



FIRE TEST REPORT

FH 5190

CONE CALORIMETER TEST AND NZBC VERIFICATION METHOD C/VM2
APPENDIX A PERFORMANCE OF LAMINAM

CLIENT

The Laminex Group
1 O'Rorke Road
Penrose
Auckland 1061
New Zealand



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

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TEST SUMMARY

Objective

To conduct cone calorimeter testing and reduce the data in accordance with ISO 5660 on client supplied specimens for the purposes of determination of the Group Classification in accordance with;

- New Zealand Building Code (NZBC) Verification Method C/VM2 Appendix A

Test sponsor

The Laminex Group
1 O'Rorke Road
Penrose
Auckland 1061
New Zealand

Description of test specimen

Laminam – a 3.5 mm ceramic sheet adhered to Standard 10 mm Plasterboard.

Date of test

17th April 2013

Test results

For the purposes of compliance with the NZBC Verification Method C/VM2 Appendix A, the following classification is considered applicable to the material as described in Section 1.

Building Code Document	Group Number Classification
NZBC Verification Method C/VM2 Appendix A	1 Smoke greater than 250 m ² /kg

LIMITATION

The results reported here relate only to the item/s tested.

TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.



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SIGNATORIES



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Reviewer

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Senior Fire Engineer/Fire Testing Team Leader
IANZ Approved Signatory

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	DESCRIPTION
1	19 April 2013	Initial Issue



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1. GENERAL

The product submitted by the client for testing was identified by the client as Laminam – a 3.5 mm ceramic sheet adhered to Standard 10 mm Plasterboard. Figure 1 illustrates a representative specimen of that tested.

Figure 1 Representative specimens (unexposed face on left, typical exposed face on right)



1.1 Sample measurements

The following physical parameters were measured for each specimen prior to testing.

Specimen ID	Initial properties		Overall apparent density (kg/m ³)
	Mass (g)	Mean thickness (mm)	
FH5190-50-1	178.6	15.0	1191
FH5190-50-2	175.6	14.7	1195
FH5190-50-3	175.1	14.8	1183

2. EXPERIMENTAL PROCEDURE

2.1 Test standard

The tests were carried out and data reduced according to the test procedure described in ISO 5660: (2002), Reaction-to-fire tests – Heat release, smoke production and mass loss – Part 1: Heat release rate, and Part 2: Smoke production rate (the test standard). The sample preparation and test procedure were as described in 2.4 and 2.5.

2.2 Test date

The tests were conducted on 17th April 2013 by Mr Peter Collier at BRANZ Limited laboratories, Judgeford, New Zealand.

2.3 Specimen conditioning

All specimens were conditioned to moisture equilibrium (constant weight), at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ immediately prior to testing.

2.4 Specimen wrapping and preparation

All tests were conducted and the specimens prepared in accordance with the test standard. The spark igniter and the stainless steel retainer frame were used. All specimens were wrapped in a single layer of aluminium foil, covering the unexposed surfaces.

2.5 Test programme

The test program consisted of three replicate specimens as identified in the above table, tested at an irradiance level of 50 kW/m^2 . All tests were carried out with the specimen horizontal, and with a nominal duct flow rate of $0.024 \text{ m}^3/\text{s}$.



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3. TEST RESULTS AND REDUCED DATA

3.1 Test results and reduced data – NZBC C/VM2

Material	Test specimens as described in Section 1 (in accordance with ISO 5660)			Mean	
	Specimen test number	FH5190-50-1	FH5190-50-2		FH5190-50-3
Time to sustained flaming	s	267	248	500	338.3
Observations ^a		-	-	-	
Test duration ^b	s	1218*	1230*	1266*	1238
Mass remaining, mf	g	175.6	172.3	171.8	173.2
Mass pyrolyzed	%	1.7%	1.9%	1.9%	1.8%
Specimen mass loss ^c	kg/m ²	0.30	0.32	0.20	0.28
Specimen mass loss rate ^c	g/m ² .s	5.0	5.4	3.3	4.6
Heat release rate					
peak, \dot{q}''_{max}	kW/m ²	66.4	53.0	38.3	52.5
average, \dot{q}''_{avg}					
Over 60 s from ignition	kW/m ²	5.9	3.9	25.6	11.8
Over 180 s from ignition	kW/m ²	29.5	21.7	23.6	24.9
Over 300 s from ignition	kW/m ²	32.6	30.0	14.8	25.8
Total heat released	MJ/m ²	10.3	9.6	4.5	8.1
Average Specific Extinction Area	m ² /kg	693.6	633.9	964.1	763.9
Effective heat of combustion ^d , $\Delta h_{c,eff}$	MJ/kg	30.1	26.0	12.0	22.7

Notes :

^a no significant observations were recorded

^b determined by * X_{O2} returning to the pretest value within 100 ppm of oxygen concentration for 10 minutes

** 30 minutes after time to sustained flaming

^c from ignition to end of test;

^d from the start of the test

+ value calculated using data beyond the official end of test time according to the test standard.

NR not recorded



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4. SUMMARY

The test standard requires that the mean heat release rate (HRR) readings over the first 180 s from ignition for the three specimens should differ by no more than 10% of the arithmetic mean of the three readings. In the event of this criterion not being met, a further three specimens are required to be tested.

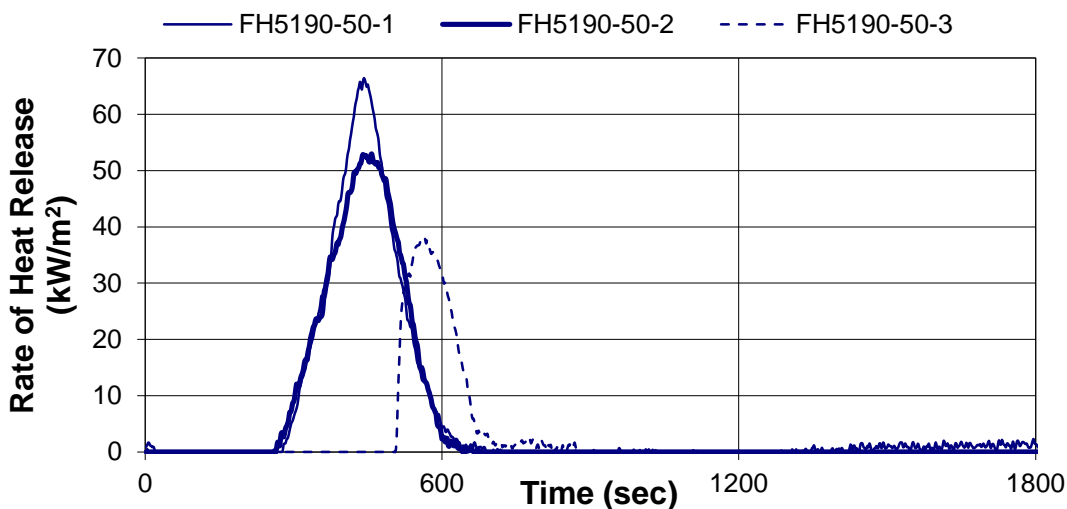
Specimen ID	Average HRR over 180s from ignition	Arithmetic mean	% difference from the arithmetic mean
FH5190-50-1	29.5	24.9	18.5%
FH5190-50-2	21.7		-13.1%
FH5190-50-3	23.6		-5.4%

The above table identifies one of the specimens exposed to 50 kW/m² irradiance met the acceptance criteria and the other two exceeded the 10% limitation.

The report summary for the specimens as described in Section 1, exposed to an irradiance of 50 kW/m² is:

Mean Specimen thickness (mm)	Irradiance (kW/m ²)	Mean Time to Ignition (s)	Mean Peak Heat Release Rate (kW/m ²)	Average Specific Extinction Area (m ² /kg)
14.8	50	338	52.5	763.9

Figure 2 Rate of heat release versus time



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5. CLASSIFICATION IN ACCORDANCE WITH NZBC VERIFICATION METHOD C/VM2 APPENDIX A

The following classification has been assessed in accordance with the New Zealand Building Code Verification Method C/VM2 Appendix A: Establishing Group Numbers for lining materials. Calculations were carried out according to section A1.3 for predicting a material's group number for each specimen tested. It states that "If a different classification group is obtained for different specimens tested, then the highest (worst) classification for any specimen must be taken as the final classification for that material." The classification for the specimens as described in Section 1 is as follows:

	Sample 1	Sample 2	Sample 3	Classification
Group number Classification	1	1	1	1

The tested sample recorded an average specific extinction area greater than 250 m²/kg. In accordance with Verification Method C/VM2 Appendix A, samples achieving either a Group number classification 1 or 2, and with an average specific extinction area less than 250 m²/kg are identified with "S" post-script to the Group number.

6. CONCLUSION

The cone calorimeter testing was carried out on the specimens as described in Section 1. For the purposes of compliance with the NZBC Verification Method C/VM2 Appendix A, the following classification is considered applicable to the material as described in Section 1.

Group Number Classification	1
The average specific extinction area was greater than the 250 m ² /kg limit.	



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proprietà fisico chimiche / physical and chemical properties /	norma / metodo norm / test method	Laminam 3	CE*	Laminam 3+	Laminam 3+3 / Laminam 7
dimensione / size /	ISO 10545-2	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm		escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm
dimensione / size /	ISO 10545-2	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm		escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm
peso / weight /	Laminam	valore medio 7,8 kg/m ² average value 7,8 kg/m ²		valore medio 8,2 kg/m ² average value 8,2 kg/m ²	valore medio 16 kg/m ² average value 16 kg/m ²
qualità superficie / % pezzi esenti da difetti surface quality / % of tiles with no visible flaws	ISO 10545-2	> 95%		> 95%	> 95%
assorbimento acqua / water absorbtion /	ISO 10545-3	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
assorbimento acqua / water absorbtion /	ASTM C373	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
forza di rottura in N / camp. 200x300 mm breaking load in N / samples 200x300 mm	ISO 10545-4**	-		valore medio 700 average value 700	valore medio 1500 average value 1500
resistenza alla flessione in N / mm ² bending strength in N / mm ²	ISO 10545-4	valore medio 50 (campioni dimensioni 200x300 mm) average value 50 (sample dimensions 200x300 mm)		valore medio 90 (campioni dimensioni 40x100 mm) average value 90 (sample dimensions 40x100 mm)	valore medio 50 (campioni dimensioni 20x100 mm) average value 50 (sample dimensions 20x100 mm)
durezza scala Mohs / Mohs scale hardness /	UNI EN 101	≥ 6		≥ 6	≥ 6
resistenza all'abrasione profonda / resistance to deep abrasion /	ISO 10545-6	≤ 175 mm ³		≤ 175 mm ³	≤ 175 mm ³
coefficiente di dilatazione termica lineare / 10 ⁻⁶ /°C coefficient of linear thermal expansion / 10 ⁻⁶ /°C	ISO 10545-8	6,6		6,6	6,6
resistenza agli sbalzi termici / resistance to thermal shock /	ISO 10545-9	resiste resistant		resiste resistant	resiste resistant
resistenza chimica / chemical resistance /	ISO 10545-13	nessun effetto visibile no visible effect		nessun effetto visibile no visible effect	nessun effetto visibile no visible effect
resistenza alle macchie / stain resistance /	ISO 10545-14	classe 5 class 5		classe 5 class 5	classe 5 class 5
resistenza al gelo / frost resistance /	ISO 10545-12	resiste resistant		resiste resistant	resiste resistant
resistenza all'urto tramite coeff. di restituzione / shock resistance /	ISO 10545-5	valore medio 0,6 average value 0,6		valore medio 0,8 average value 0,8	-
coefficiente d'attrito / coefficient of friction /	ASTM C-1028	μ > 0,6		μ > 0,6	μ > 0,6
reazione al fuoco / fire reaction /	EN 13501 (rev. 2005)	A1 (decisione 96/603/ce e sue modifiche) A1 (decision 96/603/ce as amended)		A2 - s1, d0	-

* Solo per posa a rivestimento / For installation on wall only

** Requisito UNI EN 14411 non applicabile per Laminam3, Laminam3+, Laminam3+3, Laminam7, Laminam5+3. I valori riportati per 3+, 3+3, 7,5+3 sono validi solo lato 3000 mm. / ** Requirement UNI EN 14411 not applicable for Laminam3, Laminam3+, Laminam3+3, Laminam7, Laminam5+3. The values indicated for 3+, 3+3, 7,5+3 are valid only for side length 3000 mm.

L'unicità di alcune caratteristiche fisiche dei prodotti Laminam li rende non totalmente paragonabili ai comuni prodotti ceramici. Pertanto i risultati dei test sono indicativi e non vincolanti / The unique features of Laminam products do not allow for a perfect comparison with ceramic tiles. The test results are therefore only indicative and not binding.

proprietà fisico chimiche / physical and chemical properties /	norma / metodo norm / test method	Laminam 3	CE*	Laminam 3+	Laminam 3+3 / Laminam 7
dimensione / size /	ISO 10545-2	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm		escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm
dimensione / size /	ISO 10545-2	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm		escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm
peso / weight /	Laminam	valore medio 7,8 kg/m ² average value 7,8 kg/m ²		valore medio 8,2 kg/m ² average value 8,2 kg/m ²	valore medio 16 kg/m ² average value 16 kg/m ²
qualità superficie / % pezzi esenti da difetti surface quality / % of tiles with no visible flaws	ISO 10545-2	> 95%		> 95%	> 95%
assorbimento acqua / water absorbtion /	ISO 10545-3	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
assorbimento acqua / water absorbtion /	ASTM C373	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
forza di rottura in N / camp. 200x300 mm breaking load in N / samples 200x300 mm	ISO 10545-4**	-		valore medio 700 average value 700	valore medio 1500 average value 1500
resistenza alla flessione in N / mm ² bending strength in N / mm ²	ISO 10545-4	valore medio 50 (campioni dimensioni 200x300 mm) average value 50 (sample dimensions 200x300 mm)		valore medio 90 (campioni dimensioni 40x100 mm) average value 90 (sample dimensions 40x100 mm)	valore medio 50 (campioni dimensioni 20x100 mm) average value 50 (sample dimensions 20x100 mm)
durezza scala Mohs / Mohs scale hardness /	UNI EN 101	≥ 6		≥ 6	≥ 6
resistenza all'abrasione profonda / resistance to deep abrasion /	ISO 10545-6	≤ 175 mm ³		≤ 175 mm ³	≤ 175 mm ³
coefficiente di dilatazione termica lineare / 10 ⁻⁶ /°C coefficient of linear thermal expansion / 10 ⁻⁶ /°C	ISO 10545-8	6,6		6,6	6,6
resistenza agli sbalzi termici / resistance to thermal shock /	ISO 10545-9	resiste resistant		resiste resistant	resiste resistant
resistenza chimica / chemical resistance /	ISO 10545-13	nessun effetto visibile no visible effect		nessun effetto visibile no visible effect	nessun effetto visibile no visible effect
resistenza alle macchie / stain resistance /	ISO 10545-14	classe 5 class 5		classe 5 class 5	classe 5 class 5
resistenza al gelo / frost resistance /	ISO 10545-12	resiste resistant		resiste resistant	resiste resistant
resistenza all'urto tramite coeff. di restituzione / shock resistance /	ISO 10545-5	valore medio 0,6 average value 0,6		valore medio 0,8 average value 0,8	-
coefficiente d'attrito / coefficient of friction /	DIN 51130	R9		R9	R9
coefficiente d'attrito / coefficient of friction /	ASTM C-1028	μ > 0,6		μ > 0,6	μ > 0,6
reazione al fuoco / fire reaction /	EN 13501 (rev. 2005)	A1 (decisione 96/603/ce e sue modifiche) A1 (decision 96/603/ce as amended)		A2 - s1, d0	-

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proprietà fisico chimiche / physical and chemical properties /	norma / metodo norm / test method	Laminam 3	CE*	Laminam 3+	Laminam 3+3 / Laminam 7
dimensione / size /	ISO 10545-2	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0.5 mm		escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0.5 mm	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0.5 mm
dimensione / size /	ISO 10545-2	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1.0 mm		escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1.0 mm	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1.0 mm
peso / weight /	Laminam	valore medio 7,8 kg/m ² average value 7.8 kg/m ²		valore medio 8,2 kg/m ² average value 8.2 kg/m ²	valore medio 16 kg/m ² average value 16 kg/m ²
qualità superficie / % pezzi esenti da difetti surface quality / % of tiles with no visible flaws	ISO 10545-2	> 95%		> 95%	> 95%
assorbimento acqua / water absorbtion /	ISO 10545-3	valore medio 0,1% (< 0,3%) average value 0.1% (< 0.3%)		valore medio 0,1% (< 0,3%) average value 0.1% (< 0.3%)	valore medio 0,1% (< 0,3%) average value 0.1% (< 0.3%)
assorbimento acqua / water absorbtion /	ASTM C373	valore medio 0,1% (< 0,3%) average value 0.1% (< 0.3%)		valore medio 0,1% (< 0,3%) average value 0.1% (< 0.3%)	valore medio 0,1% (< 0,3%) average value 0.1% (< 0.3%)
forza di rottura in N / camp. 200x300 mm breaking load in N / samples 200x300 mm	ISO 10545-4**	-		valore medio 700 average value 700	valore medio 1500 average value 1500
resistenza alla flessione in N / mm ² bending strength in N / mm ²	ISO 10545-4	valore medio 50 (campioni dimensioni 200x300 mm) average value 50 (sample dimensions 200x300 mm)		valore medio 90 (campioni dimensioni 40x100 mm) average value 90 (sample dimensions 40x100 mm)	valore medio 50 (campioni dimensioni 20x100 mm) average value 50 (sample dimensions 20x100 mm)
durezza scala Mohs / Mohs scale hardness /	UNI EN 101	≥ 5		≥ 5	≥ 5
coefficiente di dilatazione termica lineare / 10 ⁻⁶ /°C coefficient of linear thermal expansion / 10 ⁻⁶ /°C	ISO 10545-8	6,6		6,6	6,6
resistenza chimica / chemical resistance /	ISO 10545-13	Parziale cambiamento della superficie Partial change in appearance surface		Parziale cambiamento della superficie Partial change in appearance surface	Parziale cambiamento della superficie Partial change in appearance surface
resistenza alle macchie / stain resistance /	ISO 10545-14	classe 5 class 5		classe 5 class 5	classe 5 class 5
resistenza all'urto tramite coeff. di restituzione / shock resistance /	ISO 10545-5	valore medio 0,6 average value 0.6		valore medio 0,8 average value 0.8	-
reazione al fuoco / fire reaction /	EN 13501 (rev. 2005)	A1 (decisione 96/603/ce e sue modifiche) A1 (decision 96/603/ce as amended)		A2 - s1, d0	-

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proprietà fisico chimiche / physical and chemical properties /	norma / metodo norm / test method	Laminam 3	CE*	Laminam 3+	Laminam 3+3 / Laminam 7
dimensione / size /	ISO 10545-2	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm		escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm
dimensione / size /	ISO 10545-2	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm		escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm
peso / weight /	Laminam	valore medio 7,8 kg/m ² average value 7,8 kg/m ²		valore medio 8,2 kg/m ² average value 8,2 kg/m ²	valore medio 16 kg/m ² average value 16 kg/m ²
qualità superficie / % pezzi esenti da difetti surface quality / % of tiles with no visible flaws	ISO 10545-2	> 95%		> 95%	> 95%
assorbimento acqua / water absorbtion /	ISO 10545-3	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
assorbimento acqua / water absorbtion /	ASTM C373	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
forza di rottura in N / camp. 200x300 mm breaking load in N / samples 200x300 mm	ISO 10545-4**	-		valore medio 700 average value 700	valore medio 1500 average value 1500
resistenza alla flessione in N / mm ² bending strength in N / mm ²	ISO 10545-4	valore medio 50 (campioni dimensioni 200x300 mm) average value 50 (sample dimensions 200x300 mm)		valore medio 90 (campioni dimensioni 40x100 mm) average value 90 (sample dimensions 40x100 mm)	valore medio 50 (campioni dimensioni 20x100 mm) average value 50 (sample dimensions 20x100 mm)
durezza scala Mohs / Mohs scale hardness /	UNI EN 101	≥ 6		≥ 6	≥ 6
resistenza all'abrasione profonda / resistance to deep abrasion /	ISO 10545-6	≤ 175 mm ³		≤ 175 mm ³	≤ 175 mm ³
coefficiente di dilatazione termica lineare / 10 ⁻⁶ /°C coefficient of linear thermal expansion / 10 ⁻⁶ /°C	ISO 10545-8	6,6		6,6	6,6
resistenza agli sbalzi termici / resistance to thermal shock /	ISO 10545-9	resiste resistant		resiste resistant	resiste resistant
resistenza chimica / chemical resistance /	ISO 10545-13	nessun effetto visibile no visible effect		nessun effetto visibile no visible effect	nessun effetto visibile no visible effect
resistenza alle macchie / stain resistance /	ISO 10545-14	classe 5 class 5		classe 5 class 5	classe 5 class 5
resistenza al gelo / frost resistance /	ISO 10545-12	resiste resistant		resiste resistant	resiste resistant
resistenza all'urto tramite coeff. di restituzione / shock resistance /	ISO 10545-5	valore medio 0,6 average value 0,6		valore medio 0,8 average value 0,8	-
coefficiente d'attrito / coefficient of friction /	ASTM C-1028	μ > 0,6		μ > 0,6	μ > 0,6
reazione al fuoco / fire reaction /	EN 13501 (rev. 2005)	A1 (decisione 96/603/ce e sue modifiche) A1 (decision 96/603/ce as amended)		A2 - s1, d0	-

* Solo per posa a rivestimento / For installation on wall only

** Requisito UNI EN 14411 non applicabile per Laminam3, Laminam3+, Laminam3+3, Laminam7, Laminam5+3. I valori riportati per 3+, 3+3, 7,5+3 sono validi solo lato 3000 mm. / ** Requirement UNI EN 14411 not applicable for Laminam3, Laminam3+, Laminam3+3, Laminam7, Laminam5+3. The values indicated for 3+, 3+3, 7,5+3 are valid only for side length 3000 mm.

* L'unicità di alcune caratteristiche fisiche dei prodotti Laminam li rende non totalmente paragonabili ai comuni prodotti ceramici. Pertanto i risultati dei test sono solo indicativi e non vincolanti / The unique features of Laminam products do not allow for a perfect comparison with ceramic tiles. The test results are therefore only indicative and not binding.

proprietà fisico chimiche / physical and chemical properties /	norma / metodo norm / test method	Laminam 3	CE*	Laminam 3+	Laminam 3+3 / Laminam 7
dimensione / size /	ISO 10545-2	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm		escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm	escursione massima sul lato +/- 0,5 mm max. deviation on the side +/- 0,5 mm
dimensione / size /	ISO 10545-2	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm		escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm	escursione massima sulla diagonale +/- 1,0 mm max. deviation on the side +/- 1,0 mm
peso / weight /	Laminam	valore medio 7,8 kg/m ² average value 7,8 kg/m ²		valore medio 8,2 kg/m ² average value 8,2 kg/m ²	valore medio 16 kg/m ² average value 16 kg/m ²
qualità superficie / % pezzi esenti da difetti surface quality / % of tiles with no visible flaws	ISO 10545-2	> 95%		> 95%	> 95%
assorbimento acqua / water absorbtion /	ISO 10545-3	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
assorbimento acqua / water absorbtion /	ASTM C373	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)		valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)	valore medio 0,1% (< 0,3%) average value 0,1% (< 0,3%)
forza di rottura in N / camp. 200x300 mm breaking load in N / samples 200x300 mm	ISO 10545-4**	-		valore medio 700 average value 700	valore medio 1500 average value 1500
resistenza alla flessione in N / mm ² bending strength in N / mm ²	ISO 10545-4	valore medio 50 (campioni dimensioni 200x300 mm) average value 50 (sample dimensions 200x300 mm)		valore medio 90 (campioni dimensioni 40x100 mm) average value 90 (sample dimensions 40x100 mm)	valore medio 50 (campioni dimensioni 20x100 mm) average value 50 (sample dimensions 20x100 mm)
durezza scala Mohs / Mohs scale hardness /	UNI EN 101	≥ 6		≥ 6	≥ 6
resistenza all'abrasione profonda / resistance to deep abrasion /	ISO 10545-6	≤ 175 mm ³		≤ 175 mm ³	≤ 175 mm ³
coefficiente di dilatazione termica lineare / 10 ⁻⁶ /°C coefficient of linear thermal expansion / 10 ⁻⁶ /°C	ISO 10545-8	6,6		6,6	6,6
resistenza agli sbalzi termici / resistance to thermal shock /	ISO 10545-9	resiste resistant		resiste resistant	resiste resistant
resistenza chimica / chemical resistance /	ISO 10545-13	nessun effetto visibile no visible effect		nessun effetto visibile no visible effect	nessun effetto visibile no visible effect
resistenza alle macchie / stain resistance /	ISO 10545-14	classe 5 class 5		classe 5 class 5	classe 5 class 5
resistenza al gelo / frost resistance /	ISO 10545-12	resiste resistant		resiste resistant	resiste resistant
resistenza all'urto tramite coeff. di restituzione / shock resistance /	ISO 10545-5	valore medio 0,6 average value 0,6		valore medio 0,8 average value 0,8	-
coefficiente d'attrito / coefficient of friction /	ASTM C-1028	μ > 0,6		μ > 0,6	μ > 0,6
reazione al fuoco / fire reaction /	EN 13501 (rev. 2005)	A1 (decisione 96/603/ce e sue modifiche) A1 (decision 96/603/ce as amended)		A2 - s1, d0	-

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Laminam Tile Formats



		Packing Configurations				Weight	Minimum Order Quantity	
		No. Tiles per Box	Boxes per Pallet	Tiles per Pallet	Sqm per Pallet	Weight per Pallet	Ex Auckland*	Ex Italy**
Laminam 3.5mm	1000 x 3000			20	60	608	1 Tile = 3 sqm	
	500 x 1000	5	32	160	80	697		1 Pallet = 80 sqm
	1000 x 1000	3	25	75	75	656		1 Pallet = 75 sqm
	1000 x 1500			36	54	563		1 Pallet = 54 sqm
	500 x 1500			72	54	563		1 Pallet = 54 sqm

Lead times

* Ex Auckland - Next day dispatch

** Ex Italy - to be confirmed at placement of order - min 10 week lead time for shipping. Subject to consolidation of orders to fill a container



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SAFETY DATA SHEET

(EC REGULATION 1907/2006, ANNEX VI)

Rev. 1
Date 2013.06.10

1. IDENTIFICATION OF THE SUBSTANCE/COMPOUND AND OF THE COMPANY/FIRM

1.1 Identification of the substance/compound	LAMINAM 3+
1.2 Use	Coating of surfaces and floors
1.3 Identification of the company	LAMINAM Spa Via Ghiarola Nuova, 258 41042 Fiorano Modenese (MO) – Italy. Tel.: +39 0536 1844200 Fax: +39 0536 1844201
1.4 Competent person responsible for the SDS	Marina Fiore e-mail info@laminam.it
1.5 Emergency phone number	LAMINAM Spa Tel.: +39 0536 1844200 office hours from 8:30 a.m. to 6:30 p.m. (GMT +1 h)

2. HAZARD IDENTIFICATION

2.1 Hazard classification	Not hazardous according to the classification criteria of Directive 1999/45/EC and EC Regulation 1272/2008
2.2 Health Hazard	If the material produces dust following to processing, irritation may be experienced in the respiratory tract, skin and mucosas.
2.3 Safety Hazard	The material is not flammable. If the material breaks or is sectioned it may be sharp and the possible splinters can injure eyes and skin.
2.4 Environment hazards	Non-biodegradable. The material should therefore not pose an environment hazard for water and soil, also considering that it is very little soluble.

3. COMPOSITION / INFORMATION ON INGREDIENTS	
3.1 General description	Ceramic material combined with fiberglass blanket with two-component polyurethane adhesive.
3.2 Composition	<ul style="list-style-type: none"> - Clay (containing, in variable percentage: Montmorillonite: CAS 1302-78-9, EC 215-108-5; Kaolinite: CAS 1318-47-7, EC not assigned; Illite: CAS 106958-53-6, EC not assigned) - Fiberglass (CAS 65997-17-3, EC 266-046-0) - Binders and adhesives

4. FIRST AID MEASURES	
4.1 Skin Contact	No specific effect is known due to skin contact of the material in the standard form (slabs). If the skin is cut, obtain medical attention.
4.2 Eye Contact	Wash eyes with running water. If irritation is experienced or splinters enter the eyes obtain medical attention.
4.3 Dust inhalation	Take outdoors. Obtain medical attention if symptoms are experienced.
4.4 Ingestion	No toxic effect is known. Obtain medical attention if symptoms are experienced.

5. FIRE-FIGHTING MEASURES	
5.1 Fire behaviour	The product is not flammable.
5.2 Suitable extinguishing media	Carbon dioxide, foam, powder, sprayed water
5.3 Hazardous combustion gases	The binder and adhesive components start decomposing at temperatures over 200°C with formation of gases that may contain carbon dioxide, as well as carbon oxide, nitrogen oxides and partially unburnt carbon compounds, depending on the combustion conditions.
5.4 Advice to fire-fighting operators	Use fire-fighting media and protection means suitable for the fire extent and to the other materials in the affected area.

6. ACCIDENTAL RELEASE MEASURES	
6.1 Measures to protect the environment	Recover the product, if possible, or dispose of it according to the local and national regulations (Italian Law Decree 152/2006) on waste (see Section 13 – <i>Disposal Considerations</i>).
6.2 Removal means	Collect with mechanical means. If dusty material spreads use only a vacuum cleaner with suitable filters.
6.3 Personal precautions	None in particular with the material in its standard form (slabs). For handling whole slabs or parts of slabs use anti-cut gloves and goggles. For special situations (dust material) see Section 8 – <i>Exposure Control and Personal Protection</i> .

7. HANDLING AND STORING	
7.1 Handling	Use anti-cut gloves and goggles. Wear accident-preventing shoes with reinforced tip above all when large-sized slabs are handled. If the material is in cut, crushed or abraded pieces protect the skin again the exposure to dust. Do not eat or drink in the working areas.
7.2 Storage	No special storage conditions are required, but the material must be stored in a dry place.
7.3 Conditions incompatible with storage	Unknown.

8. EXPOSURE CONTROL AND PERSONAL PROTECTION	
8.1 Exposure limit values	If the material is subject to processing that may generate dust, in addition to the limits in Annex XXXVIII of the Italian Law Decree 81/2008 and in the Annex of the EC Regulation 39/2000, the TLV-TWA by the ACGIH (American Conference of Governmental Industrial Hygienists) are to be taken as a reference as follows: <ul style="list-style-type: none"> - Inhalable particulate: 10 mg/m³ - Respirable particulate: 10 mg/m³ - Fiberglass: 5 mg/m³ - Free crystalline silica: 0.025 mg/m³

<p>8.2 Exposure control measures</p>	<p><i>Collective protection systems</i></p> <p>If the material is mechanically processed and generates dust, identify the potential exposure situations and arrange the relevant technical and organizing actions (local suction points and/or suitable ventilation).</p> <p><i>Protection of the respiratory tract:</i></p> <p>If dust is present, wear a filtering mask with particulate filter.</p> <p><i>Hand protection</i></p> <p>Wear anti-cut gloves to handle the material and to process it in pieces.</p> <p><i>Eye and face protection</i></p> <p>There is the possibility of splinters or exposure to particles that may cause discomfort to the eyes: wear goggles and face-protecting mask.</p> <p><i>Skin protection</i></p> <p>Just wear clean clothing covering the body when handling whole slabs. No other measure is necessary.</p> <p>Avoid contact of the skin with the dust resulting from processing the slabs.</p>
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9. PHYSICAL AND CHEMICAL PROPERTIES

<p>9.1 General information</p>	<p>Appearance: solid slab. Odour: odourless</p>
<p>9.2 Information on health, safety and environment</p>	<p>Apparent specific gravity: 2.3 (water = 1) pH: not applicable Solubility in water: insoluble</p>
<p>9.3 Other information</p>	<p>Gross calorific value: non-combustible</p>

10. STABILITY AND REACTIVITY

<p>10.1 Stability</p>	<p>The product is stable and chemically inert in the standard use and storage conditions.</p>
<p>10.2 Conditions to be avoided and non-compatible materials</p>	<p>Unknown</p>
<p>10.3 Decomposition products</p>	<p>The binder and adhesive components start decomposing at temperatures over 200°C with formation of gases that may contain carbon dioxide, as well as carbon oxide, nitrogen oxides and partially unburnt carbon compounds, depending on the combustion conditions.</p>

11. TOXICOLOGICAL INFORMATION

<i>11.1 Acute toxicity</i>	<p>No toxic effect is known following to inhalation.</p> <p>Irritation and other effects are possible following to dust inhalation.</p> <p>The product in dust may cause irritation or corneal injury due to mechanical action.</p>
<i>11.2 Chronic effects</i>	<p>Considering the composition (ceramic material in traditional porcelain stoneware combined with a fiberglass blanket) the dust formed when cutting, crushing or grinding the slabs may contain free crystalline silica and glass fibers.</p> <p>Exposure to dust over the limits indicated in point 8.1 resulting from cutting, crushing or grinding the slabs without the exposure control means specified in point 8.2 can cause silicosis or other diseases.</p> <p>As for glass fibers, the International Agency for Research on Cancer (IARC) has defined the continuous glass fiber filaments as non-classifiable as for human carcinogenicity (Group 3). The results of studies on man and animals have been evaluated by IARC as insufficient to classify the continuous glass fiber filaments as possible, probable or certain carcinogenic material.</p>

12. ECOLOGICAL INFORMATION

<i>12.1 Eco-toxicity</i>	No eco-toxic effect is known.
<i>12.2 Mobility</i>	Considering the low biodegradability and solubility, the product shows a reduced mobility in the different environmental compartments.
<i>12.3 Persistence and degradability</i>	<p>Poorly biodegradable.</p> <p>Stable also under other environmental degradation processes such as oxidation or hydrolysis.</p>
<i>12.4 Bioaccumulation potential</i>	Neglectable considering the very low solubility and the high molecular weight of the product.
<i>12.5 Other harmful effects</i>	The product ground in very small parts may cause harmful effects due to mechanical reasons if swallowed by water birds or animals living in the water.

13. DISPOSAL CONSIDERATIONS

<i>13.1 Product disposal</i>	Dispose of as special non-hazardous waste or as city waste if allowed by local regulations. If contaminated, dispose of as special waste in compliance with the provisions of the Italian Law Decree 152/2006 and following modifications and additions.
<i>13.2 Package disposal</i>	Dispose of as special non-hazardous waste or as city waste if allowed by local regulations.

14. TRANSPORT INFORMATION

<i>14.1 Road/railway</i>	Not subject to the provisions of the ADR agreement and of the EID regulations
<i>14.2 Water transport</i>	Not subject to the provisions of the IMDG code
<i>14.3 Air transport</i>	Not subject to the provisions of the ICAO regulation

15. REGULATORY INFORMATION

<i>15.1 Hazard classification</i>	Not hazardous according to the classification criteria of Directive 1999/45/EC and EC Regulation 1272/2008
<i>15.2 Presence of persistent, bio-accumulable and toxic substances</i>	No substance defined as persistent, bio-accumulable and toxic according to the criteria of Annex XIII of the EC regulation 1907/2006 is present.
<i>15.3 Labelling</i>	Not subject to the regulations in force on classification, packing and labelling of hazardous substances and compounds.

15.4 REACH regulation	<p>The product is referable to items of art. 3, paragraph 4, of the REACH regulation, in this case ruled by the following art. 7 that prescribes to record each substance contained in the articles if the two conditions below are met:</p> <p>a) <i>the substance is contained in such articles in quantities globally over 1 t/year per manufacturer or importer;</i></p> <p>b) <i>the substance is to be released in the standard, or reasonably predictable, use conditions.</i></p> <p>The product is thus excluded from the recording obligations as it does not contain substances to be released intentionally.</p>
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16. FURTHER INFORMATION

The product hazard data have been prepared in compliance with the provisions of section IV of the EC regulation 1907/2006 (*concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) no. 793/93 and Commission Regulation (EC) no. 1488/94, as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC*).

The information in this sheet, if not coming from tests made on the product, have been taken from the following national and international literature sources:

- ISS, Hazardous substances database
- CE, European Chemical Substances Information System
- WHO/IPCS, International Chemical Safety Cards
- IARC, Monographs on the Evaluation of Carcinogenic Risks to Humans
- ACGIH, TLV and BEIs

This sheet cancels and replaces every previous edition.

Slip Resistance Ratings



		Chemical Resistance	Slip Resistance		Slip Resistance - Untreated	Slip Resistance - Treated
		ISO 10545-13	ASTM C-1028	DIN 51130	AS/NZS 3661.1	AS/NZS 3661.1
Stocked in 3m x 1m	Blend	No visible effect	$\mu > 0,6$	R9	$\mu = 0.21$	$\mu > 0.4$
	Collection	No visible effect	$\mu > 0,6$	R9	$\mu = 0.21$	$\mu > 0.4$
	Filo	Partial change in surface appearance		R9	$\mu = 0.21$	N/A
	Naturali	No visible effect	$\mu > 0,6$	R9	$\mu = 0.21$	$\mu > 0.4$
	Oxide	No visible effect	$\mu > 0,6$	R10	$\mu = 0.26$	$\mu > 0.4$

Note: Laminam Filo range is not recommended for horizontal applications such as flooring, as the heavily textured surface may require more cleaning. It is also not possible to treat the surface of Filo range to increase the slip resistance.

Laminex[®]
New Zealand

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