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Vehicle Standards — Specification for Vehicle Roadworthiness — Part 3: Roadworthiness - Supporting information

Version *[Insert Version Number]*

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Foreword

SADCSTAN (Southern African Development Community Cooperation in Standardization) is mandated by the SADC Council of Ministers to coordinate Standardisation activities and services in the region with the purpose of achieving harmonisation of standards in support of the objectives of the SADC protocol on trade.

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This document was prepared by *[insert name of committee or subcommittee]*.

This *[Insert edition number]* edition cancels and replaces the edition *[Insert edition number]*, which has been technically revised. It also incorporates the Amendments *[Insert edition number(s)]*.

The main changes compared to the previous edition are as follows:

— *[List changes here]*

Foreword (Cont.)

This specification 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

0 Introduction

0.1 Reference to Part 1.

The Foreword and Introduction of Part 1 of this specification are also relevant to this Part 3 which focusses providing information which may be

0.2 Principles in the 6 Parts:

The principles incorporated in the 3 parts of this specification are as follows

Part 1: Covers roadworthiness of vehicles already in service, some being very old, others possibly brand new, and deals mainly with wear and tear and deterioration of the basic parts of vehicles which need to be continually maintained to a reasonable level of safety. Because of the many sources and specifications of new and used vehicles it is necessary to ensure that no requirements are included which could result in failure of some vehicle designs which have been operating safely and successfully for many years.

Part 2: Provision is made in this Part 2 for the subsequent mandatory introduction of design safety standard requirements intended to ensure higher standards of safety for vehicles entering into service in the future and thereafter whenever roadworthiness testing is required.

Part 3: This Part 3 is intended as an advisory publication to throw light on the considerations involved in Parts 1 and 2 and to provide information which may be of assistance to some vehicle examiners.

Part 4: provides criteria and requirements on the selection and knowledge required of a vehicle examiner.

Part 5: provides requirements for testing equipment and testing facilities.

Part 6: provides for inspection of vehicle combinations whether or not any testing facilities or equipment are available.

Vehicle Standards — Specification for Vehicle Roadworthiness — Part 3: Roadworthiness - Supporting information

1 Scope

1.1 Scope of Part 3

This Part 3 of the specification contains information intended to support the vehicle examiner and organizations using other Parts of this specification.

The contents of this Part 3 are not mandatory.

NOTE Additions to this part of the specification are intended to be provided at a later date.

2 Assessment of Compliance –

Discussion of Methods of Assessment of Compliance to Vehicle Design Safety Standards

There are numerous possible approaches to the assessment of compliance to Vehicle Design Safety Standards. The degree of assurance of compliance is directly proportional to the cost and complexity of the method used. The various methods are listed below and their merits and demerits when considered for use in Africa are discussed.

But for the purposes of assessing the likelihood of compliance of imported new or used vehicles to the vehicle safety design requirements in Part 2, Table 5 it is not necessary to delve into the detail of each UN ECE Regulation. This is because one is not actually designing a vehicle or system, one is merely assessing whether the vehicle is likely to have been designed and manufactured to comply with these or similar or equivalent requirements. For example if the vehicle is fitted with a driver and passenger airbag, it is likely to have been approved to comply with a frontal collision test such as UN ECE R 94

Method No 1 – Whole Vehicle Type Approval (WVTA) system applied in Europe requires a test report for each requirement from an acceptable testing authority to be submitted to the Approval Authority and for each manufacturer to have a suitable Quality Management System in force for that product. Other countries operate suitable national approval systems (eg China, India, Japan) but would need further study to see if they would be of assistance.

WVTA is an excellent system which relies on the manufacturer to ensure that he continues to produce exactly what was tested successfully. Unfortunately, the Certifications and Test Reports are normally only released by the manufacturer to a subsidiary or authorised distributor of that brand since they constitute proprietary information which competitors must not see. Furthermore, it would be a logistical nightmare for governments to require private entrepreneurs importing second-hand or new vehicles to attempt to obtain and control such test reports for such a huge variety of brands and models often in relatively low volumes. The documentation for each car model covers 20 to 40 extensive requirements amounting to 200 or 400Mb covering possibly 600 to 800 test reports.

On the other hand, the single WVTA document would be useful as comprehensive evidence of compliance and until recently was only available for light vehicles, but it would not necessarily be released by the manufacturer to private individuals importing new or used vehicles.

So whilst this is probably the most accurate method of proving compliance it will only work if the importers of second hand vehicles are franchised to import specific brands and if they are then given access to the type approval documents and test reports.

Method No 2 – Limit the Sources and the Age - Limit the sourcing of used brands of vehicles to those brands of vehicles previously registered only in countries which have domestic requirements similar or better than those desired by the African recipient country, and which are known to have an effective enforcement regime. Then set an age limit which has been researched to give the desired requirements.

Method No 3 – Limit the Age and mandate visually assessable requirements – This is the preferred approach since limiting the age only may exclude models which are old, but which also embody the desired requirements because they were built to exceed the minimum requirements of the domestic legislation.

This may or may not affect affordability depending on where the age cut-off impacts.

Method No 4 – Limit only the visually assessable requirements – This is better than nothing but is more open to inaccuracies and errors and evasion tactics and to letting undesirable designs through. However, if 2 or 3 visually assessable features appear to indicate compliance then it increases the probability of the vehicle complying with even more of the UN Regulations.

Method No 5 – Limit only by age – This is the simplest and least administrative burdensome approach but is the least effective in weeding out vehicles with undesirable designs and is open to cheating on the date of first registration, especially where the VIN or chassis number does not tie down the date.

Method No 6 – No limitations – Whilst certainly the least administratively burdensome it must be remembered that it will still lead to general upgrading of standards since it will become less viable to bring in cheaper older vehicles as the years go by. Also avoids setting differing age limits for differing categories of vehicles.

Degrees of assurance of compliance. In summary can be categorised as follows:-

- a) Maximum degree of assurance – if test reports from acceptable sources are made available and if test equipment is available locally to re-test in cases of doubt.
- b) Lesser degree of assurance – if the vehicles are received only from countries which are known to apply similar standards to their domestic and export production and if the vehicles are not older than 5 years.
- c) Minimal degree of assurance – if the vehicles and the owner's manuals are inspected visually for some indications that the vehicle is likely to incorporate some or all of the required design safety standard requirements.

General considerations:-

- a) **Maintenance and Design.** Vehicles can be maintained to a reasonably safe condition for 20 years or more. (Cuba?).

So one can argue that setting an age limit does little to provide assurance of receiving a well maintained vehicle. If the objective is to receive vehicles which incorporate later safety technology, then setting an age limit will result in improved occupant safety and improved safety for other road users. Alternatively, simply demand specific vehicle design safety requirements.

- b) **Emissions.** African Clean Mobility Week Conference suggested that after 8 years catalytic converters needed replacement.

Unless one wishes to force expensive replacement of catalytic converters then a 5 year age limit gives little return in emissions control (3 years).

3 Annexures intended to assist vehicle examiners

Annex 1 - Information on UN ECE – United Nations Economic Commission for Europe

Excellent summary of the UN ECE Agreements and activities is given in the so-called “Blue Book” available for downloading at: - www.unece.org/trans/main/wp29/publications/other_vehicles.html

In short the UN ECE stands for the United Nations Economic Commission for Europe within which Working party 29 was formed to address the road traffic safety concerns and to tackle the problems within Europe of diverse state regulations which could disrupt the free flow of commerce across state borders.

These activities of the 1950’s followed the disruption of the 2nd World War at a time when Europe was in the process of reconstructing itself and desirous of trade facilitation and safe and efficient transportation within Europe.

An agreement, commonly known as the 1958 UN ECE Agreement, was entered into amongst several European countries, the effect of which meant that signatories would accept vehicles from any member country provided the vehicles and systems were type approved to the relevant UN EC Regulations.

Since then many countries outside of Europe have become signatories to the 1958 Agreement and have adopted many of the UN EC Regulations, thus facilitating world trade and safer vehicle transportation systems. The workings of the UN ECE WP29 are now fully global.

Note that whilst the UN ECE has focussed amongst other things on Road Transportation, the UN ECA (Economic commission for Africa) has focussed amongst other things on agricultural matters.

At this stage there are now 145 UN EC Regulations applicable to road vehicle safety design, emissions and some other road traffic safety matters with some 54 countries having acceded to the 1958 Agreement. A list is attached below which also shows the “E numeral” which each country is authorised to apply to vehicles and components which for which its government has authorised the type approval.

Annex 2 – E-mark Symbols Allocated to Specific Countries

Table 6: ECE symbols

ECE symbols	Contracting Parties	Date of adhesion
E 1	Germany ¹	28.01.1966
E 2	France	20.06.1959
E 3	Italy	26.04.1963
E 4	Netherlands	29.08.1960
E 5	Sweden	20.06.1959
E 6	Belgium	05.09.1959
E 7	Hungary	02.07.1960
E 8	Czech Republic ³	01.01.1993
E 9	Spain	10.10.1961
E 10	Serbia ¹⁰	12.03.2001
E 11	United Kingdom	16.03.1963
E 12	Austria	11.05.1971
E 13	Luxembourg	12.12.1971
E 14	Switzerland	28.08.1973
E 16	Norway	04.04.1975
E 17	Finland	17.09.1976
E 18	Denmark	20.12.1976
E 19	Romania	21.02.1977
E 20	Poland	13.03.1979
E 21	Portugal	28.03.1980
E 22	Russian Federation	17.02.1987
E 23	Greece	05.12.1992
E 24	Ireland ⁹	24.03.1998
E 25	Croatia ^{5,15}	08.10.1991
E 26	Slovenia ²	25.06.1991
E 27	Slovakia ⁴	01.01.1993
E 28	Belarus	02.07.1995
E 29	Estonia	01.05.1995
E 30	Republic of Moldova	20.11.2016
E 31	Bosnia and Herzegovina ⁶	06.03.1992
E 32	Latvia	18.01.1999
E 34	Bulgaria	21.01.2000
E 35	Kazakhstan	08.01.2011
E 36	Lithuania	29.03.2002
E 37	Turkey	27.02.1996
E 39	Azerbaijan	14.06.2002
E 40	The Former Yugoslav Republic of Macedonia ⁷	17.11.1991
E 42	European Union ⁸	24.03.1998
E 43	Japan	24.11.1998
E 45	Australia	25.04.2000
E 46	Ukraine	30.06.2000
E 47	South Africa	17.06.2001
E 48	New Zealand	26.01.2002
E 49	Cyprus ¹¹	01.05.2004

ECE symbols	Contracting Parties	Date of adhesion
E 50	Malta ¹¹	01.05.2004
E 51	Republic of Korea	31.12.2004
E 52	Malaysia ¹²	04.04.2006
E 53	Thailand ¹³	01.05.2006
E 54	Albania	05.11.2011
E 56	Montenegro ¹⁴	03.06.2006
E 57	San Marino	26.01.2016
E 58	Tunisia	01.01.2008
E 60	Georgia	25.05.2015
E 62	Egypt	03.02.2013

Annex 3 - UN ECE Regulations which this specification proposes may be referenced for compliance are shown below with abbreviated titles:-

Subject	UN ECE Regulation or TTTP Standard
Braking	ECE R13H
	ECE R13
Lighting	ECE R48
Contour tape	ECE R104
Chevrons	SANS/TTTP 1329*4
Safety glass	ECE R43
Rear view	ECE R46
Tyres - passenger	ECE R30
Tyres - commercial	ECE R54
Emissions – Light vehicles	Euro 2
Emissions - Heavy vehicles	Euro 2
Safety belts -	ECE R16
Rear underrun	ECE R58
Speedometer	ECE R39
Audible warning	ECE R28
Warning triangle	ECE R27
Frontal collision	ECE R94
Side impact	ECE R95
Tilt angle	28 Degrees (R107)
Superstructure	ECE R66

Thus a warning triangle which has been Type Approved by the government of Estonia would bear the markings with a serial No XXXXXX “E29 – R27 – XXXXXXXXXXXXX”

A passenger car tyre Type Approved by the government of Tunisia would show “E58 – R30 – YYYYYYYYYY”

Glass Type Approved by the government of Germany would show “E1 – R43 – ZZZZZZZZZZZZ”

Annex 4 – How to obtain copies of UN ECE Regulations free-of-charge

Access to all the UN ECE Regulations and to the activities and discussions of various Groups of Experts , now referred to as Working Groups is via the website below:-

<https://www.unece.org/trans/main/welcwp29.html>

The latest UN ECE Regulations may be downloaded free-of-charge from the above website by clicking on “Vehicle Regulations” then “Agreements and Regulations” then UN Regulations (1958 Agreement)”, then “Regulations (Addenda to the 1958 Agreement)” then select the Regulation number required – eg for UN ECE Reg 43 Glass, select “Regs 41-60” then “43” on the top line, and click on the level required to be downloaded.

There are commonly many revisions, amendments, supplements and corrigenda to each Regulation and the different levels of amendments will normally have been adopted or given force at different dates in the past.

For the purposes of this roadworthiness specification, the levels of the regulations selected for this specification date back a few years so as to ensure that the level which is being specified for compliance would have been achieved, or achievable, on vehicles which are older than 5 years.

All such selected levels of regulations are to be made obtainable free-of-charge from the TTTP HQ, and currently may also be obtained from Mr G Fischer whilst this specification is under development.

NOTE Vehicles and components which meet the selected levels above, or which meet any later levels of UN EC Regulations are acceptable.

Annex 5 – Vehicle category definitions used by UN ECE, EU and several other countries.

Passenger vehicles – Category M.

category M1 motor vehicle, hereinafter referred to as a vehicle is a motor vehicle that is used for the carriage of passengers, that has at least four wheels, and that has seating accommodation for not more than eight passengers in addition to the driver of the vehicle.

category M2 motor vehicle, hereinafter referred to as a vehicle is a motor vehicle that is used for the carriage of passengers, that has at least four wheels, and that has seating accommodation for more than eight passengers in addition to the driver of the vehicle, and that has a maximum mass not exceeding 5 t.

category M3 motor vehicle, hereinafter referred to as a vehicle is a motor vehicle that is used for the carriage of passengers, that has at least four wheels, that has seating accommodation for more than eight passengers in addition to the driver of the vehicle, and that has a maximum mass exceeding 5 t.

Goods vehicles – Category N.

category N motor vehicle is a goods vehicle that has at least four wheels, or that has three wheels and a maximum mass exceeding 1 t

category N1 motor vehicle, hereinafter referred to as a vehicle is a motor vehicle that has a maximum mass not exceeding 3,5 t, that has at least four wheels (or, provided that the maximum mass exceeds 1 t, at least three wheels), and that is used for the carriage of goods

category N2 motor vehicle, hereinafter referred to as a vehicle is a category N vehicle that is used for the carriage of goods and that has a maximum mass of more than 3,5 t but not more than 12 t

category N3 motor vehicle, hereinafter referred to as a vehicle is a category N vehicle that is used for the carriage of goods and that has a maximum mass exceeding 12 t

Mopeds, motorcycles, tricycles, quadrucycles - Category L.

These are mopeds and motorbikes, as well as all-terrain vehicles (quads) and other small vehicles with 3 or 4 wheels.

Within category L, motorbikes are further subdivided into 2 groups (with and without sidecars). There is also a subdivision for mopeds with 3 wheels, which have smaller engines and lower top speeds than motor tricycles

Annex 6 – Vehicle Data Plate – Explanation of information plates (data plates) which show both the manufacturers limits and the legal limits

Many vehicle manufacturers, especially those in Japan, India and China find the following requirements for a vehicle data plate on goods vehicles and on buses to be incomprehensible and unnecessary.

However, member states are requested to consider the system and its benefits to road traffic law enforcers, especially with regard to vehicle overloading and to ensure that manufacturers rated capacities are not exceeded, especially in the case of front tyres.

The essential elements of the labelling system are:-

- 1) To detail the vehicle manufacturer's limits in the left hand column and to detail the applicable legislated limits in the right hand column.
- 2) The applicable legislated limits in the right hand column are the lower of what the national or regional legislation states, and what the manufacturer has stated in the left hand column.

Consider an example of where the legislated limit for the rear axle is 10 000kg and for the front steering axle is 8 000kg. Both the tyre manufacturer and the legislation states that the tyre capacities must not be exceeded. In this case the tyre capacity is 3 875kg per tyre.

Based on this information construct the table below – which will become the data plate information.

Line	Manufacturers Limits in LH Column	Matter to be considered affecting RH column	RH Column must therefore show limiting values of:-
1	Front axle design capacity - 8 000kg	Legally permissible limit of 8 000kg on all steering axles with 2 wheels. Tyre capacity is 3 875kg	7 750kg
2	Rear axle design capacity - 11 000kg	Legally permissible on rear axle with 4 wheels is 10 000kg and the dual tyres can carry 14 600kg	10 000kg
3	Vehicle design capacity - GVM - 18 500kg	The least of the sum of the front and rear axle = 17 750kg & the GVM 18 500kg	17 750kg

Line	Manufacturers Limits in LH Column	Matter to be considered affecting RH column	RH Column must therefore show limiting values of:-
4	Vehicle in combination with a trailer – 24 000kg	It may be limited by its power mass ratio or by the minimum mass on the driving axle or by bridge formula or by the limit of 56 000kg or by parking brake performance.	24 000kg

Explanation for Line 1) – Although the front axle is designed to be able to carry 8 000kg it has tyres which are limited to a carrying capacity of 7 750kg.

Explanation for Line 2) – The rear axle is designed to carry 11 000kg and its tyres can carry 14 600kg, but the legislation limits the maximum rear axle load to 10 000kg and so its legally permissible axle load is the lowest of the three, being 10 000kg.

Explanation for Line 3) – The vehicle has a design capacity of 18 500kg and has a brake test report to UN Reg 13 to support this capacity. But legally we have shown it may only carry 7 750kg on the front axle and 10 000kg on the rear axle and so its legally permissible vehicle maximum may not exceed 10 000kg + 7 750kg = 17 750kg.

Explanation for Line 4) – The manufacturer’s GCM rating of 24 000kg implies it could tow a trailer of actual maximum mass (24 000kg minus 17 750 kg) = 6 250kg in a case where the drawing vehicle is laden to its maximum load i.e. to its GVM of 17 750kg. However in cases where the drawing vehicle is not fully laden to its maximum load then the trailer GVM can be increased provided the total mass of both vehicles does not exceed 24 000kg.

Explanation for tyre capacities – The tyres the Load Index of 155 / 153 on the sidewall (see Annex 8). The 155 refers to their use as “singles” with a load capacity of 3 875kg per tyre and the 153 refers to their use a “duals” with a load capacity of 3 650kg per tyre.

(Definition of gross combination mass is “the maximum mass of any combination of vehicles.....” (Note that it is not defined as the sum of the GVM’s of the drawing vehicle and trailer)

So the data plate for the above vehicle would be as follows:-

Manufactured by	
Made in	Model No
VIN	
Tare: abcd kg	Power: 180 kW
GVM: 18 500	V: 17 750
GCM: 24 000	D/T: 24 000

GA Fr: 8 000	A Fr: 7 750
GA Rr:11 000	A Rr: 10 000

In the event that the front tyres had a load index of 151 then the maximum tyre load would be 3 450kg and the data plate would show the following information:-

Manufactured by	
Made in	Made in
VIN	
Tare: abcd kg	Power: 180 kW
GVM: 18 500	V: 16 900
GCM: 24 000	D/T: 24 000
GA Fr: 8 000	A Fr: 6 900
GA Rr:11 000	A Rr: 10 000

Notes on layout of information on the above data plate or data label for a heavy vehicle:-

- The left hand column is what the manufacturer states as technically permissible.
- The right hand column are the values which are the lowest of the technically permissible in the left hand column and of the legally permissible in that country.
- For passenger cars and light goods vehicle (pick-ups) only the right hand column need be shown on the data plate or data label and the tare need not be shown.
- Under the SI system, it is protocol to use capital letters only where the name of the inventor is used eg: - Nm for Newton metres. kW for kilowatts. mA for milliAmpere and so on. All other abbreviations are in lower case.
- If the vehicle is not authorised by the manufacturer to draw a trailer then the GCM value may be shown as a blank, or as "N/A", or sometimes shown as being the same value as the GVM.

In the case of passenger cars and light goods vehicles, if the sequence of GVM, then GCM, then Front Axle, then Rear axle is used there is no need for any other data.

For example the following details are all that is required for a passenger car or light goods vehicle where only the name of the manufacturer, the 17 character VIN and the GVM, GCM, Front axle rating, Rear axle rating are needed to be shown.

In this example below the VIN is ABCRR123456789999; the GVM is 2 670kg; the GCM is not applicable in that the vehicle manufacturer does not approve the vehicle for towing any trailer; the front axle capacity is 1 330kg and the rear axle capacity is 1 460kg.

So long as the sequence of information is GVM, GCM, Front axle, Rear axle then no other abbreviations or descriptions are required.

Car Manufacturer Brand
ABCRR123456789999
2670 kg
N/A kg
1330 kg
1460 kg

Annex 7 – Considerations of Front Reflectors according to UN ECE Regulation 48

In the 1950s and 1960s several countries continued to require front retroreflectors on vehicles but this requirement has gradually been deleted on the grounds that:-

- a) The reflectivity needed at the front of a vehicle was considered to be almost unnecessary, whereas that for the rear was considered to be a vital safety measure.
- b) The reflectivity provided by the headlight reflectors was considered to be sufficient for the relatively fewer conditions where it might be advantageous.
- c) Under UN ECE Regulation 48 front reflectors (Reg 48 Item 6.16) are now mandatory only on trailers and on vehicles having all concealable forward facing lamps with reflectors concealable.
- d) Even parking lamps (Reg 48 Item 6.12) are optional on vehicles less than 6m long and 2m wide and are prohibited on all other vehicles.
- e) Front position lamps (Reg 48 Item 6.9) are still mandatory on all vehicles except trailers less than 1600mm wide.)

Annex 8 – Tyre load index markings

Table 2: Tyre Load Index Markings

L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg
0	45	40	140	80	450	120	1400	160	4500	200	14000	240	45000

L.I.	kg		L.I.	kg		L.I.	kg		L.I.	kg		L.I.	kg		L.I.	kg
1	46.2		41	145		81	462		121	1450		161	4625		201	14500
2	47.5		42	150		82	475		122	1500		162	4750		202	15000
3	48.3		43	155		83	487		123	1550		163	4875		203	15500
4	50		44	160		84	500		124	1600		164	5000		204	16000
5	51.5		45	165		85	515		125	1650		165	5150		205	16500
6	53		46	170		86	530		126	1700		166	5300		206	17000
7	54.5		47	175		87	545		127	1750		167	5450		207	17500
8	56		48	180		88	560		128	1800		168	5600		208	18000
9	58		49	185		89	580		129	1850		169	5800		209	18500
10	60		50	190		90	600		130	1900		173	6000		210	19000
11	61.5		51	195		91	615		131	1950		171	6150		211	19500
12	63		52	200		92	630		132	2000		172	6300		212	20000
13	65		53	206		93	650		133	2060		173	6500		213	20600
14	67		54	212		94	670		134	2120		174	6700		214	21200
15	69		55	218		95	690		135	2180		175	6900		215	21800
16	71		56	224		96	710		136	2240		176	7100		216	22400
17	73		57	230		97	730		137	2300		177	7300		217	23000
18	75		58	236		98	750		138	2360		178	7500		218	23600
19	77.5		59	243		99	775		139	2430		179	7750		219	24300
20	80		60	250		100	800		140	2500		180	8000		220	25000
21	82.5		61	257		101	825		141	2575		181	8250		221	25750
22	85		62	265		102	850		142	2650		182	8500		222	26500
23	87.5		63	272		103	875		143	2725		183	8750		223	27250
24	90		64	280		104	900		144	2800		184	9000		224	28000
25	92.5		65	290		105	925		145	2900		185	9250		225	29000
26	95		66	300		106	950		146	3000		186	9500		226	30000
27	97.5		67	307		107	975		147	3075		187	9750		227	30750

L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg	L.I.	kg
28	100	68	315	108	1000	148	3150	188	10000	228	31500	268	100000
29	103	69	325	109	1030	149	3250	189	10300	229	32500	269	103000
30	106	70	335	110	1060	150	3350	190	10600	230	33500	270	106000
31	109	71	345	111	1090	151	3450	191	10900	231	34500	271	109000
32	112	72	355	112	1120	152	3550	192	11200	232	35500	272	112000
33	115	73	365	113	1150	153	3650	193	11500	233	36500	273	115000
34	118	74	375	114	1180	154	3750	194	11800	234	37500	274	118000
35	121	75	387	115	1215	155	3875	195	12150	235	38750	275	121000
36	125	76	400	116	1250	156	4000	196	12500	236	40000	276	125000
37	128	77	412	117	1285	157	4125	197	12850	237	41250	277	128500
38	132	78	425	118	1320	158	4250	198	13200	238	42500	278	132000
39	136	79	437	119	1360	159	4375	199	13600	239	43750	279	136000

Explanation of Load Index Markings.

A tyre which is marked "11 R 22.5" has an 11 inch section, is of R = radial construction, and has a Rim Diameter of 22.5 inches.

The markings after this size are normally 148 M, i.e. 11 R 22.5 148 M. The 148 in the Table above means its maximum load is 3150kg.

A tyre which is marked "295/80 R 22.5 154M" has a 295 section, is of a low profile design (section height = 80% of section width), is of R=Radial construction, and has a rim diameter of 22.5 inches and a maximum load of 3750kg. In cases where two numbers are shown such as "295/80 R 22,5 154/150M" this means when used as singles the maximum load is 3750kg but when used as duals the maximum load is reduced to 3350kg. Speed ratings in both cases are designated by the "M" which means maximum safe speed of 130km/h.

A passenger car tyre marked "205/55 R16 91H" has a 205mm section is of low profile design (section height = 55% of section width), is of radial construction, and has a rim diameter of 16 inches and a maximum load of 615kg and a speed rating of H = 210km/h.

Annex 9 – Tyre Speed Index Ratings.

As detailed in Table 2 a tyre with sidewall markings "205/55 R16 91H" means this tyre has a 205mm section, is of low profile design (section height is 55% of section width), is of radial construction, has a rime diameter of 16 inches and a maximum load of 615kg. The last letter "H" signifies a maximum safe speed of 210km/h.

The various letter designations for maximum safe speeds are given below:-

Table 3: Tyre Speed Index Ratings

Speed Symbol	Speed Category (km/h)	Speed Symbol	Speed Category (km/h)
A1	5	J or JR	100
A2	10	K or KR	110
A3	15	L or LR	120
A4	20	M or MR	130
A5	25	N or NR	140
A6	30	P or PR	150
A7	35	Q or QR	160
A8	40	R or RR	170
B	50	S or SR	185
C or CR	60	T or TR	190
D	65	U or UR	200
E or ER	70	H or HR	210
F	80	V	240
G or GR	90	VR	Over 210
		ZR	Over 240
		W	Over 270

Annex 10 – Field of vision at ground level from the rearview mirrors.

For simplicity and practicability purposes the roadworthiness compliance checks in Part 1 are prescribed only for Class II and Class III exterior mirrors and are detailed in Part 1, Section 5.6d) requiring the driver to be able to see on each side of the vehicle marks on the ground positioned 4m behind the driver and 1m away from the side of the vehicle, and 20m behind the driver and 3,5m away from the side of the vehicle.

For information and for compliance to UN Regulation 36 purposes the following mandatory rules apply, but differ from one country to another.

Passenger cars (M1) and light goods vehicles (N1) may have Class II or Class III exterior mirrors.

Bus categories M2 and M3 must have Class II exterior mirrors and Class IV, V and VI are optional.

Goods vehicles N2 < 7,5t, N2 > 7,5t have slightly differing requirements.

Goods vehicles N3 must have Class II, IV, V and VI

The following diagrams show the field of vision which the various types of mirrors must provide in terms of UN ECE Regulation 36. But it is vital to note that assessment to the requirements below is done in a very precise manner requiring a mannequin with lights for its eyes at a specified position, with the mannequin placed on the driver's seat according to a specified procedure, the vehicle loaded as specified

and the image captured on a screen positioned behind the vehicle. The mannequin's eyes (ocular points), head and body may not be moved during the test.

The diagrams below are shown with the ocular points positioned for LHD vehicles but can be transposed for RHD vehicles without any change to the dimensions.

Class I Mirror – Interior mirror if not obscured by body or load

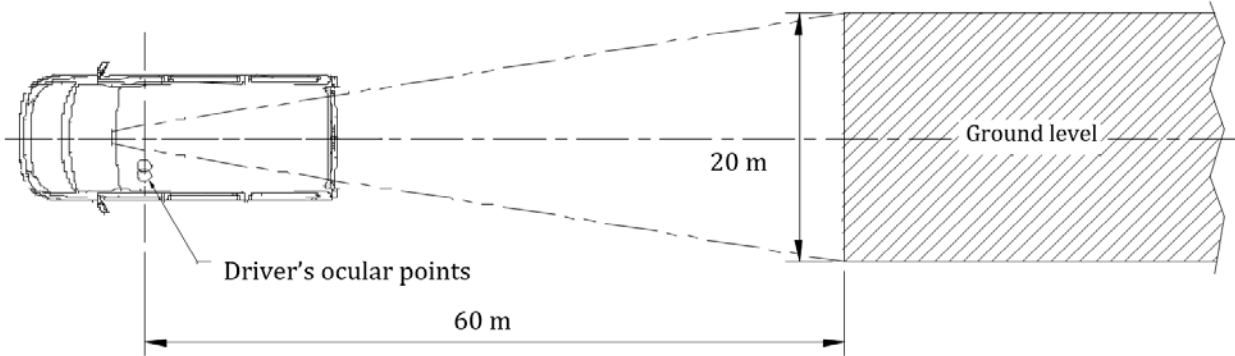


Figure 1: LHD Class I Mirror

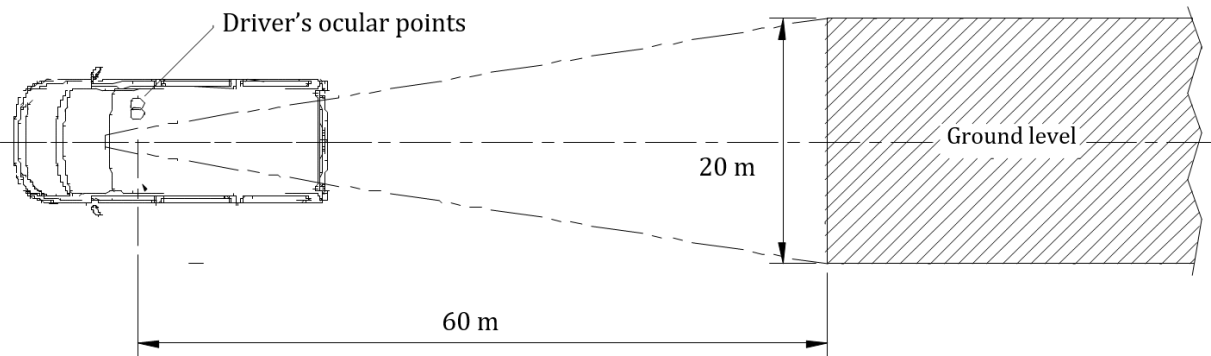


Figure 2: RHD Class I Mirror

Class II Exterior mirrors

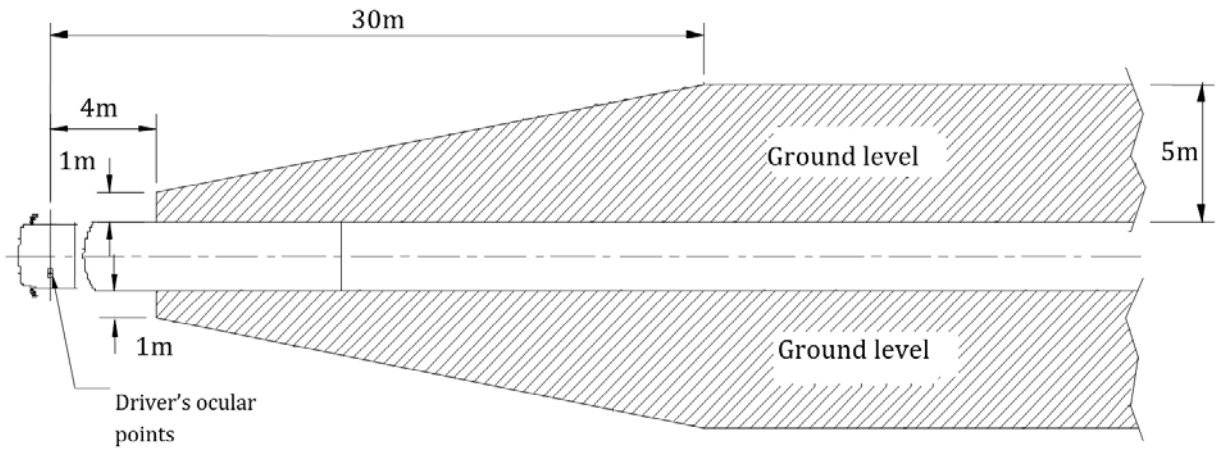


Figure 3: LHD Class II Exterior Mirrors

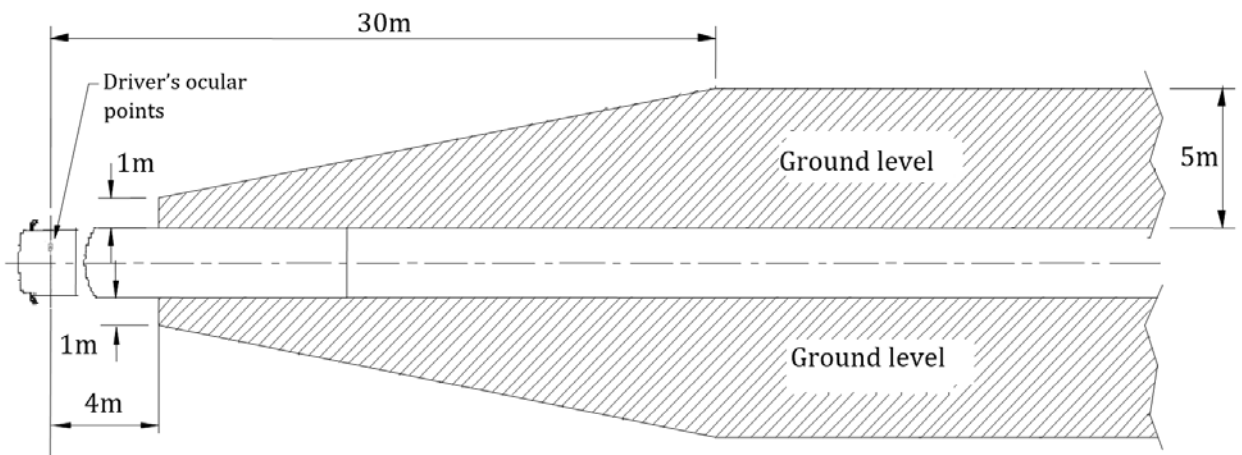


Figure 4: RHD Class II Exterior Mirrors

Class III Mirrors

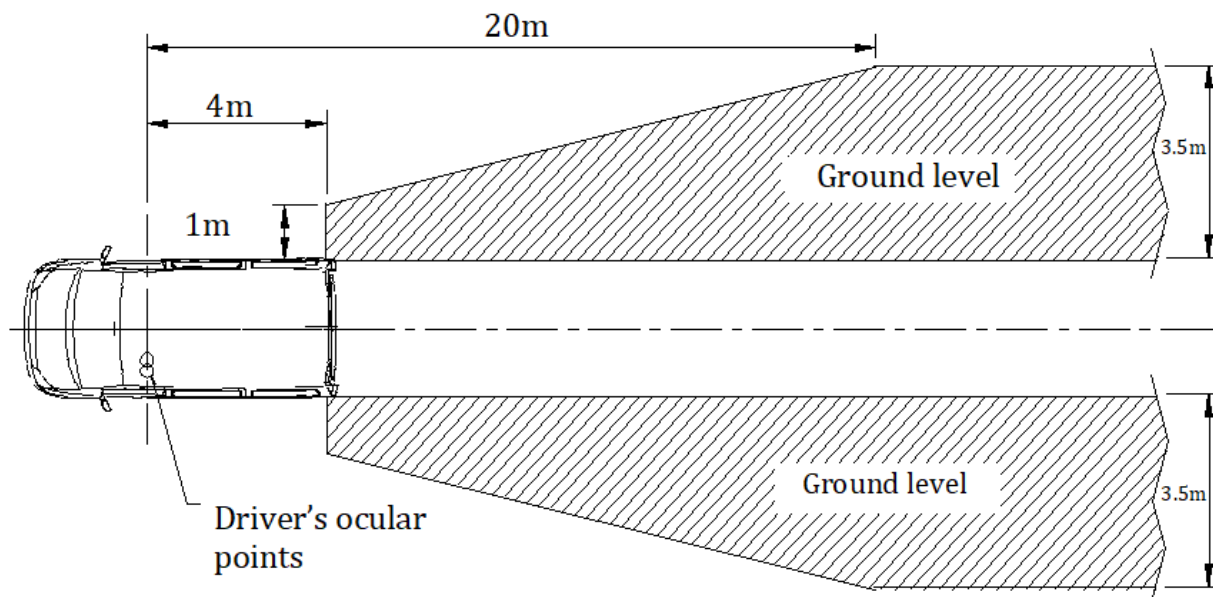


Figure 5: LHD Class III Mirrors

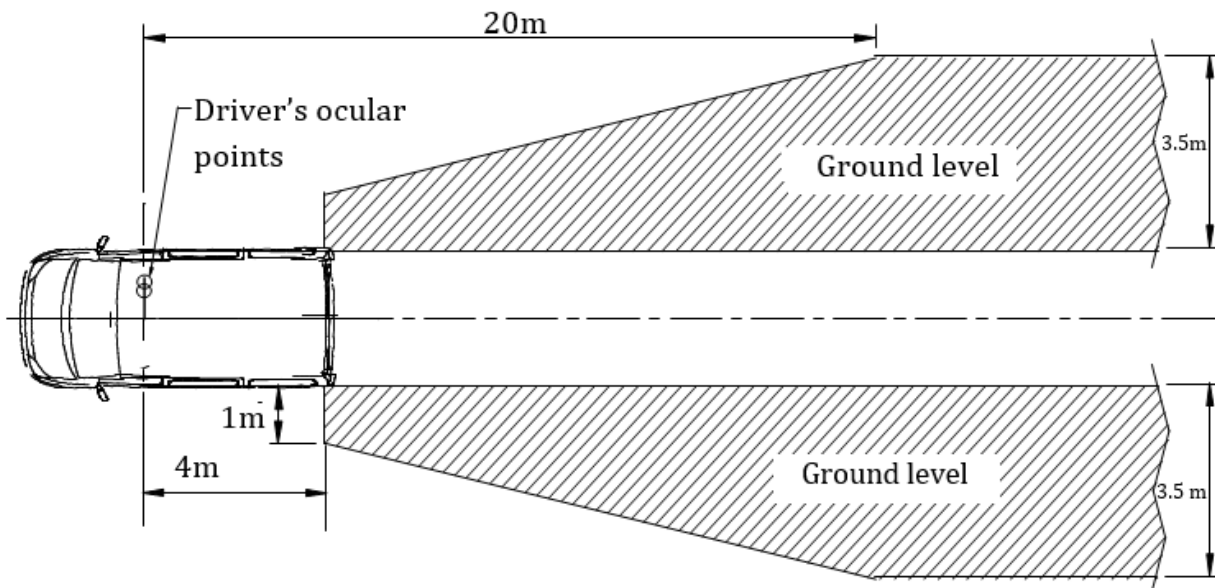


Figure 6: RHD Class III Mirrors

Class IV Mirrors - Wide angle mirrors

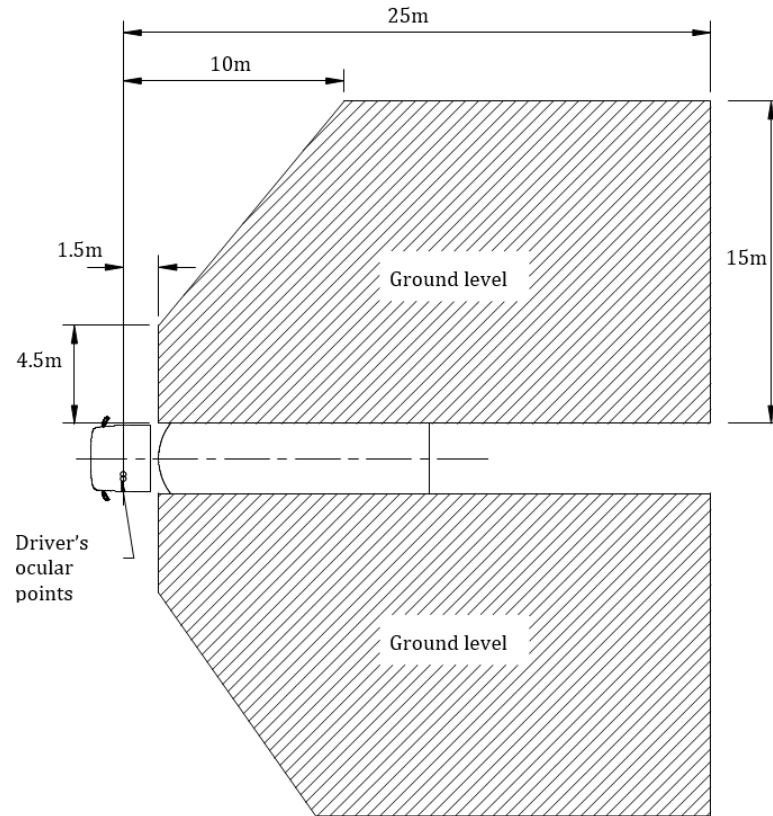


Figure 7: LHD Class IV Mirrors

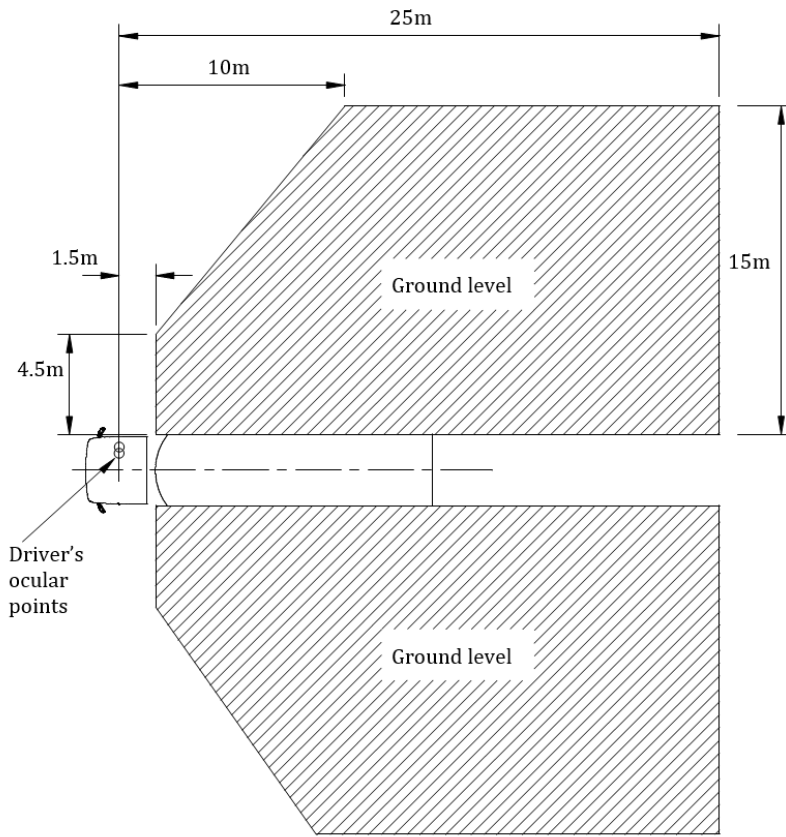


Figure 8: RHD Class IV Mirrors

Class V Mirrors – Close proximity mirrors - image 1

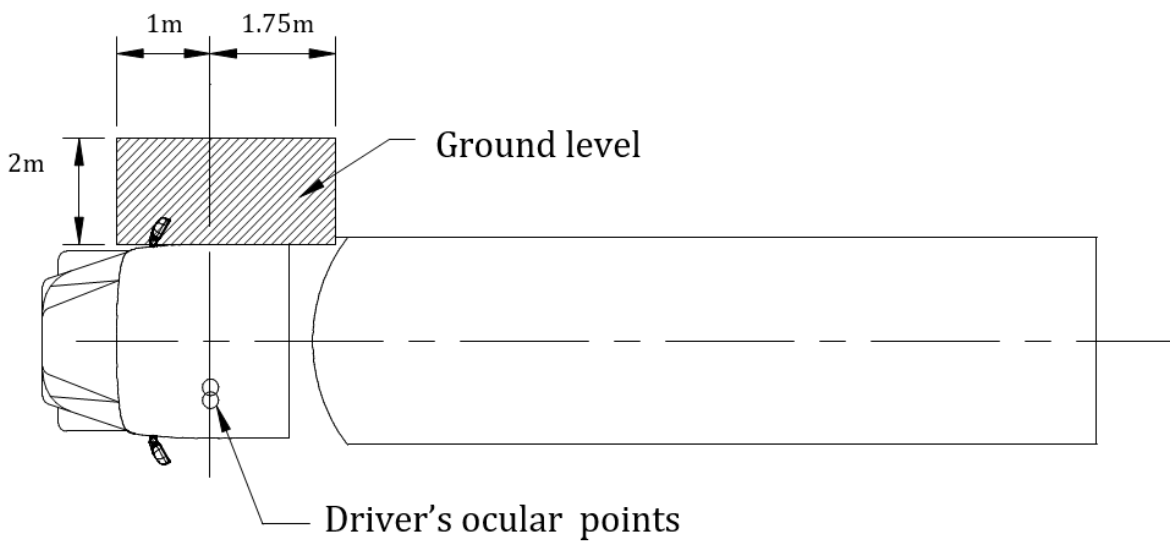


Figure 9: LHD Class V Mirrors

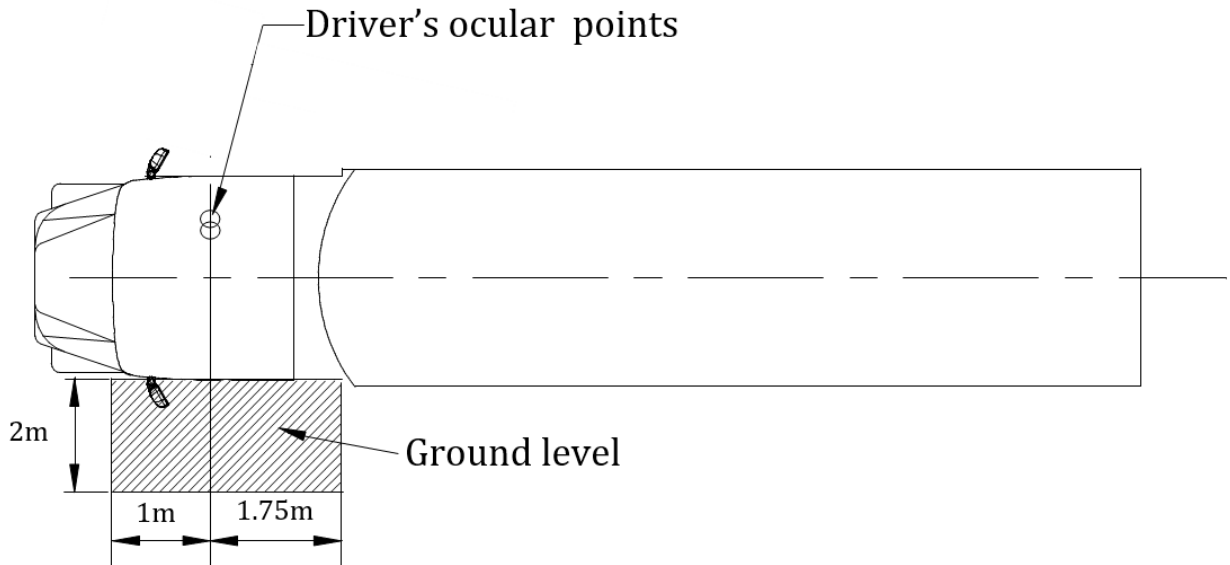


Figure 10: RHD Class V Mirrors

Class V Mirrors - Close proximity mirrors - image 2

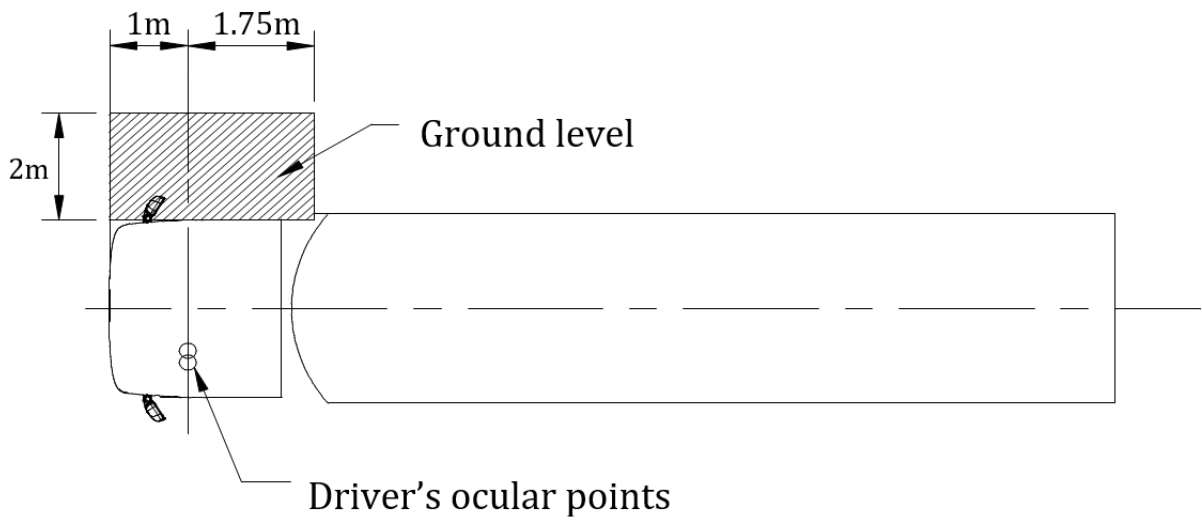


Figure 11: LHD Class V Mirrors

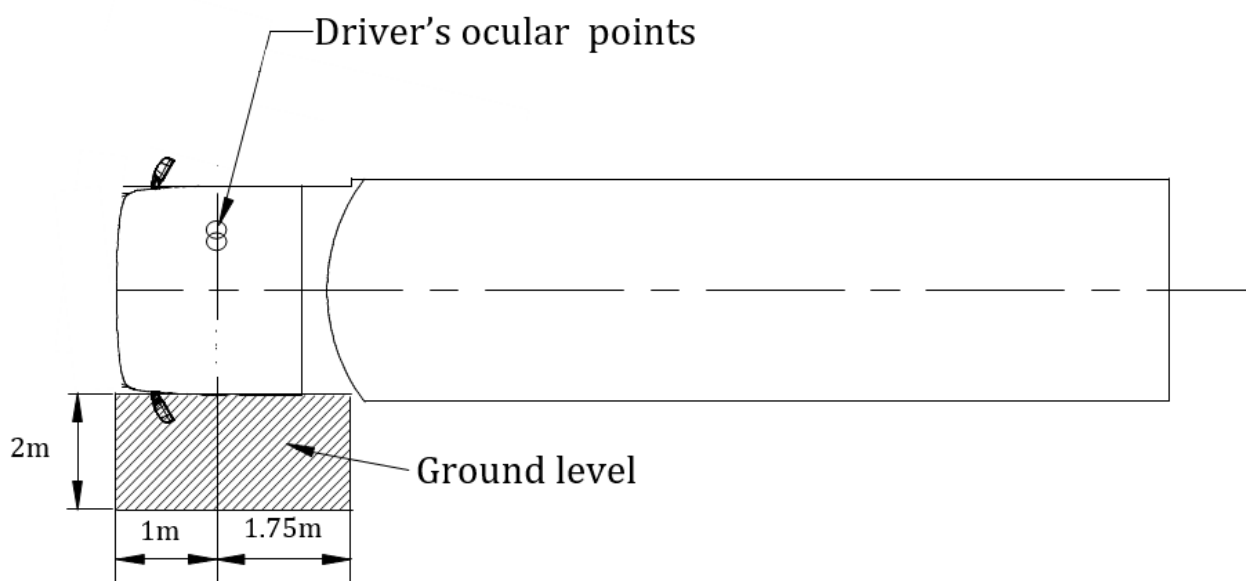


Figure 12: RHD Class V Mirrors

Class VI Mirrors – Front mirrors

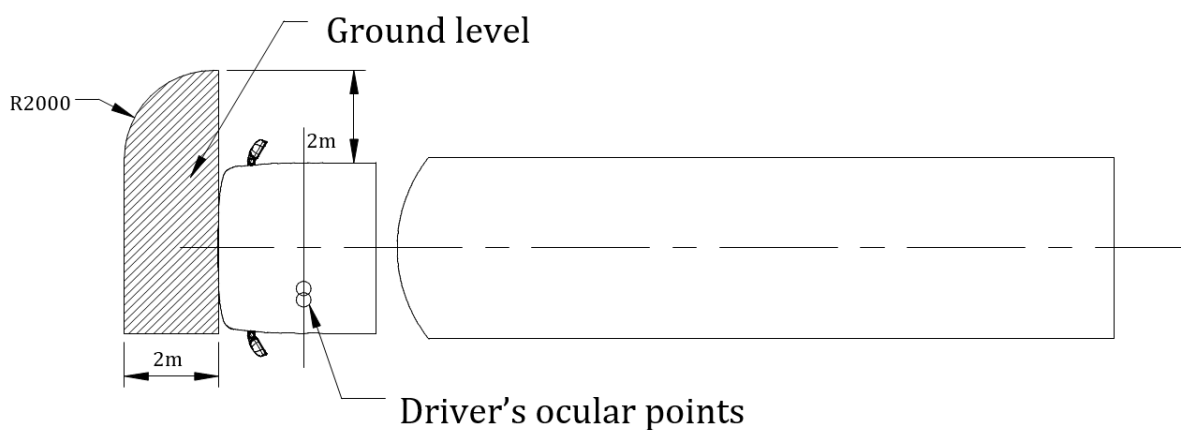


Figure 13: LHD Class VI Mirrors

Section N - MOT Testing Service Contingency Procedures

Appendix 1 - MOT Managers Training

Appendix 2 - Facilities and Security

Appendix 3 - Grounds for Refusal to Carry Out a Test

Appendix 4 - Liability for Loss or Damage

Appendix 5 - Tester Qualifications

Appendix 6 - Tester Training & Demonstration Tests

Appendix 7 - Not in use

Appendix 8 - Disciplinary Points

Appendix 8.1 - Cessation Without Previous Warning (Single Offence Cessation)

Appendix 8.2 - Incorrect Test Standards

Appendix 8.3 - Incorrect Test Methods

Appendix 8.4 - Incorrect Operation of Testing Scheme

Appendix 8.5 - Credits

Appendix 8.6 - Normal Sanction Level - Testers

Appendix 8.7 - Normal Sanction Level - Authorised Examiner

Appendix 8.8 - Informal Hearings

Appendix 8.9 - Major and Minor Demonstration Test Errors

Appendix 9 - Contact Points

Appendix 10 - Change table

Annex 12 – Approval of testing equipment

Further extremely useful UK website is <https://www.gov.uk/become-an-mot-station/approved-testing-equipment> which enables interested parties to establish which makes and types of testing equipment have been approved by the UK Authorities. For example the 15 approved makes of brake roller testers valid as at 01 June 2018 can be viewed at <https://www.gea.co.uk/document-category/dvsa-acceptable-equipment/> then click on “List-ATF-Roller Brake Tester” and download the .pdf file.

Note that ATF means acceptable for use in HGV/PSV Authorised Testing Facilities, whereas MoT test information generally relates to light vehicles.

Annex 13 – Screen method for assessment of dipped beam

In cases where headlamp beam testing equipment is not available the following method may be of assistance.

The criteria is that the dipped beam must slant downwards. If the dipped beam is level or slanting upwards it will dazzle oncoming traffic. If the dipped beam is slanting downwards too much then the driver will see very little of the road ahead when he dips his headlamps.

The downwards slant on some vehicles is adjusted automatically to compensate for whether it is loaded or not. On some vehicles this can be adjusted by the driver using a control inside the vehicle. On older vehicles the adjustment is possible only by opening the bonnet and adjusting the dipped beam headlight. The desired slant depends upon the height of the cars lights above the ground and is recommended by the vehicle manufacturer.

The above variations can mean that the beam may be slanting downwards anything from 1% to 4% when properly and acceptably set up and presented for test.

So the important issue is that the dipped beam must slant slightly downwards and never upwards.

A slant of 2 to 4% is generally acceptable. This means that for every 1m distance from the light surface on the vehicle the light should appear to drop to be 20 to 40 mm lower.

So over a distance of 5m the “drop” should be 100 to 200mm lower.

- 1) Select a reasonably flat piece of ground which will enable a vehicle to be positioned facing a flat vertical screen or a suitable wall.
- 2) Position the vehicle to be tested so that the lenses of its dipped beam lights are 5m from the vertical white screen or suitable wall.
- 3) Note the height of the centre of the dipped beam headlight on the vehicle.
- 4) Note the height where the “cut-off” of the dipped beam headlight strikes the white screen or the wall.
- 5) The “drop” should be approximately 100 to 200mm.

Annex 14 – Cross References to the UK DVSA – Heavy Goods Vehicle Inspection Manual.

The clauses in Part 1 of the Vehicle Roadworthiness Standard are the norms to be applied but further extensive information is available in overseas publications such as the UK DVSA and the UK MoT publications and no doubt similar helpful information will be available in other languages from other countries.

The detail in the UK DVSA Heavy Goods Inspection Manual* is extensive and is directly related to legislation applicable to vehicles in the UK. It may not be applicable to roadworthiness requirements for vehicles operating in Africa but is cross referenced below since it may be of some general assistance to vehicle examiners. - * Can be downloaded from <https://www.gov.uk/government/publications/mot-testing-guide>

	Clause in Part 1 of Vehicle Roadworthiness Standard	Section in UK DVSA Heavy Goods Vehicle Inspection Manual*
Brake pedal	5.3.1	37
Brake lever	5.3.2	36
Hand control valves	5.3.3	39
Vacuum assisted	5.3.4	38
Air or vacuum pumped	5.3.5	34
Trailer brakes	5.3.7	12
ABS, EBS, ESC	5.3.8	38
Braking components	5.3.9	59
Braking performance	5.4	71, 72, 73
Lighting, signalling, reflectives	5.5	62, 63, 66, 67
Driver's view, glass, mirrors	5.6	22, 23, 25
Steering & driving controls	5.8	28, 30, 54
Tyres - Size and type	5.9	7
Tyres - Condition	5.10	8
Road wheels	5.11	6
Suspension	5.12	48
Condition of chassis	5.14	41
Bodywork & equipment	5.15	15,16,17,19,20
Couplings	5.17	11
Safety belts	5.18	03
Speedometer	5.21	26
Hooter	5.22	27
Liquid leakage	5.23	44 ,45
Electrical wiring	5.24	42