

FABRICATION · ENGINEERING SPECIFICATION

3D Milling

This specification covers Technopol's 3D Milling service, in which a FROGMill 4th-axis CNC router carves full three-dimensional forms from expanded-polystyrene (EPS) blocks to a customer-supplied CAD file, for decorative, artistic and non-structural use.

Verified technical data

Property	Value	Standard
Process / machine	FROGMill CNC heavy-duty 4th-axis milling router; carves full 3D EPS forms to customer CAD, worked flatbed (XY) or on a rotary lathe	—
Base material	Expanded polystyrene (EPS); carving grade customer/detail-dependent	—
Thermal conductivity (λ , k-value @10°C, max)	0.033–0.045 W/m·K	—
Nominal density (grade range 30DV–12SD)	12–30 kg/m ³	—
Compressive stress @10% compression (min)	60–200 kPa	—
Maximum part size	Flatbed 2650 × 1250 × 254; lathe/rotary 1800 long × Ø488 mm	—
Oversized parts	Built from multiple segments joined with interlocking puzzle joints	—
Protective coating	Polyurethane — supplied by Technopol, applied by client; waterproof, abrasion/impact/corrosion resistant, durable up to ~10 years	—
Accepted CAD file formats	3D: IGS/IGES, STP/STEP, STL, OBJ · 2D: DWG, DXF	—
Company certifications	ISO 9001:2015 (ISO 14001 & 45001 lapsed Mar 2026, recertification in progress); Agrément SA 2020/609 (covers the LiteCore Building System only)	—

Scope

- 1.0** This specification covers the made-to-order CNC 3D milling of EPS forms on the FROGMill 4th-axis router, worked flatbed (XY) or on a rotary lathe, including oversized segmented assemblies joined with interlocking puzzle joints.
- 2.0** It covers an optional polyurethane protective coating supplied by Technopol for client application.
- 3.0** It excludes any structural, load-bearing or dimensional-tolerance performance, none of which is published for the milled carving.
- 4.0** It excludes coating application (carried out by the client/contractor) and coating technical performance, for which no datasheet was located.
- 5.0** Pricing, lead time and minimum order are excluded; cost is stated by the brochure to depend on complexity, size and volume, with no figures published.

Materials

- 6.0** The base material shall be expanded polystyrene (EPS).
- 7.0** No carving grade or density is specified by Technopol; the grade is customer- and detail-dependent and shall be confirmed at order, and any grade in Technopol's 12SD to 30DV EPS range can be milled.
- 8.0** Oversized forms shall be built from multiple milled segments joined with interlocking puzzle joints, which may be pre-cut for customer assembly.
- 9.0** An optional polyurethane protective coating is supplied by Technopol only, applied by the client/contractor; per the 2023 brochure it provides a rigid, waterproof lining resisting abrasion, impact and corrosion, durable up to approximately ten years.
- 10.0** No integral facing is applied to the carving; the PU coating is the only finish supplied.

Performance

- 11.0** Maximum flatbed (XY) part size shall be 2650 x 1250 x 254 mm (L x W x thickness).
- 12.0** Maximum lathe/rotary (4th axis) part size shall be 1800 mm long x 488 mm diameter.
- 13.0** Forms exceeding the machine envelope shall be produced as puzzle-jointed segments, with no fixed overall size limit stated.
- 14.0** Accepted CAD formats shall be 3D - IGS/IGES, STP/STEP, STL, OBJ; 2D - DWG, DXF.
- 15.0** Thermal conductivity (λ , @10 C, max) for the finished carving is NOT established as a per-carving guarantee; it follows the chosen grade and the general EPS datasheet spans 0.033-0.045 W/m.K.
- 16.0** Nominal density is NOT established for the carving; it follows the chosen grade across the general datasheet range 12-30 kg/m³.
- 17.0** Compressive stress @10% compression (min) is NOT established as a carving guarantee; the general datasheet range is 60-200 kPa and applies to the chosen grade.
- 18.0** No load-bearing capacity, dimensional tolerance/accuracy/repeatability, or finished-carving weight is established for the milled product; it is a decorative, non-structural item.

Fire

19.0 No reaction-to-fire class and no fire-resistance (REI/minutes) rating is specified for the milled carving; the 3D Carvings brochure makes no mention of fire grades.

20.0 Standard EPS is combustible and shall be kept away from open flame during storage, handling and installation; EPS melts away from flame contact rather than sustaining combustion but remains combustible.

21.0 Technopol's separate flame-retardant EPS, FRCel, is classified B-s1,d0 to SANS 53501-1 (established on an approximately 18.37 kg/m³, 60 mm sheet; Ignis Testing report 17 August 2023) and B1 to SANS 10177-11 (<120 mm); these classifications belong to the FRCel sheet material, not to the milled carving, and shall not be assumed for this service.

22.0 Reaction-to-fire class is not a fire-resistance (REI/minutes) rating; no fire-resistance rating exists for this product.

23.0 The flat one-page brochure's claimed 'oxygen index of at least 24%' is not supported by any Technopol test report and shall not be stated as fact.

Execution / installation

24.0 The milled carving is a fabrication deliverable; no structural fixing, mounting, bonding or anchoring specification is provided by Technopol.

25.0 Oversized multi-segment pieces shall be assembled at the engineered interlocking puzzle joints, which may be pre-cut so the customer assembles the final form.

26.0 Where specified, the polyurethane coating shall be applied by the client/contractor in accordance with their own procedures, as no Technopol coating application datasheet (coverage, DFT, primer, UV rating, adhesion, recoat/cure times) was located.

27.0 EPS carvings shall be protected from open flame throughout storage, handling and installation.

Standards & compliance

28.0 ISO 9001:2015 (quality management system) is current for the manufacturer.

29.0 ISO 14001 and ISO 45001 lapsed in March 2026 (recertification understood to be in progress) and shall not be presented as current.

30.0 Agreement SA 2020/609 covers the LiteCore Building System only; it does not cover 3D milling, EPS carvings or the company generally, and shall never be cited for this product.

31.0 No product-specific approval, CE marking or Agreement exists for milled EPS carvings.

32.0 The fire-test standards SANS 53501-1, SANS 10177-11 and SANS 10177-9 are referenced only for the separate FRCel material, not for the carving service.

Specifier's notes — not established in Technopol sources.

- The EPS grade actually used for a carving is not established in any Technopol 3D-milling source; the flat brochure's '30DV/EPS30' grade is an unverified assumption and grade shall be confirmed with Technopol at order.

- Thermal and strength values for a finished carving are not established; the grade table is a general EPS datasheet, not tied to milled carvings, and values follow the chosen grade - obtain the confirmed grade's data before relying on any figure.
- No oxygen index is established; the flat brochure's 'at least 24%' is not a Technopol test result (SANS 10177-9 is a flame-propagation test, not an LOI test) - obtain externally if required.
- No fire-resistance (REI/minutes) rating exists for the product; only reaction-to-fire classification (for the separate FRCel material) is documented.
- Whether flame-retardant FRCel grade is offered for 3D-milled carvings is undocumented in any 3D-milling source and shall not be assumed; confirm with Technopol.
- Dimensional tolerance, accuracy and repeatability of the FROGMill are not stated; obtain externally/confirm if critical.
- Polyurethane coating technical data (coverage, thickness/DFT, UV rating, adhesion, cure/recoat times and coating fire behaviour) is not established; no coating datasheet or MSDS was located.
- Density tolerance/minimum for the specific grade cut, as it relates to carvings, is not established.
- Finished-carving weight/mass and any load-bearing capacity are not established and are treated as not applicable (non-structural artwork/props).
- Price, lead time and minimum order are not established; the brochure states cost depends on complexity, size and volume, and no 3D-milling line was found in the Technopol price lists.
- The strength/integrity of interlocking puzzle joints in oversized assemblies is not quantified in the sources; the specifier shall verify joint adequacy independently.
- Mounting, bonding and anchoring details for installed carvings are not specified by Technopol and shall be determined externally.
- Contradiction to resolve: the flat one-page brochure implies fire compliance for the carving service via FRCel, whereas the 3D Carvings brochure makes no mention of fire grades; FRCel's B-s1,d0 (verified only on a 60 mm sheet) is scoped as a separate material and is not attributed to the carving service.