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Maximum road speed governors for motor vehicles — Requirements

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In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

Rwanda Standards Board

P.O Box 7099 Kigali-Rwanda

KK 15 Rd, 49

Tel. +250 788303492

Toll Free: 3250

E-mail: info@rsb.gov.rw

Website: www.rsb.gov.rw

ePortal: www.portal.rsb.gov.rw

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 291 was prepared by Technical Committee RSB/TC 23, *Road vehicles.*

In the preparation of this standard, reference was made to the following standard (s):

1) KS 2295-1:2011, *Maximum road speed governors for motor vehicles — Part 1: Performance and installation requirements*

2) KS 2295-2:2011, *Maximum road speed governors for motor vehicles — Part 2: Specification for system and component requirements*

3) IS 14382:1996, *Automotive vehicles — Speed limiters — Specification for installed requirements*

The assistance derived from the above source is hereby acknowledged with thanks.

This second edition cancels and replaces the first edition (RS 291: 2015), [clauses ….] which has been technically revised.

Committee membership

The following organizations were represented on the Technical Committee on *Road vehicles* (RSB/TC 23) in the preparation of this standard.

OXY DELIVER

KENSRIN COMPANY Ltd

CFAO Motors Rwanda

Jendie Automobiles Ltd

UR/RWANDA

Car Tech Solution Ltd.

OXY DELIVER

Jendie Automobiles Ltd

MININFRA

Beno Cars Ltd

BAKODGET Garage

Rwanda Standards Board (RSB) – Secretariat

Maximum road speed governors for motor vehicles — Requirements

1 Scope

This Draft Rwanda Standard specifies requirements for performance and installation of speed governors.

It also specifies requirements for performance of systems and components designed to form part of a speed governor intended to limit the maximum road speed of motor vehicles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold stability*

IEC 60068-2-2, *Environmental testing – Part 2-2: Test – Test B: Dry heat stability*

IEC 60068-2-38, *Environmental testing – Part 2-38: – Test – Test Z/AD: Composite temperature/humidity cyclic test stability*

RS ISO 7637-1, *Road vehicles – Electrical disturbances from conduction and coupling – Part 1: Definitions and general considerations*

RS ISO 7637-2, *Road vehicles – Electrical disturbances from conduction and coupling – Part 2: Electrical transient conduction along supply lines only*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply

3.1

engine

source (or sources) of the vehicle's motive power

3.2

qualified agent

authorized motor vehicle inspector or traffic police officer

3.3

inspection device

piece of equipment that has been designed to test all circuitry and shall be able to detect any interference with the system

3.4

speed governor

device designed to limit the maximum speed of an automotive vehicle by controlling the engine power of that vehicle.

3.5

set speed

intended mean vehicle speed when operating in a stabilized condition. It is marked on the vehicle and used for calibration purposes

3.6

juddering

action of shaking rapidly during the retardation process

3.7

permanent damage

damage sustained by a component or system which renders it inoperative. For the purpose of this definition the rupture of a fuse or the operation of other user serviceable circuit protection devices is not taken to be permanent damage

3.8

normal function

functioning in accordance with the requirements of this standard

3.9

failure to function

functioning outside the requirements of this standard but not suffering any permanent damage

3.10

nominal voltage

voltage of 12 V ± 1 V d.c or 24 V ± 2 V d.c

3.11

Vmax

maximum speed declared by the supplier of the speed limiter at which it is set to meet the requirements of this standard

3.12

Vmin

minimum speed declared by the supplier of the speed limiter at which it is set to meet the requirements of this standard.

4 Requirements

4.1 Requirements for the system

4.1.1 The systems shall be “failsafe” in such a way that if the plug to the electronic controller is removed, power is disconnected or if the speed signal and/or wire is disconnected the vehicle shall automatically, default to a limp mode or the engine shall stall or return to idle and thus shall not be able to be driven in excess of 20 km per hour.

4.1.2 The system shall be able to be verified, authenticated and tested by an authorized agent by means of an electronic device, which can be plugged into a receiver installed in a convenient position on the vehicle, whilst the vehicle is on the road. This device should test all circuitry and shall be able to detect any interference with the system.

4.1.3 The equipment shall monitor the road speed of the vehicle by being integrated to the electronic speedometer signal input, where possible or by the installation of an electro-mechanical speed sensor installed onto the speedometer cable take off at the gearbox or by use of other speed signal method as may be specified by manufacturer.

4.1.4 All cable or harness connectors in the speedometer circuit shall be wired and sealed for certification purposes.

4.1.5 The equipment shall pre-warn the driver, by way of a high frequency buzzer, that the set speed is being reached. This warning shall occur at 5 % prior to the set speed and shall continue buzzing once the set speed is achieved

4.1.6 When the set speed is reached, the speed governor shall temporarily cause the engine to lose power. Engine power shall be reinstated at a speed not less than the pre-warning switch point, which is 5 % below the set speed.

4.1.7 A second (critical) road speed governor set point shall activate a retarder device (where legislated) when this set point is reached. This set point shall be no more than 5 % above the standard set point and shall, automatically, activate the retarder to ensure that the vehicle cannot exceed the preset limit.

4.1.8 The speed governor shall be set in such a way that it shall be tamper proof with (adjust speed) and easy to detect tampering.

4.1.9 All road speed governor's systems shall be checked for accuracy and functionality, at least once per six months, at the time of the motor vehicle inspection. The maximum deviation from the set speed limit shall be not more than ± 3.3 %.

4.1.10 Speed shall be sensed to an accuracy of ± 3.3 % of actual vehicle speed, with the range Vmin to Vmax

4.1.11 The road speed governor system shall be equipped with a system which shall accept an external device for testing the speed governor and verifying its functionality. (we acknowledge that there several devices that may be used to test the functionality of speed governors, then we will need to have guidance from RNP on the approved ones.

4.1.12 the speed limiting device shall be calibrated to a set speed complying with the regulatory requirements.

4.1.13 the speed governor shall be type approved by the competent authority. The speed governors that have been type approved shall not be permitted to modify or redesign unless the validity of type approval has been revalidated.

4.1.14 the manufacturer of the speed governor shall provide manual describing installation, checking and calibration procedures. After installation it should be possible to check the set speed while the vehicle is stationary.

4.1.15 The speed governor shall be suitable for installation in the vehicle and shall be installed in accordance with the installation procedures of the manufacturer. The installation shall be done by technicians approved by competent authority.

4.2 Requirements for speed governors

Speed governors shall meet the following requirements:

a) no effect on the normal operation of vehicle:

1) road speed governor shall allow normal acceleration and full engine power up to the set maximum speed limit when the limitation function comes to play;

2) speed limitation function or road speed governor shall not interfere with the brake system of the vehicle;

3) speed limiting function shall be performed progressively in such a manner that excessive juddering or discomfort is not caused;

4) speed limiting function shall not cause engine back firing;

5) speed limitation function or the road speed governor shall not cause uncontrolled engine power;

6) no malfunction or tempering shall result in increase in engine power above that demanded by the position of the drivers accelerator;

7) speed limitation function shall be obtained once the vehicle speed reaches the set maximum speed regardless of the position action on the accelerator a driver may apply;

8) speed limitation function shall be independent of the condition or soundness of the speedometer

b) compatibility with environmental conditions:

1) speed governor shall be so designed, constructed and assembled so as to resist vibrations, corrosion, dust, humidity and petrochemical emissions;

2) speed limitation function, or the speed limitation device shall operate satisfactorily without unacceptable electromagnetic disturbance from anything in its environment and

3) road speed governor shall be resistant to reverse polarity connections.

c) susceptibility to tampering:

1) limitation threshold shall not, in any case be capable of being increased or removed temporarily on vehicles where the speed limitation device has been fitted;

2) speed limitation function, the road speed governor and the connections necessary for its operation shall be capable of being protected from any unauthorized adjustments or the interruptions of its energy supply by the attachment of sealing devices and/or the need to use special tools;

3) all components necessary for the full function of the limiter shall be energized whenever the vehicle is being driven and

4) road speed governor shall be designed and constructed in such a way that it can be fitted in a place not easily accessible to unauthorized people. To consult RNP on whether it is necessary to clarify where the speed governors shall be located.

d) functionality inspection devices (policing units):

The road speed governor shall have in built features that allow functionality checks and shall have special inspection devices for this purpose to facilitate the checking when the vehicle is not in motion or the speed governor is disconnected. To consult RURA and other relevant institution

NOTE An example of such features is the Global Positioning System GPS.

4.3 Speed recording and storing device

4.3.1 The speed limiting system shall incorporate a mechanism for recording the speed of the vehicle which speed shall be date (day, month and year) and time related, which shall store the data in a non erasable memory and when power supply disconnected shall remain.

4.3.2 The speed shall be recorded in km/h at not more than 5 sec interval

4.3.3 The stored data shall be retrievable and easy to export in a format which is acceptable and type approved by the competent authority.

4.3.4 The file of at least within past 72 h driving time data shall be read only and stored in accordance with 4.3.3.

5 Durability and environmental performance

5.1 System durability

The system, in condition equivalent to new, shall be tested in accordance with Annex A and, after completion of test, shall comply with the manufacturer's specification.

5.2 Time and temperature stability

The system, in condition equivalent to new, shall be tested in accordance with Annex B. During the procedures in clause B.1 to B.7 and B.9 the sensed speed shall not differ from the set speed by more than 3.3 %.

5.3 Electrical power supply

5.3.1 Steady state voltage

The system shall function normally when connected to a power supply in the range (12/24 V) d.c.

5.3.2 Ripple

Normal operation of the system shall not be affected by regular or irregular variations in voltage about the prevailing supply level (excluding transients) not exceeding 3 V (± 2 V d.c.) peak to peak in the range 10 Hz to 10 000 Hz

5.3.3 Reverse polarity

The system shall be reverse polarity protector.

5.3.4 Transients

5.3.4.1 After the set speed is achieved (see fig 1), the following conditions shall be fulfilled:

a) the sensed speed shall not exceed the set speed by more than 5 %,

b) the rate of change of sensed speed shall not exceed 0.5 m/s2, and

c) the stabilized speed conditions specified in 5.3.5 shall be attained within 10 sec of first reaching the set speed

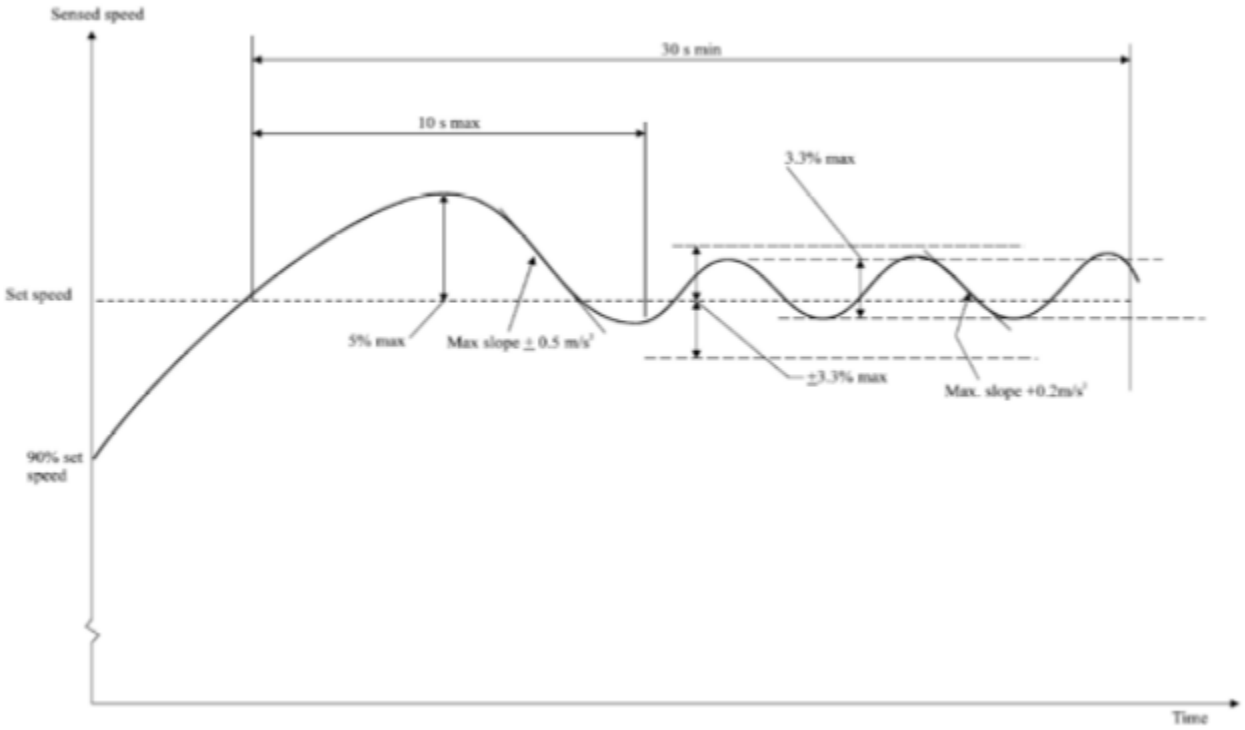

Figure 1 — Allowed tolerances of governor response characteristic

5.3.4.2 Tests for immunity to transients shall be conducted in accordance with ISO 7637-1 for 12 V systems and ISO 7637-2 for 24 V systems. Transient voltage test severity levels are given in Annex C.

5.3.5 Stabilized speed

When stable speed control has been achieved (see fig 1), the following conditions shall be fulfilled:

a) the sensed speed shall not differ from the set speed by more than 3.3 %,and

b) the rate of change of sensed speed shall not exceed 0.2 m/s2.

5.3.6 Input/output protection

Each output/input in turn shall withstand connection to earth for 1 min duration, without permanent damage, with the system operating and shall return to normal function when the connection is removed.

5.3.7 Electromagnetic compatibility

5.3.7.1 Supply line interface

When tested in accordance with relevant approved standards, the system shall operate correctly with 3 V r.m.s. interference, at any frequency in the range 1 MHz to 150 MHz, superimposed on either battery supply line with respect to a reference ground plane

5.3.7.2 Electromagnetic emissions

When tested in accordance with relevant approved standards and with the values of electromagnetic emissions measured on the output port of a 50-W line impedance stabilizing network, the system under test shall not cause interference in the supply line exceeding the value shown in Table 1.

Table 1 — Maximum supply line interference levels

S/N	Frequency band MHz	Measured level relative to 1 microvolt in 50 W (+ dB)
1	0.15 to 0.29	70 level
2	0.30 to 4.90	60 level
3	5.00 to 29	50 level
4	30 to 108	Slope 50 to 30

5.3.7.3 Radio Frequency field susceptibility

When tested in accordance with relevant approved standards, the system shall function normally when subjected to a Radio Frequency field of 140 dB above 1 µV/m (10 V/m) over a frequency range of 1 MHz to 220 MHz

5.4 Environmental protection

For environmental protection, components of the system shall be subjected to tests in accordance with IEC 60068-2-1; IEC 60068-2-2 and 60068-2-38, after each of which they shall continue to function normally.

6 Marking

Each control unit and actual shall be marked with the following in one of the official languages used in Rwanda:

a) name and/or trade mark of the manufacturer;

b) model number;

c) serial number; and

d) country of origin

e) set speed, expressed in km/h, at which the vehicle is calibrated; and

f) calibration date (day, month and year).

Annex A
(normative)

System durability test

A.1 Connect the components of a system in accordance with the manufacturer's instructions and where necessary adjust to simulate maximum load/travel conditions (worst case). Connect a 24 V (12 V) battery with the charge maintained at 28 (14) ± 1 V d.c.

A.2 Activate the system through the following test cycle:

a) drive to a full range travel *(t1);*

b) reverse to zero output *(t2)*

c) drive to mean position *(t3)*

d) control at mean output for $5\times(t1 + t2 + t3)$ and e) reverse to zero out; where t is the time required to complete each individual operation.

A.3 Repeat this test cycle for 250 000 cycles

Annex B
(normative)

Time and temperature stability test

B.1 Connect up the system in a test chamber at 18 0C ± 2 0C to a supply of 28 (14) ±1 V d.c., complete with simulation of components of the loop between the throttle actuator and speed (i.e. engine and transmission) outside of the test chamber.

B.2 Set simulated throttle demand to maximum.

B.3 Adjust the set speed of the system where appropriate.

B.4 Activate the system and the recorder. Throughout the test, B.5 to B.7, record the maximum deviation from the set speed.

B.5 Allow the system to operate for 10 h.

B.6 Reduce the test chamber temperature to 0 0C ± 2 0C. After the temperature of the test chamber has stabilized, operate the systems for further 30 min.

B.7 Increase the test chamber temperature to 60 0C ± 2 0C. After the temperature of the test chamber has stabilized, operate the system for further 30 min.

B.8 Increase the test chamber temperature to 80 0C ± 2 0C. After the temperature of the test chamber has stabilized, operate the system for a further 30 min. The system shall continue to function but accuracy may be degraded.

B.9 Reduce the test chamber temperature to 60 0C ± 2 0C. After the temperature of the test chamber has stabilized, operate the system for further 30 min. Record the maximum deviation from the set speed.

Annex C
(normative)

Transient voltage test severity levels

Table C.1 — Transient voltage test severity levels

Test pulse	Test level	Functional status	Number of pulses or test time	Remarks
1	-150 (-75)	C	5000	
2	+150 (+ 75)	C	5000	
3) a	-150 (-75)	A	1h	
3) b	+150 (+ 75)	A	1h	
4	-12 (-6)	C	5 pulses	1 min between each
5	+180 (+ 80)	C	1 pulse	
NOTE These values are for use in conjunction with ISO 7637-1 or ISO 7637-2 NOTE A is normal function and C is fail but recover				

Annex D
(normative)

Transient voltage test severity levels

D.1 Chassis and cab mounted components

D.1.1 General

Subject the component to be tested, mounted on its normal mount, complete with its ancillary components, to resonance search in all three planes using a sinusoidal wave form under the conditions given in D.1.2 followed by an endurance test under the conditions given in D.1.3.

D.1.2 Resonance search

- Frequency range 10 Hz to 250 Hz
- Input 2 gn
- Sweep time 2 min
- Duration Long enough to establish resonant frequency

D.1.3 Endurance test at resonance frequency

D.1.3.1 If there is resonance, carry out a broad sweep endurance test under the following conditions:

- Frequency range 3 dB below peak for each resonance
- Input 2 gn
- Sweep time 1 Hz/s
- Duration 7.2 h

D.1.3.2 if there is no resonance, carry out a broad sweep endurance test under the following conditions:

- Frequency range 10 Hz to 250 Hz
- Input 2 gn
- Sweep rate 4 Hz/s
- Duration 30 h/plane

D.2 Engine mounted components

D.2.1 General

Subject the component to be tested, mounted on its normal mount, complete with it ancillary components to a resonance search in all three planes using a sinusoidal wave form under the conditions given in D.2.2 followed by an endurance test under the conditions given in D.2.3

D.2.2 Resonance research

- Frequency range 40 Hz to 2 000 Hz
- Input 6 gn
- Sweep time 2 min
- Duration Long enough to establish resonant frequencies

D.2.3 Endurance test at resonance ranges

Frequency range 3 dB below peak for each resonance in the ranges 40 Hz to 200 Hz and 200 Hz to 2 000 Hz

- Input 12gn 6gn
- Sweep time 2 Hz/s 5 Hz/s
- Duration 107 reversals at resonant frequency
- If there is no resonance, carry out a broad sweep endurance test under the following conditions:
- Frequency range 40 Hz to 200 Hz 200 Hz to 2 000 Hz
- Input 12gn 6gn
- Sweep rate 2 Hz/s 5 Hz/s
- Duration 10 h/plane 10 h/plane

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