LowRider v4 Community Hog-Out Test

A standardized ladder test for comparing real-world LR4 stiffness and cutting ceiling

1. Purpose

This protocol lets LowRider v4 builders run the same increasing-load cutting test and report numerical results. The goal is not to crown one machine as best. The goal is to build a community dataset showing which build choices actually raise the cutting ceiling: gantry length, tube material, strut plate material, brace count, printed material, router/spindle mass, bit stickout, and related details.

The main score is the highest feedrate completed before unacceptable deflection or failure. Offset measurements are supporting data that explain how and where the machine starts to give up.

2. Main Output

Output	Meaning	Required?
Hog-Out Score	Highest feedrate rung completed before failure.	Yes
Failure Feedrate	First rung where failure occurred or the test was stopped.	Yes
Failure Mode	Offset over limit, chatter, belt skip, stall, burning, unsafe sound/motion, or user stop.	Yes
Offset Curve	Measured offset at each rung where practical.	Preferred
Location Comparison	Difference between X-center and optional far-edge test.	Optional but valuable

3. Required Test Concept

Use the Hog-Out mode of the community generator: https://vector76.github.io/gcode_tpgen/

The cut starts easy, then climbs in fixed feedrate rungs until the machine exceeds the deflection limit or shows a practical failure. This is similar in spirit to a volumetric flow test on a 3D printer: the useful number is where the system stops being reliable.

4. Required Bit and Material

Item	Requirement	Record Actual Value
Bit type	Single-flute upcut spiral. No compression or downcut for the standard dataset.	Yes
Bit diameter	6 mm or 1/4 in. Small variation acceptable if recorded.	Yes
Bit stickout	Measure from collet/nut to bit tip. This is a major variable.	Yes
Bit condition	New, lightly used, used, or unknown.	Yes
Material	3/4 in / 19 mm MDF.	Yes
Material hold-down	Screwed or clamped solidly to spoilboard. No material movement.	Yes

5. Test Location

The required test should be run at X-center and Y-center. X-center exposes the gantry span, tube stiffness, strut plate stiffness, brace count, and router/spindle mass. That makes it the best single required location for comparing different builds.

Location	Status	What It Shows
X center / Y center	Required	Primary comparison point. Best mix of gantry span and whole-machine stiffness.
Far from Y rail / Y center	Optional	Worst-case leverage/racking behavior. Useful for stiffness retention comparison.
Near Y rail / Y center	Optional control	Best-case baseline, but it can hide gantry-length weakness.

For the required test, set the pattern origin so the pattern is centered around X max / 2 and Y max / 2. For the optional far-edge test, place the pattern as far from the Y rail as safely possible while keeping the full pattern inside travel.

6. Standard Feedrate Ladder

Setting	Standard Value
Generator	vector76.github.io/gcode_tpgen
Mode	Hog-Out
Orientation	X
Depth of cut	-5 mm
Z clearance	0.5 mm
Reference feedrate	150 mm/min; do not change
Starting test feedrate	300 mm/min
Step increment	+200 mm/min per rung
Rung sequence	300, 500, 700, 900, 1100, 1300, 1500, 1700, 1900, 2100...
Feed override	100%; do not adjust during the test

7. Router / Spindle Speed

Keep RPM constant for the whole ladder. Feedrate changes, RPM does not. Record the dial setting and the best RPM estimate available. This is needed because chip load changes with RPM.

Setup	What to Record
VFD / digital spindle	Exact commanded RPM.
Trim router with manual RPM table	Dial setting and listed RPM from manual.
Trim router with only min/max RPM known	Dial setting plus estimated RPM from min/max range. Mark as estimate.
Tachometer available	Measured RPM. Mark as measured.

8. Failure Definition

Failure is the first rung where the machine is no longer cutting acceptably or safely. Use the first applicable condition:

- Measured offset exceeds 0.5 mm.
- Belt skip, lost steps, stall, or obvious position loss.
- Sustained chatter that does not clear immediately.
- Router/spindle bogs, burns the cut, or sounds abusive.
- The cut visibly widens or steps enough that continuing is likely to damage the bit or machine.

- User stops because continuing would be unsafe or unreasonable.

9. Measurement Method

Preferred measurement is the offset between the slow reference wall and the fast test-pass wall, in millimeters. Measure the largest clear offset for each completed rung where practical. The spreadsheet also includes a simple visual grade so useful data can still be submitted when the exact offset is hard to measure.

Grade	Meaning
0	Clean / no visible step
1	Visible step but likely under 0.25 mm
2	Approx. 0.25 to 0.5 mm
3	Over 0.5 mm or clear failure

Photos are required for the final clean rung and the failure rung. Photos for every rung are helpful, but not required.

10. Test Steps

1. Surface or verify the spoilboard if it is not recently skimmed.
2. Secure a clean MDF test piece so it cannot move.
3. Install the standard bit and measure bit stickout.
4. Measure or confirm X max and Y max travel.
5. Position the required test at X center / Y center.
6. Set router/spindle speed and record dial/RPM method.
7. Generate the Hog-Out ladder using the standard settings.
8. Run the file with feed override at 100%.
9. Measure or grade each completed rung.
10. Continue until a failure condition is reached.
11. Record last clean feedrate, failure feedrate, failure mode, and photo links.
12. Optional: repeat the ladder at the far-from-rail location and report it as a second test run.

11. Required Machine Data

Category	Required Fields
Machine size	Top rail length, X max, Y max, test location.
Gantry structure	Tube material, tube OD, tube wall if known, strut plate material/thickness, brace count.
Printed parts	Printed material, any known non-standard parts.
Toolhead	Router/spindle model, router/spindle weight if known.
Cutting setup	Bit diameter, bit stickout, bit condition, MDF thickness/type, RPM/dial setting.
Results	Feedrate rung, offset or grade, pass/fail, failure mode, notes, photo link.

12. Recommended Analysis

The companion workbook is structured so each machine has one configuration row and each feedrate rung has one result row. The key comparison fields are:

- Highest clean feedrate by machine.
- Failure feedrate and failure mode by machine.
- Offset versus feedrate curve by machine.
- Score versus gantry length.

- Score grouped by strut plate material and thickness.
- Score grouped by brace count.
- Score grouped by tube material and size.
- Optional stiffness retention: far-edge score divided by X-center score.

13. Forum Submission Format

For easiest collection, participants should paste their machine row, test-result rows, and photo links into the forum thread or shared sheet. The workbook columns are designed for copy/paste collection without retyping.

Revision focus: simple community participation, numerical ceiling score, required X-center test, optional worst-case edge test.