Technical Manual

(Engine, Hull, and Driver Safety Equipment)

2025 (R5)

SPIRIT AND INTENT / DISCLAIMER

The H1 Unlimited (***"H1"***) Rules and Regulations, including this TECHNICAL MANUAL are intended to be guidelines for establishing fair competition and to promote H1 in a most positive light, all in accordance with the H1 Mission Statement. It is expected that all Participants (Drivers, Pit Crew, Race Officials, Owners and Promoters) and their respective directors, officers, agents, employees and volunteers will adhere to the "spirit and intent" of this Technical Manual. Participants should not "read-between-the-lines" in an attempt to circumvent this Manual's requirements.

It is also the intent of H1 that Race Officials make decisions and resolve disputes arising from the requirements of this Manual in a timely manner.

If you are contemplating an undertaking that is not directly addressed herein, please contact H1 to make sure it will be allowed.

This Manual applies to all H1 sanctioned or promoted events and, by participation in these events (or with respect to an Owner or Owner's Representative by registration of a Boat), all Participants are: (A) deemed to have understood and agree to comply with the Manual's requirements; (B) that no express or implied warranty of safety shall result from publication of, or compliance with, such requirements; (C) that such requirements are intended as a guide for the conduct of the sport and are in no way a guarantee against injury or death to Participants, spectators, or others. Further, all Participants recognize and understand that H1 events have risks and hazards which include potential illness, potential injury, including but not limited to bodily injury, paralysis, or death, and potential for property damage. All Participants, by their participation expressly and voluntarily agree to assume those risks and hazards however caused; and understand that such injury may be permanent or temporary in nature and may be compounded by negligent rescue operations of H1, another Participants or first responders.

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NOTE: REFER TO THE **GENERAL RULES** SECTION FOR *DEFINED TERMS*

H1 2025 Technical Manual

A• GENERAL

1. RULES and COMPETITION COMMITTEE

The Rules and Competition Committee is a committee appointed by the H1 Board of Directors created to establish, maintain, and regulate safe and fair competition. Specific duties and responsibilities of such Committee are outlined in various places in the rulebooks, and is defined in General Rules – Section Q.

2. RULES ENFORCEMENT

a) The rules set forth in this Technical Manual shall apply at all times that a Boat is on the water during a Race, including Time Trials. Any such rule that involves driver or general safety (in the reasonable opinion of Race Officials) shall apply at any time a Boat is on the water, including, without limitation, testing and any other time that the applicable Race or test period insurance is in effect.

b) H1 reserves the right to take whatever action it deems necessary to enforce these rules, including but not limited to, impounding any Boat, parts, components and/or systems for inspection purposes as specified in **Technical Rule A7.**

c) The H1 Board of Directors shall act upon recommendation from the Rules and Competition Committee to prohibit the use of any part, component and/or system it deems shall give a Boat an unfair competitive advantage.

3. COMPETITION DIRECTIVES

H1 may publish Competition Directives (CD) during the racing season to amend, clarify or interpret these rules. A Proposed Competition Directive(s) shall be presented to the Rules and Competition Committee, if possible, for review and input prior to a vote of the Board of Directors. Each CD shall be approved by a majority vote of the Board of Directors either in person, by telephone, email or text messaging. A Competition Directive shall become effective upon the date of publication by H1, regardless of when a Race Team receives actual notice thereof.

4. PENALTY & FINE SCHEDULE

a) ***Technical Violation***. At any time a Boat (i) is presented for inspection at a Race or (ii) enters the racecourse in violation of this Technical Manual, the Owner shall be fined **$500** and the Boat shall be prohibited from participating in that or any other H1 Race, including Time Trials or testing, until such time as the violation is remedied by conforming to the provisions of this Technical Manual. The Owner shall also reimburse H1 for the reasonable costs of any additional inspection required to assure compliance, after a violation is levied.

b) ***Performance Violation***. With respect to **Technical Rules C5-8**, any Boat determined to commit a Flagrant Fuel Flow Violation or a Flagrant N2 Violation; or deemed to have made an attempt to circumvent or have successfully circumvented the intent of such Rules, including by way of tampering with, rendering inoperative, nullifying or **failing to maintain** any portion of the Data Recording and Distribution System, **in addition to the penalties of a *Technical Violation* immediately above**, such Boat shall receive the following penalties:

(i) ***Race:*** The Boat shall be disqualified and receive no points or placing in the applicable Heat of the infraction.

(ii) ***Time Trial:*** The applicable speed shall be recorded as TIME NOT RECORDED and no points awarded.

Each (i) and (ii) are in addition to the financial and participation penalties described in a) immediately above.

Note: *Race Teams (and not H1) are now responsible for the day-to-day performance of the Data Recording and Distribution System under* ***Technical Rule A11****.*

c) ***Safety Violation.*** Any driver who enters the racecourse and/or continues to race without such safety equipment, system, or structure described **in Technical Rule A17** properly installed, attached, or operating shall be black flagged, and disqualified and receive no points or placing in the applicable Heat, **in addition to the penalties of a *Technical Violation*,** described in a) above.

5. PROTESTS AND APPEALS

Note: There is no protest or appeals process that applies to the Racing Rules. Protests and/or appeals must relate to the technical conformity of a Boat under this Technical Manual.

a) ***Protests.*** A (participating) Race Team may – one time during each Race - protest the *technical* conformity of another Team's Boat to the Rules set forth in this Technical Manual) by filing a written protest with Race Officials – at the earliest possible opportunity – but no later than one-hour after the final Heat of the applicable Race. Such protest shall be made by the protesting Owner or Owner's Representative. Any such protest shall be accompanied by a "protest fee" of **$1000** per claimed violation.
   (i) If the protest is found to be invalid (i.e., the challenged Boat is determined to be legal), the "protest fee" shall be divided as follows: **½** to H1 (for the inspection budget) and **½** to the challenged Race Team.
   (ii) If the protest is found to be valid (the challenged Boat is determined to be violative), the "protest fee" shall be returned to the protesting Race Team.

b) ***Appeals.*** The Race Team of a violative Boat shall have the right to appeal any adverse decision made by Race Officials under the Rules set forth in this Technical Manual (including as a result of a protest) by filing a written appeal with Race Officials – at the earliest opportunity – but no later than twenty-four (24) hours after being notified of an adverse decision by H1 or Race Officials. Such appeal shall be made by the appellant Owner or Owner's Representative. The appeal fee shall be **$500**.
   (i) If the appeal is overruled by Race Officials or withdrawn by the appellant, the **$500** shall be retained by H1.
   (ii) If the appeal is sustained, the **$500** shall be returned to the appellant.

c) Protest and appeals procedure:
   (i) Protestors must specify the Rule being challenged along with a detailed description of the part or system being protesting and why it provides an *unfair competitive advantage*.
   (ii) Once the protest or appeal is received by Race Officials, it shall be forwarded to a three-person "appeals committee" consisting of the Chief Inspector, the Chief Referee, and the Chairman of the Board of Directors of H1 (or each of their designees) none of which may have an interest in the outcome of the appeal.
   (iii) The appeals committee may rule immediately on any protest or appeal if conditions allow or if safety is compromised, or they may, more likely, defer their decision to a later time, allowing all involved parties a proper hearing on the merits of their position, and the availability of technical resources.

d) Penalties from protest/appeal:
   (i) Any penalty both: (a) arising from a protest and (b) levied in connection with a Technical Violation, is limited to such financial penalties and "prospective" prohibitions on participation (each as described in **Technical Rule 4a)** above).
   (ii) A Boat will not – due to a protest – be retrospectively disqualified from a Heat in which it participated even if it is deemed to have committed either a Performance Violation or Safety Violation. Similarly, Heat placement will not be restored on appeal. But, in either case (protest or appeal), a Performance Violation so determined may result in forfeiture (or reissuance/adjustment on appeal) of national points or prize or tow money awarded, in the sole determination of the appeals committee.
   (iii) ANY ACTION BY A PARTICIPANT CONTRARY TO THE SPIRIT AND INTENT OF THIS **TECHNICAL RULE 5** (PROTESTS AND APPEALS) – INCLUDING TIMING OF A PROTEST TO GAIN AN UNFAIR COMPETITIVE ADVANTAGE – MAY BE SUBJECT TO DISCIPLINE UNDER THE H1 RULES AND REGULATIONS (INCLUDING **GENERAL RULE R** AS MAY BE AMENDED OR SUBSTITUTED INCLUDING BY COMPETITION DIRECTIVE).

Note: Maintaining the Minimum Speed in connection with a start is a Racing Rule and not subject to protest or appeal under the provisions of this Technical Manual, other than penalties relating to the Data Recording and Distribution System described in Technical Rule 11.

6. NON-DISCLOSURE AGREEMENT

All Race Officials shall not disclose to any party who is not a Race Official any information declared to be proprietary by any Race Team. **This shall apply to information obtained in the performance of duties or otherwise. This non- disclosure agreement is binding until the termination of said Directors or Inspector's association with H1, and for two (2) calendar years thereafter.** A non-disclosure agreement form shall be signed each year by all Race Officials and kept on file with the H1 office. This non-disclosure policy shall not apply to information regarding anything used to circumvent H1 Rules and Regulations, included in this Technical Manual.

7. INSPECTION & COMPLIANCE

a) Inspection Sealing
   (i) Race Officials may choose at any time to seal or impound any item or number of items, including the Boat to prevent tampering and/or for inspection at a later time. Certain items shall be sealed per these rules.
   (ii) H1 is not responsible for payment, reimbursement, damage, or loss to the Race Team as a result of such sealing or impounding.
   (iii) Items sealed by Race Officials shall remain sealed until the seal(s) is /are broken by Race Officials.
   (iv) Unauthorized breakage of seals by anyone other than Race Officials shall result in a **$500** fine and/or disqualification from the Race, if applicable.

b) Inspection of Boats / Compliance
   (i) Race Officials shall have the authority to check compliance to all rules set forth in the Technical Manual at any time.
   (ii) Race Officials do not have the right to waive any rule or allow a Boat to run in non-compliance of these rules.
   (iii) Race Officials shall conduct a pre-race safety inspection of all boats.
   (iv) Race Officials shall be in the Pits during the race to perform safety checks as may be required.
   (v) Race Officials shall inspect every Skid Fin rod on every boat at the conclusion of a qualification run, and every Heat, of every race.

c) At the conclusion of the final Heat of a Race, the 1st and 2nd place boats shall be impounded for the purpose of inspection. At the option of the Race Officials, any other boat starting the final Heat may also be impounded.
   (i) The impound period shall not **exceed four (4) hours** after the official results are posted, unless determined otherwise by the Chief Inspector.
   (ii) During this period, nothing shall be done to the boat without specific permission and direction of Race Officials, except for removing the drain plugs.
   (iii) The Engine Cowling shall not be removed, and no one (other than Race Officials) shall access the Cockpit.
   (iv) The Propeller shall only be allowed to be covered.

d) Following an accident or repair of damage, the damaged Boat shall be inspected and weighed by the Race Officials before re-entering competition.

e) Race Officials have the authority to disqualify a boat from competition if (in their reasonable technical opinion) they believe a Boat is unsafe or not seaworthy.

f) All registered Boats shall undergo an Annual Inspection (Annual) conducted by H1. The Annual shall be completed before the Boat is allowed to compete. The **Annual Inspection Summary Form** (attached hereto as **Appendix D**) contains a generic diagram of an unlimited Hull.
   (i) The Crew Chief shall, at the time of inspection, outline on this diagram all internal tanks, annotating them as to contents (e.g., fuel, oil, water).
   (ii) Further, it shall be his responsibility to advise the H1 if internal Hull changes are made during the season.
   (iii) The Crew Chief shall mark such changes on the diagram; he shall keep a current copy on hand and submit a copy to H1.

   The annual inspection shall be completed by **May 31** of each season unless other arrangements are made with H1, otherwise a **$500** fee shall apply.

8. CONSTRUCTION & REPAIR

a) Permission to Build
   (i) All new Hulls must have received an approved "permission to build" Form from H1, and such Hull must be built and maintained in accordance with the specifications and standards established by H1. This form is valid for 12 months from date of issuance.
   (ii) Copies of a "permission to build" form with the specifications and standards for construction can be made available by H1 on request by a builder, owner, or designer of the Hull contemplated being built.
   (iii) Failure to obtain proper permission to build and construction inspection shall subject such new Hulls to an additional **$1,000** inspection fee.
   (iv) The builder shall file a completed permission-to-build form outlining his or her intentions, including identifying any changes from current construction techniques for H1 review.

(v) The permission to build form shall be revised as needed and shall specify the need for initial inspection prior to deck installation, followed by a second at completion.

b) Inspection Request
   (i) All Hulls undergoing major modification, reconstruction, or repair must file an **"inspection request"** form. Failure to file an "inspection request" form and undergo subsequent inspections shall result in an additional **$1000** inspection fee.
   (ii) Any damage incurred and repaired at a race site shall be inspected by Race Officials and shall not necessitate the filing of this form.
   (iii) A **"Request to Inspect" form** shall be created to cover the need for inspections prior, during, and post repair of damage.

9. BOAT NUMBERS & REQUIRED GRAPHICS

a) H1 Boat Registration designated Letter and Number shall be displayed together on a horizontal surface of the Boat; and must be a minimum of 16 inches in height and be of a color that contrasts to the surface upon which it is applied.
b) Race Teams fielding more than one Boat shall mark the Transom of each Hull (in a manner acceptable to H1) to identify such Hull; and must modify the appearance of the Hulls for Race Officials to distinguish one from the other(s) while at a Race.
c) H1 required graphics must appear on the vertical surfaces of the Horizontal Stabilizer and Cowlings, when required.

10. RADIOS

Each boat shall be equipped with a working, FCC-licensed two-way radio capable of a minimum of shore to driver transmission and reception. (The intent of this rule is to enable relayed communications between Race Officials and the Driver.)

a) The license shall be reviewed at each annual inspection and the licensed frequencies noted on the Annual Inspection Summary (included herein as **Appendix D).**
b) The Race Officials may test at random the operation of each Boat's radio during a Race (including Time Trials and any testing period).

11. DATA RECORDING & DISTRIBUTION

a) H1 shall issue to each Race Team and each Boat shall compete with an H1-furnished data acquisition and recording device (the ***"Data Box"***) to monitor and record the following parameters:
   (i) Fuel flow,
   (ii) N2 or Engine output shaft speed,
   (iii) Boat speed, and
   (iv) any other parameter H1 reasonably determines to monitor.
b) The Data Box shall be installed per H1 issued guidelines and sealed by H1.
   (i) The Data Box shall be mounted inside the Cockpit or in a protected location, such as under the deck, which is easily and quickly accessible.
   (ii) Any location other than inside the Cockpit or under the deck may be considered and must receive approval in writing by the Chief Inspector.
   (iii) The intent is to protect the Data Box and connectors from the harsh environment of the Engine compartment.
c) The maximum length of the flow meter and N2 sensor cable harness shall be 15 feet.
d) The **Crew Chief** shall designate one **Crew Member** as the ***"Boat Data Contact*** at each Race.
e) Race Officials shall make the data available to the Data Contact as soon as possible after the on-water activities have been completed each day by one of the following methods:
   1. Download the data onto the team's portable storage device. There shall be a designated section inside the technical truck where the Boat Data Contacts may collect this information.
   2. Upload the data to a shared drive accessible by the team's Data Contact.

   There shall be no data released until the Race Officials have viewed and made decisions based on the data.
f) H1 shall issue one set of cables, sensors, and Data Box to each boat at each race.
g) Upon completion of any Heat, the Data Box shall be removed immediately prior to the Boat being lifted out of the water and taken by the Boat Data Contact directly to the H1 technical truck. All flow meters, cables and the Data Box must be clean and serviceable when returned to the H1 truck. Any additional cables, sensors or Data Box required due to abuse, damage or destruction shall be furnished at **150%** of the cost of the replacement parts.

(1) The replacement cost for the 15-foot N2 sensor and cable is **$300.**
(2) The replacement cost for the Data Box fuel harness is **$300**
3) The replacement cost for the GPS transmitter is **$300**

12. TELEMETRY

a) One-way telemetry (from Boat to shore only) shall be allowed.
b) No form of radio-controlled devices or actuators may be used at any time.

13. ON-BOARD VIDEO CAMERAS

(a) All Boats shall be required to carry a minimum of two (2) on-board video cameras (or equivalent housing(s)) installed by H1 (or its designee) for all Heats. These cameras are the property of H1 and may be used by H1 for any purpose, including for marketing, promotion and televising the sport. All footage from such on- board video cameras shall be the property of H1 and all rights are retained by H1.
(b) Camera locations shall be determined by H1 and limited to the a) Horizontal Stabilizer; b) Engine Cowl (front or rear); or c) Cockpit (inside). Note: if camera is to be located inside the cockpit, mounting hardware is to be installed no later than two hours prior to the boats hitting the water.
(c) A Race Team shall not tamper with, remove or fail to return any such Boat-mounted camera.

14. COMPRESSED AIR BOTTLES

All compressed air bottles used in the Pit area, regardless of purpose, and compressors used to refill said bottles shall be subject to the following rules:

b) All compressed-air bottles shall be visually inspected on an annual basis.
c) A current "VIP" sticker and current DOT hydro date shall be displayed on every bottle at all times.
d) During refilling at the race site, compressors shall be located away from areas where people congregate.
e) During refilling at the race site, compressors shall never be left running unattended. The compressor air intake shall draw clean untainted air.

15.LIFTING SLINGS

f) All components used to lift the Boat must be in good condition. Metal parts must be free of rust, wear, and cracks; nylon parts must be free of wear or fraying. No aluminum collector rings are allowed. The only approved boat-lifting sling is of the four-leg nylon type. The use of spreader bars is not allowed.
g) Rings – Collector rings shall be certified to a minimum of 25,000 lbs.
h) Each leg of the sling must be rated at a minimum of 6,000 lbs.
i) All slings shall be manufactured to industry standards. The slings must have an original manufacture rating Identification patch, or tag, that lists weight capacity of each leg, or total weight capacity, and date of manufacture.
j) All slings shall be inspected, by a recognized industrial sling manufacturer **every FIVE years** beginning with the 2025 racing season. A dated letter of verification from said manufacturer of satisfactory condition, with the sling identification number, shall be required.
k) **The Crew Chief will inspect their sling(s) and certify on the annual inspection checklist that the sling is in good working condition.** The Chief Inspector, or his/her designee, will confirm paperwork conformity each year.

16. TRAILERS AND OTHER PLATFORMS

Handrails and/or railings shall be mandatory for all steps, platforms, or elevated walking or step surfaces on any trailer. The railings shall be designed with a shape and strength to prevent falls when transitioning from stairs to Hull or Hull to stairs.

17. DRIVER SAFETY EQUIPMENT

The following safety equipment shall be worn at all times a Boat is on the water, including, without limitation, during a Race, Time Trial and any testing period:

a. Fire retardant driving suit (with tight fitting cuffs and ankles), socks, gloves, and shoes.
b. An open-face helmet. Full-faced helmets are not recommended, but permission to use a full-faced helmet with fixed scuba second stage regulator and neoprene seal at the neck level ***may*** be granted by H1 only after a pool session in which the requesting driver demonstrates to an H1 official proper helmet fit and adequate water tight integrity.
c. At all times during an event (testing, time trials, and competition), drivers shall connect their helmets to a nationally recognized head and neck restraint device/system (such as HANS type device) meeting SFI Specification 38.1. The head and neck restraint device/system, when connected, must conform to the manufacturer's mounting instructions, and must be configured, maintained, and used in accordance with the manufacturer's instructions.

d. A driver may elect not to wear a life jacket when competing, but instead choose to wear a floatation vest inside his/her racing uniform, or a driver's suit manufactured with floatation as part of the driver's suit.

Standards for such equipment shall be established by H1. Equipment that does not meet these standards must be replaced and inspected before the driver in question shall be allowed to compete.

18. GENERAL SAFETY

a. No person shall ride on a boat while it is being launched or recovered, or in transit from trailer to water or water to trailer. Standing on boat while draining water, or emergency situations shall be exempt from this rule.

b. The propeller shaft shall be disconnected before firing a boat's engine while the boat is on the trailer.

c. Crewmembers performing the fueling/defueling operations are recommended to wear a fire-resistant, long-sleeved uniform consisting of at least two (2) layers of an approved fire-resistant fabric, and fire-resistant gloves and face mask and conform to all local regulations.

B • HULL

1. DESIGN CONSTRAINTS

a) All Boats shall be designed to function as a "planing hull"; i.e., a Hull supported by a combination of hydrodynamic and aerodynamic forces generated at and above the surface of the water by the boat's forward motion. (The intent of this general specification is to eliminate hydrofoil or displacement-type hulls. Any number of planning surfaces is permitted.)

2. CONSTRUCTION PRACTICES

a) While design concepts for unlimited hydroplanes are many and varied, construction practices are subject to established standards. Reliable, well-proven methods are preferred. Innovative approaches may be taken, indeed are encouraged, within certain guidelines.

b) Any builder starting construction of an unlimited shall advise H1 beforehand, to avoid misunderstanding that might later be difficult or costly to correct H1 provides upon request a "permission-to-build" form.

c) Anyone beginning major Hull modification, reconstruction, or repair shall notify the Chief Inspector, who determines whether, intended changes are significant enough to warrant inspection.

3. HULL DIMENSIONS

a) The minimum length of a Hull shall be **28'-0"** and the maximum length **32'-0"**. This is measured from bow or tip of Sponson (whichever is farther forward) by line of sight to the Transom or rear face of the aft Shaft Strut (whichever is farther rearward). (Appendages or protrusions are ignored if they are not integral parts of Hull structure.)

b) In addition, the distance from the aft most portion of the forward planing surface to the Transom or rear face of the aft Shaft Strut must be a minimum of 16'-0" and a maximum of 20'-0". (In this context, the forward planing surface means the planing surface nearest the bow, which remains in contact with the water and provides lift to the Hull when the Boat is in a normal planing attitude at racing speeds.)

c) The minimum Beam shall be **12'-0"** and the maximum Beam not more than **14'-6"**.

4. MINIMUM WEIGHT

a) The minimum dry weight of the Boat shall be:
   (i) **6,575 Lbs.** for all T-55 turbine powered Boats
   (ii) **3,800 Lbs.** for all T-53 turbine powered Boats
   (iii) **5,775 Lbs.** for all piston-powered Boats.

b) Minimum dry weight shall include the weight of Boat (Hull, Engine, and appendages) exactly as raced.

c) Ballast used for meeting minimum weights shall be solid, structural, or bolted in place and approved by the Chief Inspector. Any loose weight found in a Boat shall not be considered in determining the total weight of the Boat as it was raced.

d) Tanks, pumps, plumbing used for the purpose of carrying liquid ballast or any other equipment that could

be used to circumvent this rule shall not be permitted.

e) In no case shall water be included in the total weight of the Boat.

5. PROPELLER AND POWER TRAIN

a) Propulsion must be by a single underwater or surface-piercing, fixed-pitch Propeller. Water jet, impeller-type propulsion systems, or variable-pitch Propellers are not allowed. Devices that extract thrust from engine exhaust or convert engine power to thrust other than through the Propeller are not allowed. (The intent of this specification is to prohibit anything other than a conventional underwater or surface-piercing Propeller.)

b) The Propeller must have no more than three blades and a maximum diameter of **16"**.

c) Turbine-powered Boats must transmit power to the Propeller via a single-speed Gearbox between the Engine output shaft and the Propeller Shaft. The Gearbox input shaft to output shaft ratio shall be no less than **1 to 0.47**. Piston-powered boats may use a multiple-speed Gearbox. (The intent of this specification is to prohibit a variable-speed Gearbox in turbine-powered Boats.)

6. STEERING & CONTROL AND SKID FINS

a) submerged blade-type Rudder and Skid Fin combinations.

b) Power-assisted steering systems are allowed. The design and construction of any power assisted steering systems shall be approved in writing by H1 prior to installation and use.

c) Skid Fins:

(i) Must be non-steerable, non-retractable, and meet dimensional and construction criteria elsewhere in this manual.

(ii) Must be of a fixed, flat, and not concaved or stepped on the entire starboard surface. Any concavity more than **0.050 inches** is prohibited. The taper necessary on the leading edge and bottom edge is permissible. The Skid Fin shall comply with this rule both off and on the Hull. (The intent of this rule is to make illegal a Skid Fin that is cambered or shaped on the inside (starboard) surface to enhance performance.)

(iii) Shall be subject to the inspection before each Skid Fin's first use during the season and shall be subject to random inspection at the discretion of H1 at any time thereafter. The area of the skid fin that shall be measured shall be the inside (starboard) surface of the skid fin from the bottom of the Skid Fin bracket to the bottom of the Skid Fin.

(1) Project a line from the front of the Skid Fin along the bottom of the Skid Fin bracket that is attached to the aft portion of the port Sponson to the back of the Skid Fin.

(2) Take this line and translate it to the surface of the inside (starboard) of the Skid Fin perpendicular to the surface of the Skid Fin

(3) All area below this line in the inside (starboard side) of the Skid Fin is the area to be measured for concavity.

(iv) The Skid Fin shall be checked for concavity while off the Hull and lying in a horizontal position.

(v) The Skid Fin shall then be checked for concavity while mounted to the Hull.

(vi) Under no circumstances shall the adjustment rods or shims be used to achieve compliance to this rule.

(vii) Use a suitable straight edge to measure both horizontally and vertically for concavity

(viii) Any Skid Fin found in violation that was used anytime during a Race (including Time Trials) shall be impounded for the duration of the racing season and shall be permanently marked for easy identification

d) The Propeller Shaft must be of a fixed-angle, non-adjustable type. (The intent of this specification is to eliminate any use of the propulsion system for steering or variable trim.)

e) Movable aerodynamic control surfaces are permitted.

(i) Such surfaces must be hinged to the primary Hull structure, not placed on elevated trusses or secondary structure.

(ii) They may not extend beyond the length of the Hull or Beam.

(iii) Once approved by the Chief Inspector, the driver may manually actuate such surfaces. The intent of this specification is to permit the use of driver-controlled Canards, Flaps and the like while prohibiting the use of driver-controlled Horizontal Stabilizers.

(iv) Computer-controlled devices or boosted actuators are not permitted.
Motorized hydraulic assist for the front Canard is permissible. System must be operated by the driver's foot and must continue to function in the case of motor failure. A spring-back function to a "fail-safe position must be installed.

(v) Movable devices intended to assist the Hull in reaching a planning attitude are permitted.

Such devices (e.g., spray rails or trays) must be controlled by manual means and may not be used when the Hull is on plane.

(vi) Devices shall be marked with colors that contrast to the Hull or Cowling, so that officials may readily observe compliance with the rule. Movable air-inlet doors (shutters) on the Cowling are permitted at any time.

f) Underwater control surfaces other than those expressly designed to provide directional control are not permitted (e.g., hydrofoils that provide lifting forces)

7. CRITICAL LINKAGE CONNECTIONS

a) Bolts used to connect critical linkages such as steering, throttle, and Rudder must have self-locking nuts or cotter pins.
b) Bolts should be installed with the heads up so that they cannot drop out should a nut come off.
c) Bolts shall be high tensile aircraft-type or equivalent.
d) All self-locking nuts must be new, "first use" pieces.
e) Any linkage utilizing clamping force for attachment must also have a positive mechanical positioning device.

8. ENCLOSED COCKPIT

a) All Boats are required to have an enclosed Cockpit "capsule" before competing or participating in any event sanctioned by the H1. The specifications contained herein are minimum and not considered as ultimate. They are based on the Bud style T-5 cockpit design.
b) Previously raced Cockpits that are not Bud style T-5 cockpits may be used, subject to yearly H1 inspection.
c) Clamshell type tilt-up canopies shall not be allowed. A clamshell tilt-up canopy is one where the entire polycarbonate canopy is hinged at the front and has the structural roll cage attached inside the canopy.
d) General Description – The enclosed Cockpit system shall be constructed of composite structural shell surrounding a roll cage.
   (i) The assembly shall be designed to function as water-deflection bulkheads in all six directions and provide impact protection to the driver's legs, sides, head, and back.
   (ii) A firewall is mandatory between the driver and the Engine compartment.
      (1) The firewall shall be sealed to prevent oil, gas, etc., from seeping into the Cockpit, and it must serve as a scatter shield.
      (2) The firewall shall be part of the structural Cockpit assembly.
e) Main Structure: The main composite shell shall be bolted and bonded to the roll cage structure and be designed to act as a water-deflection bulkhead in all six directions. The aft bulkhead also must serve as an airtight barrier to separate the Engine/Fuel compartments from the Cockpit.
f) Composite Construction Composite Cockpit construction lay-up shall use a minimum of **1.0"**-thick, **1/8"** cell, **5-lb.** density Nomex core or equivalent.
   (i) Inside skin must be a minimum of **0.040"-**thick S-glass or equivalent, outside skin a minimum of **0.060"-**thick glass or equivalent. Equivalent materials may include graphite, Kevlar, or other fibrous materials depending on lay-up techniques and schedules.
   (ii) Vacuum bag construction is recommended. Epoxy resins or prepregs shall be accepted only for laminating.
   (iii) Minimum acceptable tensile strength for epoxy resins is established at 7,000 psi.
   (iv) Protection also shall be provided for the driver's back, neck, arms, legs and back of head.
g) Roll Cage Structure – A roll cage structure consisting of a forward and rear hoop and fore and aft bracing shall be used to provide additional support to the Cockpit and to the Cockpit sides.
h) Forward Hoop – A braced hoop, strut, composite, or fabricated support structure as high as possible, following the inside contour of the canopy without interfering with the forward visibility of the driver, and the top lid opening shall be securely fastened to or incorporated within the Cockpit structure at the instrument panel bulkhead.
   (i) The hoop shall be adequately braced fore or aft at the sides of the Cockpit to secure the whole structure in an upright position and to provide additional strength to the Cockpit structural walls and front hinge receiver plate.

(ii) Strength requirements: The forward hoop must have minimum mechanical impact properties equivalent to that of a braced hoop structure of **SAE 4130** steel-alloy round seamless tubing with a minimum outside diameter of **1.250"** and a minimum wall thickness of **0.065".** Caution: Tubing may rust on the inside where its resulting loss of strength is not easily detected.

(iii) Mounting: The mounts shall be constructed to distribute high impact and shear loads into the main Cockpit structure in a manner such that the roll cage and main Cockpit structures remain intact.

i) Aft Hoop – The structural Cockpit shall be equipped with an aft hoop/rollover-type hoop that is securely fastened to the main Cockpit structure immediately aft of the driver and is attached to the rear bulkhead.

(i) The contour of the top of the structure must follow the contour of the inside of the Cockpit.

(ii) The hoop shall be adequately braced fore or aft to the sides of the Cockpit at canopy-sill level, securing the structure in an upright position and providing additional strength to the composite walls and the Cockpit rear bulkhead.

(iii) Strength requirements: The aft hoop must have minimum mechanical impact properties equivalent to that of a braced hoop structure of **SAE 4130** steel-alloy round seamless tubing with a minimum outside diameter of **1.250"** and a minimum wall thickness of **0.065"**. Caution: Tubing may rust on the inside where its resulting loss of strength is not easily detected.

(iv) Mounting: The mounts shall be constructed to distribute high impact and shear loads into the main Cockpit structure in a manner such that the roll cage and main Cockpit structures remain intact.

j) Cockpit Lid

(i) Composite Cockpit construction lay-up shall use a minimum of **1.0"** thick, **1/8"** cell, **5-lb**. density Nomex core or equivalent. Inside skin must be a minimum of **0.040"** thick S-glass or equivalent, outside skin a minimum of **0.060"** thick glass or equivalent. Equivalent materials may include graphite, Kevlar, or other fibrous materials depending on lay-up techniques and schedules.

(ii) Canopy mounting shall be reinforced at the Cockpit-sill attachment, and the front hinge area.

k) Window Material. The clear portions of the canopy shall be fabricated of hot-formed polycarbonate-ply material at least **0.500"** thick and shall be free of cracks, scratches, or hazing which could affect the driver's visibility. The glass is mounted with bolts through glass-fiber bushings in oversize holes in the polycarbonate-ply glass material. The bushings are held in place with RTV silicon.

l) Latch mechanism: The Cockpit lid section of the Cockpit should be secured in the closed position with a latch pin type latch mechanism. The latch should secure the aft frame of the tilt-up section of the lid to the main Cockpit structure at a minimum of ONE location. A back-up release mechanism shall be provided.

(i) Release system handle: Primary lid release systems must be flush-mounted, inside/outside dual-handled systems.

(ii) The outside handle shall be placed on or next to the canopy on the right side of the Cockpit and rotate in a clockwise direction to release.

(iii) Preferred mechanism is manufactured by Avibank (flush latch, **PIN 9054-**1).

(iv) Handles shall be marked with canopy release information.

m) External Attachments to Cockpit lid – External air inlets, Cowling extensions, or other large devices shall be attached to the lid with lightweight aluminum or nylon fasteners designed to breakaway upon impact. Further, the attachments to the lid shall be kept to a minimum.

n) Cockpit Operation. All Cockpit lids shall be able to be opened by the driver without any external assistance (use of springs or hydraulic lifters shall not be considered external assistance).

(i) No external device shall be mounted in such a manner as to prevent the driver from complying with above.

(ii) All canopy openings, lids, hatches, shall be equipped with a handle or hand grip of sufficient size and strength to be used with a gloved hand to apply sufficient force to open the canopy opening after an accident.

o) Headrest – A headrest shall be attached to the aft bulkhead behind the driver's head.

(i) The headrest shall be positioned as close as practical to the helmet when the driver's head is in the normal operating position.

(ii) The headrest must have a minimum contact area of 80 square inches.

(iii) The headrest shall be designed to deflect not more than 2" rearward when a load of 250 lbs. In the aft direction is applied.

p) Cockpit Dimensions – the following minimum criteria apply with the driver seated in the normal driving position.
   (i) The inside top of the Cockpit must be a minimum of **5"** above the top of the driver's helmet. Additionally, the top of the driver's helmet must not extend to a height higher than that of a plane connecting the forward and main roll hoops.
   (ii) The headrest must be as close as practical to, and not more than **2"** aft of, the helmet when the driver's head is in the normal operating position.

q) Aft Roll-Hoop Position. – The aft roll hoop must be a minimum of **4"** aft of the driver's helmet or a minimum of **5"** above the top of the driver's helmet.

r) Minimum Cockpit-opening dimensions are here defined. Cockpit structure or roll-cage assembly must not encroach on the minimum openings specified. Padding or supports for driver comfort or protection that may be easily removed without the use of any tools may be fitted within the driver compartment and encroach on the Cockpit openings only if such accessories are approved by the Director of Safety and Technical.

s) Canopy – The Cockpit opening (with lid open) must conform to the minimum listed dimensions when measured on a plane projected parallel to the water and level with the top of the driver's shoulder.
   (i) Opening length: **30"** minimum.
   (ii) Opening width: **143/4"** minimum for at least **14"** along the opening length.
   (iii) Mobility/movement clearance: Design and construction of the driver's compartment shall allow the driver to withdraw legs rearward to the driver's chest while seated in the normal driving position (steering wheel removed).

t) Emergency Hatch – An emergency hatch shall be fitted in the bottom of the Boat, immediately forward of or as part of the seat.
   (i) For any Hull built new after November 1996 the hatch opening must be no less than 17" wide at its widest point, no less than **25"** long at its longest point and shall be no less than **400-sq. ins.** Total area.
   (ii) Optional: The emergency hatch shall include **20-sq. ins**. Of window of **½"**-thick Lexan. If the emergency hatch is not equipped with a window, some other means of providing light must be provided inside a Cockpit that is inverted.
   (iii) The driver shall demonstrate his ability to exit the Cockpit through the emergency hatch when required by the Inspectors.
   (iv) To assist rescuers, the hatch shall be outlined with contrasting color.
   (v) On or immediately adjacent shall be lettered appropriate instructions for rescue.
   (vi) To assist rescuers, the bottom shall be marked with dashed lines in contrasting color at the locations where cuts with a saw are to be made to release latch pins and/or mechanism should said mechanism become inoperative.
   (vii) The use of fabric tape to seal the escape hatch and canopy is allowed with the following restrictions. The tape color must contrast with the surrounding Boat surface, one end of the tape must be folded back on the adhesive surface to provide rescue personnel with a grip to aid in removal, and tape used on the canopy may not impede the driver from opening the canopy from within.

u) Padding and Continuity – All areas that may come in contact with the driver's helmet must be smooth and continuous. Wherever possible it is recommended that these areas be padded with an energy-absorbent material. All areas that may come into contact with the driver's legs, arms, torso, and feet shall be as smooth and continuous as possible with support and padding such as energy absorbing, high-density foam.

v) Driver Restraint System – A six-point (or inverted-V) quick-release belt system is required.
   (i) All Drivers Restraint Systems shall have a manufacturer expiration date tag sewn onto at least one of the legs of the restraint system. No restraint system will be allowed beyond the expiration date shown on the manufactures expiration date tag.
   (ii) The driver restraint system must be clearly labeled as meeting **SFI Spec 16.1** and be dated by manufacturer.
   (iii) Geometry Guidelines-Systems must meet guidelines shown in **Figure 1-1** on **Appendix A** hereto.
   (iv) All straps must be of nylon or Dacron polyester material.
   (v) A latch/lever type quick-release mechanism or rotary mechanism shall be used. Latch/lever release utilizes a lever opening away from the body in a right to left, or left to right hand movement, parallel to the lap belt with a complete release of all belts and must have a provision for unintentional release.
   (vi) The restraint system must feature dual **2"** or **3"**-wide shoulder straps and lap belt rated at **9,000 lbs.**

(vii) The anti-submarine straps must be a minimum of **1 23/32"** wide rated at **5,000 lbs**.

(viii) Attachment hardware such as shoulder bolts, eyebolts, or other bolts used to secure the harness to the Cockpit structure shall be sized to withstand the rated strength of the straps. Adequate doublers, braces, and strengthening of the Cockpit structure local to the attachment hardware mounting points shall be provided to ensure that harness loads are distributed to the Cockpit structure.

(ix) Belt lengths shall be kept as short as possible.

(x) Seat/lap belt shall be worn in such a manner that it passes around the pelvic area at a point below the anterior superior ileac spine.

(1) Under no condition may it be worn over the area of the intestines or abdomen.

(2) Installation/mounting: The belt must not pass over the sides of the seat but must come through the seat at the bottom of each side thereby wrapping and holding the pelvic area over the greatest possible area.

(3) Where the belt passes through the sides of the seat, the seat edges shall be rolled or grommeted to prevent chafing or cutting of the belt

(4) The belt shall be positioned such that the straps pull down and aft, with the anchor points or location where the belt passes through the sides of the seat positioned forward of the theoretical line of intersection of the seat back and seat bottom, as close to the driver's hips as possible.

(x) Shoulder Straps – Two individual straps of adjustable length, with metal ends designed to join the seat/lap belt at the quick-release mechanism thereby forming a single release point for the seat-belt shoulder-harness system, are required.

(1) Y-type shoulder straps, in which the two straps become one common strap behind the driver (military-transport type), are not permitted.

(2) Installation/mounting: Harness straps shall be attached directly to a strong structural member of the Cockpit close behind the driver's head and neck. At points of attachment, they should be **4"** to **6"** apart.

(3) Straps shall be attached to a line approximately **90 degrees** (in a vertical, x-z plane) to a line of the seat back.

(4) Edges of structure shall be rolled or grommeted where the straps pass through the seat or Cockpit structure to prevent cutting or chafing of the straps.

(5) Position/mounting: The shoulder harness shall be mounted (or routed through a guide) not below a line drawn downward from the shoulder point aft at an angle of **40 degrees** with the horizontal, and not above the shoulder.

(6) In cases where the driver is reclined in excess of **40 degrees**, the shoulder harness shall be attached so that the angle (in a vertical, x-z plane) between the driver's spine and the shoulder harness exceeds 45 degrees.

(7) Within these guidelines, the lower position is preferred.

(xi) Dual or inverted V anti-submarine/crotch straps are required. Straps shall be positioned such that the belt straps pull down and aft, with the anchor points (or locations where the belts pass through the bottom of the seat) aft of the driver's crotch.

w) Seating System – To the degree practical, the seating system, whether reclining or upright, must provide lateral support on both left and right sides. It is required for reclining positions that the seat be fitted with a kick-up or roll-up forward of the buttocks of sufficient height and strength to prevent forward movement and/or rotation of the torso under the seat belt.

x) Steering Wheel- The steering wheel must have a quick-release hub system.

(i) The only quick-release steering wheel coupling allowed shall be the **360-degree**, sliding, spring-loaded hub type collar.

(ii) Acceptable types include, but not limited to Competition Systems (**PIN QR-6A**).

(iii) Alternative manufacturer shall be approved by the Chief Inspector and Director of Safety and Technical prior to installation and use.

y) An emergency air system/breathing system, designed to supply the driver with air should the Boat experience an accident or sustain damage such that the Cockpit fills with water, is required.

(i) The breathing system must be capable of supplying a minimum of **30 minutes** of reserve air to the driver.

(ii) Systems must use a compressed-air bottle of no less than **50 cubic-foot** size.

(iii) Pure oxygen systems are not permitted.

(iv) All compressed-air bottles shall be mounted within the structural Cockpit and secured both around the diameter of the bottle with a substantial over-center, adjustable tension clamp or equivalent method, and by a solid mechanical restraint at the neck of the bottle to prevent movement along the centerline of the bottle. (The intent is to prevent rotation and movement in any direction. Furthermore, care shall be taken to prevent damage to gauges, fittings and/or valves.)

(v) All compressed-air bottles shall be visually inspected on an annual basis.

(vi) An up to date "VIP" sticker shall be displayed on each bottle at all times.

(vii) The drivers air hose must be between **ten (10**) and **fifteen (15) feet** long; measured starting at the center of the steering wheel. A quick release coupler must be installed in the air supply between the first stage regulator and the second stage regulator, located between **ten (10**) and **fifteen (15) inches** from the driver's mask or helmet.

(viii) A quick release coupler must be installed in the air supply hose between the first stage regulator and the second stage regulator, located between **ten (10)** and **fifteen (15)** inches from the driver's mask or helmet.

b. The coupler/nipple to be used is a Parker stainless steel fluid connector, part number **SHI-62** or the RECOMMENDED **SHI-62SL/SHI-63**; with the male nipple on the mask side and the female coupler end mounted on the air supply side.

c. If the **SHI-62SL/SHI-63** is used a **1"** minimum bright yellow band must be placed on the hose next to the fitting.

(ix) All connections in the air system must be done with commercially accepted or scuba type-high pressure crimped ends. Hose clamps are not allowed.

(x) All Cockpits are highly recommended to have a secondary emergency air supply for the driver that is completely separate from the primary system above.

z) Strobe Light/Signal System – All Boats shall be equipped with a white strobe light.

(i) Suggest Whelen Power Supply (**PIN A-490**; strobe beacon bulb, **P/N A-625**).

(ii) The strobe beacon shall be mounted in a visible position and shall be operated from the Cockpit for the purpose of signaling race officials.

aa) Mirrors – Right and left rear-view mirrors shall be strategically mounted external to the Cockpit to provide the driver with adequate rearward vision. *Recommendation:* Yamaha (**PIN 2GH-2629O-00** right and **2GH-26280-00** left), or equivalent.

9. EMERGENCY SYSTEMS

a) The fuel shut-off, master electrical switch and fire-suppression controls shall be duplicated inside and outside the Cockpit. Outside switches shall be grouped in an "E" (emergency) area on the right aft side of the fixed Cockpit Cowling. The following markings shall be used for each:

(i) Yellow square around a black circle with yellow letters FUEL

(ii) Red lightning bolt and red letters: **ENGINE OFF**

(iii) Red triangle and red letters: **FIRE**

(iv) Letters shall be no less than **3/8 in.** high and shall be contrasting to surrounding color(s).

(v) Alternate markings as furnished by H1 may be used.

b) These switches shall be accessible without removing or opening a cover plate. (Recessing them in the Cowling shell is good practice (to avoid damage or accidental activation).

c) Any system that requires a push or pull to activate shall be so marked **"PUSH"** or **"PULL"** in letters no less than **½ in.** high and shall be contrasting to surrounding color(s).

10. FUEL & OIL SYSTEMS

a) Oil, water, and water-alcohol are defined as "combustible fuel" when used in Engines.

(i) The intentional introduction of fuel into the Engine lubricating oil or the Gearbox oil – resulting in a dilution of more than 25% - shall be considered a violation of this rule.

(ii) Water and water-alcohol must be contained in tanks as specified below.

(iii) Combustible gas such as nitrous oxide must be contained in appropriate pressure tanks designed for that purpose. (Note that injection of water, water-alcohol, and nitrous oxide is permitted only in piston Engines.)

b) System Material and Construction – SCCA, USAC, or NASCAR bladders are recommended; although fuel/oil tanks made of steel or aluminum may be used. Fuel tanks may be fiber glassed. Tanks shall be adequately baffled and must be separate and not an integral part of the Boat. Tanks shall be supported in two places or more.

c) All tanks having combustible fuel shall be grounded; filler caps shall have a common ground with tank.

d) All fuel tanks shall be externally vented outside the Hull.
e) All fuel and oil lines, water lines, and other plumbing shall be secured by clamps or other methods to the Hull structure.
f) The routing of fuel lines into the Cockpit area (as for instrumentation) shall be expressly prohibited.
g) All tank straps and mounts, especially those for fuel and oil, must be accessible for inspection after all installations are complete.
h) If inspection holes in the Hull are necessary owing to lack of visibility, they shall be provided before a Boat is cleared from inspection.

i) There shall be no sealed compartments in the Boat. All compartments must have deck hatch access or be visible through other compartments.
j) Any and all overboard drains that have access to, or are connected to, the Engine compartment must not be of the self-bailing (open) type and shall be closed at all times except when the Boat is on the trailer.
   (i) Any discharges from these drains shall be collected in proper containers.
   (ii) No Gearbox, Engine, or oil tanks shall be vented in such a manner that pollutants enter the water.
   (iii) The intent of this rule is to protect the environment by preventing any or all discharges of pollutants into the water, whether intentional or accidental.
k) Each Boat must have the means for shutting off the Engine in an emergency.
   (i) The capability shall be demonstrated to shut off the Engine and disconnect all electrical circuits within three seconds.
   (ii) Turbine-powered Boats, in addition to or in lieu of an electromechanical fuel shut-off system, must have a mechanical fuel shut-off independent of the fuel control.
   (iii) The shut-off handle shall be duplicated: 1) inside the Cockpit and 2) outside, in the **"E"** area.
   (iv) The emergency shut off valve shall be mounted in the Boat. It shall be mounted between the forward side of hot end and aft side of oil cover plate. No quick release ends shall be allowed. Rod ends shall be through bolted with aircraft quality bolt and nyloc nut. The shut off valve shall be deadheaded (i.e., there shall be no by-pass path for the fuel.)
   (v) For turbine-powered Boats, the emergency shut off valve shall be an independent valve. It shall not share function with any other control.
   (vi) For piston-powered Boats, any magneto shall be grounded when the switch is in the "OFF" position.

11. ELECTRICAL SYSTEMS

a) Master Switch – A master switch for all sources of electrical power is mandatory. It is recommended that this master switch include the Boat's ignition system if possible.
   (i) The master switch must be adjacent to (or, if possible, incorporated with) the fuel shut-off.
   (ii) Both functions shall be duplicated: (1) inside the Cockpit and (2) outside, in the **"E"** area.
b) Circuit Breakers – A circuit-breaker system is recommended.
c) Battery Mounting and Ventilation – Batteries must have a box or frame that provides adequate support in vertical, side-to-side, and fore-and aft directions. Batteries shall be vented externally to the atmosphere.

12. FIRE PROTECTION AND EXTINGUISHING SYSTEMS

a) Each Boat shall have on-board fire extinguishing system(s).
   (i) It is mandatory that the fire extinguishing bottles be securely mounted outside Cockpit area.
   (ii) The Chief Inspector or designee shall inspect and approve the systems and locations.
b) Fire extinguishing agents HFC-236fa, sometimes known as FE-36: HFC-227ea, sometimes known as FM-200, Novec 1230, **Halon 1211** and **1301** are the approved for use in onboard fire suppression systems. Alternates to these agents may be permitted if requested in writing and approved by H1. **Halon 1211 is not permitted for Cockpit use.**
c) The minimum weight of charge for the agent is **15 lbs**.
d) Spray heads shall be placed in areas where fire is most likely to occur, e.g., Engine compartment, battery, electrical, and fuel areas. A minimum of three heads is recommended for the Engine compartment, especially around the turbine "hot end" of turbine-powered Boats.

e) The **1211** fire system must be easily activated by switch or lever from both the inside and outside the enclosed Cockpit. It is mandatory that the outside controls for fire suppression, fuel shut-off, and Engine off be grouped in an **"E"** area on the right aft side of the Cockpit Cowling, appropriately marked per **Technical Rule B9** – "Emergency Systems."

13. THROTTLE

a) Throttle Systems/Controls – The throttle-return springs shall be attached at the fuel control, carburetor, or injector controls, as well as on the foot pedal in the Cockpit.

b) The springs must be of sufficient strength to provide immediate shut-off in an emergency.
c) All ball sockets shall be safety-wired, taped or tie-wrapped.
d) No setting fuel control to ground idle minimum. Throttle must work in such a way that when ground idle detent is in off position; throttle springs shall pull fuel control arms to off position.
e) There shall be one throttle cable connected from the foot pedal in the Cockpit to the turbine Engine fuel control unit. This cable shall connect to the N1 throttle lever only on the fuel control unit. The power turbine N2 throttle lever shall be fixed [lock wired] in a set position at all times.
f) For piston-powered Boats with aircraft engines, the mixture control shall be aft in the OFF position.
g) Toe straps, or a totally enclosed toe area on the foot petals in the Cockpit shall be prohibited.

14. STEERING

Steering systems include Rudders and Skid Fins. Carefully note the certification requirements discussed at the end of this section.

a) Rudders must be the standard blade-and-post type in one piece, whether fabricated (welded) or integral (cast or forged).
   (i) Each Rudder shall be designed to withstand minimum lateral forces, applied separately, of **40,000 lbs**. At the planing Waterline and of **10,000 lbs**. At the lower edge.
   (ii) Rudders may be cast, forged, or fabricated by a certified welder or established boat builder.
      (1) The Chief Inspector shall approve the design and the manufacturing technique before construction.
      (2) Rudders shall be made of heat-treated steel to at least **36 Rockwell** and with a minimum finished thickness of **¾"** measured at planing/racing line, or of an equivalent material.
      (3) Grain must run vertically or in the longest direction of surface.
      (4) Shot peening of the entire Rudder is recommended.
   (iii) The Rudderpost must be at least **2"** in diameter at the base (lower bearing) and for a distance extending at least **3"** above the base. Filleting at the base of minimum 1/8" radius is required. Upper and lower bearing surfaces must be no less than 7" apart center to center.
b) Mounting – Rudders shall be attached through the Transom to a load-carrying substructure within the Hull.
   (i) The Rudder bracket or attachment shall be made of 4130 chrome-moly steel plate or tubing stress-relieved and heat-treated to at least 32 Rockwell, 6060- T6 Aluminum, or of an equivalent material.
   (ii) Plating is recommended; tubing is subject to internal corrosion, which makes it unsatisfactory over time.
   (iii) The bracket shall be designed and built to withstand a static radial load of at least 40,000 Ibs. The Chief Inspector shall approve the design before construction.
   (iv) The bracket shall be fastened to the substructure with at least **four (4**) **¾"** diameter or equivalent, cad-plated bolts each with a minimum tensile strength of **160,000 psi** and a minimum shear strength of **95,000 psi.**
   (v) Bolt holes shall be placed in a square or rectangular pattern of at least **80 sq. ins.** Additionally, brackets shall be glued to substructure in the same **80-sq.in**. area, using Hysol or equivalent with a **4,200-psi** tensile lap-shear strength, minimum.
   (vi) The substructure shall be designed to accommodate the maximum load when turning, and the direction of that load.
   (vii) Control types: The push-pull rod/pitman arm steering-box systems must be of standard Ross, Casale, or equivalent type.
   (viii) Rods: Push-pull rods must be capable of sustaining no less than **25,000 lbs.** Loading. No brazed fittings or joints are allowed. Rods constructed with SAE 4130 steel-alloy round seamless tube shall wall thicknesses corresponding to the following sizes:

Diameter	Minimum Wall Thickness
1”	.120
1-1/2”	.063

Other materials can be used and shall have equivalent specifications for loading

(ix) Rod ends: Rod ends must be minimum **¾”-**bore aircraft quality, identified (stamped) by part number.
  (1) They must be rated to sustain a minimum radial static load of **25,000 psi.**
  (2) Rod ends cannot be ground or modified in any way.
  (3) Thread engagement shall be no less than **1-1/2 times** thread diameter.
  (4) A retainer washer shall be installed under the bolt head
  (5) No “Zerk-style” grease fittings are allowed.

(x) Rod attachments: Jam nuts may be used to attach push-pull rod to pitman arm and quadrant if latter are threaded.

(xi) Cables: Cable/chain steering must employ a minimum **3/16”-**diameter **7 x 19** stainless aircraft-type cable.

(xii) Bolting: All bolts in steering linkage must use a minimum of one of the following locking devices: castle nut and cotter key, safety wire, nylock nut or bearing retainer nuts and washers.

c) Skid Fin. Skid fins shall be designed to withstand minimum lateral forces, applied separately, of 40,000 lbs. At the planing Waterline and **10,000 lbs.** At lower edge.
  (i) Material: Skid fins shall be made of **4340** steel or of equivalent material.
    (1) Grain must run vertically or in the longest direction of surface.
    (2) Shot peening of the entire Skid Fin is recommended.
  (ii) Mounting: If the Skid Fin is mounted in a bracket-tie rod assembly, it shall be attached to primary Hull structure at Engine stringer and Sponson Transom. A deck hatch shall be installed for inspection of Skid Fin mount and supports.
  (iii) The bracket shall be fastened to the Hull with at least **eight (8) 3/8”-diameter** high-strength aircraft quality bolts placed within an area of at least 100 square inches.
    (1) Avoid concentrating bolt holes in line along high-stress areas.
    (2) Additionally, bracket shall be glued to Hull in the same **100-sq. in. area**, using Hysol or equivalent with a **4,200-psi** tensile lap-shear strength, minimum.
  (iv) Unless specifically agreed otherwise by H1 inspectors, at least five tie rods are required, with a total load-carrying capacity of **40,000 lb**. Minimum
    (1) No less than the equivalent of **three (3)** tie rods shall be under tension (the lower position) unless approved by the Chief Inspector.
    (2) Tie rods must be **7/8”-**diameter (**0.875”**) heat-treated steel with a minimum tensile strength of **180,000 psi**. If **two (2)** tie rods are proposed for the lower position, then rod diameters shall be one inch or more in diameter. Drawn Over Mandrel (DOM) tubes or equivalent for Skid Fin tie rods in lieu of the minimum diameter solid rods. Such tubes shall have a minimum wall thickness and material tensile strength to meet or exceed the capability of the solid rods **specified herein**.
    (3) Rod ends must have a minimum 7**/8” (0.875”)** bore (unless specified commercial ends specified below) and be of aircraft quality and so identified (stamped), or aftermarket machined (from solid billet) and meet H1 minimum standards. The following commercially available acceptable rod ends from Aurora Bearing Company shall be allowed:
      AM-14T-70 (RH Thread) RXAM-12T-1 (RH Thread)
      AB-14T-70 (LH Thread) RXAB-12T-1 (LH Thread)
    (4) Solid billet tie rod ends are required for tie rods under tension unless commercial ends specified above.
    (5) All tie rod ends shall be capable of withstanding a minimum radial load of 25,000 pounds
    (6) Rods shall be as close to parallel as possible when viewed from the rear, and as close to perpendicular with the Skid Fin and Hull as possible.
    (7) At no time shall the rods be pre-loaded in either tension or compression for the purpose of adjusting alignment (e.g., trim of toe-in). Alignment shall be accomplished solely with shims between the fin and Sponson bracket, and not by pre-loading the rods and bending the bracket. Pre-loading of rods is allowed as long as it does not deform the Skid Fin so as to exceed the straightness requirement set forth in **Technical Rule B.6.c).(ii).**

(v) Dimensions: The Skid Fin shall have a minimum thickness at and above the Waterline of **3/4" (0.750")** measured at any point (excluding the thinned down webbing as part of the structural Skid Fin and attaching area). The Waterline shall be determined as described in **Appendix E**.

(vi) All bolts and nuts not mating with parallel surfaces shall use alignment washers (e.g., spherical or wedge) on the non-parallel joint surfaces.

d) All Skid Fins and hardware shall have a serial number engraved or etched in a visible location when installed on the Hull. Skid fins or hardware without a s/n shall not be allowed to be run.
For the purpose of this rule, hardware is defined as all rods, rod ends and ALL mounting brackets whether mounted to the Hull or Skid Fin.

e) All Rudder and Skid Fin mounting brackets attached to the Hull shall be removed following the schedule below and be subject to Magnaflux or dye penetrant inspection:
(i) Subject hardware shall be removed for testing every two years after the item has been put into service.
(ii) Subject hardware may be left on and tested attached to the Hull in odd years with Crew Chief acknowledgment.
(iii) This rule applies to: Sponson Transom Skid Fin bracket(s), Non-Trip Skid Fin brackets and Rudder bracket(s).

f) Certified testing of all metal parts referred to in these rules shall be non-destructive particle testing for cracks. The accepted methods are magnetic particle testing (Magnaflux) for ferrous metals and dye check (Zyglo or equivalent) for non-ferrous metals.

g) Steering Component Certification. Magnaflux and inspection papers covering Rudders, steering cable, Skid Fins, and all Skid Fin hardware shall be presented at any annual safety inspection and at the Boat's first race of the season.
(i) A certificate must be available for the race inspector's observation at any time during the season as proof the tests have been conducted.
(ii) All certification documentation shall list each component tested by serial number and list results of test for each s/n. (Documentation with a "lot certification" shall not be acceptable.
(iii) Each Rudder and Skid Fin shall have a number stamped on it to identify inspection record with the item.

h) Hardware: Rudder, skid-fin, pitman arms, push-pull rods, push/pull rod ends, skid fin tie rods and skid fin tie rod ends must have a Magnaflux or Zyglo inspection at least once a year. All plated-steel steering components shall be baked.

i) Cable Test: Steering cables shall undergo a certified pull test to a minimum of 1500 lbs. every two years after being put into service. (Double the normal working load of **3/16"-**diameter **7 x 19 stainless** aircraft-type cable). Those cables that are designated as a "spare part", and have not been put into service since manufacture or last test, are exempt until put into service. Supporting paperwork must be presented for inspection prior to being put into service.

j) Power steering connections must have the same minimum strength standards as the skid-fin brackets and tie-rod ends. Hydraulic hoses and connections must have a minimum psi rating of 2000.

k) All steering cables shall be removed from the Boat every year and all steering components, including pulleys, shall be inspected for corrosion, wear, and damage. The Crew Chief shall be responsible for compliance and shall sign off on the Annual Inspection Form that this inspection has been completed.

l) Steering cable adjusters shall be installed and secured per **FAA Advisory Circular AC 43.13-1B pages 7-43 - 7-48** attached hereto as **Appendix F**.

m) Any component identified in Sections e), f), g) and h), above, which requires non-destructive testing on an annual, bi-annual, or other calendar-based basis, and which is considered a "backup" or "spare", may be exempt from such testing period provided the component has not been put into service since it's last test. A list of all such components, whether put in service or identified as a "backup" or "spare", shall be listed on the form included as **Appendix G** hereto and submitted to H1 during the Annual Inspection along with any inspection/certification papers required hereunder. Those items that the Race Team expects to put into service during the Racing Season shall be identified on such form and will be confirmed either (i) at the Annual Inspection, or (ii) prior to the first Event in which the Boat intends to participate.

15. PROPULSION SYSTEMS

a) Propulsion systems include Propellers, Propeller Shafts, Shaft Logs, and Shaft Struts.

b) Rear Strut. The rear strut may be fabricated of either steel castings or forgings, with mounting area to Hull a minimum of **150 sq. ins.**
(i) Such Strut must carry load into stringers, and shall be tied directly into an aluminum plate at least 3/8" thick or equivalent
(ii) Mounting shall be with a minimum of **six (6) 1/2"** or **four (4) 5/8"** high-strength aircraft-quality bolts.

c) Intermediate Strut. The intermediate Strut shall be fabricated of forged aluminum or cast steel or equivalent.
   (i) The Strut must have a Hull mounting surface of minimum **50 sq. ins.**
   (ii) Mounting shall be with a minimum of **six (6) 1/2"** or **four (4) 5/8"** high-strength bolts of aircraft quality.

d) Propeller Shafts must be of K 500 Monel or equivalent material with minimum diameter of 1 3/4" (1-1/2" diameter for **T-53** powered Boats).

16. HORIZONTAL TAIL (WING) ASSEMBLY

a) Each year the components of the wing assembly (uprights, adjusting rods, Diagonal braces) will be inspected for cracks, rust and corrosion. Deck mount brackets and hull/transom brackets are to be visually inspected.

C • ENGINE and FUEL

1. ENGINES ALLOWED

a) A single gas-turbine engine (as described in **2** below), a single aircraft V-12 piston engine (not exceeding **2,250 cu. Ins.**), or any number of automotive or marine-type reciprocating engines (each within the bounds detailed below) may be used.

b) Engines must be inboard-mounted.

c) Requests for use of engines not specifically referenced and approved hereunder shall be submitted to the Rules and Competition Committee for evaluation and approval based on sustainability, reliability and performance criteria. Any such requests shall be accompanied by substantiating data.

2. GAS-TURBINE ENGINES

a) Only single-Engine turbine-powered Boats are allowed.

b) Turbine powerplants approved are the Textron Lycoming Models **T55-L-7B, T55-L-7C,** and **TF-25** and Honeywell Int'l LLC Model **T-53-L-13-BA**. The **T55-L-11** is prohibited. (The intent of the rule is to compete with Engines that have similar factory-rated horsepower.)

c) The inspection criteria to determine compliance with the above standard shall include:
   (i) No more or less than **36 i**nlet guide vanes
   (ii) No more or less than **28** 1st stage compressor blades
   (iii) **T55-L-7C** fuel atomizers '**2-300-321-01'** or '**2-300-321-02'** must be used
   (iv) Stock T55-L-7C start fuel nozzles are required
   (v) No more than **one (1)** gas producer wheel
   (vi) No more than **two (2)** power turbine wheels.

d) All turbine Engines shall be maintained at "stock" external dimensions, including length/size of compressor section, inlet areas, etc.

e) All turbine Engine parts shall be OEM Lycoming-supplied "stock" parts.
   (i) Permission to use and any non-O.E.M. parts must be requested in writing to the Rule's and Competition Committee.
   (ii) If granted, variances for use non-OEM parts shall be issued in writing by H1 and shall apply to all Race Teams, not just the requesting Team.
   (iii) Approved alternate bleed band actuation systems shall be allowed, and may be either electrical or mechanical

f) No turbine Engine shall use an early style power turbine wheel, Part numbers 2-140-050-27 and 2-140-012-21.

g) Inspections shall be done by removing the 4/5 bearing pack cover, or by exposing the face of the first power turbine wheel.

h) Coating and rework of internal components to come up or maintain original OEM specs is allowed.

3. FUEL

a) All Boats shall be required to use the fuel provided or caused to be provided by H1 for the Race, including Time Trials. The preferred fuel is Kerosene K1 clear. If Kerosene K1 is not available, Jet A shall be allowed. Fuels other than K1 or Jet A must be approved by the Chief Inspector. **BIOFUEL IS NOT ALLOWED!**

b) No additives are permitted except those intended for moisture control (e.g., Prist), purchased over the counter.

c) All fuel is subject to testing at any time by H1

d) Any fuel transported by a Race Team from to a Race in the onboard fuel tanks, must be used prior to qualifying. Teams must declare to the H1 Inspector that they are using fuel that has been brought into the race site for trailer fire and testing. Any transported fuel remaining after trailer firing and testing cannot exceed two-inches (2") at the point of measuring the tank with a measuring stick with the boat as level as possible. If the measurement exceeds the two-inch mark, fuel must be removed into a container of the teams choice for storage/transport. For testing, time trials, qualifying or competition heats, fuel provided as stated in paragraph a) above must be used. This rule does not supersede rule **B.4 MINIMUM WEIGHT** where it is required for the boat to have no fuel in the tank for weighing.

4. FUEL SYSTEM

a) The fuel system must be per original equipment specifications.

(i) No electrical controls or actuators are permitted on the fuel control or the pressure relief devices.

(ii) Fuel-line sizes shall be maintained per **T55-L-7** specifications.

(1) The Engine-driven boost pump (**P/N 2-160-790-04**) must have a **-10** (dash ten) **0.609"(39/64")** inlet size and exit through a barrier fuel filter (**P/N 2-170-430-02**) to the fuel control inlet.

(2) The fuel control high-pressure discharge port must be **-6** (dash six) or internal passage of **0.296"(19/64")**.

(iii) The fuel control must be only **of T55-L-7B** model number (**JFC 31-12, PIN 592964 L-13**), (**JFC 31-12, P/N 706680**) or **T55-L-7C** model numbers (**JFC 31-15** or **JFC 31-17**, **P/N 717717 L-14**) as designated by Hamilton Standard.

b) All **T-53** powered Boats shall be fitted with fuel controls of **T53-L-13-BA** and all fuel line sizes maintained per **T53-L-13-BA** specifications.

(i) A system shall only be approved after an acceptable technical description with schematics and drawings has been submitted to H1

(ii) The technical description, schematics, and drawings shall not be considered proprietary and may be distributed.

c) All fuel flow sensors, fuel shut off devices, pressure transducer, substitute lines and/or fittings shall be installed as shown in **Figure 2-1** included in **Appendix B** hereto.

(i) A pressure sensing device may be installed between the fuel control and the fuel oil heat exchanger. The pressure-sensing device and all associated lines shall be in full view with the Engine Cowling removed.

(ii) All lines shall not pass through any frame or stringer in such a way as to interfere with visual observation.

(iii) All Engines shall be plumbed as stock with the exceptions noted in these rules. All lines shall be run as short as possible, except where specified length is called out. The Chief Inspector may require a Race Team to change hoses/plumbing on their Boat to stay within the intent of rules.

(iv) Bypass valves shall NOT be allowed.

(v) It is not permissible to have any other components in the system other than those shown in **Figure2-1 in Appendix B.**

(vi) The Boat teams are allowed to install only one fuel flow meter in the system. This meter may be placed at either point indicated in the fuel schematic in Appendix B, **Figure 2-1**.

(vii) A spacer shall be installed in the MIN FUEL adjustment assembly per **Figure 2-2 in Appendix B** if the modified MIN FUEL method is used to limit fuel flow.

(viii) The MIN FUEL adjustment shall be set at or below the maximum fuel flow allowed.

(ix) All fuel shut-off devices, both on the low- and high-pressure side shall be manually operated. (No electric solenoid valves allowed on any fuel line, except the start fuel circuit.)

d) The fuel-oil heat exchanger must be plumbed as outlined in Lycoming maintenance books.

(i) No substitute liquid may be used in the heat exchanger.

(ii) No device that alters any of the properties of the fuel shall be used prior to the flow control device. (Example - an external heat exchanger.)

(iii) No external cooling of Engine oil is allowed. Cooling of the oil superficially cools the fuel, which is considered altering the property of the fuel.

e) Except as noted below, the start fuel system must be plumbed in stock configuration, as outlined in Lycoming maintenance manual. The energizing of the start fuel solenoid valve shall be by means of a single, hand-operated switch, not to be mounted on the steering wheel. The number of start nozzles shall be two.

f) All fuel system plumbing must comply with the specifications and diagrams supplied by H1.
   (i) No extraneous plumbing shall be allowed.
   (ii) The Chief Inspector or designee shall have the right to require a Race Team to remove completely from the Boat any extraneous, non-essential hoses, fittings, sensors, transducers, actuators, or any device he determines to be non-essential.
   (iii) A **2"** section of **3/8**"clear PVC tubing shall be installed into the burner can/fuel manifold drain line as far from the Engine as is practical. (Suggested material: Weather head **PT-200 3/8"** clear PVC tubing.)
      (1) The tubing shall be connected with Weatherhead "Mini-Barb" or equivalent fittings.
      (2) Push-on type fittings (Aeroquip "Socketless" or Weatherhead "Barb- Tite") modified to Mini-Barb" dimensions are acceptable.
      (3) The intent of this device is to insure the proper use of the burner can/fuel manifold drain line.

5. FUEL FLOW

a) The maximum fuel consumption for any turbine Engine shall be **4.2 GPM ("Maximum Fuel Flow")**, measured by the High-pressure flow meter.

b) The two approved methods to limit maximum fuel consumption shall be:
   (i) The stock adjustments as provided on the Lycoming/Textron fuel control.
   (ii) The modified MIN FUEL adjustment as detailed in **Appendix B Figure 2-2**.
   (iii) Race Teams wishing to use an alternate flow control method or device on their Boat must request and receive permission in writing from the H1 Rules and Competition Committee.

c) H1 shall issue two flow meters to each Race Team (for each Boat such Team has registered with H1) for the purpose of monitoring Engine fuel consumption and mounted as directed by the Chief Inspector.
   (i) Flow meters shall be mounted in such a way as to prevent damage to the meters and protect against liquid intrusion. (E.g., The pickup connection shall be pointed down.)
   (ii) A fuel filter shall be installed in the fuel line prior to the low-pressure fuel flow meter.
   (iii) The #12 fuel line entering and exiting the H1 low-pressure flow meter shall be run in a straight line for no less than **5"** (on each side of the flow meter). The flow meter shall be mounted in a horizontal position. No other flow meter or parts shall be run within this distance.
   (iv) The high-pressure fuel flow meter shall be mounted between the fuel oil heat exchanger and the flow divider, using only hoses and fittings specified by H1.
   (v) The #6 Teflon fuel line running into the H1 high-pressure flow meter shall be run in a straight line for no less than **3"**. The flow meter shall be mounted in a horizontal position on, or adjacent to, the liquid-to-liquid cooler with the cable connection pointing down.
   (vi) If H1 adds an additional high-pressure meter to the fuel system, the designated meters will be mounted as follows:
      (1) One in front of the liquid-to-liquid cooler with a minimum of **3"**of #6Teflon fuel line in a straight line on either side of the meter.
      (2) The second meter will be mounted after the liquid-to-liquid cooler with a minimum of **3"** inches #6Teflon fuel line in a straight line on either side of the meter.
   (vii) The flow meter connectors may have tape applied to protect the connector from damage, disconnecting or liquid intrusion. The taping must be approved by H1.
   (viii) Flow meters are issued with special caps on both ends. The flow meters shall be returned to the H1 Tech truck with the special caps attached. A fee of **$100** shall be charged for each flow meter returned without the two supplied caps.

b) Fuel flow data shall be read and recorded from the flow meters with a Smoothing Factor of **four (4) points** applied to the Racepak DataLink II software.

6. FUEL FLOW VIOLATION. A **"Flagrant Fuel Flow Violation"** occurs any time - during the same Time Trial or Heat:

a) Maximum Fuel Flow is exceeded for more than three **(>3.00)** continuous seconds, 3 or more times, or

b) Maximum Fuel Flow is exceeded for more than five **(>5.00)** continuous seconds.

A Boat shall be considered to be in compliance while getting under way. Getting under way shall be defined as the period commencing at **0% N2** and ending **30 seconds** after the Engine reaches **70% N2** on any Engine start or restart. A restart shall be defined as **0% N2** reading during a Heat.

7. N2 SPEED RESTRICTION

a) The maximum allowable sustained N2 RPM (**"Maximum N2 RPM"**) shall be **110%**.
(For reference: 100% N2 for a T55-L-7C is 15,330 RPM, and for a T53-L-13-BA is 6471 RPM

b) The N2 sensor shall be mounted in such a way to prevent damage to the sensor. The sensor connector may have tape applied to protect the connector from damage, disconnecting, or liquid intrusion. The taping must be approved by H1.

8. N2 SPEED VIOLATION. A "Flagrant N2 Violation" occurs any time - during the same Time Trial or a Heat**:**

a) Maximum N2 RPM is exceeded for more than three **(>3.00)** continuous seconds, 3 or more times,

b) Maximum N2 RPM is exceeded for more than five **(>5.00)** continuous seconds;
N2 RPM exceeds **115.0%** for more than one **(>1.00)** second; or

c) The N2 RPM reaches **118.0%** and there is no indication of a decrease in high pressure fuel flow (defueling) within 25 data points, 3 or more times. Note: The sampling rate on the data recorders is currently set at 50 samples/data points per second.

9. ENGINE ACCESSORIES

a) All components that are visible on the exterior of the Engine must be of identical configuration, appearance or function to those manufactured by Lycoming or an approved vendor for the **T55-L-7C**.

b) All components that are visible on the exterior or the Engine shall be of identical configuration, appearance or function to those of OEM or an approved vendor for the **T53-L-13-BA**

c) The addition of in-line fuel filters is allowed.

10. INLET HOUSING AIR PASSAGE

The inlet air housing passage shall meet the OEM specifications and dimensions defined by Lycoming.

11. ROTOR-BURST PROTECTION SYSTEM (RBPS)

a) All turbine-powered Boats shall have a rotor-burst protection system installed whenever the Engine is started, including on the trailer.

b) The RBPSs described below are not to be considered the ultimate standards.

(i) They have however been established as the minimum acceptable design based on analytical and empirical data.

(ii) While suggestions for design improvements are encouraged, any changes must be approved by H1

c) The minimum-standard RBPS consists of two parts, an aluminum cylinder and a Kevlar shield "blanket'.

(i) Cylinder - The aluminum cylinder must be of 3/16" minimum thickness and must completely surround the turbine-wheel area or "hot end" of the Engine, extending a minimum of four inches forward of the foremost GP-wheel and a minimum of four inches aft of the rearmost PT-wheel.

(ii) Shield - A Kevlar blanket shall be fitted around the aluminum cylinder.

(1) The blankets shall be subject to inspection every year.

(2) If the blanket is not continuous, the overlap must be down.

(3) The blanket shall be constructed using either of two designs.

(a) The "Continuous Wind" design shall be no less than **thirty-two (32)** continuous layers of no less than **12"** wide **Style 745 Kevlar** or an equivalent material wound onto a waterproof spool.

(b) A waterproof outside coating shall be applied to retain the Kevlar within the spool and provide ultra-violet protection.

(c) The "Fold and Wind" design shall be no less than **thirty-two (32)** layers of **12"** wide **Style 745 Kevlar** folded from a single piece of material.

(d) The folded Kevlar shall be wound onto a form capable of maintaining the shape of the blanket. The "cylinder"" may be used as the form if provision is made to protect the Kevlar from direct contact with the aluminum.

(e) The wound Kevlar shall be secured by constraining straps around the circumference of the Kevlar.

(f) The number of winds required, and the number of straps required shall be determined by using the formula **NW x S x NS** and shall be greater than or equal to **108,000**, (where NW represents the number of winds, etc.)

- ***Example #1:*** A **48**" wide piece of Kevlar is folded **three (3)** times, wound **eight (8)** times around the form and secured with **three (3)** buckles rated at **5,000 lbs.** each. (**8 x 3 x 5000 = 120,000**, which exceeds **108,000** - Acceptable.)

- ***Example #2:*** A **36"** wide piece of Kevlar is folded **two (2)** times, wound **eleven (11)** times around the form and secured with **two (2)** straps rated at **4,910 lbs.** each. (**11 x 2 x 4,910 = 108,020**, which exceeds **108,000** - Acceptable.)
- ***Example #3:*** A **48"** wide piece of Kevlar is folded **three (3)** times, wound **seven (7)** times around the form and secured with **three (3)** buckles rated at **5,000 lbs**. each. **7 x 3 x 5000 = 105,000**, which is not equal to or does not exceed **108,000** is **NOT Acceptable.**

(g) The wound Kevlar shall be covered by a water-resistant material, which shall provide ultra-violet protection.

(h) It is recommended that the straps be covered. If the straps do not have provision for ultra-violet protection, they shall be replaced every **two (2)** years.

d) RBPS systems shall not be allowed unless they strictly conform to the design and construction method stated above. Any such system shall not be used until approved by the Chief Inspector.

e) RBPS systems shall be subject to inspection every year. If the RBPS system fails inspection a written report must be filed by the official and the owner shall receive an opportunity to repair or replace the RBPS system. A date and mark shall be placed on all RBPS systems that pass inspection.

12. RECIPROCATING ENGINES

a) Safety and Containment Systems - Systems shall be designed to contain debris resulting from damage due to backfire or explosion in the induction system or part failure or separation.
   (i) All Roots-type supercharger installations must have SFI-approved containment straps.
   (ii) All flywheels shall have SFI-approved containment system.

b) Automotive Engines can be any Engine that is manufactured and used in domestic or foreign passenger cars and trucks, including racing engines that are based upon engines manufactured for passenger car or truck use.

c) No Engine shall have more than eight cylinders unless that Engine is specifically demonstrated to qualify in all respects as being automotive in design, manufacture, and use.

d) It is the intent of this definition to explicitly exclude engines that are of special or custom design and manufacture that are not used or based upon passenger or truck vehicles, even if manufactured by an auto maker.
   (i) It shall be at the discretion of Rules and Competition Committee to determine if an engine qualifies as *"automotive".*
   (ii) Anyone proposing to use automotive power shall need to obtain a ruling from the Chairman of H1 on that proposed power plant.

e) Automotive rules shall not be changed for at least **five (5)** years after the first Boat runs.

f) All other reciprocating engines that are built in quantities of less than **100 per year** may be run. Participants desiring to utilize such power shall submit proof of reliability thru actual dyno sheets or other substantiated evidence assuring reliability under conditions similar in duration and high rpm loads of an Unlimited hydroplane race. Evidence must be provided that there exists a ready supply of parts necessary to build an entire engine in quantities of no less than **four (4).**

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APPENDIX A

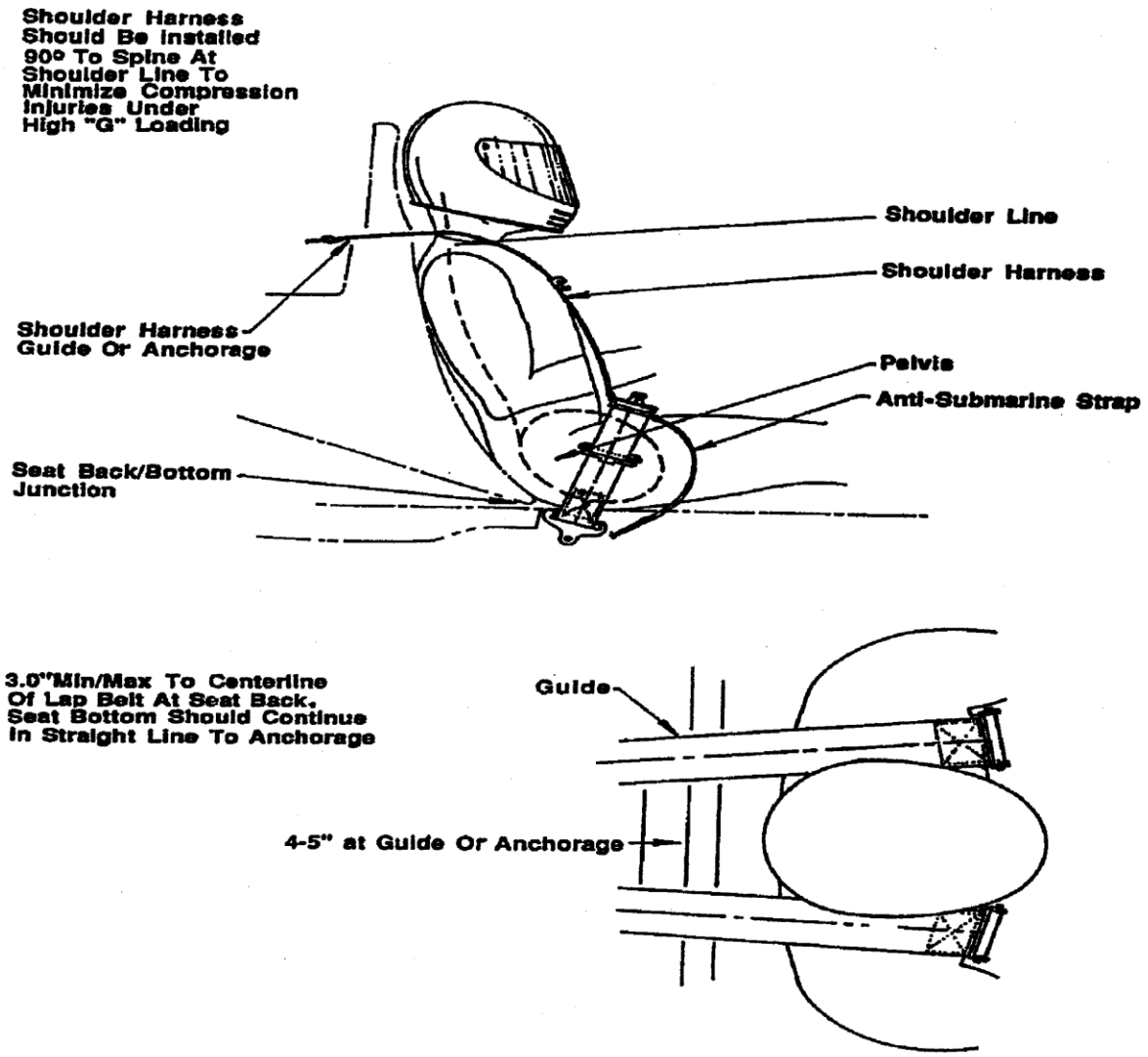


Figure 1-1 Geometry of Shoulder Harness Restraint System

APPENDIX B

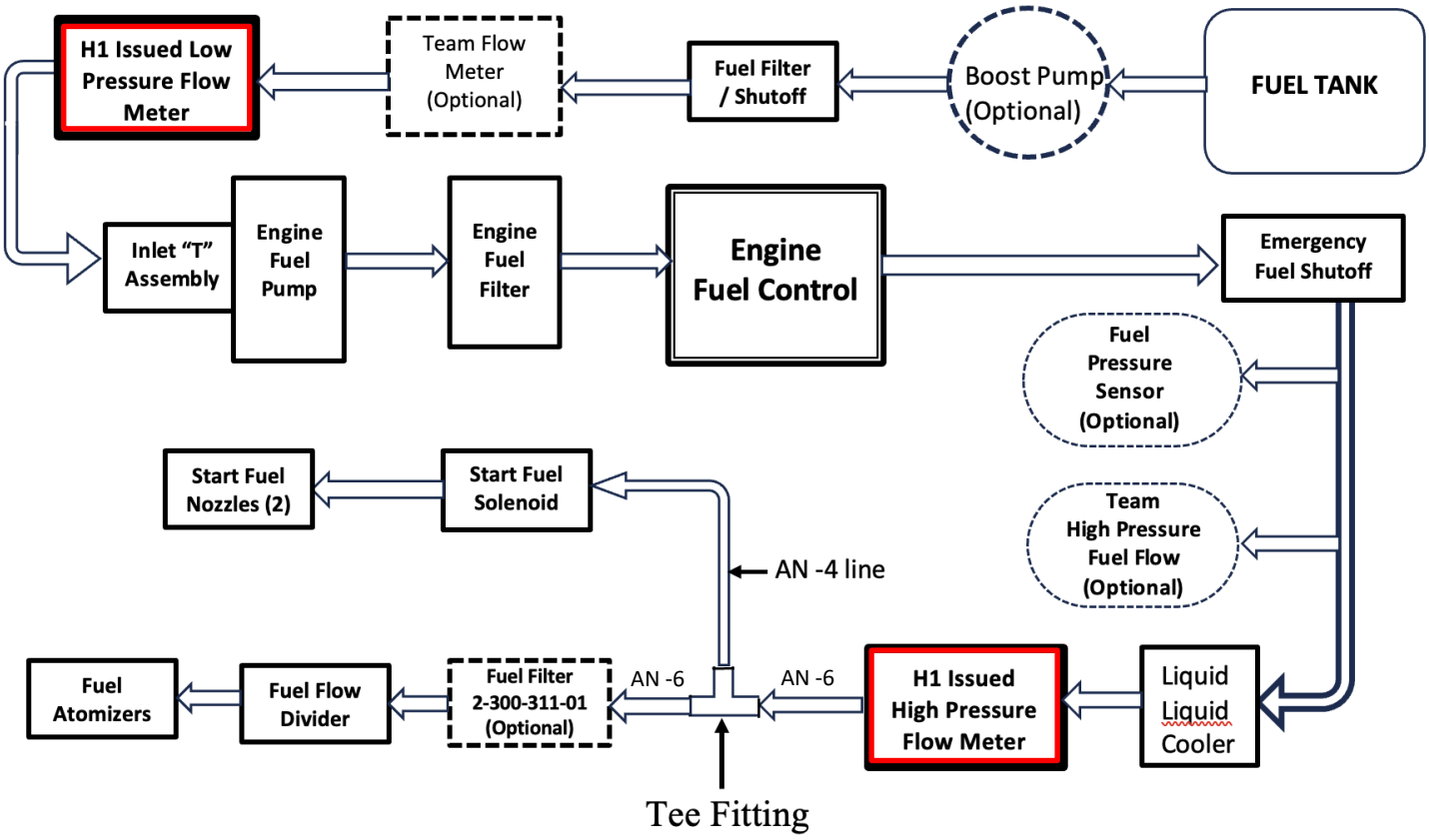


FIGURE 2-1 : Fuel System Schematic Using the Fuel Control

Note: The 'O' rings listed here should be changed when performing this procedure to insure proper sealing of the valve after re-installation.

2. Installation

- Remove the MIN FUEL adjustment assembly as described in the overhaul manual. NOTE: It is very important to screw the position adjuster in as your screw the throttle valve cap out.
- Remove the MIN FUEL adjust screw (item 44) from the housing (item 46).

Note: On some fuel controls the MIN FUEL screw adjustment (item 44) cannot be removed from the housing (Item 46) without further disassembly. In this case, you shall need to cut a notch in the housing to allow removal.

- Insert the spacer between the housing and the end of the position screw adjust.
- Install new 'O' rings.
- Assemble the screw adjust

APPENDIX B (cont.)

- Install the assembly into the throttle valve housing. Make sure you turn the screw adjust out as you are screwing the throttle valve cap in.

Note: The following information is being provided only to assist Race Teams to obtain the proper fuel flow after spacer installation. Your results may vary from these, so use this information as reference only.

Turn the MIN FUEL adjustment all the way OUT. Then, set the adjust screw 5-6 turns IN from all the way out. This shall provide a starting point for obtaining the correct fuel flow limit of **4.2** GPM. Turn the adjust screw out to increase fuel flow; turn it in to reduce fuel flow. Every 1 turn of the screw shall change the fuel flow approximately 0.08 GPM.

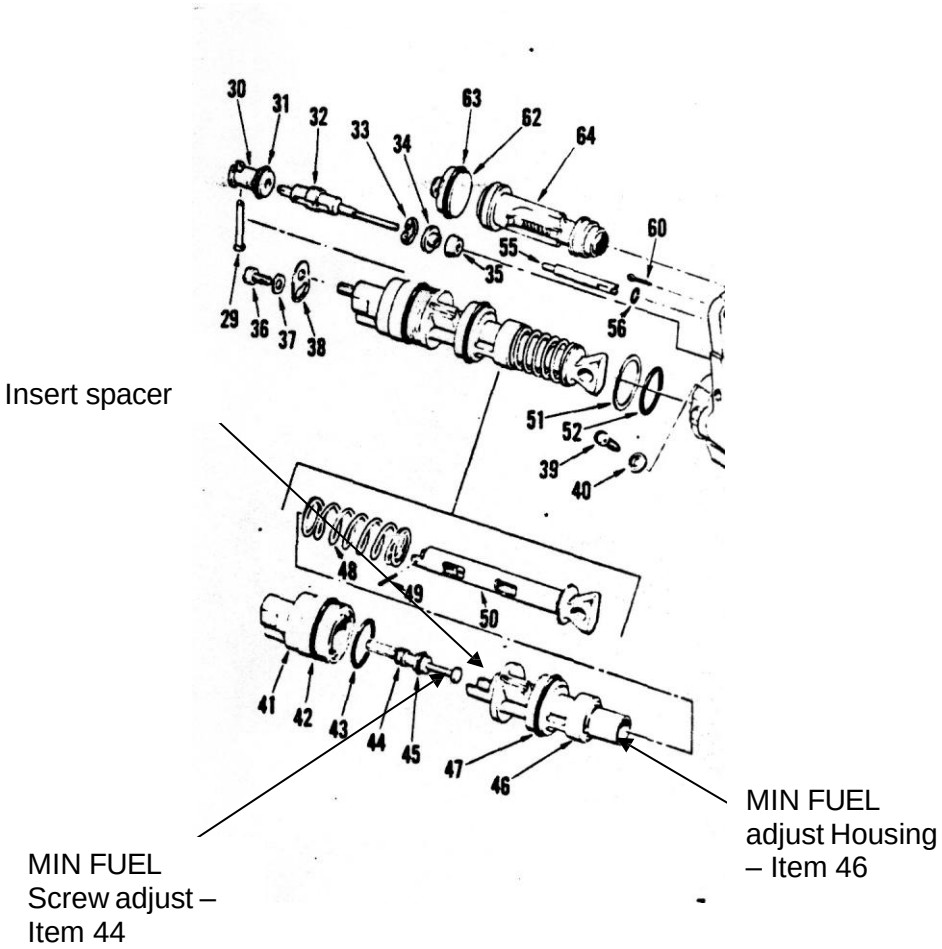


Figure 2-2 MIN FUEL adjustment assembly

APPENDIX C
ANNUAL INSPECTION FORM

2023 H1 Racing Season

(Separately Available)

APPENDIX C – ANNUAL INSPECTION FORM

2025 Racing Season H1

Hull ID: _____

Name/Number: _____ U - _____

Date: _____ / _____ / _____

Inspector: _____

HULL

1. DECK

__A. Check for looseness from frames _____
__B. Check for loose fiberglass _____
__C. Check for cracks _____
__D. Check for loose trim _____

2. BOTTOM

__A. Check for loose fasteners _____
__B. Check for exposed seams _____
__C. Check doublers _____
__D. Check for corrosion _____
__E. Check location and type of drains

3. NON-TRIPS

__A. Check fasteners _____
__B. Check for loose fiberglass _____
__C. Check for tightness of seams _____
__D. Check for condition of aluminum _____

4. RUNNERS

__A. Check fasteners
__B. Check condition of aluminum/magnesium _____
__C. Check for tightness of seams _____
__D. Check for loose fiberglass _____
__E. Check for structural integrity of wood _____

5. FRAMES

__A. Check for integrity of all glue joints _____
__B. Check fasteners _____
__C. Check for cracks _____

HORIZONTAL TAIL (WING) ASSEMBLY

1. DECK MOUNTS (UPRIGHT ATTACHMENT POINTS)

__A. Visually check for cracks _____
__B. Check fasteners for tightness _____
__C. Check all glue joints _____

2. HULL/TRANSOM MOUNTS (Diagonal Brace Attachment Points)

__A Check for cracks _____
__B. Check fasteners for tightness _____
__C. Check glue joints _____

3. UPRIGHT

__A. Check for cracks, rust and corrosion **(must be initialed by crew chief)*** _____

__B. Check uniballs _____

4. ADJUSTING RODS

__A. Check for cracks, rust and corrosion **(must be initialed by crew chief)*** _____

__B. Check rod ends _____

5. DIAGONAL BRACES

__A. Check for cracks, rust and corrosion **(must be initialed by crew chief)*** _____

__B. Check rod ends _____

COCKPIT

1. MAIN STRUCTURE

__A. Check for main structure & roll cage to Rulebook standards & minimums _____

__B. Check for loose upholstery, exposed areas that may contact drivers head. _____

__C. Check headrest to Rulebook standards and minimums _____

__D. Check seat adequately attached to boat _____

__E. Check for adequate leg clearance _____
(e.g. can driver pull knees up to chest with steering wheel removed.)

__F. Check seal/release of bottom rescue hatch _____

__G. Check for Plexiglass window in hatch. (Optional) _____

__H. Check for cockpit sealed from engine compartment _____

__I. Check for secondary emergency air supply _____

__J. Check air bottles inspection sticker, location & mounting _____

__K. Check air hose length (10-15 feet) measure from center of steering wheel _____

__L. Check for installation of radio and current license _____

2. CANOPY

__A. Check for proper material (1/2 inch thick hot formed polycarbonate, _____
Lexan cold formed is not acceptable)

__B. Check for securely fastened _____

__C. Check for cracks or breaks _____

__D. If using aircraft canopy, which model _____

__E. Check for opening mechanism, hinge, lift handle, latch per _____
Rule Book standards and minimums

__F. Check for cockpit opening with canopy open to _____
Rule Book standards and minimums

__G. Check driver's head clearance _____

3. UPHOLSTERY/PADDING

__A. Is upholstery securely attached _____

__B. Check for padding covering sharp edges/protrusions _____

4. STEERING WHEEL

__A. Check for rust _____

__B. Check for loose cover _____

__C. Check for sharp edges _____

__D. Check for proper attachment - check splines/taper, keyway, key attaching _____
bolts, lock-tited bolts, collar release mechanism w/in 2" of face of hub

5. FIRE EXTINGUISHERS

__A. Check for handles accessible from inside and outside of cockpit, properly marked as per Rulebook _____

__B. Check for bottles securely mounted _____

__C. Check for cables Pull free and operable. _____

__D. Check for bottle weights _____

__E. Check cockpit system (Halon 1211 not acceptable in cockpit) _____

__F. Verify chemical used in hull/engine and cockpit systems _____

6. MIXTURE CONTROL (Piston Aircraft Engine Only)

__A. Check aft position for off _____

__B. Check for protrusions _____

__C. Check for cable well attached _____

7. THROTTLE

__A. Check for secure attachment _____

__B. Check for smooth and free pedal/cable action _____

__C. Check that spring returns throttle to off position (a minimum of 2 springs required: 1 on pedal, and 1 on carb or fuel control) _____

__D. Check for no toe straps/coverings on pedals _____

__E. Check cable well secured (Quick release ball type not recommended) _____

8. LEFT FOOT BRACE

__A. Check structure, mounting. _____

__B. If left foot pedal operates control surface or other mechanism, check for spring back to "fail safe" position, no toe straps _____

9. DASHBOARD

__A. Check adequate drives leg clearance _____

__B. Padding on underside of dash _____

__C. Check for secure attachment _____

__D. Check for secure sub structure _____

10. SHUT-OFF DEVICES/SYSTEM

__A. Check that systems can be activated from outside cockpit. properly marked as described in Rulebook _____

__B. Check that system activation will ground magnetos (piston engines), and cut electrical power to all systems _____

__C. Turbine engines to have emergency mechanical fuel shut-off device, independent of the fuel control _____

11. MASTER ELECTRICAL SWITCH (MANDATORY)

__A. Check for easy access for driver _____

12. MAGNETO OR ENGINE MASTER SWITCH (PISTON ENGINES)

__A. Check for secure mounting _____

__B. Check for both magnetos grounded when off _____

__C. Check for accessibility from outside of cockpit _____

13. CIRCUIT BREADERS (OPTIONAL. RECOMMENDED)

__A. Examples: Instruments 15 Amp, Fuel pump 20 Amp. Water/Alcohol pump 20 Amp _____

14. SWITCHES

__A. Check for free action _____

__B. Check for secure attachment _____

15. WIRING

__A. Check for corrosion _____

__B. Check for tight wire lugs

__C. Check for chafed or cut wires _____

__D. Check for wire bundles tied off _____

16. DRIVER RESTRAINT SYSTEM

__A. Check straps and latch per Rule B.8.v) _____

__B. Check straps for wear or fraying and date stamped _____

__C. Check fever latch for rust, smooth operation _____

__D. Check for adequate attachment to hull _____

ENGINE COMPARTMENT

1. WIRING

__A. Check for corrosion/damage _____

__B. Check for tight wire lugs _____

__C. Check for chafed or cut wires _____

__D. Check for wire bundles tied off _____

__E. Check separate wiring for start fuel solenoid _____

2. PLUMBING

__A. Check for frayed hoses _____

__B. Check for corrosion on ends (pull test) _____

__C. Check for loose fittings and ends _____

__D. Check for hose bundles tied off _____

__E. Check mounting of fuel flow control device _____

3. ENGINE STRINGER/INTERNAL STRUCTURE

__A. Check for secure engine & gearbox attachments, wear or elongating of bolt holes _____

__B. Check for internal structural damage due to heat, oil, impact _____

__C. Check engine bailers/vent system meets Rule Book _____

4. COWLING

__A. Check attachment for removable cowling _____

__B. Check for cracks and breaks in glass _____

__C. Check for strobe light installed _____

STEERING SYSTEM

1. RUDDER BRACKET

__A. Check for removal of all paints & coatings, cleaned, mangnaflux or zyglo (**must be initialed by crew chief**) _____

__B. Check bolt holes for elongation. _____

__C. Check bearings/bushings for clearance and freedom of movement (recommended replacing bearings with bushings) _____

2. RUDDER BRACKET SUPPORT STRUCTURE

__A. Check for transom well attached to stringers, air traps, bottom _____

__B. Check inner structure ties together the transom, bottom, stringers _____

__C. Check all glue joints intact _____

__D. Check for inserts at all fasteners (honeycomb boats) _____

3. RUDDER

__A. Check rudder has been removed from boat _____

__B. Check all rudders have numbers _____

__C. Check rudder has been magnafluxed (certified with papers) _____

(must be initialed by crew chief)*

__D. Check for minimum thickness at and above waterline _____

__E. Check for filleting at base of post _____

__F. Check for shot peening (recommended) _____

__G. Check retaining nut or cap. _____

Check for new bearhug nut and lock ring. Check all bolts safety wired

__H. Check key way and key fit _____

__I. Check fittings and tubes for cracks _____

__J. Check hoses and fittings for corrosion and fraying _____

4. PITMAN ARM

__A. Check magnaflux or zyglo **(must be initialed by crew chief)*** _____

__B. Check key way and key for fit _____

__C. Check bore for fit on rudder _____

__D. Check/inspect threads _____

5. ROD ENDS

__A. Check zyglo (or new) **(must be initialed by crew chief)*** _____

__B. Check for loose ball _____

__C. Check for retainer washer under bolt head _____

__D. Check for minimum specification type on rod ends (40,000 lbs) _____

__E. Check for NO zerk style grease fittings in rod ends _____

(zerk style grease fittings not allowed)

__F. Check nuts and bolts cotter keyed, or threaded into push rod with jam nut _____

__G. Check thread engagement minimum (1-1/2 X thread diameter) _____

6. PUSH PULL RODS

__A. Check for rust inside and outside of tube _____

__B. Check threads for fit and rust _____

__C. Check magnafluxed or zyglo'd (must be initialed by crew chief)* _____

__D. Check for NO brazed fittings or joints _____

__E. Check for minimum wall thickness : _____

4130 1" O.D. tube - .120" wall, or equivalent

4130 1 1/2" O.D. tube - .063" wall, or equivalent

7. CABLE QUADRANT/SPROCKET (CABLE STEERING)

__A. Check mangafluxed or zyglo'd **(must be initialed by crew chief)*** _____

__B. Check bearings/bushings for free play and wear _____

__C. Check push-pull rod bolt hole for elongation and wear _____

__D. Check cable attachments _____

8. CABLES

__A. Check minimum cable type (aircraft type, 3/16 Diameter, 7 X 19 stainless) _____
__B. Check for fraying, kinks, clearances in hull holes _____
__C. Check ends - swages and clamps _____
__D. Check/verify each cable pull tested (certified with papers) _____
__E. Check/inspect ALL pulleys **(must be initialed by crew chief)*** _____

9. CABLE PULLEYS

__A. Check for excessive wear, cracks, corrosion _____
__B. Check bearings _____
__C. Check fairleads and cable guides _____
__D. Check mounting brackets _____

10. CABLE ADJUSTERS

__A. Check for safety wire per FAA specs AC 43.13-1B pgs 7-43 to 7-48 _____
__B. Check for clearances where pass through frames/stringers _____

11. SKID FIN BRACKET

__A. Check for removal of all paint and coatings, magnaflux or zyglo
(must be initialed by crew chief)* _____
__ B. Check bolt holes for elongation, stress _____

12. SKID FIN BRACKET SUPPORT STRUCTURE

__A. Check for inspection deck hatch above internal support structure. _____
__B. Check for internal structure attached through to engine stringers. _____
__C. Check all glue joints intact _____
__D. Check for inserts at all fasteners (honeycomb boats) _____

13. SKID FIN

__A. Check fin has been removed from boat _____
__B. Check all skid fins have serial numbers _____
__C. Check skid fins have been magnafluxed (certified with papers) _____
__D. Check for minimum thickness at waterline and above _____
__E. Check tie rod attach points for rust, cracks, etc. _____
__F. Check tie rods for rust and cracks, minimum pull strength of 20,000 lbs.,
two (2) rods minimum. Check magnafluxed or zyglo'd
(must be initialed by crew chief)* _____
__G. Check tie rod ends for rust, loose ball, magnaflux, zyglo or new
(must be initialed by crew chief)* _____
__H. Check for curvature per Rule B.6.c) _____

LIFTING SLING

1. TEST/CERTIFICATION

__A. Check/Inspect components for rust, wear, cracks, etc; _____
nylon for wear, fraying. No aluminum collector rings.
__B. Check/Verify Date of Mfg, rating of each leg (6000 lbs. min.), _____
collector ring minimum 25,000 lb. capacity (certified with papers)
__C. Confirm pull test date (every 5 years beginning in 2025) _____

CONTAINMENT BLANKET (TURBINE POWERED BOATS)

1. DESIGN/MANUFACTURE

__A. Check/inspect design and condition per Rulebook minimums _____
__B. Check for proper location _____
__C. Check inspection date (every year) _____

DATA RECORDING SYSTEM

__A. Check recorder location for access and security _____
__B. Check N2 sensor mount pads on gearboxes _____
__C. Check/inspect magnets _____
__D. Check flow meter location and mount _____

HEAD AND NECK RESTRAINT

1. INSPECTION/CONDITION

__A. Check for approved type, general condition _____

HELMET/AIR MASK

__A. Check certification, manufacturer _____
__B. Check air mask, straps, attachment clips _____

RADIOS

1. FCC LICENSE

__A. Verify License _____
__B. Verify Expiration Date _____
__C. List Frequencies: _____ _____

CrewChief: _____ Date: ____ / ____ / _____

Inspector:: _____ Date: ____ / ____ / _____

NON-DISCLOSURE AGREEMENT The Chief Referee, his representatives, and all inspectors shall not disclose to any individual or race team any information declared to be proprietary by any race team. This shall apply to information obtained in the performance of duties of the office of Chief Referee or his representatives. This non-disclosure agreement is binding until the termination of said referees, his representatives or inspectors' association with H1 This non-disclosure policy shall not apply to information regarding anything used to circumvent Unlimited Class Rules and Regulations.

Chief Referee: _____ Date: ____ / ____ / _____

APPENDIX D

2023 H1 ANNUAL INSPECTION SUMMARY

(Separately Available)

APPENDIX D
2025 ANNUAL INSPECTION SUMMARY

Hull ID: _____ Date: _____ / _____ / _____

Name/Number _____ U - ____

Inspector: _____

Air Bottles: VIP Date: ___ / ___ / _____ Hydrostatic Date: ___ / ___ / _____

Containment Blanket: Inspection Date: ___ / ___ / _____ By: _____

Lift Slings: Manufacture Date: ___ / ___ / _____ Each Leg 6000lbs / Collector Ring 25,000lbs
Inspection/Pull Date: ___ / ___ / _____ (Beginning 2025 – every 5 years)

Driver Restraint System: Manufacturer Expiration Date: _____ / _____ (SFI 16.1)

Crew Chief must initial to affirm Inspection and/or testing on each of the following components:

WING Uprights: _____ Adjusting Rods: _____ Diagonal Braces: _____
Rule B.16.a) Deck Brackets: _____ Transom Bracket: _____

STEERING Quadrant/Sprocket: _____ Cable removal & Inspection (off years): _____ [Rule B.14.i)]

Certification paperwork required <u>every year</u> after being put into service since last test. Rule B.14.h)

RUDDER Rudder:_____ Push/Pull Rod: _____ Rod Ends: _____ Pitman Arm: _____

SKID FIN Skid Fin:_____ Tie Rods:_____ Tie Rod Ends: _____

Certification paperwork <u>required every two years</u> after being put into service.
Crew Chief Initials in off years per Rule B.14.e)

Skid Fin: Sponson Transom Bracket:_____ Skid Fin-Non Trip Bracket:_____ Rudder Bracket:_____

Steering Cable Pull Test Date: ___ / ___ / _____ [Rule B.14.i)]

<u>RADIOS</u>

FCC License Number: _____ FCC License Expiration .Date: ____ / ____ / _____

FCC License Frequencies: _____ _____ _____ _____

Notes:

_____

_____

_____

_____

APPENDIX E

WATERLINE DETERMINATION
SKID FIN AND RUDDER

(Separately Available)

SKID FIN WATERLINE DETERMINATION

To determine the waterline location, a smart level with the appropriate length is required.
The skid fin needs to mounted on the boat, in the shallowest position in order to perform this measurement.

Step 1:
Place the level where it is touching the deepest part of the sponson primary running surface at the furthest aft location, and the back portion of the skid fin at an eyeball level. Note the approximate angle as it relates to the centerline of the boat. It is not critical that this be exact as the error factor is minimal with this specific angle.

Step 2:
Go to the back of the boat and place the smart level on the afterplane at the approximate same angle in relation to the centerline of the boat as you had at the skidfin.

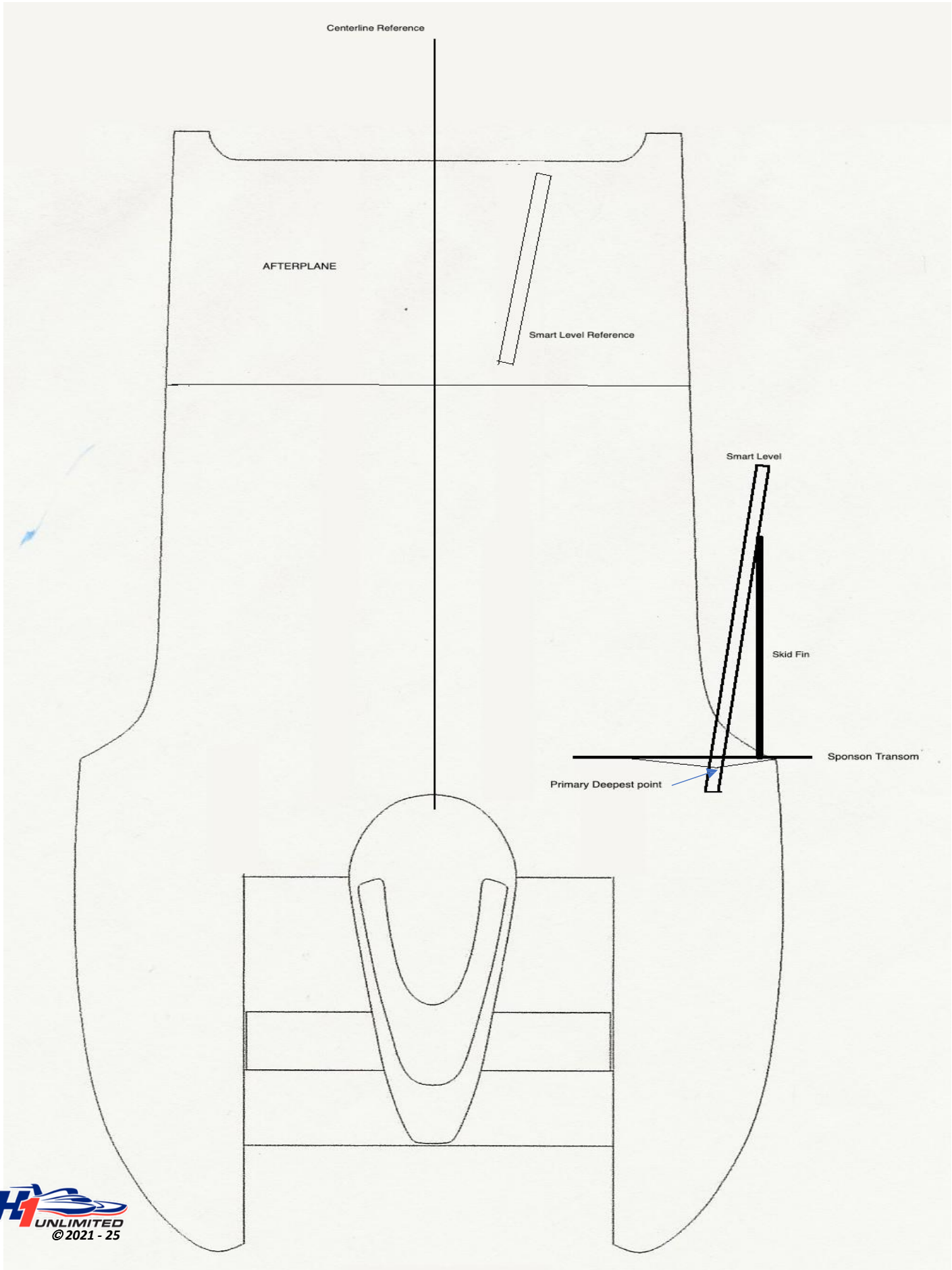
Step 3:
Zero out the smart level. At this point, you are compensating for the afterplane not being perfectly level in either fore and aft, or side to side.

Step 4:
Go back to the skid fin and place the level like you did in Step 1, only this time with one end of the smart level in continuous contact with the deepest part of the sponson primary running surface, move the level up or down so it reads 0.00 (zero).

Step 5:
Mark your point at the back of the skidfin. This is your reference for Step 6:

Step 6:
Place the level on the skidfin lining it up on your mark and moving the level up or down until it reads 0.00 (zero). Draw a line on the skidfin as this is your derived waterline. You can now measure the thickness along this line to comply with Rule 14.c).(v) and as referenced in the “Defined Terms” on page iii at the beginning of the Technical Manual.

See the drawing on the next page to reference positions in these instructions.



RUDDER WATERLINE DETERMINATION

To determine the waterline location on the rudder, a smart level with the appropriate length is required. The rudder needs to mounted on the boat in order to perform this measurement.

It is assumed the boat and trailer are on ground that has no more than a 5 degree slope.

Step 1:
Place the smart level where the top of the smart level is touching the centerline of the opening at the rear of the strut, and the back portion of the rudder at an eyeball level in relation to being parallel with the afterplane. Note the approximate angle as it relates to the centerline of the boat. It is not critical that this be exact as the error factor is minimal with this specific angle.

Step 2:
Place the smart level on the afterplane at the approximate same angle in relation to the centerline of the boat as you had at the rudder.

Step 3:
Zero out the smart level. At this point, you are compensating for the afterplane not being perfectly level in either fore and aft, or side to side.

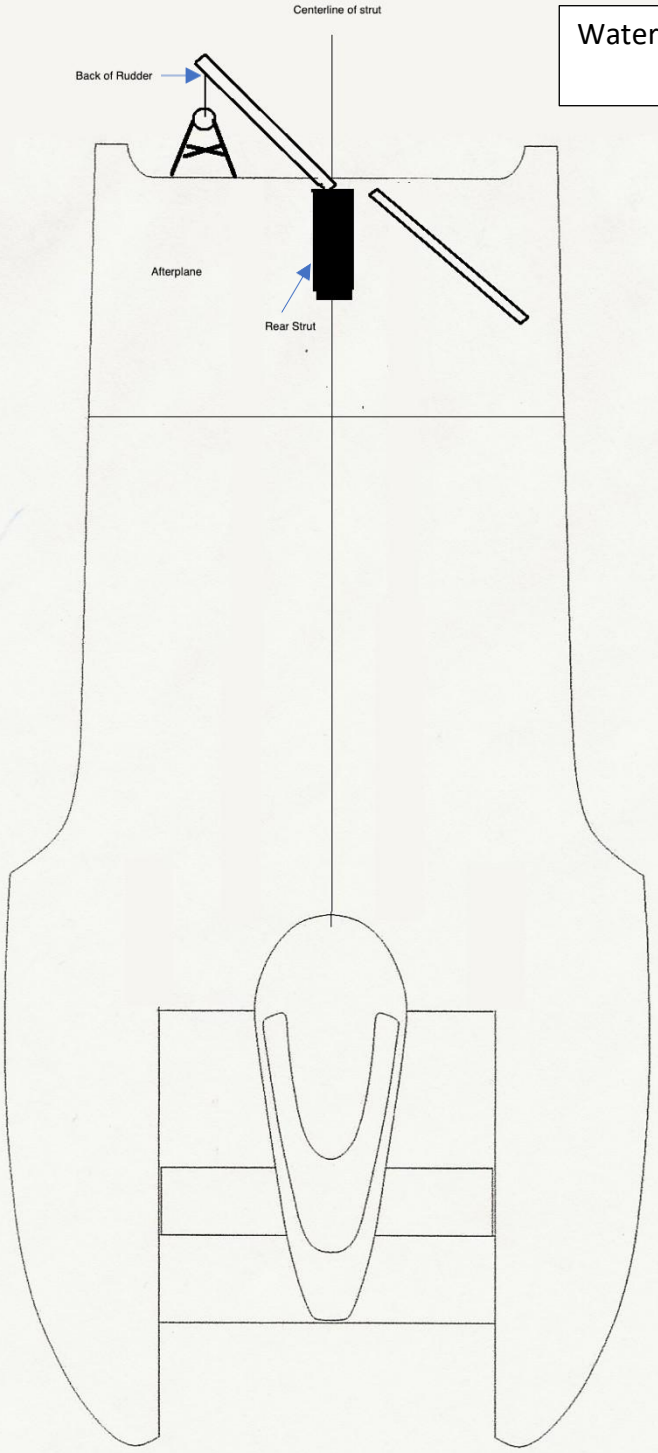
Step 4:
Relocate the smart level and place the it like you did in Step 1, only this time with one end of the smart level in continuous contact with the centerline of the opening at the rear of the strut, move the level up or down until it reads 0.00 (zero).

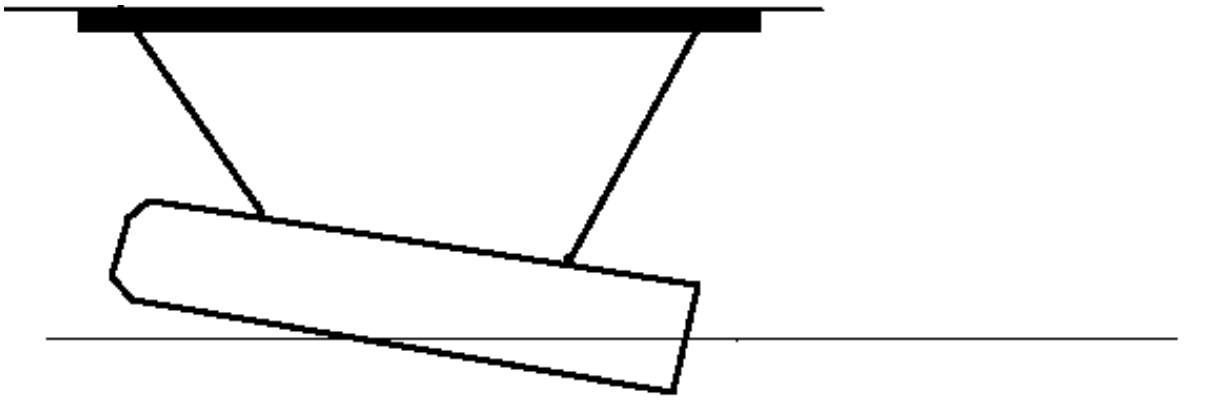
Step 5:
Mark your point at the back of the rudder. This is your reference for Step 6:

Step 6:
Place the level on the rudder lining it up on your mark and moving the level up or down until it reads 0.00 (zero). Draw a line on the rudder as this is your derived waterline.

See the drawing on the next pages to reference positions in these instructions.

Waterline at Rudder Measurement
Page 2





Centerline at rear of strut - parallel with after plane

APPENDIX F

FAA Advisory Circular AC 43.13-1B

(Separately Available)

SECTION 10. SAFETY METHODS FOR TURNBUCKLES

7-179. GENERAL. Safety all turnbuckles with safety wire using either the double or single-wrap method, or with any appropriately approved special safetying device complying with the requirements of FAA Technical Standard Order TSO-C21. The swaged and unswaged turn- buckle assemblies are covered by AN standard drawings. Do not reuse safety wire. Adjust the turnbuckle to the correct cable tension so that no more than three cable threads are exposed on either side of the turnbuckle barrel.

7-180. DOUBLE-WRAP METHOD. Of the methods using safety wire for safetying turnbuckles, the method described here is preferred, al- though either of the other methods described is satisfactory. The method of double-wrap safetying is shown in figure 7-24(A).

a. Use two separate lengths of wire. Run one end of the wire through the hole in the barrel of the turnbuckle and bend the ends of the wire toward opposite ends of the turnbuckle.

b. Pass the second length of the wire into the hole in the barrel and bend the ends along the barrel on the side opposite the first. Spiral the two wires in opposite directions around the barrel to cross each other twice between the center hole and the ends.

c. Then pass the wires at the end of the turnbuckle in opposite directions through the hole in the turnbuckle eyes or between the jaws of the turnbuckle fork, as applicable, laying one wire along the barrel and wrapping the other at least four times around the shank of the turnbuckle and binding the laid wires in place before cutting the wrapped wire off.

d. Wrap the remaining length of safety wire at least four turns around the shank and cut it off. Repeat the procedure at the opposite end of the turnbuckle.

e. When a swaged terminal is being safe-tied, pass the ends of both wires through the hole provided in the terminal for this purpose and wrap both ends around the shank as previously de-scribed. If the hole is not large enough to allow passage of both wires, pass the wire through the hole and loop it over the free end of the other wire, and then wrap both ends around the shank as previously described. Another satisfactory double-wrap method is similar to the previous method, except that the spiraling of the wires is omitted as shown in figure 7-24(B).

7-181. SINGLE-WRAP METHOD. The single-wrap methods described in the following paragraphs and as illustrated in figure 7-24(C) and (D) are acceptable, but are not the equal of the double-wrap methods.

a. Pass a single length of wire through the cable eye or fork, or through the hole in the swaged terminal at either end of the turnbuckle assembly. Spiral each of the wire ends in oppo-site directions around the first half of the turn-buckle barrel, so as to cross each other twice. Thread both wire ends through the hole in the middle of the barrel so that the third crossing of wire ends is in the hole, again, spiral the two wire ends in opposite directions around the remaining half of the turnbuckle, crossing them twice. Then, pass one wire end through the cable eye or fork, or through the hole in the swaged terminals, in the manner previously described. Wrap both wire ends around the shank for at least four turns each, cutting off excess wire. This method is shown in figure 7-24(C).

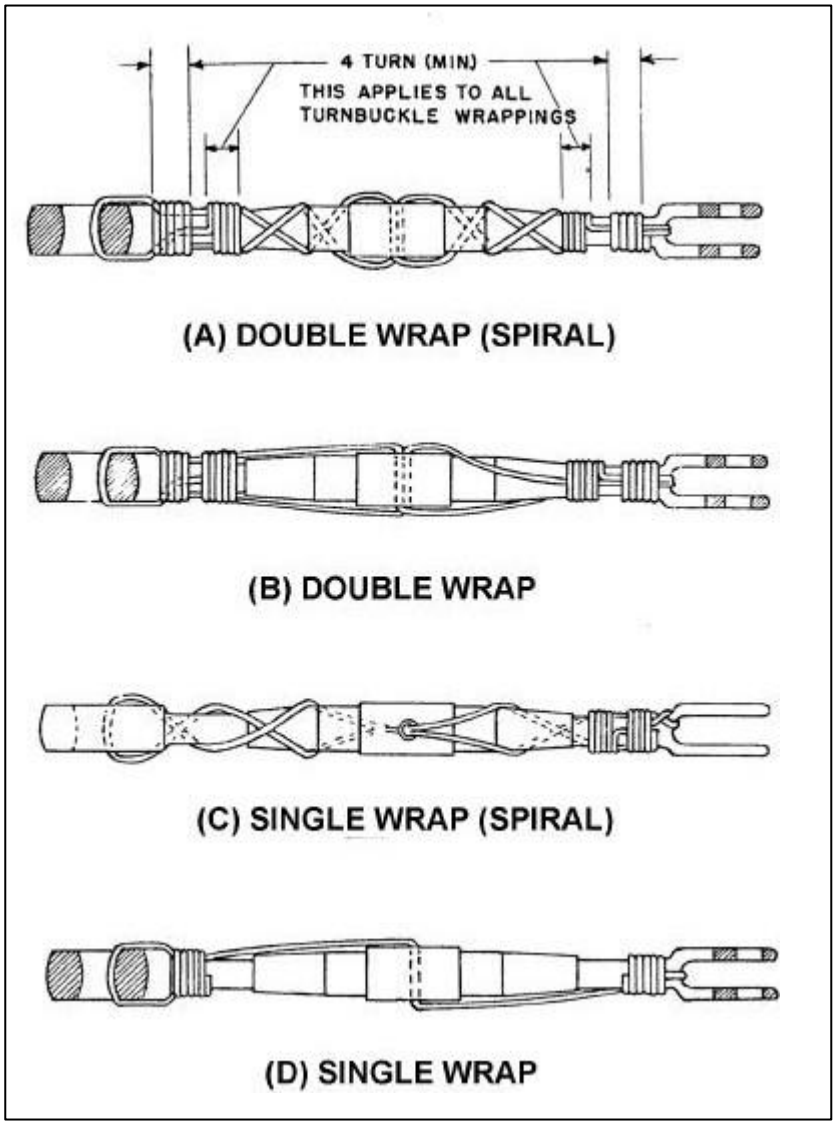


FIGURE 7-24. Safetying turnbuckles.

b. For the method shown in figure 7-24D, pass one length of wire through the center hole of the turnbuckle and bend the wire ends toward opposite ends of the turnbuckle. Then pass each wire end through the cable eye or fork, or through the hole in the swaged terminal, and wrap each wire around the shank for at least four turns, cutting off excess wire. After safetying, no more than three threads of the turnbuckle threaded terminal should be exposed.

7-182. SAFETY-WIRE SECURED TURNBUCKLES. (See figure 7-25.) Before securing turnbuckles, threaded terminals should be screwed into the turnbuckle barrel until no more than three threads of either terminal are outside the barrel. After the turnbuckle has been adjusted for proper cable tension, two pieces of safety wire are inserted, half the wire length into the hole in the center of the turnbuckle barrel. The safety-wires are bent so that each wire extends half the length of the turnbuckle on top and half on bottom. The ends of the wires are passed through the hole in the turnbuckle eyes or between the jaws of the turnbuckle fork, as applicable. The wires are then bent toward the center of the turnbuckle and each wire is wrapped around the shank four times, binding the wrapping wires in place as shown in figure 7-25.

a. When a swaged terminal is being secured, one wire is passed through the hole in the terminal and is looped over the free end of the other wire and both ends wrapped around the shank. All lock wire used in the safetying of turnbuckles should be carbon steel, corrosion-resistant steel, nickel-chromium iron alloy (Inconel), nickel-copper alloy (monel) or aluminum alloy. For safety cable diameter of safety wire size and material, refer to table 7-8.

b. Care should be exercised when safety wiring, particularly where corrosion will present a problem, because smaller wire sizes tend to crack when twisted.

TABLE 7-8. Turnbuckle safetying guide.

Cable Size	Type of Wrap	Diameter of Safety Wire	Material (Annealed Condition)
1/16	Single	0.040	Copper, brass.[1]
3/32	Single	0.040	Copper, brass.[1]
1/8	Single	0.040	Stainless steel, Monel and "K" Monel.
1/8	Double	0.040	Copper, brass.[1]
1/8	Single	0.057 min.	Copper, brass.[1]
5/32 and greater.	Double	0.040	Stainless steel, Monel and "K" Monel.[1]
5/32 and greater	Single	0.057 min.	Stainless steel, Monel or "K" Monel.[1]
5/32 and greater	Double	0.0512	Copper, brass.

[1]Galvanized or tinned steel, or soft iron wires are also acceptable.

7-183. SPECIAL LOCKING DEVICES. Several turnbuckle locking devices are available for securing turnbuckle barrels such as wire-locking clips. Persons intending to use a special device must ensure the turnbuckle assembly has been designed to accommodate such devices. A typical unit is shown in figure 7-26. When special locking devices are not readily available, the use of safety wire is acceptable.

7-184. ASSEMBLING AND SECURING CLIP-LOCKING TURNBUCKLES. (See table 7-9 and figure 7-27.) Wire clip-locking turn- buckles are assembled and secured in the following ways.

a. Engage threads of turnbuckle barrel with threads of cable terminal and turn barrel until proper cable tension is reached.

b. Align slot in barrel with slot in cable terminal.

c. Hold lock clip between thumb and forefinger at loop end and insert straight end of clip into opening formed by aligned slots.

d. Bring hook end of lock clip over hole in center of turnbuckle barrel and seat hook loop into hole.

e. Apply pressure to hook shoulder to engage hook lip in turnbuckle barrel and to complete safety locking of one end of turnbuckle.

NOTE: Repeat the above steps to safety lock the opposite end of turnbuckle. Both lock clips may be inserted in the same turnbuckle barrel hole or they may be inserted in opposite holes. However, do not reverse wire locking clips

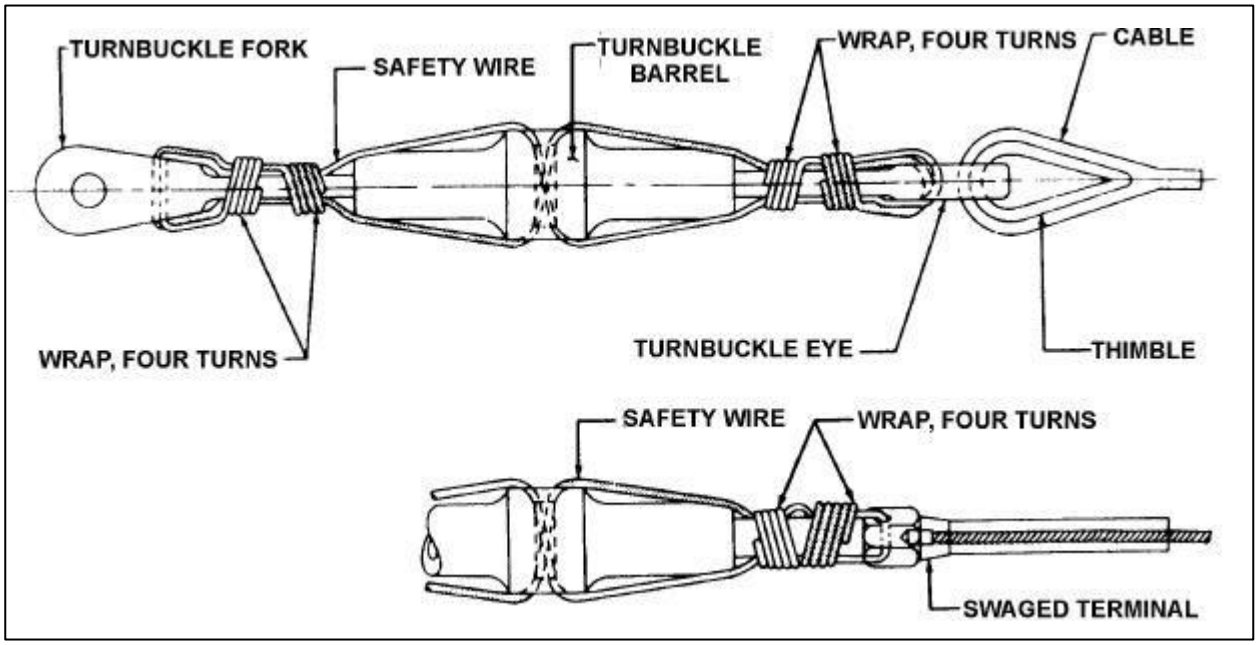


FIGURE 7-25. Securing turnbuckles.

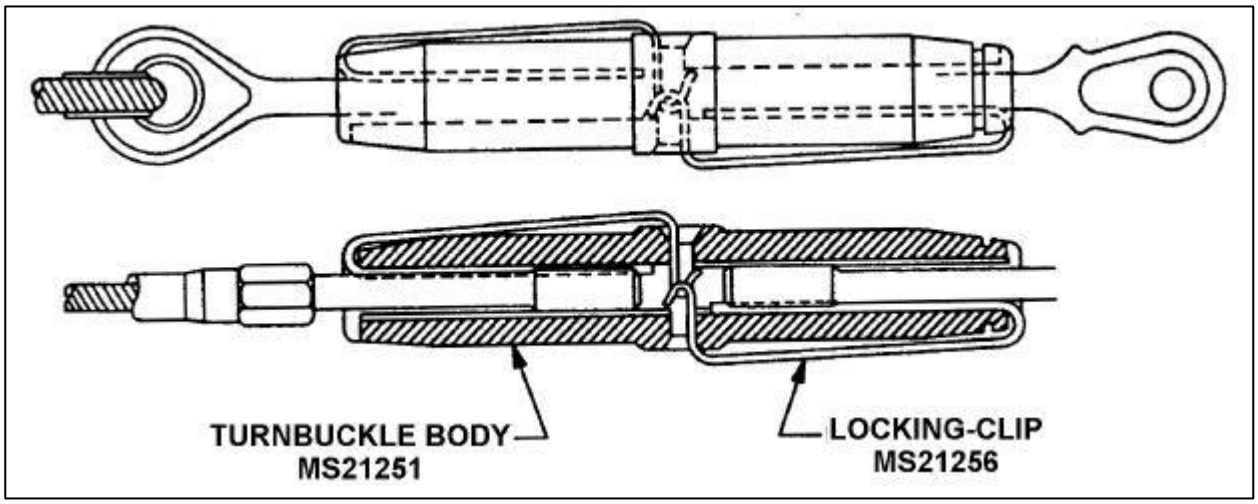


FIGURE 7-26. Clip-type locking device.

TABLE 7-9. Locking-clip application.

NOMINAL CABLE DIA.	THREAD UNF-3	LOCKING CLIP MS21256	TURNBUCKLE BODY MS21251
1/16	No. 6-40	-1	-2S
3/32	No. 10-32		-3S
		-2	-3L
1/8	1/4-28	-1	-4S
		-2	-4L
5/32		-1	-5S
		-2	-5L
3/16	5/16-24	-1	-6S
		-2	-6L
7/32	3/8-24		-7L
1/4			-8L
9/32	7/16-20	-3	-9L
5/16	1/2-20		-10L

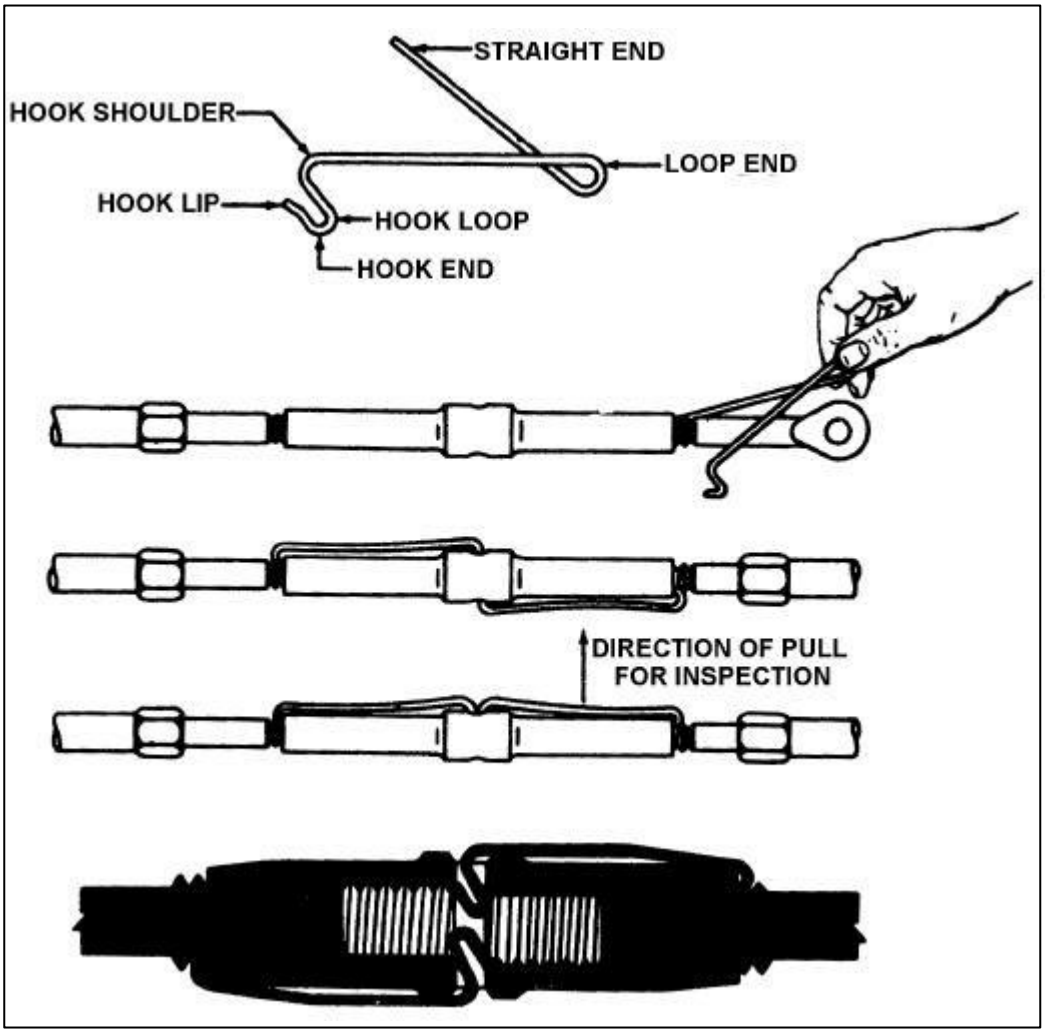


FIGURE 7-27. Assembling and securing clip-locking turnbuckles

7-185.—7-195. [RESERVED.]

APPENDIX G

PARTS INVENTORIES

(Separately Available)

APPENDIX G

SPARE PARTS INVENTORY

In an effort to avoid unnecessary Non-Destructive Testing on components that are considered "back-up" or "spare", H1 Unlimited has adopted Rule B.14.m) which will allow race teams to maintain an inventory of those components that had not been put into service since their last test, but would typically require testing per the schedule in Rule 14 e), f), g) and h). See component list below.

An inventory of ALL components shall be submitted to H1 at the beginning of the race season, and identifying which items will be put into service. It is the responsibility of each team to maintain a current list, and keep H1 apprised when a component is put into service. Components shall be listed, and submitted, on the forms contained in this Appendix. One form is for those items designated to be used at the start of the season, another form is to list all of the components that are designated as "backup" or "spare".

Per Rule 14.g), inspection papers for ALL required components shall be presented at the annual safety inspection, and at the Boat's first race of the season.

- ***Items that require certification paperwork:***

Skid Fin:	Skid Fin All tie rods	*Sponson Transom Bracket All Tie Rod Ends	*Non-Trip Bracket
Rudder:	Rudder	*Rudder Bracket	
Steering:	*Cable Pull Test		[* *Every two years test required – Ref B.14.e*)&i)]

- ***Items that need to be checked/tested and affirmed by Crew Chief:***

Rudder:	Pitman arm		
Wing Assembly:	Uprights	Diagonal Braces	Adjustment Rods
Steering :	Quadrant/Sprocket	Push-pull Rod	Push-pull Rod Ends

Components Installed for 2025 Season

Hull No: U-_____ ***Owner:*** _____

SKID FIN

INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date	INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date
❑	Skid Fin				❑	Tie Rod End			
❑	Bracket				❑	Tie Rod End			
❑	Tie Rod				❑	Tie Rod End			
❑	Tie Rod				❑	Tie Rod End			
❑	Tie Rod				❑	Tie Rod End			
❑	Tie Rod				❑	Tie Rod End			
❑	Tie Rod				❑	Tie Rod End			
❑	Tie Rod				❑	Tie Rod End			
❑	Tie Rod End				❑	Tie Rod End			
❑	Tie Rod End				❑	Tie Rod End			

WING

INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date	INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date
❑	Upright				❑	Diag. Brace			
❑	Upright				❑	Diag. Brace			
❑	Adjust Rod				❑	Adjust Rod			

RUDDER

INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date	INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date
❑	Bracket				❑	Rod End			
❑	Pitman Arm				❑	Rod End			
❑	Rudder				❑				

STEERING

INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date	INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date
❑	Quadrant				❑	Rod End			
❑	Push-Pull Rod				❑	Rod End			

SPARE PARTS INVENTORY

Hull No: ___________

Hull Name: ________________________________

INSTALLED ON HULL	ITEM	S/N	NDT Date	Install Date
☐				
☐				
☐				
☐				
☐				
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