REPORT No. 087203-002-a

CUSTOMER	CUPA PIZARRAS S.A.
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PURPOSE	RECOMMENDED DYNAMIC AND STATIC TEST METHOD FOR DETERMINING THE SEISMIC DRIFT CAUSING GLASS FALLOUT FROM A WALL SYSTEM (AAMA 501.6-18, AAMA 501.4-18)
TESTED SAMPLE	VENTILATED CLADDING REF.: “CUPACLAD 101 LOGIC 50 X 25”
RECEPTION DATE	06.07.2020
TEST DATE	06.07.2020 – 09.07.2020
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Signed: Ion Oteiza

Technical Manager

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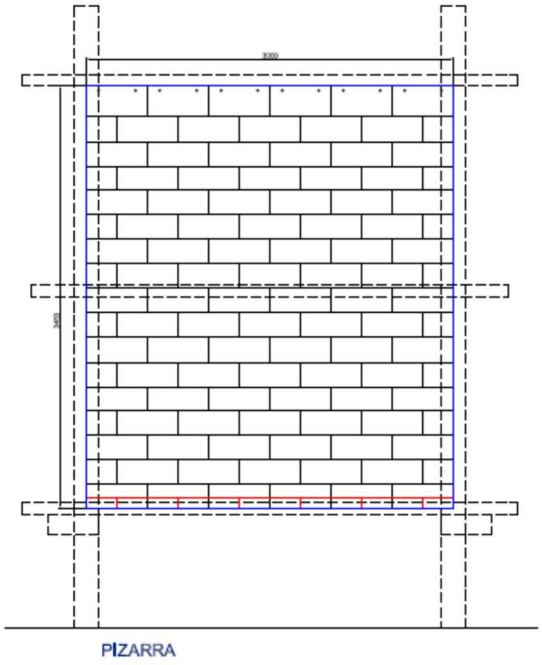
SAMPLE CHARACTERISTICS

On 6 July TECNALIA received from the company CUPA PIZARRAS S.A. the components for the assembly of the cladding sample with reference “CUPACLAD 101 LOGIC 50 X 25”.
Using these components from CUPA PIZARRAS , a sample measuring 3,200x3,500 mm was constructed
The main characteristics of the sample are the following:

TYPE:	Outer lining of ventilated cladding
NUMBER OF SLATES:	See Picture 1.
SLATE DIMENSIONS (mm):	500 x 250
TOTAL DIMENSIONS (mm):	3,000 x 3,450
TOTAL SURFACE (m^2):	10.35
STRUCTURE MATERIAL:	Aluminium / Natural slate
PROFILE DESIGN:	See Annexes



Tested sample (the rest of the sample drawings can be found in Annex I of this report and the sample photographs in Annex II).

TESTS REQUESTED

The requested tests were as follows:

- RECOMMENDED DYNAMIC TEST METHOD FOR DETERMINING THE SEISMIC DRIFT CAUSING GLASS FALLOUT FROM WINDOW WALL, CURTAIN WALL AND STOREFRONT SYSTEMS (AAMA 501.6-18)
- RECOMMENDED STATIC TEST METHOD FOR EVALUATING WINDOW WALL, CURTAIN WALL AND STOREFRONT SYSTEMS SUBJECTED TO SEISMIC AND WIND-INDUCED INTER-STORY DRIFT (AAMA 501.4-18)

TEST PERFORMED

Prior to beginning the test, the test bench was checked to be in perfect working condition for carrying out the same.

The test consists of applying an incremental movement in the opposite direction to two of the reinforcements that support the curtain walling, up to a point specified by the customer or until the breakage of the sample.

The movement to be applied to the cladding consists of a concatenated series of ramp up intervals followed by a series of constant amplitude intervals. (Figure 1 and Figure 2)

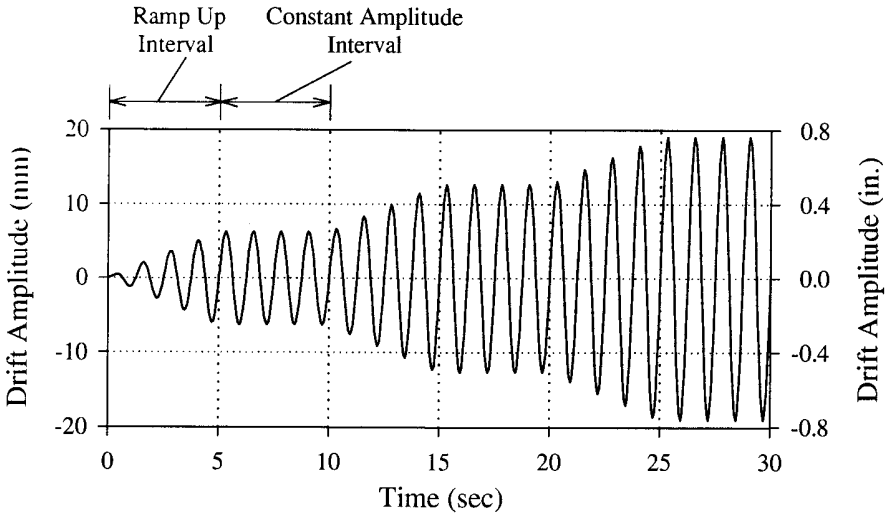
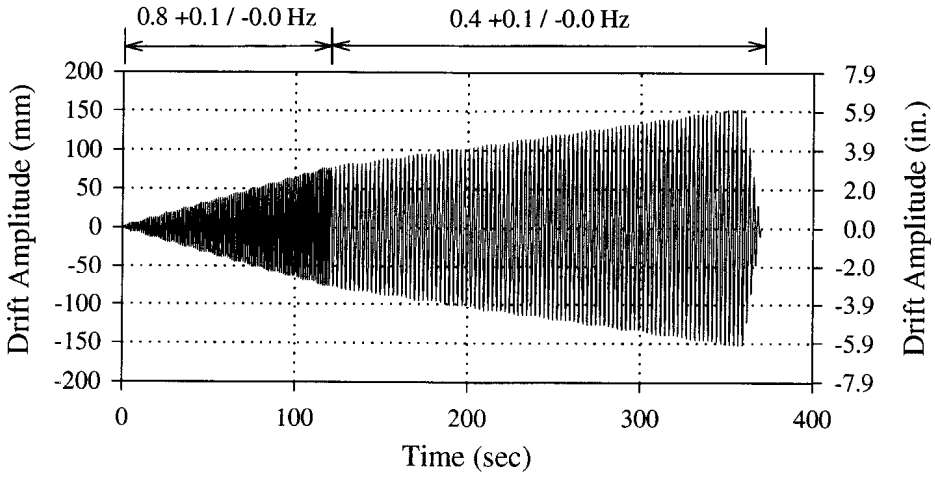


Figure 1: Graphic description of the first 30 seconds of the test.



(b) Full Crescendo Test

Figure 2: Graphic description of the complete test

Each ramp up and constant amplitude interval shall consist of 4 sinusoidal cycles. The ramp up intervals shall be performed at a frequency of 0.8+0.1/-0.0 Hz for a displacement of up to ±75 mm or less, and 0.4+0.1/-0.0 Hz for a displacement greater than 75 mm.

The test shall be continued until the first of the following conditions occurs:

- Fall of one of the slates as specified in [(1)]
- The displacement applied to the sample is ±150 mm.

The result of the test consists of defining the value of an amplitude associated with the fall of the slate ($\Delta_{fallout}$). This result is obtained based on the time at which the fall of a slate occurs.

[(1)] A falling slate shall be deemed to occur when any of the detached fragments is larger than 650 mm². If no slate falls during the course of the test, the result of the test will be "greater than" the greater range of movement reached during the test.

Photograph 1: Tested sample (front view)

Photograph 2: Tested sample (side view)

RESULTS

Environmental conditions:

Temperature: **22ºC** Relative humidity **61%** Atmospheric pressure: **101.3 kPa**

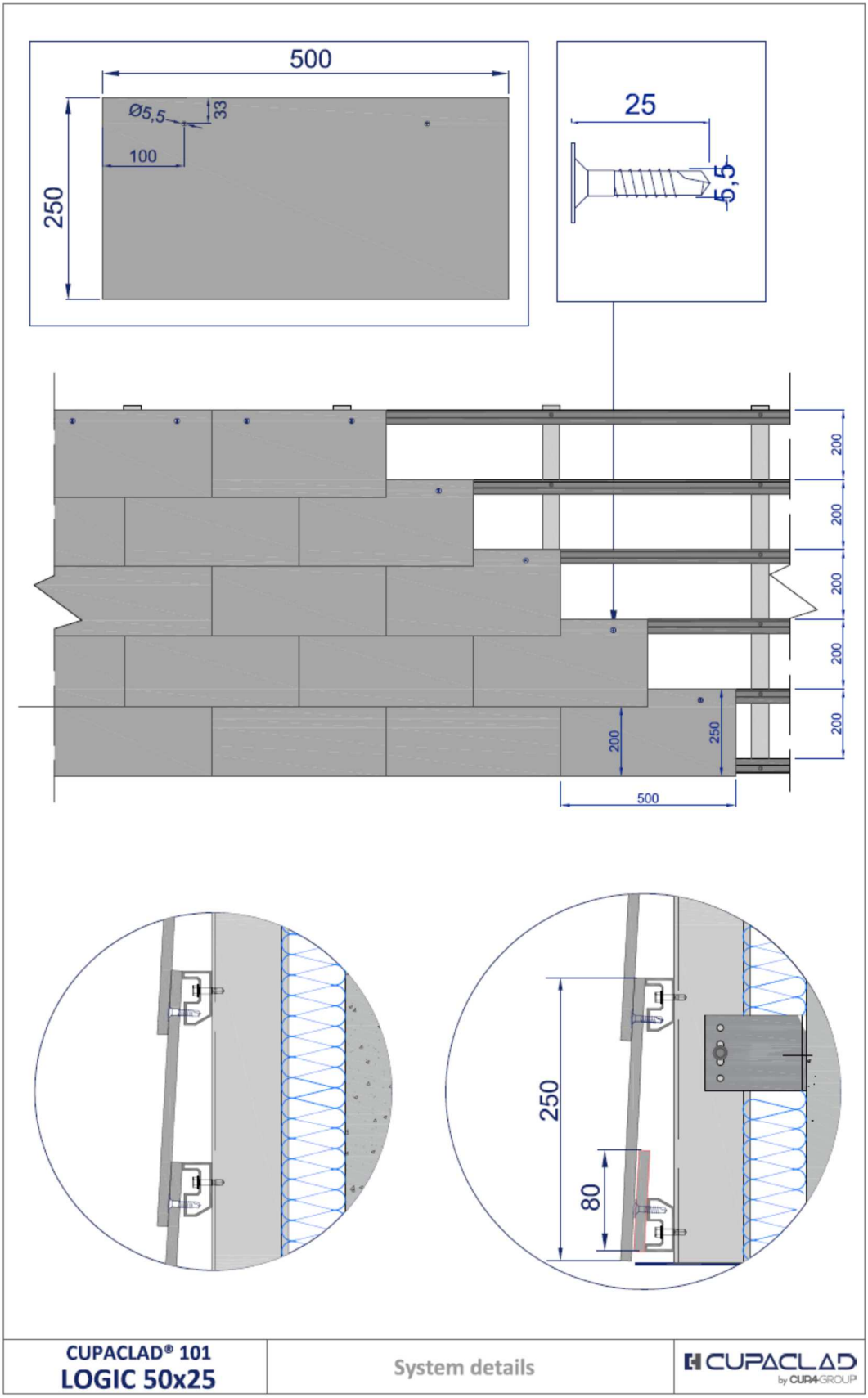
Minutes	Seconds	Displacement (mm)	Observations
	0-5	0-6	No detachments or fissures observed
	5-10	+6 and -6	No detachments or fissures observed
	10-15	6-12	No detachments or fissures observed
	15-20	+12 and -12	No detachments or fissures observed
	20-25	12-18	No detachments or fissures observed
	25-30	+18 and -18	No detachments or fissures observed
	30-35	18-24	No detachments or fissures observed
	35-40	+24 and -24	No detachments or fissures observed
	40-45	24-30	No detachments or fissures observed
	45-50	+30 and -30	No detachments or fissures observed
	50-55	30-36	No detachments or fissures observed
	55-60	+36 and -36	No detachments or fissures observed
01:00 - 01:05	60-65	36-42	No detachments or fissures observed
01:05 - 01:10	65-70	+42 and -42	No detachments or fissures observed
01:10-1:15	70-75	42-48	No detachments or fissures observed
01:15-1:20	75-80	+48 and -48	No detachments or fissures observed
01:20-1:25	80-85	48-54	No detachments or fissures observed
01:25-1:30	85-90	+54 and -54	No detachments or fissures observed
01:30-1:35	90-95	54-60	No detachments or fissures observed
01:35-1:40	95-100	+60 and -66	No detachments or fissures observed
01:40-1:45	100-105	66-72	No detachments or fissures observed
01:45-1:50	105-110	+72 and -72	No detachments or fissures observed
01:50-2:00	110-120	72-78	No detachments or fissures observed
02:00-2:10	120-130	+78 and -78	No detachments or fissures observed
02:10-2:20	130-140	78-84	No detachments or fissures observed
02:20-2:30	140-150	+84 and -84	No detachments or fissures observed
02:30-2:40	150-160	84-90	No detachments or fissures observed
02:40-2:50	160-170	+90 and -90	No detachments or fissures observed
02:50-3:00	170-180	90-96	No detachments or fissures observed
03:00-3:10	180-190	+96 and -96	No detachments or fissures observed
03:10-3:20	190-200	96-102	No detachments or fissures observed
03:20-3:30	200-210	+102 and -102	No detachments or fissures observed
03:30-3:40	210-220	102-108	No detachments or fissures observed
03:40-3:50	220-230	+108 and -108	No detachments or fissures observed
03:50-4:00	230-240	108-114	No detachments or fissures observed
04:00-4:10	240-250	+114 and -114	No detachments or fissures observed

04:10-4:20	250-260	114-120	No detachments or fissures observed
04:20-4:30	260-270	+120 and -120	No detachments or fissures observed
04:30-4:40	270-280	120 and 126	No detachments or fissures observed
04:40-4:50	280-290	+126 and -126	No detachments or fissures observed
04:50-5:00	290-300	126-132	No detachments or fissures observed
05:00-5:10	300-310	+132 and -132	No detachments or fissures observed
05:10-5:20	310-320	132-138	No detachments or fissures observed
05:20-5:30	320-330	+138 and -138	No detachments or fissures observed
05:30-5:40	330-340	138-144	No detachments or fissures observed
05:40-5:50	340-350	+144 and -144	No detachments or fissures observed
05:50-6:00	350-360	144-150	No detachments or fissures observed
06:00-6:10	360-370	+150 and -150	No detachments or fissures observed

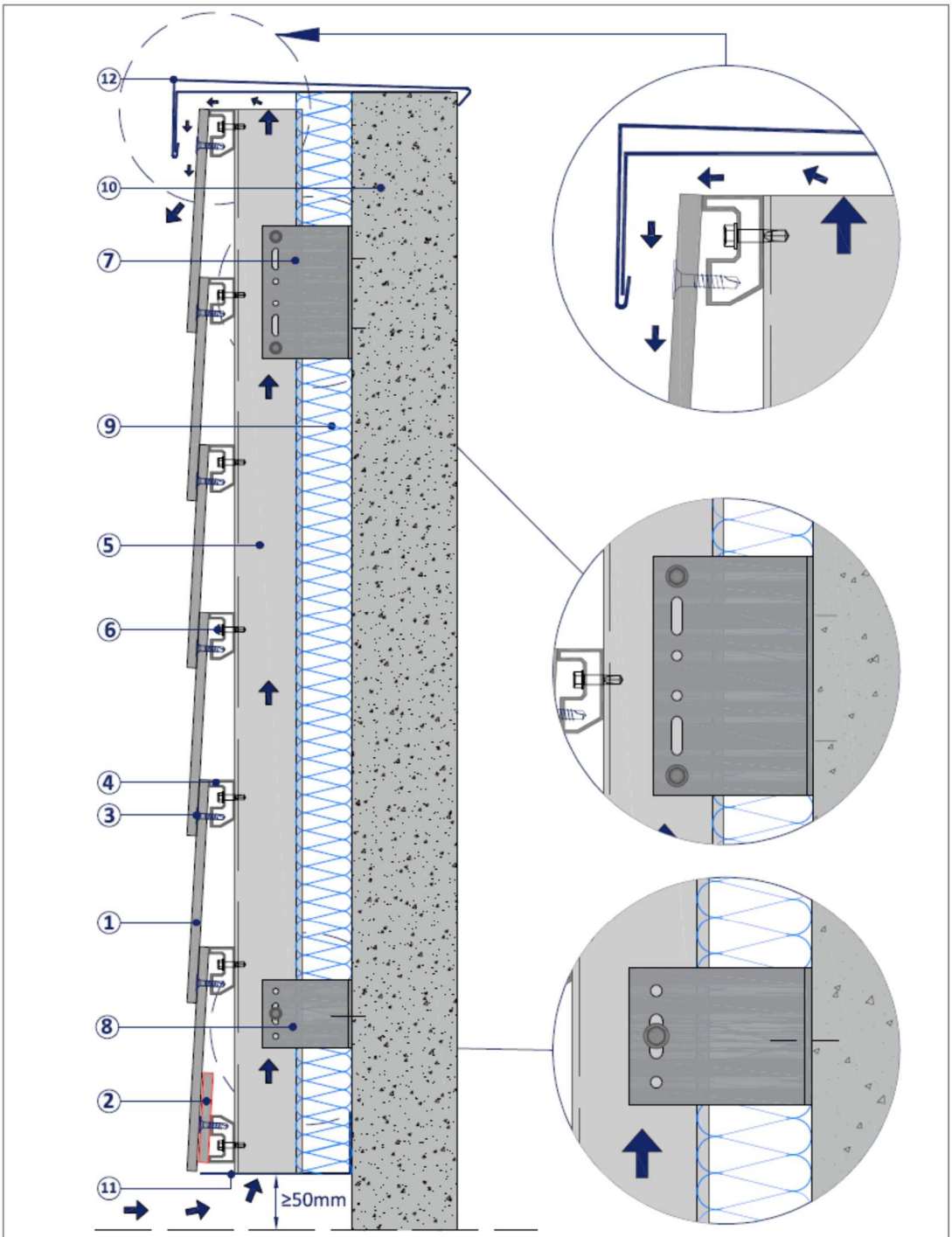
Table 1: Test results

TEST RESULTS	$\Delta_{FALLOUT}$> ± 150 mm

ANNEX I
SAMPLE TECHNICAL DATASHEET PROVIDED BY THE CUSTOMER

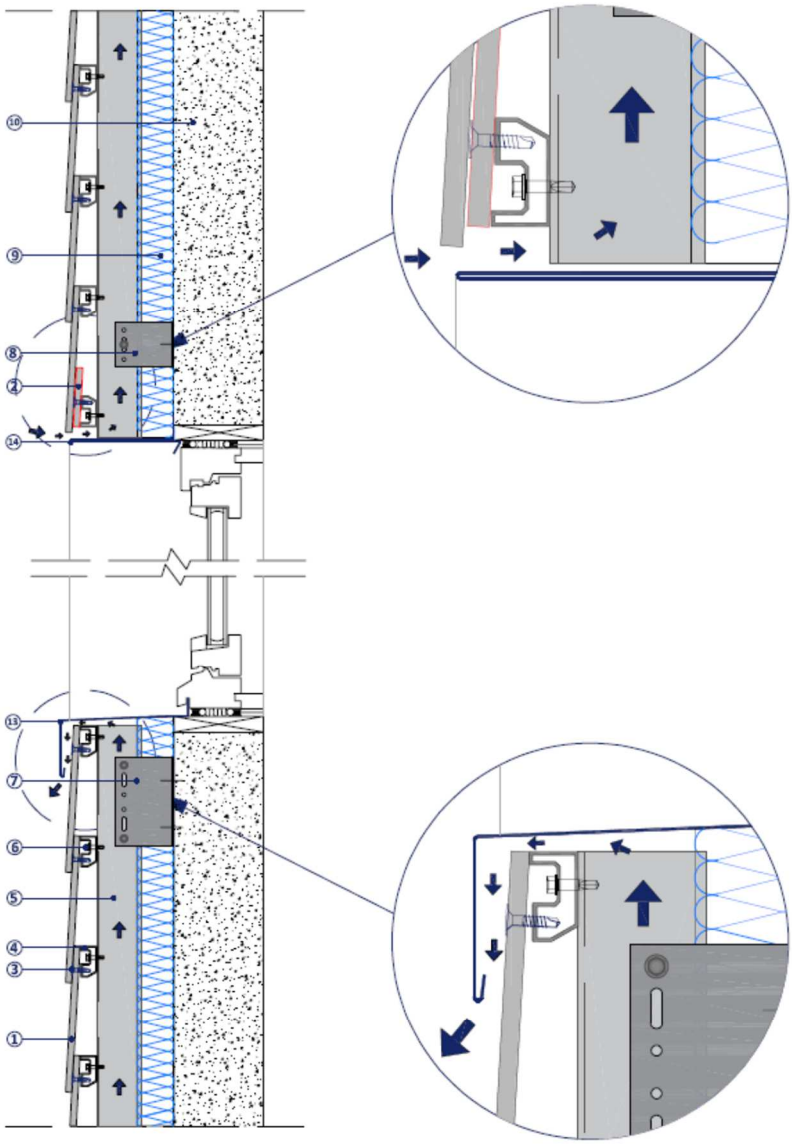


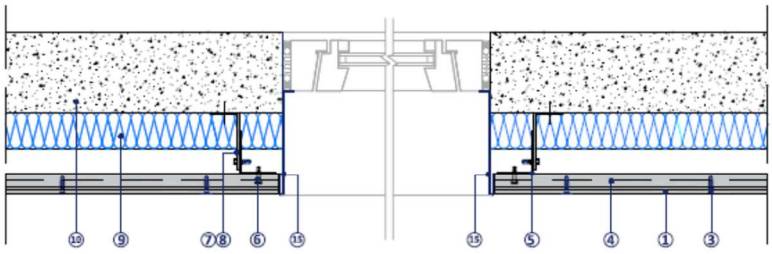
CUPACLAD® 101 LOGIC 50x25	System details	CUPACLAD by CUPA GROUP



1. CUPA PIZARRAS Natural slate
2. First course slate
3. Self-drilling CUPACLAD® 101 screw
4. Horizontal CUPACLAD® 101 profile
5. "L" shape vertical profile 50x60
6. Self-drilling Inox screw
7. "Fixed point" metal bracket
8. "Sliding point" metal bracket
9. Insulation
10. Load bearing wall
11. Ventilated flashing
12. Top metal flashing
13. Sill metal flashing
14. Metal lintel flashing
15. Metal jambs flashing
16. Metal flashing

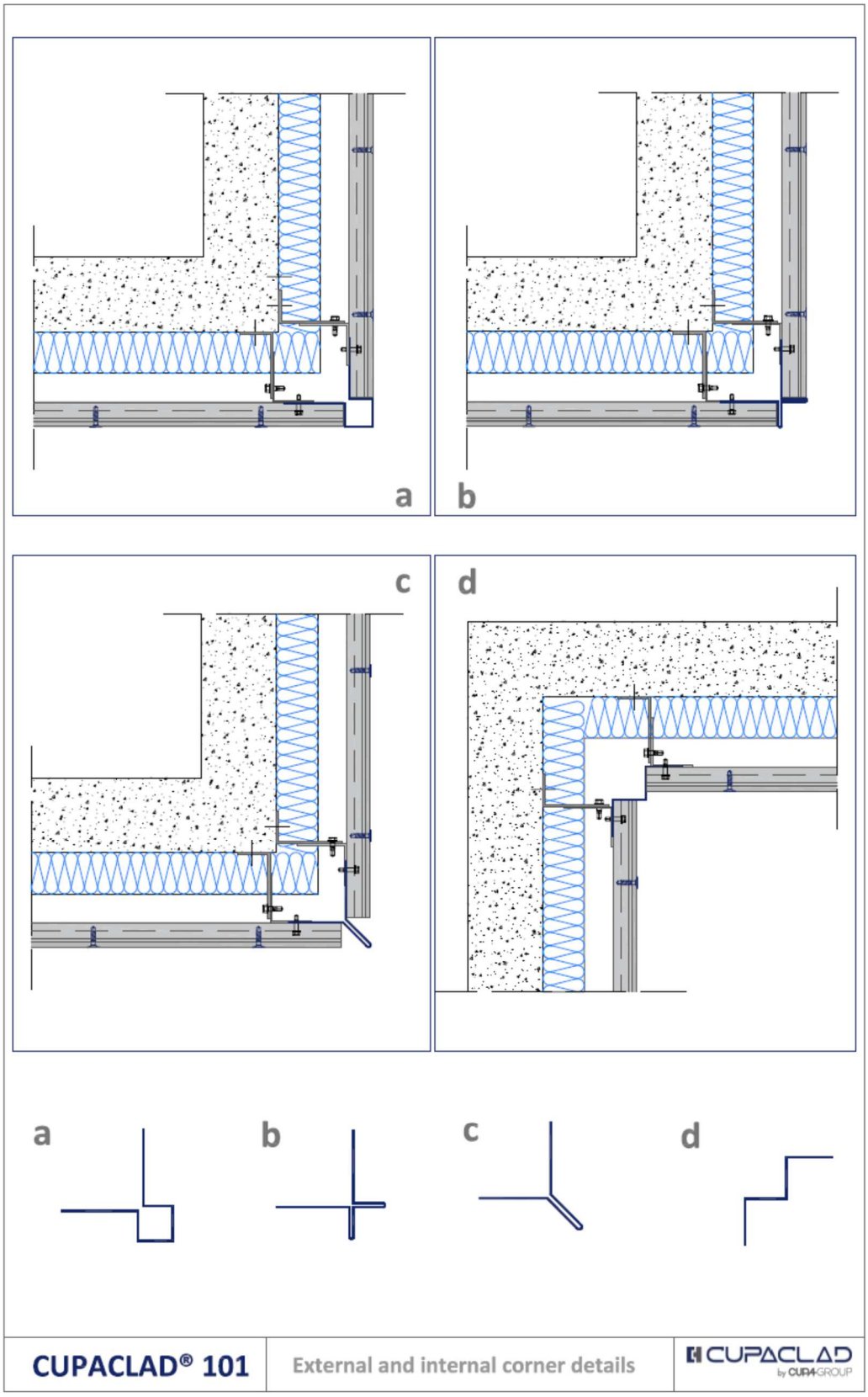
CUPACLAD® 101	Coping and base detail	CUPACLAD by CUPAGROUP

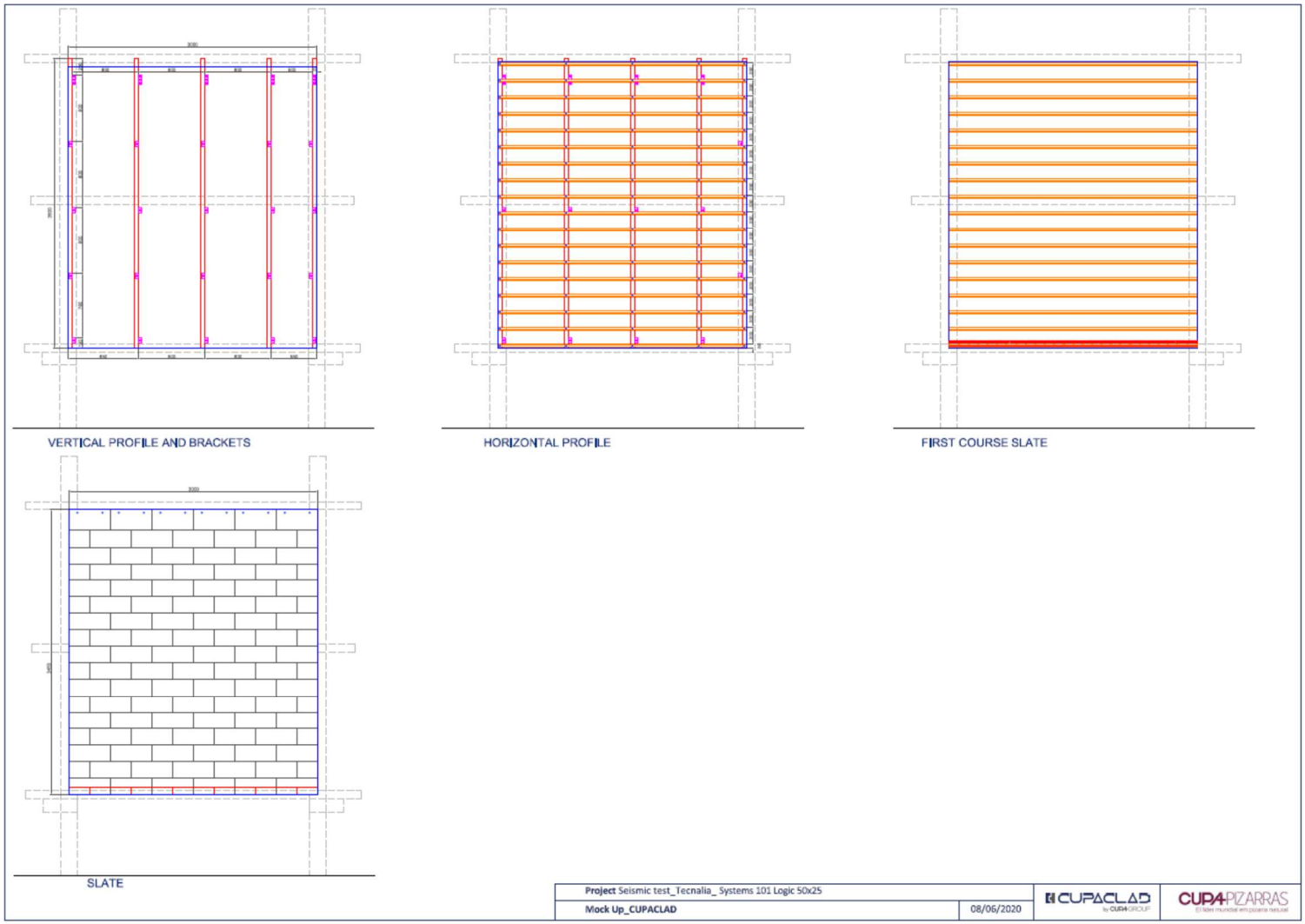




1. CUPA PIZARRAS Natural slate
2. First course slate
3. Self-drilling CUPACLAD® 101 screw
4. Horizontal CUPACLAD® 101 profile
5. "L" shape vertical profile 50x60
6. Self-drilling Inox screw
7. "Fixed point" metal bracket
8. "Sliding point" metal bracket
9. Insulation
10. Load bearing wall
11. Ventilated flashing
12. Top metal flashing
13. Sill metal flashing
14. Metal lintel flashing
15. Metal jambs flashing
16. Metal flashing

CUPACLAD® 101	External window reveal	CUPACLAD by CUPA GROUP


a
b
c
d
a
b
c
d
CUPACLAD® 101
External and internal corner details
CUPACLAD
by CUPAGROUP

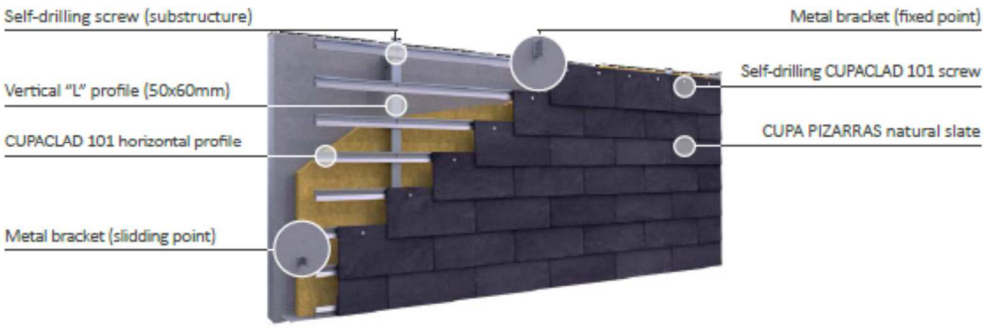

VERTICAL PROFILE AND BRACKETS
HORIZONTAL PROFILE
FIRST COURSE SLATE
SLATE
Project Seismic test_Tecnalia_ Systems 101 Logic 50x25
Mock Up_CUPACLAD
08/06/2020
CUPACLAD
CUPA4PIZARRAS

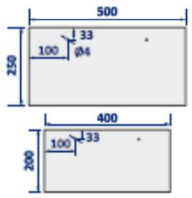
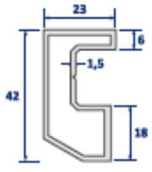
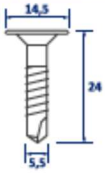
CUPACLAD

/ CUPACLAD SYSTEM COMPONENTS

1 CLADDING AND PRIMARY SUBSTRUCTURE

CUPACLAD® 101 LOGIC SYSTEM_

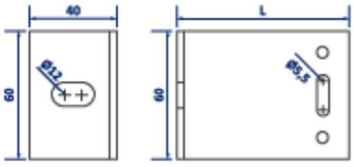
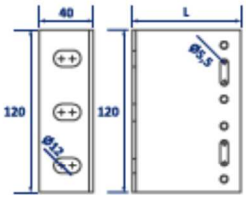
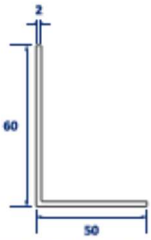
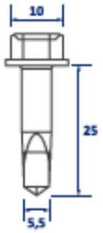


COMPONENT		CHARACTERISTIC
SLATE	  	**Slate size** : 400x200 / 500x250 mm **Nominal thickness** : 7,65 mm **Slates per m²** : 16,7 / 10 **Weight per m² (slate)** : ≤30 kg/m² **Overlap (vertical)** : 50 mm
CUPACLAD®101 HORIZONTAL PROFILE	 	**Length** : 3600 mm **Height** : 42 mm **Width** : 23 mm **Thickness** : 1,5 mm **Material** : 6060-T6
CUPACLAD®101 SCREW	 	**Length** : 24 mm **Diameter** : 5,5 mm **Material** : Stainless steel A2 **Head diameter** : 14,5 mm

CUPACLAD

/ CUPACLAD SYSTEM COMPONENTS

2 SECONDARY SUBSTRUCTURE

COMPONENT	CHARACTERISTIC
SLIDING POINT METAL BRACKET  	**Length** : 75-250 mm **Width** : 40 mm **Height** : 60 mm **Thickness** : 3 mm **Material** : 6060-T6
FIXED POINT METAL BRACKET  	**Length** : 75-250 mm **Width** : 40 mm **Height** : 120 mm **Thickness** : 3 mm **Material** : 6060-T6
VERTICAL L PROFILE  	**Length** : 6000 mm **Width** : 50 mm **Height** : 60 mm **Thickness** : 3 mm **Material** : 6060-T6
SCREW (SUBSTRUCTURE)  	**Length** : 25 mm **Diameter** : 5,5 mm **Material** : Stainless steel A2 **Head diameter** : 10 mm

ANNEX II
SAMPLE PHOTOGRAPHS

Sample photographs