

TECHNICAL REQUIREMENTS 2018

Off-road vehicles – TR-3 Group

A vehicle considered unsafe by Technical Commissioners cannot be admitted for the competition by the Sports Commission.

If unit/part is not mandatory but is used, it must conform to the requirements.

1. DEFINITION

1.1. Stock off-road 4x4 vehicles produced in a quantity of not less than 1000 identical items and equipped with two seats minimum.

1.2. Participants are responsible for proving that the car is stock as a whole and its separate parts and units. During the Technical Inspection parts and units of the car might be compared with stock parts physically or using the manufacturer's catalogue.

2. LIMITS OF ALLOWED CHANGES

2.1. Any changes not specified in the current requirements are forbidden.

2.2. Any worn out or damaged part can be replaced with an identical (completely interchangeable with the original) part only.

2.3. Out-of-production vehicles: it is allowed to install parts and units from next-generation cars of the same brand after a required approval by the Technical Commissioner.

3. REINFORCEMENT

Reinforcement is allowed unless otherwise specified in the current technical requirements, by sheet material for any part if the used material repeats the form of a part, which is being reinforced, and it contacts with the whole surface of a part without forming any box-like cavities. It is allowed to reinforce suspension parts by steel rods with a diameter of not more than 12 mm.

4. WEIGHT

4.1. The weight of the car must be not less than 1400 kg and not more than 3500 kg. This weight is measured without luggage, tools, spare parts, food and means of survival.

4.2. When weighing, all tanks containing liquids (lubrication, cooling, braking, heating, etc.) must be filled to its normal level specified by the manufacturer except wiper and headlight wiper tanks, brake-cooling tanks, fuel tanks, and water injection tanks, which must be empty at the time of weighing.

The following should be removed from the car:

- Crew, their equipment and luggage;
- Tools, jack, sand tracks, spare parts, spare tire;
- Survival equipment;
- Food.

Weighting methodology. Weighing to be performed on an industrial scale with not more than 25kg error (passport and a valid calibration certificate should be demonstrated in this case), or electronic sports scales with separate plates and +/- 0.5 kg per plate error, mounted on horizontal ground of at least 3x12m. Either

the whole vehicle or its front and rear axles may be weighed. In the latter case obtained results are summarized.

Scales errors to be taken in favor of the participant.

In order to take remainders of fuel in the tank and other consumables on-board into consideration, 50 kg is added to the minimal permitted vehicle weight. If the result of a weighing is less than the lowest permitted weight plus 50 kg, the remaining fuel must be drained from the tank, and weighing must be repeated.

Example: weighing for a vehicle with the minimum permitted weight of 1500kg was done on scales with separate plates; the result obtained is 1542 kg (846 kg + 696 kg / front axle + rear axle). This weight is 6 kg less than 1548 kg (1500 kg + 50 kg for fuel remainders – 2 kg for a possible error weights (2 (front and rear axles) X 0,5 kg X 2 plates)). In this case, all the fuel must be drained and weighing procedure must be repeated.

5. ENGINE

5.1. It is allowed to use any gasoline or diesel engines

5.2. Air filter

The design of the air filter, its case, tubes connecting the air filter with the atmosphere and the engine as well as their location in the engine compartment are not restricted. The snorkel cannot be mounted through the crew compartment under any circumstances.

5.3. Cooling system, ventilation and interior heating

5.3.1. It is forbidden to install radiator-cooling systems inside the cabin. When installing radiator (s) within the body of the car, they must be separated from the crew by a tight partition.

5.3.2. The air vents providing air supply to the engine as well as pipelines containing liquids must not have any connections and must have additional protection made from metal or plastic if they pass through the crew compartment.

5.4. Exhaust system

5.4.1. The design of the exhaust system is not limited; however under no circumstances can the systems elements pass through the crew compartment.

5.4.2. The noise level must not exceed 103 dB (A).

Measurement technique. Measurements are carried out by a sound meter, in modes of "A", "slow". The microphone must be installed at an angle of 45° according to the outlet exhaust, and at a distance of 500 mm from the centres height of an outlet. If the car is on a firm ground (concrete or asphalt), it's necessary to enclose a soft lining under the microphone.

5.4.3. In order to prevent burns from hot components of the system by people outside the vehicle the protection must be installed.

6. TRANSMISSION

Without restrictions.

7. SUSPENSION

Without restrictions.

8. STEERING

Without restrictions.

9. WHEELS AND TIRES

9.1. Using agricultural, road and special machineries tires except ones from an approved list is forbidden.

9.2. Only road tires with outer diameter dimension not less than 813 mm and not more than 965 mm are allowed.

Measurement technique: Measurements are carried out on the tires, inflated to a pressure of 1.5 atm for a straight line passing through the center of the tire and that is not vertical to the ground (natural tires indenting is not considered during measurements).

The measurement is performed on all tires (including spare wheels, etc.) used in the competition later.

9.3. Width of the tire.

Tire width depends on the vehicle weight and must be:

Vehicle weight, kg	Tire width
From 1400 to 1600	10.0 " (254 mm)
From 1601 to 1800	11.6 " (295 mm)
From 1801 to 2100	13.5 " (343 mm)
From 2101 to 2400	15 " (381 mm)
From 2401 to 3500	18.5 " (470 mm)

Values in mm stated above are rounded according to mathematical rules.

Measurement technique: Measurements are taken on the tires inflated to a pressure of 1.5 atm, in a horizontal plane through the wheel hub. The maximum width of a rubber part is taken into consideration.

9.4. Wheels may be mounted by bolts or studs and nuts, provided that the number of fastening points and fasteners diameter envisaged for the rim to be met.

9.5. Additional anti-skid devices (e.g. chains, special covers, changing grip tires, etc.) mounted on wheels and tires are prohibited.

10. BRAKES

10.1. It is allowed to use braking systems having at least a double-circuit working system acting on the wheels of both axles from one pedal and a parking system that acts independently on at least one of the wheels axle.

10.2. Brake lines location is not limited. It is recommended that they have extra protection against external damage.

11. ELECTRICAL EQUIPMENT

All electric sockets must be isolated.

11.1. Battery

11.1.1. The type, the capacity of any battery, and the cables for its connection are unlimited.

11.1.2. It is not allowed to install more than 2 batteries that are connected to the electric system of the vehicle. The location of the battery is not restricted. Batteries must be fixed according to p. 4.1.

11.2. Alternator

11.2.1. The quantity, brand and capacity are unlimited; however, its mechanical drive gear should be carried out by vehicle's engine.

11.3. Lighting equipment

11.3.1. Basic lighting equipment (lights, sidelights, direction indicators (but not repeaters), marker lights, brake lights, reversing lights, number plate lighting) must be in working condition at the time of the prelaunch technical inspection.

11.3.2. The additional lighting equipment is not limited, however the quantity of additional headlights must be even and arranged symmetrically along the longitudinal shaft of the car.

12. FUEL SYSTEM

12.1. Fuel tank

12.1.1. It is allowed to install fuel tanks of individual or factory manufacture in a safe zone. (It is recommended to install the tank in front or before the rear axle of the vehicle.)

12.1.2. Fuel tanks must be separated from the crew compartment by continuous fireproof (metal) and, whenever possible, tight partition. Additionally, pipes must have sealed protection that are suitable for the tank.

12.1.3. Liquid necks and caps must not extend beyond the perimeter of the vehicle when viewed from above. Any lock system eliminating incomplete locking or accidental opening can be used.

12.1.4. Ventilation of fuel tanks must be taken outside of a vehicle body. If tanks and fillers are located inside the body, there must be draining holes in the body floor to drain spilled fuel into the space outside the vehicle.

12.2. Fuel lines

The location of the fuel lines is not limited. If fuel lines pass through the cabin of the car, they must be made of one-piece metal pipe. Any kinds of fuel lines joints are not allowed in the cabin, where it passes through the floor or other body panels.

13. BODY AND FRAME

13.1. Jointed design frames are forbidden.

13.2. Exterior

13.2.1. External body panels must be made from a solid non-transparent material.

13.2.2. The body must completely cover all mechanical components, visible from above.

13.3. Side panels and wheel arches

13.3.1. Complete wheels (tires with wheels), as seen from above, must be covered by wings or fender extensions. Design of the side panels and the dilators must be safe.

13.4. Hood catches

The hood must have at least two additional external catches preventing spontaneous opening of a hood during driving.

13.5. Bumper and additional external protection

No restrictions.

13.6. Crew compartment

13.6.1. The crew compartment must be isolated by fire-resistant partitions from the engine compartment and the compartment where the fuel tank is located.

13.6.2. It is forbidden to have rotating elements of the transmission, suspension and steering in the crew compartment.

13.6.3. Any equipment that can be dangerous, including all types of pipelines, must be isolated from the crew and reliably fixed.

13.6.4. It is allowed to use any additional control and measuring and navigating devices if they are installed safely.

13.7. Doors

13.7.1. It is mandatory to install doors of a rigid structure with door locks preventing spontaneous opening. The distance from the level of a seat cushion to the level of the hard part of the door must not be less than 300 mm.

13.7.2. Each cabin door must have an opening window where a parallelogram with at least 400 mm horizontal side fits. Window height must not be smaller than 250 mm when it is measured perpendicular to horizontal sides. Corners of the parallelogram can be rounded with a maximum radius of 50 mm.

13.7.3. If door windows are equipped with mechanical or electric window regulator, the mechanism must be separated from the crew by a protective panel (application of aluminum or nonflammable plastic is recommended).

13.7.4. If folding lateral doors are used in the car, it is allowed to remove the top half of these doors. The crew does not have to transport these parts at special stages during the competition, but in this case, the vehicle weight must be corrected accordingly.

13.8. Windows

13.8.1. It is allowed to use multi-layered windshields of triplex type only.

13.8.2. If the aperture of a cabin door window is closed by a transparent material, the possibility of its full opening should be provided. The opening mechanism is not restricted.

13.9. Seats

Any automobile seats are allowed. Seats must be securely fixed.

13.10. Spare wheel

Spare wheels can be kept inside the body with a mandatory reliable fastening.

13.11. Hi Lift Jack

13.11.1. Jack and points of jacking are not restricted.

13.11.2. Any permanently mounted auxiliary jacking devices (mechanical, pneumatic, hydraulic, etc.) are prohibited.

13.12. Safety cage

13.12.1. Design

13.12.1.1. The vehicle must be equipped with at the least a main safety arch with rear props and a diagonal element. The possible arrangement of the diagonal an element is represented on fig. 1-3.

Recommended necessary scheme - see fig. 4-6.

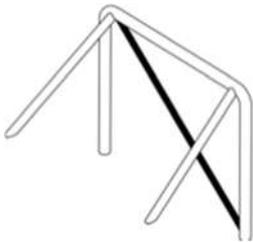


Fig. 1

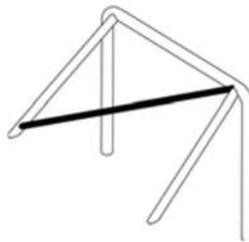


Fig. 2

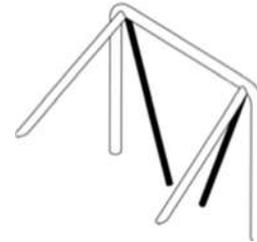


Fig. 3

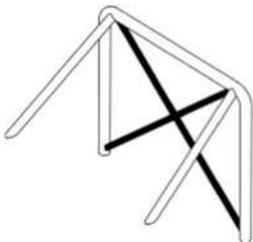


Fig. 4

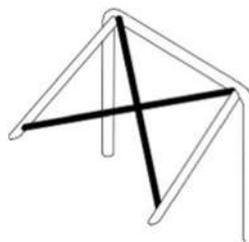


Fig. 5

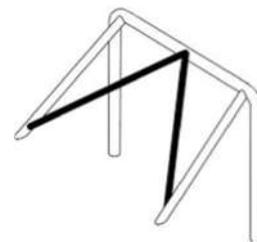


Fig. 6

13.12.1.2. For TR-3 vehicles with a spatial frame it is mandatory to have a full safety cage, see fig. 7, including vehicles with self-made / custom body.

Cars are allowed to participate with a safety arch presented on fig. 1-5, which have been made and have taken part in the competitions until 12/31/2009 (having a corresponding mark in STP RAF) 1 - 5

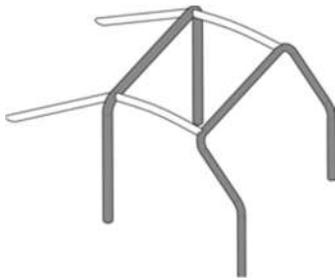


Fig. 7A

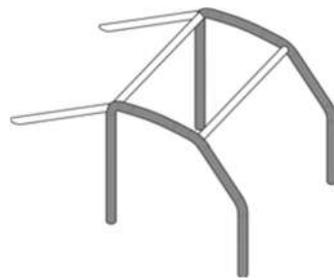


Fig. 7B

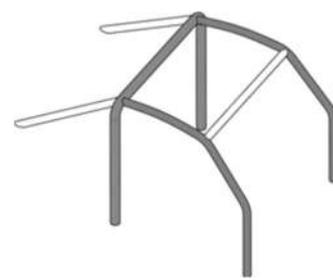


Fig. 7B

13.12.1.3. The cage can consist of:

- 1 main arch, 1 front arch, the 2nd longitudinal elements, the 2nd rear props (fig. 7A);
- 2 lateral arches, the 2nd cross-section elements, the 2nd rear props (fig. 7B);
- 1 main arch, the 2nd lateral semi-arches, 1 cross-section element, the 2nd rear props (fig. 7B).

Presence of diagonal elements located according to fig. 1-6 is a must. Each element of the cage must be made from a continuous uniform tube. Separate elements of the cage can be attached together through welding or demountable joints.

13.12.2. Demountable elements

If removable elements use plug connections, then these connections must belong to one of the following types (Fig. 8 - 8E):

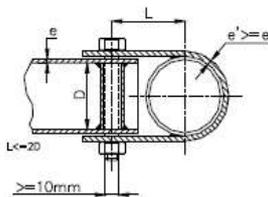


Рис. 8А

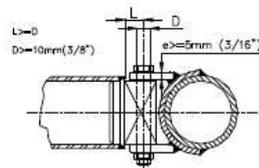


Рис. 8Б

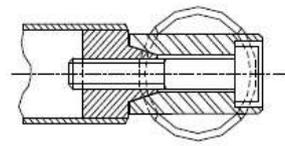


Рис. 8В

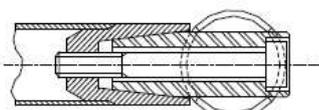


Рис. 8Г

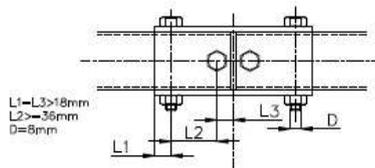
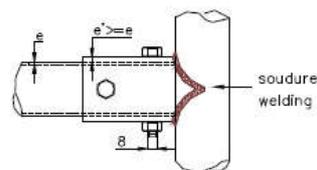


Рис. 8Д

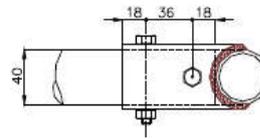


Рис. 8Е

Plug connections must be placed strictly on the axis of the pipe.

They must not be welded after the connection.

Bolts and nuts must have the minimum quality of 8.8 (ISO standard).

13.12.3. Installation

13.12.3.1. Each bearing part must include an intensifying plate the thickness of which is at least 3mm.

13.12.3.2. Each bearing part must be attached by at least three bolts to a steel intensifying plate with the minimal thickness of 3mm, and to the area of at least 120cm² which is welded on a body.

Recommended: - The Corner between the 2 bolts (measured from the tube shaft at the level of the arc beginning, see fig. 9) must not be less than 60 degrees.

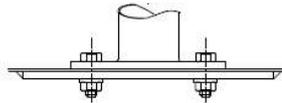


Рис. 9

13.12.3.3. These are the minimal requirements.

In addition, more mounts can be used, mounting plate supports can be welded with reinforcement plates, and the safety cage can be welded to the body / chassis.

13.12.4. Tubes size and materials.

Material	Min. strength of the material	Size (mm)	Use
Cold drawn seamless carbon steel pipe with a maximum content of 0.3% carbon	350 kg-f/mm ²	45x2.5 or 50x2.0	The main arch or lateral arches as well as the joints according to the design.
		38x2.5 or 40x2.0	Other elements of a framework safety.

13.12.5. The control bore

On a straight section of the main arc that is easily accessible, a hole should be placed with a diameter that is not less than 4.5 mm, designed to control the thickness of the pipe.

13.12.6. In spots where driver and co-driver or their helmets may touch the safety cage, it is recommended to install protective covers made of elastic non-flammable material.

14. WINCH AND ADDITIONAL EQUIPMENT

14.1. The current requirements define a "winch" as a device consisting of the following elements (not more than one from each category):

- power drive gear (including an electric motor)
- reducer
- drum
- case or frame

- brake gear
- cable

14.2. It is allowed to install not more than two winches with the power drive gear which traction parameters must exceed a minimum of 1,4 times of the vehicle weight. Using winches with mechanical, hydraulic or electric drive gear is allowed.

14.3. The winch motor voltage input must not exceed 27 V under any circumstances.

14.5. Winch cable, extension cable, tree protector, shackles and blocks used in conjunction with a winch must withstand the tensile strength equal to doubling the maximum winch line pull.

14.6. The vehicle must be equipped with a tree protector with a minimum width of 90mm.

14.6. Wheel self-extracting systems are allowed.

14.7. Not more than 4 sand tracks are allowed in the car with a maximum size of 1500X500 mm.

14.8. When installing the winch inside the vehicle body, all rotating parts must be sealed in a casing. The cable can pass through the car interior only inside a one-piece metal tube.

Rope dampener must be used with steel winch cable. A piece of the rubber hose not shorter than 500mm and not lighter than 1.5 kg can be used as a rope dampener.

15. Safety

15.1. Seat belts

The vehicle must be equipped with at least three-point factory-made seat belts. The seat belts must be mounted on the body or chassis of the vehicle. Using regular seat belt mounting points is recommended.

15.2. Helmets

Using helmets by all crewmembers is a must. Helmets that are used at the stages of all the official competitions on trophy-spot-checks, they must have a rigid external mantle, energy reducing the internal insert being an integral part of a helmets design, and ventilation holes. The use of helmets for rafting of EN 1078, EN 1077 (Europe) or ASTM of 2040 (USA) standards is recommended; for mountain bike - Snell B 90 (USA) standard (the standard mark is located on an inner helmet surface), mountain skiing or hockey. The use of automobile or motorcycle helmets, of E22 and above standards is allowed. The use of building helmets, helmets for road bicycles, tanker's or other soft-top helmets is not allowed.

15.3. Fire extinguisher

15.3.1. Vehicles must be equipped with factory-made fire extinguishers containing not less than 4 kg of fire extinguishing substance, concentrated in one or two cylinders.

15.3.2. Using foamy and aerosol fire extinguisher cylinders is not allowed.

15.3.3. Fire extinguisher cylinders must be located in easily reachable places for both driver and the co-driver. Fire extinguisher fastening must be reliable, but must be easy removable barehanded in case of fire. Fire extinguishers must have an easily readable label containing its weight, fully loaded weight in the equipped condition, weight of an empty cylinder and production date (the date of recharge).

15.4. First-aid kit

Vehicles must be equipped with a first aid kit. All kit components must have a valid expiration date and have no visible package damage. First aid kit must be waterproof-packed and located in an easily reachable place.

15.5. Means of communication:

To ensure safety and in-time medical assistance it is recommended to equip the vehicles with a Civil Band radio station (frequencies to be agreed with the organizers of the event). Crewmembers must be equipped with cellular or satellite phones.