Certificate of Testing

Certificate Number: 2019/95

Date: 5 December 2019

System: **ACM rainscreen with Hilti support structure**

Client: Hilti GB
1Trafford Wharf Road
Trafford Park
Manchester
M17 1BY

Tests performed:

Wind resistance - serviceability	✓
Wind resistance - safety	✓
Soft body impact	✓
Hard body impact	✓

In accordance with 'Standard for Systemised building envelopes' and 'Standard test methods for building envelopes', CWCT, 2006.

Signed: **Test Witness**

Signed **Director**

CWCT Services Ltd, The Studio, Entry Hill, Bath, BA2 5LY
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number 2536548; VAT number: 600 9915 52

Description of components tested

Rainscreen system:	ACM panels supported by Hilti/Eurofox support system
Panel material:	4mm Alucobond A2
Panel size:	Flat sheets, various sizes up to 2.290m x 990mm, fixings at maximum horizontal spacing of 600 mm and vertical spacing of up to 890mm. For wind load test spacing reduced to 650mm
Horizontal joint:	Open joint nominal width 10mm
Vertical Joint:	Closed joint formed by support rails behind panel edges. 10mm nominal gap between panel edges
Support system:	Hilti/Eurofox aluminium rail system MFT-L60x40 x1.8 mm vertical rails generally MFT-T 60x120 x1.8 mm vertical rails at panel joints Rails in 3m long sections at 600 mm centres Initial test layout (impact) Each section of rail supported by 3No MFT-MFI 245 M 6.5 brackets, fixed bracket at centre and movement brackets 1150 each side Revised layout (wind load) Each section of rail supported by 4 No MFT-MFI 245 M 6.5 brackets. Brackets at 833mm centres with 250mm cantilever at each end. One bracket fixed to resist vertical load remaining brackets allow vertical movement.
Fixings:	5mm dia rivets to fix cladding panels to rails S-AD 01 S(SS) 5.5x19 screws to fix profiles to rails S-MD53S 5.5x50 screws to fix brackets to back wall studs
Drainage and ventilation:	Drained and ventilated rainscreen cavity
Backing wall:	Framing: 100x50x1.5 cold rolled Steel C studs at 600 centres, 2.9m span Sheeting on cavity face: Cement particleboard with taped joints. Movement joint at floor level sealed with epdm

Test arrangements

Installer:	Pure exteriors Suite 29, Manor Court Salesbury Hall Estate Ribchester Lancashire PR7 3XU
Testing laboratory:	Wintech Engineering Ltd Halesfield 2, Telford, TF7 4QH
Registration No:	UKAS No 2223
Independent testing authority:	Wintech Engineering Ltd Halesfield 2, Telford, TF7 4QH
Witness:	Alan Keiller, Principal Engineer Centre for Window and Cladding Technology The Studio, Entry Hill, Bath, BA2 5LY
Date of test:	8 March 2019 - impact 9 August 2019 - wind
Report No	R19481-Rev 1

Results

Watertightness - dynamic: Not tested.

Note: Test carried out to assess performance of rainscreen support system. Watertightness depends on panel joints, cavity depth, membranes on the back wall and detailing of interfaces which will vary from project to project.

Wind resistance: PASS

Serviceability test pressure: 1800Pa

Safety test pressure: 2700Pa

Notes: No damage was evident following either the serviceability or safety wind load tests.

The maximum deflection during the serviceability test was:

- 0.6mm for T-rail measured over span between brackets of 835mm
- 0.4mm for L rail measured over span of 835mm

In both cases deflection was measured over the central span of a 3 span continuous rail.

Under positive wind load, load was transferred to the rail along its full length by contact with the ACM panels.

Under negative wind load, load wa transferred to the rails at the panel fixings which included fixings at mid span.

There was no significant residual deflection after unloading after either the serviceability or safety tests.

The CWCT Standard does not give a specific limit on deflection of rainscreen rails. Rails should be stiffer than the panels which they support. For metal panels the limit on deflection is span/90. For brittle materials the deflection of the supporting structure should be less than span/360. The recorded deflections were less than span/1000.

The recovery of deflection after unloading indicates that the rails were acting within the elastic region

Results (cont)

Impact:

Soft body test to CWCT TN 76		
Type of test	Serviceability	Safety
Impact energy	120Nm	500Nm
Result	Class 1	Negligible risk
Hard body test to CWCT TN 76		
Type of test	Serviceability	Safety
Impact energy	10Nm	10Nm
Result	Class 1	Negligible risk

Notes:

Serviceability performance is given in five classes. Class 1 is the highest performance class and indicates that no visible damage was caused by the impact.

Safety performance is given in four classes. Negligible risk is the highest performance class and indicates that no debris fell from the specimen during the test.

Although the system satisfied the soft body impact test without causing a safety risk from falling material, significant damage was caused to the rainscreen panels and support rails which would require replacement of these components.

Notes:

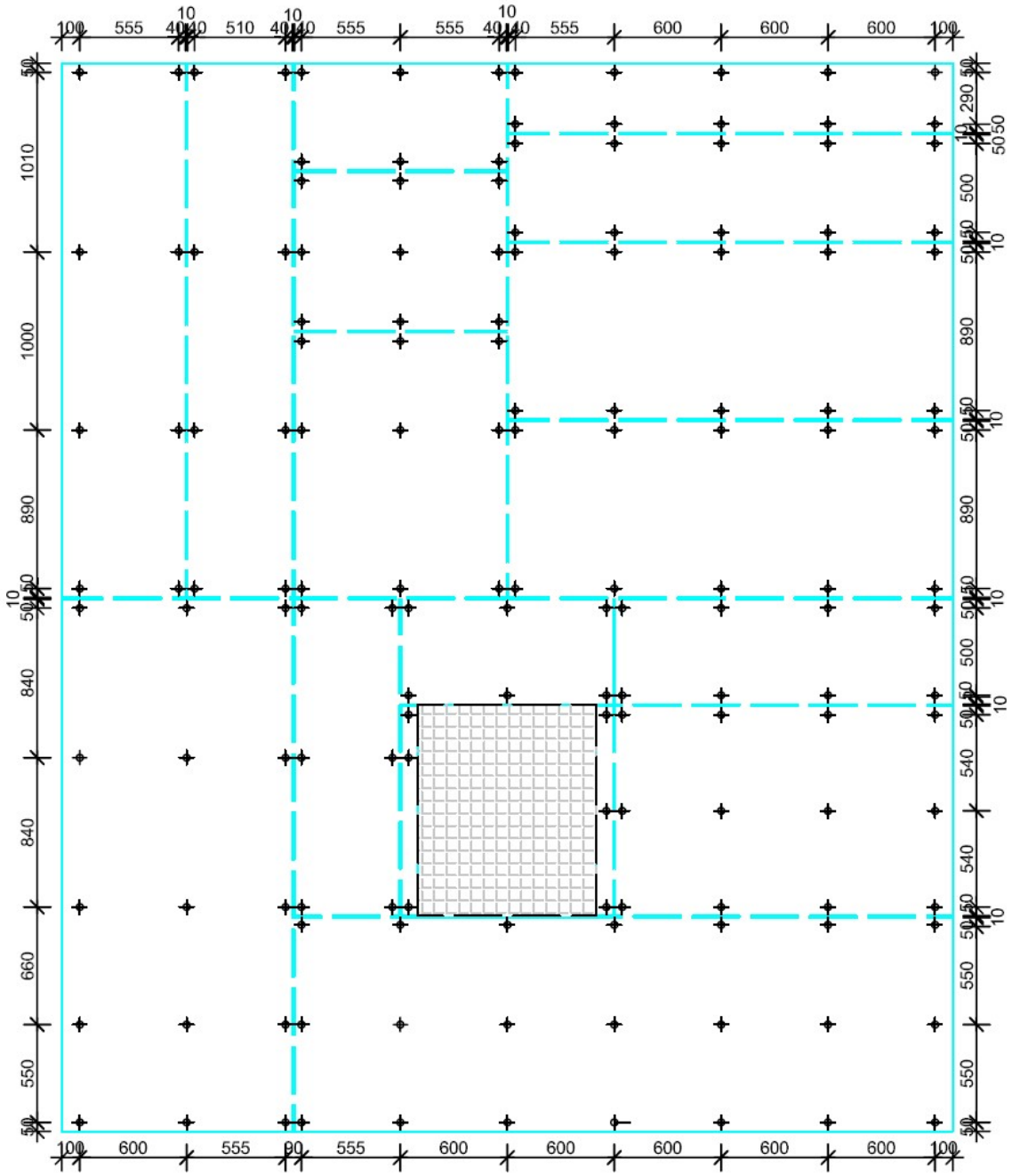
The tests described in this certificate demonstrate that the test sample as constructed satisfies the performance requirements of the CWCT Standard for the properties tested.

The test was commissioned to assess the performance of the rainscreen support system. The rainscreen panels and back wall were provided to facilitate the test.

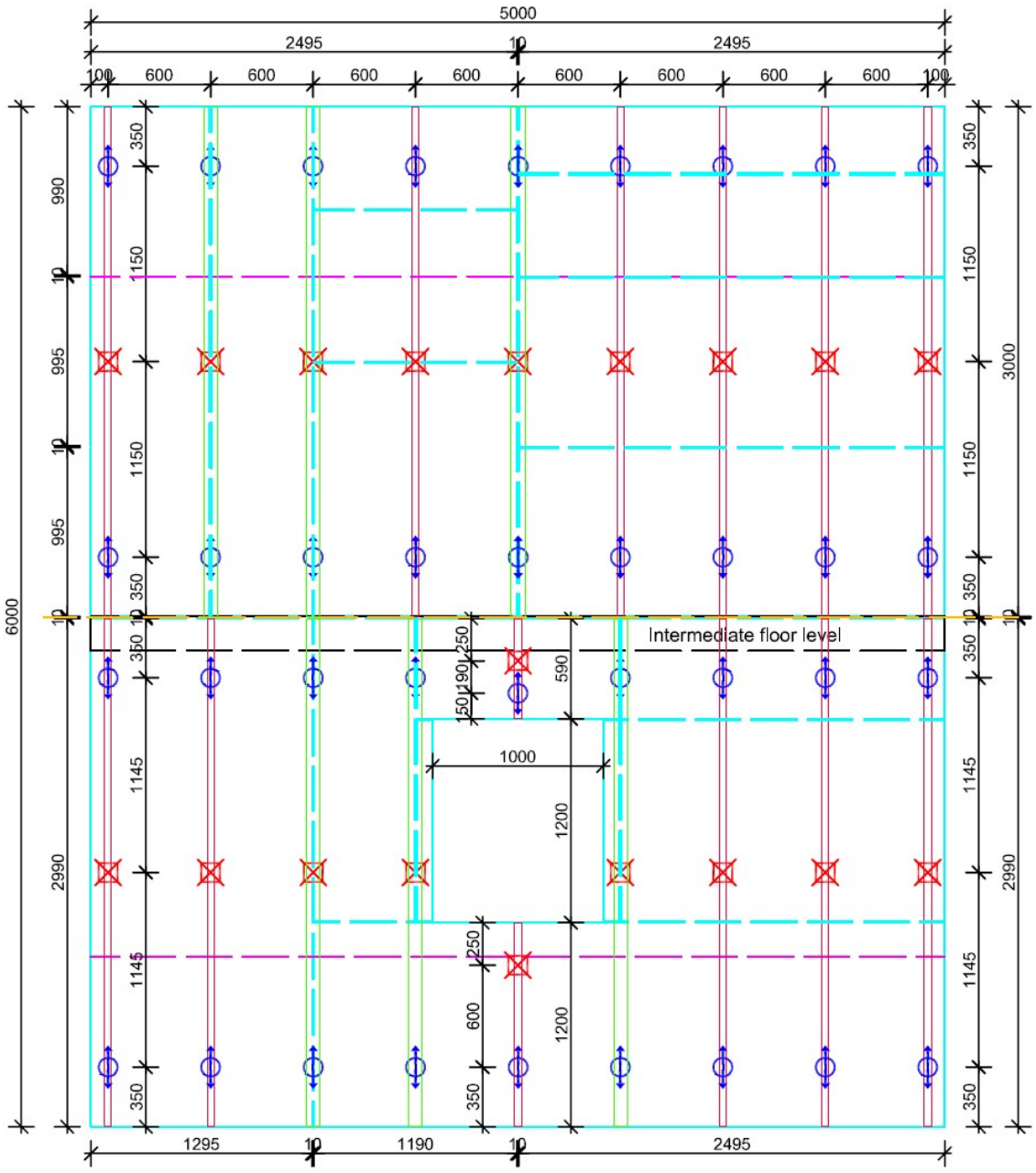
Fixings require a safety factor greater than 1.5 and should be separately verified.

Variations from the tested arrangement should be verified by additional tests or calculation.

Drawings



Elevation of initial test wall (impact tests) showing panel arrangement and panel fixing locations



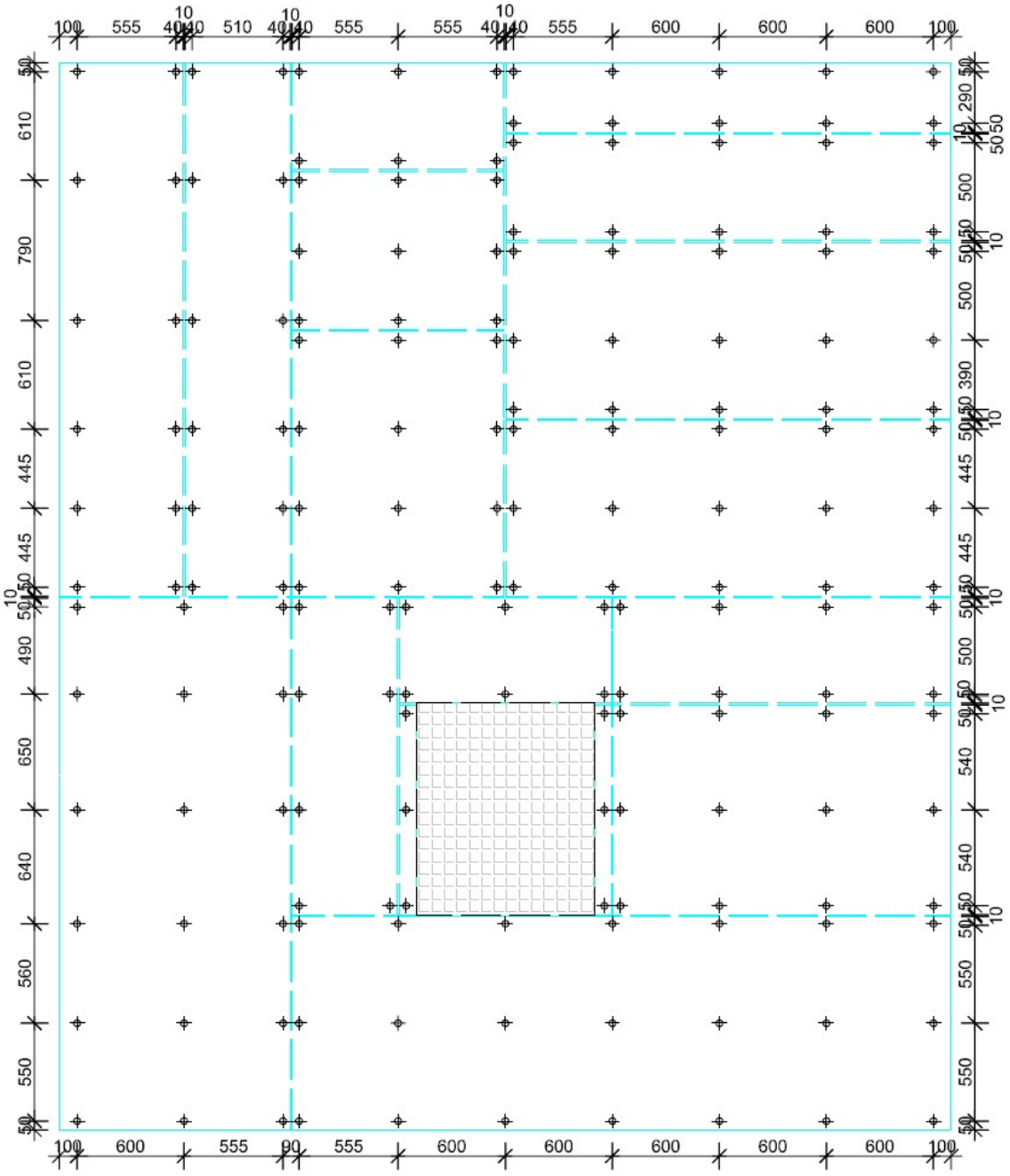
MFT-MFI 245 M 6,5/MFT-FOX VI 240 M 6,5 (flexible point/Gleitpunkt)
fastening in elongated holes/Verschraubung in Langlöchern

MFT-MFI 245 M 6,5/MFT-FOX VI 240 M 6,5 (fix point/Fixpunkt)
fastening in round holes/Verschraubung in Rundlöchern

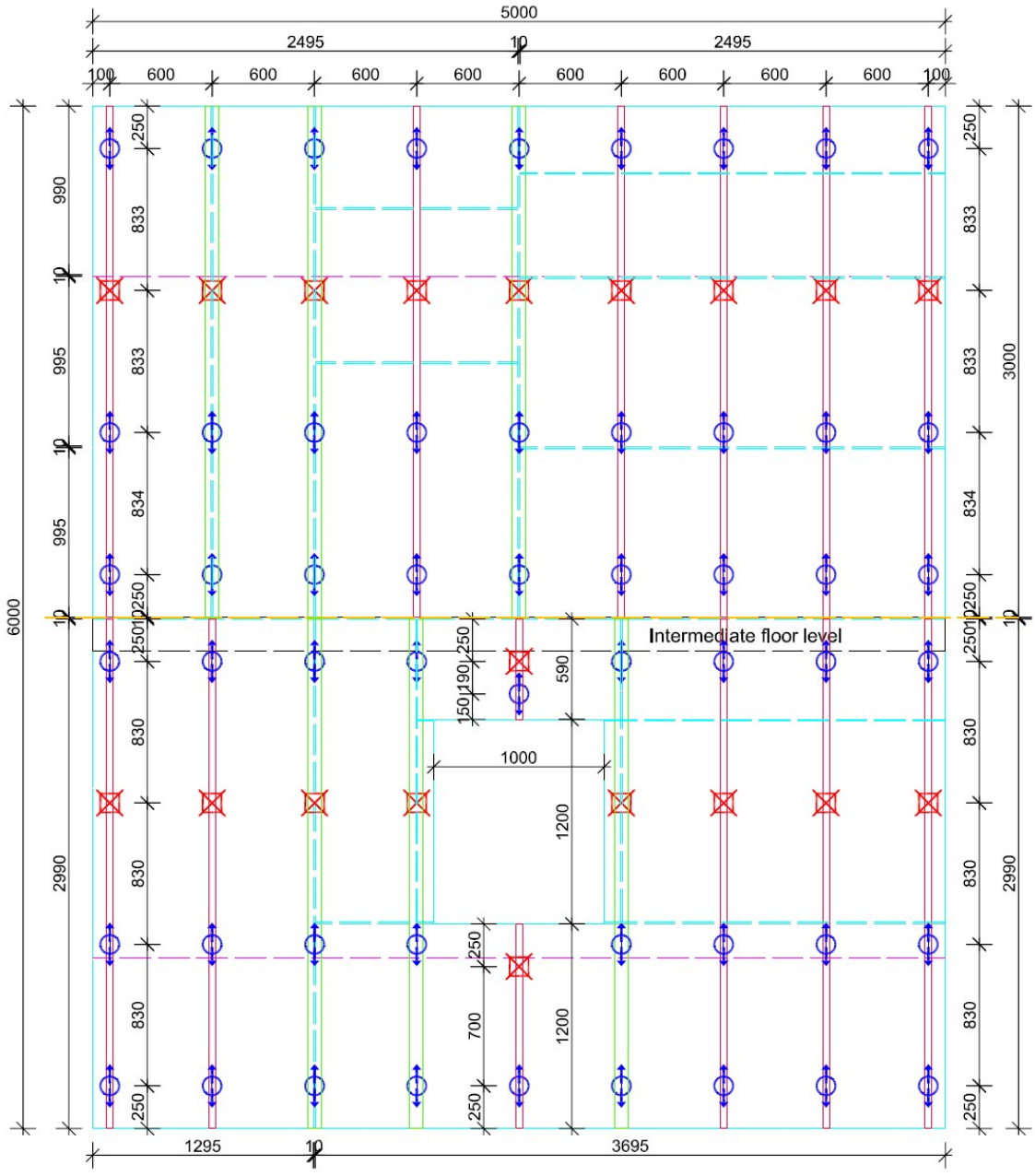
Profile/ Profil MFT-L 60x40 1,8 vertical/vertikal

Profile/ Profil MFT-T 60x100 1,8 vertical/vertikal

Elevation of initial test wall (impact tests) showing rainscreen support rails



Elevation of revised test wall (wind load tests) showing panel arrangement and panel fixing locations



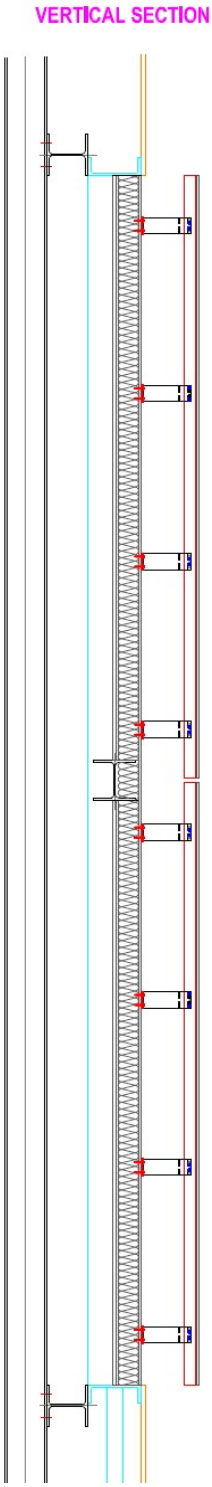
MFT-MFI 245 M 6,5/MFT-FOX VI 240 M 6,5 (flexible point/Gleitpunkt)
fastening in elongated holes/Verschraubung in Langlöchern

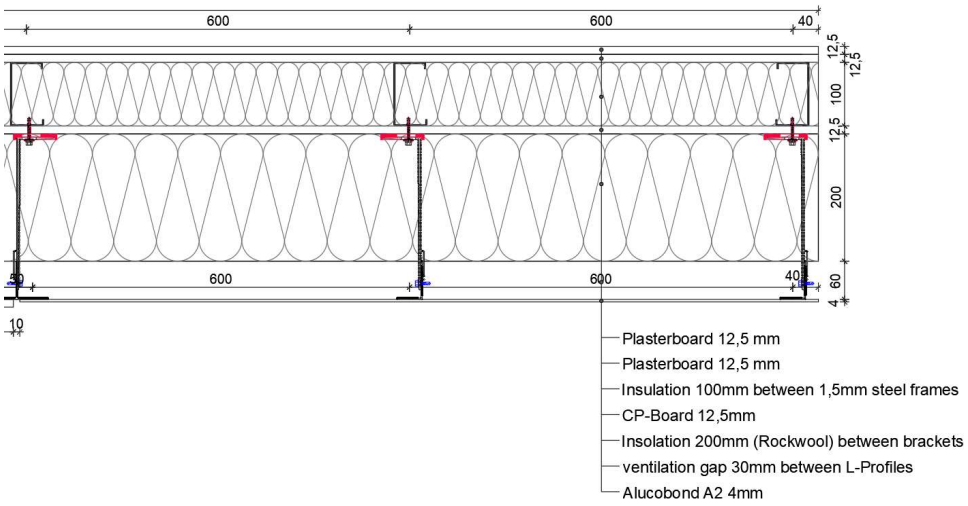
MFT-MFI 245 M 6,5/MFT-FOX VI 240 M 6,5 (fix point/Fixpunkt)
fastening in round holes/Verschraubung in Rundlöchern

Profile/ Profil MFT-L 60x40 1,8 vertical/vertikal

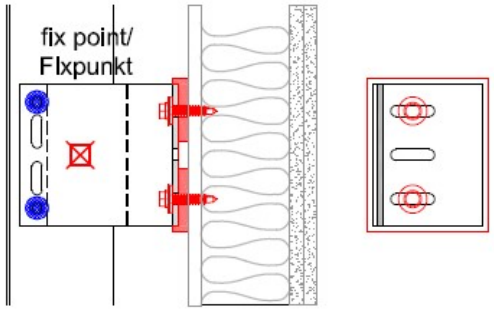
Profile/ Profil MFT-T 60x120 1,8 vertical/vertikal

Elevation of revised test wall (wind load tests) showing rainscreen support rails

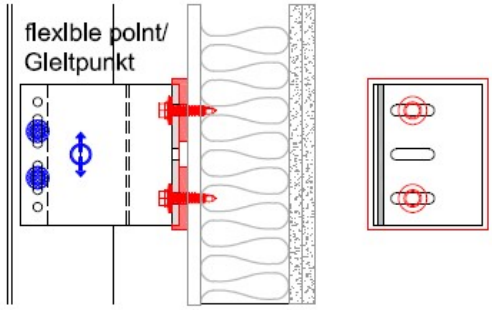




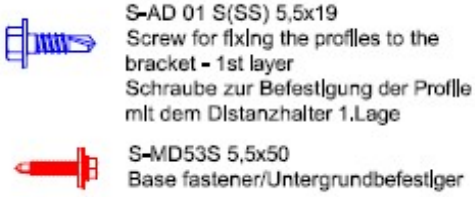
Horizontal section through wall



Fixed point bracket detail

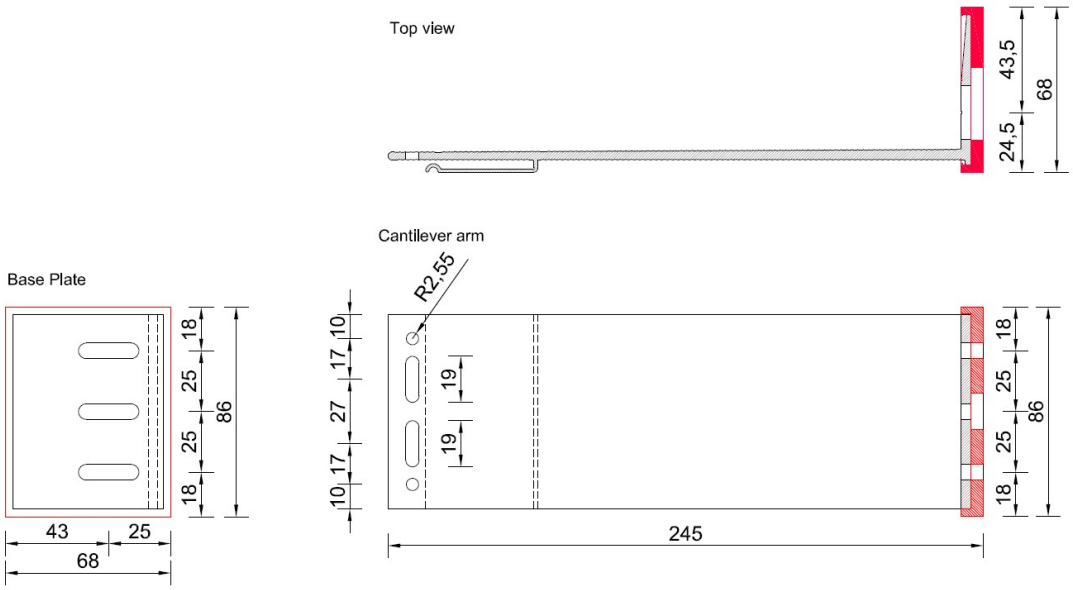


Moving point bracket detail



Vertical section Fixings

Details of rainscreen support system



Details of rainscreen bracket