

# TEST REPORT



<b>Report number</b>	<b>19.00047</b>
<b>Date of test</b>	<b>31 January 2019</b>
<b>Date report</b>	<b>20 February 2019</b>
<b>Applicant</b>	<b>Reynaers Aluminium N.V. Oude Liersebaan 266 B-2570 Duffel Belgium</b>
<b>Project number applicant</b>	<b>TC18_146 "The Light Offices" Bucharest</b>
<b>Size report</b>	This report consists of 21 pages (including appendices)
<b>Subject</b>	Determination of the <ul style="list-style-type: none"><li>• Air permeability according EN 12153</li><li>• Watertightness according EN 12155</li><li>• Resistance to wind load according EN 12179</li></ul> of an aluminium curtain walling with sizes W x H: 2800 x 6880 mm constructed from the profile system: CW50-SC
<b>Inspector</b>	R. Jonkergouw
<b>Technical manager</b>	dr. ir. A. van Beek
<b>Conclusion</b>	The curtain walling of Reynaers meets the classification as hereby mentioned: <ul style="list-style-type: none"><li>• Air permeability according EN 12152</li><li>• Air permeability based on length of joint according EN 12152</li><li>• Air permeability based on overall area according EN 12152</li><li>• Watertightness according EN 12154</li><li>• Resistance to wind load according EN 13116 positive</li><li>• Resistance to wind load according EN 13116 negative</li></ul>

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Notified Body  
NB 0957  
NB 0960

<b>Grade</b>
<b>A4</b>
<b>A4</b>
<b>A4</b>
<b>RE1050</b>
<b>1600 Pa</b>
<b>-1600 Pa</b>

**CONTENT**

1. PURPOSE OF THE TEST
2. METHOD OF INVESTIGATION
3. CONSTRUCTION TESTED
4. OBSERVATIONS AND RESULTS
  - 4.1 Air permeability curtain wall
  - 4.2 Watertightness
  - 4.3 Resistance to wind load
    - 4.3.1 Test on bending
    - 4.3.2 Repeated test for Air permeability
    - 4.3.3 Repeated test for Watertightness
    - 4.3.4 Strength test
5. CLASSIFICATION

**APPENDICES**

- 6.1 APPENDIX 1 Photos of the tested construction
- 6.2 APPENDIX 2 Drawings of the tested construction

**1. PURPOSE OF THE TEST**

SKG-IKOB was ordered by Reynaers Aluminium N.V. - Duffel to perform various tests on a curtain walling, to classify the

Air permeability

Watertightness

Resistance to wind load

according to the relevant European Standards.

The tests are performed as an Initial Type Testing (ITT) based on EN 13830: 2003

The tests have been carried out according to EN 13830: 2003

SKG-IKOB is Notified Body (NB 0960) for certifying and testing curtain walling.

SKG-IKOB is accredited according to EN-ISO/IEC 17025 by RvA under number L 406, for tests according to the following standards: EN 12152, EN 12153, EN 12154, EN 12155, EN 12179, EN 12207 and EN 13116.

**2. METHOD OF INVESTIGATION**

The construction was delivered for testing on:

**31 January 2019**

The construction was produced by and at the address of the applicant.

SKG-IKOB has verified all details of the construction with reference to the supplied drawings.

The test object was placed in the test rig and tested for:

**Air permeability**

Test according:

EN 12153: 2000 Curtain walling - Air permeability - Test method

Classification according:

EN 12152: 2002 Curtain walling - Air permeability - Performance requirements and classification

**Watertightness**

Test according:

EN 12155: 2000 Curtain walling - Watertightness - Laboratory test under static pressure

Classification according:

EN 12154: 1999 Curtain walling - Watertightness - Performance requirements and classification

**Resistance to wind load**

Test according:

EN 12179: 2000 Curtain walling - Resistance to wind load - Test method

Classification according:

EN 13116: 2001 Curtain walling - Resistance to wind load - Performance requirements

The sequence of testing was according to EN 13830 par. 5.2.3

The sequence of testing was:

- |                            |  |
|----------------------------|--|
| a) Air permeability        | for classification                               |
| b) Watertightness          | for classification                               |
| c) Resistance to wind load | for serviceability                               |
| d) Air permeability        | repeat to confirm wind resistance classification |
| e) Watertightness          | repeat to confirm wind resistance classification |
| f) Resistance to wind load | increased wind resistance test - safety          |

The test was performed with the measuring equipment and test rig of:

**Reynaers**

on the location:

**Duffel**

SKG-IKOB has verified and approved the calibration status of the equipment.

The last calibration date was:

**28 June 2018**

The ambient temperature during the test was approx. :

**16,8 °C**

The air pressure was approx.

**997,7 hPa**

The air humidity was approx.

**36,5 %**

**3. CONSTRUCTION TESTED**

The construction was produced with profile system:

**CW50-SC**

Drawings of the construction were received and are appended to this report (Appendix 2).

**Technical specification:**

<b>Components:</b>	<b>Description</b>	<b>Article nr.</b>
Mullion		<b>034.2506.XX</b>
Transom		<b>034.3527.XX</b>
Structural sealant glazing	8 mm VSG - 18 - 55.4	
Pressure Plate		<b>034.0175</b>
Pressure Plate		<b>034.0176</b>
screwed connection	6,3 x 25 mm	<b>053.5462</b>
Glazing gaskets:		
Glazing gasket transom		<b>080.9825.04</b>
Glazing gasket mullion		<b>080.9820.04</b>
Outer glazing gasket	SIKA WS605_S	
Outer glazing gasket		<b>080.9850.04</b>

See the drawings in Annex 2 for further details

4. OBSERVATIONS AND RESULTS

4.1 Air permeability curtain wall

The results of the air permeability measurements under positive key pressure in m<sup>3</sup>/h per m<sup>1</sup> joint length and per m<sup>2</sup> surface are shown in table and graph below.

The joint length L<sub>f</sub> of the element was

56,14 m<sup>1</sup>

The surface A of the tested construction was

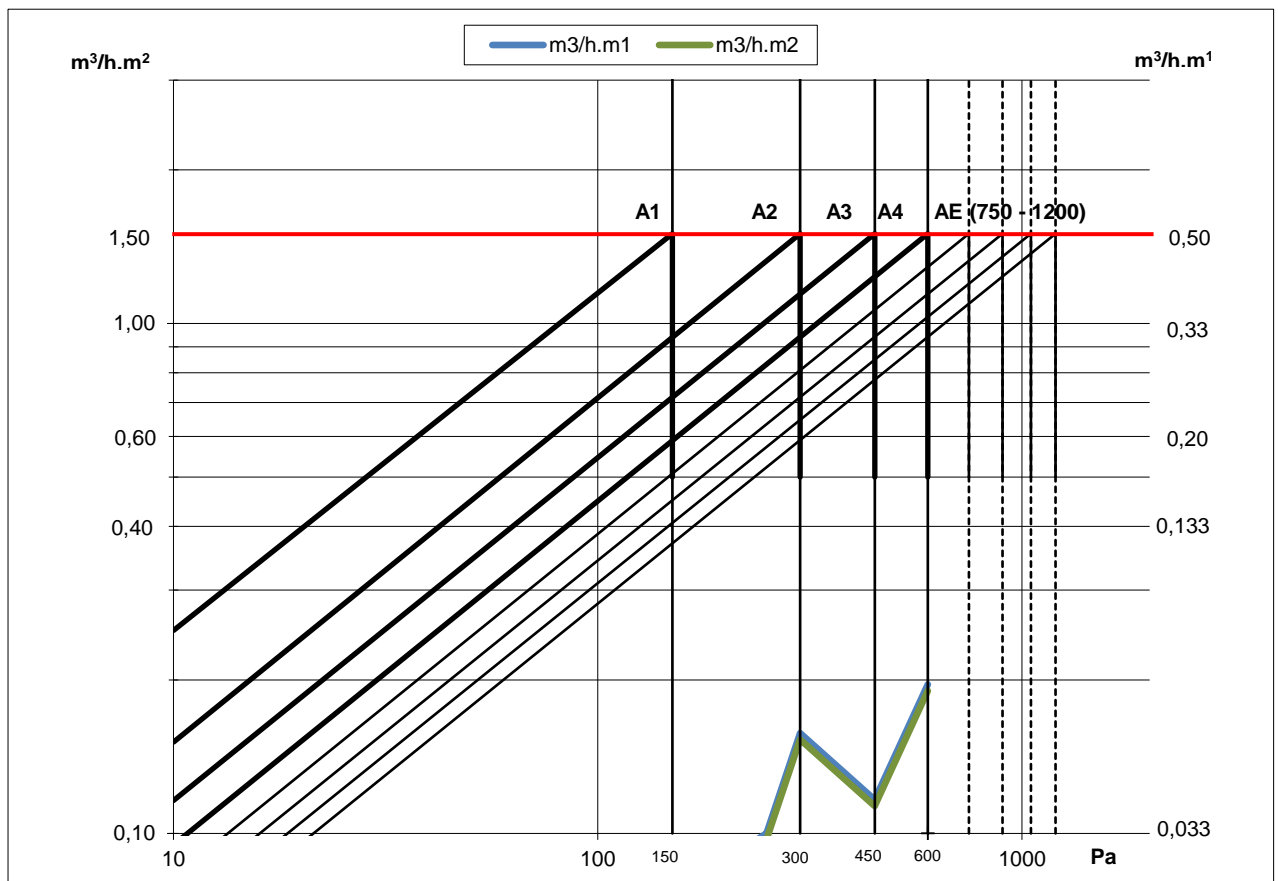
19,26 m<sup>2</sup>

For the calculation of the normalized air leakage to the standard conditions (considering the actual temperature and atmospheric pressure), there is a correction to be used at the measured values by the following factor:

0,996

(according section 8.1 of EN 1026)

Pressure in Pa	Q <sub>f</sub> (m <sup>3</sup> /h)	Q <sub>f</sub> /L <sub>f</sub> (m <sup>3</sup> /hm <sup>1</sup> )	Q <sub>f</sub> /A (m <sup>3</sup> /hm <sup>2</sup> )
50	< 0,1	0,00	0,00
100	1,25	0,02	0,07
150	1,18	0,02	0,06
200	1,65	0,03	0,09
250	1,87	0,03	0,10
300	2,94	0,05	0,15
450	2,18	0,04	0,11
600	3,67	0,07	0,19



Result: at positive test pressure

- Air permeability based on length of joint
- Air permeability based on overall area

Grade A4  
Grade A4

#### 4.2 Watertightness

The results of the water tightness test are shown in table below.

Note:

The amount of water in liters/ h used for spraying the construction was:

2312 L/h

Pressure in Pa	t (min).	Water leakage
0	15	no
50	5	no
100	5	no
150	5	no
200	5	no
300	5	no
450	5	no
600	5	no
750	5	no
900	5	no
1050	5	no

Result:

The construction was watertight up to a pressure of:

1050 Pa

**4.3 Resistance to wind load**

**4.3.1 Test on bending** Designload: **1600 Pa positive**  
**-1600 Pa negative**

The tables show the bending in response to various key pressures

Note:

The position of the displacement devices (Vx) is shown in the elevation drawing of the tested construction (see annex 2).

**Mullion 1 L= 3746**

Maximum allowable bending f in mm (max.=15): **1/200xL 15,00 mm**

Positive pressure

Negative pressure

Pressure in Pa	V1	V2	V3	f	Pressure in Pa	V1	V2	V3	f
<b>0</b>	0,00	0,00	0,00	<b>0,00</b>	<b>0</b>	0,00	0,00	0,00	<b>0,00</b>
<b>400</b>	0,23	2,07	0,22	<b>1,84</b>	<b>400</b>	0,28	2,11	0,22	<b>1,86</b>
<b>800</b>	0,65	4,85	0,59	<b>4,23</b>	<b>800</b>	0,72	4,97	0,56	<b>4,33</b>
<b>1200</b>	1,02	7,67	0,92	<b>6,70</b>	<b>1200</b>	1,49	8,85	1,49	<b>7,36</b>
<b>1600</b>	1,52	10,92	1,46	<b>9,43</b>	<b>1600</b>	2,25	12,25	2,09	<b>10,08</b>
<b>0</b>	0,06	0,18	0,14	<b>0,08</b>	<b>0</b>	0,56	1,05	0,67	<b>0,44</b>

Result:

The maximum bending at wind resistance design load is:

**10,08 mm**

Within 1 hour, the residual deflection had decreased to less than 5%

This is less than the maximal allowable bending:

**Satisfies the requirement**

**4.3.2 Repeated test for Air permeability**

to confirm the resistance to wind load

After the tests were performed as described under 4.3.1 above the air permeability test was repeated.

 The requirement is that the increase of the air permeability at maximum pressure is not more than 0,3 m<sup>3</sup>/h per m<sup>2</sup> (0,1 m<sup>3</sup>/h per meter joint length) as found in the classification test for air permeability.

The results of the air permeability measurements under positive key pressure are shown in table below.

Positive pressure 600 (Pa)	Result:		Increase	Requirements
	based on surface			
	Test 1	Test 2		
	0,19	0,16		
based on joint length				
Test 1	Test 2	0,00	< 0,1 Meets	
0,07	0,05			

The increase of the air permeability was less than maximum allowed in accordance with EN 13116.

**4.3.3 Repeated test for Watertightness**

to confirm the resistance to wind load

The results of the water tightness test are shown in table below.

The amount of water in liters/ h used for spraying the construction was:

**2312 L/h**

Pressure in Pa	t (min)	Water leakage
0	15	no
50	5	no
100	5	no
150	5	no
200	5	no
300	5	no
450	5	no
600	5	no
750	5	no
900	5	no
1050	5	no

Result:

The construction was watertight up to a pressure of:

**1050 Pa**



#### 4.3.4 Strength test

The construction was loaded to a positive key pressure of: **2400 Pa**

The construction was loaded to a negative key pressure of: **-2400 Pa**

It was established that the construction did not show any signs of distortion.

5. CLASSIFICATION

	Grade
Air permeability based on length of joint	A4
Air permeability based on overall area	A4
Air permeability curtain wall	A4
Watertightness	RE1050
Resistance to wind load                      positive	1600 Pa
Resistance to wind load                      negative	-1600 Pa

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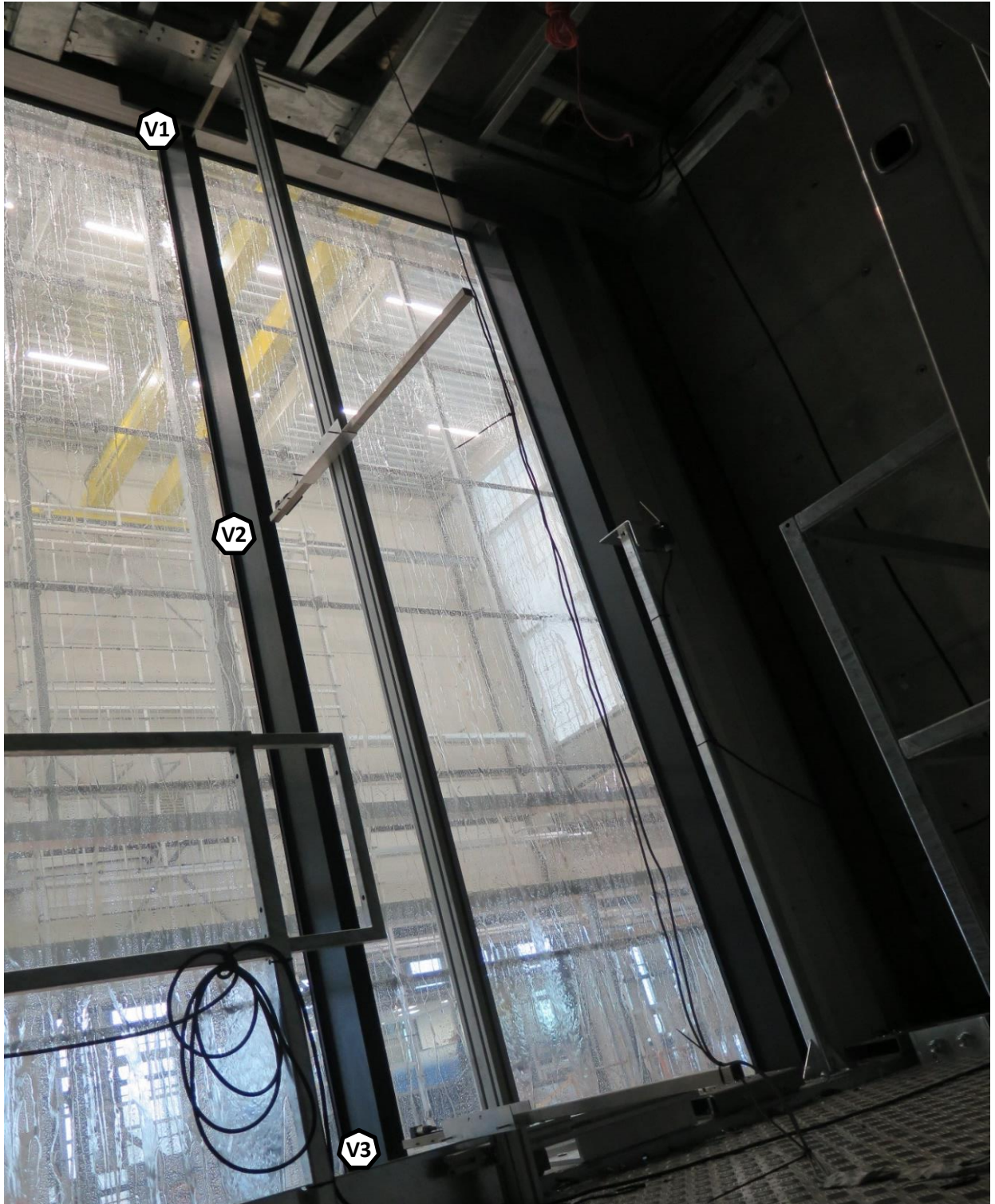
Drawn up at Geldermalsen on:                      **20 February 2019**



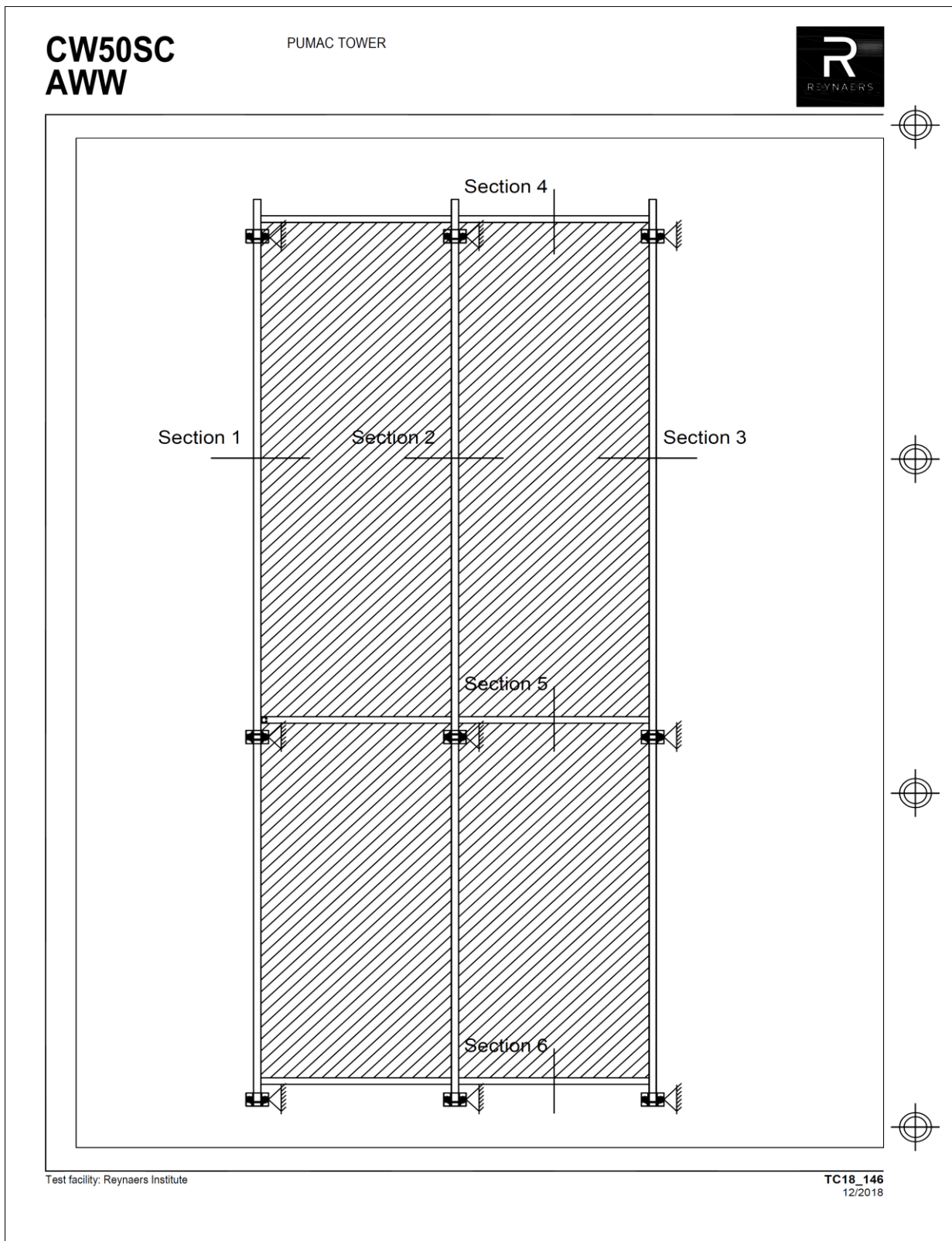
dr. ir. A. van Beek  
Technical Manager

6.1 APPENDIX 1 Photos of the tested construction



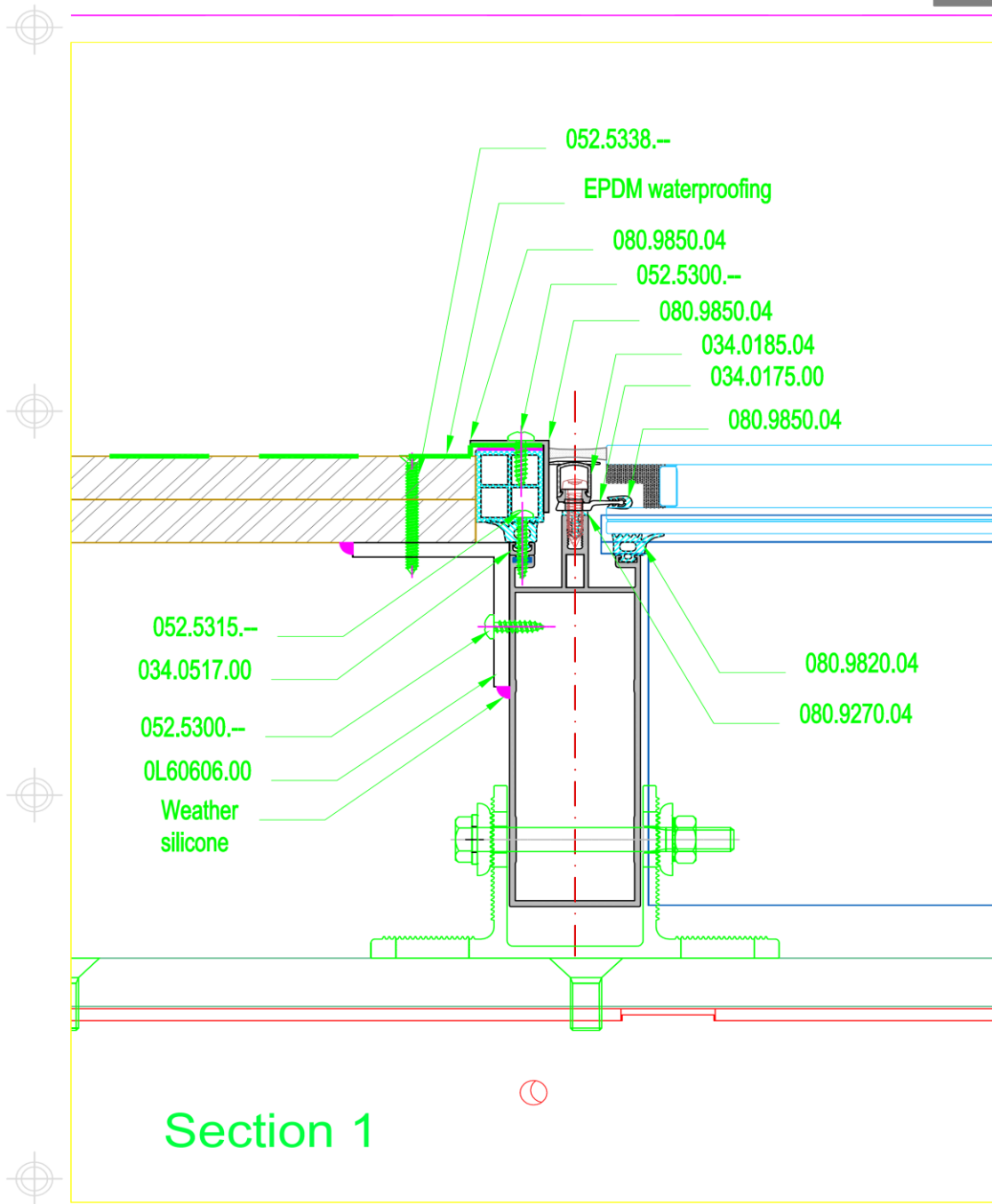


6.2 APPENDIX 2 Drawings of the tested construction



**CW50SC  
AWW**

PUMAC TOWER



Test facility Reynaers Institute

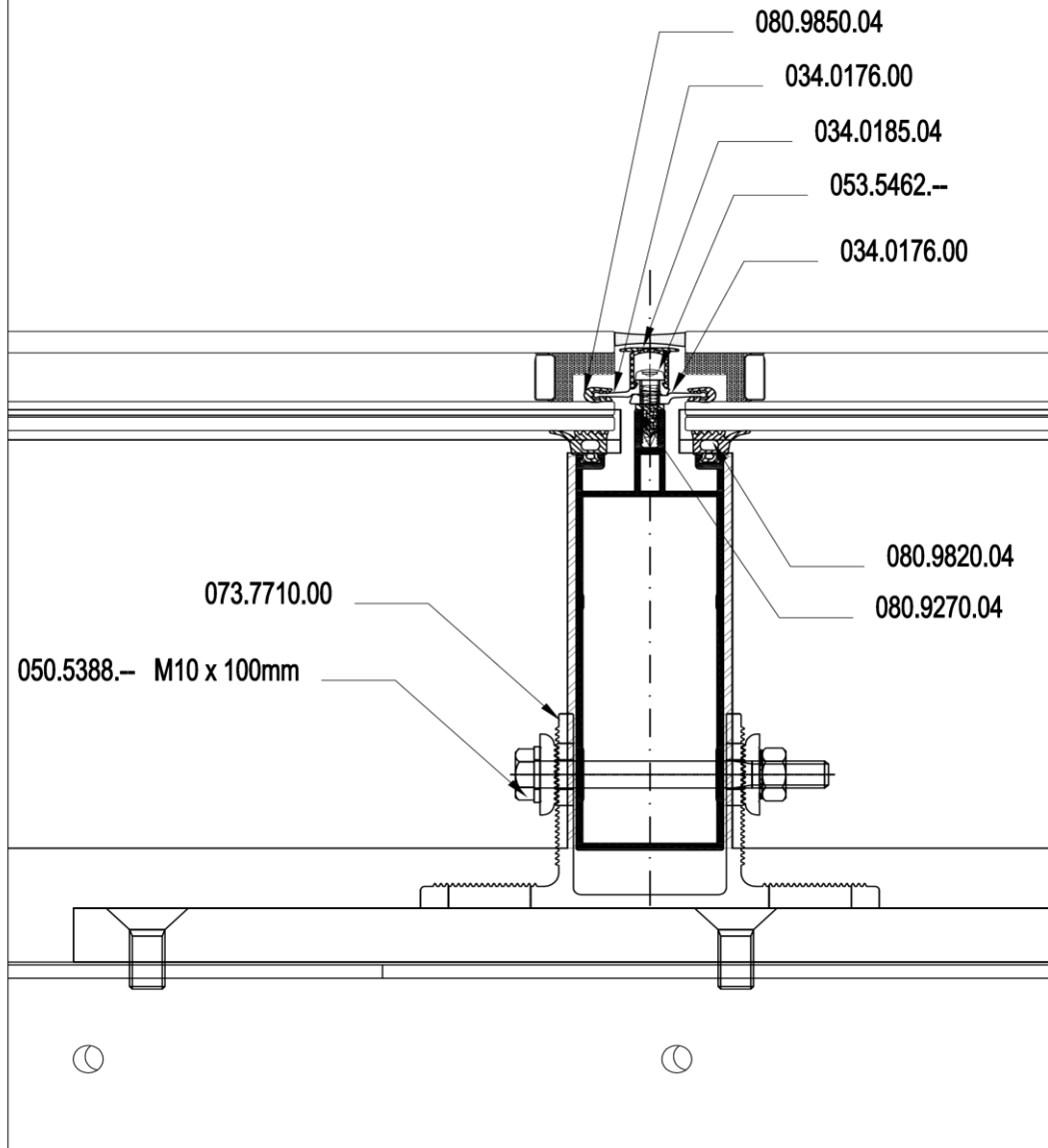
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**CW50SC  
AWW**

PUMAC TOWER



## Section 2



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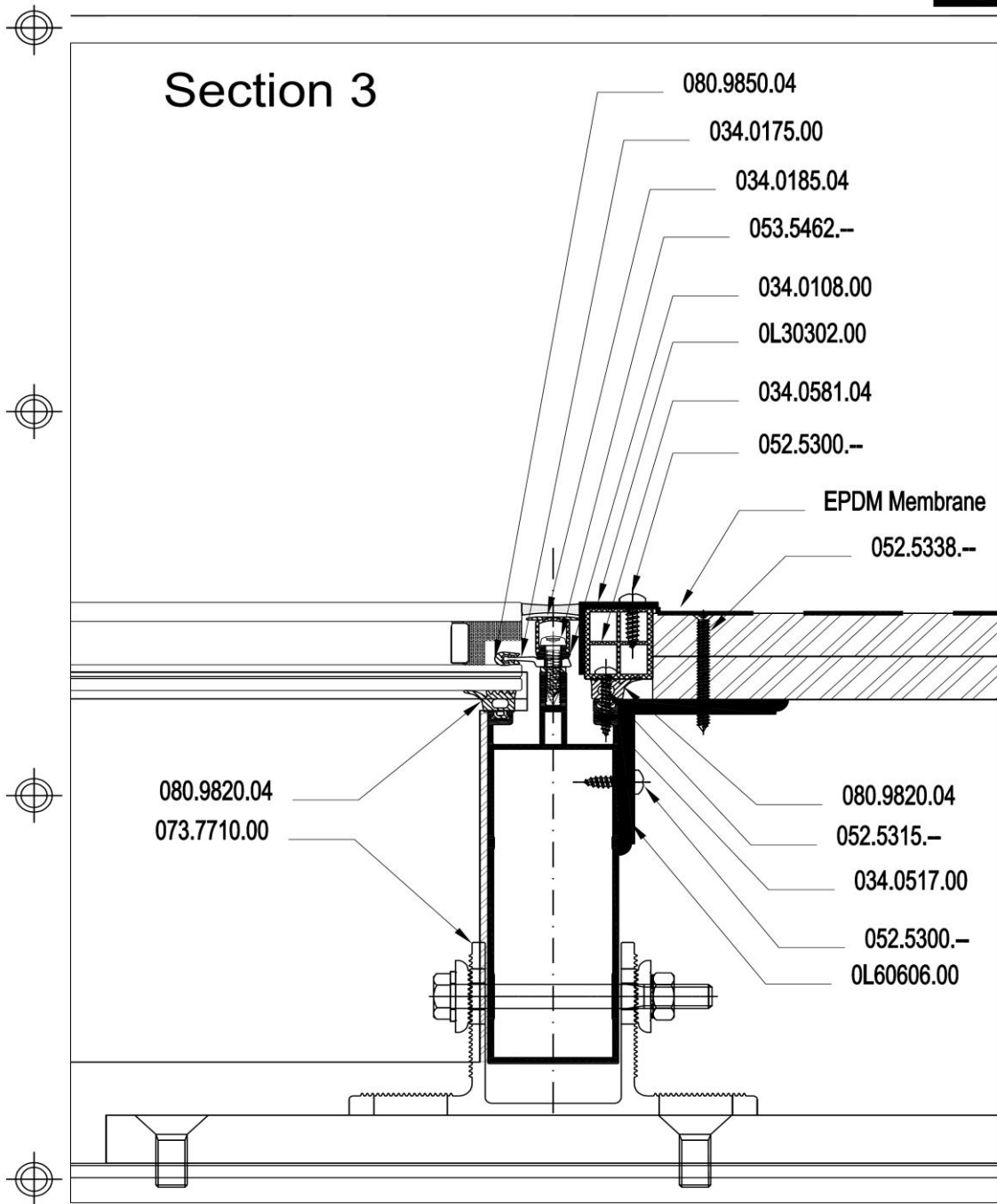
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**CW50SC  
AWW**

PUMAC TOWER



**Section 3**



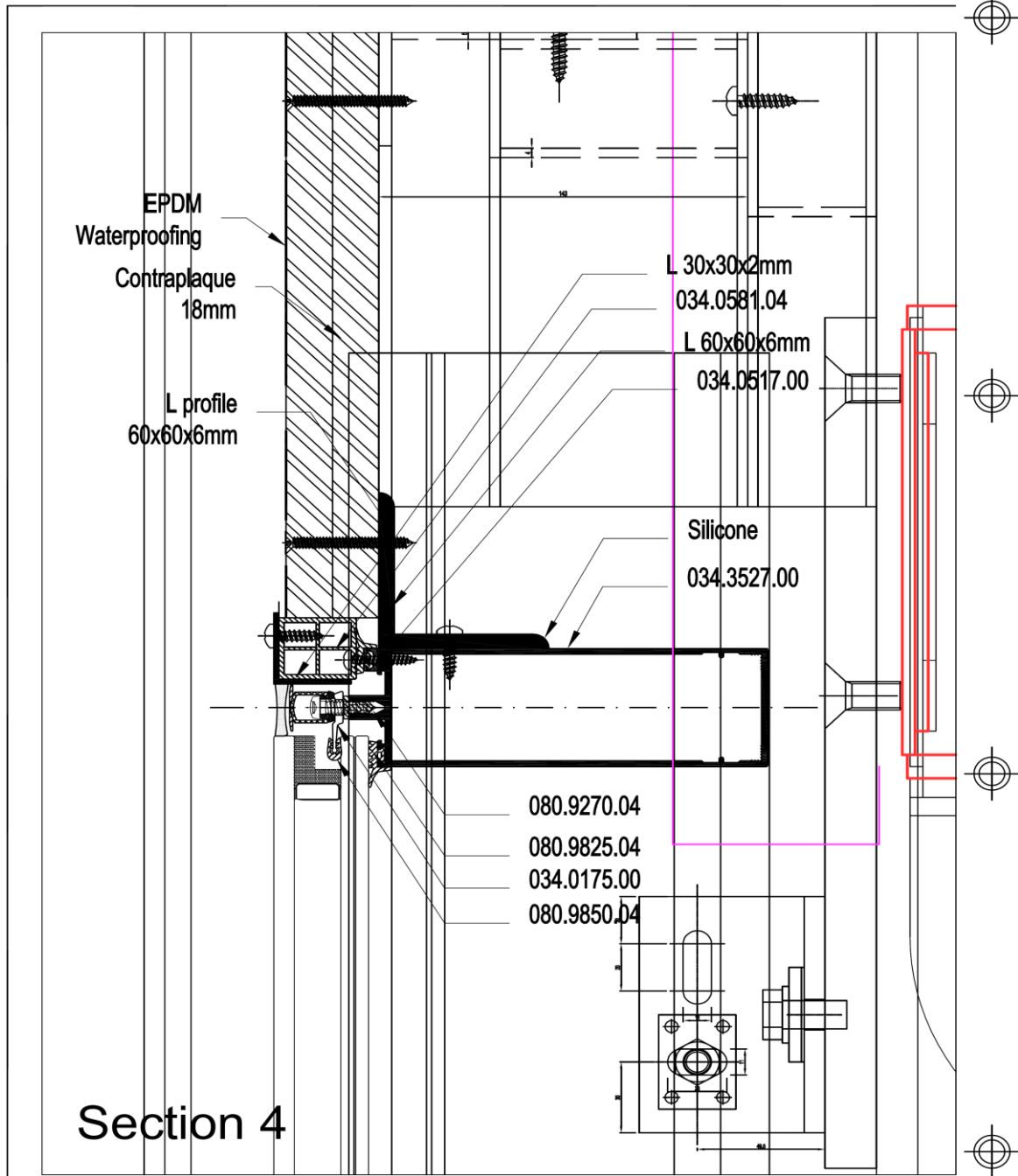
Test facility Reynaers Institute

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**CW50SC  
AWW**

PUMAC TOWER



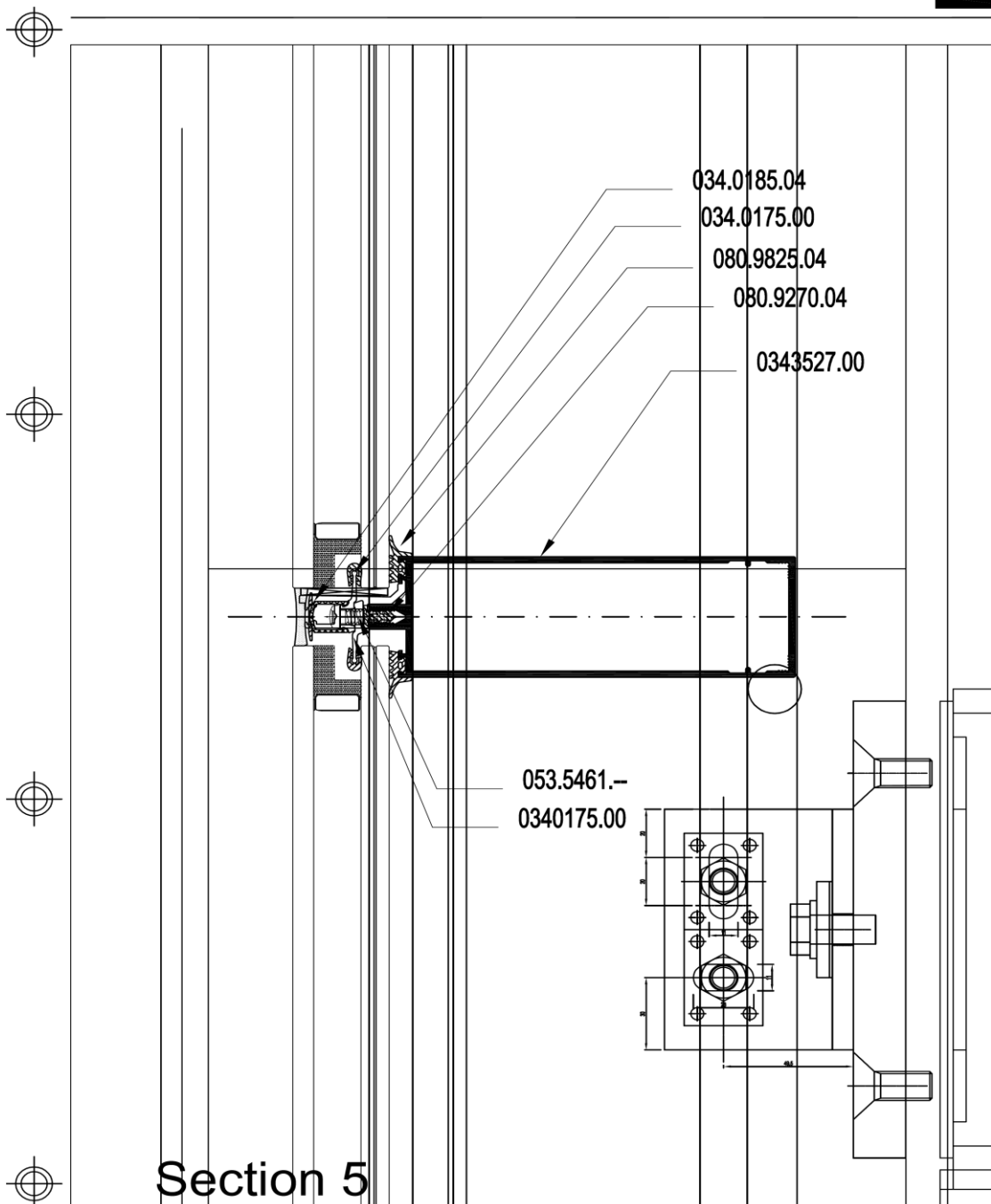
**Section 4**

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**CW50SC  
AWW**

PUMAC TOWER

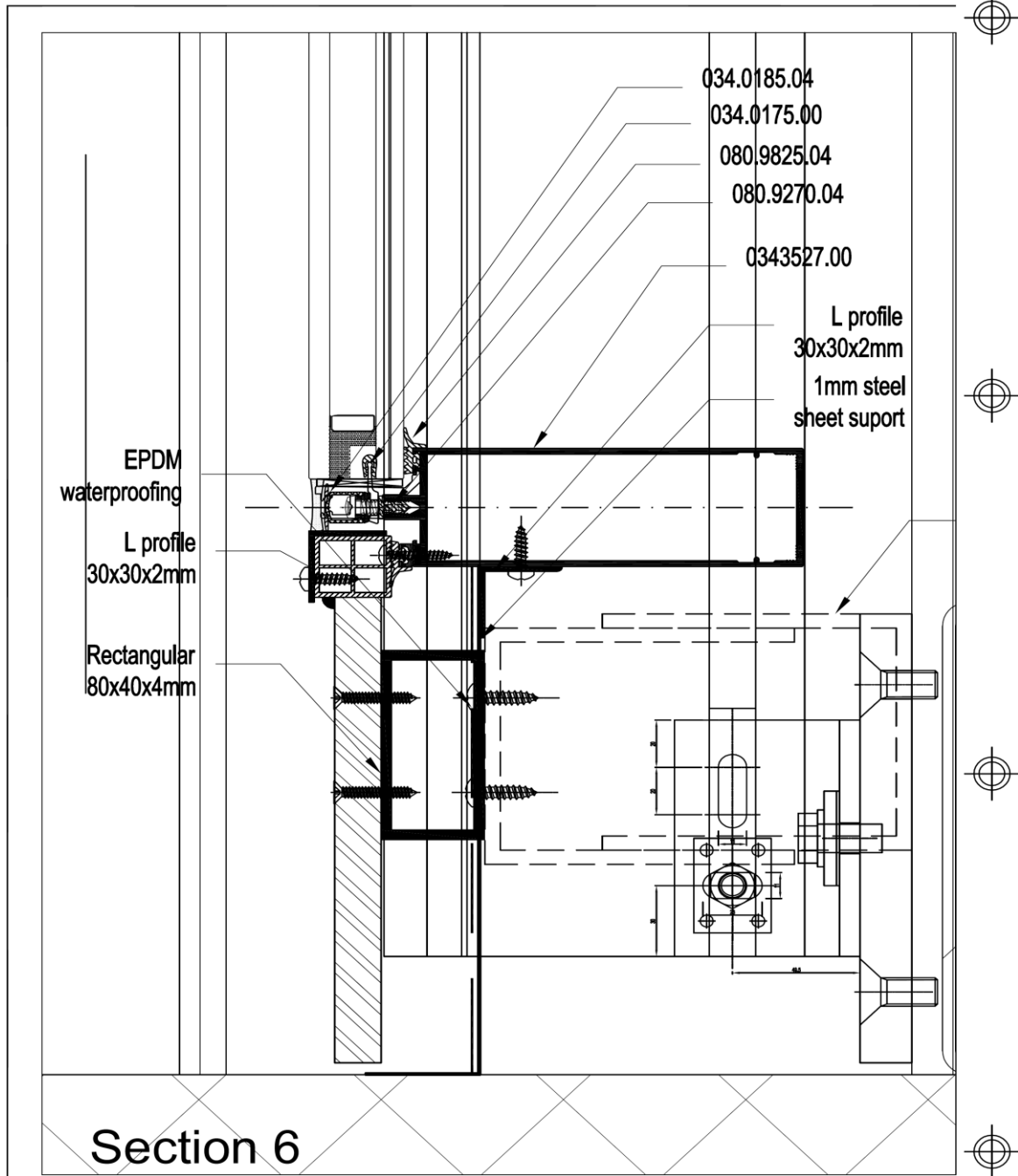


Test facility Reynaers Institute

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**CW50SC  
AWW**

PUMAC TOWER



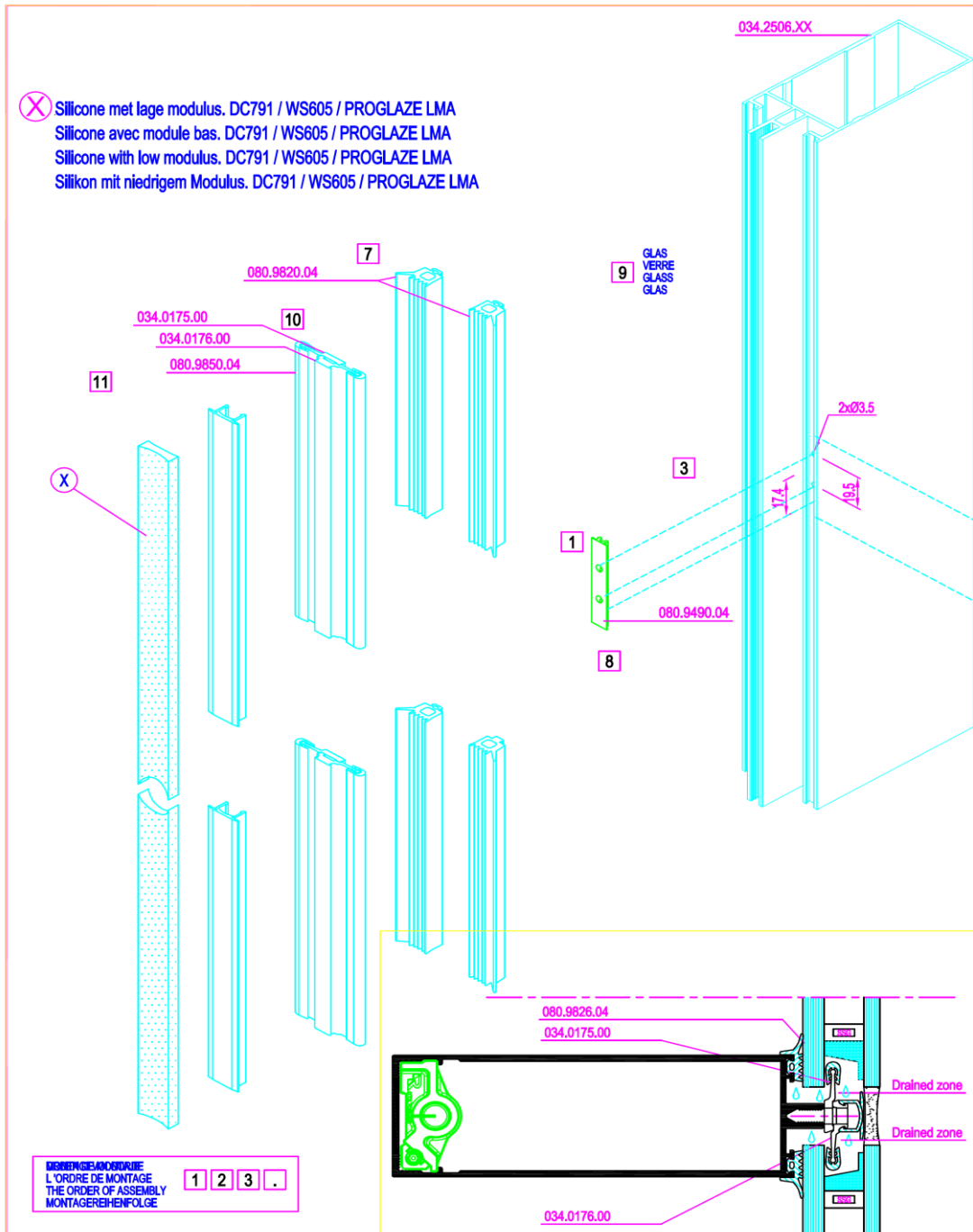
Test facility: Reynaers Institute

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12/2018

# CW50SC AWW

PUMAC TOWER

- ⊗ Silicone met lage modulus. DC791 / WS605 / PROGLAZE LMA
- Silicone avec module bas. DC791 / WS605 / PROGLAZE LMA
- Silicone with low modulus. DC791 / WS605 / PROGLAZE LMA
- Silikon mit niedrigem Modulus. DC791 / WS605 / PROGLAZE LMA



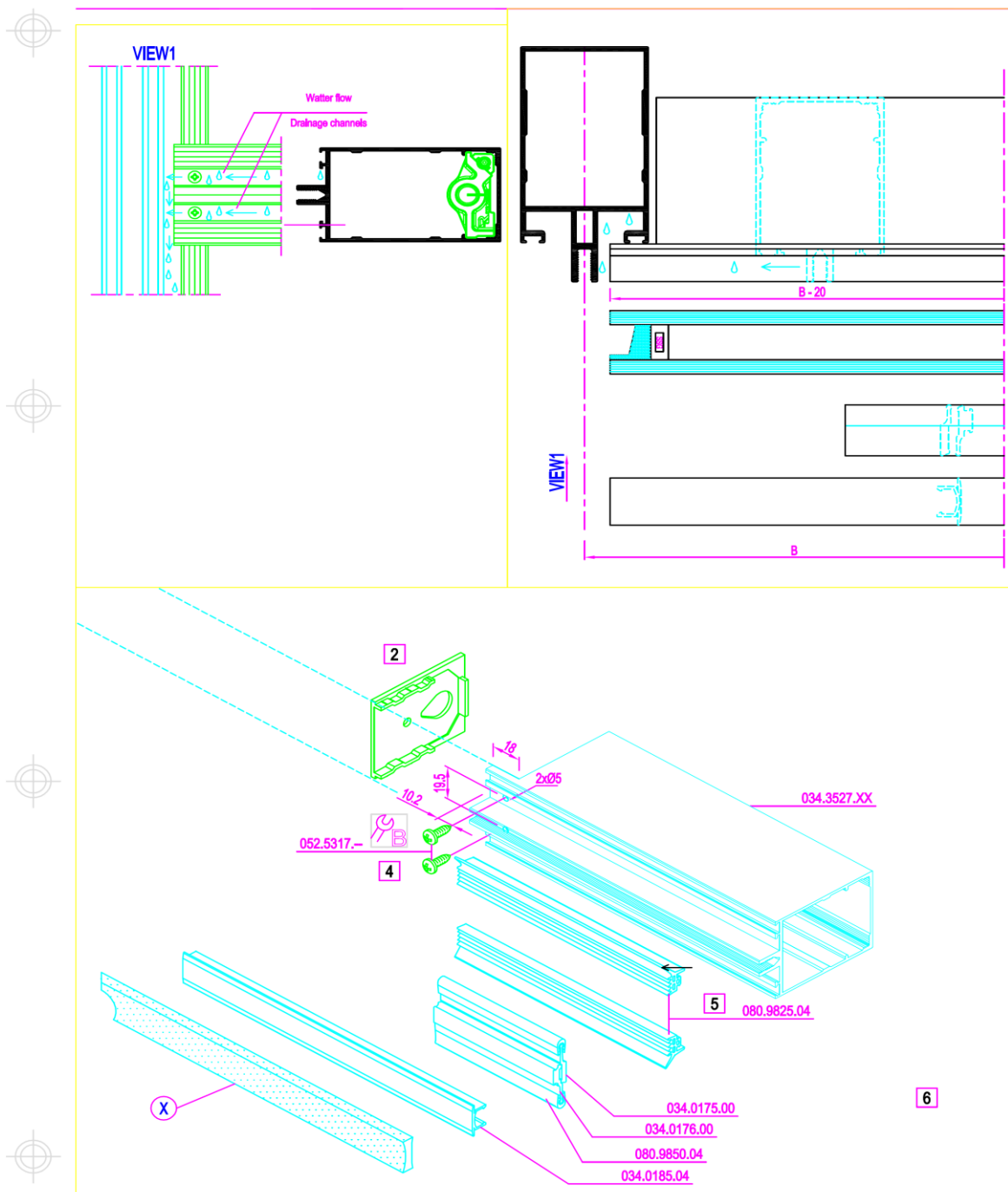
DEBENDEGENAANDE  
L'ORDRE DE MONTAGE  
THE ORDER OF ASSEMBLY  
MONTAGEREIHENFOLGE

1	2	3	.
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# CW50SC AWW

PUMAC TOWER



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