INSULATION · TECHNICAL DESIGN GUIDE

Polykey Cavity Insulation

Interlocking fire-retarded EPS cavity element that keys into the brick courses, ties the two leaves and blocks cold bridges.

Overview

PolyKey is Technopol SA's expanded-polystyrene (EPS) cavity-wall insulation system for double-leaf (double-skin) brick and blockwork walls. It is built into the cavity as the outer face-brick leaf is raised, adding thermal resistance to the external wall and helping the building meet the SANS 10400-XA energy requirements. In service it is a non-structural infill fully encapsulated within the masonry cavity between the two leaves.

The family has two variants moulded from Technopol's fire-retarded FRCel EPS at a nominal 20 kg/m3 density (the grade the datasheet designates HD / 20DV): a precision-cut Cavity Wall board that fills the cavity, and the heavier-duty PolyKey element, a moulding with tongue-and-groove profiling on all edges and mortar-key grooves. The T&G interlock leaves no shrinkage gaps between panels, the profile stops mortar droppings bridging the cavity, and the grooves key the element into the horizontal brick courses so it also helps tie the two leaves.

Because EPS is a closed-cell material, the brochures present it as resisting wicking of penetrating water through to the inner leaf, as a defence against wet spots and cold-bridge condensation. Wall ties and brickforce are incorporated as the wall rises, per the engineer's specification; on the PolyKey element the ties are pressed into the upward tongue of the horizontal joint.

Note on data basis: Technopol publishes grade physical-property and R-value data plus reaction-to-fire and small-scale fire-propagation results for the FRCel EPS material, but does NOT publish a U-value table, a fire-resistance (REI) rating, dimensional tolerances or structural span/load tables for this product. The published R-values also differ between brochure generations, and there is no Agrement South Africa certificate for PolyKey/Cavity.

Key specifications

Property	Value	Standard
Thermal conductivity (λ, k-value @10°C)	≤ 0.035 W/m·K	—
Thermal resistance R (60/40 mm element, guarded hotbox with wall ties)	2.0 m^2K/W	—
Nominal density / grade	20 (HD / 20DV grade) kg/m^3 (20 g/l)	—
Compressive stress at 10% deformation	≥ 110 kPa	—
Reaction-to-fire classification	Class B (B-s1,d0)	SANS 53501-1
Element / panel size (H × L × thickness, T&G profile)	340 × 1200 × 60/40 mm	—
Applicable fire-test standards	SANS 53501-1 (reaction to fire); SANS 10177-9 (small-scale fire propagation)	SANS 53501-1 / SANS 10177-9

Materials & build-up

The core is fire-retarded FRCel EPS (expanded polystyrene), moulded at a nominal density of 20 kg/m3 (20 g/l), the grade Technopol's datasheet designates HD / 20DV. It is a closed-cell material.

The wall is a double-leaf masonry build-up: an inner (stock-brick) leaf, the PolyKey/Cavity insulation, and an outer (face-brick) leaf. Wall ties span the two leaves and, on PolyKey, are pressed into the upward tongue of the horizontal joint. Brickforce is laid per the engineer's specification, a DPC is draped from inside down to the outside near slab level, and weep holes are left in the outer leaf. The system is built in as the outer leaf goes up, so there is no loose fill, no separate batts and no settling.

- Cavity Wall Insulation board: a precision-cut board built into the cavity with a nominal 25 mm air gap retained (per the 2025 installation drawing).
- PolyKey element: the heavier-duty variant with tongue-and-groove on all edges and mortar-key grooves, built mortar-filled with drain channels; the T&G interlock leaves no shrinkage gaps and the grooves key it into the brick courses.
- The mortar-key profile prevents mortar droppings from filling and short-circuiting the cavity.

Applications

PolyKey/Cavity is aimed at double-skin masonry construction where cavity insulation is required, and is positioned by Technopol as an aid to SANS 10400-XA compliance.

- Double-skin (double-leaf) brick walls and cavity blockwork construction
- Energy-efficient new homes and commercial buildings targeting SANS 10400-XA
- Green-building upgrades and cavity insulation
- Coastal and exposed sites where moisture resistance matters (closed-cell EPS)
- Heavy-duty commercial and industrial cavity walls (the PolyKey interlocking system)
- Perimeter / foundation-wall insulation, including a 50 mm HD EPS sheet under the slab and a 30 mm board around the perimeter
- Face-brick residential and estate construction

Installation & handling

The 2025/2020 recommended sequence builds the insulation in with the outer leaf. Use PolyKey as perimeter insulation for the foundation wall; build the inner stock-brick leaf up to slab height; then install PolyKey elements as the outer face-brick leaf is built up. Stop the outer leaf one course down to install the DPC, cut PolyKey level with the top of the outer-leaf brick, install the DPC draping from inside to outside, then build the outer leaf leaving weep holes at 600 mm centres. Include brickforce per the engineer's specification.

The current (2025) detail fits wall ties at 600 mm horizontal x 340 mm vertical centres (every 4th course) = 5 ties/m2, pressed into the upward tongue of the horizontal joint. The earlier 2017 brochure specified ties at 1.1 m centres every 4th course = 2.5 ties/m2 to meet the then-SABS requirement, so confirm the current tie schedule against the engineer's specification.

Openings can have frames built in as work progresses or fitted into a preformed opening afterwards. Elements are cut with a wood saw to fit around frames. At jambs and sills the cavity is closed with a suitable frame or by returning the inner leaf; where the inner leaf abuts the outer leaf a vertical DPM/DPC must be inserted to stop moisture passing through and should extend into the cavity to avoid mortar bridging (with 100 mm blocks the DPM must be 150 mm). Sills must shed rainwater away from the wall.

- Fit wall ties at 5 ties/m2 (600 x 340 mm) per the 2025 detail; follow the engineer's specification.
- Leave weep holes in the outer leaf at 600 mm centres and drape the DPC from inside to outside.
- Cut elements with a wood saw; light, rigid boards with no loose fill or batts to settle.
- Continuous, gap-free installation and correct DPC/weep-hole detailing are essential to avoid surface condensation on un-insulated cold areas.

Dimensions & availability

The standard PolyKey element is nominally 340 mm H x 1200 mm L x 60/40 mm (tongue-and-groove thickness profile), the panel size on the current price sheet. The Cavity Wall board is quoted in the brochures at 50 / 100 / 150 mm thicknesses (the R-value tables are published for these thicknesses). Dimensional tolerances on the 340 x 1200 x 60/40 panel are not published.

Current price (Technopol price list, 1 May 2026) is R 48.34 per panel excluding VAT, up from R 45.39 on the 1 March 2025 Technoblocks list and R 36.20 in September 2021. Confirm current pricing with Technopol.

- Standard PolyKey element: 340 (H) x 1200 (L) x 60/40 mm T&G thickness profile.
- Cavity Wall board thickness range quoted in brochures: 50 / 100 / 150 mm.
- The 50/100/150 mm range describes the board variant, not the 60/40 mm PolyKey element.

Thermal performance

Published R-values differ between brochure generations and test bases; Technopol has never published a single authoritative R-table. When specifying, use the current (2025) figure and state its basis.

Note also that thermal conductivity (lambda) and compressive strength are grade-dependent values read from Technopol's HD/20DV EPS-grade datasheet, not a PolyKey-specific test. No U-value is published in any Technopol document.

- 2025 (current): PolyKey 60/40 mm element = R 2.0 m2K/W (guarded hotbox, tested with wall ties). Cavity system = 1.5 (30 mm) / 2.0 (50 mm) m2K/W (bridged R-value).
- 2023: PolyKey Wall = 1.60 / 3.20 / 4.84 at 50 / 100 / 150 mm; Cavity Wall = 1.43 / 2.85 / 4.29 at 50 / 100 / 150 mm.
- 2014/2017: PolyKey 'added R-value' = 1.5 m2K/W at 60 mm.
- lambda <= 0.035 W/m.K is the grade-sheet figure for HD/20DV; the site flat brochure's 0.038 W/m.K is not corroborated by a primary grade sheet.

Design considerations & limitations

- Non-structural infill: PolyKey/Cavity is a cavity insulation element, not a structural component. Wall ties and brickforce are specified 'per engineer'; no span or load-capacity tables exist for this product.
- Combustible core: the EPS core is combustible. The B-s1,d0 class is a reaction-to-fire classification, NOT a fire-resistance (REI) rating, and the element relies on full encapsulation within the masonry cavity in service.
- R-value basis matters: figures differ between the 2014/2017, 2023 and 2025 brochures and between guarded-hotbox-with-ties, bridged and 'added' bases. Use the current 2025 figure (R 2.0 m2K/W for the 60/40 mm element in a guarded hotbox with ties) and state the basis. No U-value is published.
- Grade-vs-product data: lambda (<= 0.035 W/m.K) and compressive strength (>= 110 kPa) come from the HD/20DV EPS grade datasheet, not a PolyKey-specific test; they describe the material grade.
- Fire sample scope: the SANS 53501-1 B-s1,d0 result was obtained at 18.37 kg/m3 on a 60 mm sheet, slightly below the 20 kg/m3 PolyKey grade; the report is scoped to the sample as tested and whether it formally covers the 20 kg/m3 grade is not stated.
- No Agrement certificate exists for PolyKey/Cavity. Agrement SA 2020/609 in the corpus covers the LiteCore Building System ONLY and must not be presented as covering this product.
- Detailing to avoid condensation: gaps in cavity insulation cause surface condensation on un-insulated cold areas; continuous, gap-free installation and correct DPC/weep-hole detailing are essential.
- Dimensional tolerances on the 340 x 1200 x 60/40 panel are not published; the overall wall's compliance with SANS 10400-XA remains the designer's responsibility.