



Cambridge
materials testing limited

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CERTIFICATE OF TESTING

This Certificate of Testing signifies that

PetroGuard® Tape LT

Manufactured by

Advanced Corrosion Solutions Inc.

Has been tested by Cambridge Materials Testing Limited in accordance with the American Water Works Association (AWWA) specification for Petroleum And Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines using the following test methods:

Flash Point by Cleveland Open Cup Tester using ASTM D92-12a

Drop Melting Point using ASTM D127-08

Petroleum Wax Content in accordance with AWWA C217-09, Section 5.2.2.4

Cone Penetration using ASTM D937-07

Dielectric Breakdown Voltage and Dielectric Strength using ASTM D149-09, Method A

Thickness in accordance with AWWA C217-09, Section 5.2.2.2

Breaking Strength and Elongation using ASTM D1000-10

Water Vapour Transmission Rate using ASTM E96-12

Width Deviation in accordance with AWWA C217-09, Section 5.2.2.1


And meets the requirements of AWWA C217-09 Standard

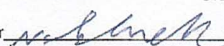
Laboratory #: 636400-13

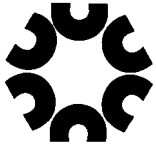
Sample #: 636400

Test Period: April 2013 – May 2013

Cambridge Materials Testing Limited

Per 
STEPHEN BROWN, QUALITY ASSURANCE

Per 
NASSIF ISKANDER, TECHNICIAN



Report For: Advanced Corrosion Solutions Inc.
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Email: chris@advancedcorrosionsolutions.com

Laboratory #: 636400-13
FINAL
Report Date: May 28, 2013
Received Date: April 05, 2013
Customer P.O. #: 58

Attention: Chris Calder
Specimen: #1 - PetroGuard Tape LT

TEST REPORT

RE: TESTING OF WAX TAPE COATING IDENTIFIED AS PETROGUARD TAPE LT TO DETERMINE COMPLIANCE WITH AWWA C217-09 MATERIAL REQUIREMENTS

This report is subject to the following terms and conditions: 1. This report relates only to the specimen provided and there is no representation or warranty that it applies to similar substances or materials or the bulk of which the specimen is a part. 2. The content of this report is for the information of the customer identified above only and it shall not be reprinted, published or disclosed to any other party except in full. Prior written consent from Cambridge Materials Testing Limited is required. 3. The name Cambridge Materials Testing Limited shall not be used in connection with the specimen reported on or any substance or materials similar to that specimen without the prior written consent of Cambridge Materials Testing Limited. 4. Neither Cambridge Materials Testing Limited nor any of its employees shall be responsible or held liable for any claims, loss or damages arising in consequence of reliance on this report or any default, error or omission in its preparation or the tests conducted. 5. Specimens are retained 6 months, test reports and test data are retained 7 years from date of final test report and then disposed of, unless instructed otherwise in writing. Test Report Template Revision January 2013
** Approved subcontracted testing.

Cambridge Materials Testing Limited

Per Stephen Brown
STEPHEN BROWN, QUALITY ASSURANCE

Per Nassif Iskander
NASSIF ISKANDER, TECHNICIAN



FLASH POINT BY CLEVELAND OPEN CUP TESTER

The submitted tape sample was tested for flash point in accordance with ASTM D92-12a using a Koehler open cup tester (Asset #1326). The ambient barometric pressure at the time of testing was recorded to be 99.5 kPa. The flash point was then corrected and reported.

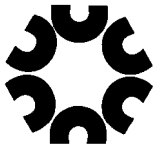
RESULTS

Sample #	Description	Corrected Flash Point (°C)
636400	PetroGuard Tape LT	>150

Note: No flash point was observed on either sample.

REQUIREMENT: Minimum >150°C

CONCLUSION: Pass



DROP MELTING POINT**

The submitted tape sample was tested for drop melting point in accordance with ASTM D127-08. The averages of the two determinations were reported.

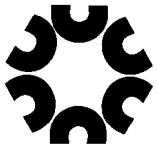
RESULTS

Sample #	Description	Drop Melting Point (°C)
636400	PetroGuard Tape LT	73

Note: The drop melting point was performed on the saturant of the tape sample.

REQUIREMENT: Minimum 60°C

CONCLUSION: Pass



PETROLEUM WAX CONTENT**

The submitted tape sample was tested for Petroleum Wax Content in accordance with AWWA C217-09, Section 5.2.2.4. The average of the three determinations were reported.

RESULTS

Sample #	Description	Solvent Extractable Material (% by wt)
636400	PetroGuard Tape LT	52.5

REQUIREMENT: Minimum 50% by wt.

CONCLUSION: Pass



CONE PENETRATION**

The submitted tape sample was tested for cone penetration in accordance with ASTM D937-07 using a penetrometer and standard cone applied to the sample for a period of 5-seconds under a load of 100-grams. The average of the three determinations were reported.

RESULTS

Sample #	Description	Cone Penetration at 25°C (% by wt)
636400	PetroGuard Tape LT	7.5

REQUIREMENT: 6.1 - 12.7

CONCLUSION: Pass



DIELECTRIC BREAKDOWN VOLTAGE AND DIELECTRIC STRENGTH**

The submitted tape sample was tested for dielectric breakdown voltage and dielectric strength in accordance with ASTM D149-09, Method A. The parameters of testing are outlined below:

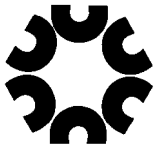
Rate of Rise:	500 Volts/sec
Voltage Type:	AC
Sample Preparation:	Cut to size to fit test fixture
Sample Conditioning:	40+ Hours at 23°C ± 2°C / 50% ± 10% RH
Electrode Size:	1.0" diameter
Surrounding Medium:	Air
Test Conditions:	23°C ± 2°C / 50% ± 10% RH

RESULTS

Sample #	Description	Test #	Failure Location on Electrode	Thickness (inches)	Breakdown Voltage (kV)	Dielectric Strength (V/mil)
636400	PetroGuard Tape LT	1	Edge	0.0568	10.2	179
		2	Edge	0.0544	9.8	180
		3	Edge	0.0563	10.3	182
		4	Edge	0.0496	9.3	187
		5	Edge	0.0542	9.8	180
Average				0.0543	9.8	181
Standard Deviation				0.0028	0.3	3.2

REQUIREMENT: Minimum 170 V/mil

CONCLUSION: Pass



THICKNESS

The thickness of the tape was measured in accordance with AWWA C217-09, Section 5.2.2.2 using a calibrated micrometer (Asset #1508 & 1517). The average of ten determinations was reported for each of three separate rolls.

RESULTS

Sample #	Description	Test #	Thickness (µm)
636400	PetroGuard Tape LT	1	1,441
		2	1,376
		3	1,397

REQUIREMENT: Minimum 1,016-µm

CONCLUSION: Pass



BREAKING STRENGTH AND ELONGATION

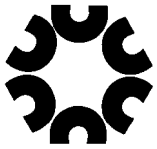
The submitted tape sample was tested for breaking strength and elongation in accordance with ASTM D1000-10 using an Instron tensile tester (Asset #1468) with 5kN load cell (Asset #1470) and self-tightening grips. The measurements of specimen width were performed using a calibrated ruler (Asset #1518). The specimens were conditioned and tested at standard laboratory conditions of 23°C ± 2°C and 50% ± 10% RH prior to testing.

RESULTS

Sample #	Description	Test #	Breaking Strength (N/m)	Elongation at Break (%)
636400	PetroGuard Tape LT	1	3976	45
		2	6437	55
		3	6052	49
Minimum			3976	45
Average			5488	50
Maximum			6437	55

REQUIREMENT: Minimum 3,940 N/m &
Minimum 6%

CONCLUSION: Breaking Strength – Pass
Elongation at Break – Pass



WATER VAPOUR TRANSMISSION RATE

The submitted tape sample was tested for water vapour transmission rate in accordance with ASTM E96-12, Procedure "A" using jars that were kept at constant temperature and humidity. The weight change was monitored on a daily basis for a period of 8 days until the weights stabilized. The parameters of testing are outlined below:

Specimen Thickness: 1.27mm
Specimen Area: 1134mm²
Vernier: Asset #1251
Test Temperature: 23°C
Relative Humidity: 50%
Exposure Period: 8 Days
Balance: (Asset #1253)

RESULTS

Sample #	Description	Water Vapour Transmission Rate (g/h m ²)	Permeance (ng/Pa s m ²)
636400	PetroGuard Tape LT	0.19	0.66
REQUIREMENT:	Maximum	0.25	1.44

CONCLUSION: Pass



WIDTH DEVIATION

The width deviation of the submitted tape sample was measured in accordance with AWWA C217-09, Section 5.2.2.1 using a calibrated ruler (Asset #1320). The average of three determinations was reported for each of three separate rolls.

RESULTS

Sample #	Description	Test #	Width Deviation (mm)
636400	PetroGuard Tape LT	1	<1
		2	<1
		3	<1

REQUIREMENT: Maximum \pm 5% Width or 6.4 mm

CONCLUSION: Pass