

## Test Report No. AFS-R1079

All tests reported herein, have been performed in accordance with the laboratory's scope of accreditation.

**Report Date:** 08<sup>th</sup> June 2023

**Test Date(s):** 14<sup>th</sup> March 2023

**Sample Designer:** Neuffer Fenster + Tueren GMBH

**Sample Installer:** Glazing 360 Limited

**Test & Sample Details:** Performance testing of the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit in accordance with the NZS 4211:2008 Specification for Performance of Windows.

**Client Details:** Neuffer Fenster + Tueren GMBH  
Kronprinzstrasse 8,  
70173 Stuttgart,  
Germany

**Laboratory Details:** All Facade Services Limited  
47 Bell Road  
Beachlands  
Auckland 2018

**Test Location:** 149 Park Road,  
Miramar,  
Wellington 6022

**Tested By:** Darryl Scott

**KTP / Signatory** Darryl Scott

**IANZ Accreditation No.** 1347

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# 1. Test Summary

## 1.1 Summary Description

The Neuffer Eco Plano Wood/Alu Open In Tilt & Turn Sash Window unit comprised of a nominal 1600mm high x 1100mm wide outer box frame which incorporated a clear triple glazed IGU, retained by external glazing beads.

## 1.2 Summary Results

The following summarises the outcome of the individual tests only. Full test results are recorded at clause 3.1 of this report.

### 1.2.1 Deflection of Structural Members

The FL A089-1x68-80 timber lock stile of the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit, when tested with a differential test booth pressure of +1515 Pa, complied with Serviceability span/200 deflection requirements of NZS 4211:2008 Clause 6, for an Extra High wind zone.

### 1.2.2 Air Infiltration

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit complied with the "Air Conditioned" air infiltration rating of NZS 4211:2008 Clause 8 at a differential test pressure of  $\pm 150$  Pa.

### 1.2.3 Water Penetration

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit complied with the Water Penetration requirement of NZS 4211:2008 Clause 9 for the Extra High Wind Zone water penetration test pressure of 455 Pa.

Following testing at 455 Pa, the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit was tested and complied with the Water Penetration requirement of NZS 4211:2008 Clause 9 at the increased differential pressures of 533 Pa and 1000 Pa.

### 1.2.4 Ultimate Strength

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit met the Ultimate strength requirements of NZS 4211:2008 Clause 10 for the Extra High Wind Zone at  $\pm 2130$  Pa.

### 1.2.5 Torsional Strength

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit, as supplied, and when triple glazed with a 44mm IGU and tested in accordance with NZS 4211:2008 Appendix A, complied with the performance requirements of NZS 4211 Clause 11.

## 1.3 Overall Compliance

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit, when triple glazed with a 44mm IGU, complied with the requirements of NZS 4211:2008 for the Extra High wind zone and an Air Conditioned rating.

These ratings apply to this specific sample and may be used to claim compliance of the

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range within the stated limitations of clause 5.2 of NZS 4211:2008.

## 2. Test Sample Description

The Neuffer Eco Plano Wood/Alu open in Tilt & Turn Sash Window unit with overall (box size) dimensions of 1573mm high x 1093mm wide, was installed by Glazing 360 Limited into the timber framed opening of the test booth with the window exterior facing the inside of the booth.

The open in Tilt & Turn Sash Window unit comprised of an open in hinged window sash and was manufactured using the BR-A667-I850 timber frame profile with square cut corners and integrated FB88-18 aluminium cladding profile with mitred corners to the perimeter frame head and jambs, and the BR-A629-I850 timber frame profile with square cut corners and integrated FB68-18 and SB36-17 aluminium cladding profiles with mitred corners to the sill.

The open in window sash was configured as both a hinged and tilting window.

The Tilt & Turn Sash Window was manufactured using the FL-A089-IxEP-080 timber sash profile with square cut corners and FL41-14 aluminium cladding profile with mitred corners.

The Tilt & Turn Sash was clear triple glazed with a 44mm thick, argon filled, insulated glazing unit comprising of 3 x 4mm glass panes separated by 2 x 16mm spacers, installed into the glazing platform using external FL40-20 aluminium cladding profile, an external AA3198 glazing gasket and Durasil W15 Plus sealant.

The Durasil W15 Plus sealant was applied as a wet seal of unspecified size to the interior junction of the IGU with the timber sash.

The triple glazed Tilt & Turn Sash Window was secured to the surrounding timber framing with manufacturer supplied proprietary fixing brackets, screw fixed to the timber window frame and adjacent timber framing at 150 mm from the corners and 450 mm (max) centres thereafter.

Drainage was by way of surface shed only with no integrated drainage pathways.

Details of the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit are shown on the attached Neuffer Fenster drawings numbered 1 - 17.

The drawings identified the following timber profiles, aluminium extrusions and components being used in the construction of the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit.

BR-A667-I850	Outer frame – head and jambs
BR-A629-I850	Outer frame – sill
FL-A089-IxEP-080	Timber sash profile
FB88-18	Aluminium cladding profile (88mm)
FB68-18	Aluminium cladding profile (66mm)
FL41-14	Aluminium cladding profile
SB36-17	Aluminium cladding profile
FL 18 x 24.5	Wooden Strip
A31168	EPDM glazing gasket
A31198	EPDM glazing gasket

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FF2048	EPDM sealing gasket
AFK2613	EPDM sealing gasket
MFK2037	EPDM sealing gasket
DC340	Plastic clip
MEH40	Plastic clip
Atlanta Secustic	Window handle
Screw 2.3 x 1.7mm	
Sealant	Durasil W15 Plus



*Photo 1: Interior of the Neuffer Eco Plano Wood/Alu  
Tilt & Turn Sash Window installed in the test booth.*

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### 3. Testing

The Neuffer Eco Plano Wood/Alu Open In Tilt & Turn Sash Window unit was tested in accordance with NZS 4211:2008, Specification for Performance of Windows, with test procedures as detailed in sections of AS/NZS 4420.1:2016.

#### 3.1 Test Results

##### 3.1.1 SERVICEABILITY DEFLECTION (Test Procedure AS/NZS 4420.1 Clause 3)

Deflection measurements were made on the FL-A089-lxEP-080 timber lock stile with compliance assessments made against the tabled Serviceability Wind Pressures at a deflection ratio of span/200

###### FL-A089-lxEP-080 Lock Stile

Overall height	1573 mm
Test Span	1492 mm
Maximum permitted deflection span/200)	7.46 mm

Positive Pressure Test	Net Deflection	Result
Deflection at 303 Pa	0.09 mm	Complies
Deflection at 606 Pa	0.30 mm	Complies
Deflection at 909 Pa	0.54 mm	Complies
Deflection at 1212 Pa	0.67 mm	Complies
Deflection at 1515 Pa	0.86 mm	Complies

The FL A089-lxEP-080 timber lock stile of the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit, when tested with a differential test booth pressure of +1515 Pa, complied with Serviceability span/200 deflection requirements of NZS 4211:2008 Clause 6, for an Extra High wind zone.

**Note:** As the FL-A089-lxEP-080 Lock Stile closed against the fixed jamb of the Neuffer Eco Plano Wood/Alu Open In Tilt & Turn Sash Window, structural deflection testing was required in the positive pressure orientation only. The location of the deflection transducers on the FL A089-lxEP-080 lock stile is shown at Photo 1.

##### 3.1.2 AIR INFILTRATION (Test Procedure AS/NZS 4420.1 Clause 5)

Overall Window Area	1.719m <sup>2</sup>
Opening Joint Length	4.770m

Maximum permitted infiltrations/exfiltration's were calculated as follows:

Overall window area x 1.6 - Air Conditioned	2.75 l/s
Overall window area x 8 - Non-Air Conditioned	13.75 l/s
Opening joint length x 0.6 - Air Conditioned	2.86 l/s
Opening joint x 2 - Non-Air Conditioned	9.54 l/s

###### Geometric Mean

Air Conditioned	2.81 l/s
Non-Air Conditioned	11.5 l/s

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Air Pressure Direction @ 150PA	Air Flow	Result
Positive Air Infiltration Test Net air flow	0.33 l/s	Complies
Negative Air Infiltration Test Net air flow	0.42 l/s	Complies

The airflow through the sample in the positive direction is  $(0.33 \pm 0.65)$  l/s. The uncertainty in the airflow through the sample is  $\pm 0.65$  l/s. This expanded uncertainty is calculated with a coverage factor, k of 2.23, and defines an interval estimated to have a 95% level of confidence. The standard uncertainty is  $\pm 0.29$  l/s, (with 68% probability).

The airflow through the sample in the negative direction is  $(-0.42 \pm 0.71)$  l/s. The uncertainty in the airflow through the sample is  $\pm 0.71$  l/s. This expanded uncertainty is calculated with a coverage factor, k of 2.57, and defines an interval estimated to have a 95% level of confidence. The standard uncertainty is  $\pm 0.28$  l/s, (with 68% probability).

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit complied with the "Air Conditioned" air infiltration rating of NZS 4211:2008 Clause 8 at a differential test pressure of  $\pm 150$  Pa.

### 3.1.3 WATER PENETRATION (Test Procedure AS/NZS 4420.1 Clause 6)

Wind Zone	Extra High
Maximum rated pressure	455 Pa

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit complied with the Water Penetration requirement of NZS 4211:2008 Clause 9 for the Extra High Wind Zone water penetration test pressure of 455 Pa.

Following testing at 455 Pa, the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit was tested and complied with the Water Penetration requirement of NZS 4211:2008 Clause 9 at the increased differential pressures of 533 Pa and 1000 Pa.

### 3.1.4 ULTIMATE LIMIT STATE STRENGTH (Test Procedure AS/NZS 4420.1 Clause 7)

Wind Zone	Extra High
Maximum rated ULS pressure	2130 Pa

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit met the Ultimate strength requirements of NZS 4211:2008 Clause 10 for the Extra High Wind Zone at a differential pressure of  $\pm 2130$  Pa.

### 3.1.5 TORSIONAL STRENGTH OF SASHES (NZS 4211:2008 Clause 11)

Tilting Hinged Sash

Length of shortest sash member (mm)	956 mm
Calculated maximum allowed deflection = $0.04 \times$ shortest sash member (mm)	37.0 mm

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Table 19. NZS 4211 Appendix A Torsional strength of sashes measurements

Force (N)	Direction	Displacement (mm)	Result
10	Opening	1.02 mm	Complies
20	Opening	2.57 mm	Complies
30	Opening	4.38 mm	Complies
40	Opening	6.29 mm	Complies
10	Closing	1.13 mm	Complies
20	Closing	2.68 mm	Complies
30	Closing	4.47 mm	Complies
40	Closing	6.36 mm	Complies

The Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window unit, as supplied, and when triple glazed with a 44mm IGU and tested in accordance with NZS 4211:2008 Appendix A, complied with the performance requirements of NZS 4211 Clause 11.

## 4.0 Qualifications

4.1 This test report "Test Report No. AFS-R1079" relates solely to NZS 4211:2008 testing carried out on the 14<sup>th</sup> of March 2023 on the Neuffer Eco Plano Wood/Alu Tilt & Turn Sash Window test sample, at the test facility located at 149 Park Road, Miramar, Wellington.

4.2 Drawings of the test specimen as attached to this report have been provided by the client and All Facade Services Ltd accepts no liability with regards the accuracy or entirety of the drawings and/or, in respect of any element missing or concealed from view.

4.3 This report has been prepared solely for the party to whom it is addressed within the terms of the brief provided to this company. This report may not be used in any other context or for any other purpose without our prior written agreement.

4.4 This report may not be read or reproduced other than as a complete document.

4.5 This test report does not constitute endorsement of the window design or the manufacturer in any form.

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## 5.0 References

- |                     |   |
|---------------------|---|
| NZS 4211:2008       | Specification for performance of windows (Including Amendment 1, May 2014)<br>Standards New Zealand, Wellington, 2008 |
| NZS 3604:1999       | Timber framed buildings.<br>Standards New Zealand, Wellington, 1999   |
| AS/NZS 4420.1: 2016 | Windows – Methods of Test   |
| Part (a)            | Deflection test   |
| Part (b)            | Operating force test  |
| Part (c)            | Air infiltration test   |
| Part (d)            | Water penetration resistance test   |
| Part (e)            | Ultimate strength test  |
|                     | Standards Australia, Sydney   |

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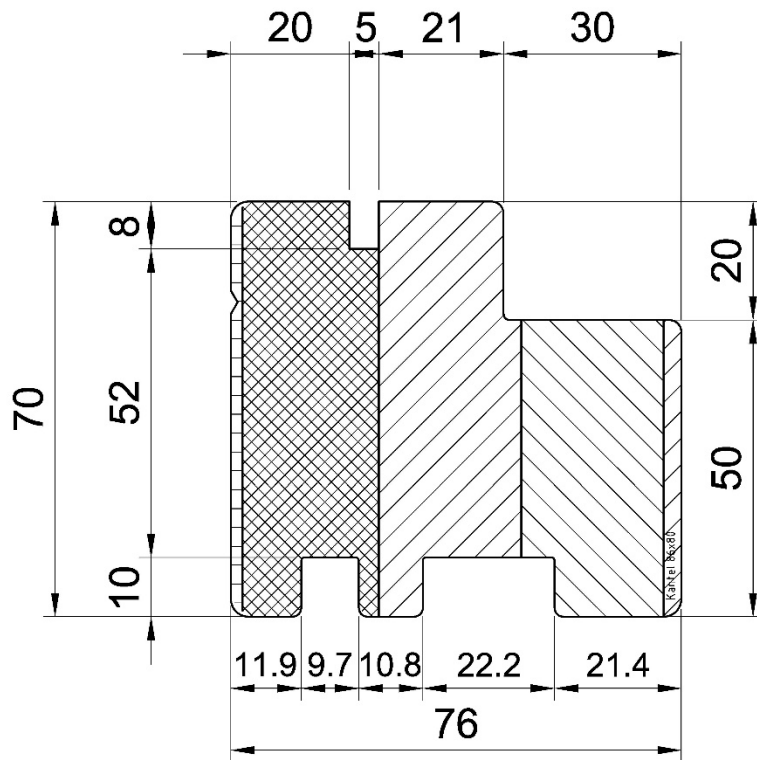
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Bill of materials					
Product: ECO PLANO window tilt and turn					
no.	description	quantity	item number	material	supplier
1	frame	3	BR-A667-I850	pinewood	IDEAL
2	frame	1	BR-A629-I850	pinewood	IDEAL
3	sash	4	FL-A089-IxEP-080	pinewood	IDEAL
4	glass ESG 4bes-16Ar-4-16-4bes. 0,6Ug	1	WS 0,6/48	glass	Glaskontor
5	window handle Atlanta secustic	1	615-F9016	aluminium	Hoppe
6	gasket	4	FF2048	EPDM	Stemeseder
7	gasket	8	AFK2613	EPDM	Stemeseder
8	gasket	7	MFK2037	EPDM	Stemeseder
9	gasket	1	A31168	EPDM	Stemeseder
10	gasket	1	AA3198	EPDM	Stemeseder
11	cladding profile	3	FB88-18	aluminium	Stemeseder
12	cladding profile	4	FL41-14	aluminium	Stemeseder
13	cladding profile	1	SB36-17	aluminium	Stemeseder
14	cladding profile	1	FB68-18	aluminium	Stemeseder
15	clip	8	DC340	plastic	Stemeseder
16	clip	58	MEH40	plastic	Stemeseder
17	wooden strip	4	FL 18x24,5	pinewood	IDEAL

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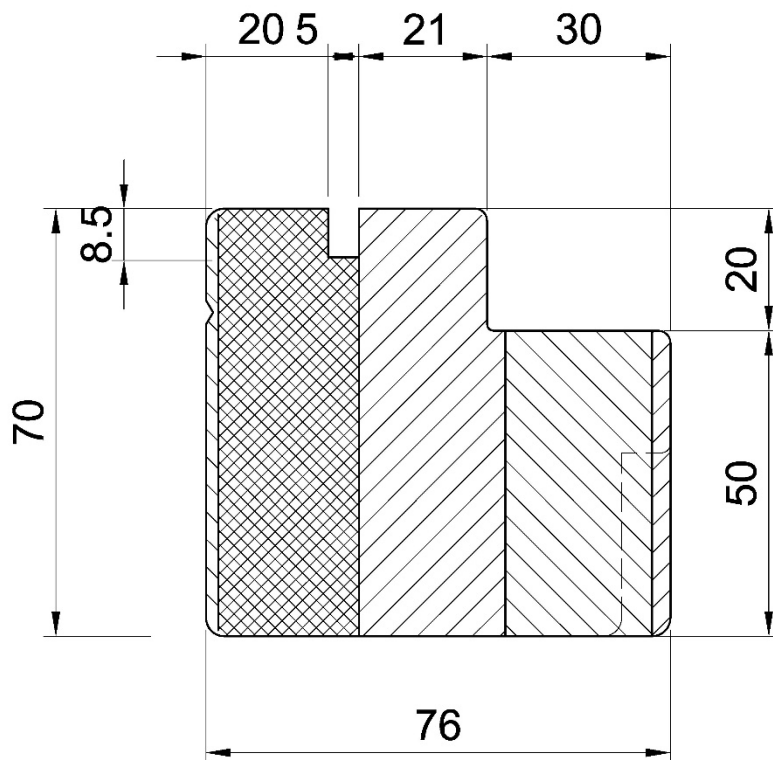
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John Moore



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		Gepr.					
		Norm					
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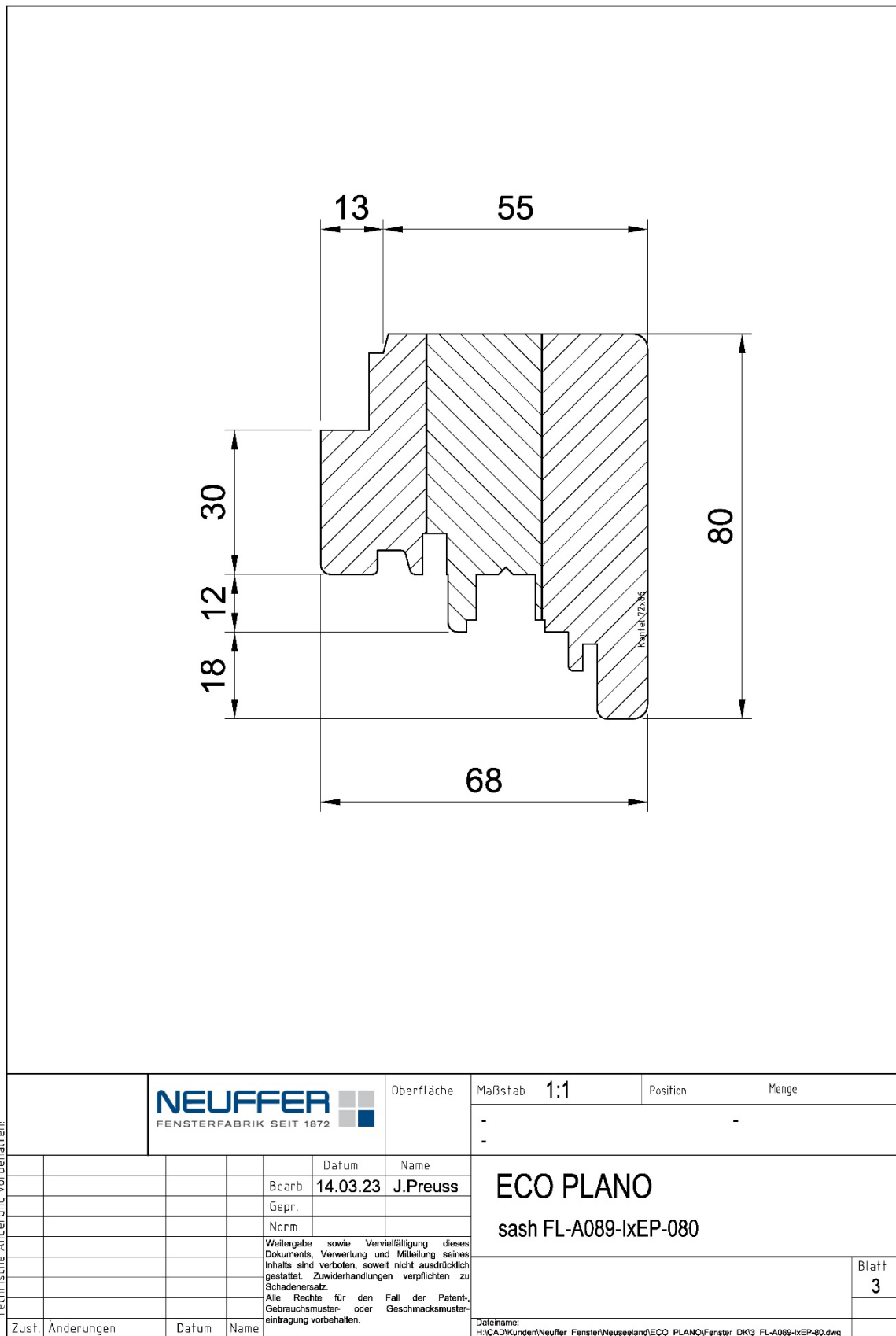
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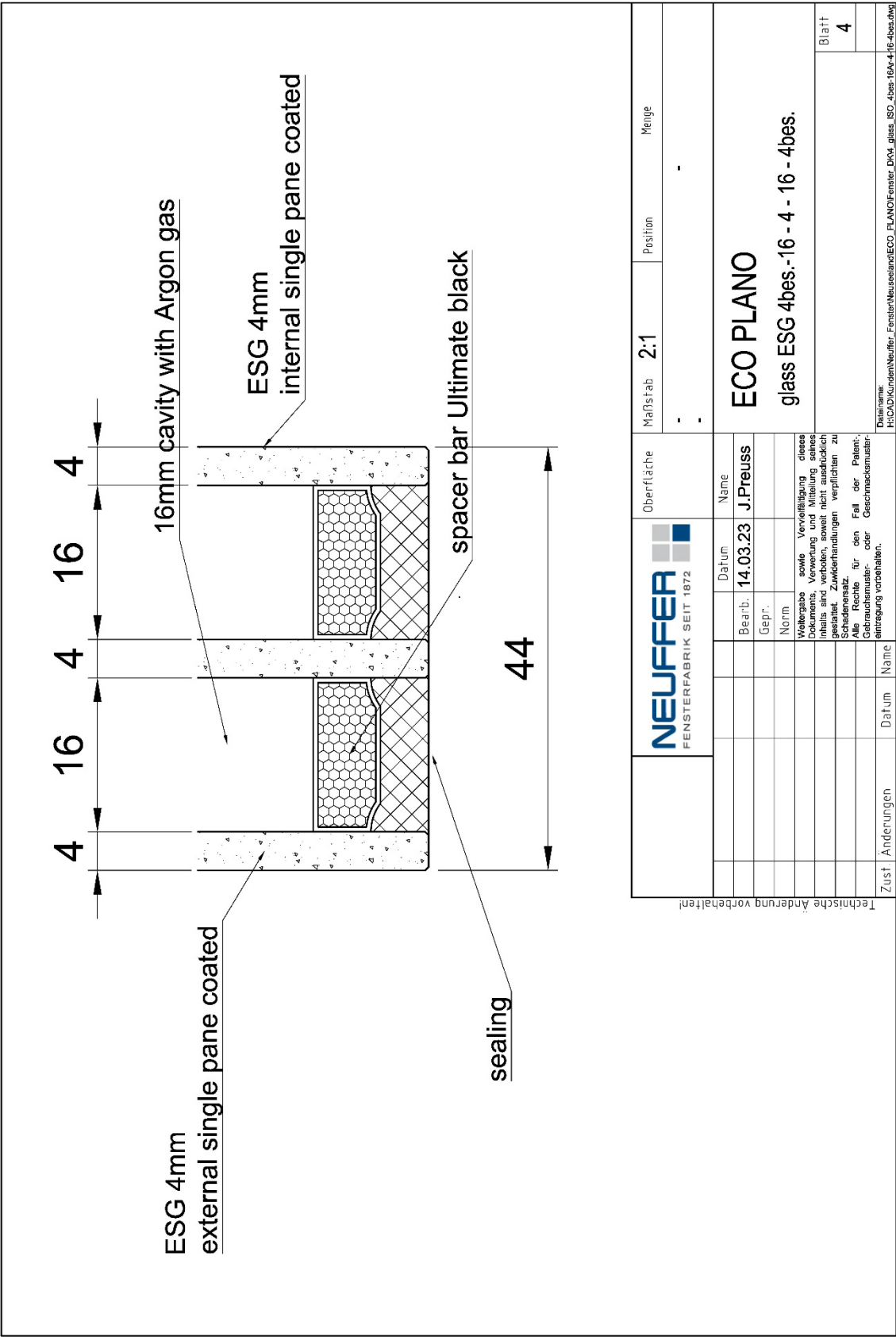
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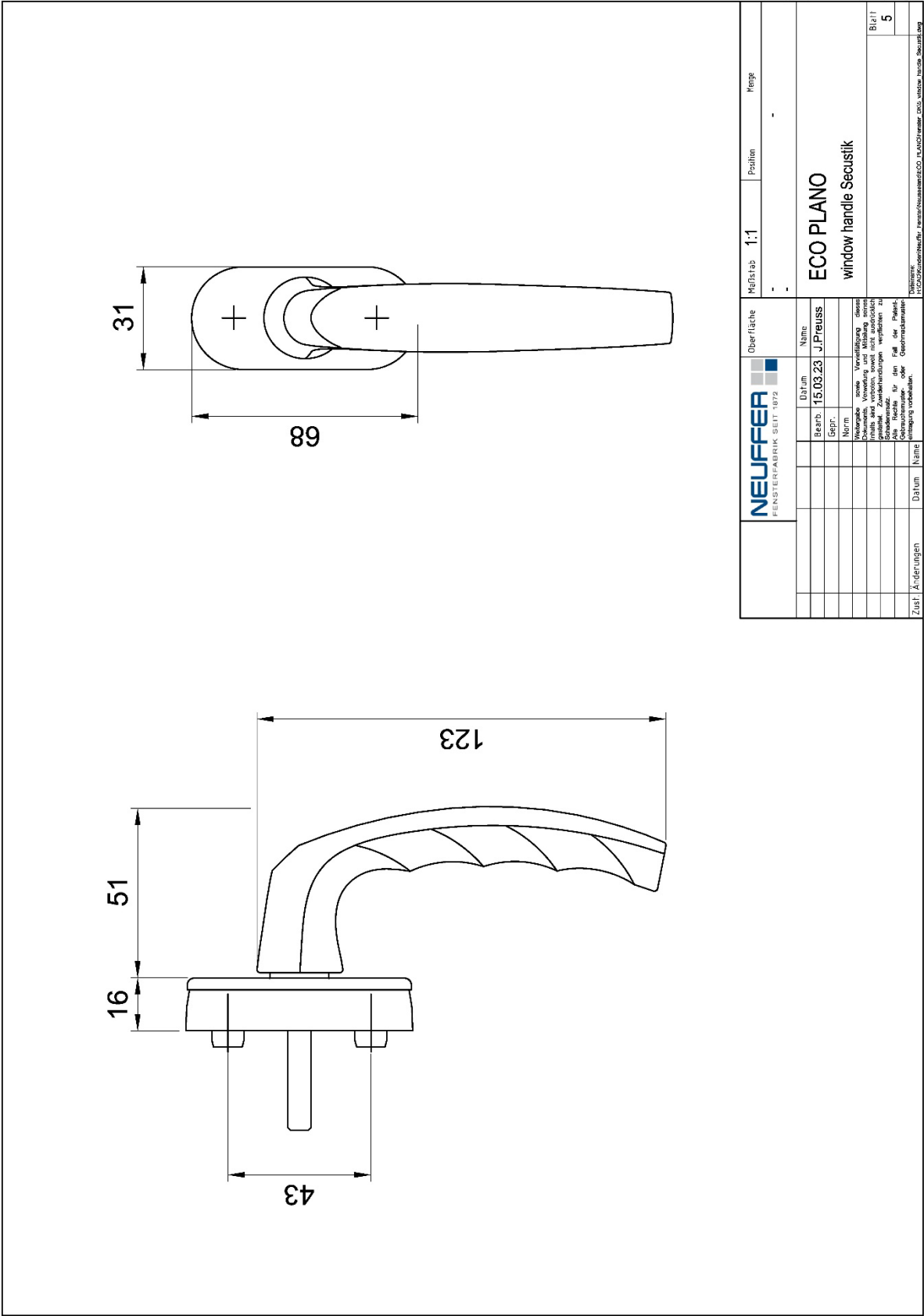
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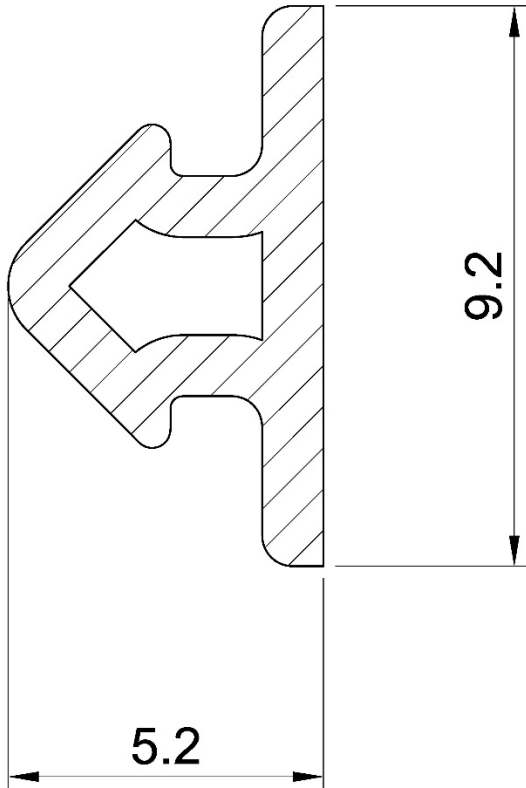
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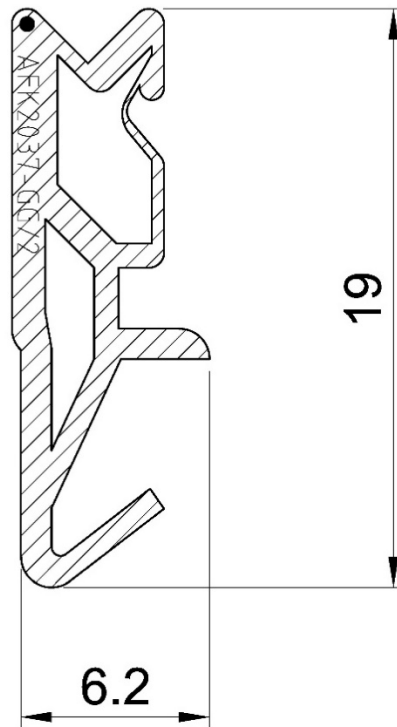
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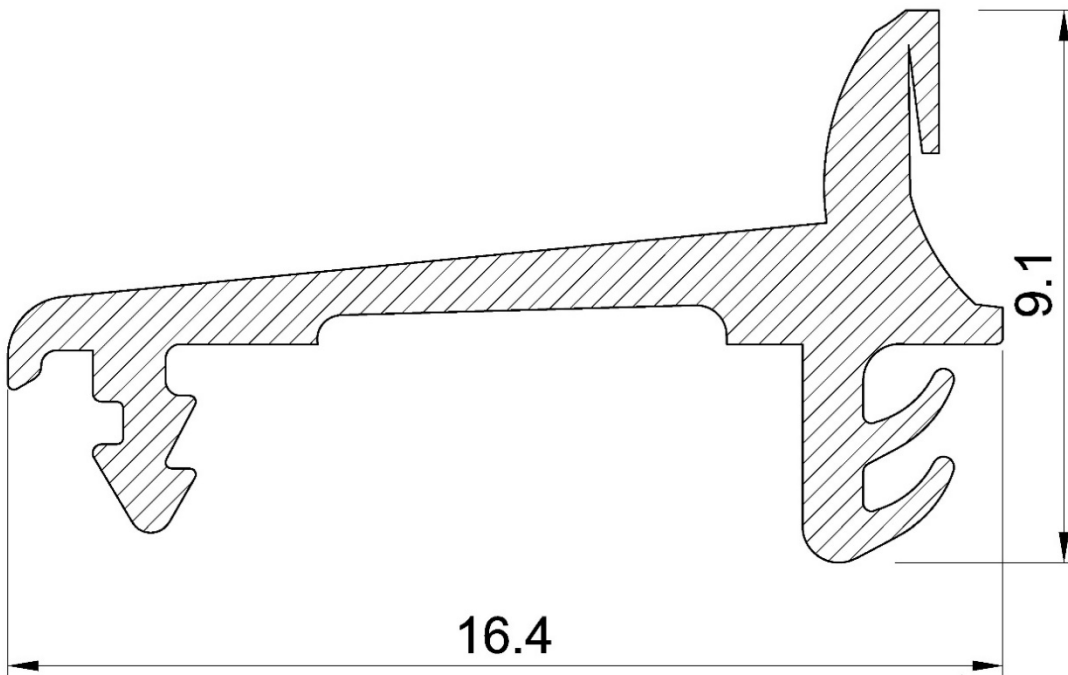
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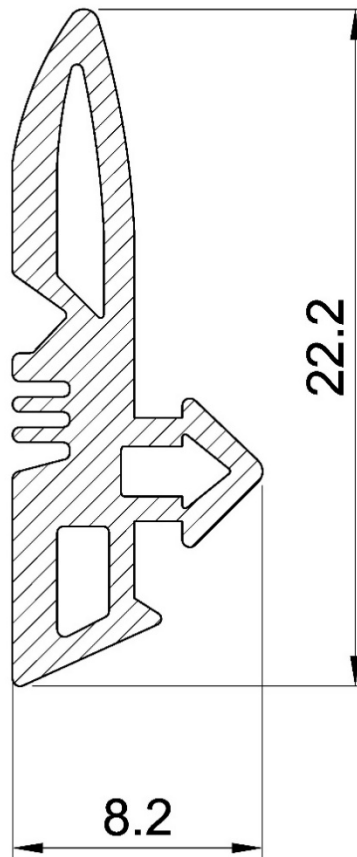
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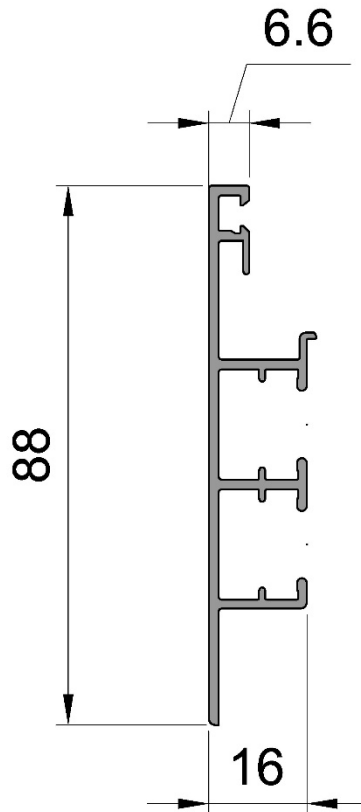


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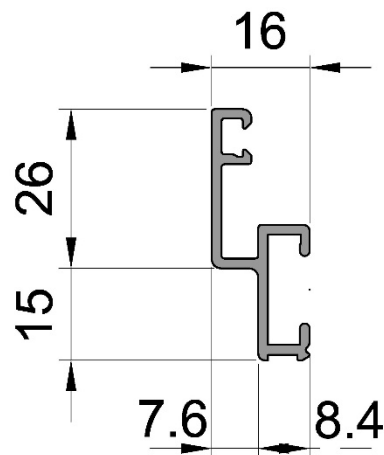
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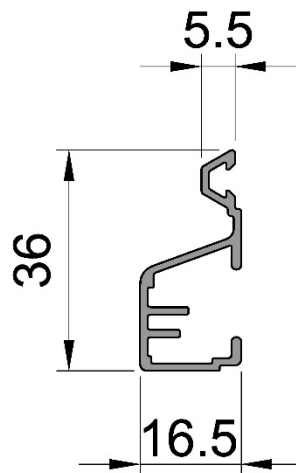




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Checked by: John Moore

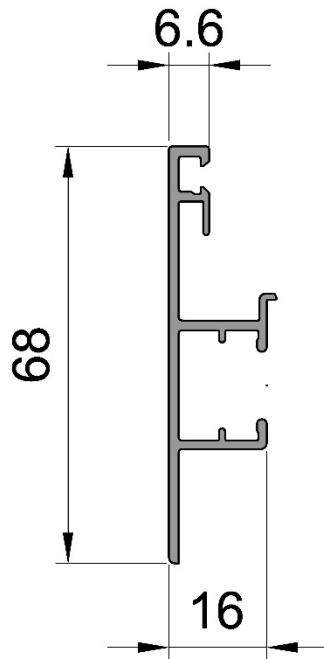


Technische Änderung vorbehalten!

				Oberfläche		Maßstab 1:1	Position	Menge	
						-	-	-	
				Datum	Name	<b>ECO PLANO</b> cladding profile SB36-17			
			Bearb.	14.03.23	J.Preuss				
			Gepr.						
			Norm						
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Zust.	Änderungen	Datum	Name	Dateiname: H:\CAD\Kunden\Neuffer_Fenster\Neuseeland\ECO_PLANO\Fenster_DK13_cladding_profile_SB36-17.dwg					
								Blatt <b>13</b>	

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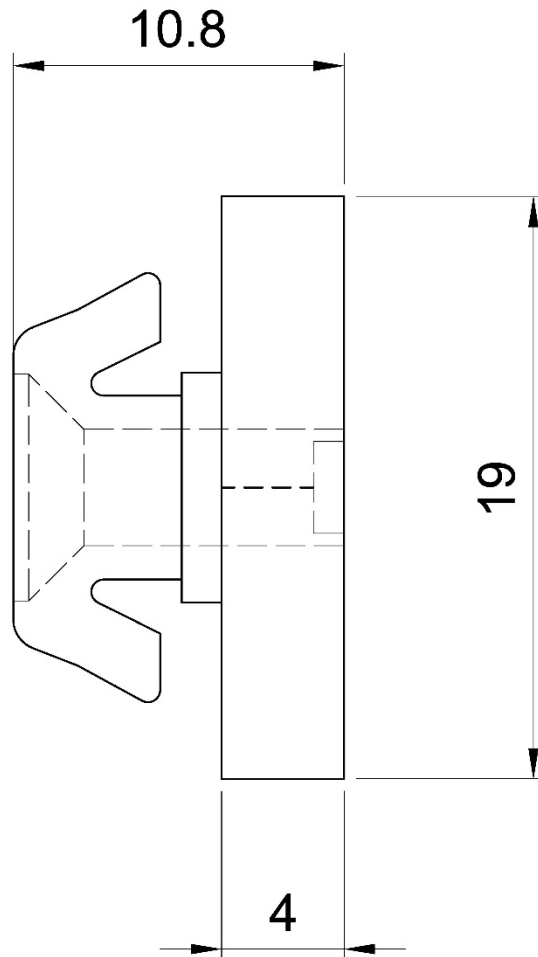
Checked by:   
John Moore



				Oberfläche		Maßstab 1:1	Position	Menge
				-				
Technische Änderung vorbehalten!				Datum		Name		
				Bearb. 14.03.23		J.Preuss		
				Gepr.				
				Norm				
				Weitergabe sowie Vervielfältigung dieses Dokuments, Verwertung und Mitteilung seines Inhalts sind verboten, soweit nicht ausdrücklich gestattet. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patent-, Gebrauchsmuster- oder Geschmacksmustereintragung vorbehalten.				
				ECO PLANO cladding profile FB68-18				
				Blatt 14				
				Dateiname: H:\CAD\Kunden\Neuffer_Fenster\Neuseeland\ECO_PLANO\Fenster_DK14_cladding_profile_FB68-18.dwg				
Zust.	Änderungen	Datum	Name					

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Technische Änderung vorbehalten!

				Oberfläche		Maßstab 1:1	Position	Menge
						-	-	-
				Datum	Name	<b>ECO PLANO</b> <b>DC340</b>		
			Bearb.	15.03.23	J.Preuss			
			Gepr.					
			Norm					
				Weitergabe sowie Vervielfältigung dieses Dokuments, Verwertung und Mitteilung seines Inhalts sind verboten, soweit nicht ausdrücklich gestattet. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patent-, Gebrauchsmuster- oder Geschmacksmustereintragung vorbehalten.				
Zust.	Änderungen	Datum	Name				Blatt 15	
				Dateiname: H:\CAD\Kunden\Neuffer_Fenster\Neuseeland\ECO_PLANO\Fenster_DK15_clip_cladding_profile_DC340.dwg				

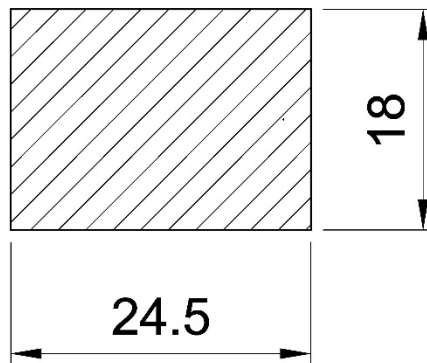
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<b>NEUFFER</b> FENSTERFABRIK SEIT 1872		Oberfläche		Maßstab 5:1	Position	Menge	
				-	-	-	
Zust.	Änderungen	Datum	Name	<b>ECO PLANO</b> <b>MEH40</b>			
		Bearb.	15.03.23				J.Preuss
		Gepr.					
		Norm					
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				Dateiname: H:\CAD\Kunden\Neuffer_Fenster\Neuseeland\ECO_PLANO\Fenster_DK16_clip_cladding_profile_MEH40.dwg			

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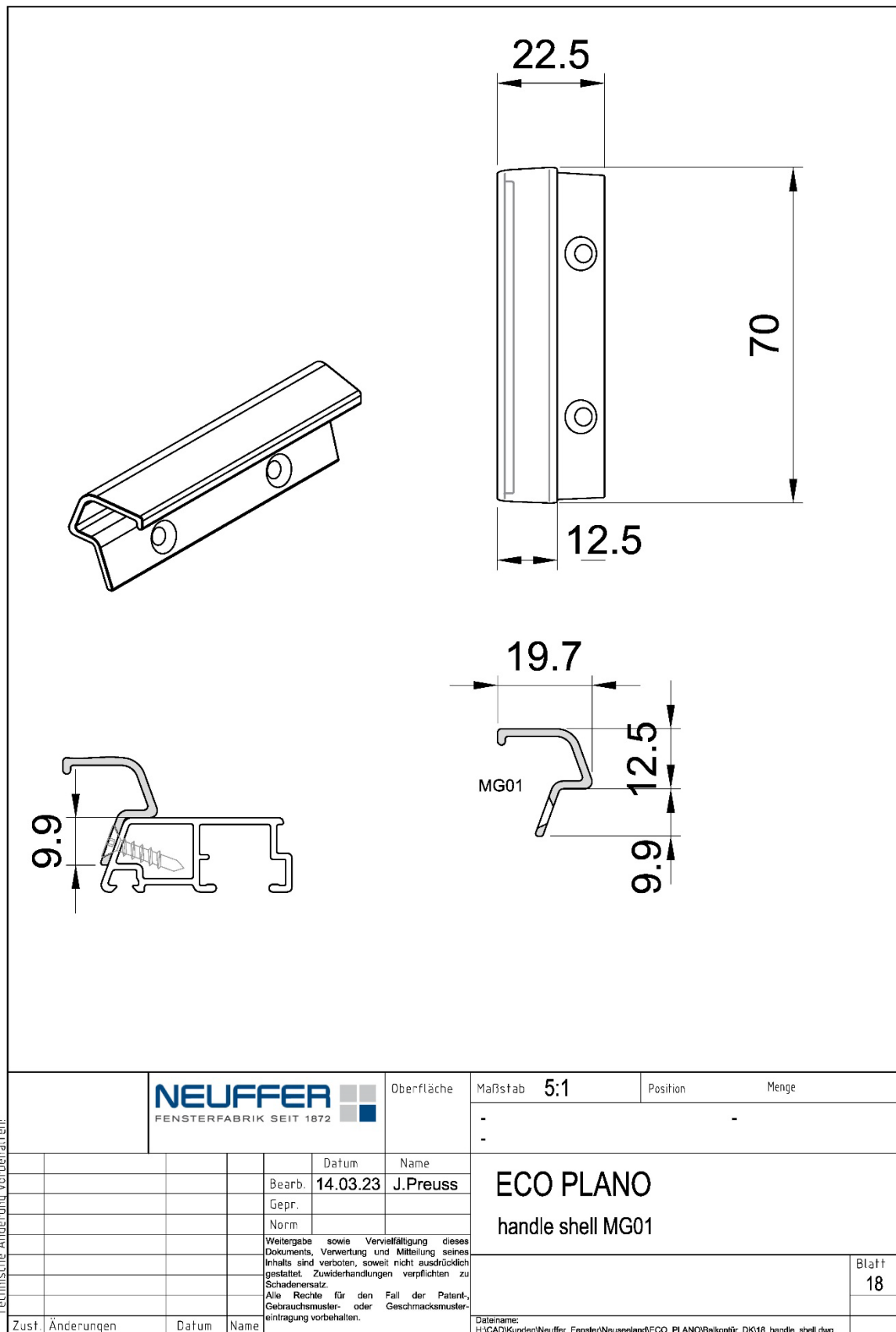


Technische Änderung vorbehalten!

				Oberfläche		Maßstab	2:1	Position	Menge
						-		-	
				Datum	Name	<b>ECO PLANO</b> wooden strip 18x24,5mm			
			Bearb.	14.03.23	J.Preuss				
			Gepr.						
			Norm						
				Weitergabe sowie Vervielfältigung dieses Dokuments, Verwertung und Mitteilung seines Inhalts sind verboten, soweit nicht ausdrücklich gestattet. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patent-, Gebrauchsmuster- oder Geschmacksmustereintragung vorbehalten.					
Zust.	Änderungen	Datum	Name	Dateiname: H:\CAD\Kunden\Neuffer_Fenster\Neuseeland\ECO_PLANO\Fenster_DK17_wooden_strip_18x24,5.dwg					
				Blatt 17					

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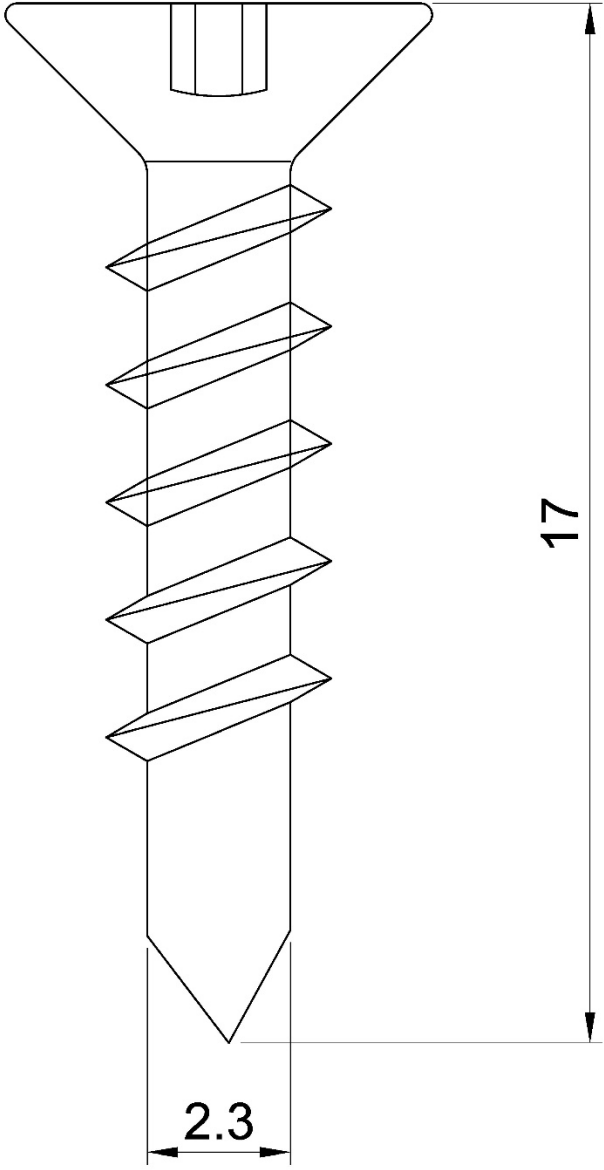
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John Moore



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				Oberfläche		Maßstab 10:1	Position	Menge
						-	-	-
NEUFFER FENSTERFABRIK SEIT 1872				Datum		Name		
				Bearb. 14.03.23		J.Preuss		
				Gepr.				
				Norm				
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Zust. Änderungen Datum Name				Dateiname: H:\CAD\Kunden\Neuffer_Fenster\Neuseeland\ECO_PLANO\Balkontür_DK19_screw.dwg				

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John Moore