

EPS Lightweight Fill — Engineering Specification & Technical Data Sheet

EPS lightweight fill is engineered expanded polystyrene supplied as large closed-cell blocks ($\approx 1\%$ the weight of soil), used as void formers and lightweight fill and — in geotechnical works — as **geofoam**. It reduces the load imposed on soft subsoils and adjacent structures, controlling settlement and lateral pressure while allowing rapid, plant-free construction. Grades and design values below are to **ASTM D6817 / D7180**.

Product & dimensional data

Product	EPS lightweight fill / void former — engineered EPS block fill (geofoam in geotechnical use)
Form	Moulded closed-cell EPS blocks, field-cut to shape
Common block size	2550 × 1250 × 960 mm — other sizes cut to order
Density range	10–30 kg/m ³ (EPS12–EPS30); ASTM types to EPS46 available
Design load limit	Compressive resistance @ 1% strain (elastic limit)
Water absorption	< 4% (closed-cell, hydrophobic)
Thermal conductivity (λ)	0.030–0.038 W/m-K (incidental insulation)
Interface friction (μ)	≈ 0.5 (moulded / cut faces)
Poisson's ratio	≈ 0.12 (elastic range)
Material standard	ASTM D6817 · design ASTM D7180 · sampling ASTM D7557

ASTM D6817 — physical property requirements

EPS grade (ASTM D6817)	EPS12	EPS15	EPS19	EPS22	EPS29	EPS39	EPS46
Density, min. (kg/m ³)	11.2	14.4	18.4	21.6	28.8	38.4	45.7
Compressive resistance @1% strain (kPa)	15	25	40	50	75	103	128
Compressive resistance @5% strain (kPa)	35	55	90	115	170	241	300
Compressive resistance @10% strain (kPa)	40	70	110	135	200	276	345
Flexural strength, min. (kPa)	69	172	207	240	345	414	517
Oxygen index, min. (vol %)	24	24	24	24	24	24	24

Highlighted row = 1% strain compressive resistance, the design load limit for sustained loads.

Technopol supplied EPS grades (with ASTM mapping)

Technopol grade	EPS12	EPS15	EPS20 (SD)	EPS24 (HD)	EPS30 (EHD)
Nominal density (kg/m ³)	12	15	20	24	30
Thermal conductivity λ (W/m-K)	0.045	0.040	0.035	0.034	0.033
Compressive stress @10% (kPa, min)	60	65	110	160	200
Safe working load @1% strain (kPa)	15	17	45	70	100
Nearest ASTM D6817 type	EPS12	EPS15	EPS22	—	EPS29

Design values, model specification & QA

Design basis

- Design sustained stress \leq **compressive resistance @1% strain** of the chosen grade
- Creep negligible below $\sim 1\%$ strain; do not design to 5%/10% values
- Immediate elastic strain $\sim 0.5\%$; allow for it in tall fills
- Buoyancy: dead load $\geq 1.2 \cdot \gamma_w \cdot h_{\text{submerged}}$
- Sliding: $\mu \approx 0.5$; add barbed connectors on slopes / uplift
- Load-distribution slab spreads concentrated loads onto the blocks

Fire & chemical

- FR grade: **Class B-s1,d0** reaction-to-fire (SANS 53501-1)
- Combustible — keep flame/hot works away; cover in service
- Attacked by petrol, oils, solvents — geomembrane where required

Handling & QA

- Blocks lifted by 1–2 people; no special plant
- Field-cut with hot-wire, hand or chain saw
- Sampling & conformance to **ASTM D7557**
- Verify delivered density / grade against specification
- Stagger joints $\geq \frac{1}{2}$ block; rotate alternate layers 90°

Standards

- ASTM D6817 · D7180 · D7557 · C578
- SANS 53501-1 (reaction-to-fire, FR grade)

Model specification clause (edit to project)

"The lightweight structural fill shall be expanded-polystyrene (EPS) geofoam manufactured to **ASTM D6817**, Type **EPS**___, with a minimum compressive resistance at 1% strain of ___ **kPa** and minimum density of ___ **kg/m³**. Blocks shall be placed on a prepared levelling course with tight, staggered joints, successive layers laid perpendicular, and connected with barbed plates on slopes and uplift zones. A reinforced-concrete load-distribution slab shall be provided over the geofoam. The design, buoyancy check and installation shall comply with **ASTM D7180**; sampling and conformance with **ASTM D7557**. Geofoam shall be protected from open flame, hydrocarbons and prolonged UV, and shall be covered by slab, pavement or soil in the permanent works."

Not an Agrément-certified line. Technopol EPS lightweight fill (geofoam) is specified to the ASTM standards above; the company's Agrément certificate (2020/609) applies to a different product (LiteCore) and is not claimed here.

Grade selection & block schedules on request — info@technopol.co.za · +27 11 363 2780 · technopol.co.za