Rascal Mini Airboat – Construction Plans

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The Rascal is a small airboat designed around the Predator 22 hp engine from Harbor Freight, although it can easily be adapted to other similar engines. Designed for 1 – 2 persons, the front of the engine stand can accommodate side-by-side seating with a control stick in the middle.

These plans focus on the hull, engine stand, and propeller guard cage. There are some details left to the builder, such as your seating configuration, where to route control cables, etc. We built our test model using the Predator 22 hp engine and our economy belt reduction drive with a 1.9:1 ratio and a 56” propeller. For a little additional thrust, you can upgrade to the larger 59” propeller. We offer the reduction drives, propellers, and some other parts like control sticks, cables, rudders, and fuel systems that you might find helpful on our website: www.lonestarhovercraft.com.

Please contact us if you have any questions about these plans. And if you finish building your own Rascal, we’d appreciate if you could send us some photos and tell us how it performs!
Rascal Specifications

Length: 10 ft
Bottom Width: 63 in
Freeboard: 15 in
Draft: 3 – 4 in
Weight: ~320 lbs
Capacity: 1 – 2 persons
Speed: 20 – 30 mph
Flotation: 400 lbs built-in polystyrene foam
Power plant: Predator 22 hp with 56 in propeller
Construction: plywood with fiberglass reinforcement

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Safety note: Always wear personal flotation devices (PFDs), and carry a fire extinguisher and whistle while boating.
Rascal Assembly Overview

Assembly Instructions

1. Cut out the hull components according to the dimension sheets. For the 1/8” and 1/4” plywood, we used cheap underlayment material from Home Depot. For the 1/2” plywood, we used nicer cabinet-grade plywood with a birch veneer (we don’t recommend BC plywood). For added durability, you can use marine grade plywood.
2. Lay out the bottom hull panels (H1a (x2) and H1b (x2)) and sides (H2a (x2) and H2b (x2)) on a clean, flat surface. Make sure all edges line up cleanly. Place wax paper beneath seams to keep glue from reaching the floor.
3. Test fit the joiner panels (H4, H5, H6, H7 (x2), and H8) and bulkheads and transom (B1, B2, and B3), and foam blocks. If the panels have been cut carefully, these parts should only fit together one way.
4. Glue the bulkheads and transom to the hull bottom (H1) using CA glue. Ensure there is 1/2” of the bottom hull extending past the aft edge of the transom.
5. Glue the joiner panels to the hull bottom using epoxy or wood glue. This fuses the 4 bottom hull panels into a single panel. Use scraps of plywood and weights to obtain uniform downward pressure on the joiner panels while the glue cures.

6. Glue the 3 foam blocks to the hull bottom using epoxy. Use the deck panel (D2) and weights to obtain uniform downward pressure on the foam blocks while the glue cures.

7. With the hull sides (H2) laying on a flat surface, glue down the joiner panels (H7), leaving 1/2" of clearance at what will be the gunwales for edge trim. This fuses the 2 panels of each side into a single panel.

8. Glue the deck panel (D2) to the foam blocks using epoxy. Use weights to obtain uniform downward pressure on the panel. This creates a very rigid but lightweight composite sandwich suitable for walking and cargo.

9. Use CA glue to carefully glue the side panels to the side edges of the bulkheads and transom, starting at the transom and working your way forward. Leave 1/2" of the side extending beyond the aft edge of the transom. 1/2" of the sides should extend above the top of the bulkheads to leave room for edge trim.

10. Use CA glue to lightly bond the inside seem between the hull bottom and sides. This is temporary until the inside edges are fiberglass taped.

11. Working from the B2 forward, use CA glue to bond the forward bottom hull and side hull edges. Work slowly to get a smooth upward bend in the bottom hull. Use accelerator to speed up the cure of the CA. This is just temporary to hold the shape of the hull.

12. Install the forward deck (D3) using CA glue.

13. Install the aft deck (D1) to the transom and hull sides using CA glue.

14. Tape all of the inside edges of the hull using 2" wide fiberglass cloth tape with 8.5 oz weight or similar. Use a generous amount of epoxy right at the edge to ensure plywood edges are sealed. This step is important as it is the fiberglass tape that makes the hull rigid and strong.

15. After the epoxy is cured, lightly sand the edges of the fiberglass tape to remove sharp edges.

16. Coat the remainder of the plywood inside the hull with epoxy to water seal the inside of the hull.

17. Flip the hull upside down. Use epoxy and a filler (Q cell, glass microspheres, or similar) to create a thick putty. Fill gaps in the plywood seams and chines on the underside of the hull.

18. Sand the filler putty smooth, and round the chines to about a 1/4” radius of curvature.

19. Tape all of the plywood joints with 3” wide glass cloth tape. Tape the chines similarly. Round the joint between the hull and forward deck with a belt sander, and tape this joint as well.

20. Fiberglass tape all of the joints on the aft side of the transom with 2” wide glass

21. Apply a coat of epoxy to the sides and bottom of the hull. On the hull bottom, the epoxy should be just thick enough to self level, forming a smooth bottom.

22. Lightly sand any rough edges on the fiberglass tape. Lightly scuff the entire hull with 22 grit or similar sandpaper.

23. Clean the entire hull with a cloth wetted with water or isopropyl alcohol to remove any amine blush from the surface of the cured epoxy. Failure to properly prepare the surface could result in poor paint adhesion.
24. Prime and paint the hull with your choice of products. We recommend an oil-based finish, at least on the inside of the hull, as this paint seems more resistant to occasional gasoline drips from filling the gas tank.
25. For the hull bottom, you can use any number of finish products including one of the commercially available slick bottom coatings. Consider where you intend to use the boat and what you might be running over (grass, reeds, mud, sand, rocks, etc.) We just used two thick coats of oil-based high gloss polyurethane and have been very pleased with the results running over grass, some submerged tree limbs, and a muddy bottom.

**Builder Notes**

We'll add notes here as we further refine the Rascal and receive feedback from builders

1. The stock fuel pump on the Predator 22 is relatively weak and can't pull fuel up very far. In these plans, we've incorporated a platform directly in front of and at the same height as the engine so builders can use the stock fuel pump. If you choose to locate the fuel tank elsewhere, the engine will likely require a better pulse pump or an electric fuel pump.
2. We left the governor installed on the Predator 22 as this makes connecting the throttle cable very easy using existing cable end clamps on the engine. If you intend to rev the engine over 4000 rpm, you will need to disable the governor.
H4 – H8 are joiner panels that are bonded to the seems of larger hull panels
Panel Dimensions 1

B1 (cut 3)

B2

H3 (Transom)

D1

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Panel Dimensions 2

**H1b (cut 2)**
Width of part given at 4" intervals

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**H2b (cut 2)**
Measurements given at 4" intervals

**H7 (cut 2)**

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**H8**

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Panel Dimensions 3

H2a

H1a

96.0

31.5

15.7

96.0

7.5

9.75

9.75

0.25

0.5

0.5
Engine Stand
Weld from 1” x 1” x 14 ga steel square tube

Front view
Engine Stand

Top View

Side View
Prop Guard

Propeller guard made from 1/2" EMT or similar

Modify dimensions to suit your installation. This diagram is for a 56" propeller.

Front view
Prop Guard

Top View

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