How to Pass Ultra4 Chassis and Tech Inspection - By Dave Cole

The purpose of this document is to clearly explain the 2013 Ultra4 Tech Inspection process. While the rulebook has not had any major changes, the focus and level of scrutiny of certain items has. As an Ultra4 driver, you are required to follow the entire rulebook, but for the purpose of an efficient and impactful inspection, we have developed a checklist that will be implemented for every vehicle. Below each line item will be listed and explained as to the purpose, common failures and potential solutions.

At KOH '13, you can expect to find three different tech stations: Scales (Weighing and Tube thickness inspection), Main Inspection (where you initially tech your vehicle), and Re-Inspection (bypass lane to have non-compliant items rechecked or challenge an initial finding).

You do not have to wait until the Thursday before the race, please make time at your earliest convenience to have your vehicle inspected. I will be on the lakebed both Thanksgiving and New Years, as well as many of the weekends between now and February. We will also be in JV starting 1/23/13 for the race. Contact me directly via email or phone or come find me if you're on the lake bed and we'll get your tech inspection handled.

Lastly, once you have passed inspection for Chassis, Safety, and had your vehicle weighed, you will be clear to race all 2013 Ultra4 events without routine inspections. It will be your responsibility to present a compliant vehicle at each race. We will only initiate random checks for compliance.

Safety

Seat Belts (Rule 6.2.2.1)

- We check for condition, mounting method, and date of manufacture
    - The common failure modes have been belts manufactured more than 3 years ago and mounted at incorrect angles relative to the occupants shoulders. Some cars have been presented with excessive dirt on the belts which make it difficult to adjust and create opportunity for abrasion and wear. Seatbelt manufacturers spec a mounting angle from the top of shoulders to the mounting point of 0 to 10 degrees downward. Excessive downward angle increases the risk of compression injuries to your spine.
        - Keep your belts clean and insure the mounting location is within spec

Headrest (6.2.2.3.5)

- We check for an integral or well mounted headrest that makes square contact with the occupant's helmet.
    - The only failure is with taller occupants who need a 'High Back' or secondary headrest

Fire Extinguishers (6.2.2.4)

- Minimum of two charged 2.5 pound extinguishers. One mounted internal to the driver's compartment and one external.
    - The extinguishers need to be mounted securely, but able to be deployed quickly

First Aid Kit (6.2.16.4)

- Pretty straightforward
    - We check for existence, it's up to you to insure completeness, don't be dumb.

Breakdown Signage Device (6.2.2.7)

- One of the few rules to change this year. We are looking for something similar to the standard 'truckers triangles'. The goal is that you can quickly deploy markers to alert other cars that your vehicle is stationary on course
    - Glow sticks don't pass anymore and they need to be readily accessible
        - Trucker Triangles in an accessible bag or mounted so that they don't require you digging for tools to deploy

Lights (6.2.16.4)

- Two Functioning running/brake lights and a rear facing Amber light
    - The main failure is running lights not wired with ignition (separate switch) and non-functioning brake lights
        - Make em work. We don't require a blue light at any races anymore.

Horn (6.2.2.5)

- A functional horn to warn other drivers or spectators
        - The louder the better

Numbers (6.2.3)

- We need to know who you are. From all 4 sides.
    - The main failure is front and rear numbers. It's also an issue with cars that integrate the numbers into the artwork of the car. The numbers should pop out from the rest of the artwork
        - Be able to stand 20 feet away from all 4 sides and see your numbers.

Spark Arrestor (6.2.6.3)

- The goal is to meet BLM standards for preventing a fire
    - Straight pipes is the only way to fail this although there is a rule that requires the exhaust to exit behind the passenger compartment
        - Any muffler or spark arrestor will satisfy this rule

Mirrors (6.2.4.8)

- Driver or Codriver need to be able to see what is behind them
    - Rear radiators or spare tires sometimes block the view of a centered rear view mirror.
        - Ideally both occupants would have a mirror to see behind them

Reflective Tape on rear of car (6.2.2.6.1)

- Redundant backup for running lights
    - LED lights do not have reflectors. Applying it to angled downbars reduces the ability for an approaching car to see you

        - Mount it someplace square to the rear of the car other than your rear bumper so it doesn't come off when you are nerfed.

Fluid/Electrical

Fluid Containment (7.9.2)

- The goal of this rule is too prevent fluids to spill on the ground for any reason. Specifically through the venting process or vehicle rollover
    - This rule had a high failure rate at Blackwell. The majority used catch cans appropriately but had a top mounted vent/filter on the catch can. If the car rolls over, the fluids will just leak out of the catch can vent. At a minimum, you need to run the vent to the bottom of the can. Ideally the vent would go all the way to the skid plate.
        - The ideal solution is the 'four sides and down' method coupled with a properly vented catch can. Second best would be vent lines that go down to the skid plate before going up to a catch can. It is also completely legal to run 4 sides and down with no catch cans at all. While it is legal to run the vent directly up to a catch can, it is not recommended because you will only have the capacity of the catch can.]

Fuel System (6.2.14.2.4)

- The goal is simple. Keep you from catching on fire
    - We require baffling to mitigate the distortion and failure of the outer can caused by sloshing impact
        - We are checking for baffling. I know that currently many people don't run baffling, I'm not judging the past at all, but really don't like when you stand there in front of me and tell me you are running foam and there is nothing in the tank. We don't want to pull every cell apart, but it may end up being our only option.
    - Rollover and Ball Valves
        - Accessible ¼ turn ball valve on all supply and return lines mounted as close to the tank as possible. Vent line needs rollover checkvalve.
        - Vent line MUST be 4 sides and down
            - Ideally, Vent line would have a ball valve as well
    - Splash Guard – The purpose is to primarily protect the occupants from spilled gasoline during the fueling process. Secondarily to divert spilled gasoline from contacting hot parts (Brakes, Shocks, Exhaust)
    - Accumulator Size – No larger than 1 quart
    - Bladder – All fuel cells must be a metal can with rotary molded or professionally built nylon reinforced bladder

Locking Dipsticks (6.2.7.3)

- Both Transmission and Motor
    - Stock Oring dipstick does not pass
        - Aftermarket (Lokar style), safety wired, zip tied all work.

Kill Switch (6.2.16.1)

- The switch needs to kill all power with exception of Winch, GPS, and Iritrack
    - Common failure mode is alternator charge on the switched side of the kill, powering all systems even with the switch off

Battery Mounting (6.2.16.2)

- Securely mounted with protection from occupants
    - Must be a sealed battery (non-spill)

Hydraulic Line Routing (6.2.4.2)

- The goal is to prevent High Pressure Injection injury caused by a ruptured steering line and burns from coolant and hydraulic fluid.
    - Having the orbital mounted under the dash with no shielding is the leading cause of failure
        - This really can be solved in a variety of ways. The shielding does not need to be able to contain liquids, just keep it from hitting your body under pressure. Aluminum (down to .040), lexan, corrugated plastic wiring loom (with the split rotated away from occupants and secure), and fire sleeving can all be used.
        - Often overlooked is the coolant line routing on rear mounted radiators. We don't require a firewall, but you need to do something to mitigate the risk of a failed cap or hose directing at the occupants

Chassis Safety

Scatter Shield

- We are removing this from our checklist. The 2013 rules do not spec a standard. We highly recommend an SFI rated blanket or 1/4" tranny cover

Firewall (6.2.4.1)

- The purpose of the firewall is protect the occupants from liquid and/or heat and flames from the engine compartment
    - Common failure modes are open gaps in the firewall, not extending the full width of the vehicle, gap between dash and hood. Fuel Cell firewall
        - If the firewall does not run the width of the car, it is acceptable to wrap around 50% of the block on both sides. Metal tape for the gaps.

Floorboards (6.2.4.5)

- The purpose of the rule is to keep debris from entering the occupant's compartment.
    - People fail for not having the floor bolted in
        - If the Skid Plate is under the floor, then you don't need to bolt your floor paneling in (dzus fasteners are acceptable)

Roof (6.2.5.9)

- The purpose is to have strong enough material to maintain occupant head area in a rollover
        - .120 thickness aluminum

Helmet Clearance (6.2.5.4)

- You are required to have at least 3" of clearance between your helmet and roof/tube
    - Some people just simply don't have enough room

        - Ideally we are looking for a closed fist worth of space between you and the roof. Either lower the seat or raise the roof.

Bumpers (6.2.4.7)

- The goal is to prevent tire to tire contact when nerfing or being nerfed. Secondarily, we are trying to minimize the risk of hooking onto an opponent's chassis or tire when making contact.
    - Bumpers that do not extend past the front and rear tires create a tire to tire contact situation causing the overtaking car to jump over the other
    - Bumpers that terminate as a cut off tube can get hooked on a chassis or tire
    - No 'pointed' tubing caps will be permitted in any way
    - Spare tire mounts that cause the spare to be the effective rear bumper create a 'spring like' effect when you are nerfed that can cause significant loss of control. They are not prohibited, but not recommended
        - Looping or swept back bumpers that have a contact patch in front of the front tires and behind the rears are what we are looking for. The wider the better

Doors (Secondary Latches) (6.2.4.3)

- Usually only found on stock and mod cars
    - Failure is relying on just the stock latching mechanism
        - Bungee cord, purpose built latches meet the need

Window Nets (6.2.2.2)

- Pretty straightforward
    - Tears in the net, loose nets, improperly fitting latching systems, and inadequate coverage are the way to fail this line item
        - From a belted position, your wrist cannot get past an open gap in the window
        - Ideally the net would latch at the bottom and be fixed at the top. We recommend you use the latch from a set of racing seat belts (OEM style seat belt latches get sticky)

Vehicle Weight (6.2.5.2)

- You are going faster than anyone expected 6 years ago. There are new people getting into the sport that don't have chassis building experience. The goal is to keep you all alive and happy
    - Refer to the rulebook for specifications
        - 2013 is a grandfather year. Anyone that races in an Ultra4 event in 2013 (not the LCQ) will be grandfathered in permanently. 2014 the rules are enforced.

Weld Quality Dented Tubes (6.2.5.3)

- The only subjective rule in the rule book. Looking for undercut structurally unsound welds
    - Dented Tubes are compromised and will not be allowed to start a race if they are structural to the drivers safety

Gussets (6.2.5.7)

- Eliminating single weld failure points on the A and B Pillar at both the roof line and window bar
        - A compound node with 50% overlap suffices
        - Recommend C Pillar as well

General Construction

- Adequate triangulation and chassis construction to protect the occupants in racing situations
    - This is the drivers responsibility, but we reserve the right to specify necessary changes

New One

IRC Mounting points

- Ensure that the IRC antennas and box are mounted in a way conducive to their operation
    - Antennas should not be co-located with a Lowrance or Radio Antenna
    - Power should be direct to battery (no switches)