

TECHNICAL REQUIREMENTS 2018

Off-road vehicles – PROTO 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. Off-road 4WD vehicles equipped with at least two sets and specially built for trophy-raid competitions.

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. If one of Technical Requirements point provides a list of allowed modifications, replacements and additions, all the technical changes that are not listed are FORBIDDEN.

2.2. The limits of allowed changes and adjustments are specified below. In addition to these, any worn or damaged part can only be replaced by the part that is identical to the one being replaced.

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 vehicle should be no less than 1200 kg and no more than 3500 kg. This is the weight of the car without luggage, tools, spare parts, survival and provisions means.

4.2. When weighing all tanks containing liquids (oil, cooling, brakes, heating, etc.) they must be filled to the normal level specified by the manufacturer. Exceptions are tanks for window and light washers, brake cooling tanks, fuel tanks, and water injection tanks which should be empty during the weight check.

The following elements must be removed from the car:

- Crew, their equipment and luggage;
- Tools, the jack, recovery tracks, spare parts and the spare wheel;
- Survival equipment;
- Provision.

5. ENGINE

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

5.2. Air filter

It is forbidden to take air from the crew compartment.

5.3. Cooling system, system of 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 with a sealed partition.

5.3.2. The air vents providing air supply to the engine as well as pipelines containing liquids should 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 should 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 is 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 (RIMS) AND TIRES

9.1. It is allowed to use automobile pneumatic tires with an outer diameter not exceeding 1043 mm when mm when measured on a straight line passing through the center of a tire and not vertical to the ground (when measured, the natural tire indent is not taken into consideration). All tires used within the competition (including spare, replaceable etc.) are measured.

Agricultural tires are allowed.

9.2. Tire width

The width of the tire does not depend on the vehicle weight and must not exceed 470 mm.

Measurement technique: Measurements are done along the horizontal line passing through the wheel hub on tires pumped to a pressure of 1,5 atm. The width of the wheel is the maximum width of the rubber part.

9.3. Wheel bolts can be replaced by fastening bolts and nuts provided that the quantity of anchorage points and the diameter of the thread remain.

9.4. Additional mountable anti-skid devices are forbidden (chains, special cases, changing the grip of the tire, etc.)

10. BRAKES

10.1. It is allowed to use braking systems, which have at least 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 and capacity of any battery, and the cables for its connection are not restricted.

11.1.2. It is not allowed to install more than three batteries that are connected to the electric system of the car. The location of the battery is not restricted. Batteries should be fixed in accordance with "Safety equipment" p. 3.

11.2. Alternator

11.2.1. The quantity, brand and capacity are unlimited; however, its mechanical drive gear should be carried out by the 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 least at the Technical Inspection.

11.3.2. Additional lighting equipment is not limited, however the number of additional headlights should be even, and the arrangement must be symmetric 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 above or in front of the rear axle of the vehicle.)

12.1.2. Fuel tanks must be separated from the crew compartment by fireproof (metal) and, whenever possible, sealed partition. Additionally, fuel lines must be sealed.

12.1.3. Liquid necks and caps should not extend beyond the perimeter of the vehicle when viewed from above. Any lock system can be used for the lid that eliminates incomplete lock or accidental opening at impact.

12.1.4. Fuel tanks ventilation must be located outside of the car 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. Frames of the jointed design are forbidden.

13.2. Exterior

13.2.1. External body panels should 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. Wheels (tires with rims), as seen from above, must be covered by mud guards or fender extensions. Splashboard and fender extensions design 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, should 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 should 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 should 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 only allowed to use multi-layered windshields of triplex type.

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 gear is to one's liking.

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

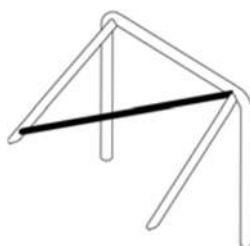


Fig. 2



Fig. 3

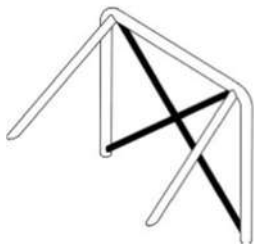


Fig. 4

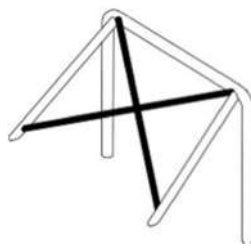


Fig. 5

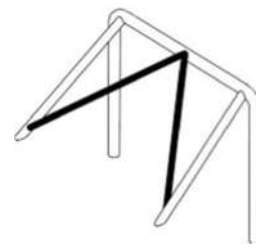


Fig. 6

13.12.1.2. For PROTO cars which have a spatial frame it is obligatory 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

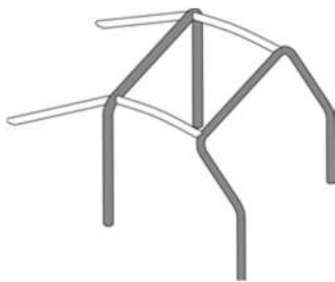


Fig. 7A

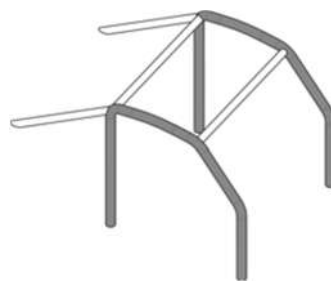


Fig. 7B

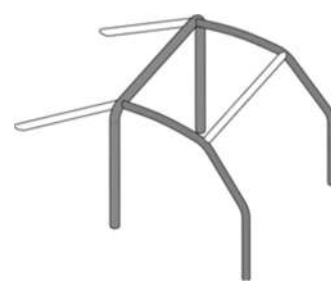


Fig. 7C

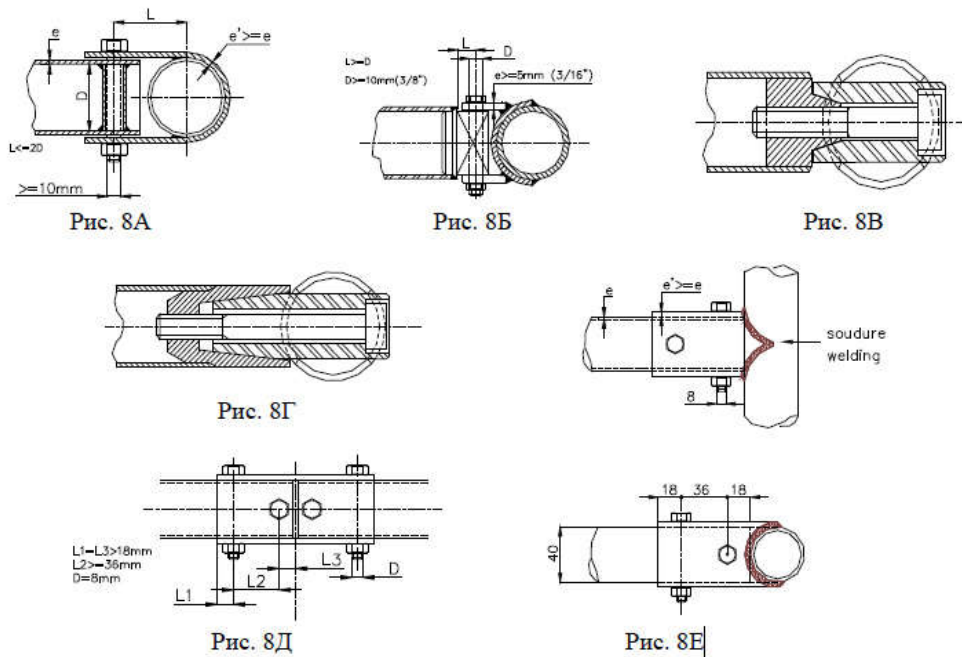
13.12.1.3. The cage can consist of:

- 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. 7C).

Presence of diagonal elements located according to fig. 1-6 is a must. Each element of the cage should 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 should meet one of the following types (Fig. 8 - 8E):



Plug connections must be placed strictly on the axis of the pipe.
 They should not be welded after the connection.
 Bolts and nuts should have the minimum quality of 8.8 (ISO standard).

13.12.3. Installation

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

13.12.3.2. Each bearing part should 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) should not be less than 60 degrees.

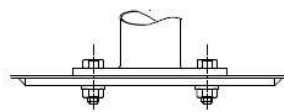


Рис. 9

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 0.22% carbon	45 kg/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 arch 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. 4. 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 should 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 should 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 should 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 be 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.