

**PERFORMANCE TESTING IN ACCORDANCE WITH
AAMA/WDMA/CSA 101/I.S.2/A440-11 (NAFS 2011) & A440S1-17**

PRODUCT MANUFACTURER
ALUMINCO S.A. Thessi Megalli Rachi 32011 Inofita Viotias Viotia, Greece

REPORT AI-04900-B1

TEST REPORT SUMMARY	
Product type	Fixed Window
Product series/model	W4750 Series Aluminum Fixed Window
Primary product designator	Class AW – PG90: Size tested 1500 x 2500 mm (~59 x 98 in) - Type FW
Optional secondary designator	Positive Design pressure (DP) = 4320 Pa (~90.23 psf) Negative design pressure (DP) = -4320 Pa (~-90.23 psf) Water penetration resistance test pressure = 720 Pa (~15.04 psf) Canadian air infiltration / exfiltration level = Fixed Level

See CLEB laboratory Inc. complete report AI-04900-B1 for test specimen description and detailed test results

Test completion date	2018-09-11	Number of pages	5 pages & 1 appendix
Report date	2018-10-03	Revision date	-

Prepared by:



Digitally Signed by:

Eric Perron, Tech.

Fenestration Testing Department
CLEB laboratory Inc.

Approved by:



Digitally Signed by:

Jean Miller, P.Eng.

Manager, Fenestration Testing Department
CLEB laboratory Inc.

LABORATORY, FIELD TESTING AND ADVISORY SERVICES FOR THE BUILDING ENVELOPE
30 YEARS STRONG, UL AND CLEB SERVING CUSTOMERS ACROSS NORTH AMERICA AND BEYOND

CHICAGO

US Headquarters
750 Anthony Trail
Northbrook, IL 60062
chicago@cleb.com

MONTREAL

Canada Headquarters
1320 Lionel-Boulet Blvd
Varennnes, QC J3X 1P7
montreal@cleb.com

QUEBEC

420 Charest East Blvd
Suite 300
Quebec, QC G1K 8M4
quebec@cleb.com

OTTAWA

29 Capital Drive
Suite 200
Ottawa, ON K2G 0E7
ottawa@cleb.com

TRURO

64 Inglis Place
Suite 203
Truro, NS B2N 4B4
truro@cleb.com

NEW YORK

747 Third Avenue
2nd Floor
New York, NY 10017
newyork@cleb.com

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 DESCRIPTION OF THE SPECIMEN(S) TESTED..... 1

3.0 ALTERATION(S)..... 2

4.0 TEST BENCH INFORMATION..... 2

5.0 RESULTS OF PERFORMANCE TESTS 3

6.0 CONCLUSION..... 5

7.0 REVISION LOG..... 5

APPENDIX: DRAWINGS, SEALANT, DRAINAGE DETAILS & BILL OF MATERIALS

1.0 INTRODUCTION

CLEB laboratory Inc. was retained by "**ALUMINCO S.A.**" to test a fenestration product according to the performance levels in the AAMA/WDMA/CSA 101/I.S. 2/A440-11 (NAFS 2011) & A440S1-17 Standards. The sample components and manufacturing are documented in section 2.0.

Note concerning the use of units of measurement in this report:

According to the AAMA/WDMA/CSA 101/I.S.2/A440 Standard, the use of SI (metric) units is the standard, while IP (Imperial) values given in parentheses are for reference purposes only, and are inexact rounded values. Section 5.0 contains testing results converted to IP units for the sake of convenience only. The only exception to using SI values is in the Performance Grade (PG) portion of the product designation.

Note concerning drawings:

The drawings reviewed for the production of this report are stamped and are on file at CLEB laboratory Inc. The availability of individual drawings will be at the discretion of the client.

2.0 DESCRIPTION OF THE SPECIMEN(S) TESTED

Model

W4750 Series Aluminum Fixed Window

Product type

FW – (Fixed window)

Operation mode

Fixed

Drawings (Appendix)

ELEVATION (INTERNAL SIDE), frame drainage drawing, frame vertical and horizontal section drawings (4 pages), materials list (3 pages)

Drawings (Others)

4750-110, 4750-907, 540-777, 3120-918, 3120-919

Date(s) of sample reception

2018-09-06

Date(s) of testing

2018-09-06, 2018-09-07, 2018-09-08, 2018-09-09, 2018-09-10, 2018-09-11

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Test specimen installation (test buck)

Material: 2" x 8" treated lumber

R.O. clearances: 0 mm (0.00")

Fastening: Sill: (3) # 8 x 2" screws; at 250 mm (9.84") from each corner and at mid span. Head: (3) # 8 x 2" screws; at 250 mm (9.84") from each corner and at mid span. Jambs: (2) rows of (5) # 10 x 2-1/2" screws, screwed from exterior of the test buck into the frame, at 250 mm (9.84") from each corner and 500 mm (19.68") c/c.

Sealing detail: Sealant between test buck and specimen on exterior, intermediate and interior perimeters.

Frame

Material: Extruded Aluminum (thermally-broken)

Joinery type: Mechanical assembly (crimped with corners keys / sealed)

Reinforcement: No reinforcement

Weatherstripping: None

Sealant: See comments on the drawing in the appendix/ Sealant in the 4 corners before assembly. Exterior side: sealant in the cramping cavity. Sealant at corner joint junctions.

Drainage: See drawing in the appendix

Glazing: Double glazed sealed unit (27.0 mm) / Glass thickness: Exterior side: 6.0 mm. Interior side: laminated 4.0 mm + 4.0 mm / Air space gap: 12.0 mm / Type of glass: Exterior side: Tempered. Interior side: laminated / Type of spacer: Aluminum / Type of sealant: Dual-sealed / Type of filling gas: Argon / Glass retention: Glazing stops / Glazing seals: Gasket on the exterior face (dry glazing) and gasket on the interior face (dry glazing) / Grid description: None / Setting blocks: (2) at the sill (4) per jamb, (0) at the head / Daylight opening: 1310 mm W x 2310 mm H

Frame depth: 130 mm (5.12")

Overall dimensions: 1500 mm (59.05") W x 2500 mm (98.43") H

Hardware

None

3.0 ALTERATION(S)

Alteration(s) performed in the laboratory on tested specimen to meet the reported performances: None.

4.0 TEST BENCH INFORMATION

Test bench identification: TB-AWS-04 and TB-AWS-07. The calibration of each test bench was done as per Article 9.0 of ASTM E283, *Standard Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors*, and ASTM E331 *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference* and ASTM E547 *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Cycling Static Air Pressure Difference*. The last calibration of each test bench and related equipment was performed in July, 2018.

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5.0 RESULTS OF PERFORMANCE TESTS

SPECIFICATIONS	TEST RESULTS
<p><u>U.S. Air Leakage Resistance Test</u> R – LC – CW Classifications: $Q_{inf} \leq 1.5 \text{ l/s-m}^2 @ 75 \text{ Pa}$ ($\sim 0.3 \text{ cfm/ft}^2 @ 1.57 \text{ psf}$) AW Classification: $Q_{inf} \leq 0.5 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.1 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$)</p> <p><u>Canadian air infiltration/exfiltration level</u> R – LC – CW Classifications: FIXED: $Q \leq 0.2 \text{ l/s-m}^2 @ 75 \text{ Pa}$ ($\sim 0.04 \text{ cfm/ft}^2 @ 1.57 \text{ psf}$) AW Classification: FIXED: $Q \leq 0.2 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.04 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$) AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.2 A440S1-17 Canadian Supplement par. 5.3 ASTM-E283-04 (2012)</p>	<p>Class AW – U.S. Requirements</p> <p>FIXED Level –Canadian Requirements</p> <p>Surface: 3.75 m^2 ($\sim 40.36 \text{ ft}^2$)</p> <p>$Q_{inf} = 0.11 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.02 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$) $Q_{exf} = 0.15 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.03 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$)</p>
<p><u>Water Resistance Test</u> No water infiltration under a minimum pressure differential: Class R: 140 Pa ($\sim 2.92 \text{ psf}$) Class LC: 180 Pa ($\sim 3.76 \text{ psf}$) Class CW: 220 Pa ($\sim 4.59 \text{ psf}$) Class AW: 390 Pa ($\sim 8.15 \text{ psf}$) AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.3. A440S1-17 Canadian Supplement par. 5.4 ASTM-E547-00 (2009) & ASTM-E331-00 (2009)</p>	<p>Class AW – U.S. & Canadian Requirements</p> <p>No water infiltration under the minimum test pressure for the Class.</p> <p>No water infiltration at an optional test pressure differential of: 580 Pa ($\sim 12.11 \text{ psf}$) - U.S. & Canadian Requirements 720 Pa ($\sim 15.04 \text{ psf}$) - Canadian requirements only</p>
<p><u>Life Cycle Testing (AW Classification)</u></p> <p>The test sequence is the following :</p> <p><u>Air Infiltration Test</u> AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 7.3.5, ASTM-E283-04 & AAMA 910-10; 3.1.2</p> <p><u>Water Resistance Test</u> AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 7.3.5, ASTM-E547-00 (2009) & ASTM E-331-00 (2009) & AAMA 910-10; 3.1.3</p> <p><u>Thermal Cycling</u> The test specimen was subjected to 6 thermal cycles per AAMA 501.5-07 (Test Method for Thermal Cycling of Exterior Walls). AAMA 910-10; 3.1.13</p> <p><u>Uniform Load Deflection Test (L/175) at DP40</u> AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 7.3.5, ASTM-E283-04 & AAMA 910-10; 3.1.14 & ASTM-E330-02 (2010)</p> <p><u>Post Thermal Cycling Air Infiltration Test</u> AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 7.3.5, ASTM-E283-04 & AAMA 910-10; 3.1.15</p> <p><u>Post Thermal Cycling Water Resistance Test</u> AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 7.3.5, ASTM-E547-00 (2009) & ASTM E-331-00 (2009) & AAMA 910-10; 3.1.16</p>	<p>Class AW – Passed</p> <p>$Q_{inf} = 0.07 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.01 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$) $Q_{exf} = 0.09 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.02 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$)</p> <p>No water infiltration at an optional test pressure differential of 720 Pa ($\sim 15.04 \text{ psf}$)</p> <p>High temperature= 82°C (180°F) Low temperature= -18°C (0°F) No damage observed</p> <p>Member deflection does not exceed the limit of L/175 at a design pressure (DP) of 1920 Pa ($\sim 40.10 \text{ psf}$)</p> <p>$Q_{inf} = 0.11 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.02 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$) $Q_{exf} = 0.15 \text{ l/s-m}^2 @ 300 \text{ Pa}$ ($\sim 0.03 \text{ cfm/ft}^2 @ 6.27 \text{ psf}$)</p> <p>No water infiltration at an optional test pressure differential of 720 Pa ($\sim 15.04 \text{ psf}$)</p>

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<p>Uniform Load Structural Test at 1.5x DP40 (STP40) AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 7.3.5, ASTM-E283-04 et la spécification AAMA 910-10; 3.1.17 & ASTM-E330-02 (2010)</p>	<p>Permanent deformation does not exceed the limit of 0.2% (L) at a structural test pressure (STP) of 2880 Pa (~60.15 psf)</p>
<p>Uniform Load Deflection Test Member deflection at a minimum design pressure (DP) and at optional DP: Class R: 720 Pa (~15.04 psf) – Reported only Class LC: 1200 Pa (~25.06 psf) – Reported only Class CW: Limited to L/175 at 1440 Pa (~30.08 psf) Class AW: Limited to L/175 at 1920 Pa (~40.10 psf) AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.4 ASTM-E330-02 (2010)</p>	<p>DP 90 – Class AW Net deflection measured on the jamb: 0.82 mm @ -1920 Pa (~0.03" @ -40.10 psf) 0.70 mm @ +1920 Pa (~0.03" @ +40.10 psf) 1.33 mm @ -4320 Pa (~0.05" @ -90.23 psf) 1.21 mm @ +4320 Pa (~0.05" @ +90.23 psf) Allowed ≤ 13.77 mm (~0.54")</p>
<p>Uniform Load Structural Permanent deformation is limited at a minimum structural test pressure (STP) and at optional STP of: Class R: ≤ 0.4% (L) at 1080 Pa (~22.56 psf) Class LC: ≤ 0.4% (L) at 1800 Pa (~37.59 psf) Class CW: ≤ 0.3% (L) at 2160 Pa (~45.11 psf) Class AW: ≤ 0.2% (L) at 2880 Pa (~60.15 psf) AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.4 ASTM-E330-02 (2010)</p>	<p>STP 90 – Class AW Permanent deformation measured on the jamb: 0.06 mm @ -2880 Pa (~0.00" @ -60.15 psf) 0.02 mm @ +2880 Pa (~0.00" @ +60.15 psf) 0.09 mm @ -6480 Pa (~0.00" @ -135.34 psf) 0.05 mm @ +6480 Pa (~0.00" @ +135.34 psf) Allowed ≤ 4.82 mm (~0.19")</p>
<p>Forced-Entry Resistance All windows shall be tested according to ASTM F588-07 Grade 10. AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.5</p>	<p>Passed Grade 10 T₁=5 min.</p>

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6.0 CONCLUSION

Based on the tests results, the fenestration product described in this report meets the requirements of the AAMA/WDMA/CSA 101/I.S. 2/A440-11 and A440S1-17 Standards regarding performance testing.

Detailed assembly drawings showing wall thickness of all members, corner construction and hardware application are on file and have been compared to the sample submitted.

The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the referenced specification. The test records from this evaluation will be retained for a minimum of four (4) years from the date of report issuance. This report does not constitute certification of this product, which may only be granted by a certification agency.

Note on the Limitation of Liability:

Due care was taken in performing the testing sequence and in reporting the results related to the test specimen received for evaluation. Through acceptance of this report, the Client agrees to exempt CLEB laboratory Inc. employees and owners from all liability claims and demands arising from any matter related to or concerning the quality and execution of the performance evaluation contained in this report.

7.0 REVISION LOG

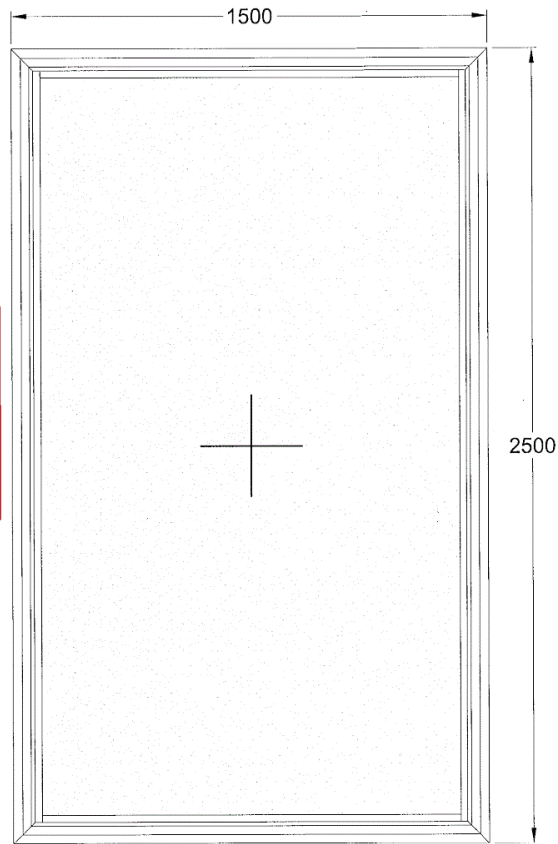
Rev. #	Date	Page(s)	Revision(s)
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APPENDIX
DRAWINGS, SEALANT, DRAINAGE DETAILS & BILL OF MATERIALS

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PRODUCT #2
Testing as per NAFS 2011 Class AW-PG50-Type FW

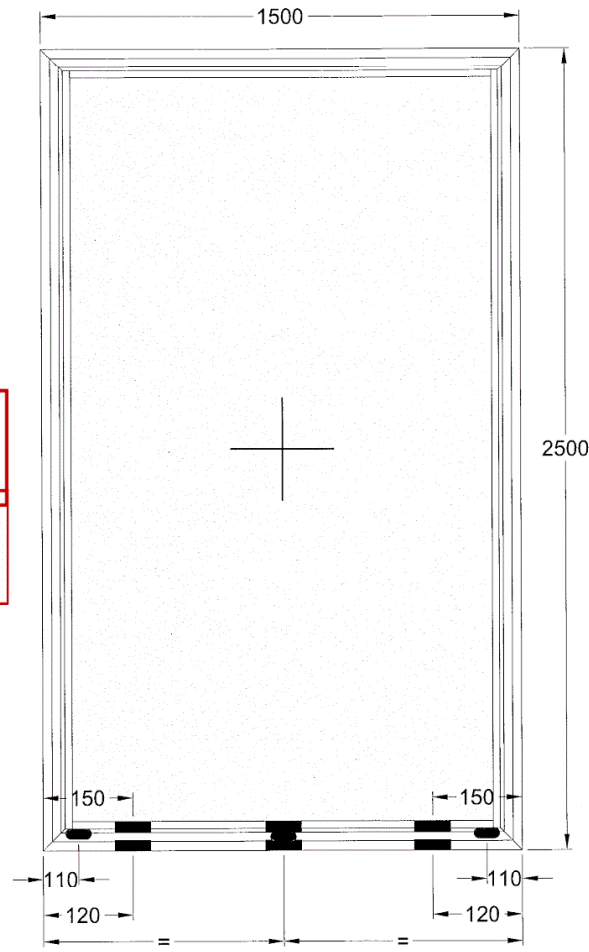
ELEVATION
(INTERNAL SIDE)







2018-10-03

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PRODUCT #2
Testing as per NAFS 2011 Class AW-PG50-Type FW

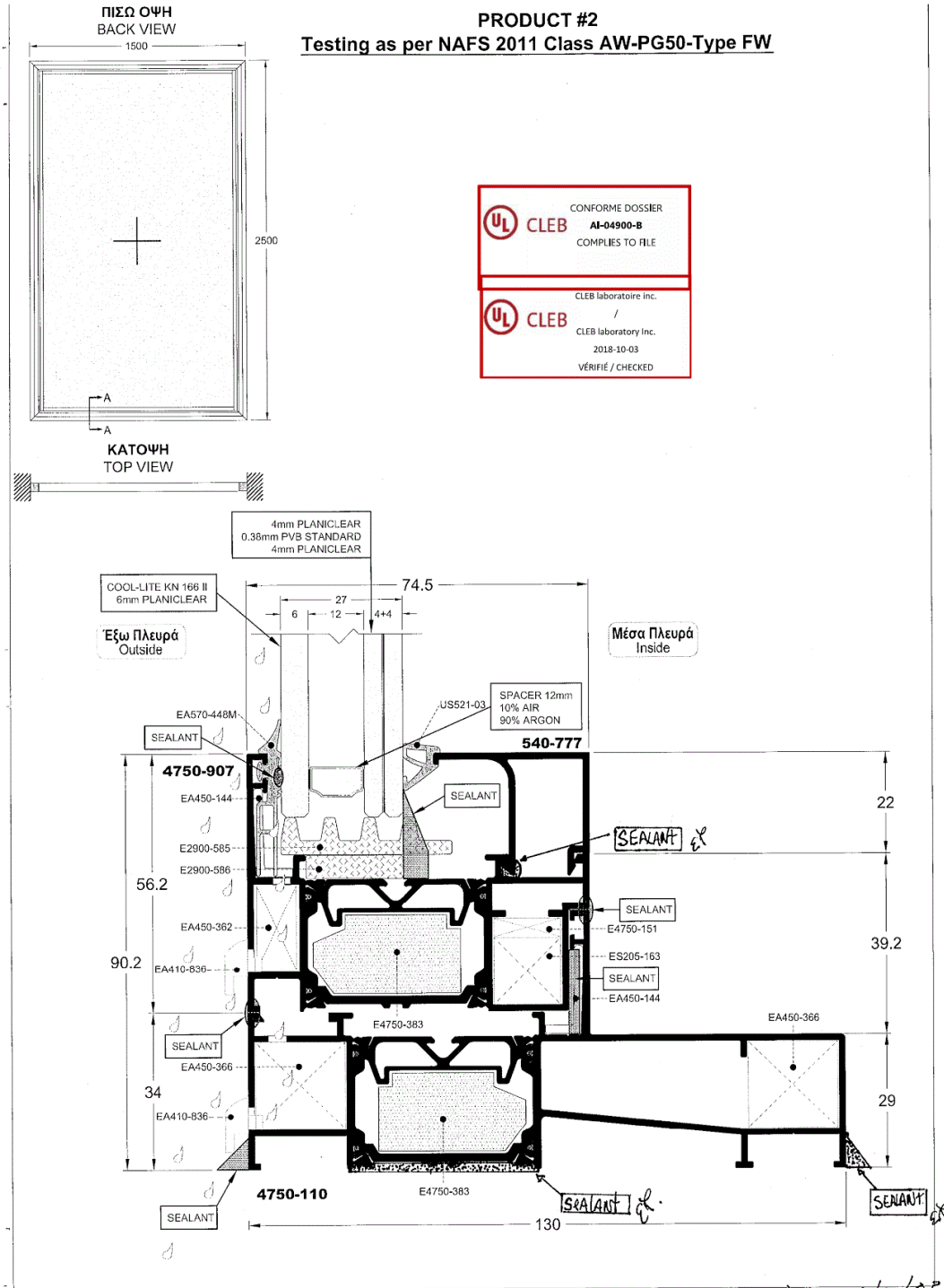


	3 x 40mm FRAME DRAINAGE
	6 x 30mm EXTERNAL FRAME DRAINAGE

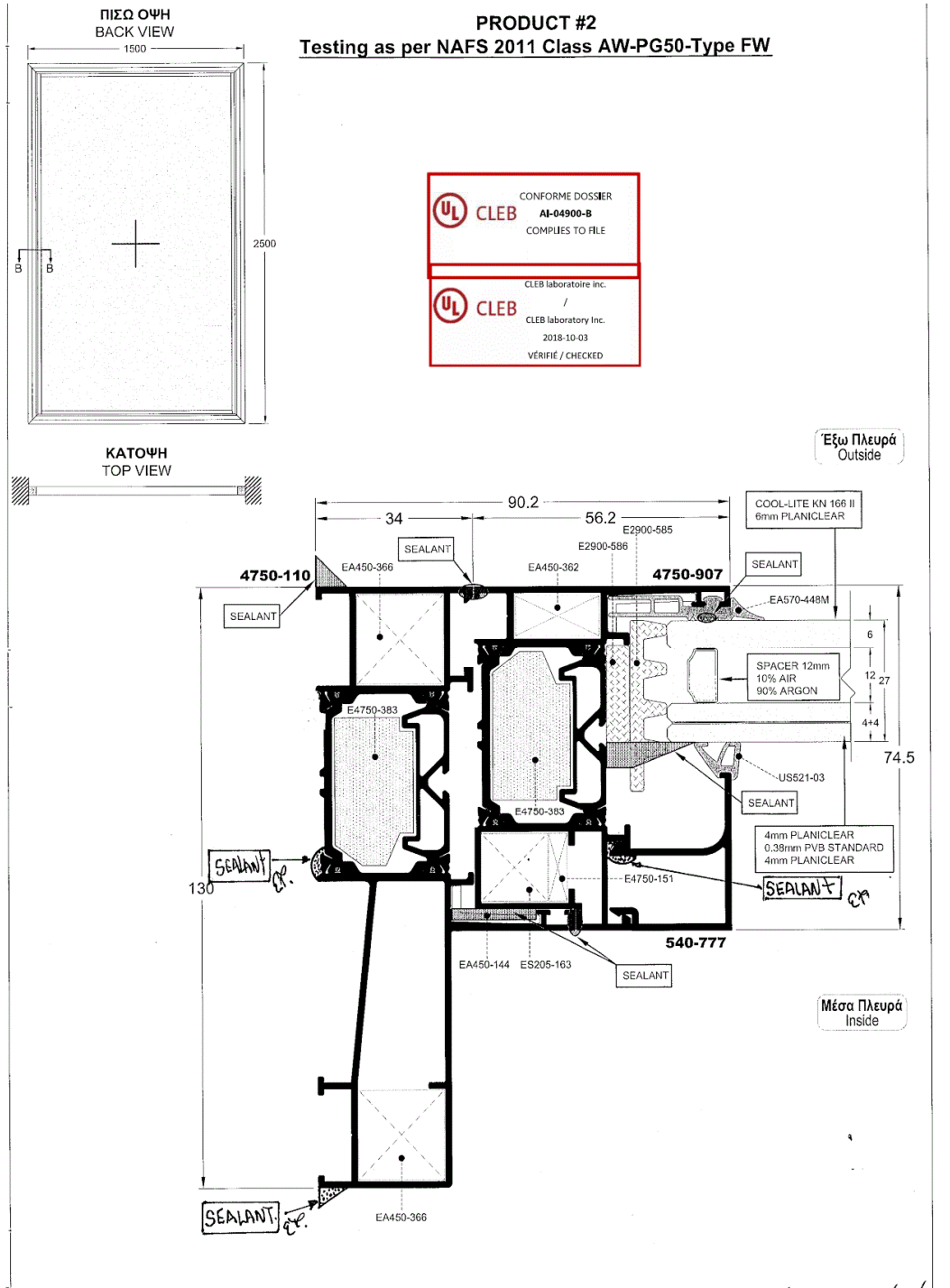
 FRAME DRAINAGE
 EXTERNAL FRAME DRAINAGE

*DIMMENSIONS IN (mm)

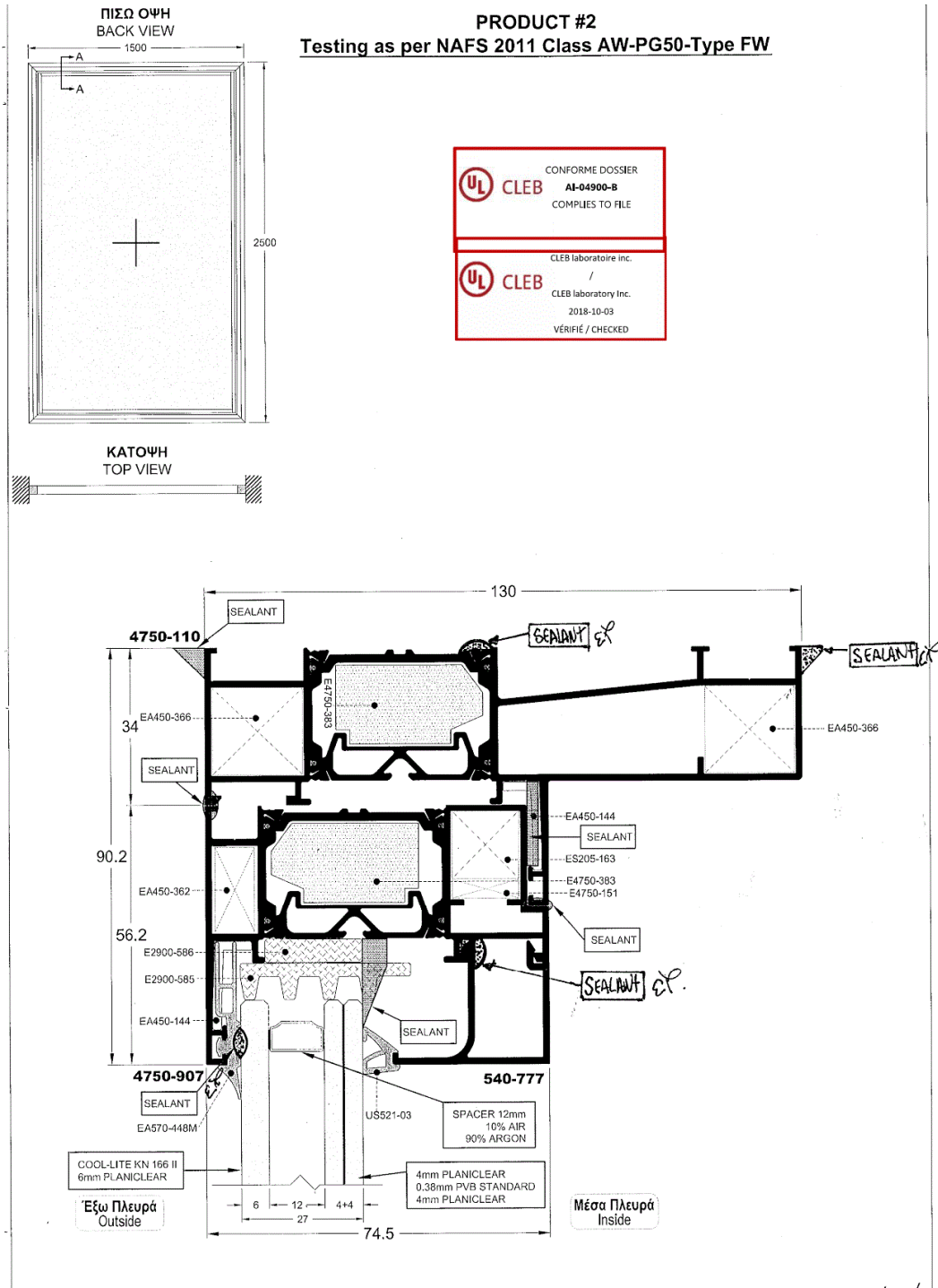
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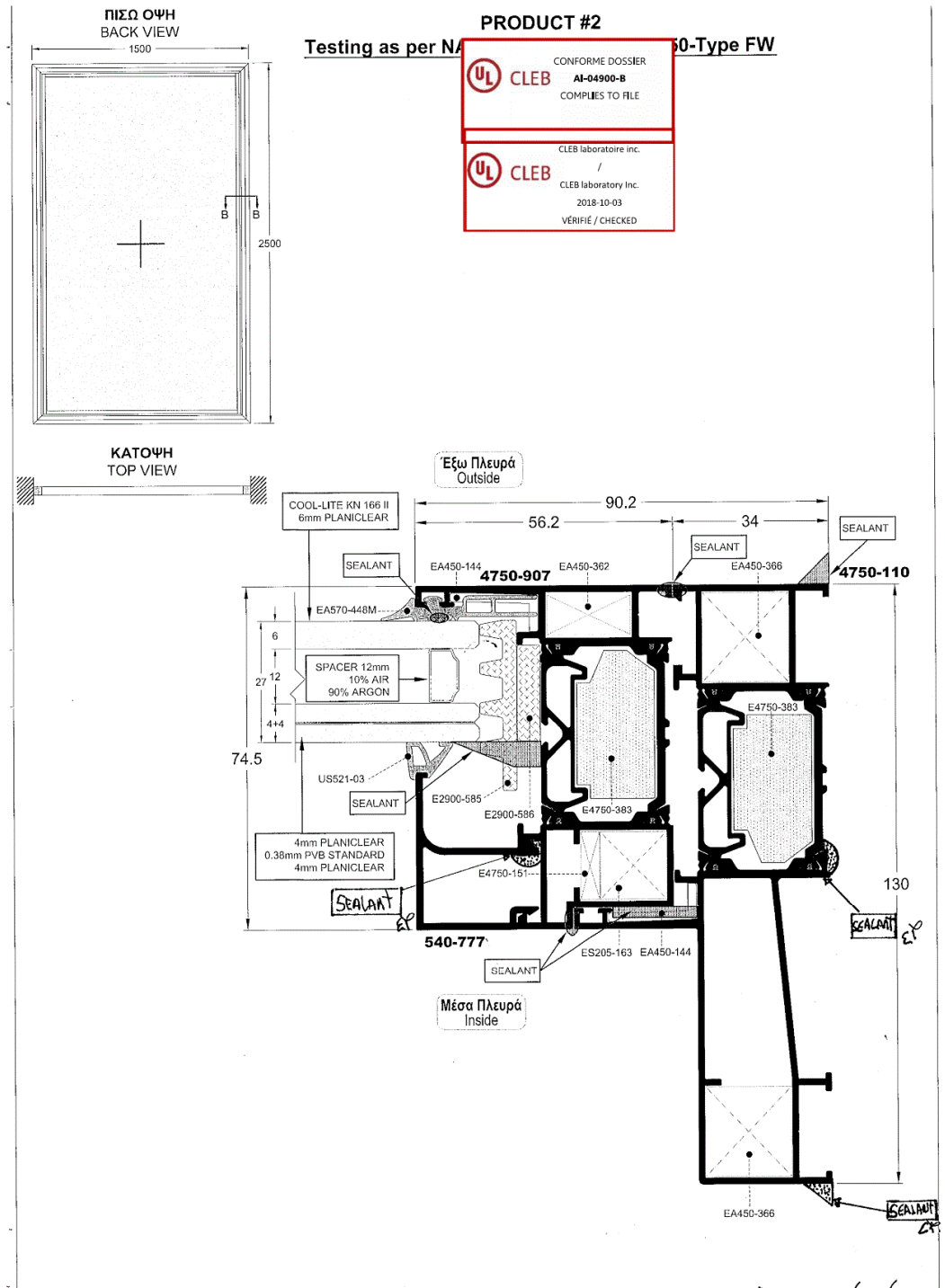
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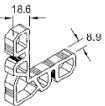
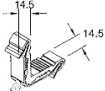
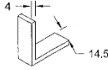
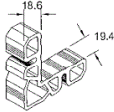
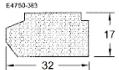

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
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Build of Materials For 1 fixed casement		PRODUCT #2 Testing as per NAFS 2011 Class AW-PG50-Type FW	
A/A	Code	Description	Material
ΠΡΟΦΙΛ			
1	4750-110	ΚΑΣΑ-FRAME	8m
2	4750-907	ΚΑΣΑ ΑΛΛΑΓΗΣ ΦΟΡΑΣ-DIRECTION CHANGE FRAME	8m
3	540-777	ΠΙΧΑΚΙ-BEAD	7.4m
ΕΞΑΡΤΗΜΑΤΑ			
4	ΕΛ450-144P	ΠΛΑΣΤΙΚΗ ΓΩΝΙΑ ΕΥΘΥΓΡΑΜΜΙΣΗΣ-ALIGNMENT CORNER	8 pcs
5	ΕS205-163	ΓΩΝΙΑ ΣΥΝΔΕΣΕΩΣ CAL-CORNER JOINT CAL 14.5 x 14.5 mm	4 pcs
6	Ε4750-151	ΠΡΟΣΘΗΚΗ ΓΩΝΙΑΣ ΣΥΝΔΕΣΕΩΣ-ADDITIONAL CONN. CORNER 14.5 x4mm	4 pcs
7	ΕΑ450-362	ΓΩΝΙΑ ΓΩΝΙΑΣΤΡΑΣ-CRIMPING CORNER 8.9 x 18.6 mm	4 pcs
8	ΕΑ450-366	ΓΩΝΙΑ ΓΩΝΙΑΣΤΡΑΣ-CRIMPING CORNER 19.4 x 18.6mm	8 pcs
9	Ε4750-383	ΘΕΡΜΟΜΟΝΩΤΙΚΗ ΜΠΑΡΑ ΚΑΣΑΣ-FRAME INSULATION BAR	8x2m bars
10	Ε2900-585	ΑΦΡΟΣ ΜΟΝΩΣΗΣ-FOAM INSULATION 35x10mm	3x3m bars
11	Ε2900-586	ΑΦΡΟΣ ΜΟΝΩΣΗΣ-FOAM INSULATION 19x5mm	3x3m bars
12	ΕΑ570-448	ΕΞΩΤΕΡΙΚΟ ΛΑΣΤΙΧΟ ΤΖΑΜΙΟΥ-EXTERNAL GLAZING GASKET	8m
13	US521-03	ΛΑΣΤΙΧΟ ΣΦΗΝΑ ΤΖΑΜΙΟΥ-GLAZING GASKET	7.5m
14	ΕΑ410-836	ΤΑΠΑ ΝΕΡΟΧΥΤΗ-END COVER FOR WATER DRAINAGE	6 pcs

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	<p>Κωδικός Code: EA450-140U</p>	<p>Περιγραφή: ΧΥΤΗ ΓΩΝΙΑ ΕΥΘΥΓΡΑΜΜΙΣΗΣ 24.5 mm Description: CAST ALIGNMENT CORNER 24.5 mm</p>
	<p>Κωδικός Code: EA450-144P</p>	<p>Περιγραφή: ΓΩΝΙΑ ΕΥΘΥΓΡΑΜΜΙΣΗΣ ΓΙΑ ΠΡΟΦΙΛ 450-105/107/108/110/112/113/907 Description: ALIGNMENT CORNER FOR PROFILE 450-105/107/108/110/112/113/907 P=ΠΛΑΣΤΙΚΗ-PLASTIC</p>
	<p>Κωδικός Code: EA450-362U</p>	<p>Περιγραφή: ΓΩΝΙΑ ΓΩΝΙΑΣΤΡΑΣ 8.9 x 18.6 mm Description: CRIMPING CORNER 8.9 x 18.6 mm</p>
	<p>Κωδικός Code: ES205-163</p>	<p>Περιγραφή: ΓΩΝΙΑ ΣΥΝΔΕΣΕΩΣ CAL 14.5 x 14.5 mm Description: CORNER JOINT CAL 14.5 x 14.5 mm</p>
	<p>Κωδικός Code: E4750-151</p>	<p>Περιγραφή: ΠΡΟΣΘΗΚΗ ΓΩΝΙΑΣ ΣΥΝΔΕΣΕΩΣ 14.5 x 4 mm Description: ADDITIONAL CONNECTION CORNER 14.5 x 4 mm</p>
	<p>Κωδικός Code: EA450-366U</p>	<p>Περιγραφή: ΓΩΝΙΑ ΓΩΝΙΑΣΤΡΑΣ 19.4 x 18.6 mm Description: CRIMPING CORNER 19.4 x 18.6 mm</p>
	<p>Κωδικός Code: E4750-383</p>	<p>Περιγραφή: ΘΕΡΜΟΜΟΝΩΤΙΚΗ ΜΠΑΡΑ ΦΥΛΛΟΥ Description: CASEMENT INSULATION BAR</p>
	<p>Κωδικός Code: E2900-585</p>	<p>Περιγραφή: ΑΦΡΟΣ ΜΟΝΩΣΗΣ 35x10mm Description: FOAM INSULATION 35x10mm</p>

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	<p>Κωδικός Code: E2900-586</p>	<p>Περιγραφή: ΑΦΡΟΣ ΜΟΝΩΣΗΣ 19x5mm Description: FOAM INSULATION 19x5mm</p>
	<p>Κωδικός Code: EA570-448M</p>	<p>Περιγραφή: ΕΞΩΤΕΡΙΚΟ ΚΟΥΜΠΩΤΟ ΛΑΣΤΙΧΟ ΤΖΑΜΙΟΥ 3mm (EPDM) Description: EXTERNAL GLAZING GASKET 3mm (EPDM)</p>
	<p>Κωδικός Code: US521-03 (6-7 mm)</p>	<p>Περιγραφή: ΛΑΣΤΙΧΟ ΣΦΗΝΑ ΤΖΑΜΙΟΥ Description: GLAZING GASKET</p>
	<p>Κωδικός Code: EA410-836M</p>	<p>Περιγραφή: ΤΑΠΑ ΝΕΡΟΧΥΤΗ Description: END COVER FOR WATER DRAINAGE</p>



20 21/10/18