



PRODUCT BROCHURE

3D Milling (FROGMill CNC Polystyrene Carving)

A made-to-order CNC service: Technopol's FROGMill 4th-axis router carves full three-dimensional forms out of expanded-polystyrene blocks to your CAD file, for decorative, scenic and non-structural work.

DOCUMENT	ISSUED	PRODUCT	STATUS
TP-BR-3D-MILLING	2026-07-14	3d-milling	Issued for use

OVERVIEW

3D Milling is a fabrication service, not a stock product. Technopol's FROGMill heavy-duty 4th-axis CNC router carves full three-dimensional forms from expanded-polystyrene (EPS) blocks, working either flatbed (XY, up to 2650 x 1250 x 254 mm) or on a rotary lathe (up to 1800 mm long x diameter 488 mm) per single segment. Larger forms are milled as segments and joined with interlocking puzzle joints. What you receive is a decorative, non-structural form: it is not load-bearing, it is not a fire-rated element, and the EPS grade it is cut from is chosen for the job and must be named on the order.

The base material is expanded polystyrene. There is no default carving grade - it is chosen for the job and the detail required, from the standard EPS ladder (12SD at 12 kg/m³ through 30DV at 30 kg/m³). Higher-density grades hold finer detail and cut a cleaner face; the lower-density grades are cheaper and coarser. The router accepts common 3D CAD (IGES/IGS, STEP/STP, STL, OBJ) and 2D CAD (DWG, DXF). Technopol holds a library of ready-to-mill models and will source or design a model from a brief where you have none. A full flatbed blank is about 0.84 m³, which is a 10 to 25 kg two-man lift depending on grade - light, but a sail in any wind. Technopol separately supplies a polyurethane protective coating for carved EPS; the coating is supplied only, application is by the client or their contractor, and its application data (coverage, dry-film thickness, primer, recoat and cure schedule) comes from the coating supplier. Nothing else is supplied with the carving: no fixings, no armature, no mounting design.

KEY FACTS

PROPERTY	VALUE
Process / machine	FROGMill heavy-duty 4th-axis CNC milling router; worked flatbed (XY) or on a rotary lathe [°]
Flatbed (XY) envelope, maximum single segment	2650 x 1250 x 254 mm (L x W x thickness) [°]
Lathe / rotary (4th axis) envelope, maximum single segment	1800 mm long x diameter 488 mm [°]
Oversized forms	Milled as several segments and joined with interlocking puzzle joints, which can be pre-cut for customer assembly. Agree the assembled size, the segment count, the seam positions and the handling weight with Technopol at enquiry, and have the project engineer design the connection between segments [°]
Base material and grade	Expanded polystyrene (EPS). There is no default carving grade - it is chosen for the job and the detail required, and it must be named on the order (for example '30DV') [°]
Nominal density, grade ladder	12SD 12 15SD 15 16DV 16 20DV 20 24DV 24 30DV 30 kg/m³. These are nominal densities; the grade table's minimum densities sit below nominal (30DV: nominal 30, minimum 27 kg/m³), so treat any calculated mass as an upper estimate [°]
Thermal conductivity (10 C, max), grade ladder	0.033 (30DV) to 0.045 (12SD) W/m.K - it follows whichever grade you order [°]

PROPERTY	VALUE
Compressive stress at 10% compression (min), grade ladder	200 (30DV) to 60 (12SD) kPa - a material-quality figure, not a design bearing capacity for a carving [°]
Accepted CAD formats	3D: IGS/IGES, STP/STEP, STL, OBJ. 2D: DWG, DXF [°]
Blank mass before carving	Flatbed: a full 2650 x 1250 x 254 mm blank is 0.84 m3, about 10 kg at 12SD to 25 kg at 30DV. Rotary: the billet mounted on the 4th axis must enclose the turned cylinder, so a full-envelope blank is 488 x 488 x 1800 mm = 0.43 m3, about 5 kg to 13 kg (the finished maximum cylinder itself is 0.34 m3). Plan the lift on the blank, not on the carving
Protective coating	Polyurethane, supplied by Technopol and applied by the client or their contractor. Described in the brochure as a rigid waterproof lining that resists abrasion and impact damage, durable up to about 10 years - a supplier statement, not a warranty. Obtain coverage, dry-film thickness, primer, UV performance, recoat and cure data from the coating supplier before you write it into a specification [°]
Maximum sustained service temperature	About 70-80 C for the EPS itself - above that it softens, creeps and slumps. For a PU6-bonded assembly the adhesive's +50 C service ceiling governs. Keep carvings away from flues, hot lamp housings and dark metal in full sun [°]
Reaction to fire	As supplied, a milled carving carries no fire classification, and all EPS is combustible. Where the flame-retardant grade FRCel is named on the order and confirmed in writing, the underlying board classification is B-s1,d0 to SANS 53501-1 - determined on a bare, unfaced 60 mm FRCel 20DV sheet at approximately 18.37 kg/m3. It is a reaction-to-fire class (surface spread of flame and smoke production), and it was determined on a board, not on a carving
Fire resistance (REI, in minutes)	Not rated. A milled carving has no fire-resistance rating and is not a fire division. Fire resistance is established by a furnace test on a specific assembly to SANS 10177-2; a reaction-to-fire class is a different rating and cannot substitute for it. Where a rated element is required, use a rated construction [°]
Structural capacity	None. Carvings are decorative and non-structural. No load, fixing or puzzle-joint capacity is specified for a milled carving, and EPS creeps under sustained load. Nothing may rest on a carving [°]
Quality management	ISO 9001:2015, Reg. no. Q 2016024 (EQCSA, SANAS accreditation C22), valid to 2 June 2028. Certified scope: EPS Blocks; EPS Sheets; EPS Cornice; Insulated Ceiling Solutions; Adhesives & Polymers; Roof solutions - it covers the manufacture of the EPS the carving is cut from; CNC milling is not one of the listed activities. It certifies the manufacturer's quality system, not the performance of a product [°]
Product certification	No product certification or harmonised product standard applies to a milled EPS carving. Agreement SA certificate 2020/609 covers the LiteCore Building System, and only as a non-load-bearing wall; it does not extend to this service [°]

[°] Catalogue or declared value — Technopol holds no test report for this figure. It is the value we publish for the grade, not a measurement of the delivered batch. Where a figure is load-bearing in your design, specify batch testing. Every test report and certificate we do hold, with its current status, is at technopol.co.za/verify.

WHERE IT IS USED

- 3D relief carvings and architectural foam features
- Set design, scenic design and special events
- Characters, busts, sculptures and figures
- Props and display pieces
- 3D signage, letters and billboard elements
- Moulds and patterns for cold casting
- Foam packaging and bespoke protective void-fill
- Wave-textured and decorative panel faces
- One-off artistic pieces through to production runs

WHERE NOT TO USE IT

- Not for use as the final exposed surface outdoors - statuary, facade features, park pieces, anything the public can touch. Bare milled EPS at 12-30 kg/m³ dents under a fingernail, degrades under prolonged UV and is combustible. Hard-coat or render it, treating the coating's 'durable up to about 10 years' as a supplier statement rather than a warranty, or carve the piece in GRC, stone or timber where the surface itself must be durable.
- Not for use as a single monolithic piece larger than the machine envelope - flatbed 2650 x 1250 x 254 mm, lathe 1800 mm long x diameter 488 mm. Anything bigger is built from puzzle-jointed segments, and those joint lines show under thin coatings and can open as the coating cures and moves. Design the joints onto natural break lines, or use a different fabrication route.
- Not for use as a pattern or mould for hot casting, or against any hot surface. EPS softens and creeps above roughly 70-80 C: it slumps, loses dimension and the coating delaminates. Use tooling board or timber for hot processes.
- Not for use as a load-bearing or load-sharing element, or as a core carrying sustained load. Carvings are decorative. The compressive-stress figures are material-quality values, not working stresses, and EPS creeps under sustained load.
- Not for use as a fire division, or as a carved feature in an escape route or other fire-sensitive space. A fire division requires a fire-resistance rating in minutes; a carving carries no such rating, and the B-s1,d0 result is a reaction-to-fire class - a different thing - available only where FRCel grade is named on the order and confirmed, and determined on a bare 60 mm FRCel 20DV board rather than on a carving. Use a non-combustible, rated construction and accept the cost.
- Not for use with solvent-based paints, lacquers, contact adhesives, polyester resin or aerosol spray cans. Aromatic solvents dissolve EPS on contact - the surface pits and craters within minutes, and the damage cannot be repaired to a close-up standard.

How to read this document. Every technical value carries a label saying where it came from — whether an accredited laboratory measured it, whether Technopol measured it, or whether it is simply the figure the standard tabulates for that class of material. Values we have not tested are marked as such rather than presented as test results.

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