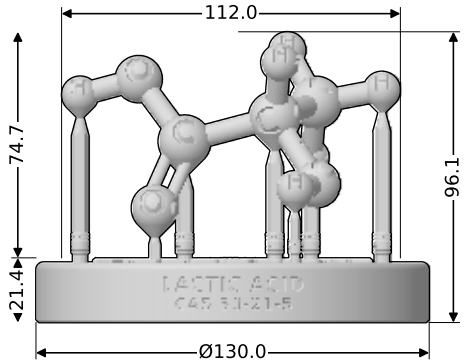
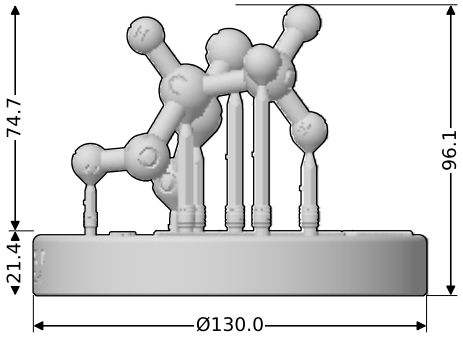
TECHNICAL DRAWING - Lactic Acid (CAS 50-21-5)

Orthographic views of the print-ready STL. All dimensions in mm, measured on the mesh.

FRONT (viewed from -Y)



RIGHT SIDE (viewed from +X)

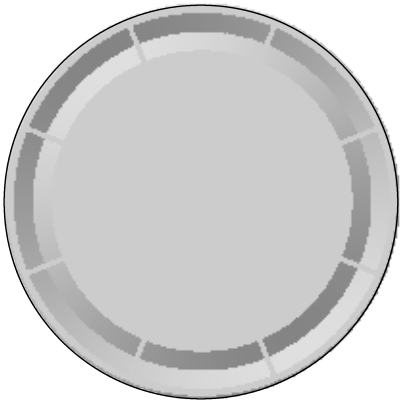


TOP (viewed from +Z)



dashed circle: molecule within Ø113.1

BOTTOM (viewed from -Z)



Overall height 96.12 | base Ø130.00 x 20.00 (21.39 with raised logo) | molecule above base 74.73, max reach Ø113.10

UNDERSIDE (studio render, not to scale)

Engraved 0.6 mm deep: QR code to the model page,
name, CAS number and licence text.
The orthographic BOTTOM view above cannot show it.



0 50 mm - drawing scale 1:2.5 on A4 (print at 100 %)

Name	Lactic Acid	**CAS**	50-21-5
File	molgod-50-21-5-ready-to-print.stl	**Version**	ANT HOUSE v7
SHA-256	4ed73c7c99b958a7...	**Sliced**	2026-10-29 (UTC)
Units	mm	**Import**	at 100 % - do not scale
Triangles	282,598	**Drawing scale**	1:2.5 (A4)

SHA-256 4ed73c7c99b958a71d93bf9d9c370ee7507cd1a346e2789745d6978df8dd1676

PRINT SPECIFICATION - Lactic Acid (CAS 50-21-5)

Method	FDM
Material	PLA 1.75 mm
Nozzle	0.4 mm (do not use a larger nozzle)
Layer height	0.2 mm
Infill	15%
Perimeters	3
Supports	7 pencil supports: part of the model, do not remove (Ø3.5 / 5 mm, thin neck under the cup: design Ø1.8 mm, 10.0-50.7 mm long) + automatic slicer supports: temporary
Temperatures	3MF profile: 215 °C first layer, then 210 °C; bed 60 °C
Orientation	base flat on the bed (QR side down), as supplied
Scale	100 % (mm) - do not scale
Model height	96.1 mm
Build plate (min.)	155 x 155 mm
Est. print time	about 13 h 00 min (3MF profile, slicer estimate)
Est. filament	125.2 g PLA with the 3MF profile (slicer estimates)
Slicer support share	18.0 % of the printed volume
Profile checked with	PrusaSlicer 2.8.1 · ANT HOUSE profile v4 (in the 3MF); profile file: slicer_profile.ini

Readiness: Level 3 of 5 - Slicer Verified

Designed for FDM printing. Geometry validated and slicing checked using the specified profile. No physical print has been made yet.

VERIFIED: file geometry (gates below) and slicing in the stated environment. ESTIMATED: print time, filament.
NOT VERIFIED: physical print, strength after support removal, legibility of small details, QR scanning.
Slicer: PrusaSlicer 2.8.1 · ANT HOUSE profile v4 (in the 3MF) - other versions or printer profiles may give different times and supports.

Validation gates (18)

Source geometry unchanged (hash)	**PASS**
Output file hash recorded	**PASS**
STL integrity: watertight, oriented, no degenerate faces	**PASS**
Independent mesh check (2nd library)	**PASS**
Printability gate: normals, groove widths	**PASS**
Single solid body	**PASS**
Model inside base footprint	**PASS**
Molecule geometry preserved	**PASS**
Author mark orientation	**PASS**
Base dimensions	**PASS**
Text height and pencil neck for 0.4 mm nozzle	**PASS**
Text stroke >= 0.6 mm and gap between letters >= 0.4 mm	**PASS**
Every heavy atom close enough to a pencil support (cantilever limit)	**PASS**
Nothing starts in mid-air (every lowest point on a support)	**PASS**
Front engraving depth	**PASS**
QR code decoded from geometry	**PASS**
Slicing check	**PASS (slicer 2026-10-29)**
Physical test print	**NOT PERFORMED**

ISOMETRIC VIEW, ORIENTATION & SUPPORT REMOVAL



1. Print with the round base flat on the build plate, exactly as modelled. Do not rotate, mirror or scale.
2. Import at 100 %; file units are millimetres. Model height 96.1 mm, base Ø130.0 mm.
3. The 7 pencil-shaped supports standing on the base are PART OF THE MODEL. Do not remove them.
4. Enable automatic supports (organic/tree, 'on build plate only' OFF); they are temporary. RECOMMENDED removal (not yet confirmed by a physical print): after printing, work from the top downwards with flush cutters.
5. Take extra care at the smallest spheres (e.g. hydrogen) and thin rods: cut at the support side, do not twist or lever against the model.
6. Engraved text and the QR code on the base are intentional design features - do not fill or sand them.

Designed for FDM printing. Geometry validated and slicing checked using the specified profile. No physical print has been made yet.

CRITICAL GEOMETRY - Lactic Acid (CAS 50-21-5)

Measured on the mesh of this exact file. Geometry only - not a strength test of the printed part.

Pencil thinnest section = neck, cut point (equiv. diameter)	2.50 mm (>= 1.8, design) PASS
Pencil at the sphere contact, incl. cup (equiv. diameter)	4.80-6.64 mm
Pencil slenderness L/d (shaft)	max 10.2 (<= 12, design) PASS
Thinnest bond (equiv. diameter)	4.10 mm (>= 1.6, provisional) PASS
Bonds measured / hidden in spheres	11 / 0 of 11
Tipping angle (centre of mass)	74.9 deg (>= 15, provisional) PASS
Centre of mass height	17.0 mm
Bed contact area (section z = 0.1 mm)	7630 mm2 (information; no threshold defined)
Nothing below the bed plane (z < 0)	PASS

Optional: a free molecule (not yet confirmed by a physical print)

After ALL tree supports are removed, the pencils can be cut at their thin neck (about 2 mm; design 1.8 mm) just under each sphere; sand off the small cone. Bonds are about 2 mm thick - never bend or twist. Package: PRINT_INSTRUCTIONS 7b.

Feedback and help until 26 November 2026: pure@molgod.org - model page: https://molgod.org/molecule/50-21-5/

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Measurement methods

- Pencil axis from the build report (foot x,y on the base top, z_styk at the atom); mesh rotated so the axis is +Z, clipped to a 2.4 mm cylinder; cross-sections every 0.2 mm; equivalent diameter d = 2*sqrt(A/pi) of the section containing the axis; free length L = height where the section area exceeds 1.05 x the neck area.

- L / d_shaft, d_shaft = dominant inscribed diameter along the pencil (hexagon across flats); L/d over the minimum section is info only.

- Bonds = atom pairs closer than 1.2 x (sum of covalent radii); section perpendicular to the bond in the middle of the visible gap, clipped to 0.9 x the smaller sphere radius; components = cylinders (multiple bonds); d = 2*sqrt(A/pi).

- Centre of mass from signed tetrahedra of the closed mesh (uniform density = solid model; real FDM infill differs); support polygon = convex hull of the section at z = 0.1 mm; tipping angle = atan(min. horizontal distance COM to hull edge / COM height).

- DESIGN: pencil d >= 1.8 mm, L/d <= 12. PROVISIONAL (to be confirmed by a test print): bond d >= 1.6 mm, tipping >= 15 deg. Contact area: information, no threshold.

- Geometric measurements on the mesh, not a strength simulation: they do not predict FDM layer adhesion, support-removal damage or the effect of infill. Physical print: not performed.

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