

Wall-Mounted Aquarium Line

Weight Load & Mounting Structural Spec Sheet — 4 Model Lineup

1. Overview

Four wall-mounted, self-contained acrylic aquarium models, frameless/picture-frame style, with internal filtration and wiring routed through the wall to the power outlet. Tank structure is supported by an L-bracket mounting system (modified with a lower extension leg — see Section 3) anchored directly into wall studs.

All weight figures below include water, acrylic shell, substrate/hardscape, and internal hardware (filter, heater). Design loads apply a 3.5× safety factor over total system weight, appropriate for a wall-hung, water-bearing structure where failure carries flood/injury risk (well above the ~2× factor typical of general shelving).

2. Weight & Mounting Table — All Sizes

Option	L × H (in)	Depth	Volume	Total system wt	Studs spanned	Design load (3.5×)	Screws/bracket	Load per screw
1	34 × 12	4"	~7.1 gal	~87 lb	3	305 lb	4	~26 lb
1	34 × 12	4.5"	~7.9 gal	~95 lb	3	333 lb	4	~28 lb
2	46 × 12	4"	~9.6 gal	~115 lb	3	403 lb	4	~34 lb
2	46 × 12	4.5"	~10.8 gal	~126 lb	3	441 lb	4	~37 lb
3	58 × 14	4"	~14.1 gal	~178 lb	4	623 lb	4	~39 lb
3	58 × 14	4.5"	~15.8 gal	~194 lb	4	679 lb	4	~43 lb
4	70 × 16	4"	~19.4 gal	~243 lb	5	851 lb	4	~43 lb
4	70 × 16	4.5"	~21.8 gal	~265 lb	5	928 lb	4	~47 lb

Stud span assumes standard 16" on-center residential framing, span starting on a stud. Confirm actual on-site spacing with a stud finder before finalizing bracket layout — older or commercial framing may run 24" o.c.

3. Bracket Design

Mounting bracket is a modified L profile with an added lower leg/flange, rather than a plain L:

- Upper leg: standard L, fastens to wall stud and supports the tank frame's primary bearing edge — 3 screws
- Lower leg: extends downward from the L, adding a 4th screw point below the main bracket body
- Purpose: a plain L-bracket under horizontal tank load concentrates rotational/prying stress on its topmost screw. The lower leg increases the bracket's effective moment arm, distributing that rotational force across a taller fastener spread instead of relying on one screw to resist it.
- 4 structural screws total per bracket (not drywall anchors) — 3 upper, 1 lower — driven into solid stud material

Fastener Capacity Check (worst case: Option 4, 70×16, 4.5" depth)

Load case	Per-screw capacity (conservative)	Worst-case per-screw demand	Margin
Pull-out (withdrawal), single screw into solid stud	~100–250 lb	~47 lb (Option 4, 4.5")	2–5×
Shear (actual load direction on a wall bracket)	~400–600+ lb	~47 lb (Option 4, 4.5")	8–13×

Even the heaviest configuration in the lineup loads each screw to a fraction of its rated capacity in both failure modes, with shear — the direction the load actually acts — carrying an 8–13× margin.

4. Recommended Mounting Method by Size

- Options 1–2 (34"–46" wide, 3 studs): discrete brackets acceptable, one per stud, 4 screws each
- Options 3–4 (58"–70" wide, 4–5 studs): continuous horizontal cleat/rail preferred over discrete point brackets — spreads load evenly across all engaged studs and simplifies the snap-on/off frame interface

5. Snap-On/Off Frame System

- French cleat: interlocking beveled rail, wall side fixed to studs, frame side on the tank back — self-centering under gravity, geometry is self-locking against being pulled straight off, and doubles as a wire-routing channel to the outlet
- Positive lock (Options 3–4 especially): quarter-turn camlock or spring-loaded pin engaging automatically when the frame seats on the cleat, preventing accidental lateral/upward dislodging
- Mandatory on every size regardless of primary mount: secondary safety strap or cable tether, same principle as anti-tip hardware on wall-mounted mirrors/TVs — a backstop if the primary mount ever loosens over time

6. Notes & Caveats

- Acrylic thickness assumed scaled to size ($\frac{1}{4}$ " small, $\frac{3}{8}$ " mid, $\frac{1}{2}$ " large) — confirm against actual structural requirement for hydrostatic pressure at each tank's height
- Fastener capacity figures are general engineering guidelines, not a substitute for a structural engineer's sign-off on the specific wall construction, stud species/grade, and hardware selected
- Recommend on-site stud verification before finalizing bracket/rail spacing for each installation — do not assume 16" o.c. without confirming