

Rev C.1 - Design review and prototype manual

Introverted Invertebrates | 2026-09-29 | Units: mm

1. Decision and evidence

Rev C.1 is a gate-fit update to the Rev C CAD prototype, not validated production hardware. Brennan measured the printed Rev C gate with calipers and reported that it remained 0.96 mm too wide. Rev C.1 therefore reduces only the removable gate's lateral width from 28.00 mm to 27.04 mm. The body and guide geometry remain at Rev C dimensions.

The underlying Rev C revision addressed three earlier linked issues: rear ears and a window-frame projection preventing flush glass contact; day-26 larvae striking the largest screen's edges despite being able to fit; and the removable funnel misaligning, leaving gaps, and falling out during emptying. Earlier feedback also identified loose lid retention.

The source was reviewed directly. Rev B uses a 92 x 66 x 64 mm shell, a 0.30 mm cassette-to-partition clearance, a projecting rear lip, removable funnel supports, and a clearance-fit lid. Dimensions in this manual come from that source, not earlier conversational estimates.

Rev C.1 retains the passive external-light principle. It has no pump, airlift, impeller, or wet electrical part. The 44 x 22 mm entrance, 20 x 12 mm throat, full partition, indexed gate, and internal window arrangement are retained.

The rear suction mounts are removed. Two identical adjustable over-rim hangers now secure to blind exterior side lugs, keeping the optical back clear. The assembly still requires a measured fit, pad inspection, and a physical load/creep test on the intended aquarium. A tether is a backup, not the primary mount.

2. Geometry and service changes

Feature	Rev C.1 disposition
Main shell	92 long x 66 wide x 64 high; side features and mount arms extend outside shell
Rear contact plane	x = 92; no rear ears or raised window lip
Clear panel	34 x 34 x 1.0; mounted from inside, behind rear face
Optical aperture	28 x 28; 3 mm nominal panel overlap per edge
Fixed funnel	44 x 22 at x = 6.5 to 20 x 12 at x = 30.4
Funnel support	Integral solid haunches; no cavity beneath or beside tunnel
Gate	1.8 thick; 27.04 wide; 26.2 travel; 1 mm open clearance
Gate lateral throat overlap	3.52 per side when centred across the 20 mm throat
Gate running fit	0.35 nominal clearance on each thickness face; not watertight
Lid	Existing locating skirt plus two external M3 nylon retaining bolts
Screen retention	Lid stop allows 0.4 nominal vertical lift
Adjustable mount	2 matching hangers; rim width 4-35; trap top nominally 28-97 below rim
Rear chamber	Approx. 210.5 mL gross rectangular envelope, less internal displacement

The fixed funnel cannot detach, but it trades disassembly access for a single-piece tunnel. Remove the screen, gate, and lid to flush and inspect from both ends. Do not print/use the body if supports or strings cannot be completely removed from the animal path.

The outer back is geometrically flush; print warp, seam blobs, silicone squeeze-out, and actual glass contact still require checking. Keep sealant inside the rear plane. No thick wet-side gasket is specified: it would recreate stand-off. Use dry-side masking/shrouding and test for a competing light halo.

Gate, screen, and lid clearances are not proof of zero larval escape. The solid partition prevents a large bypass around the funnel, but clearance paths still require a small-cohort retention trial.

3. Over-rim hanger and tank fit

The print set now contains one **rim_hanger** STL; print two identical pieces. Each slides against an exterior body lug and attaches with two M4 nylon bolts and nuts seated in blind pockets. A 98 mm vertical slot lets the pair set the trap top about 28-97 mm below the tank rim. Use the same setting on both sides. At the higher setting, the mast projects 56 mm below the trap floor; check substrate and tank-bottom clearance.

The horizontal roof crosses the aquarium rim above its top surface. An M5 nylon screw in each outside jaw faces toward the exterior glass or trim, with a soft 5 mm tip pad. Nominal geometry reaches an outside surface 4-35 mm beyond the rear contact plane. Add a soft non-slip strip beneath the roof where it rests on the rim. The screws provide gentle positional clamping; the rim supports vertical load. The trap's rear face contacts the inside glass below the rim, maintaining the light target. Nothing on the wet back extends past $x=92$ mm. Exterior hanger jaws necessarily cross that plane above the rim.

The stated 4-35 mm range is geometric. It is not a certification for every rim profile, bracing arrangement or lid. For framed tanks, lower the body enough that the back wall sits entirely below the inner trim; the 28 mm setting may not clear very deep trim. Check that you have at least 105 mm of straight pane width for both side hangers, sufficient height (about 150 mm minimum from rim to unobstructed bottom at the higher setting), and space for an external light at the rear window. Typical 5/10/20-long sized tanks can be assessed with those checks; length or gallon label alone does not establish fit. A hood, oversized eurobrace, raised trim, curved glass, or an obstructed rear pane may require a different mount.

The rim screw pads and roof pads are replaceable, aquarium-safe silicone or EPDM with no unverified adhesive in water. Check the actual pad dimensions and hardness before loading glass or plastic trim. Tighten each screw only enough to stop rocking; no torque rating is established. If the mount bends, lifts, creeps or produces a competing light gap, stop and revise it.

4. Screen set and trial logic

All inserts share the Rev C/C.1 guide and lid stop. Blind dots on the rear of the pull tab identify them; count dots and verify the actual slot with a gauge. Width means the minimum passage, not the bevelled entrance.

Tab dots	Insert	Ribs	Nominal clear slots	Purpose
1	1.2 mm	1.6 mm	15	Small-screen comparison
2	1.6 mm	1.6 mm	13	Existing intermediate option
3	2.0 mm	1.6 mm	12	Previous largest option
4	2.5 mm	1.2 mm	11	Late-stage trial
5	3.0 mm	1.2 mm	10	Late-stage trial
6	3.5 mm	1.2 mm	9	Late-stage trial
7	Open frame	None	42 x 25 opening	Larval-only vessel control

Late-stage slots have a 0.3 mm lead-in bevel per edge over 0.3 mm depth on the front face. Ribs remain 1.2 mm through the main section; their leading edge is nominally 0.6 mm. Check the slicer and printed tips for fragile or missing extrusion. Smoothness is not guaranteed by CAD bevels.

Nominal unobstructed area within the 44 x 22 mouth is approximately 53% for the 2.0 mm insert, 61% for 2.5, 67% for 3.0, 70% for 3.5, and 93% for the open frame. These are planar area estimates, not capture rates or hydraulic predictions.

Hatch-tank mode: establish larval passage and exclusion of the actual larger inhabitants. Do not assume a labelled width excludes all juveniles. Larval-only mode: compare open frame with the three late-stage inserts under the same light and placement. Record arrivals, collisions, successful entries, and exits separately. If post-larvae are present, count them separately: selective sorting is unverified.

5. Print and hardware handoff

For an existing Rev C assembly, print only `revC1\_gate.stl`. For a complete new assembly, print one body, lid, corrected gate, window baffle/bezel, and the selected screen; print two rim hangers. Print the fit coupons first; the dry external shroud is optional. Do not print a separate funnel or use the obsolete suction adapter. Import STLs in millimetres at 100%; no global rescaling.

Starting print settings: opaque PETG from a known source, 0.4 mm nozzle, 0.16-0.20 mm layers, five perimeters, six top/bottom layers, approximately 30% infill. These are starting settings for slicer review, not tested settings. No copper-filled, antimicrobial, or unknown additive material; no resin print substituted without a separate materials review.

Body is exported floor-down. The integrated tunnel roof and rear optical opening require a deliberate bridging/support plan. Support contact scars must be accessible from the mouth or throat. If the service cannot demonstrate support removal and a clean lumen, stop before the full print. No sacrificial support geometry is included; its release behavior is printer-dependent.

Lid exports cap-down; gate and screen export broad-face-down. Inspect the lid screen-stop and retaining tongues in the slicer. Measure screen slots at their narrowest point. A nominal STL dimension is not a measurement of the print.

Each hanger exports on its broad side. Its nominal print footprint is 160 x 76 mm plus normal slicer margins; verify your available bed and the roof-to-mast transition before printing. The two rim hangers require a separate structural review after printing because the digital collision checks do not measure bending or layer adhesion. Confirm the M5 nut recess and the vertical M4 slot are clean, and deburr pad contact faces.

Non-printed hardware: one 34 x 34 x 1.0 mm clear polycarbonate panel; immersion-rated aquarium silicone; two M3 x 25 mm nylon bolts and nuts for the lid; four M4 x 20 mm nylon bolts, washers/spacers, and M4 nylon nuts for the hanger lugs; two M5 x 60 mm nylon bolts and M5 nylon nuts for the outside jaws; two soft screw-tip pads about 5 mm thick and two soft rim-roof pads; one rounded 1.75 mm filament gate pin, approximately 35-45 mm long; aquarium-safe tether; dry adjustable white LED; dry-side light mask; prepared receiving vessel. Check screw length, pad thickness, nut fit and wet compatibility on the assembled print. No metal is required.

Legacy fit coupon: slots 2.3/2.5/2.7 and holes 2.0/2.2/2.4. Test a measured 1.8 mm strip in the 2.5 slot and a 1.75 pin in the 2.2 hole. Also print the Rev C.1 lid-clevis coupons and test the actual M3 hardware. Check the new 3.4 mm bolt bores; do not force a screw through a split-prone print.

Before wet use, install the corrected gate in the existing body and complete at least 100 full dry and 100 submerged cycles. It must travel freely without force, remain captured by both guides, fully cover the throat when closed, and retain visible lateral overlap on both sides. Record the printed gate width and guide opening with the same calipers used for Brennan's Rev C measurement.

6. Assembly, capture and emptying

1. Inspect, deburr, wash and rinse every wet surface. Verify the full tunnel with a light from both ends. Do not use solvents, oils, or coatings to conceal roughness.
2. Fit the clear panel from inside against the rear shoulder with a continuous silicone seal. The CAD reference leaves a nominal 0.5 mm sealant bond line between the 1.0 mm panel and shoulder; verify that continuous seal rather than leaving an open gap. Fit the baffle/bezel from inside with its tube pointing into the chamber. Keep optical area clean; allow the manufacturer's full immersion cure. The 1.0 mm panel is the specified CAD reference; thicker panels need a fit review.
3. Insert the chosen screen with the bevelled face toward the tank, when applicable. Insert gate rounded edge down. Fit lid; the internal stop sits just above the screen tab. Install both external nylon bolts and nuts gently, without distorting the lid.
4. Check both gate index positions. With the gate raised, pin the lower hole for OPEN; with it lowered, pin the upper hole for CLOSED. Mark the dry operating reference card accordingly. Do not lift by the stem.
5. Seat four M4 nylon nuts in the blind body pockets. Slide a hanger against each side lug, set them to the same depth, and insert two padded/spaced M4 nylon bolts per hanger. Place the soft roof pads and M5 screw-tip pads. Hook both roofs over the aquarium rim with the rear of the trap below any inner trim; adjust the M5 screws gently against the outside glass or trim. Verify the rear sits flush, neither hanger rocks or slides, and the rim supports the assembly. Attach an independent safety tether. The dry LED must illuminate the rear window without a brighter adjacent halo.
6. Observe capture continuously. Keep the rear target illuminated while checking the blade plane, then lower the gate over at least five seconds. Stop if an animal approaches the closing edge. Pin CLOSED before moving.
7. Support the body from below and keep it upright. Prefer transferring the entire collector within a larger water-filled receiving container; do not depend on untested air-transfer retention.
8. Over/inside the receiver, remove the nylon lid retainers and lid. Decant slowly through the open top, keeping organisms submerged as far as practical; rinse with the established receiving-system water. Do not shake or force animals back through the narrow throat.
9. Remove gate and screen, inspect all corners and the fixed tunnel for retained animals, then clean and dry. Count animals left in the funnel separately from those in the rear chamber.

The fixed funnel no longer drops out during decanting. That improvement does not validate inversion with the lid on: the gate is not a watertight valve and the stem slot remains an opening.

7. Verification and commissioning

Digital QA covers closed/single-solid meshes, installed part collisions, sampled gate travel, all screen fits, sampled funnel clearance, partition geometry, rear-plane extent, lid fastener shafts, and both hanger adjustment endpoints. Results and mesh bounds are in docs/QA.json. Sampling is not a continuous-motion proof. No physical print, slicing, FEA, leak, load, or animal test has been performed on this revision.

Before animals, record actual slot widths, guide fit, nylon fastener fit, and rear flatness. Complete 100 wet gate cycles and 25 wet lid assembly cycles. Reject binding, shedding, cracks, excessive tightening, or screen lift that uncovers the entrance.

Fill above the cured window and inspect for leakage for 24 hours, separately from gate leakage. Measure retained water and drainage at 10, 30 and 60 seconds in the intended handling sequence. Any air transfer requires a measured conservative time limit; do not infer retention from the 210.5 mL gross chamber envelope.

Test the installed hangers outside a stocked aquarium on representative glass/rim hardware. Measure the filled assembly mass, account for handling loads, and perform a conservative 1 kg ballast hold for one hour while checking position and leaks; then repeat at the operating waterline for 24 hours. Reject any glass/trim stress, sag, creep, strap crack, or tether failure. This is a prototype test condition, not a rated capacity. The earlier suction-ear load-test claim no longer applies.

Run a dark-tank optical check. The rear window should be the useful target, with no dominant halo behind or beside the body. Light intensity, exposure duration, species and larval stage remain experimental variables.

First live trial: small counted cohort, continuous supervision, short exposure, prepared receiver, and complete before/after counts. Abort on entrapment, repeated collisions, stranding, gate contact, or abnormal behavior. For late-stage work record both zoeae and post-larvae inside and outside. Do not change screen, light and exposure time simultaneously.

Fit checks before the first use

Measure glass/trim projection, the inner trim's downward reach, pane clearance, and the desired mouth depth. Use the mounting diagram to choose an adjustment position that keeps the body below trim, hangers above substrate, and lid/gate removable. Photograph the actual trial fit before the load test. Change the geometry if the rim falls outside the range or cannot carry an even load.

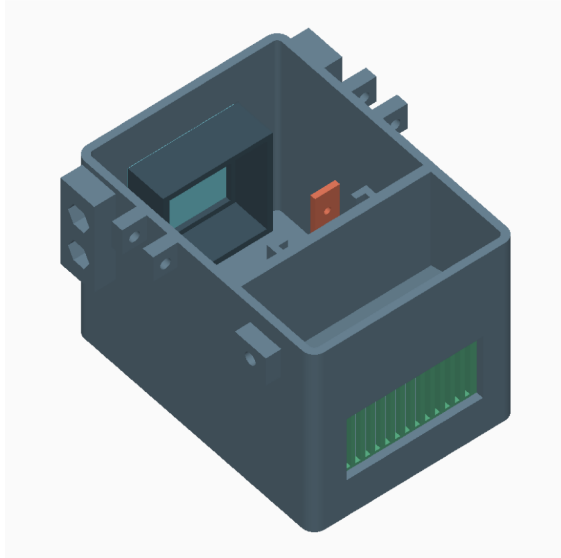
A snap lid, detachable gate handle, and printer-specific breakaway supports are deferred. Positive nylon lid retention addresses the reported loose lid now; adding an untested snap or another loose handle interface is not necessary to test the core changes.

8. Generated geometry views

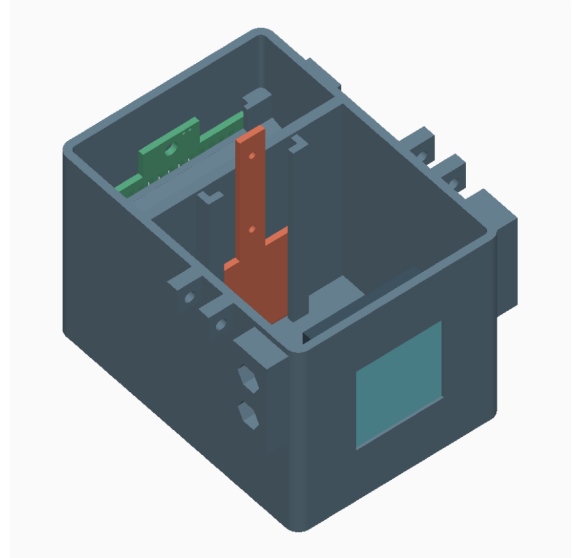
Actual meshes and centre section. Lid omitted to expose the animal path. Side clevises retain the lid; they are not a tank mounting system.

Rev C.1 | Actual CAD geometry | Lid omitted for inspection

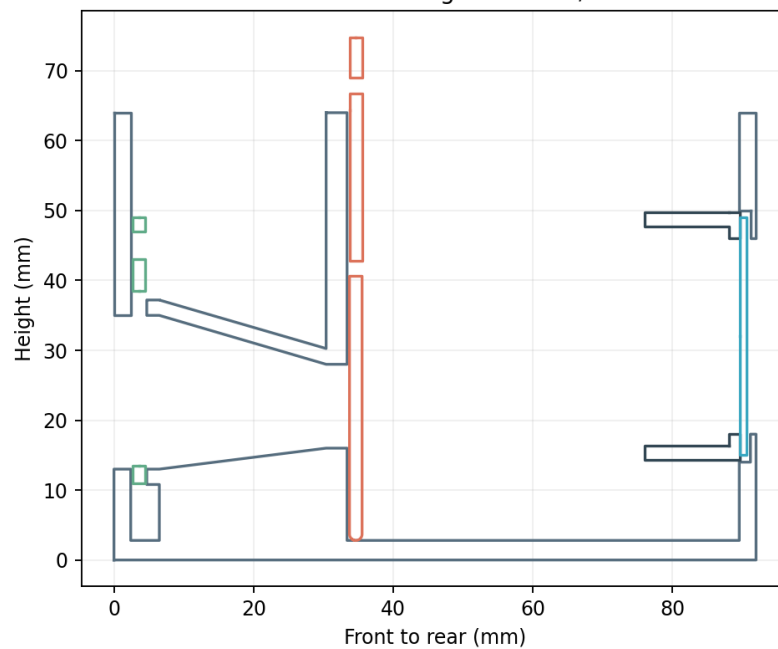
Front / open top



Rear / flush optical face



Rev C.1 centre section - gate closed; lid omitted



9. Adjustable hanger positions

Nominal side elevations of the same printed hanger at both ends of the adjustment range. The pad and rim outline illustrate a framed-tank example; check real contact surfaces before testing.

Adjustable over-rim hanger | nominal side positions; two hangers required

