

# TECHNICAL DATA AND APPLICATIONS

FIBRAN<sup>xps</sup>  
extruded polystyrene thermal insulation

## FIBRANxps turquoise thermal insulation

**A high quality and sustainable energy shield for the complete building envelope!**

Extruded polystyrene thermal insulation, marked with the international abbreviation XPS, is generally implemented in applications where installing other types of insulations would be useless - under extreme loads, in humid environments and even below groundwater level.

While FIBRANxps panels are manufactured with lightweight thermal insulating foam, they are extremely solid and non-absorbent. **Their different forms and surfaces are specially designed for different applications.**



- **Smooth** surfaced panels are intended for applications where thermal insulation is in contact with soil, moisture and even below groundwater level. Additional protection against water, moisture and soil is not necessary.



- **Waffle** surfaced panels are used in applications requiring good adhesion for further plaster finishing or concrete pouring.



- **Grooved** surfaced panels with grooves are intended for better adhesion of heavier cladding.

## Special Characteristics of FIBRANxps

**Due to the special cellular structure!**

- FIBRANxps thermal insulation is made of hard polystyrene foam that consists of extremely small - only a few microns large - cells. **Its cellular structure is more than 97% closed.** This makes the foam nearly non-absorbent and enables it to be applied at the outer side of the waterproofing; within inverted flat roof systems as well as underground, below the foundation slab, and even fully submerged in groundwater.
- Each cell contains dry air, which provides excellent thermal behaviour that enables FIBRANxps to maintain its thermal properties for not only 25 years, as required by the recent product standards. The thermal conductivity, lambda, remains unchanged over a period of **50 years.** This is equivalent to the expected life span of a building.
- Compressive strength of the FIBRANxps panels is stable over time, even under heavy loads. **This makes the panels suitable for use under permanent static as well as dynamic loads** under foundations of heavier buildings.

## Easy implementation for comfortable living

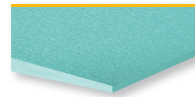
**We think of the future!**

**Durable insulation** is extremely important in both the construction of nearly zero-energy buildings (nZEB) and in sustainable construction. During a building's entire life cycle, it ensures permanent and unchanged comfort of living and significantly impacts both building life cycle analyses - LCA and life cycle costs - LCC. Durable insulations extend the life span of buildings and reduce investment costs.

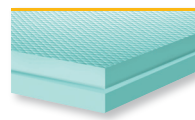
FIBRANxps 300-L



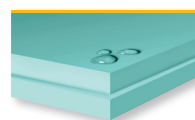
FIBRANxps INCLINE



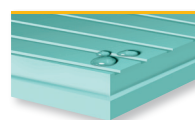
FIBRANxps ETICS GF



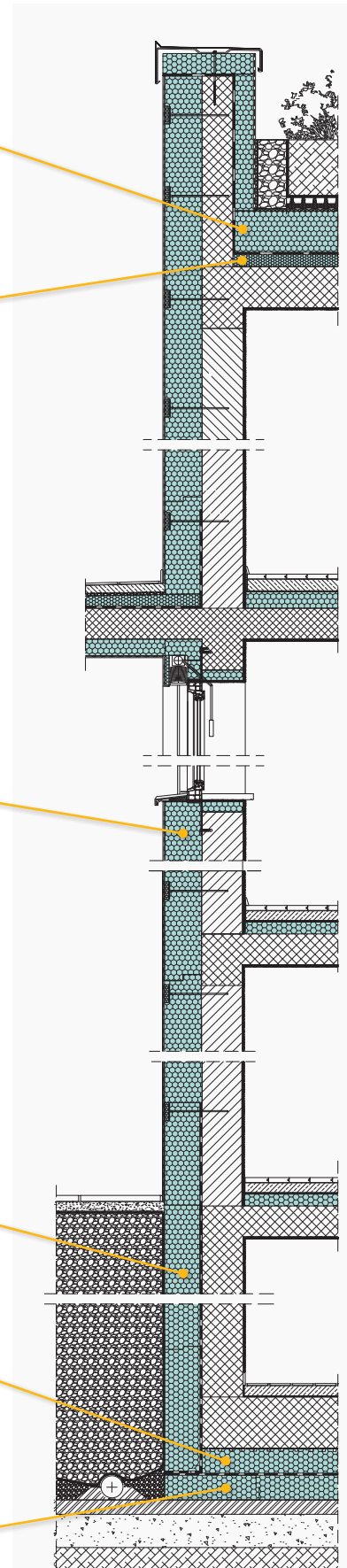
FIBRANxps 300-L



FIBRANxps SEISMIC



FIBRANxps 400-L







## Monitored and confirmed constant quality level

### For a period of 50 years!

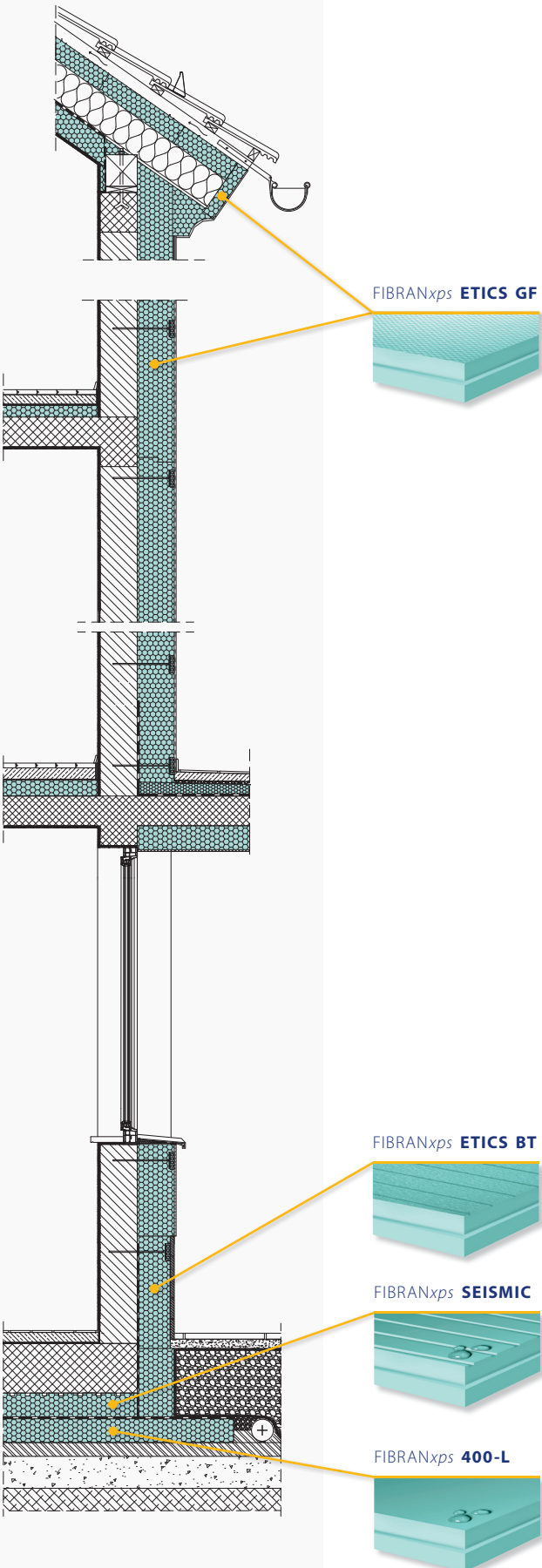
FIBRANxps products fully comply with Regulation 305/2011 / EU (Coordinated conditions for the marketing of construction products and periodic verification of product quality) and are certified for:

- CE marking of the entire product range,
- **Conformity system 3** in accordance with AVCP that regulates quality control of products, evaluation and marking of construction products, as required by the European harmonized system of assessment and verification of continuous quality,
- **Application in demanding construction assemblies** requiring continuous control of special characteristic. The factory control is performed as required by the AVCP system 1+, enabling the issuance of European Technical Assessment **ETA-17/0910** and individual technical application permits.

### Both ETA and internal controls are compulsory for applications of thermal insulation in demanding construction assemblies:

- under permanent loads underneath foundations,
- under parking lots;
- in permanently humid environments on the outer side of the waterproofing such as perimeter walls, inverted flat roof systems, green roofs etc.

FIBRANxps panels are constantly monitored by various institutes:



## Production is harmless to health and the environment

### ... by using environmentally friendly raw materials!

From the very beginning of the FIBRANxps production, we considered ecological principles. Due to the eco-policy of the raw materials, our XPS boards are:

- HBCD **free** Hexabromocyclododecan free,
- HFC **free** Hydrofluorocarbon free.

FIBRANxps products are manufactured using the so-called CO<sub>2</sub> technology and have an extremely low impact on global warming- **Global Warming Potential, GWP<5** as well as zero effect on ozone depletion- **Ozone depletion potential, ODP=0**.

## Recommended applications

		300-I	300-L	400-L	500-L	700-L	INCLINE	SEISMIC	MAESTRO	ETICS	FABRIC
<b>FLOORS and FOUNDATIONS</b> <sup>1, 4, 5</sup>											
Floors	Interior floors	•									
	Basement floors	•	•								
	With underfloor heating	•	•								
	Extra loaded floors (parking lots, cold storages)				•	•					
Underground	Insulation under foundation slab, SEISMIC foundation pillow			•	•	•		•			
	Insulation under traffic areas (bridges, roads, railways)				•	•					
	Swimming pools		•	•	•						
	Airport runways and hangars					•					
<b>ROOFS</b> <sup>2, 4</sup>											
Flat roofs	Inverted flat roofs		•	•	•	•	•				
	Conventional flat roofs		•	•	•	•	•				
	DUO roofs (nZEB, Passive houses)		•	•	•	•	•				
	PLUS roofs (reconstructions, upgrades)		•	•	•	•	•				
	Green roofs		•	•	•	•	•				
	Terraces		•	•	•	•	•				
Pitched roof	Pitched roof reconstruction from the inside, eaves									•	
	Massive and classical lightweight pitched roofs	•							•	•	
	Inner soffit insulation								•		
<b>WALLS</b> <sup>3, 1, 4</sup>											
Under-ground	Perimeter (outside the cellar walls also in case of groundwater)		•		•	•					
	Vertical insulation of foundations		•								
External walls	Façade plinth									•	
	ETICS rendered façades									•	
	Façade with stone cladding									•	
	Visible concrete (inner or sandwich insulation)									•	
	Cavity walls									•	
	Internal walls located next to unheated space									•	
	Thermal bridges (balconies, windows and doorjambes, concrete columns and tie-beams)									•	
<b>INDUSTRIAL USE</b> <sup>4</sup>											
	Panels, window/door frames, door leaves, containers, tailor made products, ...										•

<sup>1</sup> See brochure: **0100 PRODUCTS CATALOG**

<sup>2</sup> See brochure: **0111 INVERTED FLAT ROOFS**

<sup>3</sup> See brochure: **0130 FAÇADE**

<sup>4</sup> See brochure: **0150 BELOW GRADE**

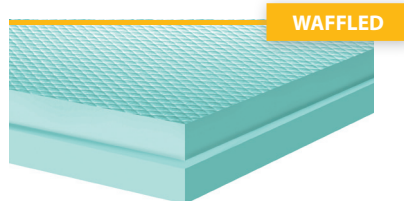
<sup>5</sup> See brochure: **0151 SEISMIC FOUNDATION PILLOW**

## Specific surface and board forms, design for different applications

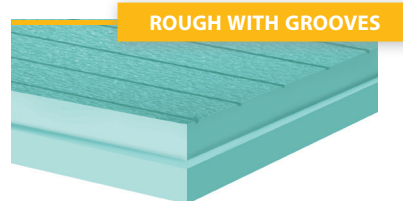
FIBRAN <sub>xps</sub> <b>300-L, 400-L, 500-L, 700-L</b>	boards are designed for constructions in contact with soil and in inverted flat roof assemblies. Depending on the expected loads, you can choose the adequate compressive strength ranging from 300 to 700 kPa.
FIBRAN <sub>xps</sub> <b>INCLINE</b>	boards allow a precise execution of slopes. They are used as a substitute for inclined concrete, reducing the total weight and increasing the thermal properties of construction assemblies. Sloping board are available starting from 1 cm board thickness.
FIBRAN <sub>xps</sub> <b>SEISMIC</b>	boards are an important component of the SEISMIC foundation pillow system solution. The boards have a smooth bottom surface, while grooves are cut into the top panel surface to provide good concrete adhesion.
FIBRAN <sub>xps</sub> <b>MAESTRO</b>	due to its smooth surface, MAESTRO boards are designed for applications where finishing is not required. Often, they are used as visible thermal insulation in large farm buildings.
FIBRAN <sub>xps</sub> <b>ETICS GF</b> <b>ETICS BT</b>	boards with rough structured surface that enable good adhesion are designed for use in construction assemblies with a finishing layer (ETICS and ITICS system). A further and important advantage of the ETICS panel is its T3 highest class thickness tolerance, ensuring high-quality façade construction. Based on the weight of the finishing layer (plastered façade / stone cladding), we choose between ETICS GF and BT.
FIBRAN <sub>xps</sub> <b>FABRIC</b>	boards are designed for industrial use and further processing.

## Surface

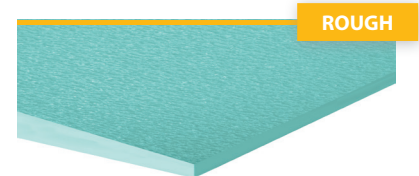
FIBRAN<sub>xps</sub>  
**ETICS GF**



FIBRAN<sub>xps</sub>  
**ETICS BT**



FIBRAN<sub>xps</sub>  
**INCLINE**



FIBRAN<sub>xps</sub>  
**300-L, 400-L, 500-L, 700-L**

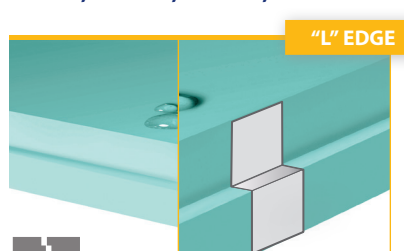


FIBRAN<sub>xps</sub>  
**SEISMIC 400-L (500-L, 700-L)**



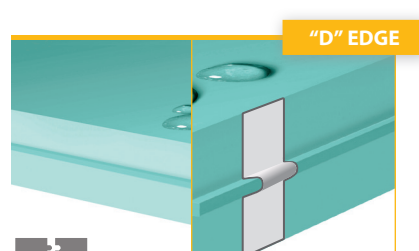
## Edge

FIBRAN<sub>xps</sub>  
**300-L, 400-L, 500-L, 700-L**



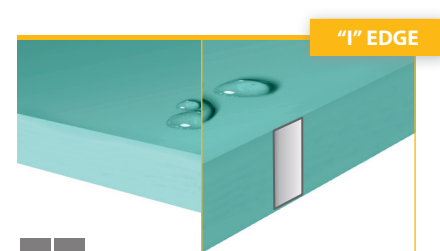
Shiplap edged joints prevent thermal bridges formation in single layer installation applications.

FIBRAN<sub>xps</sub>  
**MAESTRO**



Tongue and groove edged joints prevent linear thermal bridges formation and enable smooth roof and ceiling applications.

FIBRAN<sub>xps</sub>  
**300-I**



Straight edge boards are used in multilayer applications with staggered (brickwork) joints.

**Technical data**

TECHNICAL DATA FIBRANxps		Units	Designation code EN 13164	300-I	300-L	400-L	500-L	700-L	SEISMIC 400-L	SEISMIC 500-L	SEISMIC 700-L	MAESTRO	ETICS GF/GF-I	ETICS BT	Standard
Edge shape		-	-												
Surface		-	-	Smooth					Smooth with channels			Smooth	Rough with or channels		
Board's dimensions		mm	-	1250/ 600	1250/ 600	2500/ 600	1250/ 600	1250/ 600	2500/ 600			2800/ 600	1250/ 600	2500/ 600	EN 822
Thickness tolerance		-	Ti	T1								T3		EN 823	
Declared compressive strength at 10% deformation		kPa	CS(10\Y)i	300*	300*	400	500	700	400	500	700	300*	300*	300	EN 826
Declared compressive modulus of elasticity		MPa	E	20	20	25	30	40	25	30	40	20	15	15	EN 826
Shear strength $\tau$		MPa		-	-	-	-	-	-	-	-	-	0,15	0,15	EN 12090
Shear modul G		MPa		-	-	-	-	-	-	-	-	-	2,6	2,6	EN 12090
Compressive creep over 50 years at < 2% deformation		kPa	<b>IMPROVED!</b> CC (2/1,5/50)	130	130	155	180**	215	155	180**	215	-	-	-	EN 1606
Compressive strength design value under foundation slab	50-120 mm	kPa	<b>IMPROVED!</b> $f_{cd}$	185	185	230	280	305	230	280	305	-	-	-	<b>NEW!</b> Dibt Z-23.34- 1807
	140-200 mm		190	190	230	260	-	230	260	-	-	-	-	-	
Tensile strength perpendicular to surface $\sigma_{mt}$		kPa	TRi	600										EN 1607	
Dimensional stability at 70°C and 90% relative humidity		%	DS(70,90)	5										EN 1604	
Deformation behaviour load 40 kPa and temperature 70°C		%	DLT(2)5	$\leq 5$										EN 1605	
Linear coefficient of thermal expansion $\alpha_{+20/+70^\circ C}$		mm/mK	-	0,075											
Freeze-thaw resistance		-	FTCi	1								-		EN 12091	
Temperature range for use		°C	-	od -50 do +75										EN 14706	
Reaction to fire		-	Class	E										EN 13501-1	
Long-term water absorption by total immersion	Smooth surface	Vol. %	<b>IMPROVED!</b> WL(T)	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	-	-	EN 12087
	Waffle surface		<b>IMPROVED!</b> WL(T)	-	-	-	-	-	-	-	-	-	-	1,5	
Water absorption by diffusion	20-30 mm	Vol. %	<b>IMPROVED!</b> WD(V)	3	-	-	-	-	-	-	-	-	-	-	EN 12088
	40-60 mm		<b>IMPROVED!</b> WD(V)	2	2	2	2	2	-	-	-	-	-	-	
	80-200 mm		<b>IMPROVED!</b> WD(V)	1	1	1	1	1	-	-	-	-	-	-	
Water absorption by diffusion		-	MUi	150-50								100-50	50	50	EN 12086

\* 200 kPa for 20 mm and 250 kPa for 30 mm thick panels.

\*\* From 100 to 200 mm.

## Thermal conductivity

		300		400		500		700		MAESTRO		ETICS	
Declared thermal conductivity <sup>1</sup>		$\lambda_{D25}$		$\lambda_{D25}$		$\lambda_{D25}$		$\lambda_{D25}$		$\lambda_{D25}$		$\lambda_{D25}$	
Design thermal conductivity <sup>2</sup>			$\lambda_R$		$\lambda_R$		$\lambda_R$		$\lambda_R$		$\lambda_R$		$\lambda_R$
20 mm	W/mK	0,032	0,033									0,032	0,033
30 mm		0,032	0,033									0,032	0,033
40 mm		0,032	0,033									0,032	0,033
50 mm		0,033	0,034			0,033	0,034			0,033	0,034	0,033	0,034
60 mm		0,033	0,034	0,033	0,034	0,033	0,034	0,033	0,034	0,033	0,034	0,033	0,034
80 mm		0,034	0,035	0,034	0,035	0,034	0,035	0,034	0,035	0,034	0,035	0,034	0,035
100 mm		0,035	0,036	0,035	0,036	0,035	0,036	0,035	0,036	0,035	0,036	0,035	0,036
120 mm		0,035	0,036	0,035	0,036	0,035	0,036	0,035	0,036	0,035	0,036	0,035	0,036
140 mm		0,035	0,036	0,035	0,036	0,035	0,036			0,035	0,036	0,035	0,036
160 mm		0,036	0,037	0,036	0,037	0,036	0,037			0,036	0,037	0,036	0,037
180 mm		0,036	0,037	0,036	0,037	0,036	0,037					0,036	0,037
200 mm		0,036	0,037	0,036	0,037	0,036	0,037					0,036	0,037

<sup>1</sup> conforming to EN 13164 for 25 years period

<sup>2</sup> conforming to DIN 4108-4.

<b>NEW!</b> Declared 50-years thermal conductivity		300	400	500	700	MAESTRO	ETICS
20 mm	W/mK	0,032					0,032
30 mm		0,032					0,032
40 mm		0,032					0,032
50 mm		0,033			0,033		0,033
60 mm		0,033		0,033	0,033	0,033	0,033
80 mm		0,034		0,034	0,034	0,034	0,034
100 mm		0,035		0,035	0,035	0,035	0,035
120 mm		0,035		0,035	0,035	0,035	0,035
140 mm		0,035		0,035	0,035		0,035
160 mm		0,037		0,037	0,037		0,037
180 mm		0,037		0,037	0,037		0,037
200 mm		0,037		0,037	0,037		0,037



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The quality of FIBRAN<sup>aps</sup> products is assured by EN 13164 and EN 13172 standards. These standards establish the type and frequency of measurements executed by accredited and independent institutes, as well as by FIBRAN laboratories. Since FIBRAN sells its products throughout Europe and outside its borders, the quality of products is also verified according to local standards of certain countries including some highly developed and specially demanding construction markets.



**fibran**

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