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TEST REPORT No. 351061

Place and date of issue: Bellaria-Igea Marina - Italy, 27/04/2018

Customer: CERAMICHE MUTINA S.p.A. - Via Ghiarola Nuova, 16 - 41042 FIORANO MODENESE (MO) - Italy

Date test requested: 13/03/2018

Order number and date: 76048, 13/03/2018

Test date: 23/03/2018

Purpose of test: horizontal load testing of partition walls

Test site: via XX Settembre, 69 - 41049 Sassuolo (MO) - Italy

Sample name*

The partitions forming the sample are called “CELOSIA senza guide h 400 cm”, “MISTRAL posa orizzontale h 300 cm”, “MISTRAL posa verticale h 300 cm” e “CELOSIA con guide h 300 cm” *(“CELOSIA with no surround h 400 cm”, “MISTRAL horizontal installation h 300 cm”, “MISTRAL vertical installation h 300 cm” and “CELOSIA with surround h 300 cm”)*.

(*) according to that stated by the Customer.

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Description of sample*

The test sample comprises 4 partitions located at premises in via XX Settembre 69, Sassuolo (MO) whose characteristics are given in the following table.

Partition	Size [cm]	Description
CELOSIA with no surround h 400 cm	(145 × 400)	Partition formed by Celosia hollow-clay masonry units assembled using Mutina sealant manufactured by Kerakoll, applied at the points of contact between individual masonry units.
MISTRAL horizontal installation h 300 cm	(200 × 300)	Partition formed by Mistral hollow-clay masonry units and timber surround assembled using Mutina sealant manufactured by Kerakoll, applied at the points of contact between individual masonry units and between masonry units and the profiled sections of the timber surround. The surround is continuous on all four sides and made from solid-wood sections (size 150 mm × 22 mm) secured to the floor of ceramic tiles and ceiling using 3 wall anchors per side, whilst it is unrestrained along the two vertical edges.
MISTRAL vertical installation h 300 cm	(200 × 300)	Partition formed by Mistral hollow-clay masonry units and timber surround assembled using Mutina sealant manufactured by Kerakoll, applied at the points of contact between individual masonry units and between masonry units and the profiled sections of the timber surround. The surround is continuous on all four sides and made from solid-wood sections (size 150 mm × 22 mm) secured to the floor of ceramic tiles and ceiling using 3 wall anchors per side, whilst it is unrestrained along the two vertical edges.
CELOSIA with surround h 300 cm	(150 × 300)	Partition formed by Celosia hollow-clay masonry units and timber surround assembled using Mutina sealant manufactured by Kerakoll, applied at the points of contact between individual masonry units and between masonry units and the profiled sections of the timber surround. The surround is continuous on all four sides and made from solid-wood sections (size 150 mm × 22 mm) secured to the floor of ceramic tiles and ceiling using 3 wall anchors per side, whilst it is unrestrained along the two vertical edges.

(*) according to that stated by the Customer.





Photos of "CELOSIA with no surround h 400 cm" partition





Photos of "MISTRAL horizontal installation h 300 cm" partition





Photos of "MISTRAL vertical installation h 300 cm" partition





Photos of "CELOSIA with surround h 300 cm" partition

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Test apparatus

The following equipment was used to carry out the test:

- hydraulic jack powered by compressed air from a hand-operated pump;
- loading beam for application of the linear distributed load (in the loaded section) to partition comprising steel hollow section of dimensions 100 mm × 100 mm × 3 mm. A layer of extruded polystyrene was placed between the loading beam and partition, thickness 4 cm;
- AEP Transducers TCE 50 kN load cell, serial No. 808435 (apparatus in-house identification code SC388), complete with AEP Transducers DFI-RS232C digital force indicator, serial No. 7730 (apparatus in-house identification code SC300);
- 3 analogue dial gauges with 0,01 mm resolution for measuring horizontal displacement during the test performed on “CELOSIA with no surround h 400 cm” partition;
- 3 analogue dial gauges with 0,001 mm resolution for measuring horizontal displacement during the test performed on the “MISTRAL horizontal installation h 300 cm”, “MISTRAL vertical installation h 300 cm” and “CELOSIA with surround h 300 cm” partitions.

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Test method

The test is carried out in accordance with the procedures specified by the Customer and starts by carrying out 3 loading/unloading cycles on three partitions until reaching the design loads of:

- 2,90 kN for “CELOSIA with no surround h 400 cm” partition;
- 3,90 kN for “MISTRAL horizontal installation h 300 cm” partition;
- 4,00 kN for “MISTRAL vertical installation h 300 cm” partition.

The loads are applied in gradual increments to loading beams covering the entire width of the partition and positioned at a height of approx. 120 cm above ground. After each step, the horizontal displacement of the partition is measured using three instruments labelled “C1”, “C2” and “C3”, located in the positions shown in the drawings on the next sheet.

The partition then undergoes a horizontal load test until failure, positioning the loading beam at approximately mid-height and measuring the ultimate load.

The “CELOSIA with surround h 300 cm” partition only underwent the horizontal load test until failure with loading beam at mid-height.

A reinforced-concrete beam is used as the counterforce for the “CELOSIA with no surround h 400 cm” partition”, whilst for the other partitions a Customer-supplied steel structure was positioned frontally.

The load is exerted by a hydraulic jack placed between counterforce and test partition.

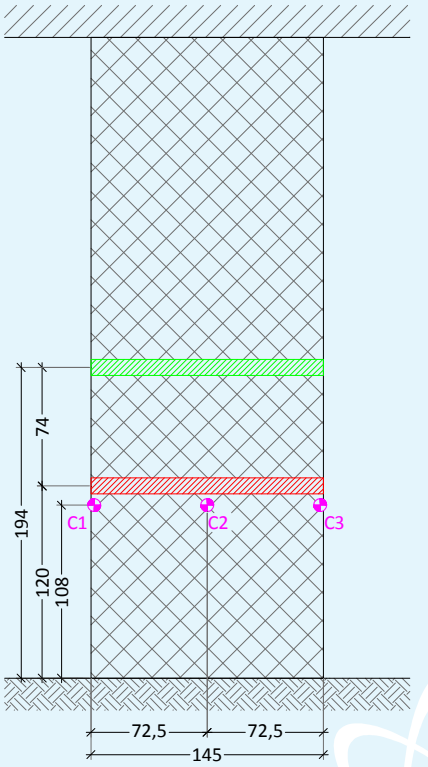
Testing observers

The test was witnessed by Dott. Ing. Fabio Lugli, a consultant to the Customer.

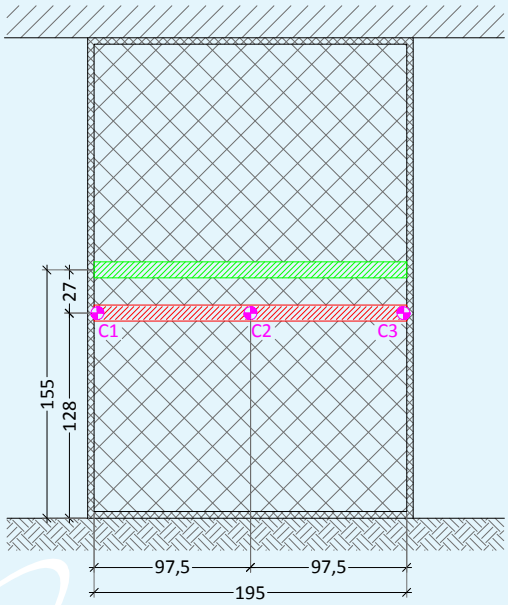
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SCHEMATIC ELEVATIONS OF THE PARTITIONS SHOWING THE LOAD AREA AND POSITION OF THE DISPLACEMENT MEASURING INSTRUMENTS (measurements in cm)

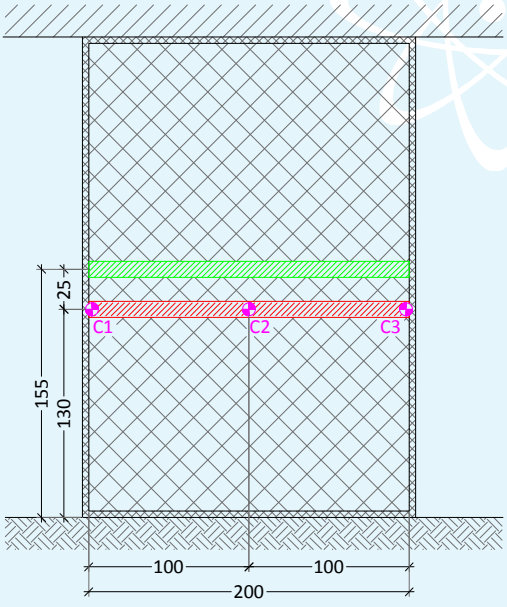
Partition 145 cm x 400 cm "CELOSIA SENZA GUIDE"



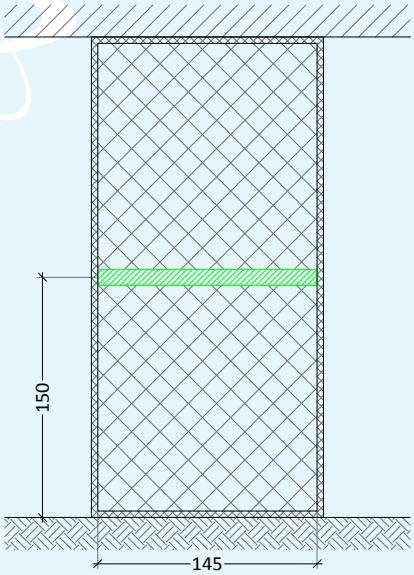
Partition 200 cm x 300 cm "MISTRAL POSA ORIZZONTALE"



Partition 200 cm x 300 cm "MISTRAL POSA VERTICALE"



Partition 150 cm x 300 cm "CELOSIA CON CORNICE"



Key

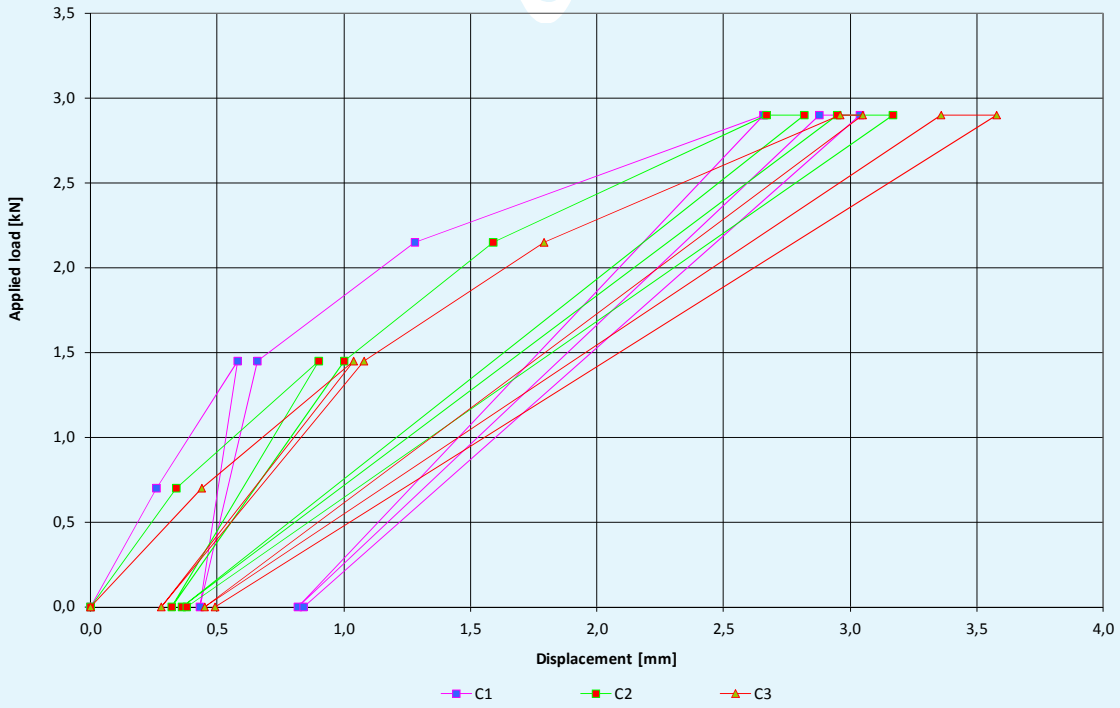
Symbol	Description
	Load area during loading/unloading cycles
	Load area during ultimate load test
	C: dial gauge to measure displacement

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Test results

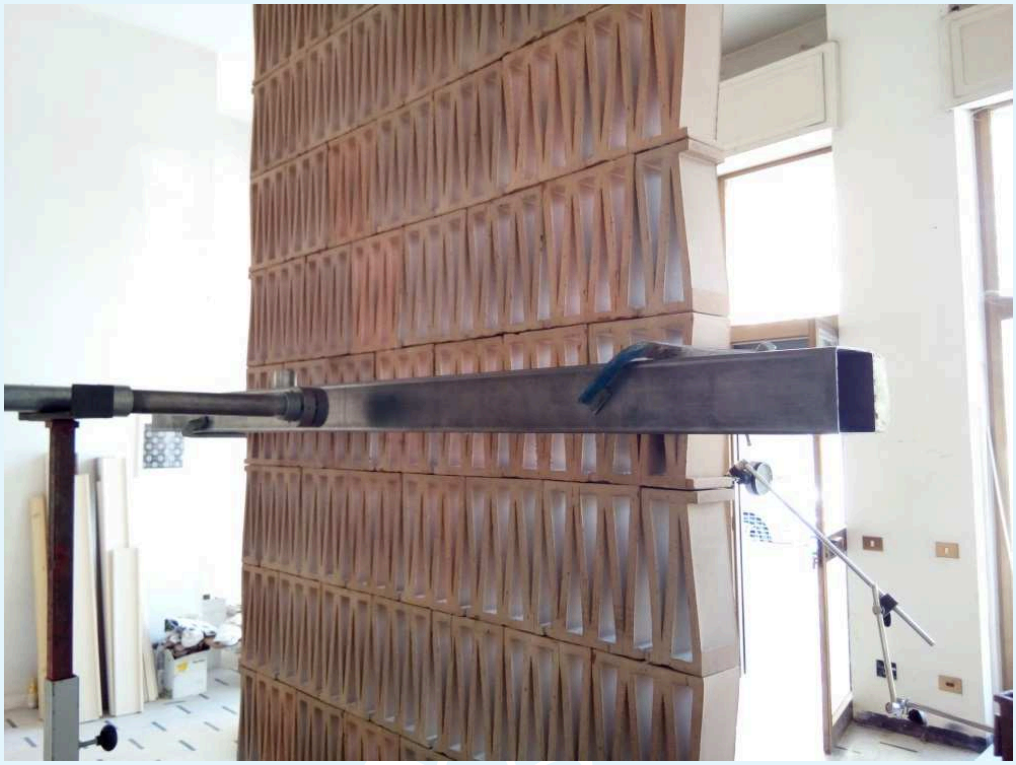
CELOSIA with no surround h 400 cm

Time	Applied load	Displacement		
		C1	C2	C3
[h:min]	[kN]	[mm]	[mm]	[mm]
10:50	0,00	0,00	0,00	0,00
10:52	0,70	0,26	0,34	0,44
10:54	1,45	0,58	0,90	1,04
10:56	0,00	0,43	0,32	0,28
10:58	1,45	0,66	1,00	1,08
11:00	2,15	1,28	1,59	1,79
11:02	2,90	2,66	2,67	2,96
11:08	2,90	2,66	2,82	3,05
11:15	0,00	0,82	0,36	0,45
11:17	2,90	2,88	2,95	3,36
11:22	2,90	3,04	3,17	3,58
11:25	0,00	0,84	0,38	0,49



Load/displacement curve

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Photos showing test procedure, position of applied load and displacement measuring instruments

Load to failure	
Load application height [cm]	**Ultimate load** [kN]
194	3,50



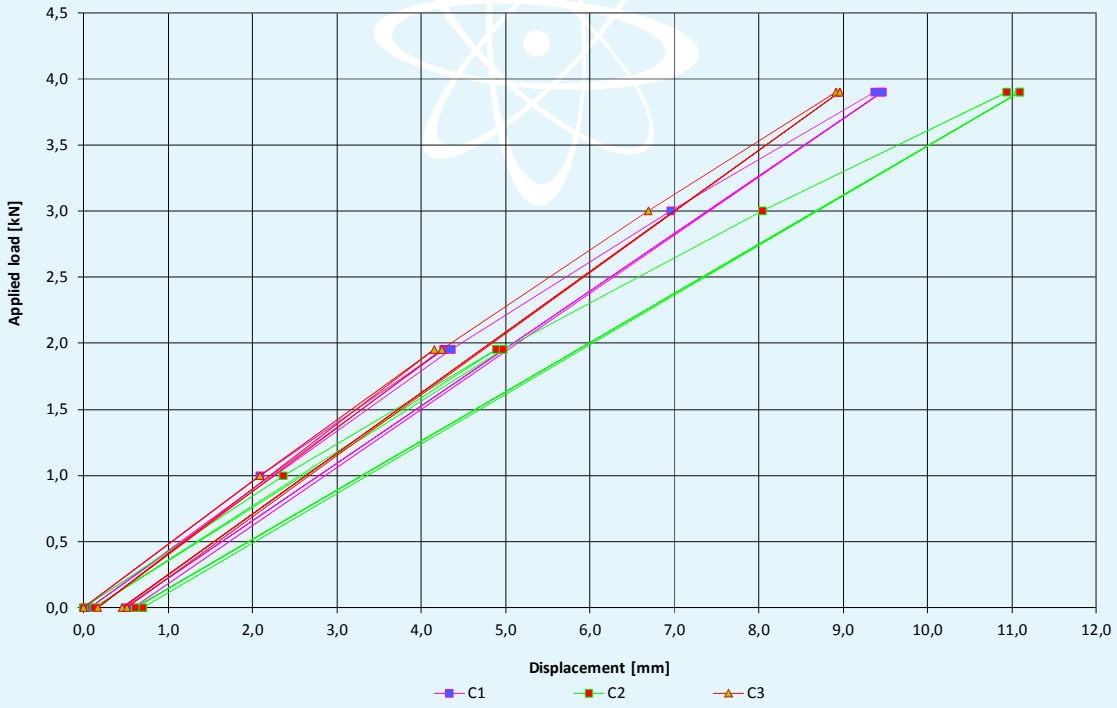


Photos showing test procedure and position of applied load

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MISTRAL horizontal installation h 300 cm

Time	Applied load	Displacement		
		C1	C2	C3
[h:min]	[kN]	[mm]	[mm]	[mm]
12:23	0,00	0,000	0,000	0,000
12:25	1,00	2,090	2,364	2,083
12:27	1,95	4,271	4,887	4,153
12:29	0,00	0,078	0,119	0,167
12:31	1,95	4,358	4,971	4,239
12:33	3,00	6,962	8,040	6,691
12:35	3,90	9,372	10,935	8,915
12:40	3,90	9,462	11,090	8,956
12:42	0,00	0,495	0,613	0,451
12:44	3,90	9,465	11,095	8,961



Load/displacement curve

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Photos showing test procedure, position of applied load and displacement measuring instruments

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Load to failure	
Load application height [cm]	**Ultimate load** [kN]
155	6,50

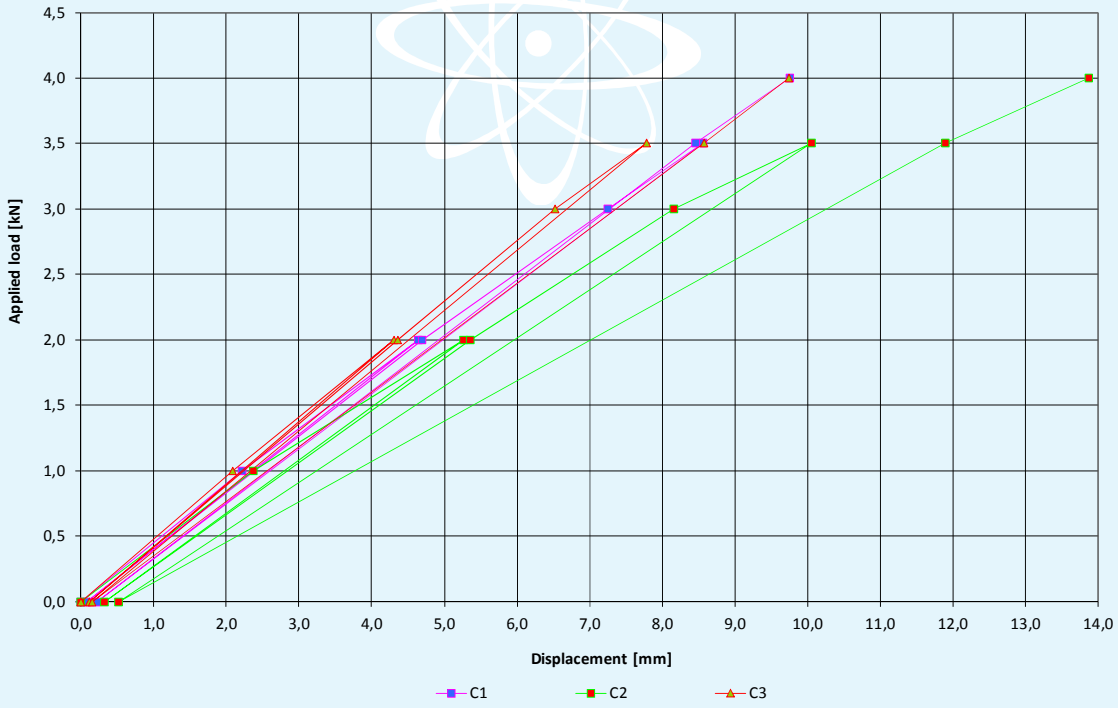


Photo showing test procedure and position of applied load

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MISTRAL vertical installation h 300 cm

Time	Applied load	Displacement		
		C1	C2	C3
[h:min]	[kN]	[mm]	[mm]	[mm]
14:20	0,00	0,000	0,000	0,000
14:22	1,00	2,216	2,367	2,093
14:24	2,00	4,645	5,268	4,310
14:26	0,00	0,079	0,318	0,112
14:28	2,00	4,691	5,359	4,362
14:30	3,00	7,255	8,166	6,526
14:32	3,50	8,568	10,060	7,781
14:34	0,00	0,214	0,513	0,156
14:36	3,50	8,461	11,895	8,574
14:38	4,00	9,750	13,875	9,742



Load/displacement curve

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Photos showing test procedure, position of applied load and displacement measuring instruments

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Load to failure	
Load application height [cm]	**Ultimate load** [kN]
155	5,60





Photos showing test procedure, position of applied load and cracks visible at end of test

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CELOSIA with surround h 300 cm

Load to failure	
Load application height [cm]	**Ultimate load** [kN]
155	5,60





Photos showing test procedure, position of applied load and cracks visible at end of test

Chief Test Technician:
Dott. Ing. Davide Panzavolta

Head of Building Materials Laboratory:
Dott. Geol. Gianluca Ferraiolo

Chief Executive Officer
(Dott. Arch. Sara Lorenza Giordano)

Firmato digitalmente da SARA LORENZA GIORDANO

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