

New England Hillclimb Series

Technical and Safety Requirements • 2021

Changes to the 2020 rules are indicated in ***bold italic***.

These regulations are set forth to provide for the orderly conduct of time trial events. Participants are cautioned that all motor sports have inherent risks; it is the participant's responsibility to take adequate precautions in light of these risks. No express or implied warranty of safety or freedom from risk shall result from publication of or compliance with these rules and regulations. They are intended as a guide for the conduct of this motor sport and are in no way a guarantee against property damage or injury to participants, spectators, or others. (Note: Double-letter designation [AA, BB, etc.] refers only to Prepared cars.)

1. CLOTHING

A. Shoes

1. No nylon.
2. No platform soles, high heels, open shoes, sandals.

B. Clothing

1. No nylon.
2. Long sleeves, long pants.
3. Fire-retardant outer clothing or underwear recommended.

BB. Clothing

1. Fire-retardant outer clothing or underwear.
2. Fire-retardant gloves.
3. Fire-retardant hood or helmet skirt in open-engine cars. Recommended for all.
4. All required personal safety equipment must have proper approval markings such as SFI or FIA.

C. Helmet

1. a. Snell ***SA 2015*** or newer, b. FIA 8860-20XX with manufacture date less than 10 years, or c. BS 6658-85 type A/FR with manufacture date less than 10 years.
2. Full-face helmets are recommended.
3. All helmets must be in good condition.
4. Recommended that helmets carry a sticker or label with medical information (blood type, any allergy, etc.).

D. Eye Protection

1. DOT-approved windshield or
2. Suitable goggles (in good condition) or
3. Face shield (shatterproof polycarbonate (Lexan) required).
4. Polycarbonate (Lexan) may be used where permitted as an alternate windshield or window. Acrylic (Plexiglass) is not acceptable.

E. Head and Neck Support

1. SFI or FIA head and neck restraints are mandatory in cars that require cages.
2. SFI tag must be no older than 5 years. FIA tag does not expire at this time, but the tether strap must be no older than 5 years.

2. CHASSIS

A. Suspension

1. Ball joints, bushings and rod ends to have negligible play (not to exceed manufacturer's specifications).
2. Wheel bearings: minimal play and secure.
3. Steering: no loose tie rods, pitman arms, idler arms, or rack ends. Limited free play; steering wheel in good condition, tight column. If a quick-disconnect steering wheel coupler is used, it must be made of metal, with no plastic inserts.
4. No excessive ride heights, devices that bind suspension, or other unsafe conditions.
5. Suspension to be in generally safe condition and suitable for high-speed competition.

B. Brakes

1. Master cylinder full to capacity, no leaks.
2. No leaks in lines, hoses, cylinders or calipers.
3. Four-wheel brakes required.
4. Solid pedal; limited free play.
5. Dual or duplex master cylinder(s) required unless chassis was originally produced with single circuit braking.

BB. Dual System

1. Any device that actuates the brake independent of driver control shall not be allowed, except for Formula Libre. Devices that limit braking power independent of driver control are allowed.

C. Wheels/Tires

1. No missing or loose lugs.
2. No cracked, broken, or badly bent wheels.
3. Street tires: visible tread the full width of the tire, no cord separation, DOT#, good tire condition.

CC. Race Tires

1. No cuts or frayed cords, sidewalls in good condition, tread indicators visible.

3. BODY AND FRAME

A. Construction

1. Neat, safe construction, all parts secure, adequate tire clearance, no jagged edges within driver's reach. Maximum wheelbase of 144", waivable only by prior approval of the tow operator and the event chair or designee (i.e. tech inspector).
2. No excessive rust in floors or structure.
3. Firewall between engine and driver.
4. Exhaust systems should be securely mounted.
5. All rotary engine cars must be adequately muffled.
6. All cars shall be muffled, 96 dBA limit at 50 feet will be considered muffled. The event chair has the right to waive this requirement.

AA. Construction

1. In absence of full factory steel floor and firewall, chassis structure must be reinforced to prevent driveline intrusion into driver's compartment.
2. Driver must be guarded from driveshaft.
3. Front driveshaft loop required on rear-wheel-drive cars.

B. Numbers

1. Legible numbers both sides (i.e., 8" minimum with 1" stroke) with class designation (3" min.). Numbers will be no more than 3 numerals. Numbers may not have preceding zeros. Breakout cars need to include an "X" and Rally cars need to include an "R" after the number (3" min.).
2. Only the number for the competing driver may be displayed. Alternate (i.e., double driver) numbers must be obscured or removed.
3. A registry of permanent numbers will be maintained by the NEHA points keeper. These numbers will be given preference in assignment for each event. If a driver is inactive (not working or driving) for more than two years their number will be removed from the list. An inactive driver can keep their number on the list for \$10.00 per year payable to the New England Hillclimb Association. NEHA also reserves the right to retire numbers.

4. COCKPIT

A. Belts

1. An SFI or FIA approved 5-, 6-, or 7-point harness assembly is mandatory for all cars with roll cages, and strongly advised for all cars.
2. Y-type shoulder harness is NOT permitted.
3. All harnesses must be properly mounted and adjusted and installed with the correct hardware.
4. All harness assemblies must be in excellent condition, not discolored or visibly deteriorated and not altered from original condition. FIA harness assemblies must not be past their expiration date, SFI harness assemblies must be no more than 3 years old from date of manufacture.
5. Seat belt and harness anchor points must each be capable of 3300# (1500 N), applied in line with the load of the harness. Sub belt points must be capable of 1/2 of this load." OE anchor points are considered adequate.

B. Fire Extinguisher minimum requirements

1. Type. All vehicles must be equipped with at least one portable 2.5-lb net minimum A-B-C type, 1.25-lb net Halon or approved substitute. It must be fully charged and must have a gauge.
2. Portable installation. All portable extinguisher brackets shall be securely mounted to vehicle. Portable extinguishers must not be mounted on the floor in the driver foot well if the car is equipped with suspended pedals. It should be mounted within reach of the driver. Additional extinguishers may be mounted beyond the driver's immediate reach. No non-metal or elastic straps, latches, or brackets are permitted. Brackets for 2.5-lb net and smaller extinguishers may use a single latching metal strap. Extinguishers over 2.5-lb net must have at least one additional metal restraining feature that secures the tank of the extinguisher to the bracket. The additional

restraint(s) may consist of a second strap, a receiver on the bracket to secure the bottom of the tank, or a similar device and should still permit rapid removal of the extinguisher.

3. Onboard systems. An onboard fire system may be installed in addition to the portable, and is required in any car with a nitrous system. This system must be of an approved type, and in good condition. The activation control of this system must be indicated with the standard symbol of a red "E" on a white background.

C. Seats

1. All drivers, co-driver seats must be in safe condition.
2. All seats used with 5+ point harness must be fixed- back (as mounted), fully supportive type, (i.e. "racing seat") with back extending to shoulder harness points' of intersection with seatback, as worn. Seat width and height must fit driver(s). Headrest: max. 3" behind driver's helmet, as seated, with sufficient area to contain helmet.
3. All seats must have sufficient framing and reinforcement, mounting and support. Mountings must align with harness loads, and at comparable strength. OE Seats and 3-point harness mountings are adequate. Aftermarket seats meeting 4.C.2 should be installed per best practices of that type seat, {i.e. Manufacturers instruction}
4. Seat assembly should mount to substantial structure, i.e. OE reinforced mountings, FIA 8855-2010 or the integrated chassis/rollcage. Must be mounted and supported in direct line with the loads of the harness as worn.

D. Interior and Trunk

1. No loose objects, loose carpets or mats.
2. No spare tire or jack.
3. Small tools or items shall be in a closed compartment or suitably secured.

E. Collision Protection minimum requirements

1. Roll bar required in all cars without a full steel roof. Roll bar should be equivalent in construction to cage specs
2. Roll cage and fire-retardant gear (per technical rule 1.BB.) required in all cars with the exception of:

- (a) Any Unprepared or Street Prepared car that has a time greater than the breakout time established for each course (crosses the finish line with a time that is greater than the breakout time) satisfies the exemption requirement.
- (b) If the driver of an Unprepared or Street Prepared car gets a time that is less than the breakout time (they broke out), they will receive a warning that they broke out and the time will not be recorded and will not count in the event results or year-end points. If they breakout a second time during the event (either day) after receiving a warning, or if they breakout by more than 10 seconds (Philo: 5 seconds) on a single run,

they will require a roll cage and fire-retardant gear at the venue with the same Unprepared or Street Prepared car and the time will not be recorded, does not count in the event results or year-end points. After they breakout a second time, or exceeding the breakout by more than 10 seconds (Philo: 5 seconds), the driver will not be allowed to drive again at the current event in the same Unprepared or Street Prepared car.

(c). Breakout times:

Ascutney 3:20 (short course), 4:20 (long course)

Bolton 1:32

Burke 2:30

Okemo 2:43

Philo 1:20

3. Roll cages consist of horizontal and vertical bars above, ahead, behind, and to the sides of the plane of the drivers' helmet. Main hoop (or equivalent) must be braced front and/or back and have diagonal member(s) or equivalent within the hoop if spanning more than 36". If the main hoop contains only one diagonal member then it must be from the upper driver's side to lower passenger side.
4. Headrest, maximum of 3" behind driver's head as seated, must be padded. Any rollcage member reachable by the driver's head must incorporate high-density shock-absorbing material in padding.
5. Rollcage must be of adequate construction. Material within the cockpit (including tubular framersails) must be steel mechanical tubing meeting commercial standards ASTM a500, a513, or a519, SAE xx16 – xx30, >50000 psi tensile, >36000 psi yield, >=10% elongation*. (ref. Rb>60). 1018 CDS or 1020 DOM are preferred. Material used is ultimately the responsibility of the entrant. Members of the cage, (as in sec. 3, above) must have a minimum diameter and wall thickness of:
1.25" x .120" or 1.38" x .090" under 1500 lbs.
1.38" x .120" or 1.50" x .090" under 2500 lbs.
1.50" x .120", 1 5/8 x .109 or 1.75" x .090" over 2500 lbs.
Other components of the rollcage, tubular chassis, and collision protection features may differ in size and wall but be of comparable material.
6. Entrants with a cage fabricated prior to 1/1/2015 that does not meet section 4.E.5 are strongly suggested to contact the technical committee to get approval.
7. FIA homologated cages with documentation and current article 253 applicable fabricated cages are acceptable.
8. All fabricated construction should exhibit reasonable standards of workmanship, i.e.: Distortion of section within bends (i.e. ovality) limited to 10%. No evident kinks or buckles in bends, any evident seam to be correctly oriented. Welded joints in the basic cage not containing a continuous tube section (i.e. "butt" or "lap") must be reinforced with gussets, sleeves, or diagonals, so that weld equals 2x tube circumference.

Cast, forged, or "junk" metals are not acceptable in the cage. Welds must be fully penetrated, all around the tube, and equal tubing wall. Welds must be visually inspectable.

9. 4" minimum of weld on each welded belt/harness mount.
 10. Roll cages must be mounted to the structure of the car at 6 points minimum. Welded mountings must be socketed, gusseted, or plated to equivalent of tube wall. Bolted or welded foot plates must be at least "4 x 5" (20 sq. inches) or bigger. Bolted foot plates must use a minimum of 3 3/8" grade 5 (or better) bolts each with sandwich plates of equal size to the foot plates.
 11. Cars must have at least 2 sections of side protection. Roll cages must have at least one bar in the door area. Stock door beam found in most cars is acceptable as a section, as is a substantial outboard frame rail or rocker panel.
 12. Protection for the foot well area, and from "drive train intrusion", (as in 3. AA.1) must be incorporated into the chassis/roll cage structure. Full, continuous (stamped, OE) steel floor is considered adequate.
 13. Energy absorbing features must be incorporated into the chassis structure ahead of the driver's feet, and to the side of the driver.
- F. Arm Restraints
1. Driver's window must be raised enough to keep the driver's arms in the car or car must be equipped with a window net.
 2. If a window net is used the window net must withstand 50-lb outward pull. Net must be releasable by driver or workers, without tools.
- FF. Arm Restraints
1. Window net or arm restraints required; however, where it can be shown to the Technical Inspector that it will interfere with the safe operation of the car, this requirement can be waived.
5. GENERAL
- A. Electrical
1. No frayed, loose, or easily pinched wires. Battery cable must not pass through the frame rails or roll cage tubing.
 2. Battery must be securely mounted and sealed from the driver.
 3. Positive battery terminal must be covered with a nonconducting cover to protect against shorting out and causing a fire.
 4. Batteries mounted in same compartment with fuel tank must be enclosed in an insulated box and securely mounted
 5. If a kill switch exists, it must meet the requirements of 5.AA.1
- AA. Kill Switch
1. Switch to cut off / isolate electrical power throughout the car, obviously marked with standard lightning bolt symbol and off position is clearly marked.
- B. Fuel System
1. Gas tank must be securely mounted and protected.
 2. No leaks in tank or system.
 3. Fuel cells in a metal can recommended.
 4. Gas tank sealed from driver, or approved by SCCA, NASCAR, etc.

5. Tank must be vented to outside air or EEC system and may not be pressurized.
6. The fuel pumps may only operate when the engine is running, except during the starting process.
7. Fuel lines must be securely mounted and well protected from heat, collision and abrasion.

C. Fuel

1. Any normally accepted fuel is legal.
2. Hydrazine and liquid oxygen are specifically banned.

D. Oil System

1. No leaks.
2. No excessive oil in engine compartment.

DD. Oil System

1. Must have oil overflow catch can of at least 1 qt or breather system to prevent oil escape.

E. Coolant Overflow

1. One-quart minimum nonpressurized reservoir required or to meet manufacturer's specifications.

FF. Traction Control

1. Devices that automatically limit engine power to control traction shall not be allowed, except in Formula Libre.

G. Horns

1. A compressed air horn is mandatory in all cars and must be secured within reach of the driver.

6. PREPARED ELECTRIC VEHICLES

A. Competitors wishing to race a Prepared Electric Vehicle (class PE) must contact the event organizer or a technical committee member prior to entering to discuss their vehicle's safety systems. Competitors must supply two copies of the vehicle's safety documents to the event chair.

B. Vehicles that comply with the current FIA Appendix J, Article 253 – Safety Equipment, Section 18, will comply with PE rules.

C. Battery System – Each battery cell must be properly cooled to always stay at or below the maximum temperature specified in the manufacturer's specification sheet. All electric cables must be properly sized to expected system currents.

D. Battery Disconnect – A battery system equipped with a manually operated, high-current switch to quickly disconnect the battery from the electrical system. This switch must be capable of interrupting the full load current. The switch must be located as near to the battery as practical and be operable from both the driver compartment and from outside the car. This switch must be clearly marked as the "Battery Switch" and be marked with "ON" and "OFF" positions.

E. Main Fuse – A separate fuse (not a circuit breaker) placed in series with the main battery, the rating must not exceed 200% of the maximum expected current draw. All low voltage taps from the main battery must be separately fused. All fuses must be placed first in series with the battery starting at the positive connection.

F. Electrical Shock Hazards – All exposed conductors operating at greater than thirty-six (36) volts must be properly insulated and marked with "High Voltage" warning signs.

G. Covers and Shields – All revolving parts (except wheels and axles) must be suitably covered to prevent accidental contact or injury should one or more of these parts break or malfunction.

H. Audio Warning – An audible warning system is required, generating between 80 and 90 decibels of sound when measured 50 feet from the vehicle.

Appendix - Recommendations for collision protection

1. Bend radii at least 3x tubing diameter, and continuous main hoop(s)
2. Mechanical tubing, as specified above is recommended for all collision protection and energy absorbing structures.
3. British "4T45" tubing is considered to be approximately equal to SAE 9620, ASTM a519)
4. Tubing larger than specification, and/or additional diagonals & supports, are recommended.
5. 4 door bars are recommended, as are additional vertical supports, "intrusion" plating, and reinforcements of "X" joins, (i.e. "FIA" gussets) in the door bar area, 2 continuous bars, and reinforcement to rocker or framerail, lateral reinforcement of rollcage mountings, framerails, or rockers (i.e. cross-members), and engagement of seat mountings in this reinforcement.
6. Windshield post support is recommended, as is a diagonal member in the roof, a vertical bar in the center of the windshield area, an anti-intrusion bar in the driver's "window", as well as 45 deg. sections in front frame rails and down tubes.
7. Cage installation should include significant structural enhancements and tie-in (i.e. seam welding, gusseting, "fish" & floor plating, subframe connection, seat mount reinforcement, sill bars) to the cockpit area.
8. Cages should be tied in at as many points as possible (our rules specifically exempt safety equipment from class restrictions, but, other sanctions may specifically restrict this)
9. Entrants are urged to research specifications relevant to their particular car, and to its eligibility for other series, and to build to or above the highest specification available.