

# Emirates Authority for Standardization & Metrology (ESMA)



المواصفة القياسية الإماراتية

UAE.S 5014 :2016

إشتراطات السلامة للمركبات المعدلة  
Safety Requirement for Modified Vehicles

دولة الإمارات العربية المتحدة  
UNITED ARAB EMIRATES

ICS: 43.020

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المواصفات القياسية لدولة الإمارات العربية المتحدة  
Standards of United Arab Emirates

<b>Date of Cabinet Approval</b>	<b>23/11/2016</b>
<b>Legal Statues</b>	<b>Technical Regulation</b>

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## Safety Requirement for Modified Vehicles

### 1- Scope

This technical regulation specifies the requirements for the modification of passenger vehicles. This is applicable to used and new passenger vehicles modified by the addition, substitution, or alteration of vehicle equipment or systems. Excluded are the motorcycle, trailers, caravans and tractors. (Annex 1 : Vehicle modifications that are required and that are not required approval )

### 2- Definitions

For the purpose of this technical regulation, the following terms and definitions shall apply:

**Authority:** Emirates Authority for Standardization & Metrology (ESMA).

**Competent Authorities:** Any federal or local governmental authority of the UAE who have been authorized to implement the technical standards for vehicle modification described herein.

**Country:** United Arab Emirates (UAE).

**Standard:** The features, description, properties, dimensions, and specifications for modifications described in the technical standards for vehicle modification described herein.

**Emission:** Substances airborne to the atmosphere, which arise in the running of the vehicle, due to exhaust gases, evaporative fuel and crankcase emissions. They include carbon monoxide, hydrocarbons.

**Passengers car :** A motor vehicle except a multipurpose passenger car, which, on account of its design and appointment, is intended mainly for carrying persons and their luggage and/or goods, and which has available a maximum of nine seating places, including the driving seat.

**Drivetrain:** consist of the engine, transmission, universal, control arms, drive shaft axel and wheels.

**Adaptor (Spacer):** Mechanical joints between two mechanical parts.

**Inspection body:** Authority which is responsible for the registration and renewal of modified vehicle.

**Body floor height:** The vertical distance between the ground and the top of the passenger compartment (cab) floor, measured directly below the center of the steering wheel.

**Frame:** The main longitudinal structural members of the chassis of the vehicle

**Frame Height:** means the vertical distance between the ground and the lowest point on the frame, measured when the vehicle is unladen on a level surface at the lowest point on the frame midway between the front axle and the second axle on the vehicle.

**GVW:** gross vehicle weight

**Multipurpose passenger vehicle (MPV) :**

A motor vehicle designed to carry a maximum of nine persons or goods equivalent by weight, which has special features for occasional off-road operation".

**Auxiliary Liquid Fuel Tank:** An additional fuel tank and any other components attached directly there to designed to supplement the vehicle's liquid fuel carrying capability beyond that provided by the vehicle manufacturer.

**Liquid fuel:** Fuel that is liquid at normal atmospheric pressures and temperatures.

**Vehicle Control Module:** A term for any embedded system that controls one or more of the electrical systems or subsystems in a motor vehicle.

**Aftermarket:** The market for replacement parts, accessories, and equipment for the care or enhancement of the original product, especially an automobile, after its sale to the consumer.

**Engine:** The engine itself and the engine management system.

### 3- Technical Requirements

#### 3-1 .General requirement

Inspection authority shall inspect the vehicles that are modified. These modifications shall not affect the safety of vehicle, environment and road users.

#### 3.2 . Engine

3.2.1 A replacement engine shall be accepted as long as it is complying the emission and noise standards.

3.2.2 The engine swap is accepted, if the replaced engine belongs to the same vehicle category, according to the OEM maximum.

3.2.3 When the replacement engine is larger in power output than the original engine offered by the vehicle manufacturer as standard or optional equipment, the vehicle must be upgraded with the appropriate parts and equipments, e.g. brakes, front and rear suspension, fire extinguisher and appropriate seat belt.

3.2.4 The replacement engine shall be suitably installed in such a way to ensure proper engine mount. Replacement engines shall be securely fastened to the vehicle frame or unit body with bolts and mounting hardware designed to accommodate the engine. Engine mounting frames or brackets that are cracked, broken, or display improper welding will cause the vehicle to fail in inspection.

3.2.5 Engines shall be located outside the compartment of the vehicle that is intended for use by the driver or passenger (passenger compartment). The engine shall be separated (from the passenger compartment) and shielded by a firewall that is (a) constructed of a metal or comparable insulated fire retarding material acting as protective barrier, (b) capable of withstanding forces normally encountered in collisions and (c) designed to retard the spread of fire from the engine compartment into the passenger compartment.

3.2.6 All the moving parts and components of the engine, that are accessible to inadvertent contact during normal operating conditions and those that may cause personal injury to persons standing outside of the vehicle, shall be effectively screened or shielded.

3.2.7 It is accepted to install force induction system (Super charger, turbocharger ....etc) as long as the engine is complying with the emission and noise standards and the system is fixed according to installation manual.

3.2.8 Vehicle Control Module shall comply with the emission standard and shall not affect the safety of the vehicle.

3.2.9 hard pipes which includes intercooler piping, Blow off valves and Ram air system for the vehicle originally equipped with force induction system should be included

### 3.3 Transmissions or Gearboxes

Transmissions between manual to auto system are allowed as long as it's not affecting the movement and the safety of the vehicle, and the installation is as per the aftermarket manufacturer's installation manual.

### 3.4 Exhaust Systems

3.4.1 Installation or use of aftermarket part is allowed provided there is a reasonable basis that such installation and use will not adversely affect emissions performance mentioned in UAE.S GSO 1680 and UAE.S GSO 144. Reasonable basis can be considered as existing if there is written document by the manufacturer of the part that emissions tests have been conducted and reveal that the part complies the requirements of the above mentioned standards.

3.4.2 A vehicle shall be equipped with a leak-proof exhaust system that includes the exhaust manifold(s) or headers, the piping leading from the flange of the exhaust manifold(s) or headers, the muffler(s), and the tail piping.

3.4.3 Exhaust systems shall discharge the exhaust fumes at a location to the rear of the vehicle body or direct the exhaust fumes outward from the side of the vehicle body or upward at a location rearward of any operable side windows.

## UAE standard

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- 3.4.4 No part of the exhaust system shall pass through the passenger compartment or in close proximity to the fuel system
- 3.4.5 No part of the exhaust system shall contain a muffler cutout or by-pass.
- 3.4.6 The modified vehicle shall not emit noise more than 95 decibels when tested as per exhaust noise test.

### 3.5 Fuel System

- 3.5.1 Every modified vehicle shall have a fuel system that is securely fastened to the vehicle so as not to interfere with the vehicle's operation. The components, such as the tank, tubing, hoses, and pump, must be of leak proof design and be securely attached with fasteners designed for that purpose. All fuel system vent lines and fuel lines must extend outside of the passenger compartment and be positioned as not to be in contact with the high temperature surfaces or moving components. The fuel pipe should be laid in the original rout of the fuel system .The use of pressed fittings or AN hose ends in high flow / high pressure fuel system is mandatory.
- 3.5.2 Only a flexible hose specifically designed, manufactured and marked for use as a fuel hose, should be used for fuel supply or return in the fuel system. The pressure rating of the fuel hose must not be less than the operating pressure of the fuel system.
- 3.5.4 The fuel line connection to the engine shall be of a flexible design, and of a length sufficient to accommodate all engine vibrations and movements of the engine with respect to the vehicle frame.
- 3.5.5 The fuel tank shall not be located in the engine compartment. The fuel tank shall be shielded from passenger compartment by a flame-proof barrier, and equipped with a filler cap designed to prevent fuel spillage from the filler opening when the cap is in place.
- 3.5.6 Fill caps shall be threaded or bayonet type or equivalent and shall be provided with a gasket.
- 3.5.7 The tank, its fittings, line and all line connections, fill pipe openings, and venting systems must be exterior to the breathable atmosphere of the passenger and luggage compartments.

The tank, its fittings, line and line connections shall not pass within 3 inches [7.62 centimeters] of any part of the exhaust system unless a suitable heat shield is used in which case a minimum separation of 2 inches [5.08 centimeters] shall be maintained.

No portion of any auxiliary liquid fuel tank shall be installed to extend downward below the lowest portion of the vehicle's axle housing, differential housing, body or frame, whichever is

lowest, with the vehicle sitting on a level plane loaded to its maximum gross vehicle weight rating and tyres inflated to their minimum recommended cold pressure.

3.5.8 The manufacturer shall provide the tank with clear and concise printed instructions for its safe installation and use. The tank shall be securely attached to the vehicle by means of suitable hangers or brackets provided by the manufacturer. The fuel line connections from the auxiliary liquid fuel tank to the primary system, including a selection control valve, shall not render the primary system inoperative for any of its functions.

The replacement tank or auxiliary tank shall be certified by any international standards, or shall have declaration and undertaking letter from the supplier.

3.5.9 If a fuel system includes a selection control valve which is operable by the driver to control the flow of fuel from two or more tanks, the valve must be installed so that either: (1) the driver may operate it while watching the roadway and without leaving the driving position; or (2) the driver must stop the vehicle and leave the driving position in order to operate the valve. If no tank selection control valve is used, each tank line must be equipped with a check valve to prevent back feeding from one tank to the other.

**3.6 Brake System**

- The vehicle shall be equipped with a parking brake that must operate on at least two wheels on the same axle, and when applied it must be capable of holding the vehicle on any grade on which the vehicle is operated. The parking brake must be separately actuated so that failure of any part of the service brake actuation system will not diminish the vehicle's parking brake holding capability. The replacement full brake system should be certified in accordance with UAE.S GSO ECE13 or equivalent international standards and pass the brake test. This excludes the partial modification such as brake pads, brake disc.

**3.7 Scoop and Hood**

Permitted providing the system (scoop) does not interfere with the driver’s visibility

**3.8 Nuts, Bolts and Fasteners.**

3.8.1 The nuts and bolts used shall be as per the below Table.

Minimum Standards for Choice of Nuts and Bolts

<b>Grade</b>	<b>Applicability</b>
Ungraded bolts	Panel fixing, floor panel fixing, and lightly loaded brackets..
Grade 5 or metric 8.8 bolts:	Seat belts, moderately loaded members, suspension mounts,.

Grade 8 or metric 10.9 bolts: Brake calipers, master and slave cylinder mounts, steering arms and all suspension assemblies.

3.8.2 The bolt or fastener should be long enough to ensure that at least one clear turn of thread is visible. This applies to all nuts, including the nylon and locking nuts. Locking must be fitted to all fasteners. spring and shake proof washers, nylon nuts, deformed thread locknuts, castellated nuts with split or roll pins, lock wire, split pins, locking tabs, and staking

**3.9. Exterior Projection Specifications.**

- 3.9.1 All hard wheel arches must be ‘turned inwards’, or have a radius of curvature of at least 2.5mm.
- 3.9.2 Grills, gaps, slots, grooves, channels, recesses and holes that have a width of 10mm or less must be blunted.
- 3.9.3 Fiberglass or carbon fiber reinforced plastic panel edge must be blunted.
- 3.9-4 The body structure of a vehicle shall be free of sharp edges and projections in all interior and exterior locations where they may be in contact with persons under the normal use and care of the vehicle shall also be free from sharp edges. This requirement does not include those locations usually accessible only when the vehicle is hoisted or partially dismantled for the purpose of maintenance or repair.

**3.10 Steering & Suspension**

- 3.10.1 A modified vehicle shall be equipped with a circular steering wheel having an outside diameter of not less than 34 cm
- 3.10.2 The steering system shall remain unobstructed from stop to stop.
- 3.10.3 The range of movement between the axle and the frame of a modified vehicle shall be limited in a manner which, under all normal conditions of suspension, compression and rebound, shall prevent the following: contact between the wheels, including the tyres, and any part of the vehicle frame or chassis; contact between the suspended and unsuspended portions of the vehicle except at suspension component attachment points and at those points which are designed and suitably cushioned to limit extreme suspension movement; and prevent any brake hose from becoming fully extended.
- 3.10.4 It’s not allowed to use any kind of welding on steering system. The modification shall use spindle nuts with split pin.
- 3.10.5 There shall be no heating or welding of coil springs, leaf springs, or torsion bars.
- 3.10.6 Whenever the suspension system provided by the original recognized vehicle manufacturer has been altered, supplemented, or adjusted in a manner which changes the height of the vehicle

frame all suspension components on the same axle shall be changed in an equivalent manner, the lateral (side to side) slope of the vehicle is permitted so long as all other suspension system and body height requirements within this section are satisfactorily met

3.10.7 No person shall operate any motor vehicle with a frame height greater than as specified:

<u>Vehicle Class by GVW</u>	<u>Maximum Frame Height</u>
Passenger Cars	55.88 centimeters [22 inches]
2041 Kg and under	60.96 centimeters [24 inches]
2041- 3402 Kg.	66.04 centimeters [26 inches]
3402- 4536 Kg.	71.12 centimeters [28 inches]

3.10.8 The ground clearance for a modified vehicle shall be able to move on its four tyres on a flat surface without touching the ground except its four tyres.

**3.11 Tyres & wheels**

3.11.1 Specialty tyres may be used if they comply with the technical specifications in section 19 of UAE.S/GSO 42. Wheels shall not be altered from the wheel manufacturer design and application. This should be further supported by the GSO conformity certificate and comply with the speed and load codes.

3.11.2 The replaced tyres shall not touch any part of the body during the moving and not obstructing it.

3.11.3 The load rating of a wheel as determined by the wheel manufacturer, either by a stamp on the wheel or in the wheel manufacturer’s literature, shall not be exceeded. If such a load rating is not available, the wheel shall not be used on the vehicle. The axle weight rating for most vehicles is shown on the identification label located on the driver’s side door jam, gas tank door, trunk lid or glove compartment.

3.11.4 All tyres shall be mounted according to the recommended procedures of the manufacturers of tyre and the tyre machine. The tyre manufacture recommendations of rim width must be followed and the wheel size shall be according to the reference manual for the given country. The reference manual for the United States of America is published by the Tire and Rim Association (TRA), the reference manual for Europe is published by the European Tyre and Rim Technical Organization (ETRTO), the reference manual for Japan is published by Japan Automobile Tyre Manufacturers Association, Inc. (JATMA).

3.11.5 Wheels must be free from damage, cracking, and rust so as to not to contribute or influence the safe operation, mounting, or performance of the wheel in service.  
 -Wheels may not be drilled, welded shaved, cut or otherwise altered from the wheel manufacturer design and application  
 - Any modification on the structure of the wheels are not allowed

- 3.11.6 Tyre-to-fender clearances and tyre-to-suspension clearances should be installed in a manner that prevents rubbing and scuffing. Wheel balance weights shall not be in contact with suspension components and tires shall not be in contact with fenders.
- 3.11.7 A wheel shall not use fewer fasteners than the wheel and vehicle was designed for, and must be set at the appropriate retention torque value according to the size of the fastener. See vehicle manufacturer manual handbook for the number of fasteners and recommended torque value.
- 3.11.8 Slick and racing tyres are not allowed to use on road

### 3.12. In-vehicle entertainment systems

The visual display unit of the in-vehicle entertainment system should be installed such that it does not interfere with the driver's visibility. If it is in the view of the driver, it shall have a function to automatically disable or switch off the visual display when the vehicle is in motion. The system shall not interfere with existing vehicle controls or instrumentation in any way. The electrical system shall be adequately protected against fire hazards. The addition of in-vehicle entertainment systems must be carried out by qualified personnel in accordance with the system manufacturer's recommendations.

### 3.13 . Chassis and frame

- 3.13.1 A vehicle shall be equipped with a frame consisting of structural beams or channels, or structural tubing, or unitized construction capable of supporting the vehicle, its load, and the torque produced by the power source under all conditions of operation. The frame structure shall be essentially rigid, free of cracks and visual indications of weakness, such as bending or buckling. Body mounts may not be broken, cracked, deteriorated or missing.
- 3.13.2 A vehicle shall be equipped with a floor pan under the entire passenger compartment. The floor pan shall be capable of supporting the weight of the number of occupants that the vehicle is designed to carry in the designated seating positions.
- 3.13.3 The body structure of a vehicle shall be free of sharp edges and projections in all interior and exterior locations where persons in the normal use and care of the vehicle may contact them. This requirement does not include those locations usually accessible only when the vehicle is hoisted or partially dismantled for the purpose of maintenance or repair.
- 3.13.4 Chassis cross members for engine and drivetrain location may be removable if desired. The flange plates and bolts shall be of suitable size and the nuts and threaded bosses shall have thread depth appropriate for the application.
- 3.13.5 Double shear – All shear style suspension mounts shall be mounted in double shear.

### 3.14. Bull bars

- 3.14.1 Fiberglass, carbon fiber and other composite material are accepted as long as there is no internally reinforcement with heavy steel that is welded or attached to the main chassis

3.14.2 For steel / rigid bull, bars are allowed as long as they come as a manufacturer's option.

**Annex 1 : Vehicle modifications that are required and that are not required approval**

1- Vehicle modifications that are allowed without approval from license department.

- Bumpers
- Car seats
- Fog lamps
- Flood lights
- Fuel additives
- Gear knobs
- In-vehicle entertainment systems
- Intake air filters
- Intercooler
- Meters and gauges
- Radiators
- Rollover bars
- Roof racks
- Side skirts
- Ignition system
- Spoilers
- After-market rims
- Tyres (excluding racing and slick tyres)

2- Vehicle modifications that require approval from the license department

- Engines
- Exhaust system
- Suspension systems
- Seating arrangements
- Force induction system (Superchargers, Turbochargers, etc.....). ( including hard pipes which includes intercooler piping ,Blow off valves and Ram air system for the vehicle originally equipped with force induction system)
- Intake manifolds
- Transmissions or Gearboxes
- Performance brake / Brake Parts system
- Bull bars
- Chassis