

iNSPHERE



synthos

PRODUCTS FOR THE CONSTRUCTION INDUSTRY

One of the biggest challenges in the construction market is energy efficiency. This challenge has become a driving force for the development of new energy saving solutions, and thus, thermal insulation solutions.

Synthos S.A. responds with modern products InVento[®], Silver[®] and InSphere[®] featuring the best thermal insulation properties on the market.





InSphere® is the most popular product on the EPS market. **Excellent mechanical properties, a low heat transfer coefficient (λ), and extremely good processability** are the characteristics of InSphere®, a combination which has brought about its great **commercial success** and **customer confidence**. InSphere® is the benchmark of quality and reliability for other EPS products available on the market.

InSphere® is an expandable white polystyrene dedicated to the thermal insulation market. For manufacturers of thermal insulation panels, the heat transfer coefficient (λ) is the most important performance parameter for their end products. The lower the lambda, the higher the insulating effect. This is why the Research and Development Centre of Synthos S.A. has focused primarily on improving the results of thermal insulation in the final product when developing InSphere® formulae.

InSphere® raw materials are characterised by good processability; their finished thermal insulation products are distinguished by **high quality, durability, and mechanical strength**, as well as **excellent thermal insulation parameters**.

The InSphere® product family offers choices in flame retardancy and pentane content, allowing them to be used in a wide variety of applications in many regions. Furthermore, they can be processed in the full range of densities for each type of moulding, block moulding, and end-use products.



APPLICATIONS

Typical applications include the thermal insulation of:

- external and internal walls,
- flat and gable roofs,
- floors and foundations.

ADVANTAGES

Thermal insulation materials based on InSphere® are very popular and have gained the trust of end users. InSphere® is a special material for thermal insulation applications. Finished InSphere® based thermal insulation panels with a high degree of efficiency provide comfortable thermal conditions for homes - against both high and low temperatures. InSphere® takes care of our comfort, saves money, and, by reducing energy consumption, protects the environment.

TYPE	PARTICLE SIZE RANGE (mm)	TYPICAL BULK DENSITY (kg/m ³)	MATERIAL CHARACTERISTICS
PRODUCTS WITH POLYMERIC FLAME RETARDANT (F) AND WITH STANDARD CONTENT OF PENTANE			
InSphere 300 F/PL	0,4 - 0,7	17 - 40	white EPS for thermal insulation, with flame retardant, increased mechanical parameters, standard pentane content
InSphere 500 F/PL	0,7 - 1,0	13 - 40	
InSphere 800 F/PL	1,0 - 1,8	10 - 30	
InSphere 1600 F/PL	1,8 - 2,4	10 - 30	
InSphere 500 F/CZ	0,5 - 0,9	13 - 40	white EPS for thermal insulation, with flame retardant, reduced λ value, standard pentane content
InSphere 800 F/CZ	0,9 - 1,3	10 - 30	
InSphere 1000 F/CZ	1,3 - 1,8	10 - 30	
InSphere 1600 F/CZ	1,8 - 2,3	10 - 30	
InSphere 2000 F/CZ	2,3 - 3,1	10 - 30	
InSphere 300 F/NL	0,4 - 0,7	17 - 40	white EPS for thermal insulation, with flame retardant, standard pentane content
InSphere 400 F/NL	0,5 - 1,0	17 - 40	
InSphere 500 F/NL	0,6 - 1,0	13 - 40	
InSphere 800 F/NL	1,0 - 1,6	10 - 30	
InSphere 1600 F/NL	1,6 - 2,5	10 - 30	
InSphere 300 FC/NL	0,4 - 0,7	20 - 40	white EPS for thermal insulation, with flame retardant, reduced λ value, standard pentane content
InSphere 500 FC/NL	0,7 - 1,0	13 - 40	
InSphere 800 FC/NL	1,0 - 1,6	10 - 30	
InSphere 1600 FC/NL	1,6 - 2,5	10 - 30	
InSphere 300 FC/F2	0,4 - 0,7	20 - 40	white EPS for thermal insulation, with flame retardant, reduced λ value, standard pentane content
InSphere 500 FC/F2	0,7 - 1,0	13 - 40	
InSphere 800 FC/F2	1,0 - 1,6	10 - 30	
InSphere 1600 FC/F2	1,6 - 2,5	10 - 30	

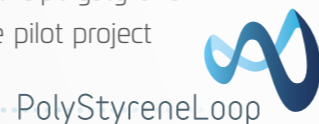
TYPE	PARTICLE SIZE RANGE (mm)	TYPICAL BULK DENSITY (kg/m ³)	MATERIAL CHARACTERISTICS
PRODUCTS WITH POLYMERIC FLAME RETARDANT (F) AND WITH REDUCED CONTENT OF PENTANE (R)			
InSphere 500 FR/CZ	0,5 - 0,9	17 - 50	white EPS for thermal insulation, with flame retardant, reduced λ value, reduced pentane content (short moulding cycles)
InSphere 900 FR/CZ	0,9 - 1,8	15 - 40	
InSphere 1600 FR/CZ	1,8 - 2,2	15 - 40	
InSphere 2000 FR/CZ	2,2 - 3,1	15 - 40	
PRODUCTS WITHOUT POLYMERIC FLAME RETARDANT (S,B) AND WITH STANDARD CONTENT OF PENTANE			
InSphere 300 S/F2	0,4 - 0,7	18 - 40	white EPS for thermal insulation, with flame retardant, reduced pentane content (short moulding cycles), reduced water absorption (perimeter)
InSphere 500 S/F2	0,7 - 1,0	15 - 40	
InSphere 800 S/F2	1,0 - 1,6	15 - 40	
InSphere 1600 S/F2	1,6 - 2,2	15 - 40	
InSphere 300 FR/F1	0,4 - 0,7	17 - 50	white EPS for thermal insulation, with flame retardant, reduced pentane content (short moulding cycles)
InSphere 500 FR/F1	0,7 - 1,0	15 - 40	
InSphere 800 FR/F1	1,0 - 1,6	15 - 40	
InSphere 300 S/F2	0,4 - 0,7	18 - 40	white EPS for cellular bricks production, without flame retardant, standard pentane content
InSphere 500 S/F2	0,7 - 1,0	15 - 35	
InSphere 800 S/F2	1,0 - 1,6	11 - 30	
InSphere 1600 S/F2	1,6 - 2,2	10 - 20	
InSphere 100 B/NL	0,2 - 0,4	NA	white EPS for thermal insulation, without flame retardant, reduced λ value, standard pentane content
InSphere 300 B/NL	0,3 - 0,8	NA	

HEALTH AND THE ENVIRONMENT

InSphere®-based finished products are safe for human and animal health as well as for the environment, both during and after use. An important aspect is also the fact that, thanks to the possibility of expanded polystyrene being processed into primary raw materials, it is the only thermal insulation product on the market which allows the possibility of full recycling.

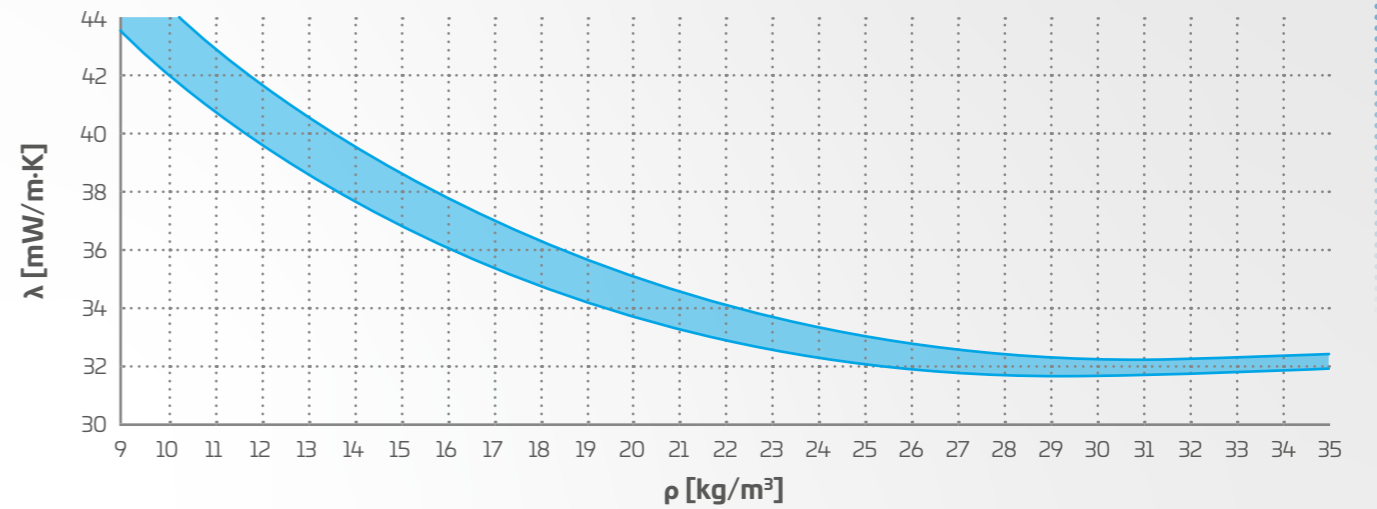
Synthos and other players in the entire supply chain for the construction market are taking actions to develop recycling technology for polystyrene foams. The techniques developed, consisting of mechanical and chemical recycling together with polymer dissolution processes, are aimed at implementing the assumptions of the Circular Economy concept (CE).

PolyStyreneLoop is the flagship recycling project in the field of construction EPS. Soon, thanks to this innovative dissolution technique, we will be able to obtain high-quality polystyrene recyclates from the polystyrene foams used in the construction industry. The whole process, which is currently in the pilot project phase, is fully effective and can be carried out without harming the environment.

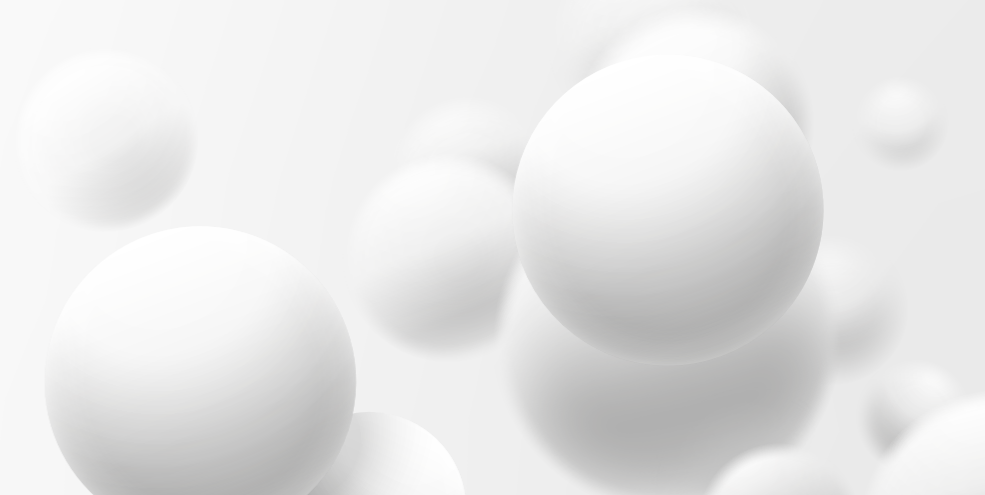
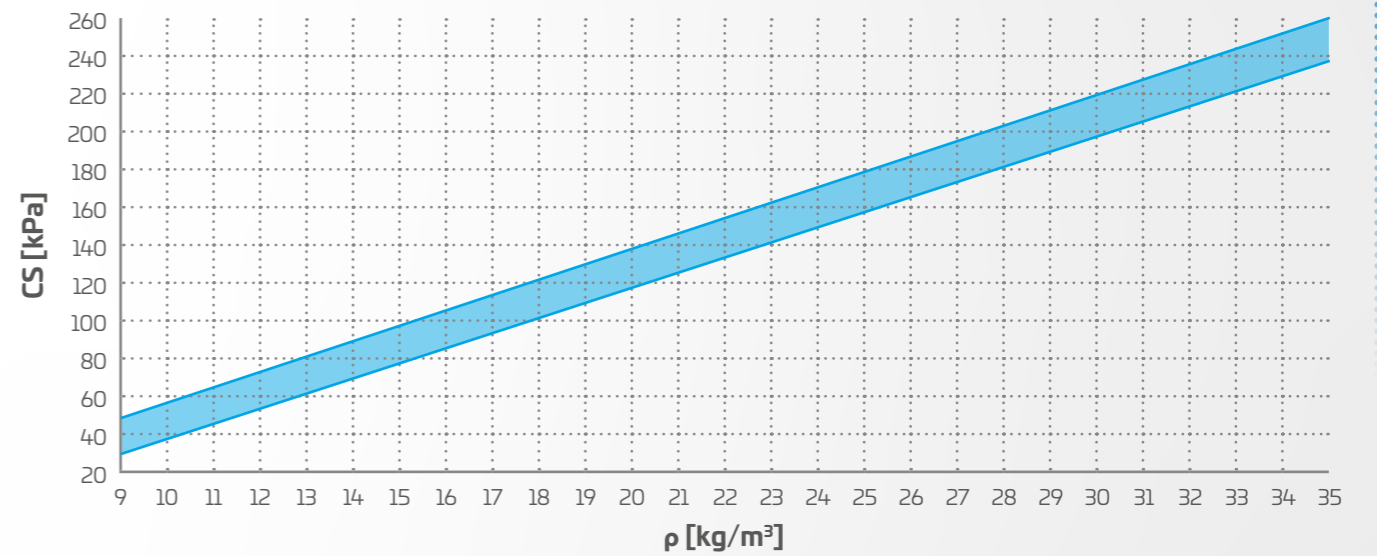


InSphere® products provide both perfect thermal insulation and mechanical parameters in a full range of densities. The rich product portfolio of InSphere® allows their use in many applications with diverse requirements for end products.

Dependence of thermal conductivity (λ) on density



Dependence of compressive strength at 10% strain (CS) on density



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