AFRICAN STANDARD

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Vehicle standards — Specification for vehicle roadworthiness — Part 1: Roadworthiness of vehicles already in use

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Foreword

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ARSO shall not be held responsible for identifying any or all such patent rights.

This African Standard was prepared by the ARSO Technical (Harmonization) Committee Number 08-4/59 on Automotive Technology and Engineering (ARSO/THC 08-4/ARSO/TC 59).

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Introduction

This specification applies minimum safety requirements. It is not intended to cover all of the specific national safety requirements of countries for vehicles registered and operating within their borders but wherever possible countries are requested to standardise on the criteria contained in this specification.

Requirements are included only for items which are critical to safety and which can be assessed by a vehicle examiner with the facilities of a vehicle testing station complying with whatever appropriate requirements are laid down in legislation for vehicle examiners and vehicle testing stations.

This specification takes into account that in Africa vehicles may be imported from a variety of countries or regions and such vehicles may have been designed to comply with the domestic requirements of specific source countries or regions anywhere in the world.

This standard consists of the following parts under the general title “Specification for vehicle roadworthiness”:

Part 1: Roadworthiness of vehicles already in service

Part 2: Roadworthiness of vehicles prior to entry into service and thereafter

Part 3: Roadworthiness — Supporting information

Part 4: Roadworthiness — Requirements for vehicle examiners

Part 5: Roadworthiness — Requirements for testing equipment

Part 6: Roadworthiness — Requirements for combinations of vehicles

Vehicle standards — Specification for vehicle roadworthiness — Part 1: Roadworthiness of vehicles already in use

1 Scope

This African Standard covers the requirements for the examination and testing for roadworthiness of motor vehicles operating within the territories and across the borders within Africa.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 1355-2: *Vehicle standards — Specification for vehicle roadworthiness — Part 2: Roadworthiness of vehicles prior to entry into service, and thereafter*

ARS 1355-3: *Vehicle Standards — Specification for vehicle Roadworthiness — Part 3: Roadworthiness — Supporting information*

ISO 3779: *Road vehicles — Vehicle identification number (VIN) — Content and structure*

ISO 3780: *Road vehicles – World manufacturer identifier (WMI) code*

ISO 4030: *Road vehicles – Vehicle identification number (VIN) – Location and attachment*

FMVSS 115: *Federal VIN Requirements (Title 49, Chapter V, Part 565)*

UN ECE R48: *Uniform provisions concerning the approval of vehicles with regard to the installation of lighting and light-signalling devices*

UN ECE R104: *Uniform provisions concerning the approval of retro-reflective markings for heavy and long vehicles and their trailers.*

3 Terms and definitions

For the purpose of this standard the following definitions apply.

3.1 Definitions

3.1.1
legally permissible
as limited by national or regional legislation

3.1.2
registration plate/ licence plate/ number plate
the plate manufactured and embossed appropriately, which is attached to the front and rear of a motor vehicle or the rear of a trailer and a motor cycle

3.1.3
technically permissible
as permitted and specified as such by the manufacturer

3.1.4
vehicle category definitions

applied by the UN ECE are included under Parts 2 and 3.

3.1.5
vehicle design compliance
compliance to a vehicle safety design standard which has been published by a national or regional body

3.2 Abbreviations

ANPR	Automatic Number Plate Recognition
CIE	International Commission on Illumination
COF	Certificate of Fitness issued after a periodic roadworthiness test which is to be displayed on the vehicle to which it relates
FIA	Federation Internationale de l'Automobile being the governing body of motor sport and which promotes safe, sustainable and accessible mobility for all road users across the world
LHD	left hand drive designed for operation in countries where traffic drives on the right
LPD	lateral protection device also referred to as the side underrun device
RHD	right hand drive designed for operation in countries where traffic drives on the left
TRIPS	Transport Registers and Information Platform System
UN ECE	United Nations Economic Commission for Europe
VIN	Vehicle Identification Number issued, affixed to and recorded on a vehicle in accordance with ISO 3779, ISO 3780 and ISO 4030 or FMVSS 115

3.3 Terminology

Non-specific terms such as excessive, extensive, significant, impaired, deficient and such like expressions are used where finite limits are inappropriate to apply, and the vehicle examiner is the final arbiter in such cases.

4 Administrative requirements

4.1 Application form

The vehicle examiner must check that the Application Form for Roadworthiness is fully relevant to the vehicle to be examined. In particular the vehicle examiner must inspect and record the VIN and Registration Plate details by obtaining these from the vehicle itself and not from any documentation, then checking these details against the detail on the Application Form.

4.2 Evidence of vehicle having been presented

An automated system must be provided to take photographs of the vehicle at random during testing showing its front ¾ including its registration plate and at the same time showing the testing station in the background. Additional photographs showing the rear ¾ of the vehicle and its body together with a photograph of the VIN or chassis number must also be taken and filed.

Additional requirements to minimise fraud are intended to be introduced such that the photographs, plate number, date, time and GPS co-ordinates should be recorded by the ANPR cameras. This ensures that photographic proof is available that the vehicle was tested. The fingerprints of the applicant are to be verified and all documents, including signatures scanned and recorded on the system.

4.3 Record of the roadworthiness inspection

A record of the inspection in respect of only the items that were rejected, covering at least the detail shown in Annex A, together with proof of identity of vehicle tested and of the person presenting the vehicle for testing must be provided to the client.

4.4 Certificate of fitness

Vehicles complying with the requirements applicable in their country of registration or licensing shall carry a COF to this effect in cases where the country of registration or licensing issues such certification and its national or regional legislation requires it to be carried on the vehicle and shall produce this certificate for inspection by a law enforcement officer. A COF disc certifying compliance to this specification must be carried on the vehicle.

NOTE Offline validation of the COF will be possible by means of the 2 dimensional barcode on the disc. Online validation of COF will be possible by means of TRIPS.

5 Procedural matters regarding the actual test

5.1 Circumstances where an examiner may refuse to examine a vehicle or to complete an examination

a) If the information on the vehicle does not correspond with the information on the application.

b) If the information on the vehicle appears to have been tampered with.

c) If the vehicle is so dirty that the examiner would be unable to examine it efficiently.

d) If the vehicle cannot be started or driven.

e) If a defect is detected which renders the vehicle unsafe or otherwise presents a risk to the examiner.

f) A trailer must be connected to a suitable drawing vehicle.

g) Some part which should be able to be opened cannot be opened.

h) The person who presented the vehicle for test is uncooperative.

i) The person who presented the vehicle for test refuses to leave the vicinity of the test area so as to give the examiner the privacy he requires, except in the case of single personnel operating a lane where the examiner welcomes the assistance provided by the driver, or in the case where a vehicle adapted for operation by a disabled person is not able to be operated safely by the examiner and the examiner welcomes the presence of the disabled person to assist by operating the vehicle.

6 Technical requirements

6.1 Registration plate — Reject if

a) a registration plate is missing or insecure or not in accordance with national legislation.

b) not easily legible to a person standing approximately 20m from the vehicle in line with its direction.

6.2 Information display — Reject if

a) information on vehicle identification, power and mass(es) as below, is not displayed on vehicles over 3 500kg GVM unless such vehicle models were not provided with plates by their manufacturers and it is not possible to obtain such data from the manufacturer:

   i) VIN or chassis number or frame number.

   ii) maximum engine power output (kW).

iii) gross vehicle mass (GVM) – also referred to as technical maximum vehicle mass specified by the manufacturer (kg).

iv) gross combination mass (GCM) – also referred to as technical maximum combination mass specified by the manufacturer (kg).

v) gross axle masses – also referred to as technical maximum axle mass specified by the manufacturer (kg).

b) information on vehicle identification as below, is displayed on any other vehicle:

i) VIN or chassis number or frame number.

c) vehicles entering into service from the date of mandatory application of this specification do not have the information as below on a data-plate:

i) for light goods vehicle not exceeding 3 500kg, GVM and passenger cars the GVM, GCM, front axle and rear axle capacity,

ii) for vehicles over 3 500kg, GVM and GCM.

d) vehicles which are required to operate within certain speeds do not have the required sign at the rear.

NOTE 1 In such cases loading enforcement will be according to the legally permissible maximum masses regulated in that country and according to the maximum tyre capacity. Vehicles entering service from the date specified in 6.3 of ARS 1355-2 will require the information display.

NOTE 2 Guidance on the layout and derivation of the masses is given in Annex F of ARS 1355-3.

6.3 Braking equipment

6.3.1 Controls and design — Reject if

a) in the case of a vehicle for which the brakes are not covered in this Part of the specification unless it is equipped with a parking brake or other device to keep it stationary.

b) parts of its assembly (including anti-slip provision) or mounting are damaged or missing or have excessive play or are fouling other components.

c) have excessive movement when braking or not releasing fully.

6.3.2 Hand lever operated brake control — Reject if

a) parts of its assembly (including ratchet) or mounting are damaged or missing, have excessive play, are cracked, fractured, excessively corroded or are fouling other components.

b) it cannot be operated from a normal driving position, is impeded in its travel, or has excessive movement when operating or not releasing fully, or does not readily stay in the “on” position.

c) it is not identifiable through different actuator colours (red and yellow for USA-origin vehicles) and readable labels.

d) pivots are tight in operation or have excessive side play such that failure is likely.

e) it is excessively worn in its gate or lever locating mechanism.

6.3.3 Vacuum assisted hydraulic brakes (vacuum drawn from engine) — Reject if

a) the brake pedal creeps down when depressed.

b) sponginess can be felt when the pedal is depressed.

c) after depleting the vacuum with engine stopped, the pedal does not dip when the engine is started.

d) there are visible leaks or “sweating” on any of the pipes, pipe connections or flexible connectors or brake assemblies or wheels after tests have been made on the vehicle.

6.3.4 Compressed air or vacuum assisted hydraulic brakes (fitted with air compressors or vacuum pumps) — Reject if

a) on vehicles which are fitted with air compressors or vacuum pumps to provide energy or assistance to the braking system, there is no visual or audible warning device for inadequate pressure or vacuum, or it is not fitted or working correctly.

b) there is not enough pressure or vacuum to give at least two fully assisted brake applications after the warning device has indicated minimum effective working conditions.

c) in the case of a solo vehicle the time to reach minimum effective working pressure after the warning signal is more than 3 minutes for pressure systems and 1 minute for vacuum systems, or 6 to 9 minutes for vehicles designed and equipped to draw a trailer.

NOTE USA sourced heavy vehicles have a maximum operating pressure of approximately 700kPa whereas European sources use 850kPa or more and that charging times are longer for say vehicles with additional air operated equipment such as air suspension.

d) in the case of a trailer being coupled to the vehicle under test, the time to reach minimum effective working pressure after the warning signal is more than 6 minutes for pressure systems and 3 minutes for vacuum systems, for vehicles designed and equipped to draw a trailer.

e) there are visible leaks or “sweating” on any of the pipes, pipe connections or flexible connectors or brake assemblies or wheels after tests have been made on the vehicle.

6.3.5 Full pressure hydraulic brake systems (fitted with a hydraulic pump) — Reject if

a) the pressure in the hydraulic system is not maintained for 10 minutes when the brakes are off and the engine is stopped.

b) there are visible leaks or “sweating” on any of the pipes, pipe connections or flexible connectors or brake assemblies or wheels after tests have been made on the vehicle.

6.3.6 Trailer brakes — Reject if

a) a trailer does not have a parking brake which acts on at least 2 wheels and an overrun or service brake, except that if it has a GVM of 750kg or less then any device which ensures safe parking is acceptable and an overrun or service brake is not required.

b) if it entered into service after the date of mandatory application of this specification and the overrun or service brake in b) above does not act on all wheels.

c) the parking brake cannot be securely set.

d) the mechanism is insecure, cracked, excessively worn or badly corroded.

e) on twin-line air-braked systems the emergency brake does not apply automatically when the emergency (usually red) brake line is disconnected from the towing vehicle.

f) does not have a parking brake acting on at least 2 wheels of the trailer which can be securely set.

g) has loose, insecure, worn or damaged brake levers, chains, cables or linkages and the brakes cannot be fully applied or do not release easily.

h) if any airline is fitted with a manual shut-off, other than a valve to apply the parking brake if fitted with spring brakes.

i) a trailer over 750kg GVM but not exceeding 3 500kg GVM does not have an inertia (overrun) brake or a service brake acting on at least 2 wheels of the trailer, and that for trailers entering into service after the date of mandatory application of this specification reject if they do not have brakes operating on all wheels.

j) a trailer over 3 500kg GVM does not have a service brake acting on at least 2 wheels of the trailer, and that for trailers entering into service after the date of mandatory application of this specification reject if they do not have brakes operating on all wheels.

NOTE Under on-road operating conditions the requirement for the kind of brake required on a trailer may be influenced by legislation related to the mass of the drawing vehicle.

6.3.7 Braking systems with ABS or ABS/EBS or ESC systems — Reject if

a) any warning lamps for such systems do not illuminate as required when the ignition is switched on.

b) any such warning lamps are missing or indicate a fault.

c) any visible wiring especially in the vicinity of the wheel brake assembly is loose or not present or not suitably protected against chafing or other damage.

d) if equipped to tow a trailer the electric connection between towing and towed vehicle is not of the 13-pin type or does not have does not have a separate plug from the vehicle electric system.

6.3.8 Braking components – Various — Reject if any of the following can be detected

a) brake rods, clevis joints, linkages, relays, levers, pins, pivots slack adjusters or cables are seriously weakened by excessive wear or have abnormal play or locking devices missing.

b) brake pipes and hoses contact moving parts or are excessively chafed or exposed to excessive heat.

c) brake drums, backing plates and brake shoes are seriously weakened or insecure or missing.

d) a brake pad or brake lining is less than 1,5mm thick or has been exposed to oil.

e) a brake disc or drum is excessively worn or a brake drum shows signs of fracture.

f) the brake fluid level below minimum or hydraulic fluid reservoir cap missing.

g) trailer couplings are interchangeable but have no indication of which line connects to which line.

h) an incorrectly adjusted load-sensing valve.

i) leaking air or vacuum connections.

j) an air compressor drive belt is missing or so loose that slippage is likely.

k) an air reservoir cannot be drained, either automatically or manually.

l) brake levers, slack adjusters and camshafts are not properly adjusted or aligned to give maximum force when the brakes are applied, or do not release to the fully-off position after the brakes are released.

m) the s-cam shafts can move freely and do not tend the stick when air brakes are released.

n) operating cylinders or diaphragms have excessive travel (if the manufacturer's service limits are not available, a limit of 55 mm for diaphragm types or half the length of the cylinder for piston types).

o) spring brakes are not operating, or are wound off.

6.3.9 Alarms and warning systems — Reject if

a) any alarm or audible or visual warning system provided by the manufacturer is not present and functioning to warn of inadequate vacuum or air or hydraulic pressure or of insufficient brake fluid.

6.4 Braking performance

6.4.1 Braking efficiency — Reject if under any condition of loading with the engine disengaged, when

a) using a brake roller tester with an automatic results recording system and an axle weighing system with automatic mass (weight) recording system – the equivalent braking force in N/kg that can be developed in relation to the axle load, is less than shown in Table 1 below, calculated from the brake roller tester results according to the following procedure:

i) Determine the mass (weight) of each axle in kg. Add the masses (weights) of each axle together to obtain the mass (weight) of the vehicle.

ii) Using a brake roller tester obtain the brake force that is available for each axle by adding the brake force reading for the left hand and right-hand brakes for each axle. Add the results for all axles together.

iii) Calculate the brake efficiency from the total force in Newtons obtained in ii) and the total vehicle mass (weight) in kg obtained in i) in accordance with the following formula and check that the result is greater than is shown for the equivalent braking force in N/kg in Table 1 below:

(Total Brake Force x 1000) / (Total Vehicle Mass x 9.81)

NOTE The determinations in 6.4.1 and their calculations will be made and recorded automatically without any manual calculations being required by the vehicle examiner.

Table 1 — Braking performance requirements

	Equivalent braking force (N/kg)
Vehicles and combinations designed for or capable of exceeding 40 km/h:	
Service Brake	4,4
Secondary Emergency Brake	1,9
Vehicles and combinations NOT designed for or capable of exceeding 40 km/h:	
Service Brake	1,9
Secondary Emergency Brake	0,95

NOTE See Clause 7 for specifics for motorcycles, tricycles (including Tuc Tucs) and quadricycles.

b) the parking brake is unable to hold the vehicle stationary on a gradient of 1 in 8 (which is 0,125 or 12.5%) facing up and facing down, or the brake roller tester shows less than 1,1 N/kg when the parking brake is applied.

c) the difference between the brake forces developed on each side of an axle is more than 30% of the highest brake force, also referred to as brake imbalance and calculated as follows, except that brake imbalance calculations are not required for motorcycles nor for service and emergency braking systems:

Highest force minus (Lowest force / Highest force) as a %

d) there is little or no braking force at any wheel.

e) the brake on any wheel is binding or sticking evidenced by a time lag when increasing brake pressure.

f) the brake force indication fluctuates indicating brake drum ovality and the difference between the highest and lowest readings of brake force on the same axle is greater than 70% of the highest reading.

g) for vehicles for which the secondary brake control operates independently of the service brake the secondary brake performance is less than shown in the table above.

6.4.2 Limitations on the use of equipment

For the purposes of issuing of a COF the brake roller tester shall be the only method used to ascertain braking performance and may be supplemented but shall not be substituted by a road test.

6.5 Lighting and light signalling and reflective equipment

6.5.1 General — Reject if

a) headlights, dipped beam lights, direction indicator lights, stop lights, tail lights, number plate lights and reversing lights are not fitted or not operable or if any lens is damaged such that it is likely to deteriorate further, or missing or obscured, except that a number plate light is not required on a tractor.

b) lighting and light signalling equipment such as, fog lights, end outline marker lights, daytime running lights, side marker lights are fitted but are not operable. (Courtesy lights and interior lights need not be fitted nor be operable if fitted).

c) any of the lighting in b) is not fitted nor operable or if any lens is damaged such that it is likely to deteriorate further or is missing or obscured.

d) headlights do not have a dipped beam function, and which will not dazzle oncoming traffic.

e) when using the headlight beam tester with automatic recording of results, the headlight and dipped beam do not meet the intensity and the dipping requirement specified by the manufacturer of the headlamp beam tester or vehicle manufacturer.

f) for the purposes of issuing a Certificate of Fitness the testing for compliance of the headlamp beam must be performed by means of equipment which provides automatic recording of the result.

g) in the case of headlights designed for LHD vehicles crossing into member states with traffic driving on the left the use of blanking tape to block light which would otherwise dazzle oncoming traffic has not been applied (similarly for RHD vehicles operating in traffic driving on the right.

h) all lights at the front of the vehicle do not emit white light.

i) except in the case of vehicles designed with a single rear fog lamp, if there is not a matching pair of lights each positioned equidistant from the vehicle centreline, or if they are not of approximately equal intensity.

j) if additional front lighting systems are fitted which are likely to dazzle other road users. (e.g. light bars) and which are not homologated, or type approved for that vehicle model and designed and supplied integral by the vehicle manufacturer.

k) lights are not of the normal number or positions for vehicles of a given model known to a vehicle examiner.

l) in cases where the number or position or switching appears irregular the requirements of UN ECE Regulation 48 are taken as being acceptable.

m) in the case of a breakdown vehicle is not fitted with side marker lights.

6.5.2 Rear and side lights — Reject if

a) stop, tail and any fog lights at the rear of the vehicle do not emit red light (except the reversing light) or if any such light is inoperable or if the lights on the LH side and on the RH side are not of approximately equal intensity, except for the case of vehicles designed with a single rear fog light which is red.

b) all lights at the rear of a vehicle do not emit a red light except for the case of a reversing light.

6.5.3 Signalling lights — Reject if

a) direction indicators are not fitted and functioning or do not emit amber or yellow light to the front or sides, and amber, yellow or red to the rear according to their designed colour and reject if all such lights cannot be brought into action by operation of a single hazard warning control except in the case of semaphore direction indicators, tractors, trailers and motorcycles.

6.5.4 Identification and end outline marker lamps — Reject if

a) identification lamps are fitted above the windscreen to a bus or goods vehicle over 3 500kg GVM and are not green or amber and if any lamp exceeds 21W.

b) end outline marker lamps are fitted and do not emit white light to the front and red light to the rear.

c) intermittently flashing red lights flashing in any directions are fitted to any vehicle other than an emergency service vehicle.

d) lamps emitting a blue light are fitted to any vehicles other than those operated by a member of the police force, traffic officer, prisons service, military force or road transport inspector.

6.5.5 Retro-reflective equipment — Reject if vehicles over 3500kg GVM or over 7m long

a) are not fitted with retro-reflective yellow contour marking tape, which complies with and is marked to show compliance to UN ECE R104 Class C and which is 50mm (±5mm) wide and fitted along the sides and rear covering as close as possible to at least 80% of the overall length and width of the vehicle. Reflective red tape may be used at the rear instead of yellow.

NOTE Yellow is generally of a higher retro-reflective performance than red.

b) are not fitted with a high intensity grade reflective chevron sign, which is 200 mm wide and long enough for the outer edges to be within 400 mm of the outer edges of the vehicle. The reflective materials, in red and yellow, shall be angled at 55 degrees and 100mm wide, as shown in Annex B and having the coefficient of retro-reflection in Table 3.

NOTE See Annex B for further information on materials.

6.5.6 Colour of retro-reflective equipment and of lighting — Reject if

a) white retroreflectors are not fitted to the front of trailers.

b) red retroreflectors are not fitted at the rear.

c) any colour of retro reflector or light other than white is fitted to the front, or other than amber or yellow is fitted to the side, or other than red is fitted to the rear except:

i) in the case of retro-reflective contour marking which may be fitted to the rear coloured yellow or red.

ii) a brake anti-lock warning light fitted to the front of a trailer which may be green or red.

iii) that the colour of retro-reflective number plates is exempted from these requirements.

6.5.7 Steadiness of light — Reject if

a) any light is fitted which does not emit a steady light excluding:

i) direction indicating or hazard warning lights or light(s);

ii) lights authorised for use by specified personnel, and

iii) stop lights designed and supplied as integral parts by the manufacturer of a motor vehicle to provide warning of abnormally severe braking action.

6.6 Driver's view, safety glass and mirrors — Reject if

a) a windscreen or a window to either side of the driver is not of safety glass or if the safety glass has been damaged or discoloured or tinted to the extent that the driver's view to the front or sides is impaired, excluding cracks or damage which are not positioned in front of the driver.

b) a windscreen to the front of the driver is not of the laminated type as indicated by two parallel lines on the windscreen or the word "laminated".

c) any glass is loose or not securely fitted or is not clearly identifiable as safety glass.

d) at least one mirror on each side is not fitted and is not securely mounted so as to avoid vibration under normal conditions of operation.

e) when standing behind the vehicle in line with the side of the vehicle, one cannot see more than 75% of the width of the mirrors.

f) the vehicle is constructed or maintained or fitted with mirrors such that the driver is not able to see a full view of the roadway ahead and a sufficient view of the roadway to the rear.

g) any mirror is broken or its reflectivity is impaired by corrosion or other damage.

h) on vehicles where the steering wheel is on the wrong side for the national traffic rule, additional mirrors known as wide angle and close proximity mirrors shown in ARS 1355-3 which were provided on more recent model heavy vehicles and buses, are missing, broken or otherwise.

6.7 Windscreen washers and wipers — Reject if

a) the wiper operation is defective or does not provide the driver with a clear view of the road ahead.

b) the wiper blade(s) has deteriorated such that it does not wipe the windscreen sufficiently cleanly to provide the driver with a clear view of the road ahead.

c) if fitted with windscreen washers and the system is inoperative.

d) wiper does not cover an adequate area or is not able to work continually.

e) a wiper arm or blade is missing.

f) at least one windscreen wiper is present except in the case of a motorcycle.

6.8 Steering and driving controls — Reject if

a) the free play is such that the steering wheel can be rotated in either direction by more than 30 degrees without movement of the road wheels, indicating excessive wear in the steering system.

b) end float in line with the column is excessive.

c) abnormal noise or stickiness of rotation is experienced when turning the steering wheels from side to side with the engine running.

d) the steering column or steering wheel is clearly insecure or likely to become so as a result of incorrect security such as missing clamps or locking devices or wear.

e) any power steering is clearly not producing the degree of assistance normal for that vehicle type.

f) anti-slip surfaces on brake and clutch pedals are worn, loose or missing.

g) pedal hinges are worn giving excessive sideways free-play or pedal movement is restricted.

h) any anti-theft system has been retrofitted which could constitute a danger to an unfamiliar driver and which was not designed and supplied as an integral system by the manufacturer of the motor vehicle.

i) legislation prohibits the registration or licensing of a left-hand-drive or right-hand-drive vehicle as from a particular date or according to other requirements and the vehicle under examination falls under such prohibition.

j) there is significant play in any steering ball joint.

k) the steering box is insecure, has significant play, stiffness or leaks oil.

l) the steering servo functions incorrectly or has an excessive oil leak.

m) the steering wheel or idler arm is insecure or has significant free play.

n) the track rod, drag link or steering arm is loose, deformed or shows signs of heating to correct deformation.

o) any steering stops (lock-stops) are missing.

p) a steering damper is insecure or damaged.

q) steering kingpins and control arm ball joints have significant play.

r) control arm bushes exhibit excessive play.

6.9 Size and type of tyres — Reject if

a) the maximum load capacities of the tyres are less than the permissible axle carrying capacity of the road pavement.

b) the maximum load capacities of the tyres are not marked in kg or coded* on the sidewalls.

c) tyres are marked “not for highway use” on vehicles designed for highway use.

d) in the case of 10 to 16 seat passenger vehicles if the tyre designation does not include a “C” which signifies “commercial radial ply” tyres – e.g. “195R15C”.

e) tyres on a dual wheel are of different sizes such one tyre is clear of the ground.

f) tyres on an axle are of different sizes or one is cross ply and another is radial ply but different makes on one axle are acceptable.

g) tyres are designed for snow operation only, but tyres designed for mud and snow are acceptable.

h) the direction of travel is incorrect.

i) if a tyre has a bead diameter less than 430mm and has been regrooved.

NOTE International codes for maximum capacities and speeds are shown in Annexes J and K of ARS 1355-3.

6.10 Condition of tyres — Reject if

a) tread wear is extensive such that the tyre shows smooth areas where no tread is visible such that adhesion would be reduced, or if the tread depth is less than 1.6 mm whether or not a tyre wear indicator is present.

b) any cuts or bulges in sidewalls are deep enough to reach the body cords are likely to lead to deflation.

c) in the case of dual wheels where sidewalls touch in the unladen condition.

d) in the case of dual wheels where one tyre does not touch the road surface.

e) any portion of the ply or cord structure is exposed.

f) a tyre has been regrooved and which does not state “regrooveable” on its sidewall.

g) the sidewall of the tyre shows evidence of repair in the case of a light vehicle.

6.11 Road wheels and their connections to the vehicle — Reject if

a) a tyre retaining ring is fractured or is lifting more than 1.5mm from the rim.

b) a nut or stud is missing, loose or for some reason is not clamping the wheel to the hub.

c) any stud hole is excessively worn.

d) a spigot wheel nut washer cracked.

e) a wheel is badly damaged or distorted or with a locating spigot or dowel missing.

f) a wheel is damaged by the corners of a wheel nut cutting into the material of the wheel.

g) the wheel fixings are not matched or compatible.

h) a wheel made of aluminium alloy repaired by welding.

i) a wheel has a load rating less than that required to support the permissible axle carrying capacity of the road pavement.

j) any half shaft bolt, nut or stud is missing or loose.

k) any balance weights are not secure.

l) any interchangeable (quickly detachable) wheels have excessive play in their splines.

m) on visual observation, any road wheel does not run reasonably true.

n) there is excessive play in the wheel bearings or kingpins when the front wheels are lifted off the ground and rocked top and bottom.

o) control arms are damaged or show signs of repair and bushes are badly worn or missing.

6.12 Suspension including shock absorbers and torsion bars — Reject if

a) a suspension component or its attachment point is insecure, disconnected, cracked or so worn or damaged that its function is adversely affected.

b) a suspension unit so weak that there are signs of fouling when the vehicle is laden.

c) in the case of leaf springs the locating pin or any shackle or any component part is missing or clearly so badly worn that failure is probable or if a spring is clearly weak or has a broken blade or spring clamps missing.

d) in the case of coil springs or torsion bars there is excessive free play or components missing or signs of repair by welding or a broken coil spring.

e) in the case of air suspension there are leaks in the system or signs of fouling during displacement or parts such as check straps missing.

f) shock absorbers are present but are ineffective or mounting points are damaged or degraded.

g) shock absorbers are missing on vehicle designs which depend on the presence of shock absorbers.

h) for the purpose of issuing a Certificate of Fitness the testing for compliance of the suspension must be performed by means of equipment which provides automatic recording of the result.

6.13 Wheel alignment — Reject if

a) side slip or wheel alignment exceeds the limits specified by the vehicle manufacturer or if not available by the manufacturer of the testing equipment.

b) the vehicle can be seen to be “crabbing” i.e. positioned slightly sideways when moving forward.

c) the camber is clearly excessive on one side of the vehicle compared with the other side.

d) for the purpose of issuing a Certificate of Fitness the testing for compliance of the wheel alignment must be performed by means of equipment which provides automatic recording of the result.

6.14 Condition of chassis — Reject if

a) any chassis or cross member is broken or is cracked or deformed and weakened to the extent that failure is likely.

b) deformation of the chassis or body is such that the vehicle can be seen to be “crabbing”.

6.15 Bodywork and various equipment — Reject if

a) the vehicle body or cab is not firmly secured to any chassis.

b) if corrosion is present to the extent that it is likely to reduce the strength of structural parts or areas which are necessary to support door pillars and hinges and mounting points for seats and safety belts and doors latches and hinges including the floor area.

c) if corrosion is present that results in sharp edges or holes in panels that are likely to cause injury to occupants, pedestrians or other road users.

d) the floor is not secure or is excessively rusted or broken.

e) any step or handrail is loose to the extent that injury could be caused.

f) any side guard, bull bar, rear underrun device, bumper bar or roof carrier is insecure or has sharp edges likely to cause injury to pedestrians or to other road users.

g) in the case of a semi-trailer the landing legs do not operate correctly or are not securely mounted.

h) if any such device protrudes beyond the maximum width of the vehicle and is not rounded so as to minimise the likelihood of injury to pedestrians or to other road users.

i) doors do not latch closed securely or cannot be opened or closed easily.

j) any seats are loose or the forward or rearward adjustment does not latch securely.

k) a seat backrest does not lock in an upright position.

6.16 Engine & Transmission — Reject if

a) gear selection is abnormally difficult or any gear selected can disengage without action by the driver.

b) engine or transmission mountings or propshaft components are insecure, damaged, worn or produce abnormal noise.

c) engine power output is clearly below normal levels such that the vehicle would be so slow-moving as to be an obstacle to normal traffic flow.

d) the vehicle cannot be driven in reverse.

e) parts of the engine or exhaust are exposed such that a person could come into contact with hot parts and risk injury.

6.17 Couplings on drawing vehicles and on trailers

6.17.1 Drawbar eye or hook — Reject if

a) the drawbar eye or hook or the pin, where appropriate, is not secure, or is excessively distorted or excessively worn, or

b) the locking or safety devices are not in position or are not working correctly.

NOTE If the vehicle has a coupled trailer, do not uncouple it. An examiner may be liable for any damage.

6.17.2 Fifth wheel coupling — Reject if

a) the fifth wheel assembly is not securely fitted to the chassis with at least 12 x grade 8.8 high tensile bolts in the case of 90mm kingpin and 8 such bolts in the case of a 50mm kingpin, or of equivalent fastening strength;

b) the safety locking device is missing, or is inadequate, damaged or ill-fitting;

c) any part is missing, broken, cracked, loose or excessively worn;

d) on an uncoupled drawing vehicle the jaws are so worn or out of adjustment that the trailer kingpin might not be securely held, which is the case if the jaws are worn in excess of 6 mm, or

e) on a coupled drawing vehicle and trailer there is excessive movement between the drawing vehicle and a trailer when the trailer brakes are applied and the driver lightly shunts the drawing vehicle backwards and forwards.

6.17.3 Towing bracket, coupling ball, coupling socket, tow bar and drawbar — Reject if

a) a towing bracket or towbar or drawbar is loose, badly welded or incorrectly or not securely fitted;

b) the coupling ball or socket is welded or shows signs of excessive wear;

c) the tow bar is loose, badly welded or incorrectly fitted to the drawing vehicle;

d) any part is cracked, broken, excessively worn or incomplete;

e) any safety device or locking mechanism is not present and capable of functioning correctly, or

f) mounting bolts are missing, loose or damaged or of mixed sizes or do not show the grade of material.

6.17.4 Semi-trailer kingpin — Reject if

a) the kingpin is not securely attached.

b) mounting bolts are missing, loose or damaged or of mixed sizes or do not show the grade of material.

c) wear on the kingpin is such that it exceeds:

i) 3 mm on an 89 mm diameter kingpin (2 mm on the 114 mm top part).

ii) 1.8 mm on a 50.8 mm diameter kingpin (2 mm on the 73 mm top part).

6.17.5 Semi-trailer suspension — Reject if

a) on vehicles registered after the date specified in ARS 1355-2, the axle unit of a semi-trailer is fitted with more than one type of suspension whether air suspension, steel suspension or rubber suspension.

6.18 Safety belts — Reject if

a) any safety belt is not anchored securely.

b) a safety belt of the retractable type does not retract.

c) a safety belt of the inertia locking type does not lock when snatched. Inertia locking type must not be confused with reel types that lock after slow withdrawal then release.

d) a safety belt is frayed or damaged such that it is unlikely to withstand accident loading.

e) flexible stalk cable strands securing the buckle are broken.

f) the tongue does not engage properly into the buckle.

g) a webbing load limiter of the “folded type” has been deployed.

h) there are obvious signs of structural deficiency such that failure is likely.

i) a safety belt is not of an approved or normal type of fitment or design.

j) any safety belt required to be fitted according to the regulation of the member state is not fitted or is not of the type required by the regulation of the member state.

6.19 Wheel flaps or mudflaps — Reject if

a) goods vehicles after the date specified in ARS 1355-2, in excess of 7 500 kg GVM, and trailers in excess of 3 500kg GVM excluding truck tractors, or passenger vehicles with more than 16 seats, do not have wheel flaps or mudflaps at least as wide as the tyres, or that do not extend downwards to at least the horizontal centreline of the wheels.

6.20 Rear and side underrun — Reject if

a) for vehicles registered after the date specified in ARS 1355-2, a rear underrun protection device is not fitted in the case of a trailer of GVM exceeding 3 500 kg or a goods vehicle in excess of 12 000 kg GVM.

b) the width of rear underrun device does not extend to the width measured to the outermost tyres and is not shorter than 100mm from the outermost edges of the vehicle.

c) the rear underrun does not present a section at least 100 mm in depth to any impact from the rear and is not farther from the rear than 450mm.

d) the ground clearance below the rear underrun is more than 550mm.

e) the lateral extremities of the rear underrun device bend towards the rear or have sharp edges with a radius of less than 2,5mm.

f) side underrun devices, also termed lateral protection devices (LPDs), if registered after the date specified in ARS 1355-2 are not fitted to vehicles in excess of 3 500kg GVM in places where the longitudinal distance between the tyres on any two adjacent axles exceeds 3 metres except in cases where equipment is fitted between such axles and which equipment fulfils the function of the LPD.

NOTE 1 Rear underrun - Bodywork, chassis or other components which totally or partially fulfil the same function as the rear underrun are acceptable instead of a rear underrun, and rear underrun need not be fitted if it is incompatible with the use of the vehicle. The function of a rear underrun device is to absorb the impact of a light vehicle running into the rear of the vehicle and avoiding the shearing of the roof its passenger compartment whilst utilising the cushioning effect of the crumple zone of the light vehicle

NOTE 2 Side underrun – also referred to as lateral protection device - is not required if it is not possible for practical reasons to fit such a device. The function of the device is to prevent pedestrians, cyclists or motor cyclists from falling under the sides of the vehicle and being caught under the wheels and as such does not require the strength of a rear underrun device.

6.21 Speedometer — Reject if

a) a speedometer is not fitted.

b) it cannot be illuminated.

c) in cases where the national legislation permits the vehicle to be driven whilst undergoing testing if the speed indication is observed to be clearly inaccurate when driven even at low speeds, or if the indication oscillates severely.

d) its speed indication does not show km/h.

6.22 Horn or audible warning device — Reject if

a) a horn is not fitted or does not sound when operated.

b) cannot be reached from the driver's seat.

c) is clearly inaudible in serving its function to warn other road users.

6.23 Liquid leakage — Reject if, with or without the engine running

a) any lubricating oil, hydraulic brake fluid or power steering fluid is seen to be forming another drip after wiping away any initial drips.

b) any fuel leaks are evident.

c) any filler cap is missing or of incorrect design for the relevant tank or reservoir.

d) fluid containers or fuel tanks are not securely mounted.

6.24 Electrical wiring — Reject if

a) the battery or battery carrier is not securely fastened.

b) any wiring is so positioned that it is chafing or likely to be damaged by heat.

c) wiring is clearly inadequately insulated or secured.

6.25 Dimensions — Reject if

a) the wheelbase, overall length, front or rear overhang, width or height do not comply with the limits laid down in Annex D for that type and mass of vehicle.

6.26 Noise emissions — Reject if

a) the noise emitted by the vehicle is significantly louder than would be expected from a properly maintained vehicle of similar design indicating that the silencer is in need of replacement or some other maintenance action is required.

b) and in cases of doubt or dispute, when a microphone is positioned 0,5m from the open end of the exhaust pipe at a horizontal angle of 45% +- 10% to the direction of the exhaust flow and the engine is accelerated to 60% of its maximum speed and readings in excess of the following are obtained:

Table 2 — Noise level requirements

Class of Vehicle	Maximum permissible noise level in decibels dB (A)
Motorcycle (with or without a side car) or autocycle	83
Any other vehicle not exceeding 3 500kg GVM	82
Any goods or passenger vehicle with an engine capacity not exceeding 10 000cc	90
Any goods or passenger vehicle with an engine capacity exceeding 10 000cc	92

c) the exhaust system is corroded or damaged such that exhaust gas is leaking from the system.

d) in the case of heavy vehicles with an engine braking system known as a "Jake Brake" check that its silencer is functioning when the brake is operated whilst the vehicle is on the overrun.

6.27 Exhaust gas emissions — Reject if

a) the extent of smoke or fumes from the vehicle is such that the driver of a following or overtaking vehicle would have some obscuration of his forward vision.

b) the CO measurement from a petrol engine vehicle with 4 or more wheels exceeds 4,5% unless it is fitted with a catalytic converter or other advanced emission control equipment in which case a limit of 0,5% applies.

c) the CO measurement from a petrol engined vehicle with 2 or 3 wheels exceeds 6,0%.

d) the smoke opacity measurement from a diesel engine vehicle exceeds 2,5m^{-1} for a normally aspirated diesel engine and 3,0m^{-1} in the case of a turbocharged diesel engine when subjected to the free acceleration test according to the instructions of the manufacturer of the smoke opacity meter.

e) the member state has legislated stricter limits for specific regions or cities within its borders then such limits must be applied but only to vehicles involved in non-cross-border operations.

f) for the purposes of issuing a Certificate of Fitness the testing for compliance of the exhaust gas emissions must be performed by means of equipment which provides automatic recording of the result.

6.28 Emergency warning equipment — Reject if

a) there are not two emergency warning triangles on each vehicle or trailer.

b) there is no reflective vest or jacket present in the vehicle if so required by the national legislation of the country.

6.29 Modifications to vehicles — Reject if

a) a modification or change is apparent to the engine, braking system, suspension, track, load body, superstructure, exhaust system, general structure, lighting system or other aspect of the original vehicle design which, in the opinion of the examiner, is likely to significantly reduce the safety of the vehicle.

b) the requirement in a) may be exempted if a report to the contrary is presented with the vehicle and which report is issued by a University or by a Professional Engineer or by an accredited testing authority or similar organization, institution or authority.

6.30 Vehicles designed or adapted for persons of reduced mobility — Reject if

a) the vehicle fails any of the performance requirements of this specification or equipment which is normally considered to be necessary for safety is not present and has not been omitted for reasons of driver disability, such as foot controls in the case of a driver with no legs.

b) in cases where the examiner does not consider himself or herself competent to operate and test the vehicle for roadworthiness the examiner may invite the driver into the testing area and allow the driver to demonstrate the roadworthiness of any aspect of vehicle performance and to be accompanied by the examiner if the examiner so desires.

7 Requirements for motorcycles, tricycles and quadricycles

7.1 Identification information — Reject if

a) The registration plate or information display does not comply with 6.1a) and 6.2b) i).

7.2 Equipment for motorcycles — Reject if

a) any equipment normally supplied with the machine is missing, loose or damaged including, but not limited to, footrests, footrests rubbers, mudguards, support stands, fairings, saddles and pillion passenger seats, chain guards and sprocket covers.

b) a support stand is not present to be able to support a parked motorcycle.

c) the throttle and brake and clutch control levers and cables are damaged or sticky in operation such as to reduce the ability to control the machine with ease.

d) the front suspension has deteriorated such that when the front brake is applied and the machine is rocked backwards and forwards excessive play in the front forks or steering yoke is evident.

e) the front or rear suspension has deteriorated such that the damping characteristic is significantly less than standard or if excessive free-play is evident in the hinge point or bushes.

f) the handlebar width or height or the wheelbase dimension is modified extensively such that safe operation has been significantly reduced.

g) the tyres are marked “for off-road use”, or “not for highway use”.

h) a tyre is retreaded.

i) the tread depth is less than 1,6 mm.

j) in the case of a passenger carrying tricycle there are no features to reduce the likelihood of passengers falling out when cornering such as safety belts or side rails or grab rails.

7.3 General — Reject if

a) wheel alignment is such that the handlebars have to be held at an angle to the machine.

b) the machine pulls to one side.

c) the free play in any part of the front or rear suspension or steering control is such that cornering stability or directional control would be impaired.

d) the braking controls are difficult to operate.

e) there are not two independent braking systems one operating on the front wheel(s) and the other on the rear wheel(s) and which can be operated independently or in combination with each other.

7.4 Brake roller test — Reject if

a) the equivalent braking force determined in accordance with 6.4.1 c) cannot be achieved in this case by adding the results the brake force obtained at each wheel.

NOTE If a passenger car roller tester is used then ensure that the unused portion of the roller is covered for safety reasons when testing motorcycles. When testing tricycles and quadrucycles using two rollers extra care may be necessary in cases where both wheels on an axle are rigidly connected.

7.5 Other equipment for motorcycles, tricycles, or quadricycles — Reject if

a) any equipment detailed under Clause 7 is fitted and is deficient in terms of the rejection criteria given in Clause 7.

8 Additional requirements for passenger vehicles with more than 8 seats in addition to the driver seat

8.1 Emergency exits and windows — Reject if

a) vehicles with more than 8 seats in addition to the driver do not have the number of exits distributed around the vehicle to facilitate emergency exiting (including knock-out windows, doors, and any roof hatches that can be used in an emergency) and which are provided at the rates for persons including the driver given below:-

i) for 9 to 16 persons – 3 emergency exits

ii) for 17 to 30 persons – 4 emergency exits

iii) for 31 to 45 persons – 5 emergency exits

iv) for 46 to 60 persons – 6 emergency exits

v) for 61 to 75 persons – 7 emergency exits

vi) for 76 to 90 persons – 8 emergency exits

b) emergency exits in the form of escape windows or roof hatches are not labelled as such (e.g. “Emergency Exit”) and are not of a dimension of at least 900mm x 450mm.

c) the emergency exits are of the type where a window must be broken but there is no instrument such as a small hammer with a sharp point near the window that can be used to break the window.

d) every alternate window on each side is not of the openable type unless the passenger compartment has forced ventilation.

e) any windows are broken or loose.

f) a seated passenger is able to risk injury by placing an elbow out of an adjacent window.

8.2 Seats, doors, and seating accommodation — Reject if

a) the driver’s seat is no longer adjustable.

b) there is no partition, guard or rail behind the driver to reduce the possibility of a passenger bumping into the driver.

c) there is no notice inside the vehicle easily legible to passengers showing the maximum number of seated and standing passengers that the vehicle is licensed to carry, and the maximum load of goods that may be carried.

d) for the above notice the seating accommodation per person is not measured at 380mm minimum width per person.

e) there is no door on the side of the vehicle opposite to the driver’s side to allow passengers to embark or to disembark.

f) any door on the driver’s side is not sealed or locked and is not accessible to passengers.

h) the width, depth, height above floor of any seat is not less than 380mm except that lower heights are permitted above wheel intrusions.

i) for forward facing seats the distance between the front of a seatback and the rear of the seat in front is less than 570mm measured at seat level.

j) a longitudinal unimpeded access gangway from the entrance to each row of seats is not provided or is not of at least 300mm width.

k) in the case of a passenger vehicle with 17 or more seats an unimpeded cross passageway is not present of 300mm width.

l) any seat adjacent to an entrance or stairway does not have a guard, a rail or partition or similar measure to reduce the risk of injury to a passenger slipping from that seat.

m) any seat or interior fitting is loose and likely to break free or cause injury in an accident.

n) the sides of the passenger compartment are less than 600mm above the level of passengers' feet.

9 Vehicle design safety standards applicable on “date of entry into service”

a) For vehicles entering into service for the first time and thereafter whenever a roadworthy test is required on that vehicle, the relevant vehicle design compliance requirements of both ARS 1355-1 and ARS 1355-2 must be complied with before a COF may be issued.

b) For all vehicles, equipment which was fitted when new and which is intended to support safety must continue to be present and operative and in an acceptable condition.

10 Vehicle dimensions — Reject if

a) any of the limiting dimensions specified in Annex D for the particular type of vehicle are not complied with.

11 Exempted vehicles — Reject if

a) an examination shows that certain exempted vehicles do not have the basic brake stopping capability or that equipment which could meet the safety requirements of this specification such as safety glass, tyres, steering mechanism do not meet such safety requirements:

NOTE Certain vehicles below are clearly not designed to meet the all the requirements of this Roadworthiness Specification are normally exempted by national or regional legislation.

i) Drilling machines, mobile cranes, fork-lifts, straddle trucks, road making machines, earthmoving machines, construction machines, loading machines.

ii) Tractors which are not goods vehicles and which are used solely for bona-fide agricultural, viticultural, or pastoral activities.

iii) Vehicles owned by the military which are not designed or adapted for the carriage of goods or passengers.

Annex A
(normative)

Essential contents of the computerised roadworthiness test report

Results for braking, headlight beam, tailpipe emissions, suspension and wheel alignment must be obtained automatically without the intervention of the examiner being possible by using appropriate equipment.

Test Report Basics — Date/Vehicle Test Number/Vehicle Registration (or Licence) Plate Detail/VIN Number (or chassis number)/Vehicle Make and Model/Vehicle Colour/Odometer Reading/Testing Station No/Examiner No/ Result – Pass/Fail/Retest/ Signature.

Evidence of vehicle having been presented for test — Photographs of vehicle with Registration Plate and GPS/ Scanned Application Documentation with signatures/ Verification and recording of fingerprints

Information Display - Vehicle identification/ Mass data plate

Braking Equipment — Brake pedal/ hand lever/ Vacuum Assistance/ Build-up of Air or Vacuum/ Sustainability of Pressure or Vacuum/ Equipment on Trailers/ Condition of Braking Components/ Alarms and Warnings.

Braking Performance — Readings for each wheel brake, service and parking/ Calculated equivalent braking force, efficiency and imbalance on brake roller tester/ may be supplemented by measured deceleration in addition to results from brake roller tester

Electrical System — Windscreen wipers & washers/ Hooter/ Electrical Wiring & equipment/ Lighting including headlight beam reading/result

Driver's view — Safety glass/ Mirrors

Steering and Driving controls — Free play/ Power assistance/ Pedals

Tyres and Wheels — Load capacities/ Condition/ Alignment reading/result

Fittings and Equipment — Suspension/ Shock absorbers reading/result / Bodywork/ Towing & Drawing equipment/ Wheel flaps/ Rear Underrun/ Speedometer/ Liquid leakage

Engine and Transmission — Condition/ Noise/ Power

Safety belts — Condition/ Number

Dimensions — Whether exceeded

Noise emissions — Whether acceptable

Exhaust gas emissions — Whether acceptable reading/result

Motorcycles, Tricycles, Quadricycles — General equipment/ Suspension/ Handlebars/ Tyres

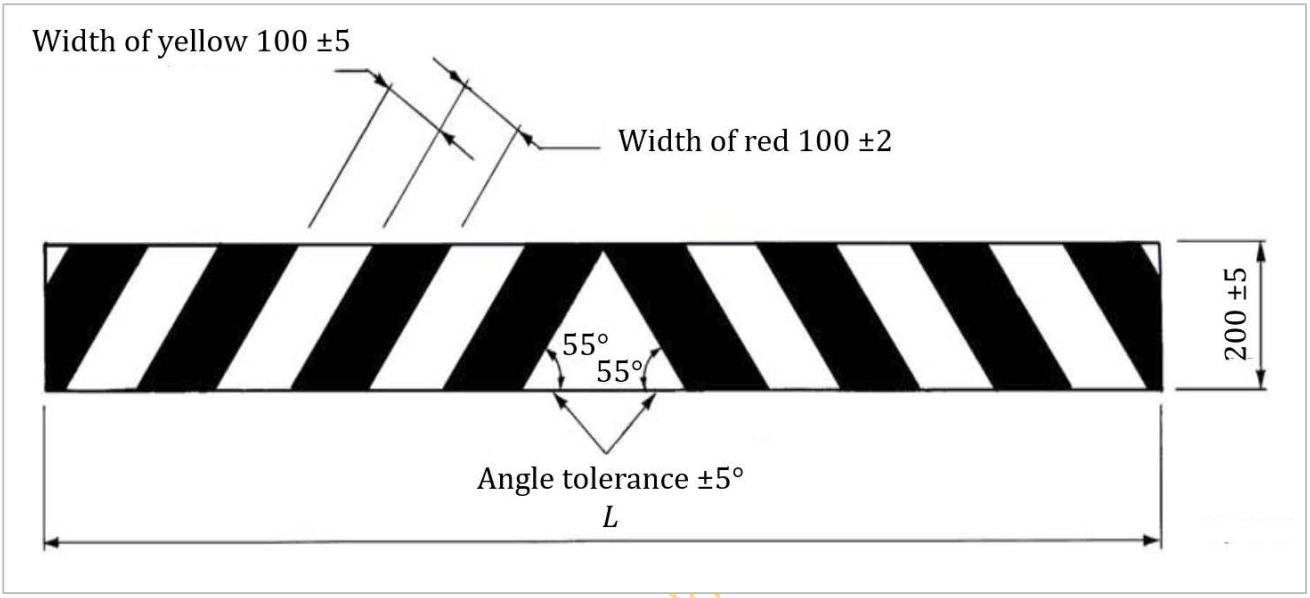
Additional for Passenger vehicles — Emergency exits/ Seats/ Doors

Remarks

Name and Signature of Examiner

Annex B
(normative)

Chevron specification details



For vehicles 2,5m wide the length L must be at least 1,7m and for vehicles 2,6m wide must be 1,8m and in both cases must be long enough to be within 400mm of each side of the vehicle.

Some cutting and trimming is permitted around protrusions and recesses at the rear of a vehicle.

The red and yellow retroreflective materials are commonly known as a high intensity grade and their coefficient of retro-reflection must meet the values indicated in Table 3 below:

Table 3: Coefficient of retro-reflection (cd/lx/m^2) when tested in accordance with CIE 54*

1	2	3	4
Colour	Observation angle α	Entrance angle, β 1 (β2=0°, ε=0°)	
		5°	40°
		(cd/lx/m$^{2)}$	
Red	0,33°	36	13
Yellow	0,33°	120	60

Any material tested shall comply with the requirements of Table 3 when tested in accordance with CIE 54 or equivalent standard by a laboratory accredited to ISO 17025 or equivalent standard.

Examples of compliant reflective materials are:

3M	3930 High Intensity Prismatic
Avery Dennison	T6500 High Intensity Prismatic
Oralite	5910 High Intensity Prismatic
Nikkalite	94000 High Intensity Prismatic

Non-compliant materials with inferior retro-reflective performance may not be used. Other brands of materials may be used only if the supplier produces evidence of compliance to the values in Table 3 from a testing authority accredited to ISO/IEC 17025 or equivalent.

Note that chevrons which comply with SANS 1329-4 are acceptable and incorporate the above retro-reflective materials. The differences in retro reflective performance between compliant and non-compliant materials are illustrated below – the upper chevron being non-compliant and the lower chevron being compliant.

The “red only” chevron above is actually both red and yellow but the yellow is non-reflective and is almost invisible at night.

Annex C
(normative)

Rear view from mirrors showing ground level that must be visible through the rear-view mirrors on both light and heavy vehicles at the roadworthiness test

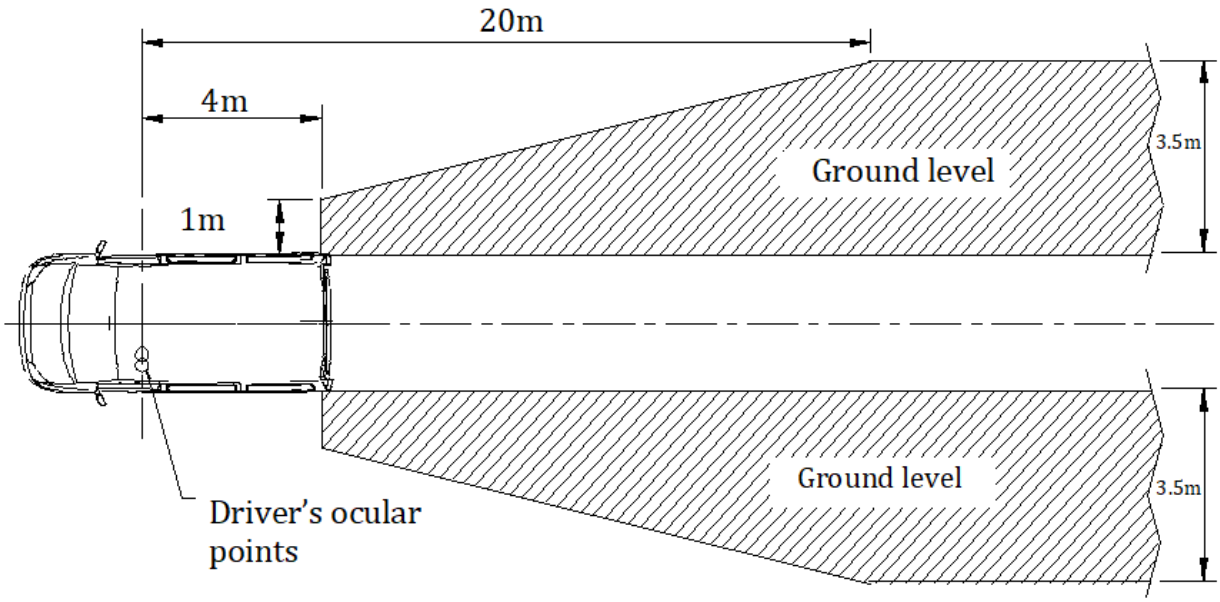


Figure C.1 — LHD Class III Mirrors

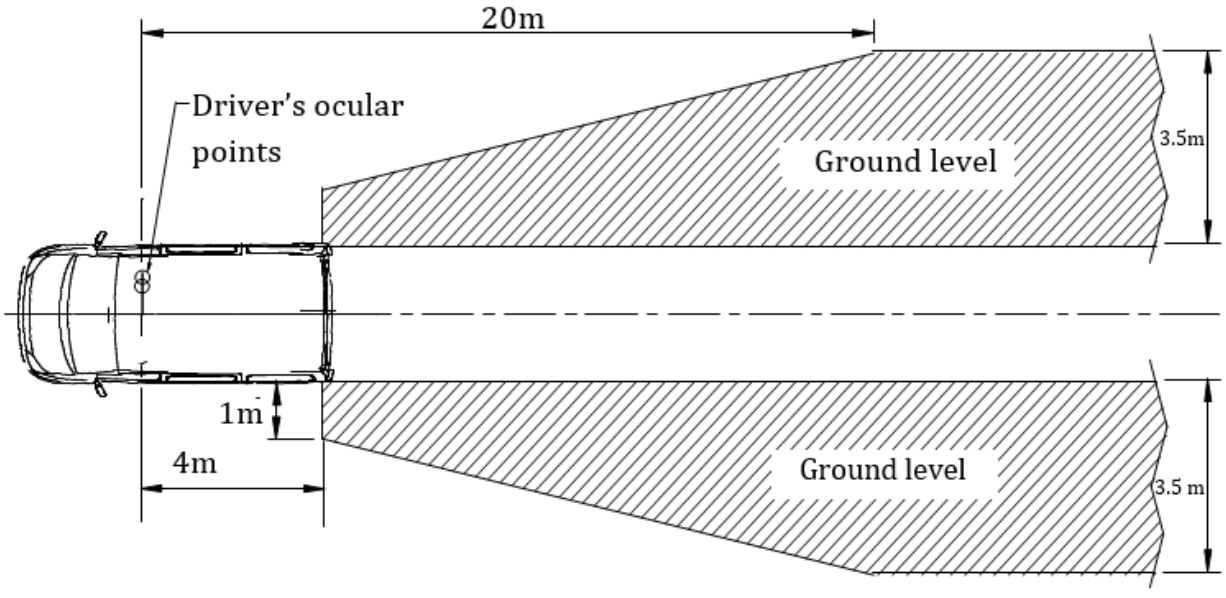


Figure C.2 — RHD Class III Mirrors

Annex D
(normative)

Vehicle maximum dimensions

D.1 Overall lengths

D.1.1 Trailers

Any trailer coupled to the drawing vehicle in such a manner that it cannot swivel in a horizontal plane – 1,8m max

One axle or one axle unit:

GVM exceeding 12 000kg – Overall length excluding drawbar or coupling – 11,3m max

GVM not exceeding 12 000kg – Overall length excluding drawbar or coupling – 8,0m max

More than one axle or one axle unit:

GVM exceeding 12 000kg – Overall length excluding drawbar or coupling – 12,5m max

D.1.2 Buses

Bus – 15m

Bus Train – 22m max

Rapid transport bus train – 26m max

D.1.3 Any other vehicle, excluding a semi-trailer

Including any drawbar or coupling – 12,5m max

NOTE Bull bars and the like are excluded from measurements of overall length provided they do not increase the overall length by more than 300mm

D.1.4 Articulated vehicle

Truck tractor plus semi-trailer: 18,5 max

D.1.5: Combination of vehicles

Truck tractor plus semi-trailer and trailer or any other combination: 22m max

D.2 Overall widths

Bus – 2,6m max if its track exceeds 1,9m, otherwise 2,5m max.

Goods Vehicle – 2,65m max if the GVM exceeds 12 000kg.

Any other vehicle – 2,5m max

D.3 Overall heights

Overall height – excluding load

Double decker bus – 4,65m max

Any other vehicle – 4,6m max

D.4 Turning radius and wheelbase

Turning radius must not exceed 13,1m except for bus trains and twin steer 4 axle rigid goods vehicles where the max limit is 17,5m.

Wheelbase – 8,5m max except for a semi-trailer where 10m is allowed and a bus train where 8,5m is allowed measured from the front axle centreline to the centreline of the middle axle or axle unit.

D.5 Front Overhangs

Semi-trailer front overhang: 1,8m max.

Any other vehicle (except a semi-trailer or a trailer with one axle or one axle unit): max front overhang 60% of wheelbase.

Any other vehicle including a semi-trailer or a trailer with one axle or one axle unit): max front overhang 5,8m less half the wheelbase.

Max front overhang 6,2m less half the wheelbase for vehicles where the front of the driver's seatback is not more than 1,7m from the front of the vehicle, and for a bus train the wheelbase measurement shall be from the centreline of the front axle to the centreline of the middle axle.

D.6 Rear Overhangs

Trailer, except a semi-trailer, is allowed a rear overhang of 50% max of the length of the trailer body, provided the trailer has one axle, or one axle unit, or two axles where their centrelines are less than 1,2m apart.

Refuse truck or street sweeper is allowed a rear overhang of 70% of its wheelbase.

Any other vehicle is allowed a rear overhang of only 60% of its wheelbase.

D.7 Projections

Any projection to the front which exceeds the front overhang limits specified above.

Any bracket projecting more than 150mm beyond the widest part of the vehicle.

Motorcycle — if some part of the motorcycle projects more than 600mm in front of the front axle centreline, or more than 900mm beyond the rear axle centreline, or more than 450mm on either side of the wheels, or more than 300mm beyond the outside of the wheel of any sidecar.

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SANS 1329-4: *Retro-reflective and fluorescent warning signs for road vehicles. Part 4: Retro-reflective chevron signs*