

Technical Data Sheet

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Approved by: Daniel Siwec, Product Manager

Previous issues of this document are not valid

SYNTHOS XPS PRIME D

Extruded polystyrene



CHARACTERISTICS

Synthos XPS PRIME D is a thermoinsulating material, which has been given a shape of a board in the process of extrusion and direct blowing. The product is manufactured from polystyrene resin, the raw material safe for your human health and approved for use in contact with food.

It is foam of specific small and closed cell structure containing air in its internal structure.

Product does not contain flame retardant.

Product does not contain blowing agents like CFCs (chlorfluorcarbons), HCFCs (hydrochlorfluorcarbons) or HFCs (hydrofluorcarbons).

INTENDED APPLICATIONS OF BUILDING PRODUCT

1) Thermal insulation for buildings:

- perimeter insulation of walls below ground level
- insulation of floors and floorings
- insulation of strip footings and slab foundations
- insulation of inverted flat-roofs
- insulation of transportation routes and parking lots
- insulation of railways and tramways
- insulation of terraces, loggias and balconies
- insulation of elements of agricultural, utility and livestock buildings
- insulation of places where cold bridges may appear
- formwork
- other thermoinsulation application in construction with the accordance to the local regulations and standards

2) Thermal insulation for building equipment and industrial installations.

3) Thermal insulation and light weight fill products for civil engineering applications

ADVANTAGES OF SYNTHOS XPS PRIME D PRODUCTS

- Excellent thermal conductivity coefficient
- Closed-cell structure
- Very low water absorption
- High compressive strength
- Easy assembling of the boards
- Suitable for complete recycling
- Due to presence of air inside the cells, thermoinsulating properties do not deteriorate in time, moreover they improve while ambient temperature decrease (due to thermal conductivity coefficient value decrease)



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TECHNICAL PARAMETERS

1. THERMOINSULATING PROPERTIES

Parameter	Unit	Test method	Values for Synthos XPS PRIME D 30	
Thermal conductivity coefficient (λ_D) acc. to EN-13164 (10 °C)	W/(m·K)	EN 13164	λ_D	R_D
Thermal resistance (R_D) acc. to EN-13164 (10 °C)	$m^2 \cdot K/W$			
$d_N = 50mm$			0,029	1,65
$d_N = 100mm$		0,031	3,20	

Temperature	Values for Synthos XPS PRIME D 30, thickness 50 mm	
	Thermal conductivity coefficient in whole range of service temperatures acc. to EN 14307 [W/(m·K)]	Thermal resistance in whole range of service temperatures acc. to EN 14307 [$m^2 \cdot K/W$]
-60 °C	0,023	2,05
-40 °C	0,024	2,00
-20 °C	0,026	1,80
0 °C	0,028	1,70
10 °C	0,029	1,65
20 °C	0,030	1,60
40 °C	0,031	1,50
60 °C	0,034	1,40
70 °C	0,036	1,35

Temperature	Values for Synthos XPS PRIME D 30, thickness 100 mm	
	Thermal conductivity coefficient in whole range of service temperatures acc. to EN 14307 [W/(m·K)]	Thermal resistance in whole range of service temperatures acc. to EN 14307 [$m^2 \cdot K/W$]
-60 °C	0,026	3,80
-40 °C	0,027	3,70
-20 °C	0,029	3,40
0 °C	0,030	3,30
10 °C	0,032	3,10
20 °C	0,033	3,00
40 °C	0,035	2,85
60 °C	0,036	2,75
70 °C	0,038	2,60

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2. MECHANICAL PROPERTIES

Parameter	Code	Unit	Test method	Synthos XPS Prime D 30 – value or feature
Declared compressive stress or compressive strength at 10% deformation	CS(10\Y)	kPa	EN 826	≥ 300
Average achieved compressive stress or compressive strength at 10% deformation	-	kPa		≥ 350
Compressive stress or compressive strength at 2% deformation	CS(2\Y)	kPa		≥ 100
Compressive stress or compressive strength at 5% deformation	CS(5\Y)	kPa		≥ 200
Average achieved short-time elasticity modulus	-	MPa		≥ 10
Average achieved long-time elasticity modulus (E50)	-	MPa		≥ 5,5
Compressive creep	CC(2/1,5/50)	kPa	EN 1606 + AC	≥ 110
Tensile strength perpendicular to faces	TR	kPa	EN 1607	≥ 200
Shear strength	SS	kPa	EN 12090	≥ 170
Bending (flexural) strength	BS	kPa	EN 12089	≥ 400
d _N = 50 mm				-
d _N = 100 mm				
Resistance to cyclic compressive load using square - wave load – deformation of 2% after 2 x 10 ⁶ cycles	-	kPa	EN 13793	≥ 130
d _N = 50mm				≥ 110
d _N = 100 mm				
Resistance to cyclic compressive load using square - wave load – deformation of 2% after 5 x 10⁶ cycles	CLRT(5/2×10 ⁶)	kPa	EN 13793	≥ 200
d _N = 50mm				≥ 140
d _N = 100 mm				
Resistance to cyclic compressive load using sinusoid - wave load – deformation of 2% after 2 x 10 ⁶ cycles	-	kPa	EN 14307	≥ 120
d _N = 50mm				≥ 95
d _N = 100 mm				
Resistance to cyclic compressive load using sinusoid - wave load – deformation of 2% after 5 x 10⁶ cycles	CLR(5/2×10 ⁶)	kPa	EN 14307	≥ 180
d _N = 50mm				≥ 125
d _N = 100 mm				
Resistance to cyclic compressive load using square - wave load –deformation after 2 x 10⁶ cycles, with load of 150 kPa	CL	%	EN 13793	≤ 2,5
d _N = 50mm				≤ 5
d _N = 100mm				
Dynamic stiffness	-	MN/m ³	EN 29052-1	280
d _N = 50mm				150
d _N = 100 mm				

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3. HYDROPHOBIC PROPERTIES

Parameter	Code	Unit	Test method	Synthos XPS Prime D 30 – value or feature
Declared long-term water absorption by total immersion	WL(T)	%	EN 12087 + A1	≤ 0,7
Average achieved long term water absorption by total immersion	-	%		≤ 0,25
Short-term water absorption	WS	kg/m ³	EN 1609	≤ 0,5
	-	kg/m ²		≤ 0,1
Freeze-thaw resistance after long-term water absorption by total immersion test	FTCI	%	EN 12091	≤ 1
Long-term water absorption by diffusion	WD(V)	%	EN 12088	
d _N = 50 mm				≤ 3
d _N = 100 mm				≤ 1
Freeze-thaw resistance after long-term water diffusion test	EN 13164: FTCD	%	EN 12091	
d _N = 50 mm	EN 14734: FTC			≤ 1
d _N = 100 mm				≤ 1
Water vapour diffusion resistance acc. to EN-ISO 10456	MU	-	EN 12086	150

4. OTHER PARAMETERS

Parameter	Code	Unit	Test method	Synthos XPS Prime D 30 – value or feature
Finishing of the surface	-	-	-	smooth
Finishing of the edges	-	-	-	I – Square edges L – Half-lapped edges N – Tongue and groove
Thickness with tolerance T1	T1	mm	EN 823	50 (-2/+3) 100 (-2/+3)
Length	-	mm	EN 822	1250 (+/-8)
Width	-	mm		600 (+/-8)
Squareness on length and width	-	mm/m	EN 824	≤ 5
Flatness on length and width	-	mm/m	EN 825	≤ 6
Density	-	kg/m ³	EN 1602	30 – 33
Dimensional stability under specified conditions – 90% relative humidity and 70 °C *)	DS(70,90) DS(TH)	%	EN 1604 + AC	≤ 5
Deformation under specified compressive load and temperature conditions, at load 40 kPa and temperature 70 °C	DLT(2)	%	EN 1605	≤ 5
Global Warming Potential (GWP) of cellular gas	-	-	-	< 5
Ozone Depletion Potential (ODP) of cellular gas	-	-	-	0

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Parameter	Code	Unit	Test method	Synthos XPS Prime D 30 – value or feature
Linear coefficient of thermal expansion	-	mm/m*K	EN 14581	
- longitudinally				< 0,08
- crosswise				< 0,06
- via thickness				< 0,05
Reaction to fire – class	-	Euroclass	EN 13501-1+A1	F
Durability of reaction to fire	-	-	-	Does not deteriorate in time
Average achieved open cells content	-	%	EN ISO 4590	≤ 5
Minimal service temperature	ST(-)	°C	EN 14309	-60
Maximum service temperature	ST(+)	°C	EN 14706	+70 ²⁾
Flashpoint	-	°C	ČSN 640149	> 400
Fungus resistance	-	-	EN ISO 846	The material does not serve as a source for the growth of fungi
Content of water soluble chlorides	CL	mg/kg	EN 13468	< 27
Content of water soluble fluorides	F	mg/kg	EN 13468	< 5
Content of water soluble sodium ions	NA	mg/kg	EN 13468	< 5
Content of water soluble silicates	SI	mg/kg	EN 13468	< 27
pH value of water extracts	pH	-	EN 13468	7 ± 0,5
Resistance against XA1 aggressive environment (acc. to EN 206-1) at temperature (23±2) °C – change of weight after 8 weeks of exposition and drying into constant mass	-	%	EN ISO 175	< 0,6

* Dimensional stability parameter is declared for following conditions: temperature up to 70 °C and ambient relative humidity level up to (90±5)%. SYNTHOS S.A. does not declare keeping dimensional stability by Synthos XPS PRIME D in conditions of temperature higher than 70 °C, and at the same time ambient relative humidity level higher than 90%.

SAFE ASSEMBLING AND STORAGE CONDITIONS

Storage

Synthos XPS PRIME D boards should be stored in ventilated buildings, the best when covered with a roof in order to keep the boards from degradation of their surface and internal structure.

The degradation can happen by the intensive sun. In case of long-term outside storage, the boards should be protected against the sun with a light-colour material.

Synthos XPS PRIME D boards the same way as all polystyrene-made products in case of exposure to heat sources above 75 °C distort or degrade what is resulting with deformation or even melting.

Synthos XPS PRIME D boards the same way as all polystyrene-made products are flammable, in the case of exposure to open fire they can rapidly burn.

That is way for each step of handling with Synthos XPS PRIME D, boards should not be exposed to open fire or any different heat source.

Synthos XPS PRIME D cannot be stored in buildings where flammable and volatile materials are stored.

Assembling

Synthos XPS PRIME D boards cannot be used in direct contact with substances which act destructively on polystyrene (e.g. organic solvents like acetone, benzol, nitro-solvents...) or different specimen containing such organic compounds. For that reason it is recommended to use for assembling solvent-free adhesives. Before use one should check if the adhesive is dedicated for polystyrene foam.



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Assembling at low temperatures requires providing adequate spacing between the boards in order to maintain proper dilatation.

Synthos does not declare keeping dimensional stability by Synthos XPS PRIME D in conditions of temperature higher than 70 °C, and at the same time ambient humidity level higher than 90%.

Attention! Synthos XPS PRIME D should be especially protected against sun during assembling. As a result of exposure on the plate to solar radiation, its surface degradation, structural degradation, dimensional change and loss of flatness and rectangularity can occur. Consequently, if the boards are exposed to these rays, they should be protected against light in opaque material.

RESPONSIBILITIES AND GUARANTEES

Responsibilities

Information in this document are only informative thus producer does not hold any responsibilities or obligations. SYNTHOS S.A. is only supplier of materials and does not hold any responsibility for their assembling. It is the customer who is responsible for the decision if the materials meet his needs and/or place of the assembling at the customer site and wastes disposal remain in accordance with applicable law.

Guarantees

According to the harmonized European Standards EN-13164, EN-14934, and EN-14307 following durabilities are referred

1. Durability of heat resistance and thermal conductivity in the conditions of exposure to high temperature, weather conditions, aging or degradation

- Declared values indicated for Synthos XPS PRIME D are based on so called aging procedure, simulating its behaviour in infinity, and confirming stability of heat resistance and thermal conductivity in time.
- Heat resistance values suitable for the temperature (up to a maximum service temperature of 70°C) remain constant with time.
- The product is resistant to freeze-thaw cycles as indicated by the declared parameters: freeze-thaw resistance, after the water absorption at diffusion test and after long-term water absorption by immersion test.
- The product is resistant against deformations, what is indicated by dimensional stability and deformation under specific conditions of load and temperature

2. Durability of reaction to fire if exposed to high temperature, weather conditions, aging, degradation.

The parameters of reaction to fire of Synthos XPS PRIME D products remain constant with time.

3. Durability of compressive strength in the conditions of aging or degradation

It is characterized by two parameters: freeze-thaw resistance (as above) and compressive creep. Synthos XPS PRIME D boards exert the following declared level CC(2/1,5/50)110 i.e. not exceeded after 50 years of use: 1.5% creep at 2% deformation (thickness reduction) for the declared stress of 110kPa.

4. Durability of resistance to dynamic load

It is characterized by the resistance to cyclic compressive load as a result of the load extending as a rectangular wave and sinusoidal wave, as limit values of applied loads causing deformation (thickness reduction), not more than 5%.



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The condition of keeping of the essential characteristics by the product is to follow the guidelines:

1. Synthos XPS PRIME D should be stored according to the guidelines in this document, see SAFE ASSEMBLING AND STORAGE CONDITIONS
2. Synthos XPS PRIME D should be used in accordance with the applicable product technical documentation issued by Synthos SA, in force at the time of its production. Through the technical documentation it is understood this document and the declarations of performance.
3. The construction project is in line with current building regulations in country of construction in force at the date of sale of Synthos XPS PRIME D.
4. Work with Synthos XPS PRIME D are carried out in accordance and accurately according to the construction project.
5. The building is used as intended.
6. The building is kept in good order.

PACKING OF SYNTHOS XPS PRIME D

Basic packaging unit – package in PE film packaging. Basic form of a loading unit with given number of packages on it, set on polystyrene-foam beams, wrapped with a PE film.

Table data given for goods with nominal dimensions 1250x600 mm:

XPS board thickness [mm]	No. of boards in a package [pcs.]	Insulation surface in a package [m ²]	Number of packages in loading unit [pcs.]	Insulation in loading unit [m ²]	Volume in a package [m ³]	Volume in loading unit [m ³]	Height of a loading unit with beams [m]
50	8	6,00	12	72	0,3000	3,60	2,48
100	4	3,00	12	36	0,3000	3,60	2,48

Dimensions of board in transportation [mm]		
Finishing of the edges	Length	Width
L	1265	615

MANUFACTURER

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This document is of an informative character. The information given herein is based on the present state of our knowledge and experience. Product should be transported, stored and used in accordance with valid regulations and good occupational hygiene practice. Making use of the information as well as product application is beyond the producer control and determination of the safe conditions of use is the sole responsibility of a customer.

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