



C GRAMITHERM: Insulation material made from grass

(N°ETA-21/0260 DIBt - Deutsche Institut für Bautechnik)

Technical Data																
Product composition	Grass fibre: 70% (+/- 5%) Recycled jute fibre: 20% (+/- 5%) Synthetic binder fibre: 10% (+/-2%)															
Density	40 kg/m³ (+/- 5kg/m³)															
Thickness	Standard: 45 to 240mm Custom: 30 mm															
Batts dimension	Standard: 1200mm x 600mm Custom: 1200mm x 450mm															
European Technical Agreement	ETA-21/0260															
EC Labelling	(€ ⊗															
Thermal conductivity λ according to EN 12667 :2001 standard	0,041 W/m.K															
Heat transfer coefficient U and R	Thickness mm	in	45	60	70	80	90	100	120	0 140	150	160	180	200	220	240
	R stated i m ² .K/W		1.11	1.48	1.71	1.98	3 2.20	2.47	2.9	6 3.46	3.70	3.95	4.44	4.94	5.43	5.93
	U stated i		0.90	0.67	0.59	0.50	0.46	0.40	0.3	4 0.29	0.27	0.25	0.22	0.20	0.18	0.17
Specific heat capacity	2232 J/kg.K								<u></u>							
Vapour diffusion resistance μ according to NF EN 12086 :2013	μ = 2	T	hickn in m		4!	5	80	12	20	160	200	2	220	240		
standard		9	S _d in r	nm	0.09	900	0.160	0.2	40	0.320	0.40	0 0.	440	0.480		
Short-term water absorption according to NF EN ISO 29767 standard	3.5 kg/m²								1			•	1			



Long-term water absorption according NF EN 16535 standard	15.5%
Tensile strength parallel to faces according to NF EN 1608:2013 standard	>20kPa
Dimensional stability according to EN 1604 en EN 13171 standard	Length change +/-2% and maximum T2 class for the thickness. Gramitherm® self-check on the width: minimum 600mm and maximum 625mm
Resistance against fungal attack according to CSTB specification 3713-V3 85% scenario	Resistant to fungal contamination at 28°C and 85% RH
Fire behaviour NF EN 13501-1:2018	EuroClass E
Corrosion resistance According to NF EN15 101-1:2013 standard	No perforation



General data

Insulation against summer heat	Dephasing time: 9 hours after absorbing heat, for a thickness of 240mm (opaque surface)
	The heat-shielding properties of insulating materials are becoming increasingly important against increasing air conditioning energy consumption requiring expensive electricity.
	These properties are expressed by the specific heat capacity « c » of a material. The « c » value is the amount of heat required to raise one kilogram of material by 1°K.
Eté ∤	Gramitherm® value = 2232 J/kg.K
Température extérieure	The insulating properties of a material result from a very slow transfer of heat through material. The combination of thermal conductivity and specific heat capacity reduces the difference in day-night temperature under the roof and diffuses heat at night (phase shift).
Vapor diffusion resistance	The vapor diffusion coefficient μ expresses the resistance of a material to vapor diffusion. μ is a comparative value, it expresses how many times the resistance of materials is compared to that of a layer of air of the same thickness. Air has a vapor diffusion coefficient of 1. Gramitherm® is open to vapour diffusion (μ =2).
The dimensional stability	The dimensional stability of Gramitherm® has been tested according to EU-822 :2013. The changes in the duration of the product in lenght and width are around +/-2%.
	Gramitherm® is classified T2 for thickness (EN 823 :2013).
Odour	Gramitherm® self-check on the width: minimum 600mm and maximum 625mm Gramitherm® has a slight hay odor. After application of the product in a building, the odor subsides and disappears after 3 to 4 weeks with normal ventilation and aeration.
Moisture resistance	Gramitherm ®'s resistance to fungal attacks has been evaluated against the CSTB 3713-V3 specification. This includes inoculating and incubating previously sterilised samples at a temperature of $28^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and a relative humidity of $85\% \pm 4\%$ for a period of 28 days.
	In conclusion: Gramitherm® is deemed resistant to fungal contamination.



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Fire resistance	According to EN ISO 13501-1 :2018, Gramitherm® meets Euroclass E criteria for
	fire resistance.
	This means that in the event of a fire, the fire will not spread to other parts of a
	building through the insulation.
15 saje. 2000 13:58:31	The fumes released are non toxic, which allows fire fighters to intervene
· · · · · · · · · · · · · · · · · · ·	effectively in the case of fire.
600 ·	
300	Gramitherm® fire resistance video:
	https://www.youtube.com/watch?v=ixWabu3yB6s
Allergies	Gramitherm® does not contain grass pollen, because the raw material is cut
	before flowering.
	In addition, Gramitherm® does not contain fungal spores. Therefore,
	Gramitherm® can be used safety even for people with allergies.
Water damage reaction	In the case of water damage, Gramitherm® will be soaked. With sufficient aeration
water damage reaction	of the material, it will gradually dry out with a moderate change in its dimensions
	and alteration of the insulation properties. Exposing the insulation in such a way
	would invalidate the guarantee.
	Always ensure that the products are installed and protected in accordance with
	the installation and usage instructions (see below).
Rodents damage	The digestible liquid components of the raw grass have been removed from the
	fibres (the ligno-cellulosic component); rodents are unable to digest the cellulose,
	so they no longer have any interest in consuming the product.
	In addition, the density and shape of the panels makes it difficult for rodents to
	nest.
	Regardless of the type of insulation material, ingress by mice and other rodents
	must be prevented by use of appropriate measures in accordance with the
	national standards in the building's location.
Product handling	Gramitherm® can be applied comfortably, and quickly. Batt cutting can be done at
1 1 Judget Hallulling	the construction site using the tools recommended on our website (see our
	cutting tools available on our website www.gramitherm.eu).
	The product does not itch and does not cause skin irritation. The grass fibres may
	spread during cutting but do not remain in the air.
	Please follow our handling instructions as referenced in our safety data sheet (SDS-
	available on www.gramitherm.eu)



Determination of the	EN ISO 16000-9		Test report BBRI :				
VOC emission rate	214 130 10000 3		DE-CH-0271 CH-20-191-02				
			Component Cas n° Emission rate after 28 days $(\mu g/m^{\circ})$ $(\mu g/m^{\circ})$				
ÉMISSIONS DANS L'AIR INTÉRIEUR			TVOC - 17 < 1000				
		۸.	Formaldehyde 50-00-0 4 < 10 Acetaldehyde 75-07-0 31 < 200				
		A+	Acetaldehyde				
A+ A B C			Tetrachloroethylene 127-18-4 < 1 < 250				
* influentation has to contact of extraction dis buildrateau reliables dans ("a) believes, priorettate on chape de foractio pur pholodies, har de extrate de classes allared de Ar (has foliales descuencia) el foliales dem			Ethylbenzene 100-41-4 <1 <750				
			Xylene (m-,p- & o-) 1330-20-7 < 1 < 200				
			2-Butoxyethanol 111-76-2 <1 <1000				
			1,2,4-Trimethylbenzene 95-63-5 <1 <1000 1,4-Dichlorobenzene 106-46-7 <1 <60				
Biobased label	Material balance methodology:	88% biobased	1,4-Dichlorobenzene 106-46-7 <1 <60 Certificate:				
	EN 16785-2 :2018	mass (sourcing					
filière Wallonne		< 300km	N°BE/14/03/20/88-BE-FW				
X BIOSOUCCO		factory)					
88% Wallonne		ractory)					
Hygroscopic absorption	EN ISO 12571:2013		Hygroscopic property at 23°C				
property	(ECOLABOR : N°ECO-	0,25					
	P21007-20021)						
	,	9,20	2 6 11				
		4	Sorption				
		e 0,15	◆ Desorption				
		Je l					
		Ö 0,10					
		e -					
		oistr					
		S 0,05					
		0,00					
		Sorption is the i	process by which a substance is adsorbed				
			a "sorbent") on or into another				
			results from the action of gas or liquid				
		molecule comin	g into contact with a solid material, and				
		which attach to	its surface (adsorption) or are fully				
			ithin it (absorption).				
		D					
		•	e opposite process to sorption, by which				
		the sorbed mole	ecules detach from the substrate.				
		Applied to this i	nsultation, these physical phenomena				
		* *	to "capture" the initial moisture from the				
			·				
			vapour moves, thus maintaining air				
		moisture levels	at a constant levels without causing				
		condensation. T	his ability ensures faster drying and that				
			ure levels return more quickly.				
	NF EN ISO 29767	Water absorption	on in the short term is 3.5kg/m².				
	NF EN ISO 16535	-	on in the long term is 15.5%.				
	2.1.00 10000	Tracei absorptio	5 the long term is 15.5/0.				



Sound absorption								
	Alpha absorption coefficient Gramitherm							
		1,2	Frequency	α coefficient	1			
			200	0,26	1			
		1,0	250	0,34	1			
		₩0.8	315	0,46	1			
		#0,8 = Gramitherm α coefficient = 0,6	400	0,59	1			
		₩0,6	500	0,73	1			
		8 80,4	630	0,87	1			
		00,4	800	0,96	1			
		0,2	1000	0,99	1			
			1250	0,95	1			
		0,0 100 300 500 700 900 1100 1300 1500 1700 Frequency (Hz)	1600	0,92	1			
Environmental balance	2015	FDES available on INIES/AFN www.gramitherm.eu.	OR ba	sis and	our website			
	tatem CREATE EVALUATE INNOVATE	Gramitherm® B-EPDs comply with th PCR version 18.10.2022. The data is a on our website www.gramitherm.eu	available					
Recyclability	The grass is recycled (waste transformation).							
	The jute is fro	m recycling cocoa and coffee bean sac batts can be recycled at the factory and		e-used in m	aking new batts.			



European Technical Approval

Gramitherm® has obtained European Technical Approval ETA-21/0260. This approval authorizes the sale of the product in all member states of the EU. Product applications must be in accordance with national construction standards. Usually use of the product in EU does not additionally require national registration.

The test and assessment methods on which this ETA is based suggest a useful life of at least 50 years for the thermal insulation batts. Indications about the lifespan of the product cannot be interpreted as a guarantee by the manufacturer, but only as a means to help select the right products for the expected economically reasonable lifespan of the building.

Registration is granted on the condition that **Gramitherm®** is protected against rain during transport, storage and application.

The Approval also sets standards for internal and external production controls that will make it possible to consistently ensure the quality of the product.

Applications for which registration exists for Gramitherm® and planned extensions

Applications*	Existing approvals (21/0260)	<u>Planned extensions</u>
Empty space	Yes	
Wood-framed buildings	Yes	
Inside external walls	Yes	
Betwwen rafters	Yes	
Above and below rafters**	Yes	
Ventilated façades	No	Yes
Sound insulation of walls	No	Yes
Sound insulation of floors	No	Yes

^{*} Approval for plastered external facades as well as that for applications for high fire resistance will be acquired later

The rules for correct application are those in force in the country concerned. Application recommendations and instructions can be consulted on the website: INSTALLATION - Gramitherm

GRAMITHERM® is labeled <u>Efficient solution</u> by the Solar Impulse Foundation (August 2022 - <u>https://solarimpulse.com/efficient-solutions/gramitherm</u>).

^{**} Without mechanical pressure

For over 20 years, Ecological Building Systems has been at the forefront of environmental and sustainable building products supplying a range of innovative airtightness solutions and natural insulations backed up with expert technical support.

As product suppliers in the UK and Ireland, we're happy to assist you with your projects and have expert technical and sales advice on hand.



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