CAR CONSTRUCTION

EQUIPMENT DIMENSIONS AND SPECIFICATIONS All specifications apply to all Quarter and Half classes unless otherwise specified.

Dimension's

1. Height Quarter Midgets: .....50" maximum, including roll cage
2. Length (Measurements include the bumpers) Quarter Midgets: 84" maximum Half Midgets: 76" minimum, 88" maximum
3. Tire Size Front Maximum 11" diameter Rear maximum 12 1/2" diameter. As branded by the manufacturer.
4. Weight Quarter Midgets: Minimum 160 lbs. Half Midgets: Minimum 170 lbs.
5. Wheelbase (Measured center to center of axle. Both sides must be within specifications.) Quarter Midgets: 42" minimum, 56" maximum Half Midgets: 48" minimum, 56" maximum
6. Wheel Tread (Measured center to center of tires.) Quarter Midgets: 28" minimum, 36" maximum Half Midgets: 28" minimum, 36" maximum

Car Construction

Axle

A. Axle, axle hubs, or axle nuts may not extend beyond the outer edge of the wheel rim.
B. All rear axles will be made out of aluminum, titanium or steel only.

Battery

A. All wet-cell batteries, which are mounted in the cockpit area must be enclosed and vented out of the cockpit area.
B. All batteries must be securely mounted to prevent loss during operation.
C. Battery and electronic ignition equipment not allowed on or in cars in the Honda and Briggs classes.

Belly Pan

A. The pan must extend from the front axle to the firewall.
B. The ground clearance shall not exceed 3.5".
C. The belly pan must be constructed in such a manner as to comply with
Refer to Firewall
D. Aluminum: minimum thickness 0.040"
(1) Steel: minimum thickness 0.025"
(2) No open holes in the belly pan.

Body Section

1. All cars must have a body which completely covers the driver's legs, a tail section, and a housing which covers the engine. The tail section can be the engine housing.
2. The body and tail section will not have any sharp edges.
3. Round the edges of the body and tail section inward, not outward for extra protection.
4. There will be no sharp corners – such as square corners. Make all corners and edges rounded in shape so as not to cut - if in an accident.
5. The majority of the bottom of the tail cone shall be no higher than the top of the bumper when normally installed. Access holes are allowed.
6. If the belly pan or the body does not enclose the front end it must be enclosed by using heavy screening or metal sheeting meeting the following specifications.
   (1) Screening Minimum material: ..... . Metal wire
   Minimum material dimension: .....0.048"
   Maximum mesh dimension: .....1/2" spacing
   (2) Metal sheeting Minimum material thickness: ……0.048"
   Maximum hole diameter: ..... 1/2" (if perforated)
7. There will be no fenders, spoilers or air deflectors on roll cage, body, engine housing or tail section.
8. Any radical changes in body, tail section, or side panels must be submitted for approval to the POWRi Technical Directors
9. All cars must have side panels on both sides of the cockpit and engine compartment. There must be a 2" min. diameter hole in the right side to access the flywheel for seal painting the nut.
10. Maximum height of the body is 28 inches as measured from the bottom of the lower frame rail (hood and tail cone).
11. The side panel must extend a minimum of 6", to a maximum of 22" in height, as measured from bottom of lower frame rail. Side panels will include everything from front bumper to rear bumper.
12. Sail Panels on either side of the cockpit may extend to top of the roll cage and may not extend forward past a cross plane established by the seat back. They must be supported on all edges by steel frame members.
13. Visors are permitted, 3" max height measure from the bottom of the front halo cage bar and must remain between uprights and attached securely (recommended Dzus buttons or zip ties). 7" max overall length. All visors are subject to review by the Technical Director and Safety Director.
14. All POWRi members' cars are required to have a POWRi and Hoosier Tire Sticker on the exterior right side of the car or they cannot pass a safety inspection and will not be allowed to qualify or race.

Brakes

1. Brake to be activated by a foot pedal.
2. A minimum of one wheel brake is required, located on the rear axle, sufficient to lock the drive wheel(s).
3. No plastic brake lines allowed.

Bumpers

1. All cars must have front and rear bumpers.
2. All cars must have double bumpers with two connecting tubes welded in place.
3 All bumpers (front and rear) may not extend beyond the side of the main lower or upper frame rails. The main frame rails must be straight from front to the back of the car. And the bumper must hook inside the main frame rails. No bumper parts past the outer edge of the main frame rails. No addition of material in front of or behind the main bumper hoop. Example - no gussets, no extra bars for reinforcement or anything extra on the bumper. This is mandatory.
4. Any design that does not meet this spec, must be approved by the National Tech. A detailed drawing must be sent to the National Tech. These bumpers must carry their letter of approval for verification at all events.
5. The bumper tubes (front and rear) shall be mounted over each other with a maximum of 15 degrees rake as measured from the vertical. They shall have at least two inches radius bend on the ends and be mounted to the frame of the car in order to prevent hooking or lifting. 1st Offense: Warning (48 hours to fix), 2nd offense DQ from class.
6. The tubes should be no closer than two inches apart.
7. The bumpers will be strong enough to be used by the handler to lift the car, must be fastened with 2 bolts, one on each side, and must be approved by the Safety Committee.
8. Bumpers will be of tubular metal construction. Titanium and/or composite materials shall not be used.
9. Front and Rear bumpers to be bolted and bolts must be 6/32 to max 10/32 grade 5 or better. Minimum tubing wall thickness of 0.049”

Drive

Quarter Midgets:

10. Drive must be direct, no clutches allowed.

Half Midgets:

11.Drive may be either direct or clutched.

Drive Chain

12.Chains and sprockets must not be exposed to the driver or handler while race car is in motion.

Drive Wheel

13. All cars must run right rear drive/left wheel is optional.

Engine

(A) **NOVICE CLASS**: Honda 120
(B) **HONDA 120 CLASS:**
(B) (1) Honda GX120K1HX2* and HX2 6
(B)(2) Honda GX 120J1HX2
(B)(3) Honda GX 120 GCAHK-10085093 and up
(C) **SUPER STOCK CLASS**:
(C) (1) Continental AU7R
(C) (2) Continental 717
(C) (3) Detroit Engine DE7R
(C) (4) Deco Grand DE2R
(C) (5) Deco Grand DE7R
(C) (6) Deco #300

(D) **HONDA 160 CLASS**:
(D) (1) Honda GX160K1HX2* and HX2 6
(D)(2) Honda GX 160J1HX2
(D) (3) Honda GX 160 GCACK-1120414 and up
(D) (4) Honda GX 160 UT-2 HX2 GCBPT and up
(E) **MODIFIED, B, AA CLASS**
(E) (1) Continental AU7R
(E) (2) Continental 717
(E) (3) Detroit Engine DE7R
(E) (4) Deco Grand DE2R
(E) (5) Deco Grand DE7R,
(E) (6) Deco #300
(F) **HALF MIDGET: HALF MIDGETS MUST COMPLY WITH THE FOLLOWING SPECS**.
(F) (1) 4 Cycle, Single Cylinder
(F) (2) 253 CC maximum displacement
(F) (3) No blowers or fuel injection
(F) (4) Single Crankshaft
(F) (5) No Water Cooled Engines
(F) (6) No Free Spinning Flywheels
(F) (7) All Briggs World Formula/Animal based engines must use scatter shield per POWRi drawing.
(G) **WORLD FORMULA CLASS:**
(G) (1) Briggs and Stratton World Formula
(H) **ANIMAL CLASS:**
(H) (1) Briggs and Stratton Animal
(I) **ALL CLASSES:**
(I) (1) Air cooled only and no external liquid cooling devices
(I) (2) No blowers or fuel injection
(I) (3) No freewheeling type flywheels. Definition of type flywheel: they are the type whose fins continue to rotate after the engine has been shut down.
(I) (4) Gearbox is not considered part of the engine; therefore, any type of gearbox may be used, except for Honda 120, Honda 160 and Animal which must use the stock gearbox and gear.
(I) (5) No Water Cooled Engines in any POWRi Class.
(I) (6) No External Cooling Devices of any kind in any POWRi Class.
(I) (7) Any modifications to existing POWRi engine tech manuals will be updated and be approved by the POWRi National Tech Directors and changes will be posted to POWRi website.

Engine Housing

1. All cars are required to have a catch can if the engine is vented. All breathers, engine vents and catch cans are to be placed under the engine housing or tail section. (In case of an accident, this would help prevent oil from flowing onto the driver.)
2. The frame cannot be used as a catch can.
3. Carburetors are to be completely within the engine housing covered in such a way as not to protrude.
4. Smaller tail section, the carburetor may have to be covered with a bubble or scoop, securely attached to the tail section. The bubble or scoop must either be completely closed or rear-facing so as to not capture air.

Exhaust System

1. The exhaust system must extend outside of the engine compartment.
2. Any exposed portions of the exhaust system shall not be higher than the rear tire.

3. No portion of the exhaust system may extend outside of a straight edge extending from the rear edge of the rear tire and the extreme rear of the rear bumper, must be intact at the scales.
4. Forward exhaust pipe (including mufflers) shall not extend outside of the nerf bar.
5. All POWRi Quarter Midgets and Half Midgets will run a 4 to 8 horsepower Briggs & Stratton Part 3294599 or equivalent. No holes in muffler baffles. Inside seam of baffle must be straight edged. (Note: Some seams may not be parallel in baffle) It is OK to weld a washer or nut on the flange for a place to apply safety wire. **NOTE**: See Animal class exception.
6. Honda 120, Honda 160, WF, Animal classes must utilize a tailpipe and muffler conforming to specifications published in the appropriate tech manuals. You cannot cut off the threaded inlet if it is to be used in a Honda. Muffler rule: hand tight, turn back out, anything more than 1/2 turn - DQ.
7. Animal classes may use “candy cane” exhaust with RLV #4100 muffler.
8. All quarter midgets and half midgets, if any part of the exhaust system comes off during any race, the car may be brought in under yellow for repair, but must be repaired with no leaks by fall of the checker flag. If not repaired properly, this will be a DQ at the scales.
9. All quarter midgets and half midgets, all exhaust must pass thru the muffler, any exhaust that is tampered with will result in a 30 day suspension.
10. It is recommended that all exhaust pipes are wrapped with "header wrap" or "heat sleeves." For Example - Thermo Tech, Long Acre and/or DEI.

Firewall

1. A metal firewall is required between the driver and the fuel tank.
2. The firewall and belly pan must be constructed so as to prevent fuel from entering the cockpit.
3. Allowable materials for firewalls are listed below:
   (1) Aluminum: Minimum thickness: 0.048”
   (2) Steel: Minimum thickness: 0.025” 13.
4. No open holes in firewall. No "duct" tape. The hole must be filled with pop rivet or bolt to prevent of any "melting of duct tape."

Frame

1. The frame for any new cars built after 3/1/2000 must be manufactured from SAE 4130. Effective 1/1/2009 all cars must be manufactured from seamless, cold-drawn, SAE 4130, Chrome Moly (chromium molybdenum) tubing, extending forward from the top of the roll cage to approximately the front bumper (down-tube design).

Fuel

1. Honda 120, Super Stock, Honda 160, Mod, B, WF, Animal: Gasoline, automotive type only; no white or aviation, no additives.
2. Modified WF, AA & Half: Straight methanol or gasoline, no additives.

Fuel Lines

1. All fuel fittings must be automotive type. Fuel line must be attached with any positive stop clamp.
2. All fuel lines must be rated for gasoline/methanol use and be in good condition. No clear vinyl/PVC type tubing.
3. A fire-resistant sleeve must be used over any fuel lines that are not a heavy wall SAE/USCG line or stainless braided fuel line. Fire-resistant cover must be one piece, not a wrap. The cover must fit and be in good condition.
4. No cool cans or other device for cooling the fuel in any class. No device used to reduce the temperature or remove energy from the fuel system, including dry ice in the fuel tank.

Fuel Filters

1. Fuel filters must be of a metallic type of material. Aluminum or Steel only. No glass or plastic filters allowed. The filter may NOT exceed 1.5 inches in diameter and 3.0 inches in length.

Fuel Tanks

1. All fuel tanks must be vented below the belly pan. (The tank lid hole must be plugged) (Rollover cap allowed)
2. No pressurized tanks.
3. All fuel tanks must be securely mounted to the frame as not to move inside the tail section. If hose clamps are used minimum of two.
4. Only Aluminum fuel tanks are permitted. Minimum wall thickness of 0.050". No coatings or anodized exterior finishes are allowed on fuel tanks.
5. If the fuel cap comes off on the racing surface for any reason, it is an automatic DQ.
6. Fuel tanks cannot be replaced during a race; penalty is DQ from that race.
7. Only one fuel tank may be used.
8. Maximum fuel tank size 140 ounces.

Fuel Pumps

1. Super Stock, Honda 120, Honda 160: No fuel pumps of any type allowed.
2. Modified, B, AA, Modified WF, WF, Animal, and Half Midgets: Vacuum type fuel pump, which will automatically deactivate if the engine stops, (vacuum operated only), Maximum allowable pressure: 3 PSI

Nerf Bars

1. All cars must be equipped with nerf bars (side bumpers) at the front of the rear tire to prevent tires hooking or locking together.
2. Nerf bars must extend outward to a minimum of the center of the rear tires, but must not extend beyond the outside edge of the tires. The outside edge will be checked with a straight edge from the rear tire to the front tire on each side of the car with the wheels parallel to the frame of the car.
3. Nerf bars will be of steel construction. Titanium and/or composite materials shall not be used.
4. Left and right nerf bars to be bolted with min. #6-32 to max #10-32 bolts grade 5 or better. Minimum tubing wall thickness of 0.049." Solid steel nerf bars are allowed on the left side ONLY.

Radius Rods

1. Radius rods, steering rods, and track locating rods will be constructed only of aluminum. Titanium and/or composite materials shall not be used.
2. A rod end adapter into which the Rod-end bearing is threaded may be constructed from non-ferrous material; however, the maximum length of adapter is 1 1/2".
3. Bird cages, torsion bars, and sway bars are excluded from the aluminum construction requirement, however, titanium and/or composite materials shall not be used.
4. The definition of an axle radiusing device is as follows: an axle locating device that is fixed on the axle-end and with bearing on the chassis attaching end (for example: a wishbone).
5. An axle radiusing device must be made of aluminum.
6. There is no length limit on an aluminum radiusing device.

Roll Cage

1. All front and rear roll cage uprights (vertical bar) must form a cockpit to completely enclose the driver's shoulders and head when the driver is sitting upright. All new manufactured chassis must be a down-tube design extending from the top of the roll cage to approximately the front bumper. No bolt on halo extension bars are allowed above the roll cage. Welded on extensions or “halo” bars that are added above the original roll cage top may not be used as the measurement point for the helmet clearance requirement of 1”. Effective 2009 all roll cages for all cars must be manufactured from seamless, cold drawn, SAE 4130, (minimum wall thickness 0.058”) Chrome Moly (chromium molybdenum) tubing, extending forward from the top of the roll cage to approximately the front bumper (down-tube design) .
2. No wings or other aerodynamic features are permitted on the roll cage.
3. There shall be no less than 1” clearance between the top of the driver’s helmet and the bottom of the top cage bars, three inches is recommended. The driver must be in the car at the Safety Inspection and it must be checked off on the safety inspection sheet. Please see the POWRi website for the Helmet Clearance Measuring Procedure and the Pit Steward Procedure.
4. Roll cages that exceed 34” from the top of the bottom frame rail to the top of the roll cage must use a minimum 7/8” O.D. tubing and have a minimum wall thickness of 0.058”. Also roll cages exceeding 34” must have two rear support bars that attach to the roll cage not more than four inches from the top of the roll cage, and extend downward towards the rear of the car, and must be mounted to the rear part of the frame or frame superstructure.
5. Support bars shall be constructed from a minimum of 5/8” O.D. tubing, and have a minimum wall thickness of 0.049”. Support bars may be bolted or welded to the roll cage and frame or frame superstructure, but holes cannot be drilled in the roll cage for the purpose of bolting the support bars to the roll cage.
6. Existing roll cages in use as of 1984 that are over 34” must add the support bars, but are not required to change the diameter of the roll cage. Also, roll cages in use as of 1984 that are made of 0.058” stainless steel are legal for continued use.
7. All roll cages are to be inspected and approved by the National Tech Directors.
   See New Car Construction Approval Process on POWRi website.
8. Helmet hooks are not allowed.

Safety Belts

1. All cars must have a web type safety belt with a quick release buckle. The safety belt must be securely fastened to the frame. Pull up lap belts are recommended.
2. Drivers will be required to use them at all times.
3. The safety belt should be located so that the pressure is across the drivers’ hips.
4. Metal to metal fittings at the quick release is preferred.
5. A dual shoulder harness (five-point safety belt) or strap is mandatory, and must have a quick release fastener approved by the Safety Committee.
6. The shoulder harness/straps shall be worn securely across the right and left shoulders.
7. No restraining device of any kind is to be used to keep the driver’s head or body outside the roll cage, with the exception of attaching both shoulder straps to the left upright bar of the cage.
8. FOUR YEAR REPLACEMENT (any belt from 2013 to current that falls under the 4-year rule)
9. Shoulder belts must not be retained by shoulder loops or epaulets on the driver’s suit.
10. SFI 16.1 Belt 1-3/4 Minimum or 16.2 Belts
11. The use of cam lock belts will be allowed
12. Seat Belts will not be allowed to pass through the firewall.

Shoulder Bar

1. A left side shoulder bar will be mandatory on all cars, and must meet the following specifications:
2. SAE 4130 Minimum diameter: 5/8" O.D. Minimum wall thickness: 0.049"
3. Stainless: Minimum diameter: 5/8" O.D. Minimum wall thickness: 16 gauge - 0.065"
4. The shoulder bar must be securely fastened to the nerf bar and roll cage upright at the firewall. The shoulder bar may be welded, mounted with split clamps or nerf style spuds. If spuds are used, the bar must be retained by #6-32 to #10-32 grade 5 or higher steel bolts. No clevis, rod ends, cotter keys, or hose clamps may be used. Flat plate bolting of the shoulder bar to the nerf bar is acceptable and securely fastened to the cage.
5. The shoulder bar must be securely fastened within the following area: nerf end: - between the left most point of the nerf bar and a point four inches inboard of the left most point. Cage end: the shoulder bar must extend at least as high as the top of the tail cone.

Steering

1. No cables are allowed for steering systems.
2. The steering system must be designed so the drivers' legs cannot impair right or left steering.
3. A car sitting on the ground with or without the driver must have steering that does not go past center in either direction, so that it will not lock in one position.

Steering Wheel

1. All steering wheel hubs must be padded.
2. The steering wheel pad will be a minimum of one-inch thickness, and two-inch minimum outside diameter.
3. Steering wheel shall not be constructed of titanium and/or composite materials.
4. No Data acquisitions allowed on the steering wheel.

Shock Absorbers

1. Any type shock absorbers are permitted.
2. No change or adjustments to car or engine settings except to turn fuel valve on or off may be made to any Quarter or Half Midget race car by any method, while it is on the racing surface. Methods specifically include, but are not limited to, driver actuated and remote controlled. Additionally, no device, system or other method capable of making changes to these settings will be installed, permanently or temporarily in any car. This includes practice sessions occurring on a scheduled race day

Switch

1. A functional on/off ignition kill switch is required.
2. The kill switch is to be located so that it will be operated from inside the drivers' compartment.
3. It is mandatory that the switch be located in the upper left portion of the drivers' compartment or on the steering wheel.
4. The driver's knee should not be able to contact the switch or its mounting bracket.
5. Attention should be paid to installation so that sharp edges and pinch points do not exist.
6. The switch must be installed so that when the handle is down or to the rear the ignition is off.
7. No more than one ignition kill switch is allowed. Exception: cars running in the novice class MUST have an additional switch mounted on top and recommended to be mounted on the right side of the roll cage to allow easy access for trainers, corner workers, or handlers. Switch must be operational to stop the engine. The extra switch must be removed upon graduation from Novice class.

Weights

1. No loose weights.
2. No weights are to be added or fastened to the inside or outside of any nerf bars, front or rear bumpers or shoulder bars. No weights shall be fastened to the roll cage.
3. Ballast cannot be mounted any higher than 5" above the bottom of lower frame rail. No ballast can be mounted to the body panel. Ballast can be mounted in the left side kick out, but must be bolted to a metal kick out floor pan. A tab or a frame upright. Ballast in the kick out cannot be mounted to the Side of the body panel or to a fiberglass floor. The kick out floor pan must be attached to the chassis with tabs, bolts or rivets in order to attach any ballast. All weights attached through metal belly pans shall be secured with a min. 1.5" fender washer and bolts so that the bolt heads will not pull through the belly pans. Two (2) bolts are required if ballast is 6" or larger in length or width.
4. All lead weights must be covered.

Windshield

1. No windshields on cars.
2. No mirrors on cars.

Measuring, Sensing, and Sending Devices

1. All data acquisition and measuring devices shall be mounted securely within the roll cage or down tubes and the readout display shall not be operated nor be in the sight of the driver.
2. In car video cameras are permitted if mounted per the provisions in 1.
3. All metal specifications listed in the manual are subject to industry standards and tolerances.

Wheels

1. No composite wheels.

New Car Construction Approval Procedure (applies to all POWRi cars)

1. Communicate with National Tech Director the intent to build a newly designed car for use in POWRi.
2. Must submit materials list in compliance with POWRi rules to the National Tech Directors.
3. Obtain approval to proceed from the POWRi Tech Directors.
4. Submit detailed pictures and/or drawings of the chassis.
5. Obtain approval to proceed from the POWRi Tech Directors.
6. Submit photographs of completed car to the POWRi Tech Directors.
7. The POWRi Tech Directors will coordinate approval with the POWRi National Board of Director at each step in the process.

Tires

1. The POWRi Quarter Midget League requires all four corners to be Hoosier Tires for Pavement & Dirt . (See approved Tires on the POWRi Website.
2. All race cars participating in a POWRi event will display a Hoosier decal, on the exterior right side of the vehicle.

Front Suspension

1. No rocker arm, bell crank, or cantilever type suspension is allowed. If rear torsion bar suspension or a rear sway bar is used, the bottom of the rear shocks may be mounted to the arm that connects the birdcage to the torsion/sway bar. All shocks and springs must be mounted from the chassis down to the axle, birdcage, and/or rear torsion/sway bar in a manner that keeps the shock and spring in an upright position; no greater than a 30- degree angle from 90 degrees. The shock and spring will be on a vertical plane from the chassis to the axle, birdcage, and/or rear torsion/sway bar arm; to which the bottom of the shock is connected.