Test Reports

AAMA2604 Certified Florida Weathering Test Report
Extract of Interpon D2000 Data

AAMA2604-20 South Florida Exposure

Weathering exposure of coatings in South Florida(Latitude 27°North at a 45°angle facing south) is one of the requirements in AAMA2604-20. After 5 years of exposure in accordance with ASTM G7/G7M, coating should maintain its film integrity, color and gloss retention, chalking resistance properties. Below requirements should be met by coatings after 5 years of exposure in South Florida.

	Test Standard	Performance Criteria
Color Retention	ASTM E805	Max. $5\Delta E_H$
Chalking	ASTMD4214 Test Method A	No.8
Gloss Retention	ASTM D523	Min. 30%

Test results of representative products have been presented in following pages. Tests have been conducted either by ATLAS or QLab.

SOUTH FLORIDA TEST SERVICE
A Division of Atlas Material Testing Technology LLC
16100 Southwest 216th Street
Miami, Florida 33170
Phone: +1 305-245-3659
Fax: +1 305-245-9122
www.atlas-mts.com

INSPECTION REPORT

July 21, 2016

INSPECTION DATA AT 60 Months

Akzo Nobel Coatings Inc.
150 Columbia Street
Reading, PA 19601

Purchase Order Number: 5600045592; Release Number: N/A
Client Reference: Project Ref. Architectural FLA 2011
Client Code: AKSD
Account Number: 115402

Test Number: **FS39047**

Report Number:	10
Test Type:	INLAND WEATHERING
Test Location:	Miami, Florida (26°N)
Specimens Inspected:	34
Description:	34 Multi-Colored Aluminum Panels.
Exposure Type:	Exposure testing is performed in Miami, Florida (26°N) in accordance with Governing Standards at a tilt angle(s) of 45° from the horizontal facing south. The specimens are mounted unbacked on a 1643 x 3586 mm aluminum exposure rack, with grass groundcover, and the coded side facing the sun.

Observations, Deviations and Waivers

Notes contained in relevant documents are an integral part of a test, and shall be included by the client in discussions, correspondence, and presentation of test results to a third party. This Test Report represents only one part of the test documentation. Interim reports and other test documentation may have been submitted prior to this date. Test results reported are pertinent only to the items tested and are not relevant to other specimens of the same type, or in the same lot, which are not being tested. Test Reports, and/or other pertinent test documentation, shall not be reproduced, except in full, without the written approval of Atlas Weathering Services Group and so certified by the client.

ATLAS
MATERIAL TESTING SOLUTIONS

AMETEK
MEASUREMENT & CALIBRATION TECHNOLOGIES

Test Number: FS39047
Report Number: 10
July 21, 2016

INSPECTION TEST PART 1

RADIATION DATA

Exposure Period: 7/13/2011 - 7/14/2016
Type of Test: 45° Direct Global

Radiant Energy: Total: 29,904 MJ/m² (Total); 714,723 Langleys
UV: 1,345 MJ/m² (295-385 nm)

VISUAL MEASUREMENTS

The following Visual Evaluations (with associated Standards) are performed every 6 Months:

General visual evaluations are performed in accordance with client instructions. Specimens inspected indoors are illuminated by overhead Macbeth D65 fluorescent lamps simulating average daylight, with illumination between 810 lux and 1880 lux. The surround and ambient field of the inspection area are neutral gray in color.

ATLAS
MATERIAL TESTING SOLUTIONS

AMETEK
MEASUREMENT & CALIBRATION TECHNOLOGIES

Test Number: FS39047
Report Number: 10
July 21, 2016

Sample Number	COLOR CHNGE WASH	COLOR CHNGE UNWSH	CHALK WASH	CHALK UNWSH	CRACK UNWSH	CRACK WASH	BLIST UNWSH	BLIST WASH	CHECK UNWSH	CHECK WASH	GEN. APPR. WASH	GEN. APPR. UNWSH
304 YT2057	9F	9F	10	10	10	10	10	10	10	10	10	8
305 YL2517	8F	8F	10	10	10	10	10	10	10	10	9	9
307 YG2017	9F	9F	10	10	10	10	10	10	10	10	10	10
311 YN2107	9DC	9DC	10	10	10	10	10	10	10	10	10	9
312 YT2047	8F	8F	10	10	10	10	10	10	10	10	10	10

VISUAL LEGEND

COLOR CHNGE WASH = VISUAL COLOR, WASHED AREA
COLOR CHNGE UNWSH = VISUAL COLOR, UNWASHED AREA
CHALK WASH = CHALKING, WASHED AREA
CHALK UNWSH = CHALKING, UNWASHED AREA
CRACK UNWSH = CRACKING, UNWASHED AREA
CRACK WASH = CRACKING, WASHED AREA
BLIST UNWSH = BLISTERING, UNWASHED AREA
BLIST WASH = BLISTERING, WASHED AREA
CHECK UNWSH = CHECK, UNWASHED AREA
CHECK WASH = CHECK, WASHED AREA
GEN. APPR. WASH = GENERAL APPEARANCE, WASHED AREA
GEN. APPR. UNWSH = GENERAL APPEARANCE, UNWASHED AREA

CHECKING TYPE
A= Long Line
B= Irregular
C= Short Parallel
D= Short Random
E= Crowsfoot
F= Switch
G= Sigmoid
H= Shrinkage
J= Mosaic

CRACKING TYPE
A= Long Line
B= Irregular
G= Sigmoid

BLISTERING SIZE
10 = None
8 = < 1mm Seen with unaided eye
6 = 1mm
4 = 2mm - 3mm
2 = 4mm - 5mm
0 = > 5mm

BLISTERING FREQUENCY
f = few
m = medium
md = medium dense
d = dense

VISUAL COLOR
B Bleaching
D Darkening
F Fade
BR Bronzing
M Mottled
Y Yellowing
G Greying
DC Discolor

ASTM
10 None
8 Trace
6 Slight
4 Moderate
2 Severe
0 Failure

GEN APPEARANCE
10 As Received
8 Very Good
6 Good
4 Fair
2 Poor
0 Very Poor

GLOSS MEASUREMENTS
Gloss measurements are performed on the washed and unwashed area of the specimens in accordance with ASTM D523 - 2008. The measurements are performed with a BYK-Gardner Micro-TRI-Gloss portable glossmeter at angles of 20° and 60°. Specimens are measured initially, and every 6 Months.

Sample Number	GLOSS 20° INIT.	GLOSS 20° UNWSH	GLOSS 20° WASH	GLOSS 60° INIT.	GLOSS 60° UNWSH	GLOSS 60° WASH
60 Months of 60 Months						
304 YT2057	6.1	1.8	3.8	27	16	25
305 YL2517	6.2	1.5	1.5	27	12	12
307 YG2017	4.5	1.6	2.6	25	12	18
311 YN2107	4.3	1.4	2.3	25	13	18
312 YT2047	6.7	1.8	1.9	30	14	15

COLOR MEASUREMENTS
Color measurements are performed with a X-Rite Color i7 Spectrophotometer with a 6 inch integrating sphere on the washed and unwashed areas in accordance with ASTM E1331 - 2009. The specimen port is circular and 25 mm in diameter. The reduction of data is computed from spectral data taken every 10 nm over the wavelength range from 360 to 750 nm. Measurements are performed with a CIE Lab color scale, reflectance specular included, with a 10 degree observer and illuminant D65, and are computed in accordance with ASTM E308. Color difference is calculated in accordance with ASTM D2244. Specimens are measured initially, and every 6 Months.

ATLAS
MATERIAL TESTING SOLUTIONS

AMETEK
MEASUREMENT & CALIBRATION TECHNOLOGIES

Test Number: FS39047
Report Number: 10
July 21, 2016

Sample Number		L*	a*	b*	E*	C*	H*
304 YT2057	Initial	33.41	4.67	3.83			
	Current Unwashed	33.46	5.25	4.46			
	Delta	0.05	0.58	0.63	0.86	0.85	0.12
	Current Washed	33.80	5.18	4.14			
	Delta	0.39	0.51	0.31	0.71	0.59	-0.06
305 YL2517	Initial	46.18	0.22	5.31			
	Current Unwashed	47.51	0.06	5.84			
	Delta	1.33	-0.16	0.53	1.44	0.53	0.15
	Current Washed	47.40	0.11	5.68			
	Delta	1.22	-0.11	0.37	1.28	0.37	0.11

Sample Number		L*	a*	b*	E*	C*	H*
307 YG2017	Initial	37.23	18.45	9.53			
	Current Unwashed	37.40	18.88	9.58			
	Delta	0.17	0.43	0.05	0.47	0.41	-0.15
	Current Washed	37.71	18.76	9.32			
	Delta	0.48	0.31	-0.21	0.61	0.18	-0.33
311 YN2107	Initial	25.47	-0.27	-0.60			
	Current Unwashed	24.67	-0.10	-0.92			
	Delta	-0.80	0.17	-0.32	0.88	0.27	0.25
	Current Washed	25.32	-0.11	-0.98			
	Delta	-0.15	0.16	-0.38	0.44	0.33	0.25
312 YT2047	Initial	41.36	4.41	6.14			
	Current Unwashed	42.30	4.88	6.94			
	Delta	0.94	0.47	0.80	1.32	0.92	0.11
	Current Washed	42.20	4.89	6.83			
	Delta	0.84	0.48	0.69	1.19	0.84	0.07

A2LA ACCREDITED
ISO/IEC 17025
TESTING CERT #717.02

Q-Lab Test Services

INSPECTION REPORT

CLIENT: Akzo Nobel Powder Coating Ningbo Co., Ltd.
ADDRESS: No. 137 East Jiangtian Road
Songjiang Industrial Estate
Shanghai 201600
CHINA

YOUR REFERENCE:

CONTENTS: Cover Sheet: Page 1
Report: Pages 2-3

TEST NO: AZC-2
REPORT NO: 20
DATE: 24 April 2019
DATE EXPOSED: 24 April 2014
DURATION: 60 Months
TYPE: Direct Inland, 45° South-Florida
SPECIMENS: 48 Painted metal panels
RADIATION LOG: TOTAL = 32,075.75
TUVR = 1,602.98

NOTES: Please refer to the legend located on our website at www.myweathertest.com for an explanation of the ratings used in this report.

Specimens were washed with deionized water prior to evaluation.

Gloss readings were recorded using a BYK Micro Tri-Gloss.

Inspected By: Marie Jones Marie Jones

Approved By: Ana Garcia Ana Garcia

Q-Lab Test Services

INSPECTION REPORT

TEST NO: AZC-2 REPORT NO: 20 DATE: 24 April 2019

Specimen ID	Gen. App.	60° Gloss						Visual Color	Dirt	Mildew	Chalk			Comments
		O	P	Δ										
60 Months Set														
EX1605-F20930	8	26	13	13				8 F	10	10	10			
EX1605-F20931	8	26	18	8				8 F	10	10	10			
EX1604-F20896	8	91	54	37				9 F	10	10	10			
EX1604-F20900	8	81	38	43				8 F	10	10	10			
EX1604-F20901	8	82	36	46				8 F	10	10	10			
EX1604-F20903	8	82	29	53				8 F	10	10	10			

Q-Lab Test Services

INSTRUMENTAL COLOR REPORT

TEST NO: AZC-2 REPORT NO: 20 DATE: 24 April 2019

Specimen ID	Original			Present			Difference			Delta		
	L*	a*	b*	L*	a*	b*	L*	a*	b*	E*	C*	H*
60 Months Set												
EX1605-F20930	27.81	1.44	0.26	28.47	1.47	-0.32	0.66	0.03	-0.58	0.88	0.04	-0.58
EX1605-F20931	27.72	1.49	0.34	28.58	1.50	-0.32	0.86	0.01	-0.66	1.08	0.01	-0.66
EX1604-F20896	43.45	-0.39	-1.07	44.24	-0.51	-1.06	0.79	-0.12	0.01	0.80	0.04	-0.11
EX1604-F20900	63.38	-2.00	-2.66	64.60	-2.17	-2.98	1.22	-0.17	-0.32	1.27	0.36	0.05
EX1604-F20901	63.50	-1.99	-2.58	64.75	-2.18	-3.04	1.25	-0.19	-0.46	1.35	0.48	0.12
EX1604-F20903	63.53	-2.00	-2.65	64.79	-2.19	-3.04	1.26	-0.19	-0.39	1.33	0.43	0.08

INSPECTION REPORT

Q-Lab Test Services

CLIENT:	**Akzo Nobel**
ADDRESS:	**51 McIntyre Road** **Sunshine, Victoria 3020** **AUSTRALIA**
YOUR REFERENCE:	**EX1501 & EX1502**
CONTENTS:	**Cover Sheet: Page 1** **Report: Pages 2-4**
Inspected By:	**Jennifer M. Castro**
Approved By:	**Ana Garcia**

TEST NO:	**AVA-11**
REPORT NO:	**5**
DATE:	**14 May 2018**
DATE EXPOSED:	**14 May 2013**
DURATION:	**60 Months**
TYPE:	**Direct Inland, 45° South-Florida**
SPECIMENS:	**82 painted metal panels**
RADIATION LOG:	**TOTAL = 32,028.82 MJ/m²** **TUVR = 1,600.83 MJ/m²**

NOTES: Please refer to the legend located on our website at www.myweathertest.com for an explanation of the ratings used in this report.

Specimens were washed with deionized water prior to evaluation.

Gloss readings were recorded using a BYK Micro Tri-Gloss.

INSPECTION REPORT

Q-Lab Test Services

This inspection report contains only findings and results arrived at after employing the specific test procedures listed in the Test Confirmation. It does not constitute a recommendation for, endorsement of, or certification of the product or material tested. Q-Lab Test Services makes no warranty, expressed or implied, except that the test has been performed, and a report prepared, based upon the specimen or specimens furnished by the client. Extrapolation of data from the specimen or specimens relating to the batch or lot from which it was obtained may not correlate and should be interpreted accordingly with extreme caution. We assume no responsibility for variations in quality, composition, appearance, performance, or other feature of similar subject matter produced by other persons or under conditions over which we have no control. This report shall not be reproduced except in full without the written approval of Q-Lab Test Services.

CLIENT:	**Akzo Nobel**
ADDRESS:	**51 McIntyre Road** **Sunshine, Victoria 3020** **AUSTRALIA**
YOUR REFERENCE:	**EX1501 & EX1502**
CONTENTS:	**Cover Sheet: Page 1** **Report: Pages 2-4**
Inspected By:	**Jennifer M. Castro**
Approved By:	**Ana Garcia**

TEST NO:	**AVA-11**
REPORT NO:	**5**
DATE:	**14 May 2018**
DATE EXPOSED:	**14 May 2013**
DURATION:	**60 Months**
TYPE:	**Direct Inland, 45° South-Florida**
SPECIMENS:	**82 painted metal panels**
RADIATION LOG:	**TOTAL = 32,028.82 MJ/m²** **TUVR = 1,600.83 MJ/m²**

NOTES: Please refer to the legend located on our website at www.myweathertest.com for an explanation of the ratings used in this report.

Specimens were washed with deionized water prior to evaluation.

Gloss readings were recorded using a BYK Micro Tri-Gloss.

Q-LAB

INSPECTION REPORT

Q-Lab Test Services

TEST NO: AVA-11 REPORT NO: 5 DATE: 14 May 2018

Specimen ID	60° Gloss			Comments
	O	P	Δ	
EX1501-12QC003/1	90	58	32	
EX1501-12QC003/3	39	38	1	
EX1501-12QC003/4	28	9	19	
EX1501-12QC003/7	26	13	13	
EX1501-12QC003/11	70	38	32	
EX1501-12QC003/13	95	55	40	
EX1501-12QC003/26	32	21	11	

Q-LAB

INSPECTION REPORT

Q-Lab Test Services

TEST NO: AVA-11 REPORT NO: 5 DATE: 14 May 2018

Specimen ID	60° Gloss			Comments
	O	P	Δ	
EX1501-12QC003/35	68	35	33	
EX1501-12QC003/37	30	17	13	
EX1501-12QC003/38	37	25	12	
EX1501-12QC003/40	36	21	15	
EX1501-12QC003/42	31	21	10	
EX1501-12QC003/43	23	11	12	
EX1501-12QC003/46	29	17	12	
EX1501-12QC003/47	37	22	15	
EX1501-12QC003/51	29	16	13	
EX1501-12QC003/52	31	17	14	
EX1501-12QC003/53	27	18	9	
EX1501-12QC003/60	60	48	12	

TEST NO: AVA-11 REPORT NO: 5 DATE: 14 May 2018

Specimen ID	60° Gloss			Comments
	O	P	Δ	
EX1501-12QC003/63	57	34	23	
EX1501-12QC003/64	51	33	18	
EX1501-12QC003/65	59	28	31	
EX1501-12QC003/67	61	39	22	
EX1501-12QC003/72	63	33	30	

INSTRUMENTAL COLOR REPORT

Q-Lab Test Services

CLIENT:	**Akzo Nobel**
ADDRESS:	**51 McIntyre Road** **Sunshine, Victoria 3020** **AUSTRALIA**
YOUR REFERENCE:	**EX1501 & EX1502**
CONTENTS:	**Cover Sheet: Page 1** **Report: Pages 2-4**
Inspected By:	**Marie Jones** Marie Jones
Approved By:	**Ana Garcia** Ana Garcia

TEST NO:	**AVA-11**
REPORT NO:	**5**
DATE:	**14 May 2018**
DATE EXPOSED:	**14 May 2013**
DURATION:	**60 Months**
TYPE:	**Direct Inland, 45° South-Florida**
SPECIMENS:	**82 painted metal panels**
RADIATION LOG:	**TOTAL = 32,028.82 MJ/m²** **TUVR = 1,600.83 MJ/m²**

NOTES: Please refer to the legend on our website located at www.myweathertest.com for an explanation of the values and scales used in this report.

Specimens were washed with deionized water prior to evaluation.

COLOR DATA INFORMATION:
INSTRUMENT: X-Rite Color i7 (d/8° sphere)
COLOR SCALE: CIE L*a*b*
ILLUMINANT: D65
OBSERVER: 10°
SPEC. IN/OUT: Included

INSTRUMENTAL COLOR REPORT

Q-Lab Test Services

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CLIENT:	**Akzo Nobel**
ADDRESS:	**51 McIntyre Road** **Sunshine, Victoria 3020** **AUSTRALIA**
YOUR REFERENCE:	**EX1501 & EX1502**
CONTENTS:	**Cover Sheet: Page 1** **Report: Pages 2-4**
Inspected By:	**Marie Jones** Marie Jones
Approved By:	**Ana Garcia** Ana Garcia

TEST NO:	**AVA-11**
REPORT NO:	**5**
DATE:	**14 May 2018**
DATE EXPOSED:	**14 May 2013**
DURATION:	**60 Months**
TYPE:	**Direct Inland, 45° South-Florida**
SPECIMENS:	**82 painted metal panels**
RADIATION LOG:	**TOTAL = 32,028.82 MJ/m²** **TUVR = 1,600.83 MJ/m²**

NOTES: Please refer to the legend on our website located at www.myweathertest.com for an explanation of the values and scales used in this report.

Specimens were washed with deionized water prior to evaluation.

COLOR DATA INFORMATION:
INSTRUMENT: X-Rite Color i7 (d/8° sphere)
COLOR SCALE: CIE L*a*b*
ILLUMINANT: D65
OBSERVER: 10°
SPEC. IN/OUT: Included

Q-Lab Test Services

INSTRUMENTAL COLOR REPORT

TEST NO: AVA-11 **REPORT NO: 5** **DATE: 14 May 2018**

	Original			Present			Difference			Delta		
Specimen ID	L*	a*	b*	L*	a*	b*	L*	a*	b*	E*	C*	H*
EX1501-12QC003/1	66.50	0.37	4.60	67.09	0.33	4.61	0.59	-0.04	0.01	0.59	0.01	0.04
EX1501-12QC003/3	56.64	0.22	1.94	57.80	0.14	1.72	1.16	-0.08	-0.22	1.18	-0.23	0.06
EX1501-12QC003/4	40.48	30.40	17.65	40.18	30.37	19.95	-0.30	-0.03	2.30	2.32	1.18	1.97
EX1501-12QC003/7	43.49	-0.57	1.07	44.46	-0.97	1.48	0.97	-0.40	0.41	1.13	0.56	0.13
EX1501-12QC003/11	70.21	-6.17	-5.69	70.57	-6.26	-5.60	0.36	-0.09	0.09	0.38	0.01	-0.13
EX1501-12QC003/13	26.01	0.01	-1.02	23.69	-0.02	-0.56	-2.32	-0.03	0.46	2.37	-0.46	-0.03
EX1501-12QC003/26	67.22	-15.66	-14.65	67.49	-15.73	-15.52	0.27	-0.07	-0.87	0.91	0.65	0.58

Q-Lab Test Services

INSTRUMENTAL COLOR REPORT

TEST NO: AVA-11 REPORT NO: 5 DATE: 14 May 2018

	Original			Present			Difference			Delta		
Specimen ID	L*	a*	b*	L*	a*	b*	L*	a*	b*	E*	C*	H*
EX1501-12QC003/32	52.12	-7.02	-10.93	52.90	-7.26	-11.47	0.78	-0.24	-0.54	0.98	0.58	0.09
EX1501-12QC003/35	61.12	-0.13	2.78	60.48	-0.02	2.63	-0.64	0.11	-0.15	0.67	-0.15	-0.11
EX1501-12QC003/37	34.93	0.07	-0.50	35.74	-0.09	-0.99	0.81	-0.16	-0.49	0.96	0.49	-0.16
EX1501-12QC003/38	26.19	0.05	-0.62	25.10	0.07	-0.71	-1.09	0.02	-0.09	1.09	0.09	0.01
EX1501-12QC003/40	55.39	1.33	8.18	56.66	0.94	8.00	1.27	-0.39	-0.18	1.34	-0.23	0.36
EX1501-12QC003/42	58.44	-2.18	0.15	59.15	-2.44	-0.13	0.71	-0.26	-0.28	0.81	0.26	0.28
EX1501-12QC003/43	33.92	-1.04	-2.31	33.95	-1.14	-2.63	0.03	-0.10	-0.32	0.34	0.33	0.04
EX1501-12QC003/46	49.54	13.08	19.31	49.60	12.96	19.89	0.06	-0.12	0.58	0.60	0.42	0.42
EX1501-12QC003/47	70.22	-21.25	-9.12	70.21	-21.91	-9.76	-0.01	-0.66	-0.64	0.92	0.86	0.32
EX1501-12QC003/51	60.33	-18.47	-18.55	60.60	-18.64	-19.65	0.27	-0.17	-1.10	1.15	0.91	0.64
EX1501-12QC003/52	67.32	-27.85	2.46	67.40	-28.80	1.78	0.08	-0.95	-0.68	1.17	0.90	0.75
EX1501-12QC003/53	68.44	3.61	-3.92	69.30	3.11	-3.69	0.86	-0.50	0.23	1.02	-0.50	-0.22
EX1501-12QC003/60	40.54	-0.66	-2.75	40.74	-0.83	-2.92	0.20	-0.17	-0.17	0.31	0.21	-0.12

Q-Lab Test Services

INSTRUMENTAL COLOR REPORT

TEST NO: AVA-11 REPORT NO: 5 DATE: 14 May 2018

	Original			Present			Difference			Delta		
Specimen ID	L*	a*	b*	L*	a*	b*	L*	a*	b*	E*	C*	H*
EX1501-12QC003/63	48.09	-13.56	-11.24	48.79	-14.59	-11.41	0.70	-1.03	-0.17	1.26	0.91	-0.51
EX1501-12QC003/64	45.44	-6.56	-1.78	45.82	-6.76	-2.45	0.38	-0.20	-0.67	0.80	0.39	0.58
EX1501-12QC003/65	38.01	-15.62	-5.82	37.90	-16.31	-6.30	-0.11	-0.69	-0.48	0.85	0.82	0.20
EX1501-12QC003/67	63.48	1.33	3.67	64.00	1.26	3.42	0.52	-0.07	-0.25	0.58	-0.26	-0.02
EX1501-12QC003/72	74.46	-17.86	-7.43	74.49	-18.33	-7.90	0.03	-0.47	-0.47	0.67	0.62	0.25