

Technical Data

Recommended Applications

Assistance Data for Dimensioning





Recommended Applications STYRODUR®

1. Recommended Applications Styrodur®

Styrodur®	2500 C	2800 C	3035 CS	3035 CNE	4000 CS	5000 CS
Perimeter ¹⁾ floor slabs	■		■		■	■
Perimeter ¹⁾ basement walls	■		■		■	■
Perimeter ¹⁾ load-bearing floor slabs	■		■		■	■
Perimeter ¹⁾ / subsoil water areas	■		■		■	■
Domestic floor	■	■	■		■	
Industrial and refrigerated warehouse floors	■	■	■		■	■
Cavity walls	■		■	■	■	
Internal walls	■	■	■		■	
Lost formwork	■	■	■		■	
Cold bridges	■	■	■		■	
Exterior basement wall insulation	■	■	■		■	
Plaster base	■	■	■		■	
Inverted flat roofs	■		■		■	■
Duo roofs / Plus roofs	■		■		■	■
Promenade roofs	■		■		■	■
Roof gardens	■		■		■	■
Parking decks	■		■		■ ²⁾	■
Conventional flat roofs ³⁾	■		■		■	■
Parapet walls	■	■	■		■	
Basement ceiling / Underground garage ceiling	■	■	■		■	
Attic ceiling	■		■		■	
Pitched roofs	■	■	■	■	■	
Drywall composite board	■	■	■		■	
Sandwich panels	■	■	■		■	
Warehouses	■		■	■	■	■
Ice rinks	■		■		■	■
Road transport infrastructure / Rail construction	■		■		■	■







Styrodur®: Product approval: DIBt Z-23.15-1481,
extruded polystyrene foam in accordance with EN 13164;

- 1) Insulation in direct contact with the ground
- 2) Not for installation under concrete paving stones
- 3) With protective layer over the sealing



Technical Data STYRODUR®

2. Technical Data Styrodur®

Property	Unit	Code according to EN 13164	2500 C	2800 C	3035 CS	3035 CNE	4000 CS	5000 CS	Standard
Edge profile									
Surface			skin	embossed	skin	skin	skin	skin	
Length x width	mm		1250 x 600	1250 x 600	1265 x 615	2515 x 615 ¹⁾	1265 x 615	1265 x 615	
Compressive stress or compressive strength at 10% deformation ²⁾	kPa	CS(10Y)	200	200 (20-60 mm) 300 (80-200 mm)	300	250	500	700	EN 826
Compressive creep over 50 years at < 2% deformation ²⁾	kPa	CC(2/1,5/50)	–	–	130	–	180	250	EN 1606
Rated value of the compressive stress under foundation slabs ²⁾	kPa		–	–	185	–	255	355	DIBT Z-23.34-1325
Adhesive strength on concrete	kPa	TR 200	–	200	–	–	–	–	EN 1607
Compressive modulus of elasticity	Short-term E	CM	10,000	15,000	20,000	15,000	30,000	40,000	EN 826
	Long-term E50		–	–	6,500	–	10,000	14,000	
Dimensional stability: 70 °C; 90% r.H.	%	DS(70,90)	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	EN 1604
Deformation behavior: load 40 kPa; 70 °C	%	DLT(2)5	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	EN 1605
Linear coefficient of thermal expansion									
Longitudinal	mm/(m·K)	–	0.08	0.08	0.08	0.08	0.08	0.08	DIN 53752
Transverse		–	0.06	0.06	0.06	0.06	0.06	0.06	
Reaction to fire	Euroclass	–	E	E	E	E	E	E	EN 13501-1
Long-term water absorption by immersion	% v/v	WL(T)	–	–	0.7	0.7	0.7	0.7	EN 12087
Long-term water absorption by diffusion	% v/v	WD(V)	–	–	3	3	3	3	EN 12088
Water-vapor transmission (thickness-dependent)	μ	MU	200 – 100	200 – 80	150 – 50	150 – 100	150 – 80	150 – 100	EN 12086
Freeze-thaw resistance	% v/v	FTCD	–	–	1	1	1	1	EN 12091
Maximum service temperature	°C	–	75	75	75	75	75	75	EN 14706

1) Thickness 30 and 40 mm: 2510 x 610 mm 2) 100 kPa = 10 N/cm² = 100 kN/m² = 10 to/m²



Thermal Conductivities STYRODUR®

3. Thermal Conductivities Styrodur®

3.1 Declared Thermal Conductivities

Thermal conductivity W/(m·K) and Thermal resistance (m²·K)/W Styrodur®

March 2014

Property	Unit	2500 C		2800 C		3035 CS		3035 CNE		4000 CS		5000 CS	
Thermal conductivity		λ_D		λ_D		λ_D		λ_D		λ_D		λ_D	
Thermal resistance		R_D		R_D		R_D		R_D		R_D		R_D	
Thickness	20 mm	0.032	0.60	0.032	0.60	–	–	–	–	–	–	–	–
	30 mm	0.032	0.90	0.032	0.90	0.032	0.90	0.032	0.90	0.032	0.90	–	–
	40 mm	0.032	1.25	0.032	1.25	0.032	1.25	0.032	1.25	0.032	1.25	0.032	1.25
	50 mm	0.034	1.45	0.034	1.45	0.034	1.45	0.034	1.45	0.034	1.45	0.034	1.45
	60 mm	0.034	1.75	0.034	1.75	0.034	1.75	0.034	1.75	0.034	1.75	0.034	1.75
	80 mm	–	–	0.035	2.30	0.035	2.30	0.035	2.30	0.035	2.30	0.035	2.30
	100 mm	–	–	0.035	2.85	0.035	2.85	–	–	0.035	2.85	0.035	2.85
	120 mm	–	–	0.036	3.30	0.036	3.30	–	–	0.036	3.30	0.036	3.30
	140 mm	–	–	0.038	3.70	0.038	3.70	–	–	0.038	3.70	–	–
	160 mm	–	–	0.038	4.20	0.038	4.20	–	–	–	–	–	–
	180 mm	–	–	0.038	4.70	0.038	4.70	–	–	–	–	–	–
	200 mm	–	–	0.038	5.25	0.038	5.25	–	–	–	–	–	–

3.2 Approved Applications

Design values of thermal conductivity in W/(m·K) as per DIBt approval (German Institute for Building Technology) March 2014

Approved Styrodur® types: 3035 CS, 4000 CS, and 5000 CS

Board thickness in mm	Thermal insulation under foundation slab load-bearing DIBt Z-23.34-1325		Perimeter insulation of walls with ground contact and basement floors (non-load-bearing building elements) DIBt Z-23.5-223				Inverted roof constructions DIBt Z-23.4-222			
	Ground moisture	Pressing water	Wall area	under basement floors	Installation in pressing water and accumulating seepage water		Green roof	Fre-quented	With gravel layer and water-draining separation layer	
					Multi-layer ¹⁾	Single-layer ²⁾			Multi-layer ²⁾	Single-layer
≤ 60	0.035	0.037	0.040	0.035	0.037	0.040	0.037	0.037	0.035	–
≤ 80	0.037	0.039	0.042	0.037	0.039	0.042	0.039	0.039	0.037	–
≤ 120	0.039	0.041	0.044	0.039	0.041	0.044	0.040	0.040	0.039	0.042
≤ 160	0.039	0.041	0.044	0.039	0.041	0.044	0.040	0.040	0.039	0.042
≤ 200	0.041	0.043	0.046	0.041	0.043	0.046	0.042	0.042	0.041	0.044

¹⁾ Application for ground moisture and nonaccumulating seepage water in accordance DIBt Z-23.5-223 Table 5 and Section 4.1 and 4.2

²⁾ Application in accordance with DIBt Z-23.5-223 Table 5 and Section 4.1 and 4.3

λ_D = Declared thermal conductivity to EN 13164

R_D = Declared thermal resistance to EN 13164



Thermal Conductivities STYRODUR®

3.3 Temperature Dependence

Thermal conductivity of Styrodur® (reference values)

Example: Styrodur® 3035 CS, thickness 60 mm

Temperature [°C]	Thermal conductivity in W/(m·K) Styrodur®
-80	0.026
-60	0.029
-40	0.030
-20	0.032
0	0.034
10	0.035
20	0.036
30	0.037
40	0.038
50	0.039

3.4. Moisture Dependence

Thermal conductivity of Styrodur® C (reference values)

Between 0–12% by volume of moisture content, thermal conductivity increases 2.3% per 1% by volume

Moisture content [Vol.-%]	Thermal conductivity in W/(m·K) Styrodur®
0	0.035
1	0.036
2	0.036
3	0.037
4	0.037
5	0.038
6	0.039
8	0.040
10	0.041
12	0.042

4. Mechanical Characteristic Values Styrodur®

4.1 Dynamic Stiffness

Dynamic stiffness of Styrodur® grades 3035 CS, 4000 CS and 5000 CS

Board thickness	mm	30	40	60	80	100	120	140	160	180	200
Styrodur® 3035 CS	MN/m³	500	380	260	190	150	130	100	80	60	50
Styrodur® 4000 CS	MN/m³	550	400	280	210	170	150	120	100	80	70
Styrodur® 5000 CS	MN/m³	600	420	300	230	190	170	140	120	100	90



Assistance Data for Dimensioning STYRODUR®

5. Assistance Data for Dimensioning Styrodur®

5.1 Floor Slabs

Assistance data for dimensioning of Styrodur® applications under floor slabs

Type	Long-term bedding modulus in N/mm ³ for board thicknesses in mm														
	40	50	60	80	100	120	140	160	180	200	220	240	260	280	300
3035 CS	0.163	0.130	0.108	0.081	0.065	0.054	0.046	0.041	0.036	0.033	0.030	0.027	0.025	0.023	0.022
4000 CS	0.250	0.200	0.167	0.125	0.100	0.083	0.071	0.063	0.056	0.050	0.045	0.042	0.038	0.036	0.033
5000 CS	0.350	0.280	0.233	0.175	0.140	0.117	0.100	0.088	0.078	0.070	0.064	0.058	0.054	0.050	0.047

Modules of subgrade reaction = modulus of long-term compressive elasticity / thickness of insulating layer

5.2 Traffic Load

Traffic Load

Vehicle ¹⁾				Compressive stress at traffic load in kPa							
				Nonreinforced layered construction ²⁾ thickness of layer above insulation in mm				Reinforced concrete static height in mm			
Type	Weight	Wheel load	Contact area	180	200	220	240	90	100	110	120
	in metric tons	in kN	in mm x mm								
SLW	30	50	200 x 400	200	180	170	140	230	200	190	180
LKW	16	50	200 x 400	200	180	170	140	230	200	190	180
LKW	12	40	200 x 300	190	170	160	150	220	200	180	170
LKW	9	30	200 x 260	160	140	130	120	180	160	150	140
LKW	6	20	200 x 200	120	110	100	90	140	130	100	100
LKW	3	10	200 x 160	60	50	50	40	70	60	60	50
PKW	< 3	10	200 x 200	60	50	50	40	60	60	60	50
GS	7	32.5	200 x 200	200	170	160	140	220	200	180	170
GS	3.5	15	200 x 200	90	80	70	60	100	90	80	80
GS	2.5	10	200 x 200	60	50	50	40	70	60	60	50

¹⁾ Heavy truck, truck, and car according to DIN 1072; forklift according to DIN 1055.

²⁾ **Important note:** For reasons of long-term positional stability, the deformation under compressive stress caused by traffic loads must not exceed 0.7 mm *); this is why Styrodur® 5000 CS must always be used with concrete paving stones in parking roof structures, even under compressive stress values that would allow the use of Styrodur 3035 CS or Styrodur 4000 CS.

³⁾ According to the information sheet on surface reinforcement with pavement and slabstone paving issued by the German Road and Transportation Research Association, Cologne/Germany, 1994.

Styrodur® grade	Dimensioning of Styrodur® grade		
	3035 CS	4000 CS	5000 CS
Allowable long-term compressive traffic load in kPa	130	230	300



Assistance Data for Dimensioning STYRODUR®

5.3 Allowable Mounting Depth

Assistance data for dimensioning of Styrodur® applications in basements

Allowable mounting depth

Calculations for soil pressure with silt sand

Application	Mounting depth in m for Styrodur® grades		
	3035 CS	4000 CS	5000 CS
Without ground water pressure	12	17	24
With ground water pressure	3.5	3.5	3.5

Note for other materials:

EPS:

- Maximum mounting depth: 3 or 6
- Minimum distance of traffic loads: 3 m
- Not allowable in case of water pressure
- U of 0.05 W/(m²·K) must be added to take into account water absorption

6. Adhesiveness and Bond Strength Styrodur®

6.1 Which Glue Is Suited for Which Surface Material?

	Mineral surface	Mortar	Metal	Wood	Plastics
Gluing mortar	■	■	■		■
Epoxy resin glue			■	■	■
PUR glue			■	■	■

Important note: The dimensioning aids are noncommittal planning aids. They do not replace the technical and structural design of an engineering specialist.

Notes

All technical information can be found online:
www.styrodur.com

Please contact us at styrodur@basf.com in case you have any technical questions concerning our products and applications.



Styrodur® – A Strong Product Line

With the Styrodur product line, BASF offers the ideal insulation solution for almost every application.

Styrodur® 2500 C

- The light thermal insulation board with smooth surface and smooth edges for applications with normal compressive strength requirements.

Styrodur® 2800 C

- The thermal insulation board with embossed honeycomb pattern and smooth edges for application in combination with concrete, plaster, and other covering layers.

Styrodur® 3035 CS

- The all-round thermal insulation board with smooth surface and overlap is suitable for almost all applications in structural and civil engineering.

Styrodur® 3035 CNE

- The long thermal insulation board with smooth surface and groove and tongue for quick, thermal bridge-free installation.

Styrodur® 4000/5000 CS

- The extremely compression-proof thermal insulation board with smooth surface and overlap for applications with highest compressive strength requirement.



Note:

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights, etc. given herein may be changed without prior notice and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.

BASF SE

Performance Materials
67056 Ludwigshafen
Germany

www.styrodur.com
styrodur@basf.com

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