ST. KITTS AND NEVIS NATIONAL STANDARD

Road Vehicles – Code of Practice for Inspection and Testing of Used Motor Vehicles for Roadworthiness

SKNNS xxx:20xx

St. Kitts and Nevis Bureau of Standards (SKNBS) La Guerite

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AMENDMENTS ISSUED SINCE PUBLICATION

AMENDMENT NO.	DATE OF ISSUE	TYPE OF AMENDMENT	NO. OF TEXT AFFECTED	TEXT OF AMENDMENT

ATTACHMENT PAGE FOR SKNNS AMENDMENT SHEETS

Foreword

St. Kitts and Nevis Bureau of Standards (SKNBS) is the national standards body tasked with the mandate to develop and adopt standards under the National Standards and Quality Act 2021. With a distinct mandate outlined in the National Standards and Quality Act of 2021, the SKNBS is entrusted with the crucial task of developing and adopting standards essential for maintaining the quality and consistency of products and services within the nation. A notable feature of this process is the active engagement of SKNBS technical committees, incorporating stakeholders from diverse disciplines to collaboratively contribute to the development or adoption of standards.

In alignment with broader regional and global initiatives, the development of these national standards adheres rigorously to the principles and guidelines established by the CARICOM Regional Organisation for Standards and Quality (CROSQ) and the International Organization for Standardization (ISO). St. Kitts and Nevis, as esteemed members of these organisations, demonstrate a steadfast commitment to harmonising its standards with widely recognised benchmarks.

Moreover, the work of the SKNBS emphasizes that the adoption of these standards is seamlessly integrated into the SKNBS' Quality Management System (QMS). This systematic incorporation within a QMS underscores a structured and organised approach, ensuring that the adopted standards not only meet stringent criteria but are also smoothly assimilated into the operational framework of the SKNBS.

In essence, this document provides a comprehensive overview, shedding light on the significance of SKNBS' role, the collaborative standardisation process, and the commitment to aligning national standards with regional and international best practices.

Committee Representation

This St. Kitts and Nevis National Standard was developed under the supervision of the National Technical Committee for Road Vehicles – Code of Practice for Inspection and Testing of Used Motor Vehicles for Roadworthiness. This national standard was modified from the BNS EAA 002:2017 standard. The technical committee comprised the following members:

Members	Representing
Mr Frank Gordon (**Chairperson)**	Gordon's
Mr Derval Phipps **(Vice Chairperson)**	AutoDoc Parts and Services
Mr Alrick Edwards	The Royal St. Christopher & Nevis Police Force
Mr Anthony Fraites	ATF Auto Repairs
Mr Carl Claxton	Reliable Motors Ltd
Mr Cromwell Henry	The Royal St. Christopher & Nevis Police Force

Mr Desmond Richards	S.L Horsford's Automotive, S.L Horsford's & Co. Ltd.
Mr Duran Merchant	TDC Automotive, TDC Group Ltd
Mr Eric Haynes	Inland Revenue Department
Mr Franchette Manners	Zone 1 Auto
Mr Jayvon Granderson	Hanley's Automotive
Mr Romaine Belgrove	Quality and Experience
Mr Stafford Beach	Tully's Auto Repair Clinic
Ms Tricia Samuel **(Alternate)**	Tully's Auto Repair Clinic
Mr Trevor Cornelius	Men at Work
Mr Valentine Fraites	Public Works Department
Mrs Carissa Franks-Benjamin **(Technical Secretary)**	St. Kitts and Nevis Bureau of Standards
Mr Jermine Mike **(Technical Secretary)**	St. Kitts and Nevis Bureau of Standards
Ms Judy Edwards **(Technical Secretary)**	St. Kitts and Nevis Bureau of Standards

Table of Contents

1 Scope

This St. Kitts and Nevis (SKNBS) National Standard (SKNNS) specifies the safety related performance characteristics of used motor vehicles and their inspection and tests for road worthiness.

2 Normative References

For the purpose of this standard, the following references shall apply:

- The Commonwealth of The Bahamas Road Traffic Act 220 and Regulations;
- TZS 4: 2009, Rounding off numerical values
- TZS 598: 2010, Automotive engineering – Bus body building-Code of practice
- TZS 240: 1984, Road vehicles – Positioning and routing of engine exhaust pipes – General requirement
- TZS 238:1984, Road vehicle – Laf spring- Specification
- TZS 557: 1995, Road Vehicles – Reflective rear marking plates for motor vehicles- Specification

3 Terms and Definitions

For the purpose of this St. Kitts and Nevis National Standard (SKNNS), the following definitions shall apply:

3.1

background radiation

ionizing radiation constantly present in a natural environment of the earth, which is emitted by natural and artificial sources

3.2

backlash (6.1.1)

gap with the mechanical parts

3.3

braking force/brake power:

a measure of force applied to the brakes to slow a vehicle

3.4

Breaking capacity

Ability of the braking system to cause the vehicle to come to a halt

3.5

defect

The non-fulfillment or intended usage and requirements

3.6

dose

A measure of the radiation received or absorbed by a target

3.7

Dose rate (annex F, Procedure)

quantity of radiation absorbed or delivered per unit time

3.8

drag, (6.1.4)

mechanical force generated by a vehicle's movement through the air as it accelerates forward

3.9

idling

leaving a vehicle's engine running when the vehicle is not in motion

3.10

Idling (4.4):

the concentration of the exhaust gas from an automobile shall be measured when the engine is idling

3.11

inspection

Activities such as measuring, examining one or more characteristics of a product or service and comparing these with specified requirements to determine conformity

3.12

irradiation (annex D, Purpose)

process by which something is exposed to radiation

3.13

luminous intensity (4.5.1)

the quantity of visible light that is emitted in unit time per unit solid angle (Britannica)

3.14

non-conformity

non-fulfillment of specified requirement

3.15

Oil sump (5.1.3)

Oil pan, oil tray or oil reservoir

3.16

Oxidation (4.5.3)

the yellowing, fogginess or cloudiness of headlights due to UV rays

3.17

Preload

measurement of how much a spring is compressed at full extension of the shock

3.18

Radiation dose rate (4.4.4)

3.19

reliability

ability of an item to perform a required function under stated conditions or a stated period

3.20

run-out (5.5.3 b)

wobble or inaccuracy of rotating mechanical systems

3.21

specification

Prescribed requirement with which the product or service must conform

3.22

Toe-in (4.1 c): When relevant, sidecar wheel shall be parallel to or shall not have slight "toe-in" towards the front wheel

The intentional nonparallel orientation of opposite wheels.

Note to entry: Toe-in is measured by subtracting the distance between the front edges of a pair of tires from the distance between the rear edges of the same pair of tires. The toe-in dimension is positive when the fronts of the tires are turned toward the center of the car.

3.23

torque (annex B, Purpose)

measurement of how much power or force an engine produces

3.24

quality

the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs

4 Symbols and Abbreviated Terms

mm	Millimeters
db	Decibels
cm	Cenimeters
µsylh	Microsieverts
cd	Candela
CFGS	Chlorofluorocarbons
m, km	Meters, Kilometers
Km/h	Kilometers per hour
CO	Carbon Monoxide
HC	Hydrocarbons
rpm, s	Revolutions per minute, seconds
am	Radiation
lx	Luxe
Pa	Pascal
Ms	Particle speed
Log	
PIP	
MPa	
$\mathbf{P_0}$	
Pa_a	
N/m^2	
atm_a	
Pa	
Ft	

5 Inspection for Performance Characteristics

5.1 Inspection of steering wheel alignment

The alignment of the steered wheels shall be inspected with a side slip tester machine or any other suitable apparatus. The reading for skidding shall not exceed 5 mm inward or outward for 1 m of travel (see annex A). Wheel alignment shall also be inspected visually in accordance with the following:

a) the camber shall not exceed the manufacturer's specified limits or
b) in case of a semi-trailer, any axle shall not be out of square to longitudinal center - line of the vehicle by more than 10.0 mm/m of length of trailer and
c) the front wheels (in the straight-ahead position) and rear wheels shall be in the same vertical plane. When relevant, sidecar wheel shall be parallel to or shall not have slight "toe-in" towards the front wheel (in the straight - ahead position).

5.2 Inspection of braking force

The braking force of a vehicle under inspection shall be measured with one inspector therein as an occupant with no passenger or luggage, according to the requirements specified in annex B and the results conform to 4.2.1 and 4.2.2

5.2.1 Braking force of main brake system

a) The total braking force of the main braking system shall not be less than 50% of the axle weight of the vehicle, and the sum of braking forces on the rear wheels shall not be less than 50% of the axle weight of the subject axle when un laden.
b) For the main braking system, the difference of braking forces applied to the right and left wheels shall be 8% or less of the axle weight of the subject axle when un laden.

5.2.2 Braking force of parking brake system

The total sum of the braking force of the parking brake system shall not be less than 20% of the weight of the vehicle as inspected.

5.3 Level of noise produced by automobile

5.3.1 The measurement of the noise level of steady running noise shall not be more than 88 dB(A).

To allow for any lack of precision in the measuring equipment the highest sound level reading obtained shall be reduced by 1 dB (A).

5.3.2 The muffler shall be free from corrosion, damage, and cracking, and shall function favorably to muffle sound.

5.4 Exhaust gas from automobile

The concentration of, or the level of contamination from exhaust gas shall be determined according to annex C and observe the following requirements:

5.4.1 Automobiles using gasoline or liquefied petroleum gas as fuel

The concentration of the exhaust gas from an automobile shall be measured when the engine is idling, and inserting the probe of a tester into the exhaust pipe to a depth of approximately 60 cm (If this is not feasible, measures to prevent the ingress of air from outside shall be taken before inserting the probe). The measurements shall not exceed the following reference values:

a) concentration of carbon monoxide: 4.5% and
b) concentration of hydrocarbon:

4 - cycle engine: 1,200 ppm

5.4.2 Automobiles using light oil (diesel) as fuel

The excessive smoke or fumes emitted from the automobile shall not be allowed.

5.4.3 Smoke and soot emission

a) The exhaust pipe shall be securely installed and be free from damage and excessive deformation.
b) The catalytic muffler shall be securely installed and free from damage.
c) The blow by gas reducing device shall be securely installed and free from damage.
d) The emission control device for fuel evaporative gases shall be securely installed and free from damage.

5.4.4 When the vehicle subjected to radiation dose test as described in annex F, the radiation

dose rate shall not exceed 0.3 microsieverts/hour (0.3 μSvlh).

5.5 Brightness of headlamps and orientation of main optical axis

The brightness of headlamps and the orientation of their main optical axis shall be measured either manually or using suitable apparatus with the light receiving portion of a tester squarely opposed to the headlamp according to the distance and method of measurement. The manual measurements shall be done in accordance with test methods specified in annex D and shall agree with the following reference values:

5.5.1 Luminous intensity

a) Four-lamp type

For the main headlamp for driving, the intensity shall be 12 000 cd or above and with a sub headlamp added, the intensity shall be 15 000 cd or above.

b) Other types

For the headlamps for driving, the intensity shall be 15 000 cd or above.

5.5.2 Orientation of main optical axis

The main optical axis shall be properly oriented both in the horizontal and vertical directions.

5.5.3 Pre-set Lights & Oxidation

Headlights should be visibly clear, free from defects, physical damage and oxidation in accordance of 4.5.1 and 4.5.2.

5.6 Horn

With the engine of an automobile stopped, the loudness of its alarm unit (horn) shall meet the following requirements. Measurement shall be conducted in accordance with test method specified in annex E, a microphone set in a position 1.0 m above the ground and at 2.0 m from the front of the vehicle:

a) reference value: within the range 90 dB (A) through 115 dB(A).
b) the sound of an alarm buzzer shall be continuous and of constant volume.

6 Inspection for the operational requirements

6.1 Inspection for engine

The engine shall be inspected visually while observing the following:

6.1.1 The engine shall start, and shall not produce excessive unusual noise or vibration during operation.

6.1.2 No oil leakage or water leakage shall be observed from the main body of the engine.

6.1.3 No cracking, shall be observed in the oil sump, and there shall be no excessive oil leaking from gaskets.

6.2 Exhaust pipe

6.2.1 No damage or cracking shall be permitted in the intake or exhaust manifold.

6.2.2 No cracking or rubber flaking shall be observed in the exhaust pipe and support bracket.

6.2.3 The muffler and the gaskets of the exhaust pipe shall be free from excessive odor, damage, exhaust leakage, noise and smoke.

6.3 Inspection of cooling system

No coolant leakage shall be observed from the radiator or rubber hoses. Where an air-conditioning system is fitted, the refrigerant shall not be chlorofluorocarbons (CFCS).

6.4 Fuel system

6.4.1 The fuel system shall have no visible leakage.

6.4.2 The fuel tank shall be firmly mounted and within a safe distance from the engine or separated by a firewall.

6.5 Transmission system

6.5.1 Clutch

a) There shall be no anomalies in the engagement system of the clutch (e.g. slip, incomplete disengagement, judder and unusual noise) and shall operate smoothly.
b) No oil leakage shall be permitted in the clutch system.
c) A clutch pedal shall be provided with a mechanism to prevent slipping
d) For automatic transmission vehicles, the torque converter shall function properly.

6.5.2 Gearbox

a) The transmission shall be capable of being turned to each shift position with ease in the idling state, and there shall be no excessive play in the shift lever in any shift position.
b) The gears or bearings in the transmission shall not produce unusual noise, and no oil leakage shall be permitted from oil seals.
c) For an automatic transmission car, the indicator reading shall be matched with the actual shift position, and its engine shall not be capable of being started in any position other than the (P) position and neutral (N) position.

6.5.3 Propeller shaft

a) No excessively loose fixing bolt or joint shall be present at the coupling portions in the propeller shaft.
b) The propeller shaft shall not produce run-out or excessive vibration during driving.

6.5.4 Final drive system

The final drive system shall be free from excessive backlash, unusual noise, and oil leakage.

6.5.5 Axle housing

No cracking, or excessive oil leakage shall be permitted in the axle housing.

6.6 Suspension system

6.6.1 No cracking damage, setting, or misalignment shall be permitted in the spring and the clip band. Center bolt or U-bolt shall not be damaged, missing, or loose.

6.6.2 Miscellaneous

a) No excessive play, oil leakage, or gas leakage shall be present at the mounting portions of the shock absorber.
b) The torque rod, radius rod, and their brackets shall be free from deformation and damage such as cracking and mounting portions and coupling portions shall not be loose or damaged.
c) No damaged or loosely mounted upper or lower arm shall be permitted, and the knuckle arm and support arm shall be free from cracking, damage, and bends.
d) The bellows and piping of an air suspension system shall be free from damage, and no air leakage shall be permitted from air piping.

6.7 Warning system

6.7.1 Warning lights

Warning lights shall provide warning on the state of the braking system and shall function favorably and be free from damage.

7 Inspection of axles, wheels, and tyres

7.1 Axles

7.1.1 The axle shall be free from cracking and damage, and the drive shaft shall be free from looseness and backlash.

7.1.2 No nuts or bolts shall be loose or missing in a wheel

7.1.3 The wheel disks, rims, and side rings shall be free from cracking and damage due to excessive corrosion or deformation, and the disks shall be free from excessive run-out.6

7.1.4 Wheel bearings shall be free from excessive backlash, and the drag from the brakes and the preload on bearings shall be correct.

7.2 Steering system

7.2.1 Steering wheel

a) The steering wheel shall be capable of being easily and reliably operated by a driver sitting in the regular position, and the steering wheel shall be mounted without backlash, easy to operate and provided with proper play.
b) There shall be no backlash in the direction of the axis of the steering shaft.
c) The effort required to manipulate the steering wheel shall not be excessively different between the clockwise direction and the counterclockwise direction.

7.2.2 Steering gear box

a) The gearbox shall be mounted without looseness and be free from excessive oil leakage.
b) The sector shaft shall be free from backlash.

7.2.3 Steering linkage

a) The steering linkage shall be free from deformation and damage such as cracking.
b) No loosely mounted parts, excessive backlash, or defective split pins shall be present in any part of the rod arms.
c) There shall be no risk of the wheels coming into contact with the frame, fender, brake hose or any other part during steering.

7.2.4 Power steering/Hydraulic Steering

The power steering/hydraulic system shall be free from oil leakage and looseness in its body or connecting portions and shall operate and function properly.

7.3 Brake system

7.3.1 Brake pedal

a) The height, play, and full depression of the brake pedal shall be correct, and the clearance between it and the floorboard shall not be less than 25% of the overall stroke of the pedal. (For an air brake, the play of its pedal shall not exceed 20 mm).
b) The brake pedal shall be free from backlash in the axial direction, and shall not produce any unusual noise when depressed.
c) The brake pedal shall be provided with a mechanism to prevent slipping or a rubber pad.
d) The brake system shall be free from oil leakage and the ingress of air.

7.3.2 Parking brake

a) The parking brake shall be completely engaged when the brake lever is fully activated.
b) The pulling margin of the brake lever shall not be more than 70% of its overall stroke.
c) The ratchet shall not be worn or damaged.

7.3.3 Brake rods and cables

Any visual damage shall not be allowed.

7.3.4 Brake hose and piping

a) No damaged or loosely installed brake hoses or pipes shall be permitted and there shall be no oil leakage or air leakage from piping or joints.
b) There shall be no risk of a hose or pipe being brought into contact with any other part and no hose or pipe shall show signs of having been in contact with any other part.

7.3.5 Master cylinder and wheel cylinder

The master cylinder and wheel cylinder shall function properly and shall be free from oil leakage, and no bend or damage shall be present in the push rod.

7.3.6 Backing plate

The backing plate shall be free from deformation and distortion and shall not be cracked especially in proximity to anchor pin installation areas.

7.3.7 Air brake

The hoses and pipes, release valve, and brake chamber shall be free from damage and air leakage. The brake chamber and rod shall be free from deformation, and no split pins shall be missing.

7.3.8 Braking servo unit

The servo unit shall function properly and there shall be no liquid or air leakage from the unit or pipe joints.

7.3.9 Rotors, brake pads and liners

Rotors should be free from scaring and rust. The brake pads and liners thickness must meet manufactures specification or should not be less than 3mm.

7.4 Tyres

The tyres shall be inspected visually in accordance to types and sizes while observing the following:

7.4.1 The tread pattern shall not be excessively worn or damaged. The sidewall shall be free from cracking and damage and tread shall not show signs of slipping. A gage shall be used to measure the tread of the tyre.

7.4.2 Tyres shall be free from excessive wear, the minimum tread depth to be no less than 3mm.

7.4.3 Tyres age of acceptance will be in accordance to inspector recommendations for use.

7.4.4 No Snow tyres shall be permitted.

7.5 Front windshield and all other window glass

7.5.1 Front windshield

The windshield shall be made of safety glass and shall be free from any flaws that may limit visibility.

7.6 Lighting devices and reflectors

7.6.1 Colour of lighting

The light from headlamps shall be white and the colour of all headlamps shall be identical.

7.6.2 Brake lights

The light from brake lamps shall be red, and the brake lamps shall be automatically turned on when the main brake system is activated.

7.6.3 Number plate lights

The light from license plate lamps shall be white in colour and the license plate lamps shall be so structured that they are not interlocked with the headlamps or position lamps.

7.6.4 Parking lights

The light from parking lamps shall be red in colour and the parking lamps shall be so structured that they are interlocked with the headlamps or auxiliary headlamps.

7.6.5 Reverse lights

The light from back-up lamps shall be white in colour.

7.6.6 Indicating device

Indicator light lamps shall be installed at the front and rear of an automobile, and shall be positioned bilaterally and symmetrically in pairs, respectively. The light from the indicator lamps shall be orange, and the lights shall flash 60 through 120 times per minute.

7.6.7 Indicator lights

The light from position lamps shall be orange or light yellow and the colour of left and right position lamps shall be identical.

7.6.8 Reflectors

Reflectors used shall be in accordance with requirements specified in The Bahamas.

7.6.9 Function and damage

Lighting devices and reflectors shall function normally and shall be free from damage and/or dirt.

7.7 Devices for ensuring vision

7.7.1 Wipers

The windscreen shall be provided with wipers capable of cleaning the wind screen. The wipers shall function normally, and its blades shall be free from damage.

7.7.2 Rear view mirror

a) The rear-view mirror shall be firmly installed, and its surface shall be free from smudges, distortion and excessive cracking.

b) The rear-view mirror shall be so structured that its orientation can be easily adjusted and maintained.

c) Requirements for rear-view mirror shall apply to other devices used to view the rear of vehicle such as cameras and other sensor devices.

7.8 Warning system

7.8.1 Warning lights

Warning lights shall provide warning on the state of the braking system and shall function favorably and be free from damage.

7.9 Goods - carrying equipment

Goods - carrying equipment shall be capable of carrying goods safely and reliably.

7.10 Frame and vehicle body

7.10.1 Frame

a) The frame of an automobile shall be sufficiently rigid to withstand driving.
b) The frame shall be free from cracking, damage or deformation.
c) No loose rivets shall be permitted at the joints between a side member and a cross member and no cracking shall be observed in proximity to rivet holes.

7.10.2 Vehicle body

a) The vehicle body shall be reliably secured on the frame and shall not be loosened by vibration or impact.
b) The contour and any other shape of the vehicle body shall not contain any sharp projections, protruded rotating parts or any other elements that may interfere with the safe traffic of other vehicles or pedestrians.
c) Any damage including cracking, corrosion or distortion in structural areas, such as pillars, sills and the floorboard, which constitute the fundamentals of a vehicle body shall be remedied.

7.11 Coupling device

7.11.1 The coupling device shall be rigid and so structured that it will provide secure coupling. The coupling device shall not be disconnected due to vibration or impact during driving and shall sufficiently withstand driving.

7.11.2 The coupler of the coupling device shall be installed without looseness, and shall function favorably. The pitching shaft, rolling shaft, and bearings shall be free from wear and damage.

7.11.3 The kingpin of the coupling device for trailers, shall be installed without looseness.

7.11.4 The pintle hook and lunette eye installed on trucks, etc., shall be reliably operable and free from damage.

7.12 Vehicle appearance

7.12.1 Any serious damage to an outer panel shall be remedied.

7.12.2 Any other damage that may interfere with the safe driving of the vehicle shall not be permitted.

7.13 Seating arrangement

For any situation where any vehicle is requested to be altered from factory design, permission must be sought from the licensing authority.

8 Criteria for conformity

Unless otherwise stated, the following information shall be made available:

8.1 Certificate of roadworthiness attesting conformity to the requirements according to clauses 4, 5 and 6 above.

9 License Plate

9.1 License plate must be visible.

9.2 The dimensions of a license plate should be 5 inches thick, 2 inches wide, 3 inches high. The space between top and bottom should be ½ inch apart. The space between letters and numbers should be 1 ½ inches.

Annex A

(normative)

Wheel alignment testing

A.1 Purpose

This annex sets out the assessment of the wheel slip sideways, to be measured while the vehicle is travelling. The unit of scale employed on measuring the slip is generally m/km which is the amount of the wheel slip perpendicular to the direction of travel as the vehicle makes a straight drive for 1 km.

A.2 Apparatus

The tester may be either mechanical or electrical depending on the method by which the amount of movement of the board is detected and transmitted to the indicator. The length of the running board is available in either 500 mm, 800 mm, or 1000 mm.

A.3 Procedure

Before performing the test, make sure that there is no dirt on the board and that the boards and the indicator are functioning properly. Then let the vehicle run straight parallel to the center-line of the tester at 4 km/h and read the maximum amount of slip indicated on the scale, before the front wheels completely pass the boards: Make necessary adjustments to the vehicle wheel alignment if the reading is 5 mm or more or even when less than 5 mm or if the figure is different from the value designated from the given vehicle.

Annex B

(normative)

Brake testing

B.1 Purpose

This annex sets out the assessment of the braking capacity of the vehicle. The widely used testers are roller driven. The rollers rotate with the wheels placed on top of them. The rollers are motor driven supplied in a set of two, one for each wheel. When brakes are applied, a rotation resistance is applied to the roller that creates torque in the direction opposite to the roller rotation.

B.2 Apparatus

There are various types of testing equipment such as the roller gearbox driven type and roller driven worn shaft type.

B.3 Procedures

Turn on the motor and let the rollers run idle to check that they are smoothly rotating. Make sure the needle indicator is adjusted to zero.

Turn off the motor and move the vehicle to place its wheels on top of and perpendicular to the rollers. Make sure that each of the wheels to be measured are firmly supported by two rollers.

Turn on the motor and let the rollers rotate. Before applying the brakes, check the reading on the indicator and make sure there is no drag of brakes. Then slowly step on the brake pedal. Gradually press down the pedal. The wheels will be eventually locked and the reading on the indicator will become constant.

Read the value indicated immediately prior to the locking of the wheels. This value is usually the maximum braking force.

Measure the braking force of both front and rear wheels.

Annex C

(normative)

Exhaust emissions testing

C.1 Purpose

The test is done to measure the volumetric concentrations of CO and HC emissions at idling and not at slightly higher speed and load.

C.2 Apparatus

The apparatus used should be an independent exhaust-gas analyzer unit or part of engine analyzer.

C.3 Procedures

Procedures for calibrating and using exhaust gas analyzers vary with the make and model of testers so emphasis shall be put on careful reading of the instructions for the analyzer.

Make necessary connections (electrical supply etc.), turn on the analyzer, warm the equipment and calibrate the HC and CO meters for zero reading.

Check the system to be sure it is leak free.

To measure the amount of CO, run the engine at fast idle (say 1 500 to 2 000rpm for about 30s), then run the engine at its specified idle speed and read CO on the CO metre.

To measure the HC, run the engine at fast idle (1 500 – 2 000rpm for about 30s), then run the engine at its specified idle speed, then read HC on the HC metre.

For diesel engine, vehicle measurement is done under no load and quickly accelerated and the percentage of smoke is read from the smoke metre or inspection done visually.

Annex D

(normative)

Head light testing

D.1 Purpose

This annex sets out test for determining the luminosity and direction of irradiation (am) of the headlamp manually. The luminosity is expressed in candela (cd) and the direction of irradiation is generally indicated by the amount (in cm or mm) which the main optical axis oscillates at a 10 m distance in the front or as specified by the vehicle manufacturer as to agreed standards.

D.2 Apparatus

There are various types of testers according to the methodology and specifications of measurements. The types of headlight testers are classified into types: screen type, projecting type, and automatic tester (i.e. automatic optic axis tracking testing) type.

D.3 Procedure

The arrangement shall be done as shown in figure D.1. The results shown in figures D.2 and D.3, together with the following general guidelines on handling a headlight tester shall also be observed:

a) air pressure of all the tyres is of standard/specified value;

b) there is no inclination of vehicle body due to damaged springs;

c) the tester and the vehicle are precisely facing each other;

d) the testing floor is flat;

e) the distance between the tester and the vehicle headlamp is accurate;

f) the engine is running, and its battery is being charged while testing;

g) the vehicle should be un-laden with one driver on board.

NOTE - Luminosity refers to the brightness of light source and is expressed in candelas (cd) whereas illumination refers to the brightness of the irradiated surface and is expressed in luxe (Ix).

Figure D.1 Manual headlight aiming screen

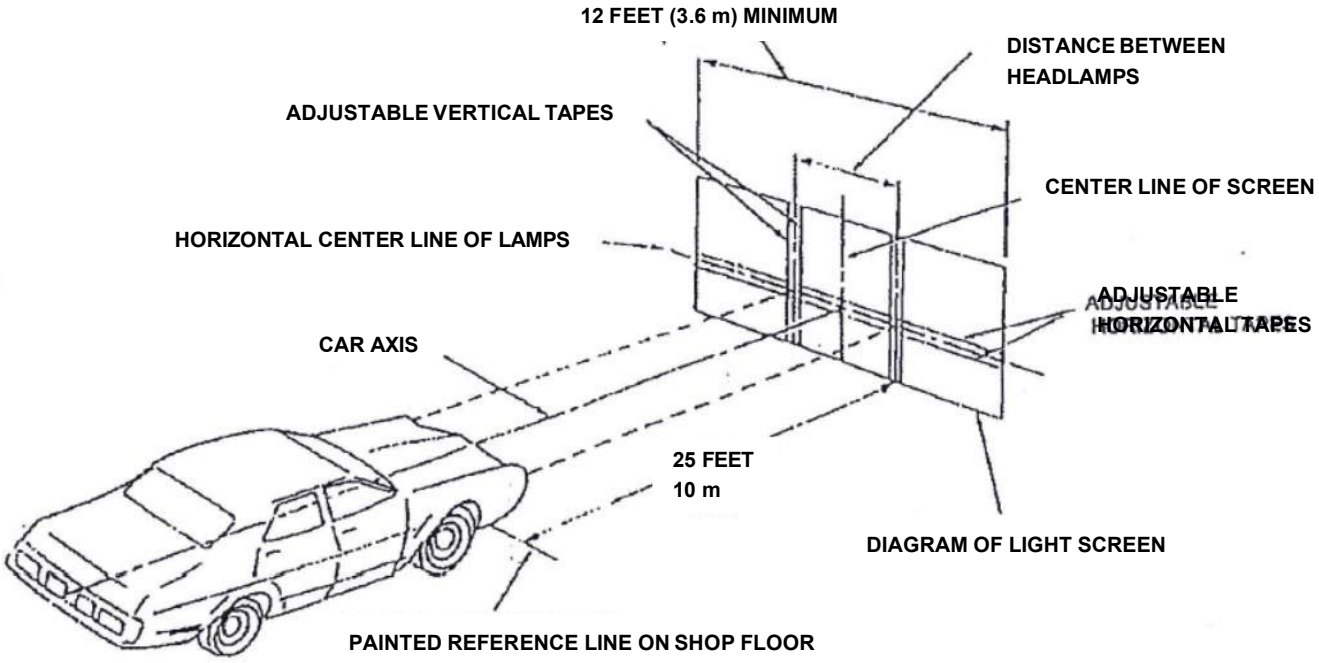


Figure D.2 Irradiating range of headlights

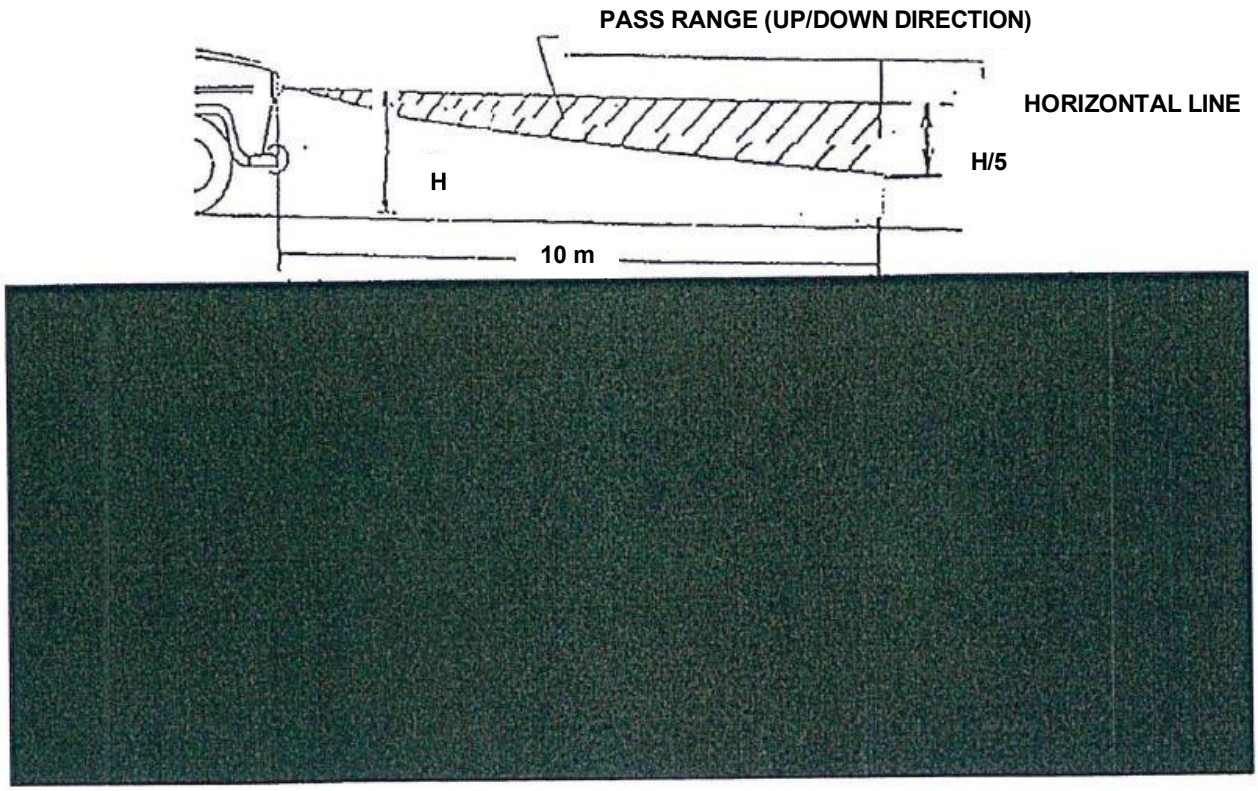
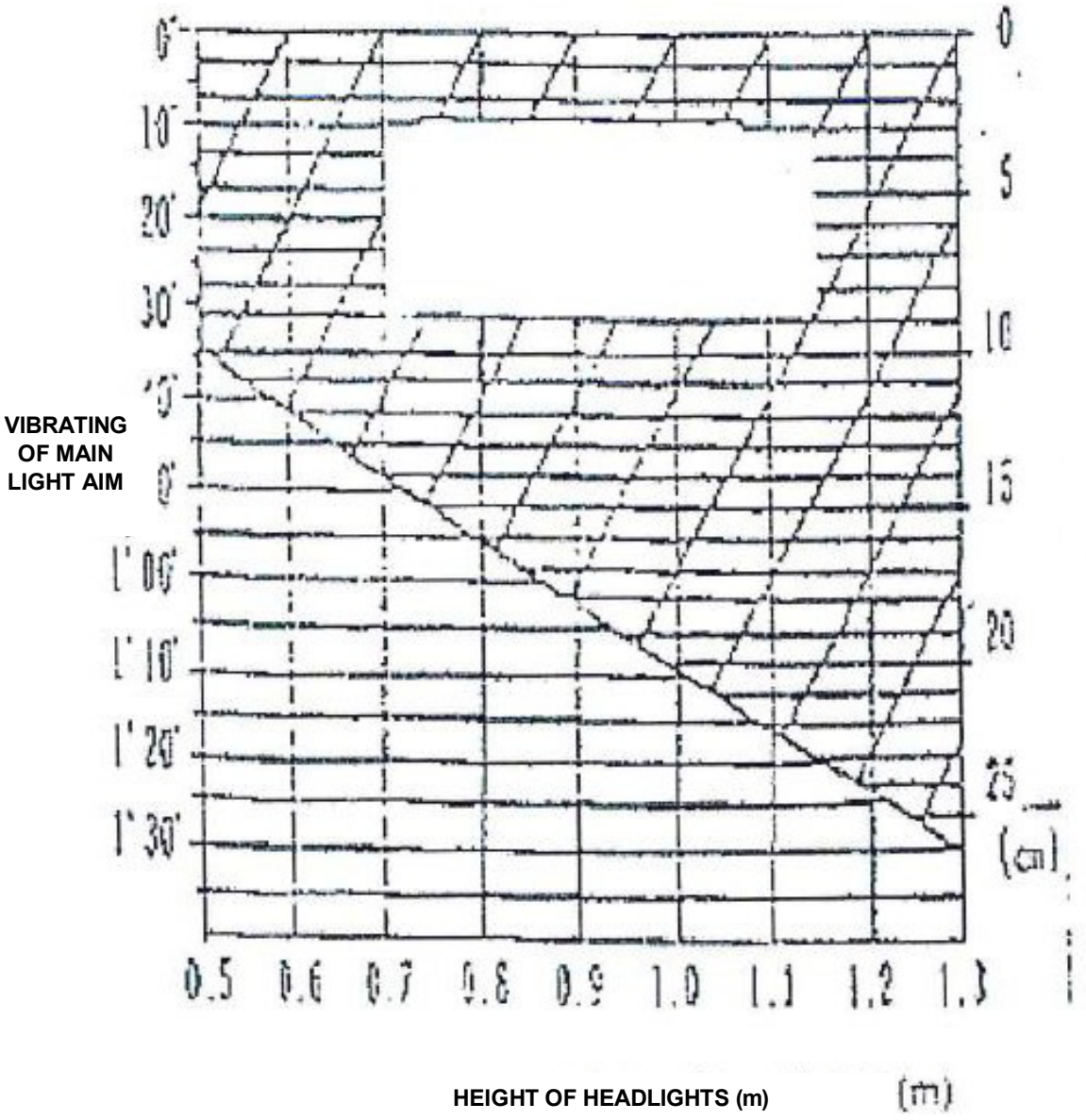


Figure D.3 Upper and lower limits to mounting position of headlight



Annex E

(normative)

Sound level testing

E.1 Purpose

This annex sets out assessment of the levels of noises produced by the vehicle and the sound of its horn. The gauge simulates human auditory perception. The audit level is indicated in dB (A) units.

Also sound can be expressed in many physical quantities other than dB (A) such as in Pascal (Pa) unit of pressure, sound power (watts), intensity (sound/surface) in watts/meter2 or particle speed (m/s).

NOTE-

Sound level dB_a 20 x log *PIP*,

where

P_0 is the lowest audible sound of 20 MPa.

2 $1Pa_a$ $1N/m^2$

$1atm_a$ 10^5Pa

E.2 Apparatus

Apparatus uses microphone that converts sound captioned in electrical current and its level is indicated on the indicator in dB(A).

E.3 Procedures

Calibrate the indicator before use. Follow specific instructions as to the gauge settings and measurements taking. Note the specific settings for measuring of exhaust noises and sound level of the horn, careful noting placement of a gauge to avoid interference of background noises and reflected sounds. Adjust for such noises where such noises cannot be avoided.

Annex F

(normative)

Radiation measurement test

F.1 Purpose

The aim of the test is to measure radiation dose on the surface, interior and on the tyres of motor vehicles when the vehicle is stationary.

F.2 Apparatus

The apparatus or equipment to be used for the measurement should be handheld radiation alert detector such as Geiger Muller (GM) tube, Scintillator counter, Ionization chamber, Semi-conductor survey meter etc. calibrated to an accuracy of± 10 % of the measure ranging from 0.1μSv/h and stop watch.

F.3 Procedures

F.3.1 The equipment for measuring the dose rate should be placed as close as possible to the surface of the measuring point, though it shall not be in contact with the surface.

F.3.2 The measurement should take place in such a manner that the time of measurement is enough for the equipment to stabilize to indicate the dose rate and that both the maximum and minimum value for the respective point are recoded.

To fully calculate and understand the amount of dose radiation at the given point, measure five to ten times and take an average.

Annex G

(normative)

Minimum Equipment Requirements

G.1 Purpose

To ensure standardised and effective inspection equipment and procedures across all facilities. It aims to enhance the accuracy, consistency, and reliability of vehicle inspections, thereby promoting road safety.

G.2 Apparatus

The apparatus or equipment to be used for inspections should include black boards, lift/hoist, or pit or ramp with tyre jack, tachometer, and tread depth gage.

G.3 Requirements

G.3.1 Black boards: 10ft shall be the distance to perform headlights alignment test (lights to wall) and shall be 2-4ft from the ground.

G.3.2 There shall be a lift/hoist, or pit or ramp in conjunction with a tyre jack at each inspection centre/site.

G.3.3 There should be a tachometer to test brake force.

G.3.4 Inspection centres/sites shall use either a tread depth gauge or equivalent measuring device to measure tread depth. The tread depth should be 3mm.

VEHICLE INSPECTION REPORT

Vehicle Reg. Mark_____ V.I.N_____ Yr. of Manufacture_____

Make and Model_____ Color_____ Rec. Miles_____

Engine Size_____

A. INSPECTION ITEM	PASS	FAIL	REASONS FOR FAILURE AND REMARKS
Front Lamps			
Rear Lamps			
Head Laps			
Headlamp Aim			
Stop Lamps/ Number Plate			
Rear Reflectors			
Direction Indicators			
SECTION II			
Steering Controls			
Steering Mechanism			
Power Steering			
Transmission Shafts/Constant Velocity Join			
Stub Axle Assemblies			
Wheel Bearings			
Suspension			
Shock Absorbers			
SECTION III			
Service Brake Performance			
Parking Brake Performance			
Parking Brake Performance			
SECTION IV			
Rim and Tyre Condition			
Spare Condition			
SECTION V			
Horn			
Windscreen Front/Back			
Windscreen Wipers			
SECTION VI			
Exhaust System			
Location of Plate			

All parameters shall have a passing mark for the vehicle to be considered roadworthy.

YOU ARE ADVISED TO KEEP THIS FORM UNTIL THE VEHICLE IS RE-INSPECTED

End of document