

FABRICATION · TECHNICAL DESIGN GUIDE

3D Milling

A made-to-order CNC service that carves full three-dimensional forms from expanded-polystyrene blocks on Technopol's FROGMill 4th-axis router.

Overview

3D Milling is a service, not a stock product. Technopol's FROGMill is a heavy-duty 4th-axis CNC milling router that carves full three-dimensional forms out of expanded-polystyrene (EPS) blocks directly from a customer's CAD file. It handles intricate curves, fine corners and organic surfaces as readily as simple geometry.

The router works in two modes. In flatbed (XY) mode it carves parts up to 2650 x 1250 x 254 mm. On the lathe/rotary 4th axis it turns forms up to 1800 mm long by 488 mm diameter. Pieces larger than the machine envelope are milled as several segments and joined with interlocking puzzle joints, which can be designed into the part so the customer can pre-assemble the finished form.

The base material is EPS, but no default grade is specified: the carving grade is customer- and detail-dependent, and any grade in Technopol's EPS range (12SD to 30DV) can be milled. Technopol accepts common 3D and 2D CAD formats, holds an extensive library of ready-to-mill 3D models, and can source or design a model from a brief where the customer has none.

Carvings are decorative, artistic and non-structural forms. An optional polyurethane (PU) protective coating is supplied by Technopol for application by the client or their contractor.

Key specifications

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	—

Materials & build-up

The carving substrate is expanded polystyrene (EPS). The 3D Carvings brochure specifies no density or grade; the grade a carving is cut from follows the customer and the detail required, and any grade across Technopol's 12SD to 30DV range can be milled. Higher-density grades hold finer detail.

- Base material: EPS, grade customer/detail-dependent (no default grade published).
- Process: FROGMill heavy-duty 4th-axis CNC router carves the block to the supplied CAD geometry, flatbed (XY) or on a rotary lathe (4th axis).
- Oversized parts: built from multiple milled segments joined with interlocking puzzle joints, which can be pre-cut so the customer assembles the final form.
- Optional PU coating: a polyurethane protective coating is supplied by Technopol only; application is by the client or contractor. Per the 2023 brochure it gives a rigid, waterproof lining resisting abrasion, impact and corrosion, durable up to roughly ten years.
- Model service: an extensive ready-to-mill 3D model library is held, and a model can be sourced or designed from a brief.

Applications

Documented uses from the 3D Carvings Brochure-2026 span one-off artistic pieces through to higher-volume production runs.

- 3D relief carvings and architectural foam
- Set design and scenic design; special events
- Characters, busts and sculptures
- Foam packaging
- Moulds for casting
- 3D signs, billboards and props

Dimensions & availability

Single pieces are bounded by the machine envelopes; larger forms are produced as jointed segments with no fixed overall size limit stated.

- Flatbed (XY) envelope: up to 2650 x 1250 x 254 mm (L x W x thickness).
- Lathe/rotary (4th axis) envelope: up to 1800 mm long x Diameter 488 mm.
- Beyond the envelope: produced as puzzle-jointed segments.
- Accepted CAD formats: 3D - IGS/IGES, STP/STEP, STL, OBJ; 2D - DWG, DXF.
- Ordering: made to order from a customer CAD file, from the ready-to-mill model library, or from a design-from-brief.
- Pricing/lead time: the brochure states cost depends on complexity, size and volume; no figures are published and no 3D-milling line appears in the reviewed Technopol price lists.

Installation & handling

This is a fabrication service producing decorative and non-structural forms, so no structural fixing specification exists in the sources. Mounting, bonding, anchoring and load/impact handling details are not specified by Technopol.

- Oversized assembly: multi-segment pieces join at engineered interlocking puzzle joints, which can be pre-cut for customer assembly.
- Coating: the PU coating is supplied only; application is the client's/contractor's responsibility, and no coating datasheet (coverage, DFT, primer, UV rating, adhesion, recoat/cure times) was located.
- Fire caution: EPS is combustible; keep carvings away from open flame during storage, handling and installation.

Design considerations & limitations

- Grade is a design decision: no default carving grade is specified by Technopol. Thermal and strength properties follow the chosen grade (general EPS datasheet spans λ 0.033-0.045 W/m.K, compressive 60-200 kPa @10%); confirm the grade at order.
- Non-structural: carvings are decorative/artistic. No load-bearing capacity, dimensional tolerance/repeatability or finished-weight data is published.
- Fire: no reaction-to-fire class and no fire-resistance (REI/minutes) rating applies to the milled carving as supplied, and standard EPS is combustible. Do not assume FRCel or any fire class for a carving unless separately specified and confirmed. FRCel's B-s1,d0 classification belongs to a separate sheet material, not to this service.
- Unverified brochure claims: the flat one-page brochure's 'oxygen index of at least 24%' and '30DV/EPS30' carving grade are not supported by any Technopol test report or the 3D Carvings brochure, and are not facts.
- Coating is a client responsibility: PU coating is supplied only, applied by the client, and no coating performance datasheet was located; durability, UV and waterproofing claims rest on brochure statements only.
- Envelope limits: single pieces are capped by the flatbed/lathe envelopes; larger forms rely on segmented, puzzle-jointed assembly whose joint strength is not quantified in the sources.
- Certification scope: Agreement SA 2020/609 covers the LiteCore Building System only and must never be cited for 3D milling; no product-specific approval, CE marking or Agreement exists for milled EPS carvings.

Technopol SA (Pty) Ltd · Johannesburg · info@technopol.co.za · +27 11 363 2780 · technopol.co.za

Figures trace to Technopol technical documentation. Properties listed as "not established" are not covered by Technopol primary sources and must be obtained from a qualified source. Confirm exact figures for your specification with Technopol. Not for construction without project-specific verification.