US 2277-2

~~WORKING~~ DRAFT UGANDA STANDARD

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Road vehicles — Maximum road speed limiters — Part 2: Specification for system and component

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Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to co-ordinate the elaboration of standards and is

(a) a member of International Organisation for Standardisation (ISO) and

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(c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

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Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC *08*, *transport and communication*

WDUS 2277:2020 consists of the following parts, under the general title *Road vehicles — Maximum road speed limiters for motor vehicles*:

- *— Part 1: Performance and installation requirements*
- *— Part 2: Specification for system and component requirements*

Road vehicles — Maximum road speed limiters — Specification for system and component

1 Scope

This Part of Uganda Standard specifies requirements for the performance of systems and components designed to form part of a speed limiter intended to limit the maximum road speed of motor vehicles by control of engine power.

2 Normative references

The following referenced documents 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.

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

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

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

IEC 60068-2-2, *Environmental testing - Part 2-2: Tests - Test B: Dry heat Stability.*

IEC 60068-2-10*, Environmental testing - Part 2-10: Tests - Test J and guidance: Mould growth Stability.*

IEC 60068-2-11, *Environmental testing - Part 2: Tests. Test Ka: Salt mist Stability*

IEC 60068-2-14*, Environmental testing - Part 2-14: Tests - Test N: Change of temperature Stability*

IEC 60068-2-18, *Environmental testing - Part 2-18: Tests - Test R and guidance: Water Stability*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
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

3.2
Normal function
Functioning in accordance with the requirements of Part 1 of this standard

3.3
Failure to function
Functioning outside the requirements of Part 1 of this standard but not suffering any permanent damage

3.4
Nominal voltage
A voltage of 12± 1 V d.c or 24±2 V d.c.

4 Durability and environmental performance

4.1 System durability

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

4.2 Time and temperature stability

The system, in a condition equivalent to new, shall be tested in accordance with Appendix B. During the procedures in B.1 to B.7 and B.9 the sensed speed shall not differ from the set speed by more than 3.2 km/h.

4.3 Electrical power supply

4.3.1 Steady state voltage

4.3.1.1 The system shall function normally when connected to a power supply in the range (12/24V) d.c.
4.3.1.2 The system shall be tested at (5 V and 28 V) d.c., for a period of 10 min at each, with a sweep between these maximum and minimum values. The change from nominal voltage to each extreme and from each extreme to nominal voltage shall take place over a time interval of 10 ms. The system may fail to function but it shall not be permanently damaged and shall return to normal function when the power supply is returned to normal.

4.3.2 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 3V (± 2 Vdc) peak to peak in the range 10 Hz to 10 kHz.

4.3.3 Reverse polarity

The system may fail to function but it shall not be permanently damaged when subjected to a reversal of polarity of the supply referred to in 3.3.1.1 for 1 min and shall return to normal function when the power supply is returned to normal.

4.3.4 Transients.

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 Appendix C

4.3.5 Input/output protection

4.3.5.1 Each output 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.

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

4.3.6 Electromagnetic compatibility

4.3.6.1 Supply line interference.

When tested in accordance with BS 3G 100-4.2:1980 (civil applications), 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.

4.3.6.2 Electromagnetic emissions.

Using the test procedure described in paragraph 4 of DIN 57879 3:1981 and with the values of electromagnetic emissions measured on the output port of a 50 Ohm line impedance stabilizing network using a CISPR quasi-peak measuring receiver (both of which shall meet the requirements of BS 727), the system under test shall not cause interference in the supply line exceeding the values shown in Table 1, or their equivalent if other equipment is used

Table 1 — Maximum supply line interference levels

Type Frequency band MHz [a]	Measured level relative to 1 microvolt in 50 ohm(+ dB)
0.15 to 0.29	70 level
0.30 to 4.90	60 level
5.00 to 29	50 level
30 to 108	Slope 50 to 30

4.3.6.3 RF field susceptibility

When tested in accordance with the procedure described in DEF STAN 59 41, Part 3, Issue 2:1986 (DRSO2 radiated susceptibility) the system shall function normally when subjected to an R F field of 140 dB above 1 µV/m (10 V/m) over a frequency range of 1 MHz to 220 MHz.

4.4 Environmental protection

4.4.1 Components of the system shall be subjected to the following tests, after each of which they shall continue to function normally.

4.4.2 Low temperature storage test in accordance with IEC 60068-2-1 at a temperature of:

a) 0 °C for cab mounted components; b) 0 °C for engine and chassis mounted components. The period for this test shall be 96 h after the component has reached the required temperature. Return the component to 18 ± 2 °C at a rate not exceeding 1 °C/min and test.

4.4.3 Using the component tested under 4.4.2, carry out a high temperature storage test in accordance with IEC 60068-2-2 at temperature of:

a) + 80 °C for cab mounted components;
b) + 140 °C for engine mounted components;
c) + 100 °C for chassis mounted components.
The period for this test shall be 96 h after the component has reached the required temperature
Return the component to 18 ± 2 °C at a rate not exceeding 1 °C/min and test.

4.4.4 Using the component tested under 4.4.3 Carryout a humidity storage test in accordance with IEC 60068-2-38 and test after the drying period.

4.4.5 Using the component tested under 4.4.4 carry out a sinusoidal vibration test as given in Appendix D, and after, test for normal function.

NOTE Additional tests which may also be considered by manufacturers are described in Appendix E.

5 Marking

Each control unit and actuator shall be marked with the following:

a) The number of this Uganda Standard,

b) The name and/or trade mark of the manufacturer;

c) A part number

d) Serial number

e) Country of origin

NOTE Note integrated in the text.

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 a mean position (t3);

d) Control at mean output for 5 × (t1 + t2 + t3);

e) Reverse to zero output; 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 ± 2 °C (see Figure 1) 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 ± 2 °C. After the temperature of the test chamber has stabilized, operate the system for a further 30 min.

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

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

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

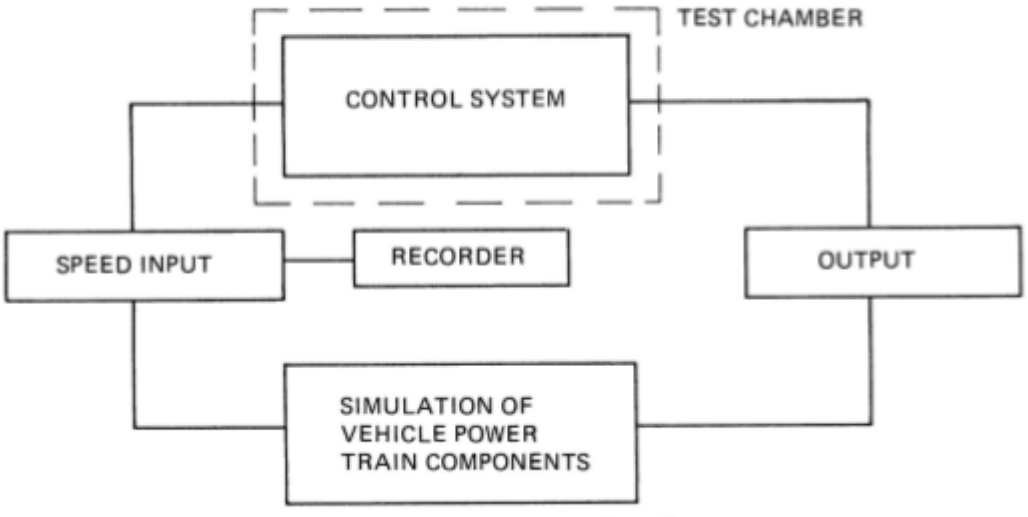

Figure 1 – Test Layout

Annex C
(normative)

Transient voltage test severity levels

Normal function A

Fail but recover C

Table 2 — 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 other
5	+180 (+80)	C	1 pulse	
NOTE These values are for use in conjunction with ISO 7637-1 or ISO 7637-2				

Annex D
(normative)

Sinusoidal vibration test

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 a 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	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	12 gn 6 gn
Sweep time	2 Hz/s 5 Hz/s
duration	10^7 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	12 gn , 6 gn
Sweep time	2 Hz/s , 5 Hz/s
duration	10 h/plane , 10 h/plane

Annex E
(informative)

Additional tests

E.1 General

The tests given in E.2 to E.6 may be considered by system component manufacturers

E.2 Change of temperature (thermal shock)

Mount the component in its normal operating attitude and test in accordance with test Na of IEC 60068-2-14 using the following minimum and maximum temperatures

a) 0 °C to + 65 °C for cab mounted components;

b) –0 °C to + 120 °C for engine mounted components;

c) –0 °C to + 85 °C for chassis mounted components

Subject the component to 20 cycles and use an exposure time at each temperature of 2 h. Return the component to 18 ± 2 °C at a rate not exceeding 1 °C/min and test for normal operation

E.3 Resistance to dust

E.3.1 Locate the component in a box 900 mm cube internally, in its normal operating attitude, on a pedestal raising it 150 mm above the base of the box, and positioned at least 150 mm from any wall of the box.

Introduce on the floor of the box a mixture of 4.5 kg of fine powdered cement complying with KS 18-1/2 and agitate by projecting blasts of air for 2 s pointed in a downward direction in such a way that the mixture is uniformly diffused within the box. Repeat the cycle every 15 min over a period of 5 h.

E.3.2 Conduct the test in accordance with Appendix A for 25 000 cycles and test for normal operation

E.4 Salt mist test

Submit engine and chassis mounted components tested under 4.4.5 to a salt mist test in accordance with IEC 60068-2-11, for a period of 96 h and after test for normal operation.

E.5 Contamination

Mount the component in its normal operating attitude and test in accordance with test Rb of IEC 60068-218 by applying a spray, using the following materials at the temperatures stated:

a) At 20 ± 5 °C:

1) 1,1,1-trichloroethane (BS 580);

2) White spirit (KS 666);

3) Unleaded petrol (KS 2060);

4) Methanol (BS 506-1).

b) At 70 ± 3 °C:

1) Diesel fuel (class A1) (KS 1309-1);

2) Engine oil (KS 1099);

3) auto-gearbox/power steering oil (KS 1507);

4) Manual gearbox/hypoid oil (KS 1507);

5) Grease: lithium soap based;

6) brake/clutch fluid;

7) Hydraulic power brake fluid;

8) Ethylene glycol anti-freeze (50 % solution)

Visually inspect the component for surface deterioration and test for normal operation.

E.6 Driving rain: chassis mounted components

The test chamber shall have the dimensions and 6 nozzle arrangements as shown in Figure 2. Each nozzle includes a jet which shall emit a solid cone spray (a solid cone spray is defined as one where the water within the spray is evenly distributed). Each nozzle shall pass (455 mL/min to 758 mL/min) of water. Mount the component in the test chamber in its normal operating attitude, positioned so that the centre of the unit is approximately 6 in (152 mm) above the centre of the test chamber floor and so that the spray from all the angled jets impinges upon the component. Leave any drain holes open and fit all appropriate electrical leads and grommets. Where applicable, protect mounting and mechanical connections to simulate normal service conditions. Subject the component to continuous water spraying (maximum water temperature 40 °C) for a period of 25 h. Allow the test unit to drain for 1 h.

At the conclusion of the preceding test, test the component for normal operation. The component shall have passed the test unless small globules of water are present in the enclosure in such aggregate quantity as to be detrimental to the life or operation of the component. Materials used for the enclosure, including gaskets, if any shall be unaffected by water

NOTE 1 The component may subsequently be subjected to a prolonged storage and/or endurance test. Any such test requirements should be stated in the product specification.

NOTE 2 A practical evaluation technique is to remove the component after completing the above procedure and whilst maintaining the same mounting attitude, transferring to a low temperature environment to cause water freezing, and then test for normal operation

E.7 Mycological

Test in accordance IEC 60068-2-10 as follows:

Wash the exterior of the component and the spraying equipment with a 2 % solution of liquid detergent, rinse in clean water and thoroughly dry.

Position the component together with any relevant ancilliary equipment in its vehicle attitude with all its connections made, in an environmental chamber for 24 h. maintain the test chamber at a temperature of 32 °C with relative humidity of not less than 95 % without precipitation.

Spray the component with a suitably labeled aqueous solution of fungus spores from the following list. It is sufficient that each part be wetted with solution.

Maintain the component in the environmental conditions detailed above in darkness for a period of 28 days.

Test the component for normal operation.

The following fungus spores are required in aqueous solutions, as specified 2):

a) Aspergillus niger;

b) Aspergillus amstelodami;

c) Paecilomyces variotii;

d) Stachybotrys atra;

e) Chaetomium globsum;

f) Penicillium brevicompactum;

g) Penicillium cyclopium

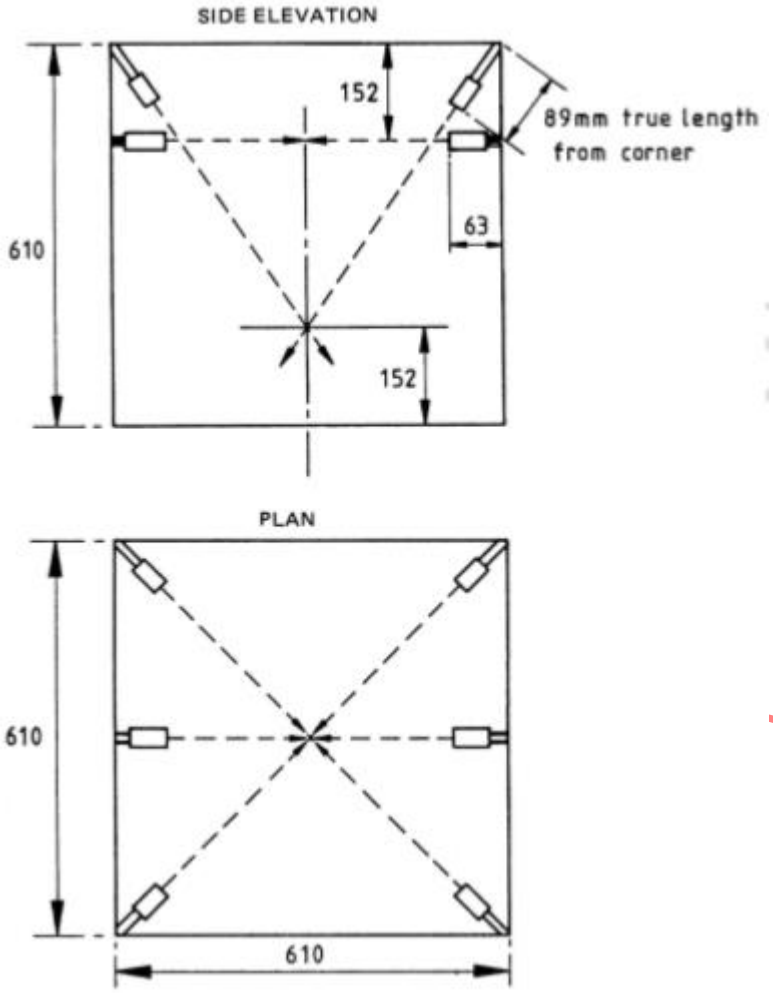

Figure 2 — Driving rain test: test cabinet nozzle arrangement (6 nozzles, 4 angled, 2 horizontal)

Bibliography

[1] BS 506, *Methanol for industrial use.*

[2] BS 506-*1, Specification for methanol.*

[3] BS 580, *Specification for trichloroethylene*

[4] BS 245, *Specification for mineral solvents (white spirit and related hydrocarbon solvents) for paints and other purposes*

[5] BS 3G 100-4, *Specification for general requirements for equipment for use in aircraft - Electrical equipment.*

[6] BS 3G 100-2, *Electromagnetic interference at radio and audio frequencies.*

[7] KS 1586-1, *Specification for radio interference measuring apparatus and measurement methods - Part 1- Radio disturbance and immunity measuring apparatus*

[8] KS 875, *Method of test for rubber vulcanized - Determination of the effect of liquids*

[9] KS 1309-1 *Specification for diesel fuels - Part 1: Automotive gas oil.*

[10] KS 2060, *Specification for unleaded petrol (gasoline) for motor vehicles.*

[11] CD/ENG/17:2009, *Maximum road speed limiters for motor vehicles — Part 1: Specification for installed requirements*

[12] DEF STAN 59-41-3 *(issue 2) Electromagnetic compatibility- DRSO2, Radiated susceptibility.*

[13] DIN 57879:1981-3, *Radio interference suppression for motor vehicles, vehicle equipment and internal combustion engines - Measurements of vehicle equipment*

Certification marking

Products that conform to Uganda standards may be marked with Uganda National Bureau of Standards (UNBS) Certification Mark shown in the figure below.

The use of the UNBS Certification Mark is governed by the Standards Act, and the Regulations made thereunder. This mark can be used only by those licensed under the certification mark scheme operated by the Uganda National Bureau of Standards and in conjunction with the relevant Uganda Standard. The presence of this mark on a product or in relation to a product is an assurance that the goods comply with the requirements of that standard under a system of supervision, control and testing in accordance with the certification mark scheme of the Uganda National Bureau of Standards. UNBS marked products are continually checked by UNBS for conformity to that standard.

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