 90, 180, and 270 degree points.
  - Randomly assign one mark as 0°, then counter clockwise mark 90°, and so on.
  - Extend marks onto longitudinal sides of specimen.
  - Mark center of longitudinal length of specimen for visual reference.

Marking


0°
90° Top (Finished face) 270°
180°
Circumferential marks
Longitudinal center marks

Conditioning

- Pre-testing
  - Saturate specimens, must remain in a condition of 100% humidity for at least seven (7) days prior to testing.
- During testing
  - Maintain air temperature around specimens in range of 20 to 25°C (68 to 77°F)

Procedure

A. Remove specimen from humidity room or water and blot off excess water using towel.
B. Transfer specimen to holder with 0° mark on top.
C. Dip surface resistivity meter probe tips into pan of water several times, be sure to press against the bottom of the pan to fill the reservoirs.

Procedure

D. Place meter on longitudinal side of the specimen, lining up with 0° mark. Make sure center mark is equidistance between the two inner probes.

E. Take reading to nearest tenth (0.1), record on calculation sheet.

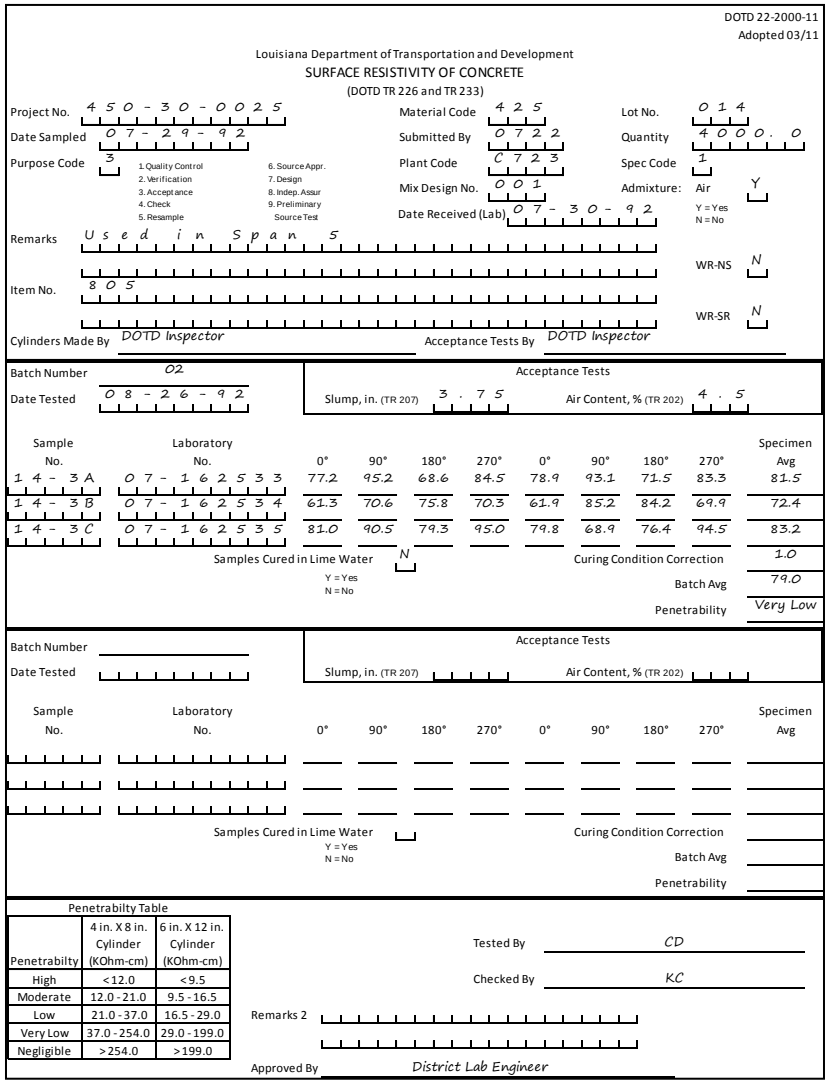
Procedure

F. Rotate specimen from 0° mark to 90° mark and repeat steps D and E
G. Rotate specimen from 90° mark to 180° mark and repeat steps D and E
H. Rotate specimen from 180° mark to 270° mark and repeat steps D and E
I. Dip probe tips into pan and repeat last four (4) readings at 0°, 90°, 180°, 270°
J. Repeat steps A to I for other specimens in set

Calculation Sheet

Surface Resistivity (SR) Readings (KOhm-cm)									
Sample	0°	90°	180°	270°	0°	90°	180°	270°	Average
A	77.2	95.2	68.6	84.5	78.9	93.1	71.5	83.3	
B	61.3	70.6	75.8	70.3	61.9	85.2	84.2	69.9	
C	81.0	90.5	79.3	95.0	79.8	68.9	76.4	94.5	

Surface Resistivity Form



DOTD 22-2000-11
Adopted 03/11

Louisiana Department of Transportation and Development
SURFACE RESISTIVITY OF CONCRETE
(DOTD TR 226 and TR 233)

Project No. 450-30-0025
Date Sampled 07-29-92
Purpose Code 3
1. Quality Control 2. Verification 3. Acceptance 4. Check 5. Resample 6. Source Appr. 7. Design 8. Indep. Assur 9. Preliminary Source Test

Material Code 425
Submitted By 0722
Plant Code C723
Mix Design No. 001
Date Received (Lab) 07-30-92

Lot No. 014
Quantity 4000.0
Spec Code 1
Admixture: Air Y (Y = Yes, N = No)

Remarks: Used in Span 5
Item No. 805
WR-NS N
WR-SR N

Cylinders Made By: DOTD Inspector
Acceptance Tests By: DOTD Inspector

Batch Number 02
Date Tested 08-26-92

Acceptance Tests
Slump, in. (TR 207) 3.75
Air Content, % (TR 202) 4.5

Sample No.	Laboratory No.	0°	90°	180°	270°	0°	90°	180°	270°	Specimen Avg
14-3A	07-162533	77.2	95.2	68.6	84.5	78.9	93.1	71.5	83.3	81.5
14-3B	07-162534	61.3	70.6	75.8	70.3	61.9	85.2	84.2	69.9	72.4
14-3C	07-162535	81.0	90.5	79.3	95.0	79.8	68.9	76.4	94.5	83.2

Samples Cured in Lime Water: N (Y = Yes, N = No)
Curing Condition Correction: 1.0
Batch Avg: 79.0
Penetrability: Very Low

Batch Number
Date Tested

Acceptance Tests
Slump, in. (TR 207)
Air Content, % (TR 202)

Sample No.	Laboratory No.	0°	90°	180°	270°	0°	90°	180°	270°	Specimen Avg

Samples Cured in Lime Water (Y = Yes, N = No)
Curing Condition Correction
Batch Avg
Penetrability

Penetrabilty Table

Penetrabilty	4 in. X 8 in. Cylinder (KOhm-cm)	6 in. X 12 in. Cylinder (KOhm-cm)
High	<12.0	<9.5
Moderate	12.0 - 21.0	9.5 - 16.5
Low	21.0 - 37.0	16.5 - 29.0
Very Low	37.0 - 254.0	29.0 - 199.0
Negligible	>254.0	>199.0

Tested By: CD
Checked By: KC
Remarks 2:
Approved By: District Lab Engineer

DOTD 22-2000-11
Adopted 03/11

Louisiana Department of Transportation and Development

SURFACE RESISTIVITY OF CONCRETE

(DOTD TR 226 and TR 233)

Project No. 450-30-0025
Date Sampled 07-29-92
Purpose Code 3

1. Quality Control
2. Verification
3. Acceptance
4. Check
5. Resample
6. Source Appr.
7. Design
8. Indep. Assur
9. Preliminary Source Test

Material Code 425
Submitted By 0722
Plant Code C723
Mix Design No. 001
Date Received (Lab) 07-30-92

Lot No. 014
Quantity 4000.0
Spec Code 1
Admixture: Air Y
Y = Yes
N = No

Remarks Used in Span 5

WR-NS N

Item No. 805

WR-SR N

Cylinders Made By DOTD Inspector

Acceptance Tests By DOTD Inspector

Batch Number 02
Date Tested 08-26-92

Acceptance Tests
Slump, in. (TR 207) 3.75
Air Content, % (TR 202) 4.5

Sample No.	Laboratory No.	0°	90°	180°	270°	0°	90°	180°	270°	Specimen Avg
14-3A	07-162533	77.2	95.2	68.6	84.5	78.9	93.1	71.5	83.3	81.5
14-3B	07-162534	61.3	70.6	75.8	70.3	61.9	85.2	84.2	69.9	72.4
14-3C	07-162535	81.0	90.5	79.3	95.0	79.8	68.9	76.4	94.5	83.2

Samples Cured in Lime Water N
Y = Yes
N = No

Curing Condition Correction 1.0

Batch Avg 79.0

Penetrability Very Low

Batch Number

Date Tested

Acceptance Tests
Slump, in. (TR 207)
Air Content, % (TR 202)

Sample No.	Laboratory No.	0°	90°	180°	270°	0°	90°	180°	270°	Specimen Avg

Samples Cured in Lime Water
Y = Yes
N = No

Curing Condition Correction

Batch Avg

Penetrability

Penetrabilty Table

Penetrabilty	4 in. X 8 in. Cylinder (KOhm-cm)	6 in. X 12 in. Cylinder (KOhm-cm)
High	<12.0	<9.5
Moderate	12.0 - 21.0	9.5 - 16.5
Low	21.0 - 37.0	16.5 - 29.0
Very Low	37.0 - 254.0	29.0 - 199.0
Negligible	>254.0	>199.0

Tested By CD

Checked By KC

Remarks 2

Approved By District Lab Engineer

LOUISIANA TRANSPORTATION RESEARCH CENTER

Header and Mix Information

DOTD 22-2000-11
Adopted 03/11

Louisiana Department of Transportation and Development

SURFACE RESISTIVITY OF CONCRETE

(DOTD TR 226 and TR 233)

Project No. 450-30-0025

Date Sampled 07-29-92

Purpose Code 3

1. Quality Control
2. Verification
3. Acceptance
4. Check
5. Resample
6. Source Appr.
7. Design
8. Indep. Assur
9. Preliminary Source Test

Material Code 425

Submitted By 0722

Plant Code C723

Mix Design No. 001

Date Received (Lab) 07-30-92

Lot No. 014

Quantity 4000.0

Spec Code 1

Admixture: Air Y

Y = Yes
N = No

Remarks Used in Span 5

WR-NS N

Item No. 805

WR-SR N

Cylinders Made By DOTD Inspector

Acceptance Tests By DOTD Inspector

Test Data Computations

Batch Number: 02

Date Tested: 08-26-92

Acceptance Tests

Slump, in. (TR 207): 3.75

Air Content, % (TR 202): 4.5

Sample No.	Laboratory No.	0°	90°	180°	270°	0°	90°	180°	270°	Specimen Avg
14-3A	07-162533	77.2	95.2	68.6	84.5	78.9	93.1	71.5	83.3	81.5
14-3B	07-162534	61.3	70.6	75.8	70.3	61.9	85.2	84.2	69.9	72.4
14-3C	07-162535	81.0	90.5	79.3	95.0	79.8	68.9	76.4	94.5	83.2

Samples Cured in Lime Water: N (Y = Yes, N = No)

Curing Condition Correction: 1.0

Sample Type: 4x8

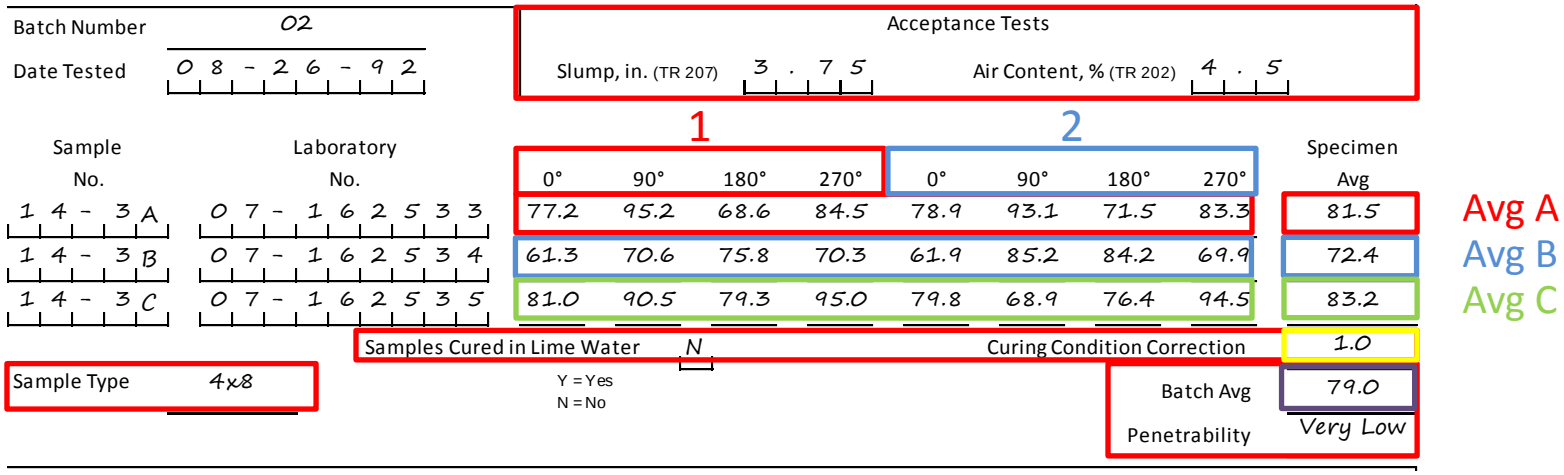
Batch Avg: 79.0

Penetrability: Very Low

Penetrabilty Table

Penetrabilty	4 in. X 8 in. Cylinder (KOhm-cm)	6 in. X 12 in. Cylinder (KOhm-cm)
High	<12.0	<9.5
Moderate	12.0 - 21.0	9.5 - 16.5
Low	21.0 - 37.0	16.5 - 29.0
Very Low	37.0 - 254.0	29.0 - 199.0
Negligible	>254.0	>199.0

Test Data Computations



Batch Number: 02

Date Tested: 08-26-92

Acceptance Tests

Slump, in. (TR 207): 3.75

Air Content, % (TR 202): 4.5

Sample No.	Laboratory No.	1				2				Specimen Avg	
		0°	90°	180°	270°	0°	90°	180°	270°		
14-3A	07-162533	77.2	95.2	68.6	84.5	78.9	93.1	71.5	83.3	81.5	Avg A
14-3B	07-162534	61.3	70.6	75.8	70.3	61.9	85.2	84.2	69.9	72.4	Avg B
14-3C	07-162535	81.0	90.5	79.3	95.0	79.8	68.9	76.4	94.5	83.2	Avg C

Sample Type: 4x8

Samples Cured in Lime Water: N (Y = Yes, N = No)

Curing Condition Correction: 1.0

Batch Avg: 79.0

Penetrability: Very Low

$$Avg.S_{Avg.A} = \frac{S_{0.1} + S_{90.1} + S_{180.1} + S_{270.1} + S_{0.2} + S_{90.2} + S_{180.2} + S_{270.2}}{8}$$

Penetrabilty Table

Penetrabilty	4 in. X 8 in. Cylinder (KOhm-cm)	6 in. X 12 in. Cylinder (KOhm-cm)
High	<12.0	<9.5
Moderate	12.0 - 21.0	9.5 - 16.5
Low	21.0 - 37.0	16.5 - 29.0
Very Low	37.0 - 254.0	29.0 - 199.0
Negligible	>254.0	>199.0

$$Avg.SR = C \times \frac{S_{Avg.A} + S_{Avg.B} + S_{Avg.C}}{3}$$

Test Data Automated

Batch Number

Date Tested

Acceptance Tests

Slump, in. (TR 207)

Air Content, % (TR 202)

Sample No.	Laboratory No.	0	90	180	270	0	90	180	270	Specimen Avg

Samples Cured in Lime Water (Y = Yes, N = No)

Curing Condition Correction: 1.0

Sample Type

Batch Avg

Penetrability

Penetrabilty Table

Penetrabilty	4 in. X 8 in. Cylinder (KOhm-cm)	6 in. X 12 in. Cylinder (KOhm-cm)
High	<12.0	<9.5
Moderate	12.0 - 21.0	9.5 - 16.5
Low	21.0 - 37.0	16.5 - 29.0
Very Low	37.0 - 254.0	29.0 - 199.0
Negligible	>254.0	>199.0

Test Data Automated

Batch Number	02			Acceptance Tests							
Date Tested	8/26/1992			Slump, in. (TR 207)	3.75			Air Content, % (TR 202)	4.5		
Sample No.	Laboratory No.	0°	90°	180°	270°	0°	90°	180°	270°	Specimen Avg	
14.3A	07-162533	33.2	35.2	33.6	34.5	33.4	33.1	31.5	33.3	33.5	
14-3B	07-162534	31.3	30.6	35.8	30.3	31.9	35.2	34.2	31.2	32.6	
14-3C	07-162535	31.0	30.5	39.3	35.0	33.2	32.5	36.4	34.5	34.1	
Sample Type	4x8	Samples Cured in Lime Water Y = Y N = N	Y N						Curing Condition Correction		1.1
									Batch Avg		36.7
									Penetrability		Low

Penetrabilty Table		
Penetrabilty	4 in. X 8 in. Cylinder (KOhm-cm)	6 in. X 12 in. Cylinder (KOhm-cm)
High	<12.0	<9.5
Moderate	12.0 - 21.0	9.5 - 16.5
Low	21.0 - 37.0	16.5 - 29.0
Very Low	37.0 - 254.0	29.0 - 199.0
Negligible	>254.0	>199.0

Test Data Automated

Batch Number	02			Acceptance Tests								
Date Tested	8/26/1992			Slump, in. (TR 207)	3.75			Air Content, % (TR 202)	4.5			
Sample No.	Laboratory No.	0°	90°	180°	270°	0°	90°	180°	270°	Specimen Avg		
14.3A	07-162533	33.2	35.2	33.6	34.5	33.4	33.1	31.5	33.3	33.5		
14-3B	07-162534	31.3	30.6	35.8	30.3	31.9	35.2	34.2	31.2	32.6		
14-3C	07-162535	31.0	30.5	39.3	35.0	33.2	32.5	36.4	34.5	34.1		
										1.1		
Sample Type		Samples Cured in Lime Water		Y						Curing Condition Correction		
4x8		Y = Yes								Batch Avg	36.7	
6x12		N = No								Penetrability	Very Low	

Penetrabilty Table

Penetrabilty	4 in. X 8 in. Cylinder (KOhm-cm)	6 in. X 12 in. Cylinder (KOhm-cm)
High	<12.0	<9.5
Moderate	12.0 - 21.0	9.5 - 16.5
Low	21.0 - 37.0	16.5 - 29.0
Very Low	37.0 - 254.0	29.0 - 199.0
Negligible	>254.0	>199.0

Check and Approval

Tested By CD

Checked By KC

Remarks 2

Approved By District Lab Engineer

Simplified Procedure Recap

- Blot off excess water with towel
- Dip probes in pan of water several times
- Place meter on longitudinal side at 0° mark
- Read, Turn 90°, Repeat …
- Collect each mark twice
- Repeat for each specimen
- Make sure to record to nearest tenth (0.1)