Certificate of Testing

CENTRE FOR WINDOW AND CLADDING TECHNOLOGY

Certificate Number: 2018/74

Date: 29 January 2018

System: **Krion K- Bolt rainscreen system**

System supplier: **Butech**
CV-20km 2.5
12540 Vila-real
Castellon
Spain

Tests performed:

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

In accordance with 'Standard for Systemised building envelopes CWCT, 2006

Signed: Test Witness

Signed Director

Description of system tested

Rainscreen system:	Krion K-Bolt rainscreen system
Panel description:	Krion, Flat panels 12 mm thick composed of fine grained mineral material (aluminium trihydrate) mixed with acrylic resin K-Bolt panels are attached to aluminium rails by stainless steel clips fixed to back of panels with undercut anchors. Clips at top of panels are screwed to rails and engage with clips fixed to the bottom of panel above
Joints:	Tongue and groove joints between sections of Krion bonded with Krion adhesive and polished to form seamless panel Closed lap joints between seamless areas
Support rails:	Extruded aluminium T rails supported by aluminium brackets. Rails and brackets composed of 6005A T6 aluminium
Fixings:	K-Bolt undercut anchor to fix clips to Krion panels 4.8 mm dia stainless steel screws to fix clips to rails 4.8mm dia stainless steel screws to fix rails to brackets
Drainage and ventilation:	Drained and ventilated rainscreen cavity with drainage openings at bottom of cavity and ventilation opening at top of cavity. Limited ventilation openings in joints at panel corners
Backing wall:	Steels studs with plywood sheathing Note: Backing wall provided to facilitate testing and not part of system. System can be used with other forms of backing wall.

Test arrangements

Date of test:	21 July 2017 (hard body impact tests) 8 November 2017 (wind load tests)
Testing laboratory	Technology Centre VINCI Construction UK Ltd Stanbridge Road Leighton Buzzard Bedfordshire LU7 4QH
Registration No:	UKAS No 0057
Independent testing authority	Technology Centre VINCI Construction UK Ltd Stanbridge Road Leighton Buzzard Bedfordshire LU7 4QH
Witness:	Alan Keiller Principal Engineer CWCT The Studio Entry Hill Bath BA25LY
Fabricator:	Butech CV-20km 2.5 12540 Vila-real Castellon Spain
Installer:	Butech CV-20km 2.5 12540 Vila-real Castellon Spain

SUMMARY OF RESULTS

Watertightness - dynamic: Not tested

Note:

The system has limited openings in the rainscreen which will restrict the amount of water entering the rainscreen cavity.

It is recommended that any surfaces that would be adversely affected by the presence of water should be protected by a waterproof membrane.

Flashings are also required to drain water above window and door openings and from the bottom of the cavity

Wind resistance: PASS

Details of wind resistance tests:

Serviceability test pressure:	1200Pa	
Deflection of panel	Deflection	Span
Positive pressure	2.4mm	590mm
Negative pressure	-4.5mm	590mm
Safety test pressure:	1800 Pa	

Impact test to CWCT Technical Note 76:

	Impact Energy (Nm)	Performance Class
Soft body (serviceability):	120	1
Soft body (Safety):	500	Negligible risk
Hard body (serviceability)	10	1

Notes:

Test results apply to the tested arrangement as shown on drawings. Variations from the tested arrangement would need to be assessed by calculation or further testing.

Span has been taken as distance between rails.

Recorded deflection is the total movement at midspan. True deflection of the panel will be less than that recorded due to movement of the supports.

For serviceability, the CWCT Standard recommends a deflection limit for rainscreen panels of span/90 for metals and glass and span/360 for brittle materials. The deflection limit for metal panels is to prevent visually unacceptable deflection. The limit for brittle materials is to limit the risk of cracking. Deflections measured were in all cases less than span/90 hence would be visually acceptable. The limit for brittle materials is applicable to ceramic materials. Resin based materials would normally permit greater deflection.

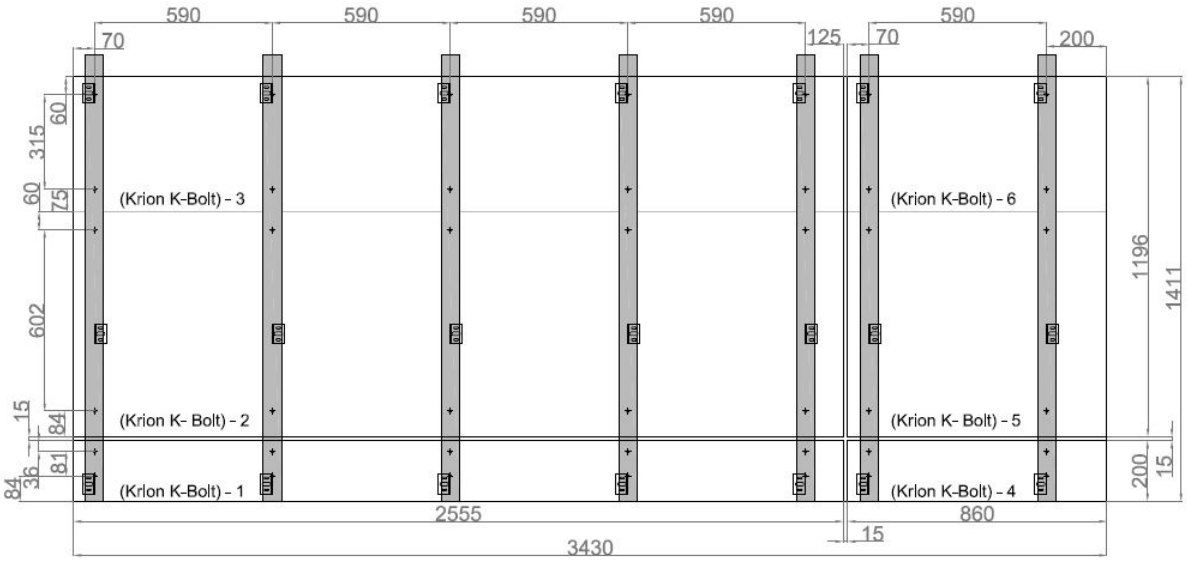
Failure to recover from deflection on unloading may indicate plastic deformation which could lead to fatigue failure after a number of load cycles. In all cases the residual deflection on unloading after the serviceability wind load tests was less than 1mm which is taken to indicate full recovery.

At the safety load there should be no permanent damage to the system and the panels should remain secure. The CWCT Standard does not set a limit on residual deformation of rainscreen panels after application of the safety load. At the loads shown the residual deformation was less than span/500 which is the limit given for framing members.

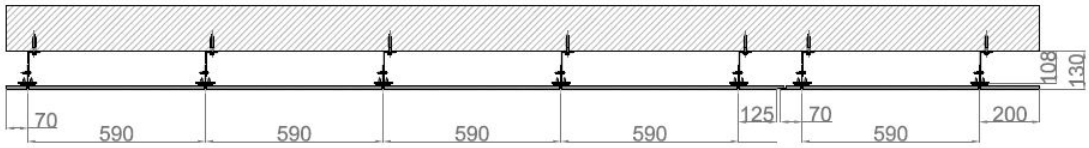
Performance under impact for serviceability is given in 5 classes. The best performance is class 1 which indicates there was no damage visible from 1m. In this case no damage was observed.

Performance under impact for safety is given in 4 classes. The best performance is negligible risk which indicates that no material was dislodged during the test and no damage likely to lead to materials falling subsequent to the test was observed. In this case no damage was observed.

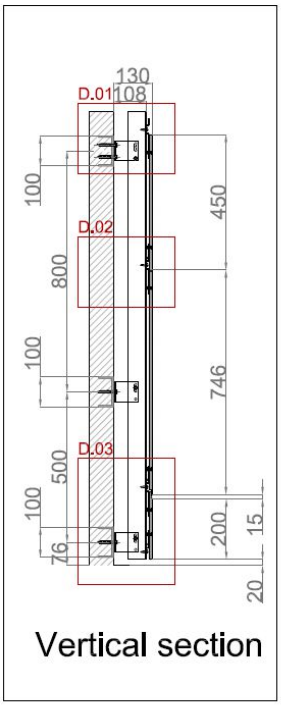
Drawings



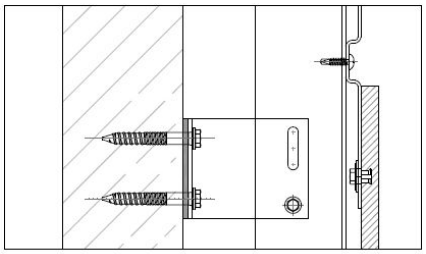
Elevation



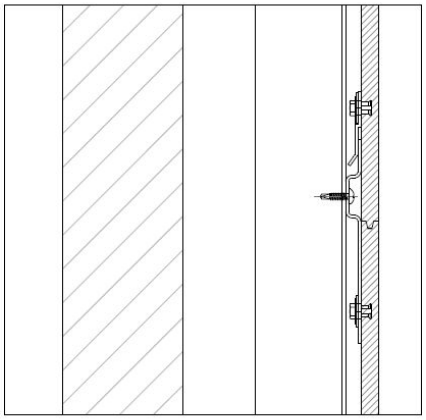
Horizontal section



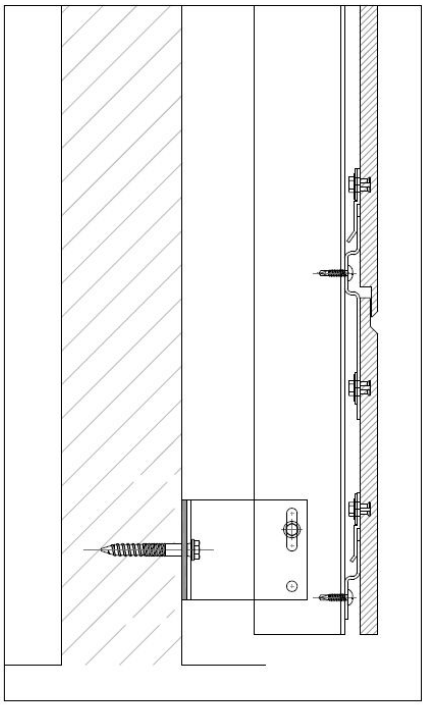
Vertical section



DETAIL 01

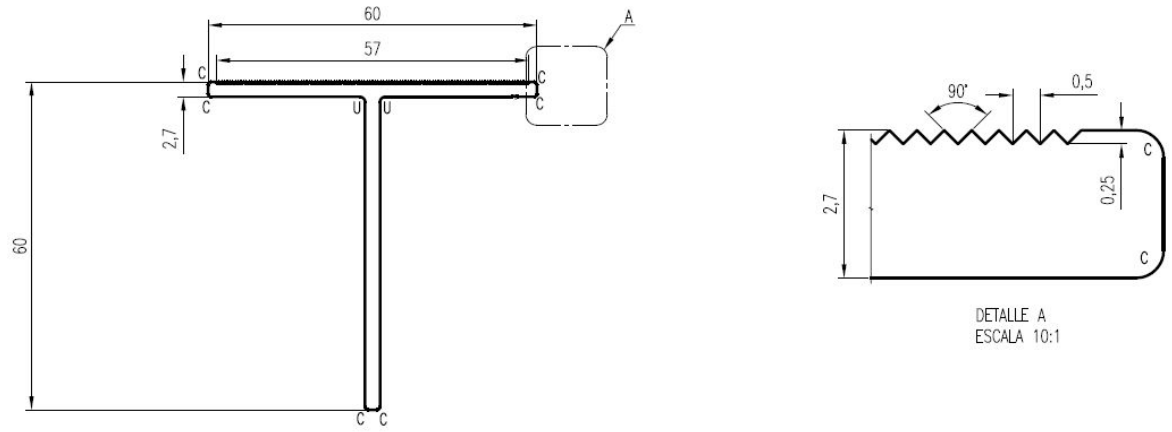


DETAIL 02

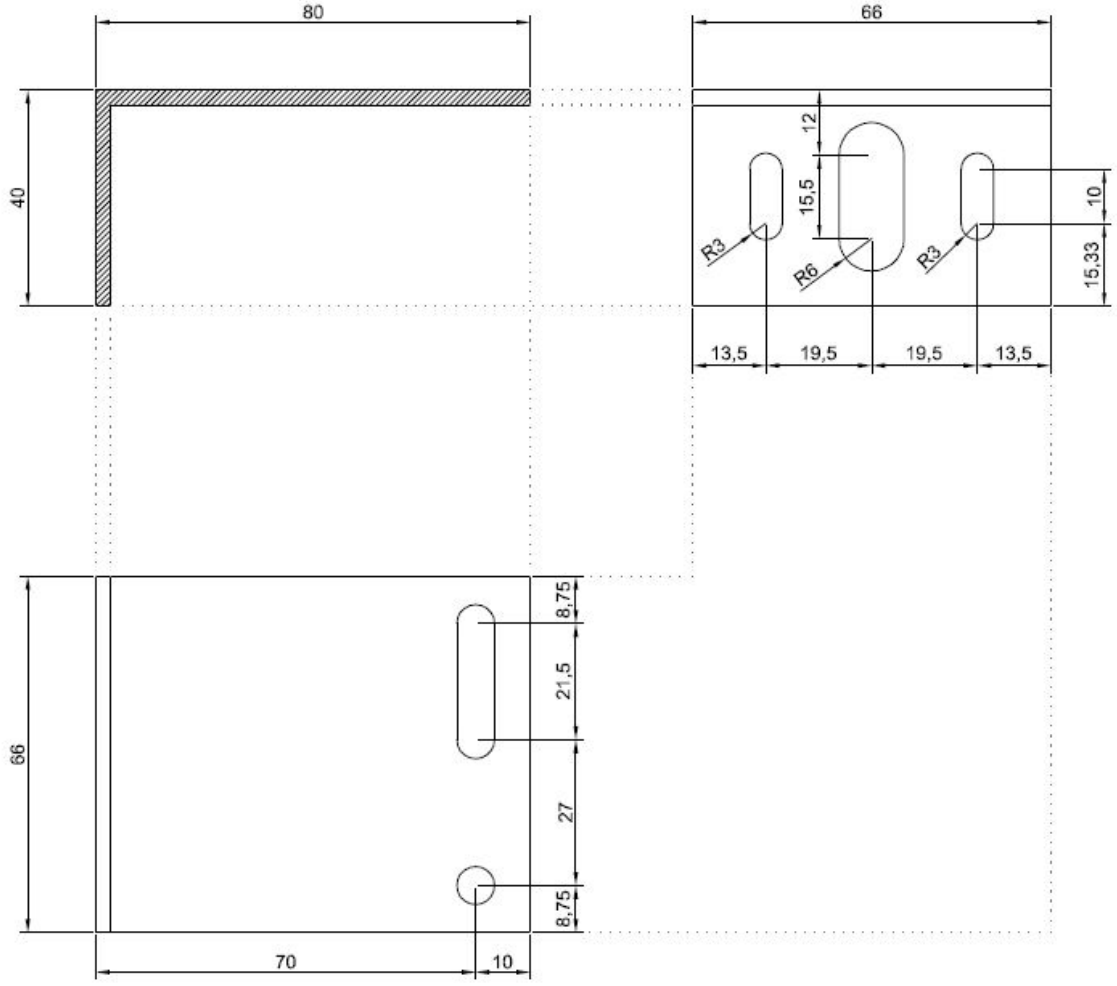


DETAIL 03

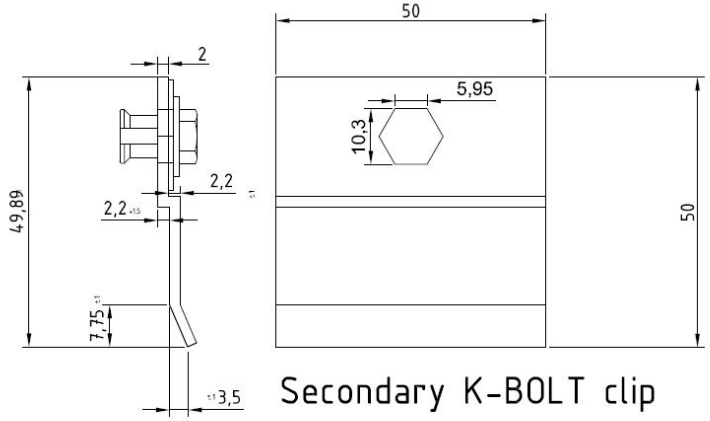
Elevation, sections and details of sample



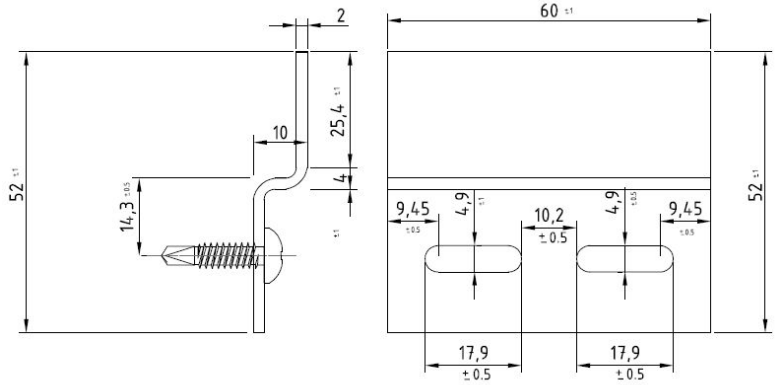
Details of rail



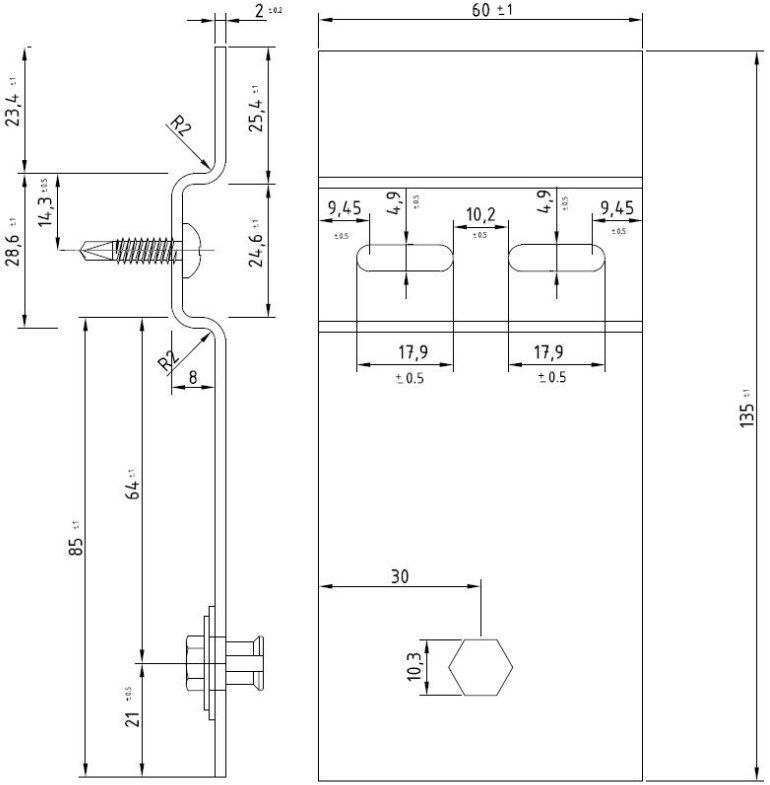
Bracket details



Secondary K-BOLT clip

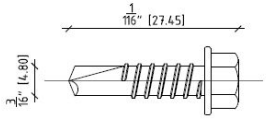
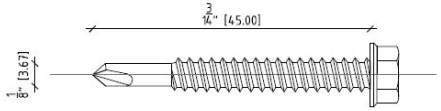
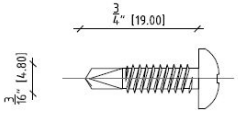
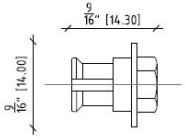


Hanging K-BOLT clip



Primary K-BOLT clip

Details of clips for K-Bolt system

USED	TYPE OF SCREW	SUBSTRATE WALL	USED TO	LATERAL VIEW	LARR NO.
●	LT SCREW HILTI S-MD ¼" – 20x1" (17)		TO FIX T/L PROFILE TO SPACER L-BRACKET & SPACER L-BRACKET TO OMEGA PROFILE		25886
●	STEEL SCREW HILTI S-MD 12 - 24 x 2" (9)	STEEL SUBSTRUCUTRE	TO FIX SPACER L-BRACKET TO STEEL SUBSTRUCTURE		25886
●	KRION SCREW HILTI S-WD 12 - 14 x 1" (25)		TO FIX CLIP TO SUBSTRUCTURE		25886
●	K-BOLT FIXING SCREW (23)		TO FIX KRION PANEL TO SUBSTRUCTURE		

Details of fixings