



NATIONAL CERTIFIED TESTING LABORATORIES

FIVE LEIGH DRIVE • YORK, PENNSYLVANIA 17406 • TELEPHONE (717) 846-1200
FAX (717) 767-4100
www.nctlinc.com

**AAMA/WDMA/CSA 101/I.S.2/A440-11
CSA A440S1-17**

TEST REPORT SUMMARY

Rendered to:

**Oknoplast Spolka z.o.o.
Ochmanow 117, 32-003 Podleze**

PRODUCT TYPE: Type XO Sliding Glass Door

SERIES/ MODEL: "HST 70"

Title	Summary of Results
Primary Product Designator AAMA/WDMA/CSA 101/I.S.2/A440-11	Class CW-PG45: Size tested 2416 x 2108 mm (~95 x 83 in) - Type SD
Positive Design Pressure	+2160 Pa (+45.11 psf)
Negative Design Pressure	-2160 Pa (-45.11 psf)
Operating Force (in motion _{max})	27 N (6 lbf)
Air Infiltration	0.3 L/s/m ² (0.05 cfm/ft ²)
Canadian Air Infiltration/Exfiltration	A3 Level
Water Penetration Resistance Test Pressure	330 Pa (6.89 psf)
Uniform Load Structural Test Pressure	±3240 Pa (±67.67 psf)
Forced Entry Resistance	ASTM F842-13 - Grade 10 Pass

Test Completed: 03/09/18

Reference must be made to Report No. NCTL-110-20789-1 dated 03/29/18 for complete test specimen description and data.

For National Certified Testing Laboratories


DIGITAL SIGNATURE

Justin L. Bupp
Laboratory Manager



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**AAMA/WDMA/CSA 101/I.S.2/A440-11
CSA A440S1-17**

STRUCTURAL TEST REPORT

NCTL-110-20789-1

REPORT TO:
**OKNOPLAST SPOLKA z.o.o.
OCHMANOW 117, 32-003 PODLEZE**

REPORT NUMBER: NCTL-110-20789-1
REPORT DATE: 03/29/18

PRODUCT TYPE: TYPE XO SLIDING GLASS DOOR

SERIES/ MODEL: "HST 70"



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Report Number NCTL-110-20789-1

Report Date 03/29/18

Report To Oknoplast Spolka z.o.o.
Ochmanow 117, 32-003 Podleze

Date Testing Started 03/08/18
Date Testing Completed 03/09/18

Specification AAMA/WDMA/CSA 101/I.S.2/A440-11
NAFS 2011 - North American Fenestration Standard/Specification for windows, doors, and skylights

CSA A440S1-17
Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard/ Specification for windows, doors, and skylights

Performance Results AAMA/WDMA/CSA 101/I.S.2/A440-11
Class CW-PG45: Size tested 2416 x 2108 mm (~95 x 83 in)-Type SD

Description of Specimen Tested

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

Model/ Series "HST 70"

Configuration Type XO - Sliding Glass Door

Frame Size Overall
2416 mm x 2108 mm (95.125" x 83")

Panel Size (2) 1187 mm x 2019 mm (46.75" x 79.5")

Viewing Area (2) 991 mm x 1822 mm (39" x 71.75")

Frame & Panel Type Extruded vinyl

Joint Construction Head/ Jambs
(4) Screw butt-type

Threshold/ Jambs
(3) Screw butt-type with plastic spacer block

Fixed Panel to Frame
The fixed panel was fastened to the frame with (5) screws at the jamb and (4) screws at the rails

Panels
Mitered, welded

Glazing Components
Overall 24.13 mm (0.950") nominal
Glass Thickness (2) Lites of 4 mm (0.150") nominal annealed glass
Spacer Type/Size 16.51 mm (0.650") Desiccant-filled aluminum spacer (Type A1-D)
Glazing System Interior glazed with a (2)-leaf bulb-vinyl back-bedding and a snap-in (2)-leaf dual durometer rigid vinyl glazing bead

Weatherstrip

Type	(2) Strips (2)-leaf (2) flexible bulb-vinyl
Location	Rails and jamb stiles
Type	(1) Strip (2)-leaf (2) flexible bulb-vinyl
Location	Meeting stiles
Type	(1) Strip center fin
Size	6.86 mm (0.270") high
Location	Active portion of the center head leg
Type	(1) Felt-wrapped foam pad
Location	Head at the exterior meeting stile
Type	Closed cell foam plug
Location	Each end of the fixed meeting stile and active jamb/ head corner
Type	Rubber bumper
Location	Top of the active meeting stile

Operating Hardware

Locks	
Type	Single handle integrated (2)-point lock/ roller lifter
Location	1010 mm (39.75") From the bottom of the lock stile
Keeper	
Type	Metal
Location	Active jamb at the lock locations

Auxiliary

Type	Dual nylon rollers with metal housing
Location	Each end of the active bottom rail
Type	Rigid vinyl alignment block
Location	Bottom of the fixed meeting stile
Type	Rigid vinyl interlock
Location	Meeting stiles fastened with (1) screw at each end
Type	Rigid vinyl cover
Location	Meeting stiles
Type	Extruded aluminum roller track
Location	Interior sill track
Type	Extruded aluminum threshold
Location	Active portion of the exterior sill track
Type	Rubber filler
Location	Center sill section of the fixed portion of the head and sill
Type	Plastic anti-lift block
Location	Each end of the top rail
Type	Rigid vinyl spacer block
Location	216 mm (8.5") From each end and midspan of the active bottom rail
Type	Extruded aluminum fixed panel spacer
Location	Fixed portion of the exterior sill track

Reinforcement

Type	Steel L-shaped tube
Thickness	22.86 mm (0.090")
Location	Active panel largest hollow and fixed meeting stile fastened with (6) evenly spaced screws at the verticals and (4) at the horizontals.

Reinforcement (continued)

Type	Steel L-shaped
Thickness	2.03 mm (0.080")
Location	Fixed panel rails and jamb stile
Type	Extruded aluminum with polyamide thermal break
Thickness	2.54 mm (0.100")
Location	Head and jambs

Weep Description

Size	33 mm (1.300") wide by 5.08 mm (0.200") high
Location	35.56 mm (1.400") From each end of the rails glazing channel
Size	30 mm (1.200") wide by 5.08 mm (0.200") high
Location	197 mm (7.75") From each end of the bottom rails horizontal face
Size	5.08 mm (0.200") Diameter
Location	127 mm (5") From each end of the top rail exterior face

**Interior/ Exterior
Surface Finish**

White vinyl (PVC)

Sealant

Location	Top of the meeting stiles
Material	Silicone

Insect Screen

No screen applied

Installation Method

The door was installed in a 102 mm x 102 mm (4" x 4") spruce-pine-fir lumber test buck and fastened through the outside of the buck with (1) #12 x 140 mm (5.5") flat head screw located 152 mm (6") from each end and 305 mm (12") on center thereafter at the frame perimeter. The exterior perimeter was sealed with silicone sealant.

Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011

<u>Paragraph</u>	<u>Test</u>
9.3.1	Operating Force and Force to Latch - Method B (Force Gauge) ASTM E2068-00(08)
	Initiate Motion = 31 N (7 lbf)
	Allowed (CW Rating ₁₁) = 180 N (40.47 lbf)
	Maintain Motion - Opening = 27 N (6 lbf)
	Maintain Motion - Closing = 18 N (4 lbf)
	Allowed (CW Rating ₁₁) = 115 N (25.85 lbf)
	Latches = 36 N (8 lbf)
	Allowed = 100 N (22.5 lbf)

NOTE: The results above represent the maximum force among all sash tested.

<u>Paragraph</u>	<u>Test</u>
9.3.2	Air Leakage Resistance ASTM E547-00(09) The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 for air infiltration at 75 Pa (1.6 psf). Maximum Allowable = 1.5 L/s/m ² (0.3 cfm/ft ²) Total Air Leakage = 1.30 L/s (2.75 cfm) Extraneous Air Leakage _{Tare} = <0.01 L/s (<0.01 cfm) Net Air Leakage = 1.30 L/s (2.75 cfm) Air Infiltration Rate = 0.3 L/s/m ² (0.05 cfm/ft ²)

<u>Paragraph</u>	<u>Test</u>
9.3.3	Water Penetration Resistance ASTM E547-00(09) <u>3.4 L/ (min• m²) (5.0 gph/ft²)</u> No Leakage after 4 cycles of 5 minutes at 330 Pa (6.89 psf) NOTE: Tested without insect screen

<u>Paragraph</u>	<u>Test</u>
9.3.4.2	Uniform Load Deflection at Design Pressure ASTM E330-14 No damage after positive 2160 Pa (45.11 psf) held for 10 seconds No damage after negative 2160 Pa (45.11 psf) held for 10 seconds Measured Deflection _{Positive} = 11.00 mm (0.433 inches) Measured Deflection _{Negative} = 10.46 mm (0.412 inches) Maximum Allowed (_{L/175}) = 11.53 mm (0.454 inches)

<u>Paragraph</u>	<u>Test</u>
9.3.4.3	Uniform Load Structural Test ASTM E330-14 No damage after positive 3240 Pa (67.67 psf) held for 10 seconds No damage after negative 3240 Pa (67.67 psf) held for 10 seconds Measured Permanent Set _{Positive} = 2.03 mm (0.080 inches) Measured Permanent Set _{Negative} = 0.97 mm (0.038 inches) Maximum Allowed (0.3%) = 6.07 mm (0.239 inches) NOTE: Deflection and Permanent Set measurements taken on the meeting stile over a 2019 mm (79.5”) span.

<u>Paragraph</u>	<u>Test</u>
9.3.5	Forced Entry Resistance ASTM F842-13 <u>Type A SGD Assembly/Grade 10:</u> = Pass <u>Test</u> Hardware Manipulation Test = No Entry Test A1 = No Entry Test A2 = No Entry Test A3 = No Entry Test A4 = No Entry

Test A5	=	No Entry
Test A6	=	No Entry
Hardware Manipulation Test	=	No Entry
<u>Type D SGD Assembly/Grade 10:</u>	=	Pass
<u>Test</u>		
Test D1	=	No Entry
Test D2	=	No Entry
Test D3	=	No Entry
Hardware Manipulation Test	=	No Entry

NOTE: 1. T1 = 5 minutes, L1 = 1334 N (300 lbf), L2 = 778 N (175 lbf), L3 = 133 N (30 lbf), L4 = 222 N (50 lbf) plus weight of panel.
2. Loads were held for 60 seconds.

<u>Paragraph</u>	<u>Test</u>
9.3.6.2	Thermoplastic Corner Weld Test (PVC products only) = Pass

<u>Paragraph</u>	<u>Test</u>
9.3.6.3	Deglazing Test
	ASTM E987-88(09)
	<u>Active Panel (Interior)</u>
	Rails – 230 N (51.71 lbf)
	Maximum Allowed = 90% (100%)
	Top Rail = 4.1%
	Bottom Rail = 3.7%
	Stiles – 320 N (71.94 lbf)
	Maximum Allowed = 90% (100%)
	Jamb Stile = 11.0%
	Meeting Stile = 10.7%
	<u>Active Panel (Exterior)</u>
	Rails – 230 N (51.71 lbf)
	Maximum Allowed = 90% (100%)
	Top Rail = 4.3%
	Bottom Rail = 3.9%
	Stiles – 320 N (71.94 lbf)
	Maximum Allowed = 90% (100%)
	Jamb Stile = 11.2%
	Meeting Stile = 11.0%

NOTE: The glass bite was approximately 12.7 mm (0.5")

Test Results - CSA A440S1-17

<u>Paragraph</u>	<u>Test</u>
5.2	Operating Force and Force to Latch - Method B (Force Gauge)
	ASTM E2068-00(08)
	Initiate Motion = 31 N (7 lbf)
	Allowed = 135 N (30.35 lbf)
	Maintain Motion - Opening = 27 N (6 lbf)
	Maintain Motion - Closing = 18 N (4 lbf)
	Allowed = 90 N (20.23 lbf)
	Latches = 36 N (8 lbf)
	Allowed = 100 N (22.5 lbf)

NOTE: The results above represent the maximum force among all sash tested.

<u>Paragraph</u>	<u>Test</u>
5.3	Canadian Air Infiltration/Exfiltration ASTM E283-04(12) The tested specimen meets or exceeds the performance levels specified in CSA A440S1-17 for air infiltration at 75 Pa (1.57 psf) A3 Level Maximum Allowable = 0.5 L/s/m ² (0.1 cfm/ft ²) <u>Infiltration</u> Total Air Leakage = 1.30 L/s (2.75 cfm) Extraneous Air Leakage _{Tare} = <0.01 L/s (<0.01 cfm) Net Air Leakage = 1.30 L/s (2.75 cfm) Air Infiltration Rate = 0.3 L/s/m ² (0.05 cfm/ft ²) <u>Exfiltration</u> Total Air Leakage = 1.21 L/s (2.57 cfm) Extraneous Air Leakage _{Tare} = <0.01 L/s (<0.01 cfm) Net Air Leakage = 1.21 L/s (2.57 cfm) Air Infiltration Rate = 0.3 L/s/m ² (0.05 cfm/ft ²)

<u>Paragraph</u>	<u>Test</u>
5.4	Water Penetration Resistance ASTM E547-00(09) <u>3.4 L/ (min• m²) (5.0 gph/ft²)</u> No Leakage after 4 cycles of 5 minutes at 330 Pa (6.89 psf) NOTE: Tested without insect screen

This test report was prepared by National Certified Testing Laboratory (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F842-13 test method. Foam tape is mounted to the perimeter of the test buck prior to clamping to the test wall. It is the assertion of this laboratory that any film employed during testing does not affect measurement values. NCTL is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained per applicable requirements by NCTL. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. Tests were performed in the order set forth by the applicable standard or specification. This report is the joint property of National Certified Testing Laboratories Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except its entirety, without the written consent of NCTL.

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Justin L. Bupp
Laboratory Manager

JLB/ dro
Attachments
Appendix A – Revision Summary
Appendix B – Drawings

Appendix A

Revision Log

<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	03/29/18	Not Applicable

Appendix B

Drawings

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were reviewed (as submitted) for Product Verification. Detailed assembly drawings showing wall thicknesses of all members, corner construction and hardware application are on file and have been compared to the test sample submitted.

(Reference: NCTL-110-20789-1)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained by NCTL per applicable retention requirements. This testing facility assumes that all information provided by the client is accurate.

BILL OF MATERIALS: HST 70 Sliding Glass Door

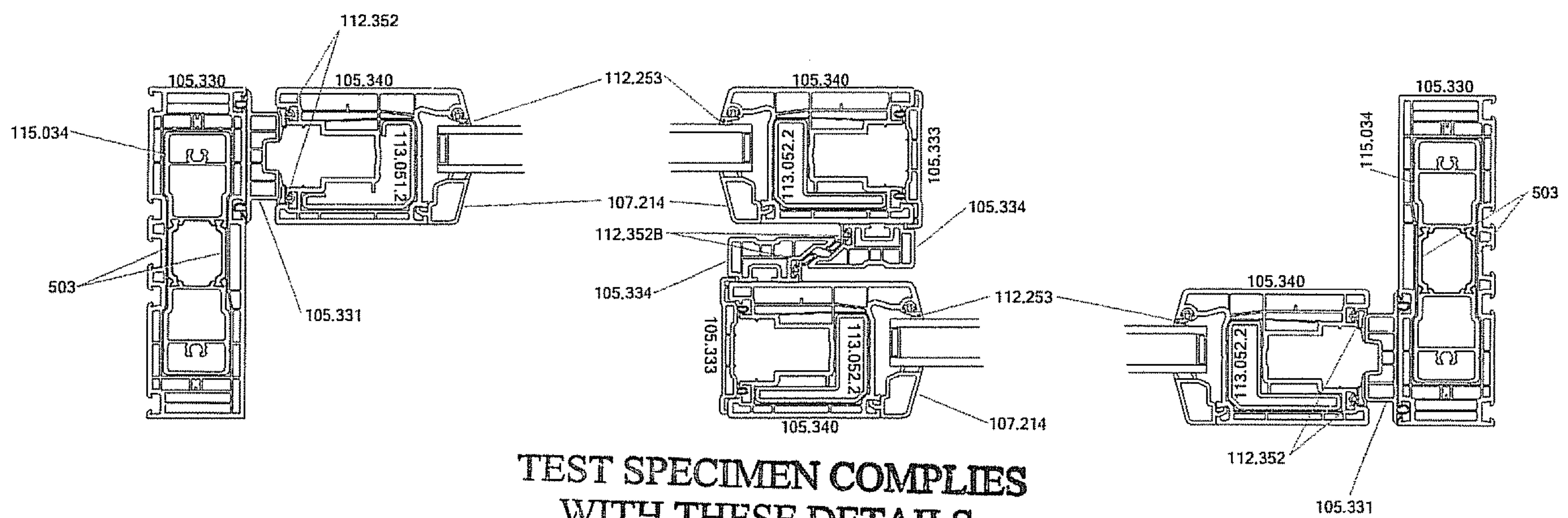
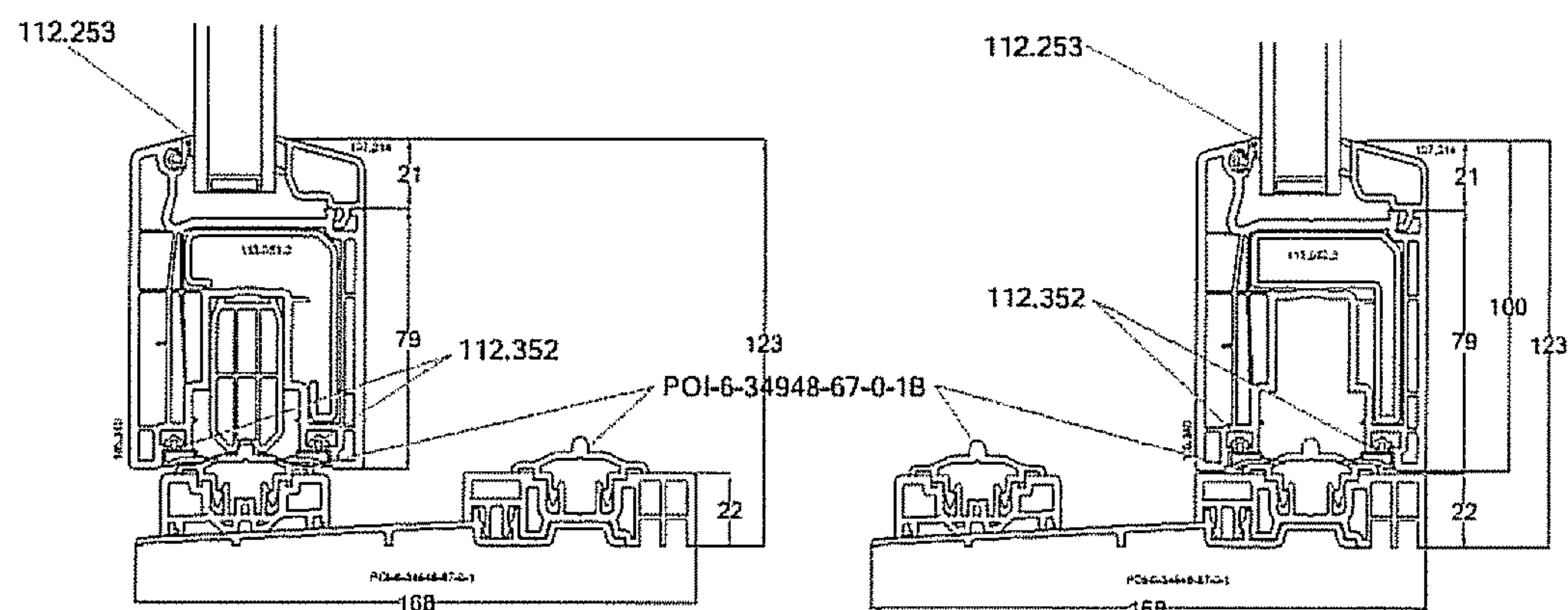
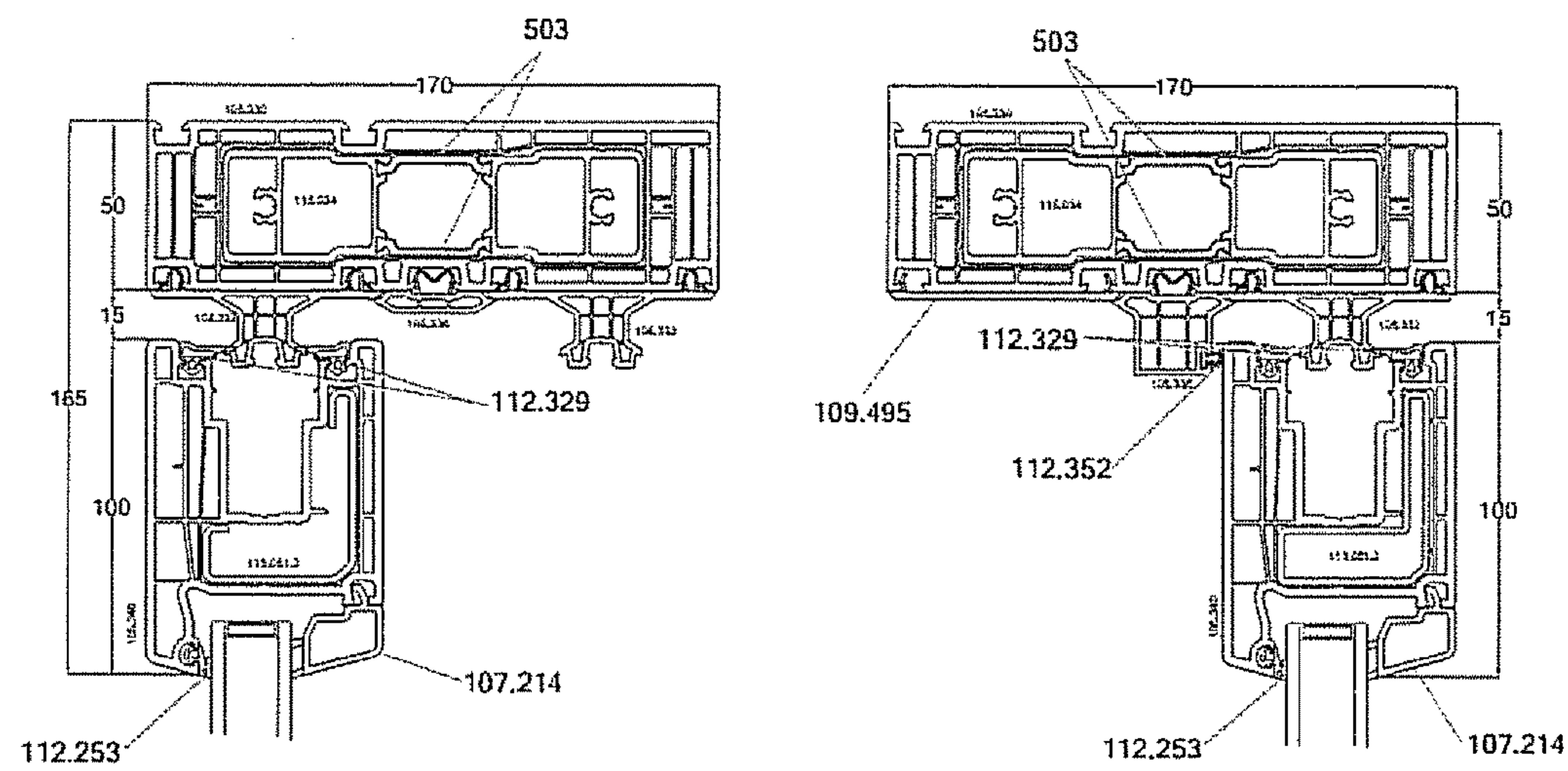
<u>Part#</u>	<u>Part Name</u>	<u>Material</u>
POI-6-34948-67-0-1	Sill Frame	Anodized Aluimnum/Rigid Vinyl (PVC)
105.330	Head/Jamb Frame	Rigid Vinyl (PVC)
105.340	Main Sash	Rigid Vinyl (PVC)
115.034	Head/Jamb Insert	Anodized Aluminum
107.214	Glazing Bead 24mm IG	Rigid/Flexible Vinyl (PVC)
107.218	Glazing Bead 35-38mm IG	Rigid/Flexible Vinyl (PVC)
107.208	Glazing Bead 39-40mm IG	Rigid Vinyl (PVC)
105.206	Left Sill Sash Insert	Rigid Vinyl (PVC)
105.331	Jamb Sash Adapter	Rigid Vinyl (PVC)
105.332	Head Sash Adapter	Rigid Vinyl (PVC)
105.335	Right Head Frame Adapter	Rigid Vinyl (PVC)
105.336	Left Head Frame Cap	Rigid Vinyl (PVC)
109.495	Right Head Frame Cap	Rigid Vinyl (PVC)
105.334	Meeting Rail Adapter	Rigid Vinyl (PVC)
105.333	Meeting Rail Cap	Rigid Vinyl (PVC)
POI-6-34948-67-0-1B	Slider Track	Anodized Aluminum
113.051.2	Reinforcement 1	Galvanized Steel
113.052.2	Reinforcement 2	Galvanized Steel
503	Thermal Break	Polyamide
112.329	Frame Gasket	Ethylene Propylene Diene Monomer (EPDM)
112.352	Sash Gasket	Ethylene Propylene Diene Monomer (EPDM)
112.352B	Meeting Rail Gasket	Ethylene Propylene Diene Monomer (EPDM)
112.253	Glazing Gasket	Ethylene Propylene Diene Monomer (EPDM)
502	39-40mm IG Glazing Bead Gasket	Ethylene Propylene Diene Monomer (EPDM)
500	8mm x 26mm Decorative Grid	Painted Aluminum
501	5.85mm x 8mm Decorative Grid	Painted Aluminum

**TEST SPECIMEN COMPLIES
WITH THESE DETAILS.**

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018

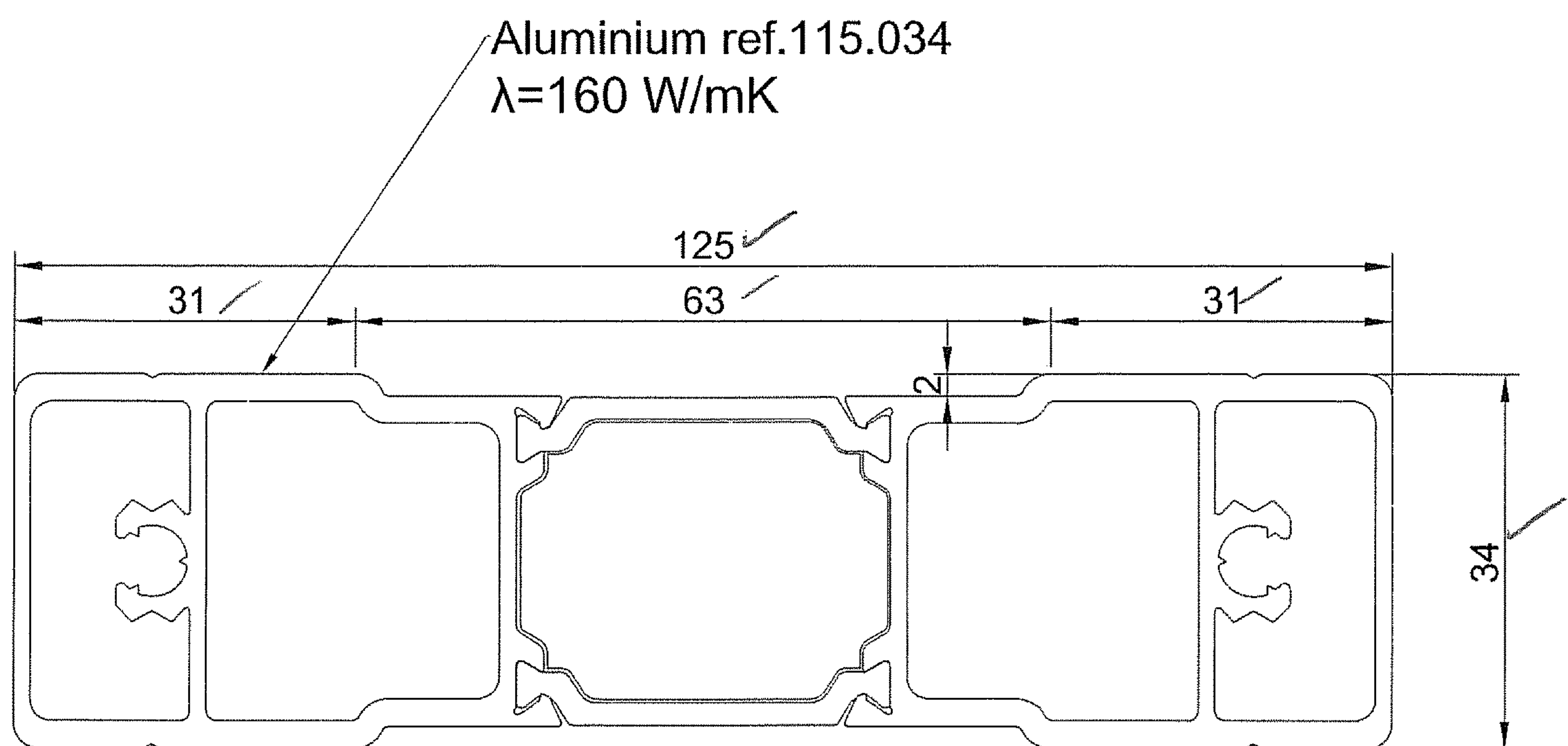


TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 26789-7

TEST DATE: MAR 09 2018



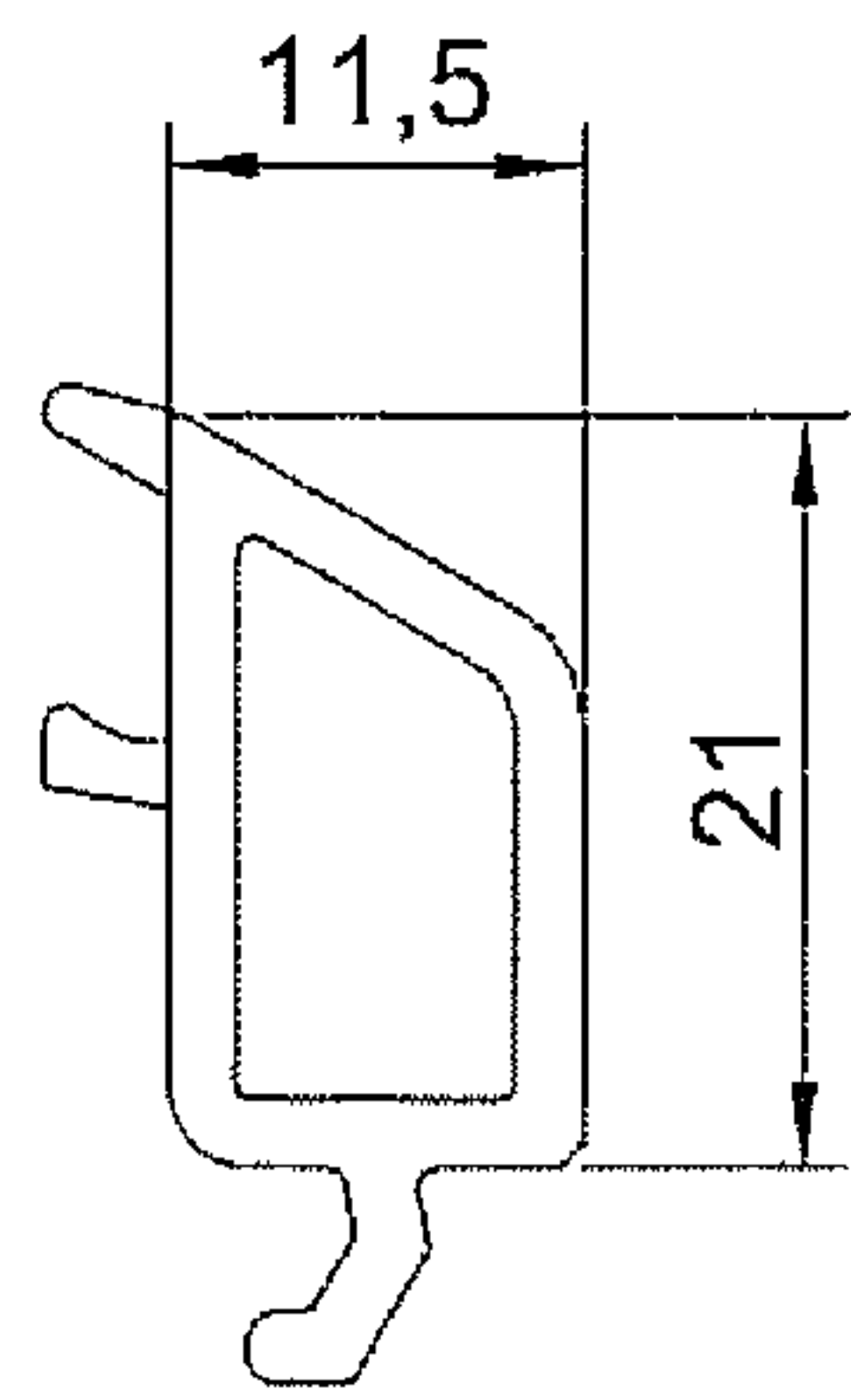
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TEST SPECIMEN COMPLIES
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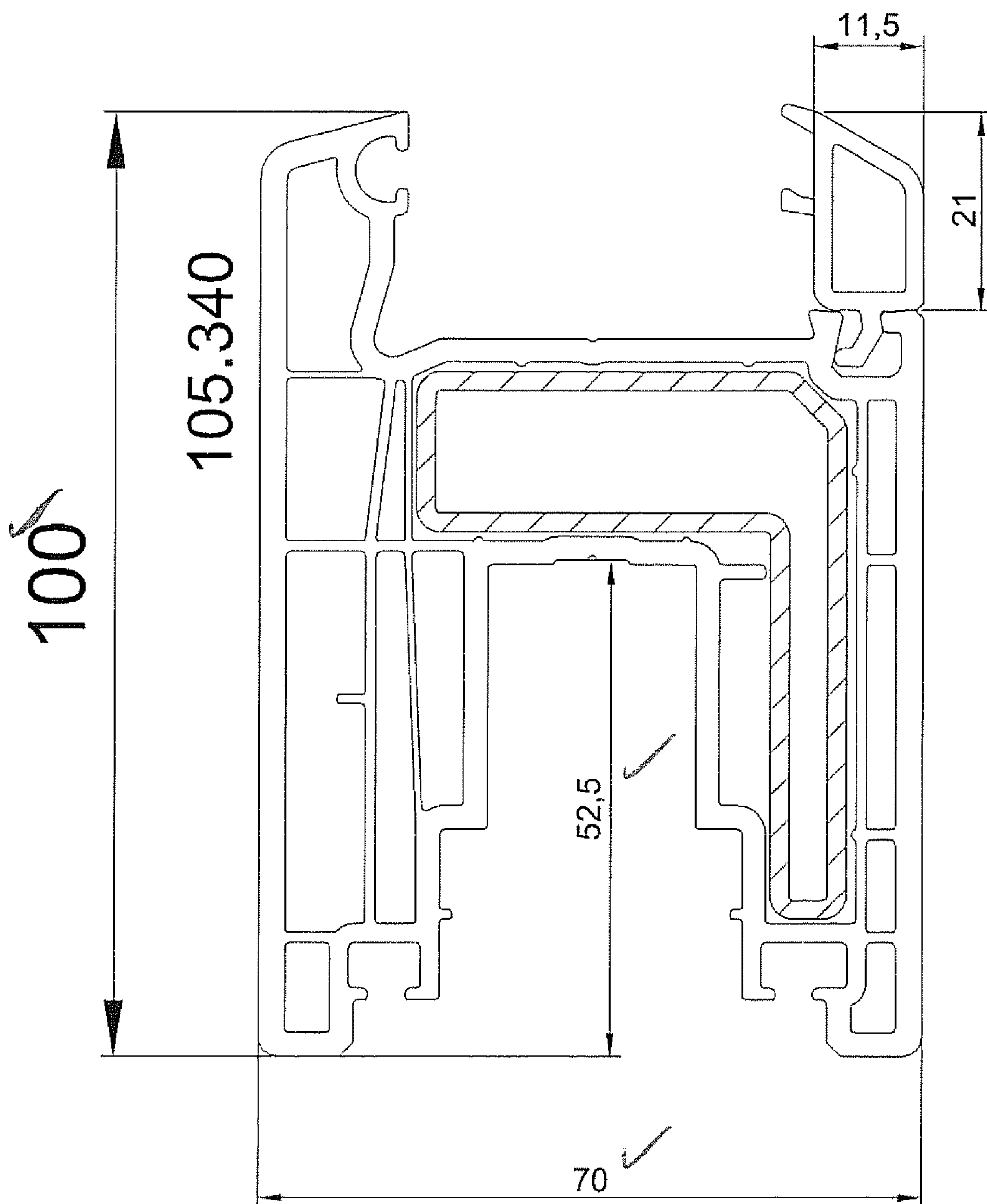
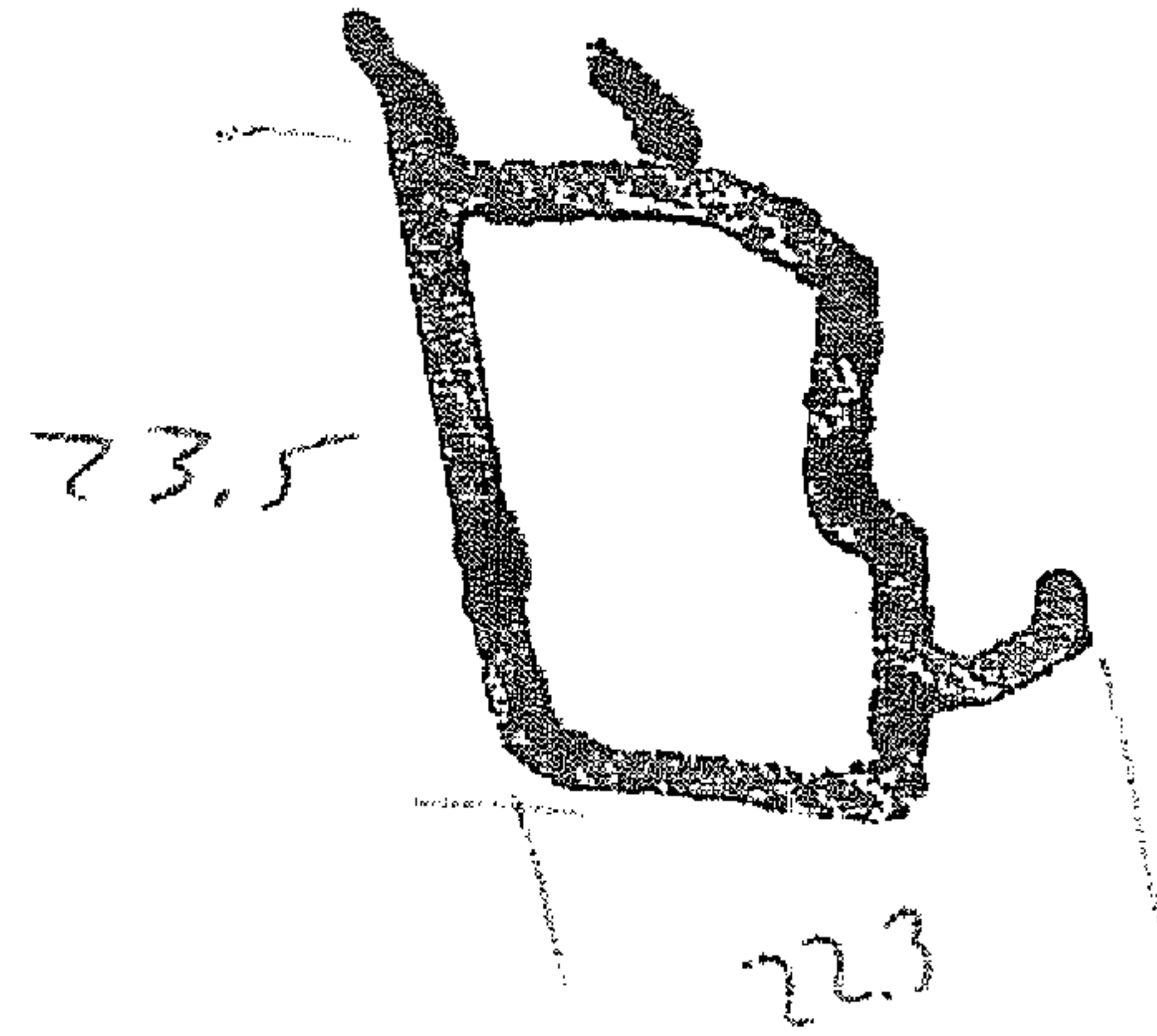
ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20748-1

TEST DATE: MAR 09 2018



107.218
Glazing 35-38mm

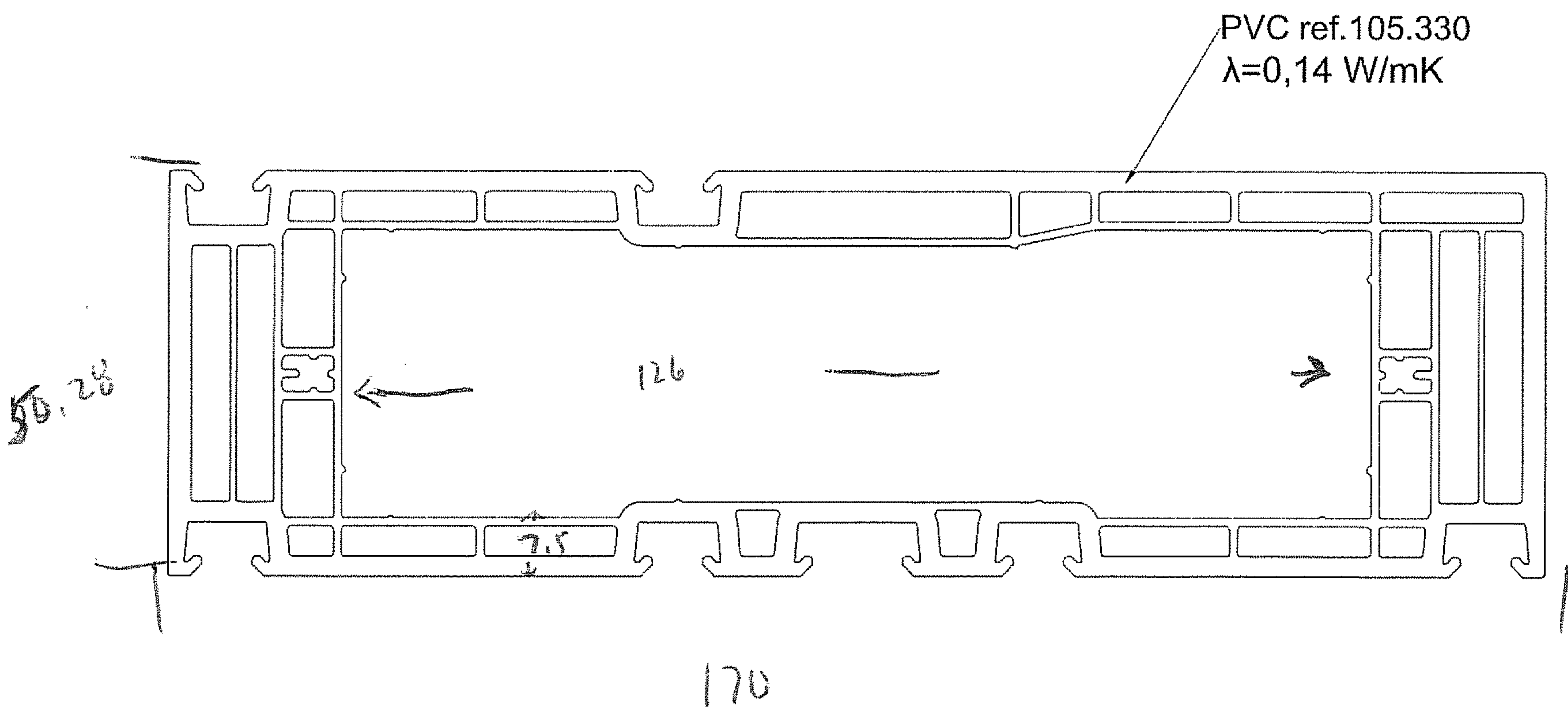


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REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018

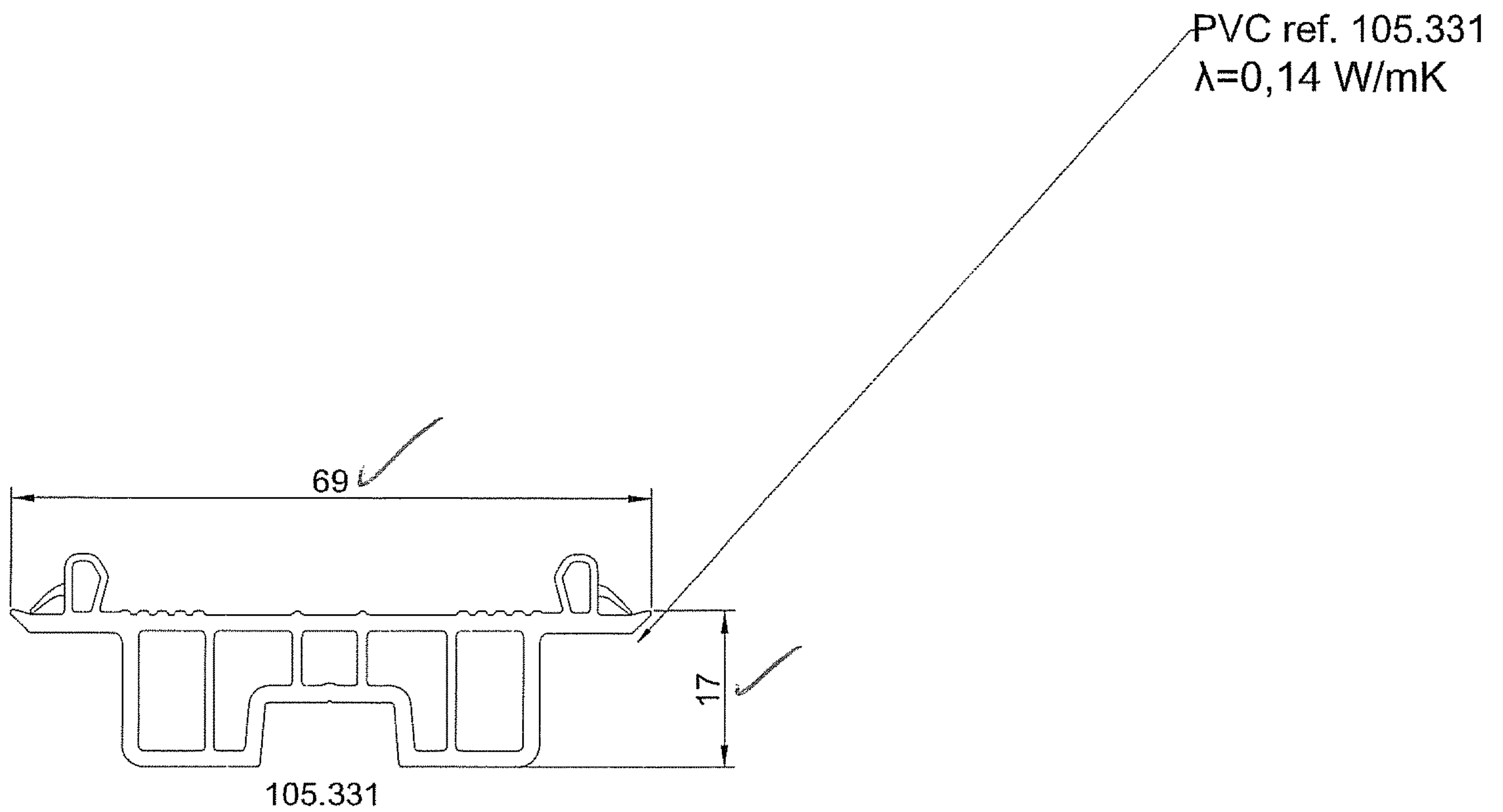


TEST SPECIMEN COMPLIES
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REPORT NO. NCTL-110- 20788-1

TEST DATE: MAR 09 2018



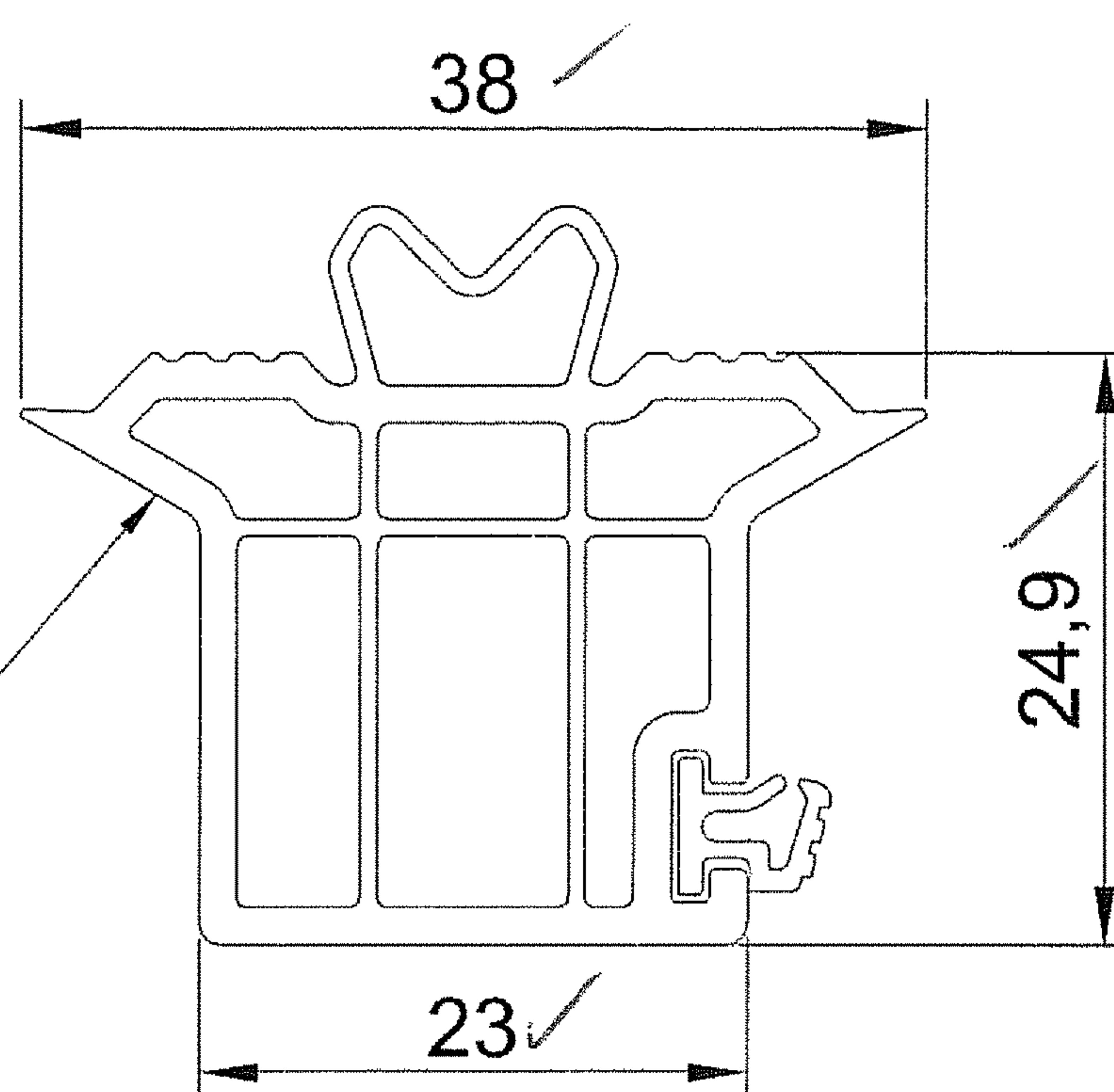
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ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018

PVC ref.105.335
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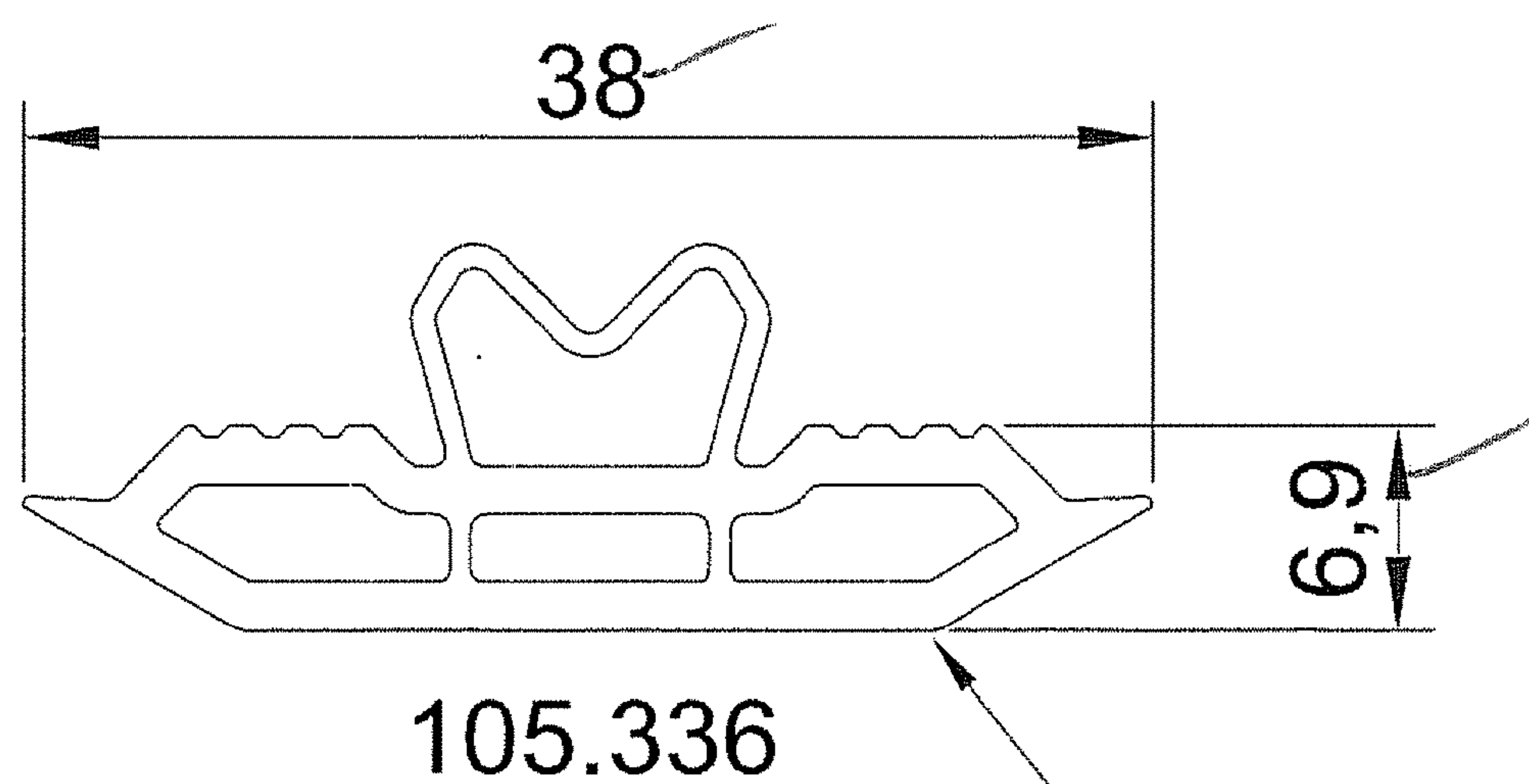
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TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20749-1

TEST DATE: MAR 09 2018



PVC ref.105.336
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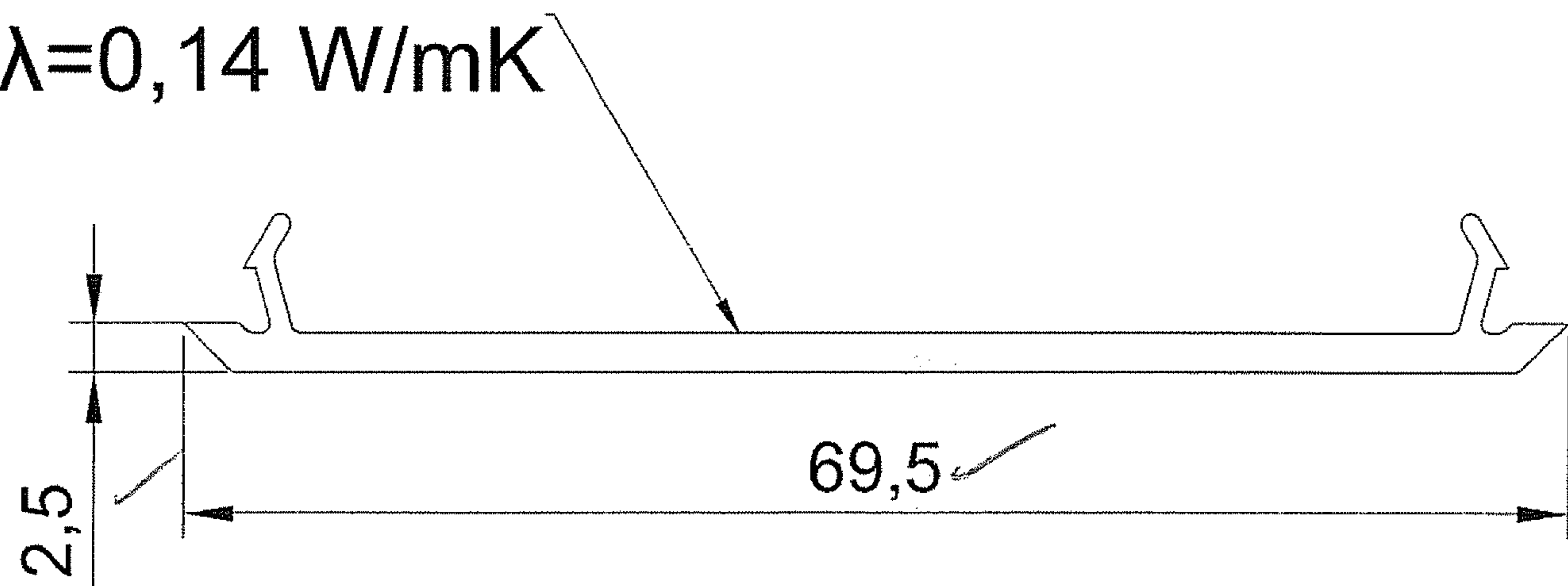
TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20788-1

TEST DATE: MAR 09 2018

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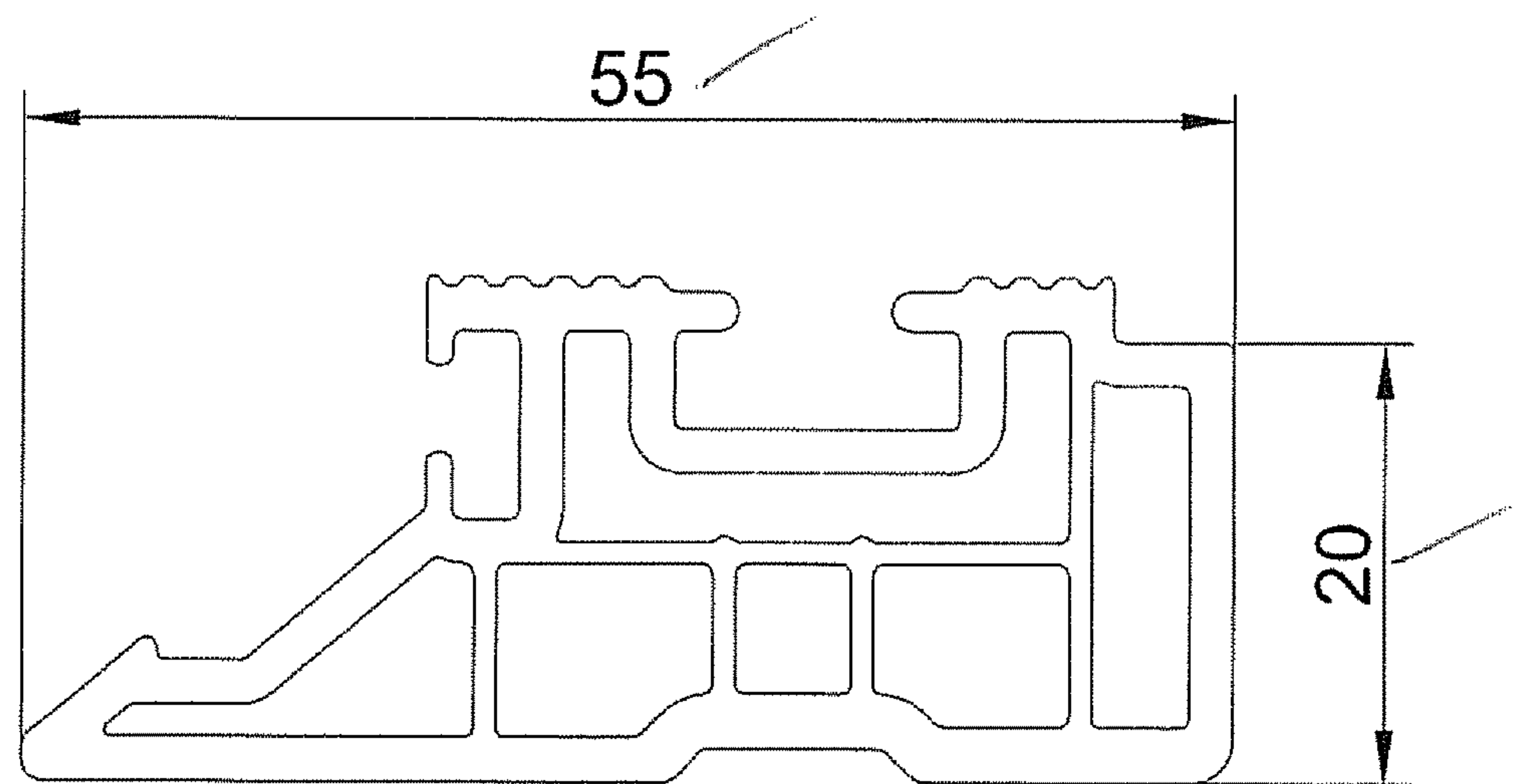
109.495

TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20787-1

TEST DATE: MAR 09 2018



105.334

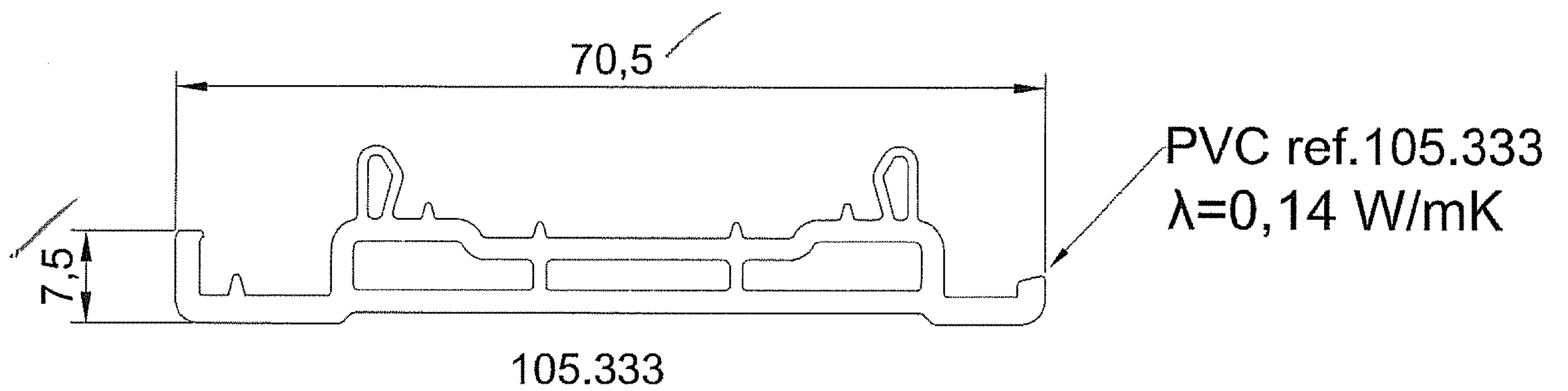
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TEST SPECIMEN COMPLIES
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ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20768-1

TEST DATE: MAR 09 2018

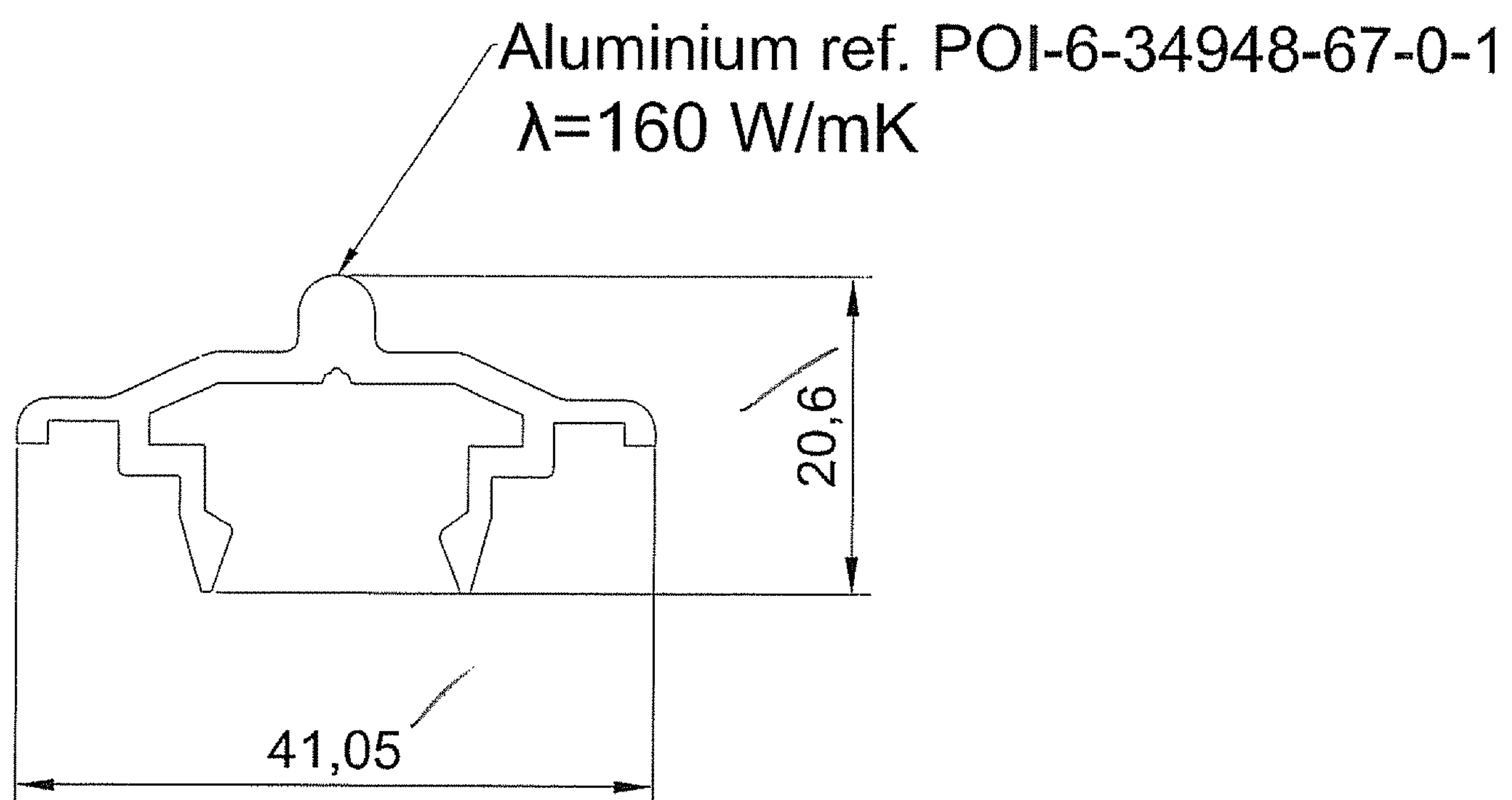


TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20788-1

TEST DATE: MAR 09 2018



TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

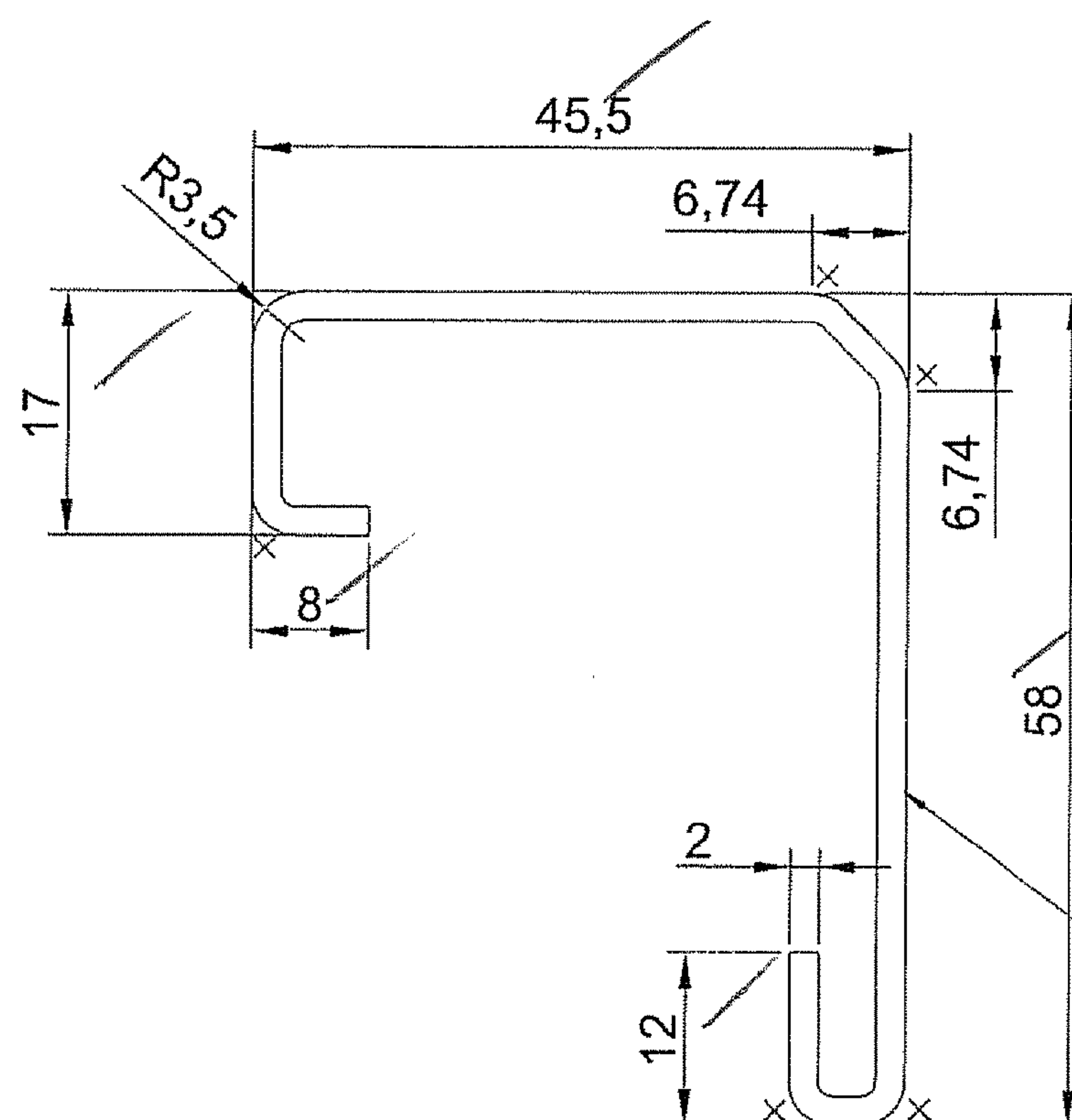
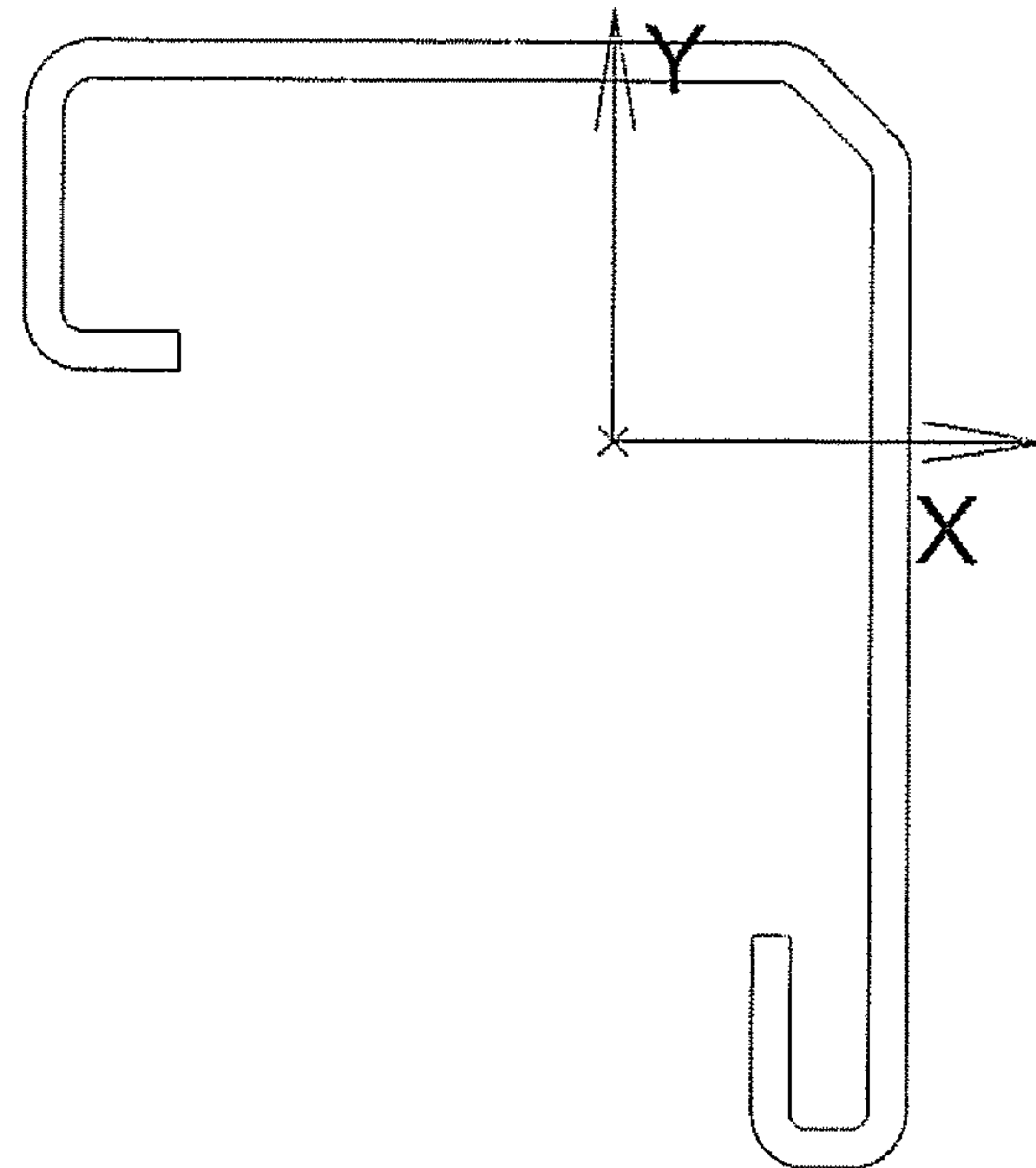
REPORT NO. NCTL-110- 20288-1

TEST DATE: MAR 09 2018

MOMENT OF INERTIA:

$I_x: 10,17 \text{ cm}^4$

$I_y: 7,04 \text{ cm}^4$



TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018

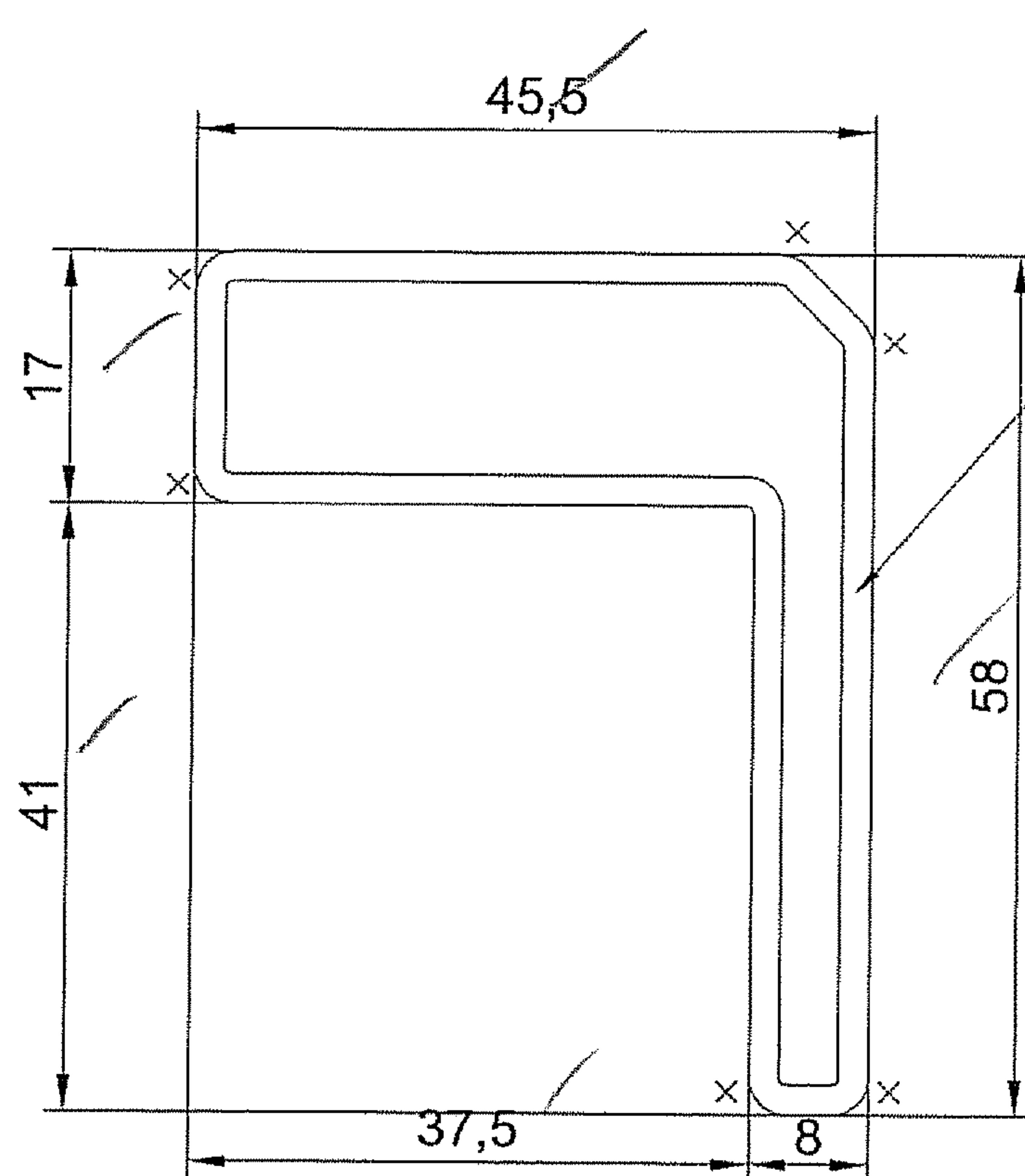
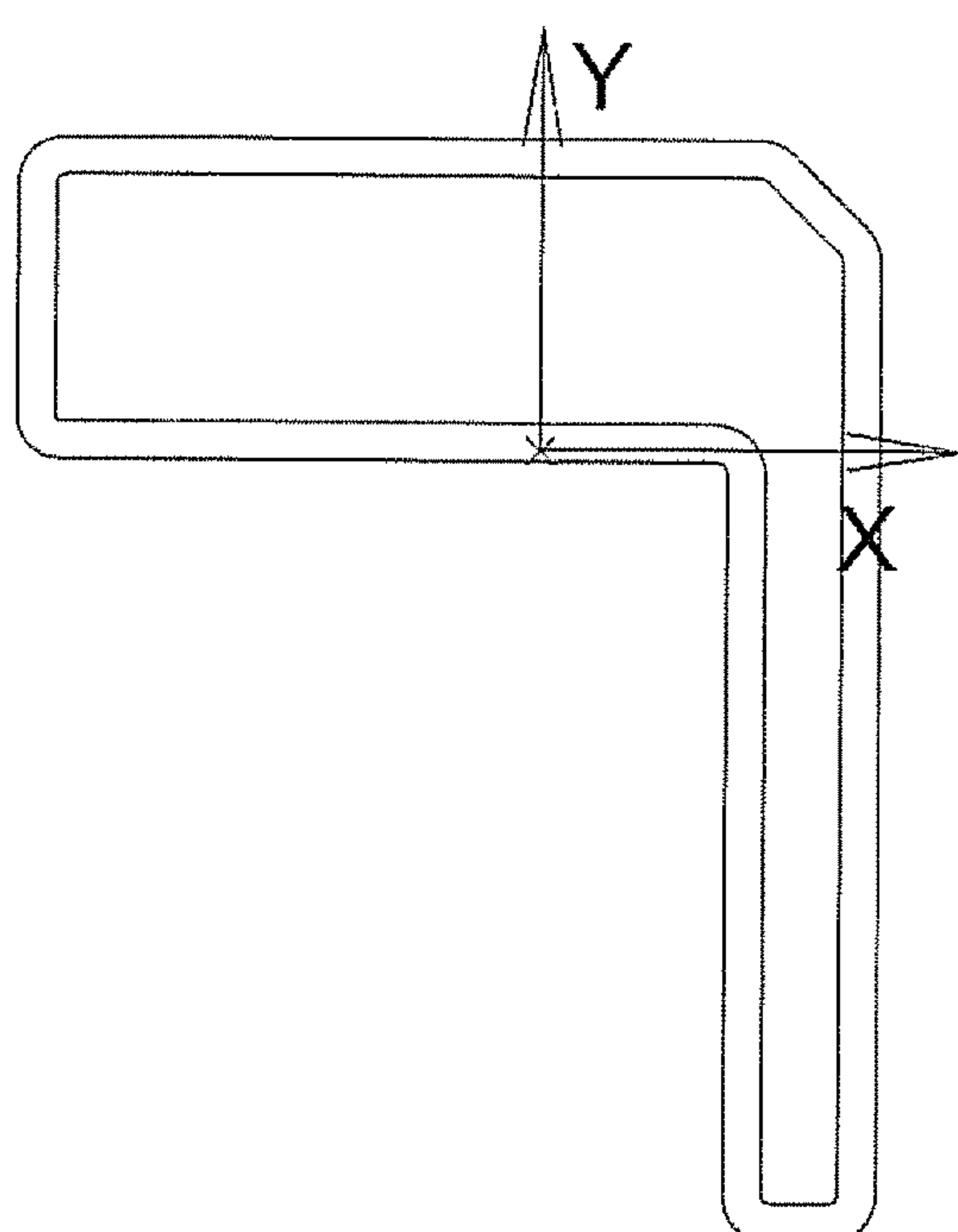
steel ref.113.051.2
 $\lambda=50 \text{ W/mK}$

113.051.2
× r=3 mm

MOMENT OF INERTIA:

$I_x: 11,28 \text{ cm}^4$

$I_y: 8,17 \text{ cm}^4$



steel ref.113.052.2
 $\lambda=50 \text{ W/mK}$

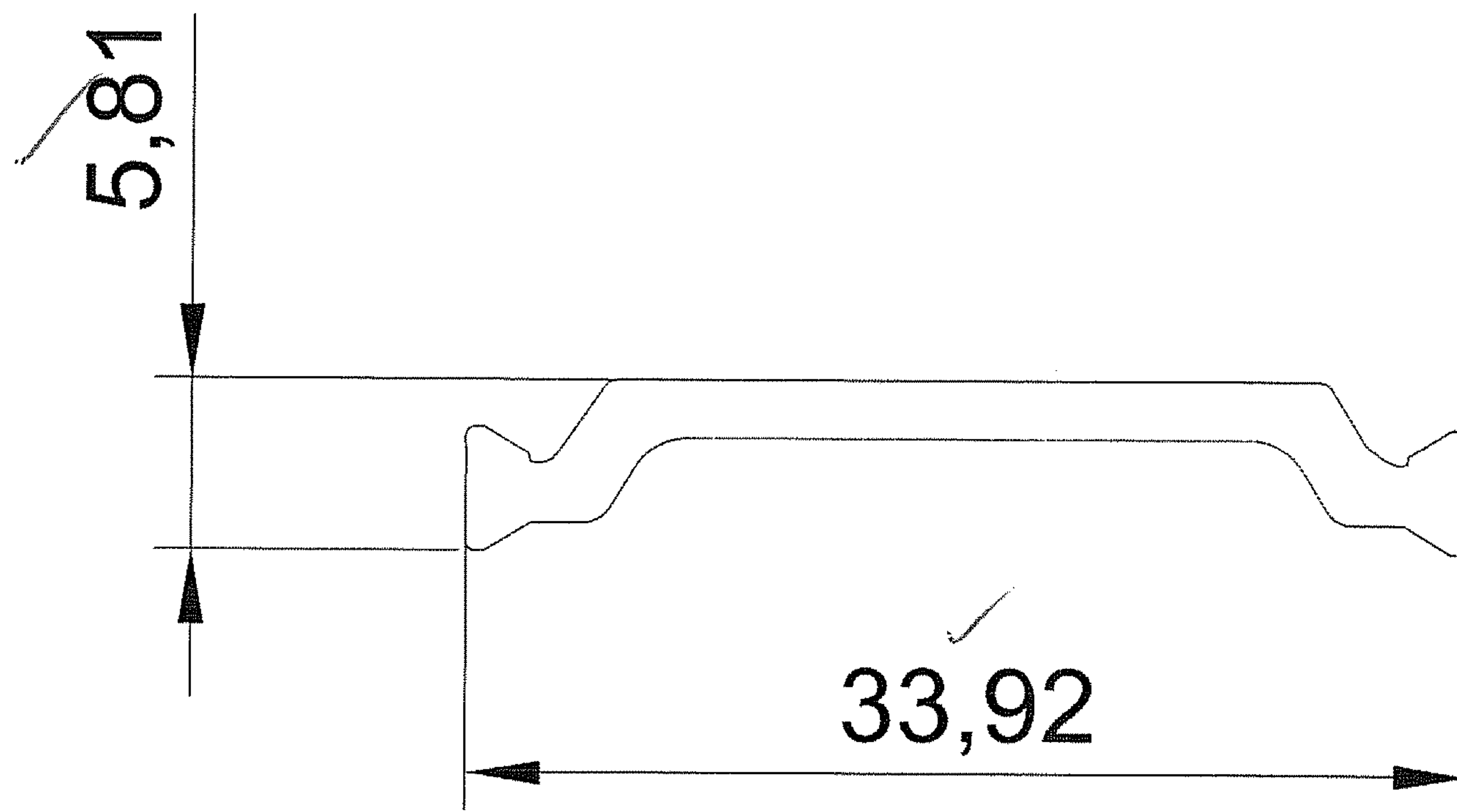
TEST SPECIMEN COMPLIES
 WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018

51.2



Part No. 503

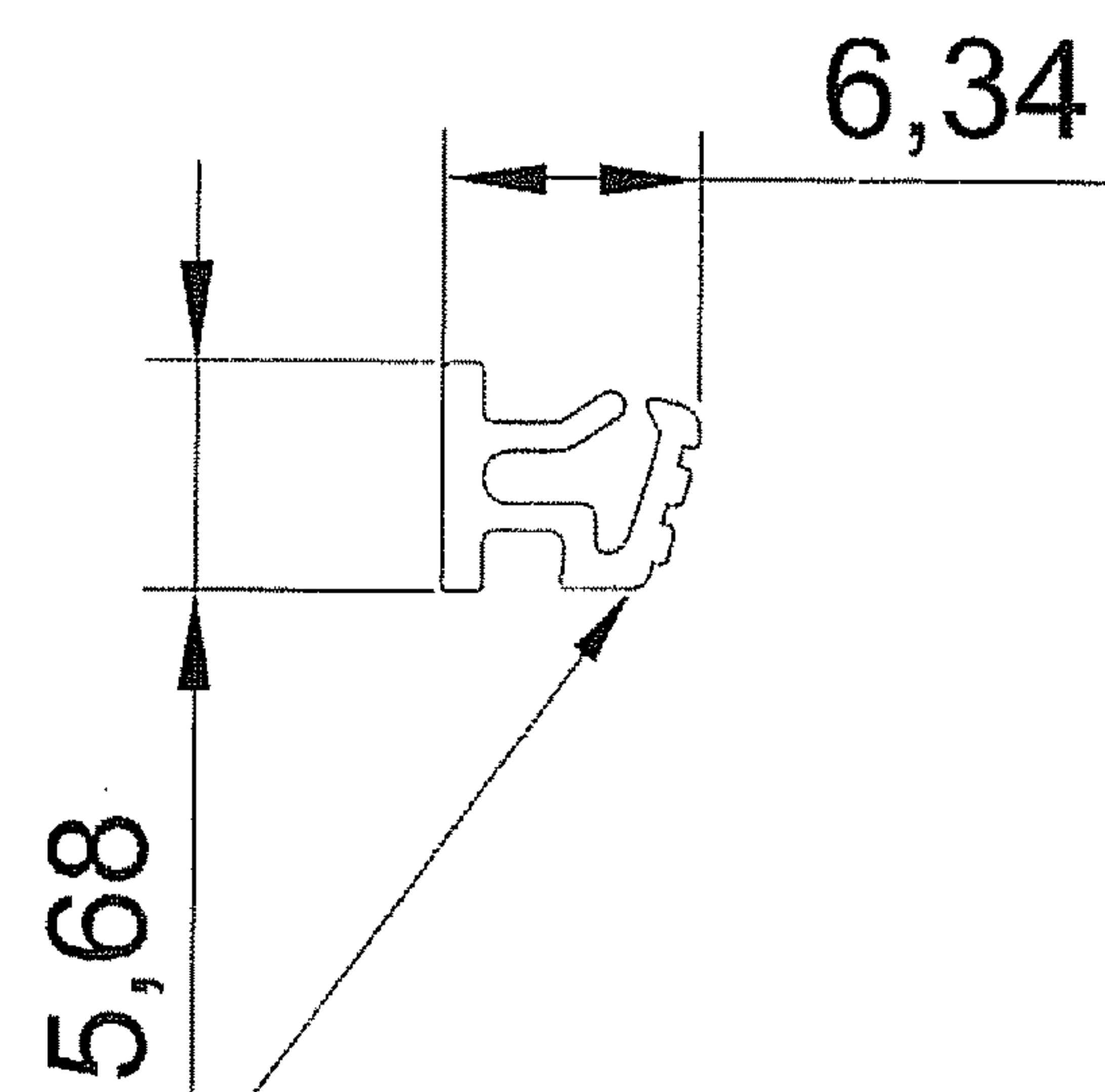
TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20768-1

TEST DATE: MAR 09 2018

EPDM ref. 112.329
 $\lambda=0,25 \text{ W/mK}$

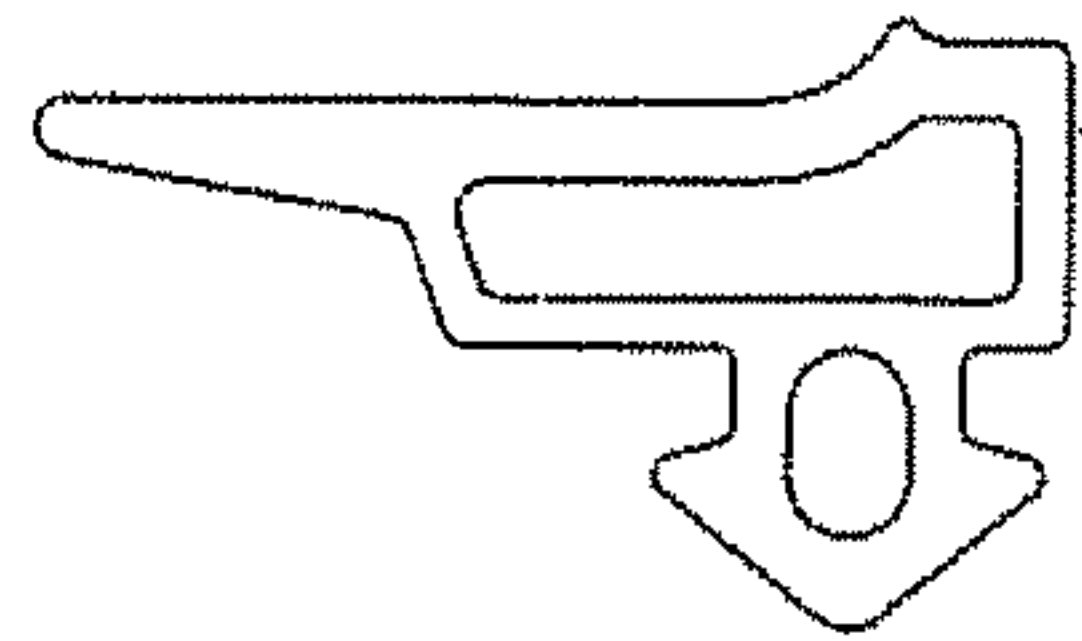


TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20788-1

TEST DATE: MAR 09 2018



EPDM ref. 112.352
 $\lambda=0,25$ W/mK

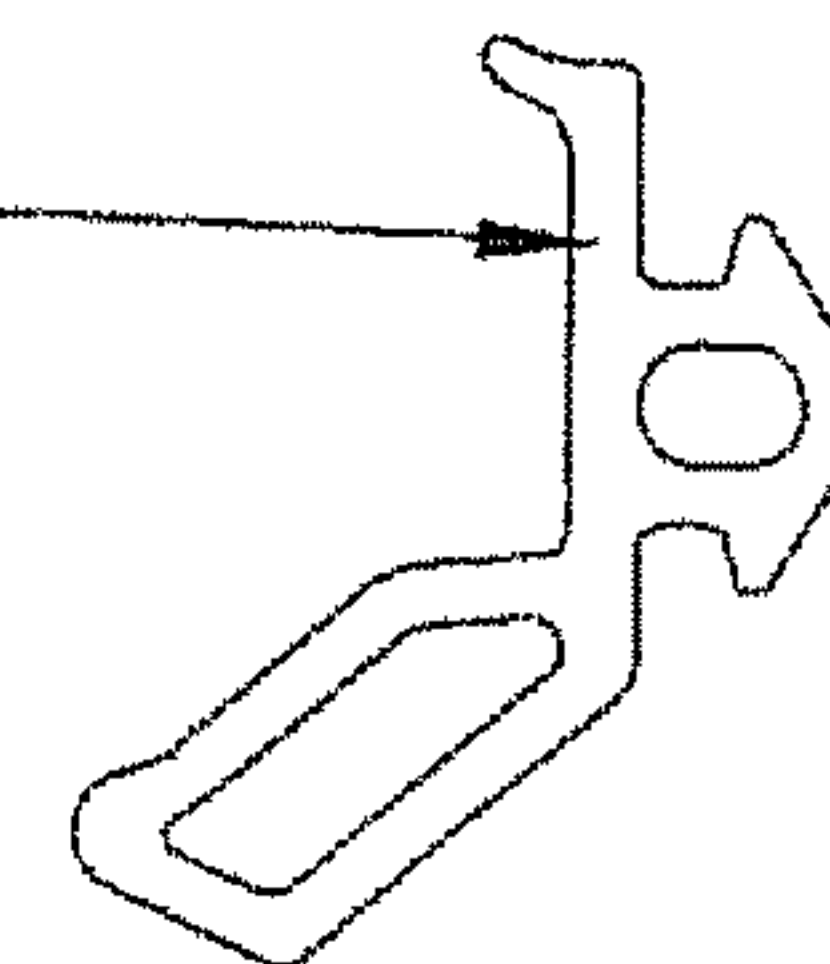
TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018

EPDM ref. 112.352
 $\lambda=0,25$ W/mK



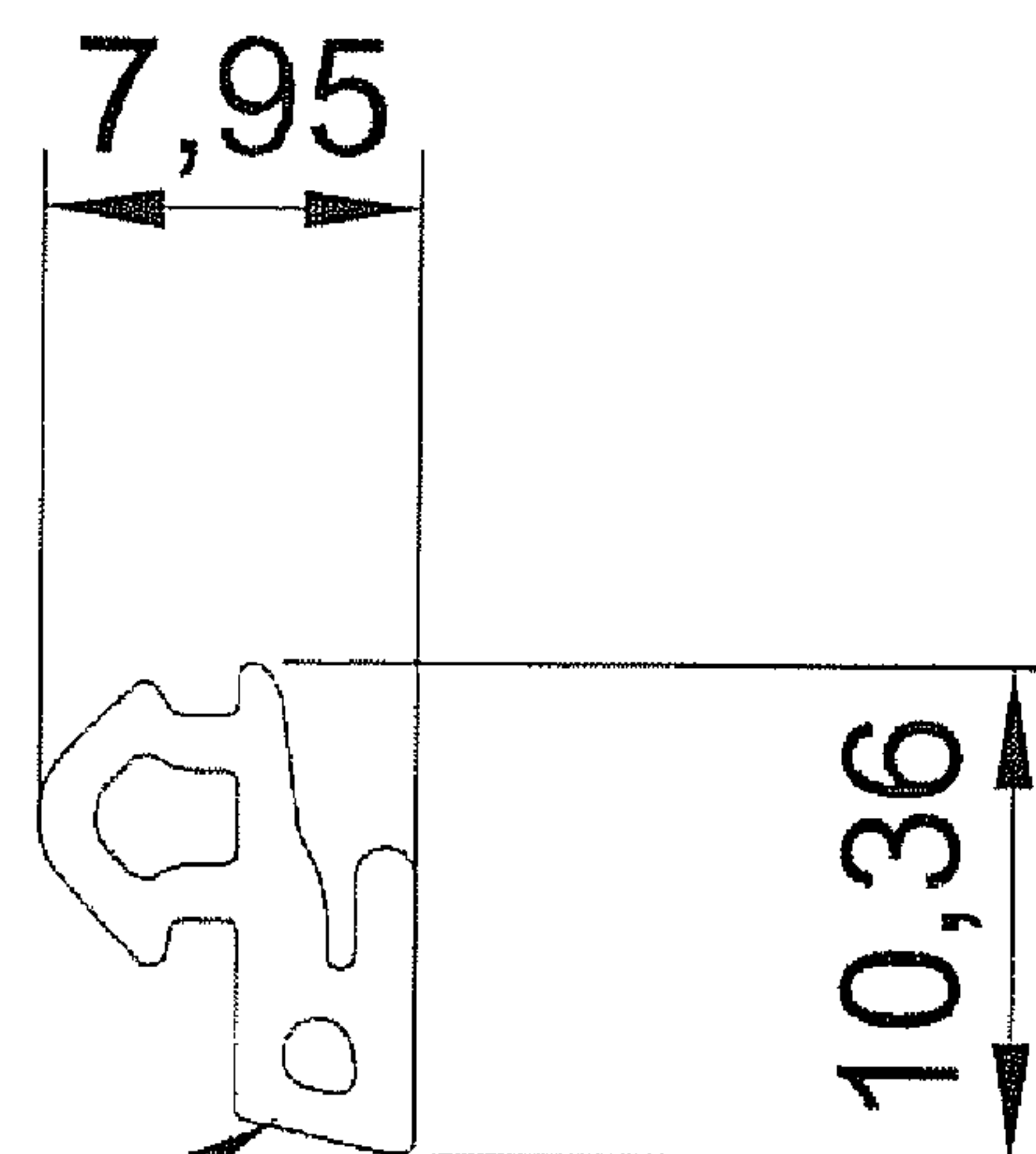
TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018

EPDM ref. 112.253
 $\lambda=0,25 \text{ W/mK}$

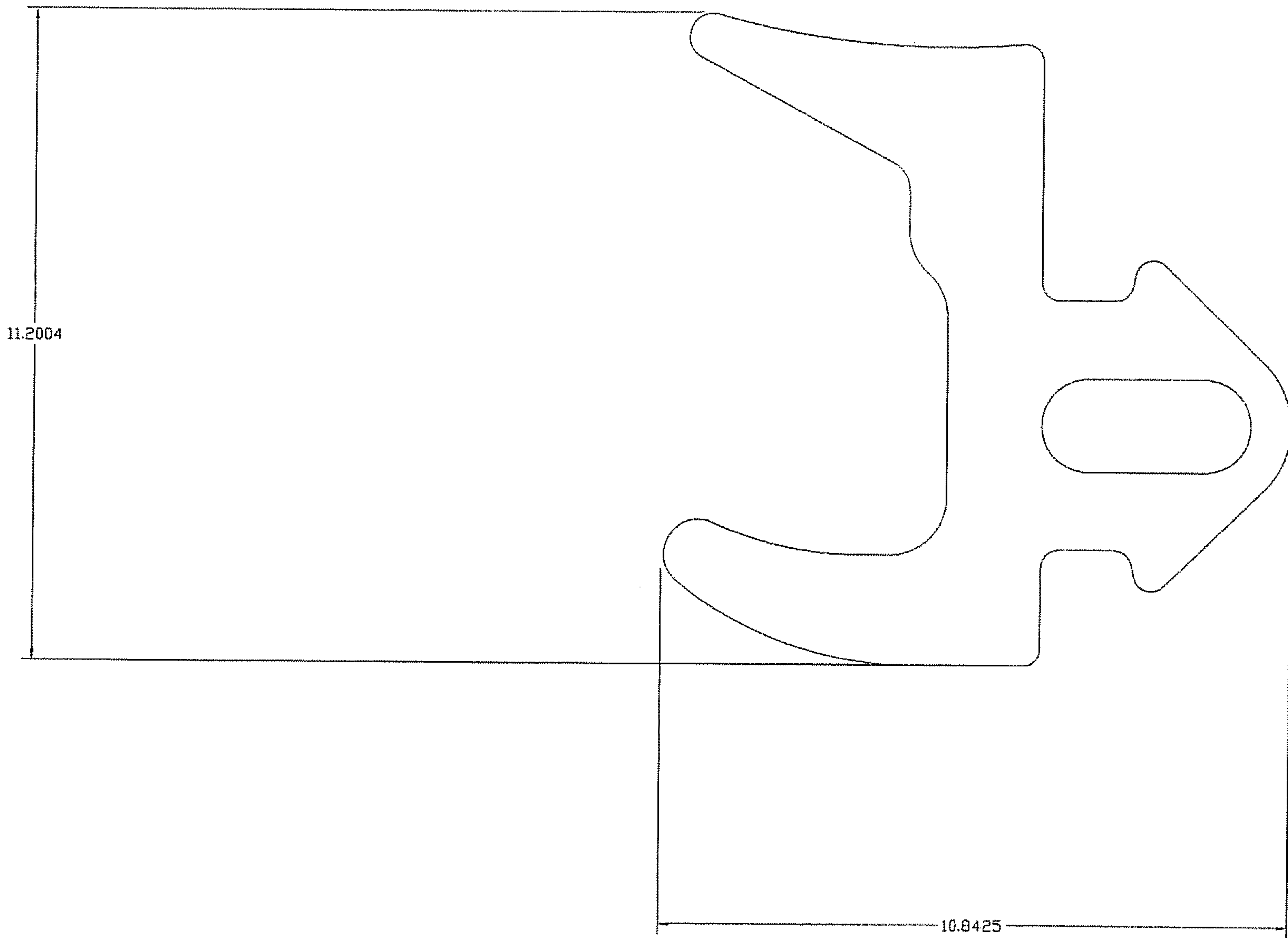


TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 26788-1

TEST DATE: MAR 09 2018



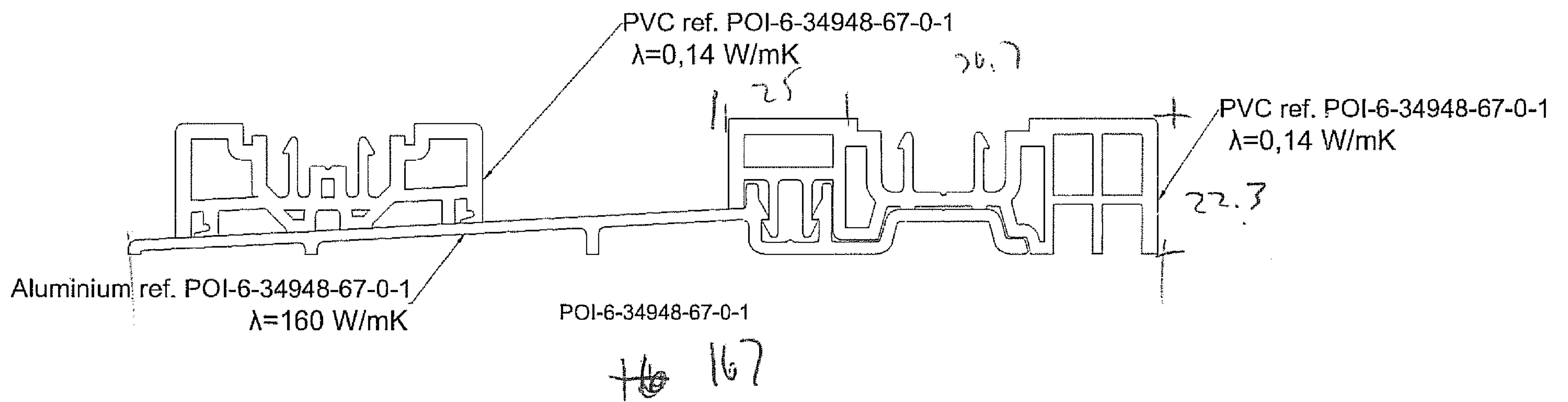
TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

P
Part No. 502

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018



TEST SPECIMEN COMPLIES
 WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 20789-1

TEST DATE: MAR 09 2018