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ZS 201: 1994

The Standards Act (Cap. 416)

Declaration of Compulsory Standards

PURSUANT to Section 9 of the Standards Act, notice is here by given that at the expiry of two months from the date of this notice, the Zambia Bureau of Standards intends to recommend to the Minister of Commerce, Trade and Industry under Section 7(1) of the Standards Act, Cap. 416 that the Zambian Standards appearing in the Schedule hereto to be declared compulsory standards for Zambia.

The purpose of making this recommendation is to allow Zambia Bureau of Standards to compel manufacturers, traders and importers of various products that have a bearing on health, safety and other hazards to the people of Zambia to comply to the specified standards. A draft of each standard to be declared as compulsory is given in the schedule below.

Any person objecting to the substance of the standards, should lodge written objections to the Director, Zambia Bureau of Standards, P.O. Box 50259 Lusaka, within two months from the date of publication of this notice in the Government Gazette.

	M.M. Mukelabai,
LUSAKA	Director
25th March, 2010	Zambia Bureau of Standards

GAZETTE NOTICE NO. 331 OF 2010

ZAMBIAN STANDARD

Paints and Varnishes Emulsion Paints for Interior and Exterior Use - Specification

1 Scope

This Zambian Standard specifies requirements for emulsion paints, based on polymers, intended for brushing, spraying and roller applications for exterior and interior use on new or previously painted surfaces painted with compatible emulsion paint.

2 Normative References

Publications referred to in this standard are given in annex C.

3 Definitions

For the purpose of this standard, definitions given in ZS 277, and the following shall apply:-

3.1 Batch

A final mix or blend of paint in one large vessel from which smaller containers are filled for distribution and marketing.

3.2 Standard test conditions

A temperature of 25 ± 5°C and a relative humidity of 60 ± 5%. All tests shall be carried out at standard test conditions unless otherwise stated.

4 Types

The paint shall be one or both of the following types:-

- Type 1 suitable for exterior use
- Type 2 suitable for interior use

In case the paint is meant for both interior and exterior use, it shall meet the requirements specified for both Type 1 and Type 2 paints.

- 5 Requirements
- 5.1 Composition

The material shall consist of pigments and suitable extenders in suitable proportions, in a medium consisting of a stable synthetic polymer dispersion in water with suitable ingredients as may be necessary to produce a material so as to satisfy the requirements of the standard.

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The paint on receipt in an unopened full container, which should be rust-free internally within the recommended shelf-life by the manufacturer, all not have irritating or offensive adverse that the depth of the upper layer shall not exceed 50/ shall not have irritating or offensive odour and, if any separation of the liquid has taken place, the depth of the upper layer shall not exceed 5% of the total depth of the contents of the of the total depth of the contents of the container. The paint shall be free from lumps and skins, shall not exhibit excessive settling, caking, granulation, levering, or colour account of the dome in the shall be dome in the state of the container. granulation, levering, or colour separation, and shall be easily dispersed with a paddle to a smooth, homogeneous state. Tests shall be done in accordance with Appen A accordance with Annex A.

5.3

The volatile matter content of the paint, determined in accordance with ZS 284 Part 1, shall not be more than 50% (m/m).

5.4

When tested in accordance with ZS 284 Part 2, the paint shall not leave a residue of more than 1% (m/m) on a sieve of nominal aperture size 75 im.

5.5 Viscosity

When tested in accordance with ZS 284 Part 3, the paint as supplied shall have a viscosity lying between 10 and 13 poises at $25 \pm 0.5^{\circ}$ C. As alternative, the stormer viscometer can be used to determine the consistency which should be between 250 and 425 grams or 89 and 106 Krebs units at 25 ± 0.5°C (see ZS 284 Part 4).

Fineness of Grind 5.6

When tested in accordance with ZS 284 Part 18, the fineness of grind reading of the unthinned paint shall not exceed 20 im.

5.7 Dilution Stability

When suitably thinned with water in accordance with the manufacturer's instructions, for roller, brush or spray application, the material shall mix readily with a minimum amount of foaming to a smooth and homogeneous state. The foaming, if any, shall dissipate rapidly. After the wellmixed and reduced paint has been stored for 72 hours at 25 ± 5°C, it shall show no signs of instability of the emulsion. The paint shall readily re- mix to a smooth, uniform state suitable for roller, brush or spray application.

pH Value 5.8

The pH value of the material when determined by a suitable glass electrode system shall be between 8.0 and 8.5.

5.9 Shelf-life

The paint, when stored at a temperature between 18°C and 30°C in shade and in fully sealed containers as delivered by the manufacturer, shall meet all the requirements of this standard up to at least 9 months from the indicated date of manufacture.

5.10 Temperature Stability

The paint when put into a 400 ml glass jar with ground-in cover, to about three quarter full, and kept fully closed in a suitable oven at a temperature of $40 \pm 2^{\circ}$ C for one month or $60 \pm 2^{\circ}$ C for 48 hours shall not develop an offensive odour and shall still comply with the requirements of 5.7, 5.13 and 5.14.

5.11 Mass in Kgs/litre

The mass in kgs/litre of the material when tested in accordance with ZS 284 Part 17 shall not differ by more than ± 5% from that of the approved sample.

5.12 Resistance to Alkali

When tested in accordance with ZS 284 Part 5, the difference between the unsealed and the sealed material shall not be appreciable when examined visually.

5.13 Application Properties

When tested in accordance with ZS 284 Part 5, the material shall, after recommended thinning, be suitable for application by brush, spray or roller. The first coat shall brush, or work satisfactorily and during the application of the second coat the paint shall brush, spray or work easily, flow, spread and join well. It shall show no floating, film coarseness or any other undesirable film characteristic in the wet or dry film.

5.14 Recoating properties

When three successive coats of paint, after suitable thinning with water, are applied under normal conditions on dry asbestos cement panel (8.2.1) at an interval of two hours between coats by brushing, roller-coating, or spraying at a spreading rate of approximately 12 square metres (8.2.1) at an interval of two nous octation der-lying coats. The paint system shall not exhibit colour separation, sagging, pitting, flaking or per litre, there shall be no thing of the ander the application of the successive coats by brushing, spraying or with the roller. The brush marks

5.15 Drying properties

15 Drying properties Apply a coat of paint on a glass panel (8.2.2) giving a wet film thickness of approximately 75 im. When tested in accordance with ZS 284 Part 5.16 Specular gloss at 85° (sheen)

75 im

16 Specular gloss at 65 (succery Apply a coat of paint by means of a spreading device (e.g. doctor's blade) on a glass panel (8.2.2) giving a wet film thickness of approximately im. When tested in accordance with ZS 284 Part 7, the dry paint shall have the 85°C specular gloss given below relevant to the type of finish specified by the manufacturer:-

Flat finishes : 15 max Egg-shell finishes : 16 - 50

5.17 Colour

The colour of the paint specified shall match that of the standard colour chip in BS 4800 or any reference colour as agreed between purchaser and vendor, when tested in accordance with ZS 284 Part 8.

5.18 Reflectance of white paints

White paint shall have a daylight 45°, 0° luminous directional refletance relative to magnesium oxide of at least 85% when tested in accordance with ZS 284 Part 9.

5.19 Hiding power

When tested in accordance with ZS 284 Part 10, a paint that has the daylight 45°, 0° luminous directional refletance value in column 1 of the Table shall have the corresponding dry hiding power given in column 2

Column 1	Column 2
Reflectance, %	Hiding power, m ² /l
40 and more	10
20	13.3
10—19.9	15.4
less than 10	10.00

TABLE-REQUIREMENTS FOR	R HIDING	POWER
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5.20 Resistance to wet abrasion

When tested in accordance with ZS 284 Part 11, for 1500 oscillations, the material shall be deemed to have passed the test if it does not show film defects like blistering, exposure of undercoat, finish and colour fading.

5.21 Resistance to exterior exposure

This test shall apply to Type 1 paints. When tested in exposure stations approved by the Zambia Bureau of Standards (as prescribed in Annex B), the paint shall not chalk more than the equivalent ASTM D 659 Rating No. 8 after 6 months and Rating No. 6 after 12 months and coloured paints shall not exhibit more than a very slight change of colour. The paint shall not show more than a slight degree of dirt retention and shall show no sign of film breakdown, such as cracking, flaking, blistering after 12 months exposure.

5.22 Light fastness

This test shall apply only to type 1 paints. When tested in accordance with ZS 284 Part 12, using a single carbon are apparatus and glass panels (see 8.2.2 and 8.2.3) the paint after 168 hours of exposure, shall not exhibit more than a slight change of colour corresponding to rating 4 as specified in ZS 284 Part 13, grey scale.

5.23 Resistance to staining

This test shall apply to both type 1 and type 2 paints. When tested in accordance with ZS 284 Part 14, the paint film shall show no sign of staining.

5.24 Resistance to development of gloss

This test shall apply only to Type 2 paints. Panels are prepared and aged as prescribed in Annex B. In the case of an egg-shell finish, the 85° specular gloss is measured. The test carried out as in ZS 284 Part 11, but only 375 oscillations of the brush are used. The paint film is then washed with water, the panel is allowed to dry and the 85° specular gloss then measured.

When the paint is tested as above, the 85° specular gloss (sheen) of flat finishes shall not increase by more than 50% over the original value.

5.25 Resistance to fungal growth

When a paint is specified as providing a fungus-resistant finish the dry paint film both after 48 hours ageing and after 6 months ageing in standard air-drying conditions shall pass the test described in ZS 284 Part 15. This test applies to both Type 1 and Type 2 paints except that, for Type 1 paints and for paints meant for both interior and exterior use, the test shall be carried out after 6 months' exterior exposure instead of ageing for 6 months in standard air-drying conditions.

5.26 Water drop test

When an undiluted paint is applied to a glass panel to give a wet film thickness of about 120 im and allowed to air-dry for 24 hours, no blistering, wrinkling, swelling or cracking of the paint film shall occur within a period of 30 minutes after 4 ml of distilled water in the form of

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circular drop is placed on the film.

6 PACKAGING AND MARKING

The paint shall be packed in clean and dry containers. The containers shall be strong enough to withstand normal usage and shall be adequately aled to prevent leales and shall be adequately 6.1 Packing (container) sealed to prevent leakage and contamination of the contents during normal transportation and storage.

6.2 Marking

The following information shall be clearly and indelibly marked on each container or on a label securely fixed to it:-

- (a) manufacturers name, address and trade mark, if any;
- (b) volume of the material or net mass in the container;

(c) the use of the product;

- in case of Type 1 paints, 'for exterior use';
- in case of Type 2 paints, 'for interior use';
- ---in case of paints meeting the requirements specified for both Type 1 and Type 2 paints, 'for exterior and interior use'; and when applicable, the words "fungus-resistant";

(d) the colour;

- (e) the batch identification and date of manufacture;
- (f) the thinning instructions;
- (g) the storage precautions;
- (h) the finish (whether flat or egg-shell).
- 6.2.1 The containers may also be marked with the ZABS Certification Mark.

Note on the use of the certification mark

The Zambia Bureau of Standards is the owner of the registered certification mark shown below, the independent assurance that the product conforms to the requirements of this Zambian Standard. Manufacturers only under licence from the Bureau may use this certification mark. Particulars of the condition under which licenses are granted may be obtained from the Director, Zambia Bureau of Standards, and P.O Box 50259 Lusaka 15101.



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7 Sampling

The following sampling procedure shall be applied in determining whether a lot complies with the relevant requirements of the standard. The samples so drawn shall be deemed to represent the lot.

- (a) From the lot draw at random two containers each of capacity at least 1 litre, for the storage stability test. If the containers have a capacity of less than 1 litre, draw at random two containers of the greatest capacity. (b) From the lot draw at random one container for all the remaining tests,

8 TEST SAMPLE AND TEST PANELS

8.1 Test Samples

1 Test Samples First assess the condition in the container in accordance with Annex A. Then thoroughly stir or mix the

First assess the condition in the container in the container a test sample of volume at least 1 litre. If the containers in the lot have a capacity of the c homogeneous product is obtained and take inclusion provide 1 litre test sample. Use this sample for the remainder of the tests. In case of the

8.2.1 Asbestos Cement Panels

2.1 Asbestos Cement Functs 300 x 300 mm and 300 x 100 mm sizes having density between 1.6 and 1.7 and water absorption below 20% (m/m).

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8.2.2 Polished glass panels

150 x 100 x 4 to 6 mm and 320 x 110 x 6 mm complying with ISO 1514 requirements.

8.2.3 Method of film application

Apply the paint according to the following method, unless otherwise specified.

A clean, soft, flat paintbrush, free from loose bristles shall be used. Use only brushes which have been thoroughly broken-in previously. First soak the brush in water for a few minutes and then shake off the excess water.

Apply the well-mixed material to the cleaned panel with the brush and do not pour or spill it on the surface. Work the brush through the film up and then down and across to obtain a uniform thickness of film.

The wet film thickness per coat shall be approximately 75 im except where a different thickness is specified in the method.

Where two coats are specified, allow an interval of 2 hours to elapse between coats, unless otherwise specified.

8.2.4 Air-drying conditions

Immediately after application of film place all panels in a horizontal position for drying except where otherwise specified. Air-dry in a wellventilated room. During drying protect the film from direct sunlight.

8.2.5 Ageing

Age all panels for 24 hours after application of the final coat, except where different times for ageing are specified.

ANNEX A-CONDITIONS IN THE CONTAINER

A.1 APPARATUS

A.1.1 Spatula

A stiff steel spatula with a square end.

A.2 Procedure

Open the original container as received and examine the contents for skinning, incompatibility, levering or gelling, before shaking or stirring. Remove, by means of a spatula, any continuous skin that may be present. Stir the contents with the spatula and examine for presence of any hard sediment or cake. If hard sediment is present, decant the supernatant paint, stir the residue, and determine whether it can be easily broken up and re- incorporated with the vehicle to form a smooth paint by stirring manually.

ANNEX B-RESISTANCE TO EXTERIOR EXPOSURE

B.1 PREPARATION OF PANEL

B.1.1 Panels

Use asbestos cement panels of 300 x 100 mm size (see 8.2.1).

B.1.2 Paint application

Apply three coats of paint on the panel by brush, roller or spray application at intervals of 24 hours between each coat. Air dry for seven days at a temperature of $25 \pm 5^{\circ}$ C and $60 \pm 5^{\circ}$ relative humidity in a horizontal position and in the absence of direct sunlight.

B.2 PROCEDURE

B.2.1 Racks

Expose the panels on racks constructed from galvanized steel sheets and sections at appropriate exposure site(s). The test fence runs east and west, and is constructed to hold test panels on racks on both sides so that there are panels facing both north and south. There are three rows of racks one above the other on each side of the fence. A 45° flap is placed along the top of the fence, and projects beyond the racks. At the end of each rack a channel running parallel to the fence is fitted so as to prevent rain water from one panel to fall on the next one below it (the water runs and falls on either side of the fence).

B.2.2 Panel exposure

Fit the painted asbestos cement panels with galvanized screws and nuts on the test racks. Examine the conditions of the exposed film after six months for chalking and after twelve months for the following properties:---

(a) Colour	(b) Flaking
(c) Cracking	(d) Chalking
()	10 D'

(e) Blistering (f) Dirt retention

The exposure shall commence between August and October. For the above examination, wash the right hand half of the surface of test panels by pouring water and then wiping with soft cloth. Examine the same half of the test panels at each examination; at the end of the stipulated period for exterior exposure test, examine the two halves of the test panels for the above characteristics. The sample shall be considered satisfactory if the condition of the film in both halves, the one washed periodically as well as the one washed only for the final examination meet the requirements of 5.3.7. Stray film failure due to extraneous causes other than climatic shall be ignored.

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ANNEX C-LIST OF REFERENCES

ZS 284-Part 1- Determination of volatile and non-volatile matter

Part 2- Determination of coarse and foreign matter

Part 4-Determination consistency of paints by means of Krebs-Stormer viscometer

Part 5-Determination of application properties

Part 6- Determination of drying properties - Surface drying test

Part 7-Determination of specular gloss of paints film at 85°

Part 8-Visual comparison of the colour of paints

Part 9-Determination of reflectance of white paints

Part 10-Comparison of contrast ratio (hiding power) of paints of the same colour

Part 11-Determination of resistance to wet abrasion

Part 12-Determination of light fastness of paints for exterior use exposed to natural light source

Part 13-Grey scale for assessing change in colour

Part 14-Determination of resistance to staining

Part 15-Determination of resistance to fungal growth

Part 16-Determination of resistance to alkali

Part 17- Determination of specific gravity (weight/litre)

Part 18-Determination of fineness of grind

GAZETTE NOTICE NO. 332 OF 2010

ZAMBIAN STANDARD

Paints and Varnishes High Gloss Synthetic Enamel Paint-Specification

1 Scope

This Zambian Standard covers ready mixed high gloss synthetic resin based enamel paint for interior and exterior use as a finishing coat on metal, wood, sealed plaster walls and concrete surfaces, composition board and similar materials that have been primed or painted previously.

2 Normative References

Publications referred to in this standard are listed in annex C.

3 Composition

3.1 Volatile content

When determined in accordance with ZS 284 Part 1, the volatile content of the paint shall be not more than 60% m/m for black, dark red and maroon and not more than 50 % m/m for other colours.

32 Vehicle

The vehicle shall consist of a long drying or semi-drying oil modified alkyd resin or other suitable synthetic resin polymer. Rosin and rosin derivatives when tested in accordance with ZS 284 Part 19, shall not be present.

3.3 Pigment

The choice of pigment shall be left to the manufacturer.

3.4 Special ingredients

Small quantities of ingredients designed to produce special effects, such as ease of wetting or dispersion, or to confer special properties, such as anti-skinning or anti-settling, may be incorporated in the paint.

3.5 Noxious ingredients

The paint shall not contain chlorinated hydrocarbons and the benzole content shall not exceed 1%,

4 Requirements

Viscosity 4.1

Viscosity When tested in accordance with ZS 284 Part 4, the viscosity of the paint at 25°C shall be between 70 - 75 Krebs units.

4.2 Application properties

When tested in accordance with ZS 284 Part 5 with a lapping time of 3 minutes the paint shall be judged to have good brushing properties if it can be applied, crossed, laid off and joined without difficulty.

can be applied, crossed, land of and of any seconds in a BSB4 cup at 25 °C when reduced with a suitable solvent as recommended by the manufacturer.

After the enamel has been reduced to spraying consistency and tested as described in ZS 284 part 23 there shall be no perceptible colour difference between the two dry surfaces.

4.3 Fineness of grind

³ Fineness of grind When determined in accordance with ZS 284 Part 18, the fineness of grind reading for the unthinned paint shall not exceed 10 μm.

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4.4 Drying time

When tested in accordance with ZS 284 Part 27, the drying time of a wet film of the unthinned paint produced by a standard 75 µm film applicator shall be as follows:

(a) Surface dry not more than 4 h.

(b) Hard dry not more than 16 h.

A pressure of 1 kg force shall be applied for the hard dry test.

4.5 Appearance

The paint when applied at a spreading rate of $10 \text{ m}^2/1$ to vertical surfaces shall be uniform and glossy with no evidence of runs, sags, brush marks, bloom, specks, flotation or other film defects.

4.6 Directional reflectance for white paint

When tested in accordance with ZS 284 Part 9, the daylight 45-degree, 0-degree, luminous directional reflectance shall be not less than 85% relative to a freshly prepared surface of magnesium oxide. The application shall be by a suitable film applicator to produce a wet film of 60 to 65 μ m per coat. The panels shall be aged for 48 h at 25 ± 5°C and 60 ± 5% relative humidity before testing.

4.7 Gloss

When tested in accordance with ZS 284 Part 7, the paint film, after drying for 48 h at $25 \pm 2^{\circ}$ C and $60 \pm 5\%$ relative humidity, shall have specular reflection of not less than 80% (60° Head, glossmeter).

The same film after drying for 7 days at $25 \pm 5^{\circ}$ C and $60 \pm 5^{\circ}$ relative humidity, shall have a specular reflection of not less than 80% (60° Head Glossmeter).

4.7.1 Retention of gloss

The paint film, when tested in accordance with the method described in ZS 284 Part 25, shall have a specular reflection, after three months exposure, of not less than 70% (60° head glossmeter).

4.8 Yellowing of white paint

When tested in accordance with the following method the white paint shall show no yellowing after exposure in total darkness for a period of 14 days and recovery for a period of 7 days:

Apply two coats of the well mixed sample by brush at a spreading rate of $10 \text{ m}^2/1$ to the clean steel panels in accordance with ZS 284 Part 27, of size 150 mm x 100 mm. Allow the panels to age 24 h in diffused daylight after application of the second coat at $25 \pm 5^{\circ}$ C and $60 \pm 5^{\circ}$ relative humidity. Place in a cupboard that excludes all light for a period of 14 days. Do not open the cupboard during the testing period. At the end of this period, allow the panel to recover in diffused daylight then compare the test panels visually with a 24 h old panel prepared in a similar manner.

4.9 Colour

Unless otherwise agreed between purchaser and manufacturer, the colour shall be in accordance with the British Standard colours shown in BS 381 C and BS 4800, when determined as described in ZS 284 part 26.

4.10 Weathering

When tested for 1 000 h in accordance with ZS 284 Part 25, the paint film shall not;

(a) show chalking, checking or cracking,

(b) have a 60° specular gloss of less than 40,

(c) have a colour change rating lower than the appropriate value given below:

TABLE 1 VISUAL COLOUR CHANGE RATING

Colour	Visual colour change rating* min	
All colours except yellow and orange Yellow and orange	6 4	

*Based on a figure of 10 for no defects.

4.11 Odour

The odour of the paint in the container and during and after application, shall not be abnormally pungent, offensive or disagreeable.

4.12 Hiding power

When tested in accordance with ZS 284 Part 10, the wet hiding power of paints of the colours given in Table 2 using a Morest chart, shall be not less than those specified in that table.

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Paints of other colours shall have wet hiding powers not less than the hiding powers of the colours they most nearly approximate

in	Table	2.

TABLE 2-HIDING POWER

		Minimum Wet Hiding Power m ² /1	
Colour	Reflectance, %	8.0	
White	> 80 Nil	25.0	
Pastels Blue, Green, Grey Cream, Pink	> 60	10.0	
Light—Medium Colours Blue, Green, Grey, Cream, Beige Tones and Pink	15—60	12.0	
Dark Colours Blue, Green, Grey, Beige, Stone, Brown and Red Oxide	< 15	15.0	
Yellow and Orange Pastel, Light Medium, dark	< 60 < 60	8.0 10.0	
Red All shades	< 30	7.0	
Maroon	< 5	5.0	
Violet All shades	< 80	10.0	

4.13 Storage stability

The paint as supplied shall be free of any skin, dry sediment and coarse particles and shall show no evidence of livering or curdling or of other signs of container instability.

The paint shall be in such a condition that stirring readily produces a smooth uniform mixture of good brushing consistency within the viscosity limits.

The paint, when stored in the original sealed containers at temperatures between 15°C and 30°C, shall retain the properties detailed above for a period of not less than twelve months. The viscosity shall not increase by more than 10 Krebs units.

4.14 Skinning

When tested in accordance with ZS 284 Part 28, the paint shall not show any sign of skinning after 48 h.

4.15 Durability

See Appendix A.

The method of sampling and the size of sample shall be as agreed between purchaser and manufacturer.

4.16 Containers

The paint shall be packed in clean, dry containers. The containers shall be strong enough to withstand normal usage and shall be adequately sealed to prevent damage, leakage and contamination during normal transport and handling. The container shall not have a deleterious effect on sealed to prevent damage, reacting and container over normal storage period of at least 12 months at the ambient temperatures in Zambia.

5 Sampling

The method of sampling and the size of sample shall be as agreed between purchaser and manufacturer.

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6 Marking

Each container complying with Clause 4 of this standard shall be clearly and permanently marked with the following:----

(a) the manufacturer's name, address and/or trade mark on the side of the container;

- (b) volume of the material/or net mass in the container.
- (c) name or number of colour on the container.
- (d) the batch identification and date of manufacture.
- (e) the type of paint i.e. high gloss synthetic enamel, on the side of the container.
- (f) the storage precautions.
- (g) the containers may also be marked with the ZABS Certification Mark.

Note on the use of the certification mark

The Zambia Bureau of Standards is the owner of the registered certification mark shown below, the independent assurance that the product conforms to the requirements of this Zambian Standard. This certification mark may be used by manufacturers only under licence from the Bureau. Particulars of the condition under which licenses are granted may be obtained from the Director, Zambia Bureau of Standards, P.O Box 50259 Lusaka 15101.



ZS 295

ANNEX A --- DURABILITY

The information in this Appendix is additional to that in the specification and has been included purely for amplification.

It is anticipated that the paint shall, when properly used on correctly prepared surfaces, have a useful life of not less than 18 months when applied on all normal external surfaces under Zambian climatic conditions.

"Useful life" requires that the paint shall wear away in such a manner that the surface of the material is at no time laid bare. The paint system shall show no cracking, checking, peeling or flaking but shall wear away through gradual surface erosion (chalking).

At the completion of the useful life, the paint system shall form a firm base for repainting, requiring a minimum of surface preparation.

ANNEX B-TOXICITY

In accordance with current worldwide awareness on the use and handling of hazardous substances, all raw materials prohibited by the Hazardous Substances Act should not be used.

ANNEX C-LIST OF REFERENCES

ZS 284 - Part 1

Part 4- Determination of consistency of paints by means of Krebs-Stormer viscometer

Part 5-Determination of application properties

- Determination of volatile and non-volatile matter

Part 7-Determination of specular gloss

- Part 9-Determination of reflectance of white paints
- Part 10-Determination of hiding power

Part 18-Determination of fineness of grind

Part 19-Determination of rosin and rosin derivatives

Part 23-Determination of spraying consistency

Part 25- Determination of resistance to artificial weathering

Part 26-Determination of colour stability

Part 27-Determination of air-drying and baking properties

Part 28-Determination of resistance to skinning

BS 381 C - Colours for identification, coding and special purposes

BS 4800 - Schedule for paint colours for building purposes

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GAZETTE NOTICE No. 333 OF 2010		ZS 371-2008
ZAMBIAN STANDARD:	Brood Flammable Liquids-Sp	pecification
Road Tank V	ehicles for Petroleum-Based Flamman	
		1 and flommable liquide Is:

Introduction

This standard covers road tank vehicles that are used predominantly for the transportation of petroleum based flammable liquids. It is standard also makes provision to assumed that discharge operations are carried out by the driver and take place using gravity or a pump. This standard also makes provision for the commonly used type of petroleum products the commonly used type of road tank vehicle with compartments that are capable of transporting different types of petroleum products.

1. Scope

This standard covers the requirements for tank vehicles intended for use on public roads, for transportation, at temperatures below their ling point of normalization to the standard form this standard form this standard form this standard form this standard form the standard form t boiling point, of normally stable petroleum-based flammable liquids. Flammable liquids other than hydrocarbons are excluded from this standard.

2. Normative References

The following standards contain provisions which through reference in this text, constitute provisions of this standard. All standards are subject to revision and since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this standard are encouraged on currently valid national and international standards which may be obtained from the Zambia Bureau of Standards.

AISI,	Steel products manual- Stainless and heat-resisting steel.
ASTM B209 BS 1470	Standard specification for aluminium alloy, sheet and plate. Specification for wrought aluminium and aluminium alloys for general engineering purposes: plate, sheet and strip
BS 1474	Specification for wrought aluminium and aluminium alloys for general engineering purposes: bars, extruded round tubes and sections.
BS 1490	Specification for aluminium alloy ingots and castings for general engineering purposes.
BS 5500	Specification for unfired fusion welded pressure vessels
IEC 60529	Degrees of protection provided by enclosures (IP Code)
ISO 3874	Series 1 Freight containers- Handling and securing.
ISO 7638	Road Vehicles - Connectors for the electrical connection of towing and towed vehicles
SANS 141	Glass-reinforced polyester (GRP) laminates
SANS 991	Aluminium and alloy gravity die castings.
SANS 1141	Aircraft fuelling hose
SANS 1142	Diesel engines modified for use in hazardous locations (other than in mines)
SANS 1191	High penetration-resistant laminated safety glass for vehicles.
SANS 1207	Motor vehicle safety standard specification for braking
SANS 1506	Motor vehicle safety specification for braking
SANS 10123	The control of undesirable static electricity.
SANS 0228	The identification and classification of dangerous substances and noode
SABS 10232	Emergency information response system for road and rail
SANS 1518-1	Transportation of Dangerous goods- Design requirements for road vehicles and portable tanks- Part 1 Requirements applicable to all vehicles
ZS 373	Portable fire extinguishers
ZS 385-1	The Petroleum Industry
	Part 1: Storage and distribution of petroleum products in above ground bulk installations - Code of Practice
ZS 385-2	The Petroleum Industry
	Part 2: Electrical installations in the distribution and and the
ZS 402	The classification of hazardous locations and the selection
ZS 437	Pneumatic tyres - Specifications
ZS 675	Road Vehicles -
	Road Speed Limiters - Guidelines
ZS 676	Retro-reflective and fluorescent warning size a
ZS ISO 9001	Quality Management System - Requirements
eray Regulation	

The Energy Regulation Act (Laws of Zambia, Volume 24, Cap. 436)

The Environmental Protection and Pollution Control Act Cap 204 Volume 12 of 1990 The Occupational Health and Factories Act, Cap 441of the Laws of Zambia

The Petroleum Act (Laws of Zambia, Cap 424)

The Public Roads Act No 12 of 2002

The Road Traffic Act No 11 of 2002

The Road Traine Act to Cape and The Regulations, 1998 (The Laws of Zambia, Volume 23 Cap 403).

18th June, 2010 Zambia Gazette 3. Definitions For the purposes of this standard, the following definitions shall apply: 3.1 Acceptable: Acceptable to the parties concluding the purchase contract, but in relation to the certification mark and to inspections carried out by the Zambia Bureau of Standards, acceptable to the Zambia Bureau of Standards. 3.2 Assize: Means to examine, verify or test an instrument(s) to confirm it as an authorised measure. 3.3 Authorised body: An organisation or person with acceptable qualifications, training and experience to carry out effective repair works on the road tank vehicle.

- 3.4 Auxiliary engine: An engine that is additional to the main propulsion engine of the road tank vehicle and that can be operated either on or off that vehicle. 3.5
- Baffle: A non-liquid tight transverse or longitudinal partition in a tank. 3.6
- Bulkhead: A liquid-tight transverse wall between adjacent compartments of a tank.
- 3.7 Calibration: Set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realised by standards
- 3.8 Compartment: A liquid-tight division of a tank.
- 39 Compartment tank: A tank that has two or more compartments, each of which has a total-volume capacity not exceeding 7,000 litres. 3.10 Demountable tank: A tank that is designed to be lifted onto and mounted on a conventional truck that is to be used as a road tank vehicle.

Note

A tank that is designed as a full load on rigid chassis, with attachment direct to the chassis in a positive and safe manner is not classified as a demountable tank for the purposes of this standard.

- 3.11 Double bulkhead: Two bulkheads that are placed in a tank next to each other, to divide the tank into two compartments.
- 3.12 Endurance braking: Braking system intended to stabilize vehicle speed on a long descent, without the use of service, secondary or parking braking systems.
- 3.13 Explosion protected: Descriptive of electrical apparatus that is designed and approved for use in hazardous areas in accordance with one of the protection methods described in ZS 402 (or any acceptable equivalent).
- 3.14 Exposed area: The area of the surface of a tank that is exposed to outside atmosphere direct.
- 3.15 Head: A liquid-tight transverse closure at the end of a tank.
- 3.17 Road tank vehicle: A tank truck, tank trailer, or truck-tractor and tank -semi-trailer combination.
- Standard reference conditions: 20°C and 101, 325 kPa absolute. 3.18
- Tank: A container that has a liquid-full capacity in excess of 500 l, that is used for transporting petroleum-based flammable liquids and 3.19 that is mounted permanently or temporarily on a vehicle other than for the purpose of supplying fuel for propulsion of the vehicle.

Note

The term "tank" embraces the container and all components and ancillary equipment that affects its structural integrity.

Tank semi-trailer: A vehicle with a tank mounted on it or built as an integral part of it, and so constructed that, when the semi-trailer 3.20 is drawn by a truck tractor, through a fifth wheel connection, part of the load rests on the towing vehicle.

Note

A tank semi-trailer, when coupled to a truck tractor, is an articulated vehicle.

- Tank trailer: A vehicle with a tank mounted on it or built as an integral part of it and so constructed that when the trailer is drawn by 3.21 a motor vehicle, practically all its load rests on its own wheels.
- Tank truck: A single, self-propelled motor vehicle with a tank mounted on it. 3.22
- Third party: An independent body/person conducting an activity on behalf of another body. 3.23
- Type D vehicle: Vehicle intended for the transportation of flammable, dangerous or self reactive materials. 3.24
- Ullage: That portion of the total-volume capacity of a tank that is not occupied by its liquid contents, expressed as a percentage of 3.25 the total-volume capacity.

4. Symbols and Abreviations

ASTM ASTM International, originally known as the American Society for Testing and Materials (ASTM)

- British Standards BS
- Kilopascal kPa
- International Electrotechnical Commission IEC
- Degrees of protection provided by enclosures in accordance with IEC 60529 IP
- South African National Standards SANS
- Minimum Min
- Kilograms per cubic metre Kg/m³

5. REQUIREMENTS

Road tank vehicles and their ancillary equipment shall comply with this standard and all other relevant statutory requirements and gulations. The ancillary requirements that comply with this standard but not limited to, the items in summary Tetra regulations. The ancillary requirements on road tank vehicles type D shall include, but not limited to, the items in summary Table 1 below: below:

		Vehicle Type D
Sub clause	Requirement	
	Electrical Equipment	x
5.8.7.2	Wiring	х
5.8.7.3	Battery Master Switch	х
5.8.7.4	Batteries	х
5.8.7.5	Permanently energized circuits	х
5.8.7.6	Electrical Installation at rear of drivers cabin	
	Braking Equipment	
501	General	X
502	Anti-Lock braking System	X
5.9.3	Endurance braking system	Х
	Prevention of Fire risks	
5 10 1	Vahiolo anh	х
5.10.1	Fuel Tentra	х
5.10.2	Fuel Talks	x
5.10.7	Exposet System	x
5.10.4	Endurance braking	X
	Combustion Heaters	
51051	Heaters	v
5.10.3	Exhaust System	X
5.10.5.2	Operation	A
5.10.5.3	Switching	X
	Recommended Equipments	
515	Sneed Limitation devices	
5.15	Automatic sneed and time mean time to a	х
	Automatic speed and time recording devices	0
Note:		
X – Mandatory requireme	nt	

	ON ROAD TANK VEHICLES	,
TABLE 1-ANCILLARY REQUIREMENTS	SON ROLL	

Tank compartments discharge valves shall be colour-tagged to identify product loaded and minimize the possibility of cross contamination. The international petroleum colour coding scheme shall apply as shown below:

n 1 .			
	Product	Identification Colour Mark	
(a)	Leaded Petrol	Orange	
<i>(b)</i>	Unleaded Petrol	Graan	
(c)	Diesel	Green	
(d)	Illuminating Kerosene(Paraffin)	Straw	
(e)	Jet A-1	Blue	
		Black	

5.2 MATERIALS

5.2.1 Metals for tanks

Tanks shall be constructed of an aluminium alloy, a low carbon steel, a high-strength low carbon steel, a high-strength low alloy steel, or a transmission of the metal shall be free from rust, scale, cracks, laminations and must be free from rust, with the Tanks shall be constructed of an automatic from rust, scale, cracks, laminations and surface blemishes, and shall comply with the

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5.2.1.1 Aluminium alloys

An aluminium alloy shall comply with requirements for

(a) grade 5252 or 5083 of BS 1470 or grade 5454 of ASTM B209 or acceptable equivalent standards, in the case of sheets and plates;

(b) grade 6061, 6063 or 6082 of BS 1474 or equivalent and acceptable standard in the extrusions or

(c) grade SA22 of SANS 991 or grade LM6 or LM18 of BS 1490 or equivalent and acceptable standards in the case of castings.

5.2.1.2 Steel

A suitable low carbon or high-strength low alloy steel shall be of weldable quality and shall have physical properties at least equal to the appropriate minima given in Table 2.

TABLE 2---MINIMUM MECHANICAL PROPERTIES OF STEEL (OTHER THAN STAINLESS STEEL)

Mechanical property	Low carbon steel	High-strength low alloy steel
Yield stress, MPa, min Ultimate tensile strength MPa, min	172 310	310 414
Elongation 5.65 So %, min	20	25
Impact resistance 1) at -20°C, J, min	20	20
1) Charpy V-notch		

5.2.1.3 Stainless Steel

A stainless steel shall comply with the requirements for one of the following grades of AISI steels (or acceptable equivalent): 304, 304L, 310, 316,316L, 317, 317L, 321 or 347.

Note

The attention of purchasers is drawn to the advisability of using (to avoid carbide precipitation) one of the low carbon grades or one of the stabilised grades.

5.2.2 Pipes, fittings and other ancillary equipment

Materials for pipes, fittings, valves, manifolds, etc shall be of a suitable material that is compatible with the material of the tank and with the flammable liquid that is to be transported in the tank.

5.2.3 Gasket joint rings and other components

Gasket joints and components designed to come into contact with the flammable liquid shall be of a suitable material that is compatible with the flammable liquid that is to be transported in the tank, preferably, cork and asbestos materials or an approved gasket material.

5.2.4 Other materials

Components that do not come into contact with the flammable liquid may be of any material of adequate strength and that is acceptable for the required duty.

Note

Consideration should be given to the effects of galvanic corrosion when dissimilar metals (especially when one of these is aluminium or an aluminium alloy) are used in combination.

5.3 TANK DESIGN

5.3.1 General

A tank and its ancillary equipment shall have been designed in accordance with sound engineering principles, due consideration having been given to expected road conditions.

5.3.2 Capacity

The tank, which may be of the single-compartment or multi-compartment type, shall have a total-volume capacity (including an ullage of between 2.5% and 5% of that capacity at 47°C of the liquid) as required, and in no case shall the capacity of a compartment exceed 7, 000 litres. The maximum volumetric capacity shall not apply to heavy fuel oil. In addition, the total-volume capacity of a tank calculated on the liquid density of the product that is to be transported shall be such that when the road tank vehicle is fully loaded, its mass does not exceed the appropriate requirements of the Road Traffic Act No 11 of 2002 and the Public Roads Act No 12 of 2002.

The volumetric quantity carried in the compartment shall be as calibrated by Zambia Weights and Measures Agency and the ullage mark sealed.

The Zambia Weights and Measures Agency shall conduct tank calibration and issue a certificate at least once a year or during the following instances:

- After the ullage marks have been disturbed
 - After major repairs have been carried out on the tank 2.
 - After vehicle combination changes 3.
 - After any damage to the shell of the tank
- The manhole covers shall be secured by four (4) Zambia Weights and Measures seals, sealed diagonally for the bolted and hooked

manhole types and one (1) seal for the belted manhole type.

5.3.3

The tank may be of circular, elliptical or any other acceptable cross-section and shall be self-draining.

5.3.4

The maximum calculated stress value of a tank (including all stresses given in 5.3.5 to 5.3.7) shall not exceed 20% of the tende strength of the material used for its construction.

5.3.5

The design pressure shall be at least 23 kPa plus the pressure exerted by the static head of liquid in the fully loaded tank in the normal position. This shall be based on the greater of the density at 20°C of the flammable liquid for which the tank is being designed or 865kg/ m3.

5.3.6

Each tank and its components and ancillary equipment shall be designed to withstand dynamic loading in all directions and for al load configurations. The total dynamic loading shall be deduced by multiplying the static loads in question by the following acceleration factors considered individually:

- (a) 2g in the direction of travel;
- (b) 1g in the vertically upwards direction;
- (c) 2g in the vertically downwards direction and
- (d) 1g in the transverse horizontal direction

Note:

For the safety factors in a) to d) above, the safety devices discussed in 5.5 shall apply.

5.3.7 Additional loads

The following additional loads shall be taken into account and where applicable, a vector summation of all the loads under dynamic loading conditions shall be made:

(a) superimposed loads such as operating equipment, insulation, linings, hose tubes, cabinets and piping.

(b) reactions at supporting lugs and at saddles or other supports; and

(c) differential thermal expansion of dissimilar metals

5.3.8 Distribution of loads

The loads from supports shall be borne by bulkheads, baffles or ring stiffeners and shall be distributed as widely over the members as is practicable by using pads, gussets or other appropriate means of avoiding stress concentration.

5.3.9 Towing

For tank trailers the calculated D-value of the Tow-eye and the Tow- hitch shall always be less than that of the actual ratingon the Toweye. The tow-eye and the tow hitch shall both be supplied by an approved supplier.

5.3.10 Shell, heads, bulkheads and baffles

- 5.3.10.1 Thickness of the shell, heads, bulkheads and baffles
 - Thickness of the shell, the heads and where fitted, the bulkheads and baffles shall be:
 - (a) such that, under dynamic loading conditions, the maximum stress value given in 5.3.4 is not exceeded and
 - (b) not less than the relevant minimum given in Table 3 or 4 as appropriate and in no case except at the knuckle-radius, shall the thickness of a tank head be less than the thickness of the shell.

Notes

1. The material thickness given in Tables 2 and 3 are based on a liquid density of 865 kg/m². Where the liquid density of the flammable liquid to be conveyed in the tank exceeds 865 kg/m³, the thickness of the shell will have to be proportionally increased. 1. The material thickness given in Tables 2 and 3 are based on a liquid density of 865 kg/m². Where the liquid density of the flammable

liquid to be conveyed in the tank exceeds 865 kg/m², the thickness of the shell will have to be proportionally increased. 2. Where an aluminium alloy is used for the construction of a head, bulkhead, baffle or ring stiffener it shall be in the O (amealed) or

2. Where an authing and the stronger temper. A shell shall be constructed of material with properties at least equal to grade 5454 of ASTM B209 in the H320r H34 tempers, or where lower tensile strength tempers are used, the minimum thickness of shell material given in Table 2 shall be proportional 3. Consideration should be given to the loss of strength of an aluminium alloy in the welded condition (see 5.4.2.3)

5.3.10.2 Stiffening of heads, bulkheads and baffles

Unless a proven equivalent form of stiffening is provided the following requirement shall apply: Heads, bulkheads and baffles for all Unless a proven equivalent form of structures a provided the following requirement shall apply: Heads, bulkheads and participation tanks shall be dished to a depth, exclusive of any flange of at least 120 mm/m of the depth of the minor axis of the tank crossection.

Rated Capacity V Maximum Maximum thickness mm 1/m of tank length shell radius R 1.4m<1 <1.5m 1< 0.9m 0.9m<1<1.4m M LCS LCS SS HSLA SS HSLA AL LCS SS HSLA AL AL V<1400 1.8<R 1.8<R<2.3 2.4 2.0 2.0 1.6 2.2 2.2 2.2 2.0 2.4 1.8 2.0 1.6 2.3<R<3.2 3.2 <R 2.0 1.6 2.8 2.0 2.8 2.4 2.0 1.8 2.4 2.4 1.8 2.8 2.4 3.0 2.8 2.4 2.0 3.0 2.0 2.8 2.4 3.0 2.8 3.8 1.8<R 2.0 2.2 2.8 1.6 2.0 1.8 2.4 2.4 2.0 1.8<R<3.2 2.0 1.8 2.4 2.4 2.0 2.8 2.8 2.4 3.0 1 400<V≤2 100 2.3<R<2.3 2.4 2.0 2.8 2.8 2.4 3.0 3.0 2.8 3.8 3.2<R 2.8 2.4 3.0 3.0 2.8 3.8 3.5 3.0 4.4 1.8<R 2.0 1.8 2.4 2.4 2.0 2.8 2.8 2.4 3.0 1.8<R<2.3 2.8 2.4 2.0 2.8 2.4 3.0 3.0 2.8 3.8 2 100<V<2 700 2.3<R<3.2 2.8 2.4 3.0 3.0 2.8 3.8 3.5 3.0 4.4 2.8 3.8 3.5 3.2<R 3.0 3.0 4.4 4.0 3.5 5.0 2.8 2.8 3.8 1.8<R 2.4 2.0 2.4 3.0 3.0 2.8 2.8 1.8<R<2.3 2.8 2.4 3.0 3.0 3.8 3.5 3.0 4.4 V>2700 2.3<R≤3.2 3.0 2.8 3.8 3.5 3.0 4.4 4.0 3.5 5.0 3.0 4.4 4.0 3.5 5.0 3.2<R 3.5 4.0 4.0 5.5

TABLE 3-MINIMUM THICKNESS OF SHELL MATERIAL I)

¹⁾ The minimum thickness given in the table can be less than those required in terms of 5.3.10 (a)

Legend:

Li indicates distance between heads, bulkheads, baffles or ring stiffeners

LCS indicates low carbon steel

SS indicates austenitie steel

HSLA indicates high-strength low alloy steel

AL indicates aluminium alloy

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	TABLE 4—-MINIMUM THICKNESS	S OF HEADS ¹⁾ , BULKHEADS AND DIE	
Rated Capacity 1	y Minimum thick Mm	ness	AL
1/m of tank lengt	th LCS	1.8	2.4 2.8 3.0
V<1400	2.0	2.0	
1 400 <v 10<="" 2="" <="" td=""><td>0 2.4</td><td>2.4</td></v>	0 2.4	2.4	
2 100 < V < 2 / 0 V > 2 700	3.0	2.8	3.8
¹⁾ The minimun Legend:	n thickness given in the table can be less than the	bse required in terms of 5.3.10 (a).	
LCS indic SS indic HSLA indic	ates low carbon steel ates austenitic stainless steel ates high-strength low alloy steel		

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5.3.1 Circumferential reinforcement

5.3.11.1 Double bulkheads, where fitted, shall be separated by means of an air space that is vented and provided with drainage facilities (see 5.3.11.2)

5.3.11.2 Each ring stiffener shall be continuous around the circumference of the shell and where an air space is enclosed; the space shall be vented and provided with drainage facilities.

5.3.11.3 Baffles shall be adequately vented on the horizontal and vertical structure.

A ring stiffener shall have a section modulus about the neutral axis of the ring section parallel to the shell that is at least equal to the value calculated by the following formula:

I/C = KWL

Where:

I/C is the section modulus in cubic millimetres

is 0.0069 of low carbon, high-strength low alloy, and austenitic stainless steel and 0.01186 for aluminium alloys K

is the width or diameter of the tank in millimeters and W

is the ring spacing (distance from the midpoint of the unsupported shell on one side of the ring stiffener to the L midpoint of the unsupported shell on the opposite side of the ring stiffener) in millimetres.

Where a ring stiffener is welded to the shell in accordance with 5.4.3 a portion of the shell may be used as part of the ring section modulus. The portion of the shell used in this calculation shall not exceed the relevant maximum given in column 3 of Table 5.

TABLE 5-CIRCUMFERENTIAL RING STI	FFENERS: SHELL SECTION CREDIT THAT MAY BE DICH UP TO D	
----------------------------------	--	--

Number of welds between ring stiffener and shell	Distance between parallel ring stiffener to shell welds	Shell section credit max.
1 2 3	less than 20 d more than or equal to 20 d	20 d d + 20 d 40 d

stiffener-to shell welds in millimetres

5.1 CONSTRUCTION

5.4.1 General

All welding shall be carried out by a certified welder by means of an acceptable welding process and using a suitable filler metal. The welding procedure used shall be such as to ensure that the filler metal, the heat affected zone and the surrounding parent metal are free from cracks, unacceptable cavities and trapped slag, and when relevant, acceptable free from tungsten inclusions. Butt welds shall have complete penetration. Fillet welds shall have a leg length at least equal to the thickness of the thinner of the parts being joined.

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Note

The welding of aluminium alloys should be carried out in accordance with BS 3019-1 and BS 3571-1 (or equivalent standards). 5.4.2 Welding

5.4.2.1

Welds in steel and stainless steel

The mechanical properties of welded joints shall be equal to at least 85% of (and the corrosion resistance at least equal to) the minimum specified for the parent metal.

5.4.2.2 Welds in aluminium alloys

When subjected to transverse tensile test, a weld joint in an aluminium alloy, with the reinforcement removed shall have a tensile strength of at least the relevant value given below.

In the case of a joint between two dissimilar alloys, the tensile strength shall be at least that of the alloy that has the lower tensile strength.

Alloy designation	Ultimate tensile strength MPa, min
5083	275
5251	160
5454	215
6061	165"
6063	120"
6082	1651)

¹⁾ These values are for material welded in the TF condition after natural ageing for 3 days.

Where:

TF is the Temper Designation of Aluminium, and

F - As fabricated, applies to products in which no thermal treatments or strain-hardening methods are used to shape the product.

5.4.3 Baffle and ring stiffener joints

A baffle (or baffle-attaching ring) or a ring stiffener used for tank reinforcement (see 5.3.11) shall be fully welded around the circumference of the tank.

5.4.4 Overturn protection

Each closure for opening (but not limited to) manhole, fill or inspection openings and each valve fitting, pressure relief device, vapour recovery stop valve or the filling retaining located within the upper two-thirds of a cargo tank circumference (or cross-section perimeter in the case of non-circular tanks) shall be protected by being enclosed inside the body of the tank or by being enclosed inside an overturn damage protection device or being 125% as strong as such damage protection device would be.

An overturn damage protection device on a road tank shall be designed and installed to withstand any load normal (perpendicular to 5.4.4.1 the tank surface) or tangential (in any direction perpendicular to the normal load) to the tank shell, applied anywhere over the protected part of the tank and equal to at least twice the weight of the load tank vehicle. The design shall be based on the ultimate strength of the material used.

These design loads may be considered independently. If more than one overturn protection device is used, each device shall be capable of carrying its proportionate share of the applicable loads and in each case at least a quarter of the applicable total tangential load. The design shall by means of calculations, tests, or a combination of test and calculations be proven capable of carrying the applicable loads. Deformation of the damage protection device is acceptable provided that the devices being protected are not damaged.

- An overturn damage protection device that would otherwise allow the accumulation of liquid on the top of the tank shall be provided 5.4.4.2 with drain that directs the liquid to a safe point of discharge, away from any structural component of the road tank vehicle.
- The overturn damage protection device shall be so constructed to at least 60 mm above the man hole covers. 5.4.4.3

Manholes and Fill openings 5.4.5

Each tank compartment shall be provided with a manhole of diameter at least 400 mm, or with a 400 mm x 300 mm oval manhole. In the case of an oval manhole, the orientation shall be in line with the Weights and Measures Act. The manhole cover can be fitted with a hatch for opening and filling. The manhole cover and when relevant the hatch closure, shall not leak or fail when the tank is subjected to the test given in 7.2. The manhole shall always be in the centre.

FITTINGS AND ATTACHMENTS

5.5

All attachments to a tank shall be made from materials that are compatible with the material of the tank. The filling and discharge 5.5.1 devices (including flanges and threaded plugs) and any protective caps shall be capable of being secured against unintended opening.

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5.5.2 Valves

5.5.2.1

Each liquid discharge opening shall be provided with a spring-loaded valve that opens towards the tank interior and is of a type that, when de-energised, will close automatically (fail safe). The valve seat shall be located within the mounting pad and the valve stem shall

The valve assembly shall be of a design such that in the event of an accident the actuator and the outlet pipe can break away, causing the valve to close automatically (fail safe). Alternatively, where the valves do not have a breakaway section, they shall be adequately protected by an under-rail damage protection device.

5.5.2.2 Controls

Valve actuators shall be operated by spring-loaded mechanical levers, hydraulic or pneumatic means, with controls designed to give rapid response. An additional spring loaded mechanical lever, hydraulic or pneumatic control (emergency trip) shall be situated in a position away from any discharge point, and an acceptable means of automatically closing the valve(s) in the event of a fire shall be provided.

5.5.3 Vents

Each tank compartment shall be provided with at least one pressure-and-vacuum vent that is so designed as to prevent loss of liquid through the vent owing to surge or to the vehicle's overturning. The vent(s) shall be mounted, shielded and drained in such a manner as to prevent the accumulation of water. The exit of all vents other than emergency vents shall be covered with wire gauze of nominal aperture size in the range 425µm to 600µm. Each vent shall comply with the appropriate of the requirements given in 5.5.3.1 to 5.5.3.4.

Normal vents 5.5.3.1

A normal vent shall have an unrestricted outlet area of at least 280mm². When tested in accordance with 7.5.2.3 the vent shall start to open at a pressure not exceeding 7 kPa and when tested in accordance with 7.5.2.1 it shall start to open at a vacuum not exceeding 3 kPa.

5.5.3.2 Filling and discharging vents

Where a tank compartment is designed for filling and discharging with the hatch closure closed it shall be provided, where necessary with an artificial vent or vents that at the specified liquid load and discharging rates for the tank (see 6.1 (i) in addition to the venting provided in terms of 5.5.3.1 ensure(s) that the pressure in the tank, determined in accordance with 7.5.2.2 cannot exceed 7 kPa. Unless effective protection against overfilling is provided the vent(s) when tested in accordance with 7.5.2.8 shall have sufficient venting capacity to ensure that in the case of accidental overfilling a tank pressure of 20kPa is not exceeded.

5.5.3.3 Emergency vents

The following requirements shall be complied with:-

- (a) Each tank or compartment of a tank (as relevant) shall be provided with one or more emergency vents of total capacity determined in accordance with 7.5.2.9 of not less than the appropriate minimum given in Table 6.
- (b) Pressure-actuated emergency vents shall be of a design that in the case of a pressure increase the vent(s) will function in any overturn attitude of the vehicle. Each such vent shall when tested in accordance with 7.5.2.3 and 7.5.2.7 open at a pressure between 23.5 kPa and 25.0 kPa and close as soon as the pressure drops below this value and shall have a flow rate determined in accordance with 7.5.3.5 and corrected to standard reference conditions of at least 170 m³ of free air per hour.
- (c) Where the pressure-actuated emergency vent(s) cannot provide the total minimum venting capacity required in terms of (a) above one or more fusible emergency vents shall be fitted to increase the rate to at least the required value. The venting capacity of a fusible vent shall be determined at a pressure of 35 kPa in accordance with 7.5.2.10.

A fusible vent shall

- 1. be actuated by an element that operates at a temperature not exceeding 120 °C
- have an unrestricted outlet area of at least 800 mm² and 2.
- be so positioned that under normal conditions, it cannot come into contact with the flammable liquid transported in the tank. 3

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compartment m ²	Emergency venting capacity m ³ of air/h ¹⁾ minimum	Exposed area of tank compartment m ²	Emergency venting capacity m ³ of air/h ¹⁾ minimum
2	480	20	6650
3	720	30	7260
4	960	40	7830
5	1200		0070
6	1200	45	8370
7	1440	50	8880
	1680	55	9370
8	1920	60	9840
9	2160	65	10300
10	2400	70	10700
12	2000	75	11200
14	2000	73	11200
16	3840	85	12000
18	4320	90	12400
20	4800	95	12800
25	6000	100	13200

TABLE 6-MINIMUM EMERGENCY VENTING CAPACITY

5.5.3.4 Flow rate of vents

When tested in accordance with 7.5.2.4 or 7.5.2.10 as relevant, the flow rate of a vent in cubic metres per hour (m3/h) corrected to standard reference conditions shall be at least that claimed by the manufacturer (see 6.2).

Vents over 25mm 5.5.3.5

All vents over 25 mm shall be sealed using a Zambia Weights and Measures or equivalent authority approved device.

5.5.4 Piping and fittings

The piping and fittings shall have been designed for the pressure involved and before attachment to the tank, shall have been subjected in accordance with 7.3, to a pressure of 200 kPa but in the case of valves, manifolds and fittings that are subject to bottom loading, to a pressure of 800 kPa and shall have shown no sign of leaking.

Piping and fittings shall comply with the following requirements (see also 5.2.2).

- (a) They shall not project beyond the sides or the ends of the vehicle and shall be so protected as to minimise accidental damage.
- (b) Piping and flexible couplings shall be designed for a maximum flow rate of 7m³/s, and to withstand the most severe combined stresses of the vapour pressure of the product at a temperature of 55°C and either the superimposed pumping pressure or the shock loadings caused by vehicle movements.
- (c) Fill pipes of diameter exceeding 50mm shall terminate not less than 50 mm and not more than the pipe diameter from the bottom of the tank while fill pipes of diameter 50 mm and smaller shall terminate not more than 50 mm and not less than the pipe diameter from the bottom of the tank.
- (d) Unless located inside the manhole cover, a fill shall
 - be vented to the vapour space of the tank by a vent of diameter at least 10 mm (or equivalent area), fitted with wire gauze of nominal aperture size in the range 425 mm to 600 mm and so shrouded as to redirect the liquid down to the fill pipe and 1.
 - have a closure of a type such that excess pressure is automatically relieved before the closure is opened. 2.

5.5.5

Where a dip opening is provided, it shall comply with the relevant requirements of 5.5.4(d) for venting and pressure relief. The tube shall be stayed and of length such that it will guide the dip stick towards a reinforcing plate of thinness at least equal to that of the tank shell but not less than 3 mm.

Access to manholes and fill openings

Ready access to each man hole or fill opening shall be provided by means of a fixed skid-proof access ladder, except that a tank that 5.5.6 keady access to call in process to call in process access access

unnecessary. All tankers shall be equipped with a retractable hand rail.

5.5.7

Where practicable, attachment of non-liquid carrying components shall be made to the overturn damage protection device or sub frame of the vehicle and the following requirements shall in all cases be complied with:

- (a) Attachment of heavy components to the shell or head of the tank shall be made by means of mounting pads of shape and size such that excessive stress concentration on the tank is prevented. The thickness of a pad shall not exceed the thickness of the shell or head (as relevant) or the weld joint design shall be such that, when force is applied in the region of the pad, shear failure of the weld will occur without causing the tank to rupture (see also BS 5500)
- (b) Skirting structures, conduit clips, brake line clips and similar light components of a suitable metal of thickness not exceeding 70% of that of the shell or head to which they will be attached, or of construction or material appreciably less strong than the shell or head, may be secured directly to the shell or head provided that each component is so designed and installed that damage will not affect the flammable-liquid retention integrity of the tank. Light components shall be secured to the tank shell by continuous welding or in such a manner as to preclude formation of pockets that could become sites for corrosion.

5.1 PUMPING SYSTEMS

5.6.1 Power source

Where a pumping system is fitted to the vehicle, it shall be driven by one of the following means:

- (a) the tractive engine of the vehicle
- (b) a flameproof electric motor (see ZS 402 or any other equivalent standard);
- an air motor or an hydraulic motor or (c)
- an auxiliary compression-ignition engine of sound design and construction (see also SANS 1142) and that (d)
 - has an air intake, fitted with an efficient flame arrester or located in a position such that in the case of a backfire, flammable 1. vapour in the atmosphere will not be ignited
 - has an exhaust system free from leaks, that is mounted at least 100 mm from the tank and from all liquid-carrying 2. components and that discharges the gases at the rear of the cab as specified in 5.8.7
 - has an electrical system (if fitted) that complies with the applicable requirements of ZS 402 or any other equivalent standard 3. and
 - 4. is located in a suitable position and so shielded that flammable vapours are not drawn towards the engine and that spillages or leaks do not come into contact with the engine or the exhaust system but that is not so enclosed that overheating or the accumulation of explosive vapours can occur.

WARNING- A spark-ignition auxiliary engine shall not be used to operate the pumping system.

5.6.2 Pumps

The pump shall be suitable for the required application and shall have a rotational speed that is so controlled that the rating of the pump cannot be exceeded. The body shall be non-porous and made of a non-flammable material. The pump shall be mounted on the vehicle in a suitable position and protected from accidental damage.

Working pressure 5.6.3

The working pressure of a pumping system shall be as required. The entire system after assembly, when hydraulically tested in accordance with 6.4 at its normal working pressure, shall not leak.

5.2 HOSES

5.7.1 Normal hoses

A normal hose for the conveyance of flammable liquids shall be compatible with the liquid to be transported and its length, normal size, maximum working pressure and type (which shall be one of the following) shall be as required:

- (a) Type B: a hose that has electrical continuity or
- (b) Type C: a hose that has an anti-static cover and no electrical bonding

When tested in accordance with the relevant method given in SANS 1141 after flexing, type B hose shall have electrical continuity from

end to end and 1 m length of a type C hose shall have an electrical resistance of not less than 104U and not more than 10⁷U. When tested in accordance with hydraulic pressure test given in SANS 1141, a hose shall withstand a pressure of twice the maximum

Aircraft fuelling hoses

5.7.2

When an aircraft fuelling hose is specified it shall comply with all the relevant requirements of SANS 1141 or any acceptable equivalent.

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5.8 THE ROAD TANK VEHICLE

5.8.1 Cah

The cab of a road tank vehicle shall be of sound design and construction and so mounted that a distance of at least 150 mm is provided between the back of the cab and the front of the tank.

Where a steel cab is fitted, it shall preferably be insulated with a material that has a fire rating of class II and in the case of a glassreinforced polyester cab, the laminate shall comply with all the relevant requirements of type F of SANS 141.

Where a window is provided in the back of the cab, it shall be non-opening and of safety glass that complies with the relevant requirements of SANS 1191.

Provision shall be made for the fitment of an orange diamond at the front of the vehicle.

A special clearly marked document holder shall be mounted in a conspicuous position in the cab (see 5.8.6.2). If the vehicle is used for different commodities on different legs of a trip, a lockable document storage container shall be mounted in a conspicuous position in the cab (see 5.8.6.3)

A fire extinguisher complying with ZS 648 shall be located in an easily accessible position for the driver to reach whilst in the driving seat.

5.8.2 Shielding of engine

Where the engine or any component part of the engine extends beyond or is exposed at the rear of the cab, it shall be shielded from overhead spillage by a metal shield. Care shall be taken to ensure that engine cooling is not restricted.

5.8.3 Chassis and mounting of tank(s)

The chassis of a road tank vehicle and the means of attachment of tank(s) shall be designed to withstand the loading given in 5.3.6 and 5.3.7 based on the mass of the fully loaded tank(s) complete with fittings and attachments subject to a permissible stress of not more than the value given in terms of 5.3.4. The tank(s) shall form an integral part of or be attached to the chassis in a positive and safe manner and such that relative movement between a tank and the chassis is restricted and no excessive stress due to loading or vehicle movement is introduced into the shell.

5.8.4 Stability

The height of the centroid of the tank cross-section at half the tank length shall fall within an isosceles triangle that has a base length at ground level equal to the overall width between the outside walls of the outside tyres of the major load axles and that has base angles not exceeding 62°.

Demountable tanks 5.8.5

A demountable tank shall comply with all the appropriate requirements of this standard, except that an ISO container tank designed for the conveyance of petroleum-based flammable liquids may be used, provided that such a tank is properly secured (see ISO 3874) to the truck through the bottom corner fittings by means of acceptable securing devices, e.g. twist locks or pin-type securing devices.

When so required, a demountable tank shall be fitted with lifting lugs. Such lugs shall be so designed as to withstand the maximum stress values induced when a fully loaded tank is being lifted. A demountable tank of capacity not exceeding 3,000 l shall be exempt from the requirements given in

- (a) 5.5.3.3 (emergency vents) and
- (b) 5.4.4 (overturn protection) provided that each fitting is protected by (at least) a vertical metal strip a thickness at least 4.5 mm and that extends continuously around it and projects at least 25 mm above the fitting (or unless each fitting is provided with equivalent protection).

Placard and document holders 5.8.6

Holders for identification placards 5.8.6.1

When so required a holder for identification placards shall be fitted on each side and rear of a tank. Holders shall be of such size and shape that suitable placards can be fitted that identify the type of liquid being conveyed and describe the action to be taken in the event of an emergency. Placard holders are not required when a decal type of placard is affixed on the tank direct. The placard holders shall be at least 710mm by 410mm.

Document holder in cab 5.8.6.2

A container shall be provided to store emergency information documents during transportation. The container shall be installed as a permanent fixture towards the front of the cab and near the centre of the cab so that the documents can be reached in an emergency, either from the inside of the cab or through a broken front windshield. The container shall be orange in colour and shall be marked with the word "DOCUMENTS". The holder shall be large enough to store:

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- Tremcards,
- Dangerous goods information,
- Route information.

No other items shall be stored in the document holder.

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5.8.6.3	Document storage container
	A separate unmarked container shall be available to hold any documents related a for offloaded products.
5.8.7	Electrical Equipment
5.8.7.1	Electrical System
	The electrical system shall comply with the requirements given below and shall be control and a shall be control a
	Annex E gives a typical check list of electrical inspections and tests to be performed.
5.8.7.2	Wiring Wiring All circuits shall be protected
	The conductors shall be large enough to avoid over heating. Conductors shall be adequately insuface. The conductors fuses or by automatic circuit breakers, except for the following;
	(a) From the battery to the cold start and stopping systems of the engine.
	(b) From the battery to the alternator
	(c) From the alternator to the fuse or circuit breaker box and
	(d) From the battery to the starter motor and from the battery to the power control housing of the endurance braking system if system is electrical or electromagnetic.
	The above protective systems shall be as short as possible.
	The cables shall be securely fastened and positioned in such a way that the conductors are adequately protected against mechanical thermal stresses.
5.8.7.3	Battery master switch
	The vehicle shall be fitted with a master switch comprising the following requirements:
	(a) A four pole isolating switch for breaking the electrical circuits shall be placed as close to the battery as is practicable. It shal protected against inadvertent operation and shall be easily operated by someone standing next to the vehicle.
	(b) The switch shall have a casing with protection degree IP 65 in accordance with IEC 60529
	(c) The cable connections on the switch shall be of protection degree IP 54. However this does not apply if these connections contained in housing, such as the battery box. In this case it is sufficient to insulate the connections against short circuits, example with rubber cap.
	(d) Shall be labelled
5.8.7.4	Battery
	The battery terminals shall be electrically insulated and covered by a non conducting battery box cover. If the batteries are not loca under the engine bonnet they shall be fitted with a vented box.
	The batteries shall be properly secured by clamping to ensure minimum movement
	Batteries with cell to cell connection exposed shall not be allowed.
5.8.7.5	Permanently Energized Circuits
	Those parts of the electrical installation that include the leads that remain energized when the battery master switch is open shall suitable for use in hazardous areas. Such equipment shall meet the general requirement.
	(a) Permanently energized electrical equipments, including the leads for which there are no requirements in 5.8.7.3 and 5.8.7.4, si equipment situated in the drivers cab (See ZS 402 or growth)
	(b) The requirements for explosion group II, temperature also the main and and), and
5.8.7.6	Electrical Installation at the rear of the drivers cab
5.8.7.6.1	General General
	The installation shall be so designed, constructed and protected that it cannot provoke any ignition of vehicles, and these risks can be minimized in the
5.8.7.6.2	Wiring Wiring
	The wiring located to the rear of the drivers cab shall be protected against impact, abrasion and chafing during normal vahials operations.
	devices do not need additional protection

5.



Figure 1 — Corrugated polyamide conduit



Figure 2 — Corrugated polyamide conduit with insulating sheath



Figure 3 - Polyurethane sheath with inner sheath



Figure 4-Metal-threaded protection layer

5.8.7.6.3 Lighting

Lamp bulbs with screw caps shall not be used.

5.8.7.6.4 Electrical Connections

Electrical connections between motor vehicles and trailers shall be of protection degree IP 54 in accordance with IEC 60529 and shall be designed to prevent accidental disconnection. Examples of appropriate connections are given in ISO-7638-1 and ISO-7638-2.

5.8.7.6.5 Electrical bonding

The chassis, tank, piping and associated equipment, including all covers shall be so bonded together as to ensure electrical continuity. This bonding shall be connected to two clearly marked earthing points one on each side of the vehicle, each of which shall be connected to the earth bond wire when the tank is being filled or discharged. The final discharge electrical hose connection shall be bonded to the road tank vehicle or shall be completely insulated from the road tank vehicle by means of an insulating block or a non-conductive hose. (See also ZS 385-2).

No earth point shall be insulated or painted.

- 5.9 BRAKING EQUIPMENT
- 5.9.1 General requirements

Motor vehicles shall comply with the requirement of 5.9.2 and 5.9.3 in accordance with Table 1.

5.9.2 Anti-lock braking system

Motor vehicles of GVM exceeding 16 000 kg, and motor vehicles authorized to tow trailers of GVM exceeding 10 000 kg, shall be equipped with anti-lock braking systems of category 1 in accordance with SANS 20013.

Trailers of GVM exceeding 10 000 kg shall be equipped with anti-lock braking systems of category A in accordance with SANS 20013.

5.9.3 Endurance Braking system

> Motor vehicles of GVM exceeding 16 000 kg, and motor vehicles authorized to tow trailers of GVM exceeding 10 000 kg, shall be fitted with endurance braking system. The system may be a single device or a combination of several devices and each device may have its own control.

> The effectiveness of the endurance braking system shall be so controlled by the anti-lock braking system that the axle(s) braked by the endurance system cannot be locked by the endurance braking system at speeds above 15 km/h. This requirement shall not apply to that part of braking system constituted by natural engine braking.

- 5.10 PREVENTION OF RISKS
- 5.10.1 Vehicle Cab

Any windows in the rear of the cab or in the shield shall be hermetically closed and shall be made of fire resistant safety glass with fire resistant frames that prevent the glass from falling out in the event of a fire. Furthermore there shall be a clear space of at least 150mm between the tank and the cab or the tank and the shield.

5.10.2 Fuel Tanks

In the event of any leakage from the fuel tank(s) supply of the vehicle, the fuel shall drain to the ground without coming into contact with hot parts of the vehicle or the load.

5.10.3 Exhaust System

The exhaust shall discharge sideward on the right hand side of the vehicle at the point not closer than 1m from any tank outlet or liquid discharge point. Parts of the exhaust situated directly below the fuel tanks shall either have a clearance of at least 100 mm or be

5.10.4 **Endurance Braking**

Vehicles equipped with endurance braking systems that raise the temperature and that are placed behind the rear wall of the driver's cab, shall be equipped with thermal shield, securely fixed and located between the system and the tank or load so as to avoid any

In addition, the thermal shield shall protect the braking system against any outflow or leakage, even accidental, of the load. Protection

Combustion heaters for heavy fuel oil and bitumen road tank vehicles 5.10.5

5.10.5.1 Combustion heaters and their exhaust gas routing shall be so designed, located and protected or covered as to prevent any unacceptable risk of heating or ignition of the load. This requirement shall be considered to have been complied with if the fuel tank and the exhaust system of the appliance comply with the requirements equivalent to those prescribed for fuel tanks and exhaust system in 5.9.2 and

- 5.10.5.2 Combustion heaters shall be capable of being put out of operation by at least the following methods:

 - (b) stopping of the vehicle engine, in which case the heating device may be restarted manually by the driver; and (c) start-up of a feed pump on the vehicle for the dangerous goods carried.

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5.10.5.3 The combustion heater shall be switched on manually. Programming devices shall not be used.

One portable (1kg to 4.5kg maximum) dry chemical powderFire Extinguisher (or any acceptable type) shall be carried in the cabin. The two portable fire extinguishers shall be carried on the outside of each road tank vehicle, one on each side. An extinguisher shall be of the multipurpose dry powder type (suitable for fires of classes A, B, and C) and shall comply with the relevant requirements of ZS 373 and be of capacity at least 9.0 Kg. The suitable mounting position provided for the extinguishers must allow for easy access to the

Multiple combination vehicles shall carry one fire extinguisher per unit in the combination; rigid vehicles shall have two fire extinguishers and on a truck tractor as in the case of ISO containers (see 5.8.5) there shall be two fire extinguishers.

5.12 REAR BUMPER AND UNDER RUN

Stout steel guards on the frame of the vehicle shall be used to protect the lower part of the rear of the tank and piping in the event of a collision and to minimize the possibility that the tank will be struck by any part of a colliding vehicle. The tank must not go beyond the chassis. The rear bumper shall be placed at least 300 mm beyond the rear end of the tank

Road tank vehicles of GVM exceeding 3500 kg shall be fitted with rear and side under run protection devices at a maximum height of 500mm from the ground.

5.13 MANHOLE COVERS

Manhole cover, including fill openings shall comply with the requirements of one of the following tests:

- (a) a drop test (see 7.6.1) after which there shall be no leakage or
- (b) a pressure test (see 7.6.2). The unit shall be structurally capable of withstanding, without leakage or permanent deformation that would affect its structural integrity, the greater of a static internal fluid pressure of 25 kPa or the tank test pressure (see 7.2).

5.14 TYRES

The mechanical horse and drawbar trailer shall be fitted with non-retreaded front tyres (steering axle). All other tyres shall be in good condition as provided for in ZS 437. A combination of steel belted and nylon tyres on the same side of an axle shall be prohibited.

5.15 SPEED LIMITING DEVICE

Road Tank Vehicles shall be fitted with speed limiters complying with ZS 675.

6. MARKING

6.1 Tanks

The tank serial number shall be stamped on a suitable part of the tank. Each tank shall in addition bear the following information legibly and durably marked on a flameproof data and inspection plate that is adequately secured to the tank or attached structure and that is preferably located on the left side (facing forward) of the tank near the front and in a place readily accessible for inspection:

(a) the manufacturer's name trade name or trade mark

- (b) the serial number of the tank
- (c) the date of manufacture
- (d) the date of test
- (e) the design pressure
- (f) the tank capacity in litres per compartment (front to rear)
- (g) the maximum liquid load in kilograms
- (h) the maximum design liquid density in kilograms per cubic metre
- (i) the maximum fill rate in litres per minute and pressure, in kilopascals
- (j) the maximum discharge rate in litres per minute and
- (k) the Zambia Bureau of Standards certification mark (issued by ZABS).

6.2

Each vent shall be legibly and durably marked with its flow capacity and the pressure at which this was determined or with a reference number. Where a vent is marked with a reference number the supplier shall provide, in a pamphlet or booklet details of the flow capacity and pressure for that reference number.

Warning signs (HAZCHEM, Reflectors, No smoking, No naked flame and Switch off Cellphone) (a) For the purpose of fire handling alert, each tanker must carry HAZCHEM signs and adjacent No smoking and No Naked Flame 6.3

- signs at the rear and at the front side of the cargo tank (See Annex D). (b) The tank trailer must have high density orange reflectors along its sides for the safety of other road users. The reflectors shall be
- continuous along the sides of the tractor, tanks or trailer. These reflectors shall comply with ZS 676.

- (c) The rear of the trailer shall have a chevron and adequate red reflectors
- (d) The tractor and the trailer(s) shall have certified number plates for easy identification
- INSPECTION AND METHODS OF TEST 7.
- 7.1

Visually examine and using any means that will provide the required accuracy, then measure the tank and components of the road tank vehicle for compliance with all the relevant requirements of clauses 5 and 6 which tests are not given in 7.2 to 7.7 inclusive. On going inspection of road tank vehicles for flammable liquid shall include the evaluation of the operator's quality system. In this connection it should be noted that ZS ISO 9001 covers the provisions of an integrated quality system.

Internal and External Inspection of the road tank vehicle shall be undertaken by an authorized inspections body at least once every two (2) years. In addition to this requirement the internal and external inspections shall be carried out after any major repairs are undertaken (e.g. road accident repairs, structural repairs).

A certificate shall be issued to show the test results of the inspection carried out as shown in 7.2 to 7.6.

7.2 Resistance of the tank to Hydrostatic or Pneumatic Pressure

With the manhole cover removed the manhole opening covered with a plate and all relief valves clamped, plugged or otherwise rendered inoperative, subject the tank to an internal hydrostatic or pneumatic test pressure equal to the higher of the marked design pressure (see 6.1 (e)) or 35 kPa.

Maintain the pressure for a period of 30 minutes at 1.25 MAWP (Maximum Available Working Pressure) to verify that the tank does not burst or leak (see 5.4.1 and 5.4.5). If it is a compartmentalised tank, test each compartment separately, ensuring that the adjacent compartments are empty and at atmospheric pressure.

7.3 Hydrostatic or Pneumatic Testing of Pipes, Valves, Manifold and Fittings

> Prior to attachment, subject each pipe, valve, manifold and fitting used for conveying liquid to an hydrostatic or a pneumatic test at the relevant pressure given in 5.5.4. Maintain the pressure long enough to detect any leaks.

7.4 Resistance of the Pumping System to Hydraulic Pressure

> After final assembly subject the entire pumping system (if fitted) of the road tank vehicle to an hydraulic pressure test at normal working pressure (see 5.6.3). Continue pumping long enough to detect any leaks.

> This shall be carried out to determine the residual thickness of the shell plate in comparison to the minimum allowable retirement thickness.

7.5 Welding Tests

These shall be carried out after any welding repairs on the tank as set out in ASME 9.

- PRESSURE, VACUUM AND FLOW TESTING OF VENTS
- 7.5.1 Apparatus. Shall consist of the following:
- Steel test tank of depth 0.3m and of length and width 1 m each, suitably constructed to withstand a pressure of at least 50 kPa, with 7.5.1.1 provision for mounting a manhole cover, adapters for fitting additional vents where required, and an 80 mm screwed inlet at the bottom.
- Pressure gauge, capable of reading from 10 kPa to + 100 kPa. 7.5.1.2
- 7.5.1.3 Air flow meter.
- 7.5.1.4 Water flow meter
- 7.5.1.5 Exhauster
- 7.5.1.6 Compressed air supply
- 7.5.1.7 Water supply
- 7.5.2 Procedure

Fit in the normal operating positions the manhole cover, the hatch and where relevant any additional vent(s) of the prototype (see NOTE (b) to Clause 1) used on the test tank. Test the appropriate vent(s) as given in 7.5.2.1 to 7.5.2.10 with, when relevant all other

Connect the exhauster, air flow meter and pressure gauge to the tank. Operate the exhauster, record the vacuum at which the vent starts 7.6.1

Where relevant, slowly increase the rate of exhaustion to a value corresponding to the maximum liquid discharging rate (see 6.1 (j). 7.6.2 Check that filling and discharging vents do not allow the vacuum to exceed 7 kPa (see 5.5.3.2).

Disconnect the exhauster and replace it with the compressed air supply. Slowly introduce dry air and check the pressure at which the 7.6.3 vent starts to open for compliance with 5.5.3.1 in the case of normal vents and with 5.5.3.3 (b) in the case of pressure actuated

- Zambia Gazette 435 Adjust the air flow until steady operating conditions are obtained at a pressure corresponding to the pressure claimed by the 7.6.4 manufacturer (see 6.2) Except in the case of fusible vent (which is tested as in 7.5.2.10) record the flow rate and check for compliance When relevant adjust the air flow until a steady pressure of 35 kPa is obtained and check the flow rate of pressure actuated emergency 7.6.5 When relevant adjust the rate of air flow to the maximum liquid filling rate for the tank (see 6.1(1)) and check filling and discharging 7.6.6 vents for compliance with 5.5.3.2. Adjust the air flow to obtain a pressure in excess of 25 kPa, slowly decrease the air flow and check the pressure at which the emergency 7.6.7 pressure vent closes for compliance with 5.5.3.3(b). When relevant, connect the tank to the flow meter, pressure gauge and water supply. Adjust the flow rate to the maximum liquid filling 7.6.8 rate for the tank (see 6.1 (i) and check the filling vent for compliance with the relevant requirement of 5.5.3.2. Dry the tank manhole cover and vents. Where a fusible vent is fitted remove the plug. Connect the air supply, flow meter and pressure 7.6.9 gauge to the tank and by introducing dry air at a steady pressure of 35 kPa, verify that the total venting capacity of the emergency vents complies with 5.5.3.3(a). 7.6.10 Where a fusible vent is fitted by repeating 7.5.2.4 with the plug removed and with all other vents sealed verify the area of the flow rate claimed by the manufacturer (see 6.2 and 5.5.3.3(c)). TESTING OF MANHOLE COVERS (AND HATCH CLOSURES, WHEN FITTED) 7.6 7.6.1 Drop test Conduct the test as follows: (a) attach the base plate of the manhole cover, including the fill opening of the prototype (see NOTE (b) clause 1) to the end of a steel tube of such thickness that it will not distort during the test and that it has a length of 1.5 to 1.6 m and a shape such that the sealing ring of the base plate forms a liquid tight joint with the tube and with a suitable stop at the end of the tube; (b) place the assembly in a suitable apparatus with the manhole cover at the bottom. Fill the tube with water to a depth of 0.9 m to 1.0 m; (c) raise the assembly vertically to height of 1.45m to 1.55m (measured from its lowest point); and (d) allow the tube and fitted manhole cover to fall freely through a distance of 1.20m - 1.21m and arrest the fall abruptly by means of the stop at the open end of the tube. Consider the manhole cover (and hatch closure, if fitted) to have passed the test if the assembly remains liquid-tight throughout, except that sight is permissible on impact, provided that the leak stops immediately thereafter. 7.6.2 Pressure test Conduct the test as follows: (a) fit each manhole cover including the fill opening with a safety device that prevents the cover from opening fully when internal pressure is present; (b) secure each cover with fastening that will prevent opening of the covers as a result of vibration under normal conditions of
 - (b) secure each cover with fastening that will prevent opening of the covers as a result of vibration under normal conditions of transportation or of shock impact due to a rollover accident on the roadway or shoulder, provided that the area is not struck by a substantial obstacle.
 - (c) mark each cover permanently by stamping or other means with
 - 1. the manufacturers name
 - 2. the test pressure in kPa and
 - 3. a statement certifying that the manhole cover meets the pressure test requirements

ANNEXA

(Normative)

NOTES TO PURCHASERS

The following requirements shall be specified in tender invitations and in each order or contact:

(a) the type and grade of metal required for the tank(s) see 5.2.1;

(b) the type of road tank vehicle;

(c) the total volume capacity of the tank in litres (see 5.3.2);

(d) when relevant the orientation of oval manholes (see 5.4.5);

(e) the normal working pressure of the pumping system (see 5.6.3);

(f) the length normal size maximum working pressure and type of hoses (see 5.7);

(g) whether lifting lugs are to be fitted to demountable tanks (see 5.8.5);

(h) whether identification placard holders are to be fitted (see 5.8.6); and

(i) when relevant the volume capacity of the individual compartments. (see 5.3.2)

ANNEXB

(Normative)

INFORMATION TO BE SUPPLIED BY THE MANUFACTURER

The manufacturer shall supply the purchaser with the following information in the form of a data book with each road tank vehicle produced:

(a) details of the markings required for tanks and vents in terms of clause 6;

- (b) design calculations that prove compliance with the relevant requirements of 5.3;
- (c) where applicable certificates covering the chemical analysis and tensile properties of all metal(s) used for the construction of the tank(s)
- (d) where applicable, certificates covering the Charpy V-notch impact values for the metal(s) and weld deposit(s) used in the construction of the tank(s) (to prove compliance with the requirements of 5.2.1 and 5.4.2.2);
- (e) weld procedure test results that prove compliance with 5.4.2;
- (f) proof of compliance of the prototype and of road tank vehicles of the same model designation with the requirements for manhole covers (see 5.4.5) vents (see 5.5.3) and hoses (see 5.7); and
- (g) the results of pressure tests carried out in accordance with 7.2 to 7.6

ANNEX C

INSPECTION RECORD

Inspection of a road tank vehicle during and after its fabrication should include but not restricted to the following items and should be supported by a full detailed inspection report:

Sub clause	Item inspected
5.2.1	Metal(s) for tank(s)
5.2.2	Materials for pipes, fittings and other ancillary equipment
5.2.3	Gasket joint rings and other components
5.2.4	Other materials if any
5.3.2	Capacity of each tank
5.3.9	Thickness of the shell, heads, bulk-heads and baffles
5.3.10	Stiffening of heads, bulk-heads and baffles
5.3.11	Circumferential reinforcement
5.4.2.1	Welding: general
5.4.2.2	Welds in steel and stainless steel
5.4.2.3	Welds in aluminium alloys
5.4.3	Baffle and ring stiffener joints
5.4.4	Overturn protection
5.4.5	Manholes and fill openings
5.5.2.1	Valves: design and mounting
5.5.2.2	Valve controls
5.5.3.1	Normal vents
5.5.3.2	Filling and discharging vents
5.5.3.3	Emergency vents
5.5.4	Piping and fittings
5.5.5	Dip tubes
5.5.6	Access to manholes and fill openings (lodd
5.5.7	Attachment of non-liquid carrying company
5.6.1	Power source for pumping
5.6.2	Pump(s)
5.6.3	Working pressure

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Sub clause	Item inspected	
5.7.1	Normal hoses	
572	Aircraft fuelling hoses	
5.8.1	Cab	
582	Shielding of engines	
5.8.3	Chassis and mounting of tank(s)	
5.8.5	Demountable tanks	
5.8.6	Placard and document holders	
5.8.61	Holders for identification placards (if applicable)	
5.8.6.7	Document holder in cab	
5.0.63	Document storage container	
5.8.0.5	Electrical Equipment	
5.8.7	Electrical system	
5.8.7.1	Wiring	
5.8.7.2	Battery Master switch	
5.8.7.5	Battery	
5.8.7.4	Permanently Energised circuits	
5.8.7.5	Electrical installation at the rear of the driver's cab	
5.8.7.6	Braking System	
5.9	Prevention of Fire risks	
5.10	Vehicle cab	
5.10.1	Fuel tanks	
5.10.2	Exhaust system	
5.10.3	Endurance braking	
5.10.4	Combustion heaters for heavy fuel oil and bitument tout	
5.10.5	Fire extinguishers	
5.11	Rear bumper and under run	
5.12	Manhole covers and openings	
5.13	Tyres	
5.14	Speed limiters	
5.15	Marking	
6	Marking of tanks	
6.1	Marking vents	
6.2	Inspection and Methods of test	
7	Resistance of the tank to hydrostating of pipes, valves, manifolds and fittings	
7.2	Hydraulic or pneumatic testing of P1	
7.3	Resistance of the pumping system of vents	
7.4	Pressure, vacuum and now teams	
7.5	Testing of manhole covers (
7.6		

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ANNEX D (Normative)

REFLECTOR AND HAZCHEM SIGN POSITIONS



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ANNEXE

(Normative)

ELECTRICAL INSPECTION AND TESTING CHECK LIST

Under listed are mandatory electrical checks for a road worthy vehicle. These checks shall be considered to the minimum requirements.

Vehicle registration number:

Check serviceability of:

- 1. Battery Master Switch
- 2. Battery Electrolyte and Terminals
- 3. Battery Bracket and Cover
- 4. Indicator and Lenses
- 5. Parking Lights and Lenses
- 6. Brake Lights and Lenses
- 7. Headlights and Lenses
- 8. Wipers
- Horn 9.
- 10. Starter Motor Cables and Connections
- 11. Charging System
- 12. Ignition System
- 13. General Cable Insulation and Wiring
- 14. Tachograph
- 15. Bonding Cable
- 16. Earth Pins

VALIDITY PERIOD: Three (3) months

DATE OF ISSUE:

EXPIRY DATE:

CHECKED BY: Company name:

Address:

Name of Inspector: Qualification:

SIGNATURE:

ANNEXF

(Informative)

NOTE ON THE USE OF THE CERTIFICATION MARK

Condition

The Zambia Bureau of Standards is the owner of the registered certification mark shown below, the independent assurance that the product This certification mark may be used by manufacturers only under license from the Bureau. Particulars of the conditions under which licenses complies with the requirements of this Zambian Standard. are granted may be obtained from the Executive Director, Zambia Bureau of Standards, P.O. Box 50259, Lusaka, 15101, Zambia



ZS 371

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Manufacturers producing road tank vehicles to this standard may, under a licence issued by the ZABS, apply the certification mark illustrated above to the compared the standard as illustrated above to the commodity as evidence to the purchaser that the commodity is being made in accordance with the standard and that compliance with its requirements is met and inspections carried out by ZABS.

1. In terms of the Standards Act, Cap 416 of the Laws of Zambia, it is a punishable offence for any person other than a licence holder to apply a certification mark to a commodity, to refer to the ZABS or any of its standards in a manner likely to create the impression that the commodity has been approved by the ZABS.

Furthermore, no person shall claim or declare that he or any other person complied with a standard unless:

(a) such claim or declaration is true and accurate in all material respects and

(b) the identity of the person on whose authority such claim or declaration is made is clear

2. It is recommended that authorities who wish to incorporate any part of this standard into any legislation in the manner intended by Section 14 of the Act consult ZABS regarding the implications.

GAZETTE NOTICE No. 334 OF 2010

[2081104/4

ZAMBIAN STANDARD

THE HANDLING, STORAGE, AND DISTRIBUTION OF LIQUEFIED PETROLEUM GAS (LPG) IN DOMESTIC, COMMERCIAL, AND INDUSTRIAL INSTALLATIONS

Part 4: Transportation of LPG in Bulk by Road - Code of Practice

1. SCOPE

This part of the code of practice contains recommendations for the design, construction, inspection, fittings and filling ratio of tanks used in the transportation of LPG in bulk by road, the design of vehicles and ancillary equipment, and operating practice.

Fire precautions are also covered, but protection against a major fire outbreak that leads to direct flame impingement on the vehicle cargo tank for any considerable period cannot be provided for in the design features; sound engineering and good operating practice will lead to the avoidance of this contingency and, where thought necessary, recommendations are made in respect of these aspects.

The suitability of vehicle cargo tanks for use under cold temperature conditions has been provided for in the design parameters of the tank.

The attention of users of this part of the code is drawn to the "Hazchem" system of marking of tankers, which is at present finding wide application in industry, to identify (particularly for the purpose of indicating the actions required of Fire Authorities in the case of accidents involving such tankers) the hazardous product that is being conveyed. The adoption of such a system for the identification of LPG road tankers is mandatory.

Note:

Where the contents of supply vehicles are to be transferred by fixed compressor or pump to the storage tank (s) of the consumer, the recommendations given in this part of the code shall be followed. Any additional requirements shall be agreed upon between the supplier and the consumer and shall be to the satisfaction of the approving authority.

NORMATIVE REFERENCES 2.

The following Standards and references contain provisions that, through reference in this text, constitute provisions of this part of ZS 429 Standard. All Standards are subject to revision and, since any reference to a Standard is deemed to be a reference to the latest edition of that Standard, parties to agreements based on this part of ZS 429 are of the most recent editions of the Standards indicated below. Information on the currently valid National and International Standards can be obtained from the Zambia Bureau of Standards.

The Handling, Storage and Distribution of Liquefied Petroleum Gas in Domestic, Commercial and Industrial ZS 429 - 2

Transportation of Petroleum Products: Operational Requirements for Road Tank vehicles -- Code of Practice. ZS 372

SANS 1186 Symbolic Safety Signs

IEC 60529: 2001/ SANS 60529: 2001: Degrees of Protection provided by enclosures (IP Vode)

Mines and Minerals Act Cap 213 of 2003

Occupational Health and Factories Cap 441

Public Roads Act No 12 of 2002 and

Road Traffic Act No 11 of 2002

3. DEFINITIONS

For the purposes of this part of the code the following definitions shall apply:

3.1 Approved

Approved by the approving authority.

18th June, 2010

3.2	Approving Auderia Lambia Gazette 441
	The appropriate of the arts
	The Weights are 13 f
	The Energy Development of the Laws of Zambia Volume 23 Cap 403)
	The Paterlaum A and Claws of Zambia, Volume 24, Cap. 436)
	The Pend Trees to the second trees to the seco
	The Road Traffic Act No 11 of 2002
	The Public Roads Act No 12 of 2002
	The Occupational Health and Factories Act Cap 441
	The Environmental Protection and Pollution Control Act, Cap 204, Volume 12 of 1990
	The Mines and Minerals Act, Cap 213 of 2003
	Zambia Weights and Measure Act Cap 403
2 2	Within the scope of the jurisdiction of local authorities: The local authority concerned
5.5	Filling Ratio
	The ratio of the mass or volume of LPG introduced into a tank to the mass or volume of water (determined at, or corrected to 20°C for Volume) that would fill the tank.
	Note: The term "filling ratio" applies when the filling of a container with liquefied gas is controlled on the basis of the mass of gas introduced.
3.4	Liquefied Petroleum Gas (LPG)
	Commercial butane, commercial propane, or a mixture of light hydrocarbons (predominantly propane, propene, butane and butene) that is gaseous under conditions of ambient temperature and pressure and that is maintained in the liquid state by an increase of pressure or a lowering of temperature.
	Note: Commercial butane, liquefied petroleum gas mixtures and commercial propane are covered by ZS 426.
3.5	Maximum Permissible Service Pressure
	The maximum internal Pressure that is permitted for a tank during service.
3.6	Semi-Trailer
	A trailer having no front axle and so designed that at least 15 % of its tare is superimposed on and borne by a vehicle drawing the trailer.
3.7	Tank
	A pressure vessel designed for the conveyance of LPG, and as defined in, and complying with, the regulations framed under ZS 429 Part 2, the Occupational Health and Factories Act Cap 441 and Mines and Minerals Act, Cap 213 of 2003.
	Note: A tank that is suitable for the conveyance of commercial propane may also be used to convey commercial butane and LPG mixtures.
4.	DESIGN, CONSTRUCTION AND TESTING OF CARGO TANKS
4.1	General
4.1.1	Cargo tanks shall be designed and constructed in accordance with 23 4291 at 2 of its equivalent, sound engineering practice and the relevant regulations framed under Occupational Health and Factories Cap 441.
4.1.2	In the case of a large tank, suitable buffer plates shall be provided to minimize surging of the contents.
4.2	Capacity
	The gross laden mass of the tank is determined by the design capacity of the vehicle of the Public Roads Act, No 12 of 2002 of vehicles must be in accordance with the appropriate requirements of the Public Roads Act, No 12 of 2002
4.3	Connecting Points and Manholes
4.3,1	Connecting points shall be provided with study for hanged integer control of the LPG, the pumping pressures and shock loadings combined stresses to which they may be subjected by the pressure of the LPG, the pumping pressures and shock loadings caused by transport conditions.
122	Each tank shall be provided with a manhole or with inspection openings such that the whole of the interior can be examined.
1 2 2	Wherever possible, fixtures or connections that may trap water shall be avoided.
+.3.3	GAUGES AND FITTINGS
ŧ. 4	General
	All gauges and fittings shall be suitable for use in the range of competentiation of the protected against physical damage and tampering.
	shall be able to that gauges be so placed that they can be read from ground to the
	It is recommended uses, sampling valves and other shut-on valves and tender where applicable (see 8.5).
	that are not in use shall be made for the connection of bonding leads, where apprendict the transfer and the state of the connection of bonding leads, where apprendict the transfer and the state of th
	Provision such as the

Each tank shall be equipped with a contents-gauging device that is subject to the relevant of the following precautions:

- (a) Each gauging device (such as a rotary tube, fixed tube or slip tube) that relies on bleeding to the atmosphere shall be so designed that designed that:
 - unless it is protected by a suitable emergency shut-off valve, the maximum opening of the bleed hole does not exceed í. 1.4 mm; and
 - it cannot be withdrawn completely during normal gauging operations.
- (b) Any maximum liquid level indicator shall be located as near to the midpoint (front to rear) of the tank as is practicable and shall be readily shall be rea
- (c) If the contents of the tank are to be measured with a rotary tube, magnetic or slip-tube gauge, at least one fixed tube gauge, set at 85 % of the verifield gauge set at 85 % of the water capacity of the tank, shall in addition be provided for checking the accuracy of the variable gauge.

iii. Temperature Gauge

Each tank shall be provided with a suitable temperature measuring instrument. Bulbs or sensing heads of temperature measuring instruments shall not be mounted in direct contact with the contents of a tank unless they are fire proof, of high resistance to fracture and designed to operate at a pressure of at least 1.725 kPa.

For standard instruments, thermometer pockets (in the form of blind tubes of suitable strength and filled with oil) shall be permanently fitted into a tank in a manner that complies with the standard to which the tank is constructed.

iv. Pressure Gauge

Each tank shall be equipped with a suitable pressure gauge connected to the vapour space of the tank. Pressure gauge connections shall be protected internally by means of a suitable excess-flow valve, or by a pressure tapping reduced internally to a bleed hole of diameter not exceeding 1.4 mm, and a manually-operated isolating valve shall be fitted externally between the tank and the pressure gauge.

- v. Pressure-relief Devices (see also the relevant regulations framed under the Occupational Health and Factories Act, Cap 441)
 - Each tank shall be equipped with at least one pressure-relief device (of stainless steel spring-loaded or equivalent (a) type), each having direct communication with the vapour space of the tank.
 - Each pressure-relief device shall be set to start to discharge at a pressure in the range 1,725 1,900 kPa (inclusive), (b) and shall be of such size and so designed and installed that the device discharges (at not less than the appropriate rate given in Table 1) before the pressure in the tank exceeds 2,070 kPa.
 - Pressure-relief devices shall be such that it is not possible to tamper with the relief-valve settings. (c)
 - Emergency shut-off valves shall not be installed between a tank and any pressure-relief device except as allowed in (d)terms of (f) below
 - The size and the number of pressure-relief devices shall be sufficient to provide the full relief flow capacity required (e) for the tank when any one is inoperative.
 - Provision may be made to isolate any relief valve for testing or servicing provided that the provisions of (e) above are (1) observed (i.e. it is ensured, by mechanical interlock, that the remaining relief valve or relief valves provide the full relief capacity required in terms of (h) above).
 - Each pressure-relief device shall be legibly and permanently marked with the following: (g)

i. The pressure at which the device is designed to open;

- ii. The maximum discharge rate of air in cubic metres per second at ambient temperature and pressure (see Table 1).
- Pressure-relief devices shall be tested for accuracy of set-to-discharge pressure at intervals that do not exceed 5 years. (h)
- The pressure-relief device(s) shall vent upward, away from the tank, along an unobstructed path and into the open air. (i)
- The vents shall be fitted with loose-fitting rain caps drained at the bottom, the drain holes being so positioned as not to

vi. Emergency Shut-off Valves

- Subject to the provisions of (b) below, all liquid and vapour connections in the tank, other than those for pressure (a)Subject to the provisions of (c) sector temperature, pressure and liquid content and those permanently fitted with blank flanges, shall be fitted with an emergency shut-off valve (e.g. an excess-flow valve, an automatically operated
- As sludge, scale, dirt, etc. may cause excess-flow valves and non-return valves to stick in the open position, drain (b) As sludge, scale, unit, etc. may cause succession and the drain is fitted with two valves (one of which is of the outlets need not be fitted with such valves, provided that the drain is fitted with two valves (one of which is of the
- Where the emergency shut-off value is of the excess-flow type, the rate of flow required to close it shall be less than Where the emergency share on the line it is protecting (calculated under the most adverse conditions that likely to result from a complete fracture of the line it is protecting (calculated under the most adverse conditions (c) that likely to be experienced) and in no case shall it exceed 1.5 times the design flow for the line.
- Excess-flow valves shall have a rated closing capacity sufficiently above normal flow requirements to prevent valve (d)

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vii. Protection of Valves and Accessories

All valves and accessories shall be safe-guarded against interference and accidental damage. They shall be mounted and protected in such a way that side of a main interference and accidental damage. protected in such a way that risk of accidental rupture of the branch to which they are connected is minimized. In addition, valves at the rear of a value to the the rear of a value to the transmission of the frame valves at the rear of a vehicle shall be so mounted that they are protected from damage by the rear cross-member of the frame of the vehicle

n ²	of Air, min.	Surface Area m ²	Flow Rate m ³ /s of Air, min,	Surface Area m ²	Flow Rate m ³ /s of Air, min
20	0.248	16.5	1 77	55.0	4.75
2.0	0.313	17.0	1.91	60.0	5.10
2.5	0.377	17.5	1.86	65.0	5.45
3.0	0.437	18.0			
3.5	0 497	18.0	1.90	70.0	5.79
4.0	0.553	18.5	1.94	75.0	6.13
		19.0	1.99	80.0	6.46
4.5	0.610	19.5	2.03	85.0	6.79
5.0	0.665	20.0	2.03	90.0	7.11
5.5	0.718	21.0	2.16	95.0	7.44
6.0	0.772	22.0	2.24	100.0	7.75
6.5	0.825	22.0	2.24	100.0	1.15
7.0	0.877	23.0	2.32	105.0	8.07
	0.077	24.0	2.41	110.0	8.39
7.5	0.927	25.0	2.49	115.0	8.70
8.0	0.977	26.0	2.57	120.0	9.01
8.5	1.03	27.0	2.65	125.0	9.31
9.0	1.08	28.0	2.73	130.0	9.62
95	1.13	29.0	2.81	135.0	9.92
10.0	1.17	30.0	2.89	140.0	10.2
10.5	1.22	31.0	2.07	145.0	10.5
10.5	1.22	32.0	3.05	150.0	10.5
11.0	1.27	33.0	3.12	155.0	11.1
11.5	1.52	55.0	5.42	155.0	
12.0	1.36	34.0	3.20	160.0	11.4
12.5	1.41	35.0	3.30	165.0	11.7
13.0	1.46	36.0	3.36	170.0	12.0
	1.50	37.0	3.43	175.0	12.3
13.5	1.50	38.0	3.51	180.0	12.6
14.0	1.55	39.0	3.58	185.0	12.8
14.5	1.59				
15.0	1.64	40.0	3.66	190.0	13.1
15.0	1.68	45.0	4.03	195.0	13.4
15.5	1 72	50.0	4.39	200.0	13.7

TABLE 1-RATE OF DISCHARGE OF PRESSURE-RELIEF DEVICES (FOR TANKS OF SURFACE AREA UP TO 200 M²)*

Flow rate, m^{3}/s of air = 0.17763 A^{0.82}

Where $A = surface area, m^2$

Min. = minimum

4.5

The mounting structure shall be of steel and so designed as to limit, as far as is practicable, movement of the tank in relation to The mounting structure. The design of the mounting structure, based on the ultimate strength of the mounting the The mounting structure shall be of steel and the mounting structure, based on the ultimate strength of the material used, shall be such the chassis of the vehicle. The design of the mounting structure will withstand a static load in any direction structure for the structure will withstand a static load in any direction structure. the chassis of the venicle. The design of the structure will withstand a static load in any direction equal to twice the weight that, subject to a safety factor of at least four, the structure will withstand a static load in any direction equal to twice the weight that, subject to a satety factor of at teast total mark with the maximum mass of liquid permitted (see 4.2). Where the mounting of the tank and attachments when the tank is filled with the maximum mass of liquid permitted (see 4.2). Where the mounting of the tank and attachments when the tank shell, it shall be continuously welded to the shell, structure is designed as an integral part of the tank shell, it shall be continuously welded to the shell.

4.6 FINISH AND MARKING

4.6.1. Finish

Tanks shall be painted with a suitable corrosion -resistant and light-reflective paint.

4.6.2.

A plate, securely attached to the shell of the tank in a conspicuous place, shall, in terms of the relevant statutory regulations, be marked (by the marked (b))). be marked (by the manufacturer) with the following information:

- (a) manufacturer's name;
- (b) country of origin;
- (c) manufacturer's serial number;
- (d) year of construction;
- (e) date of initial pressure test (4.7.1);
- (f) test pressure, in kilopascals;
- (g) maximum permissible service pressure, in kilopascals;
- (h) water capacity, in cubic metres (or litres) at 20 °C;
- (i) number and title of the standard to which the tank was constructed.
- 4.7 INSPECTION AND TESTING

4.7.1. Initial

- (a) Tanks shall be constructed and subjected to initial inspection and testing, under the supervision of an approved inspecting authority, in accordance with the appropriate requirements of the ZS 429 Part 2.
- (b) A certificate giving the following information shall be provided with each tank:
 - (i) maximum permissible service pressure;
 - (ii) water capacity, in cubic metres (or litres) at 20 °C;
 - (iii) date of test;
 - (iv) pressure at which tested;
 - (v) number and title of the standard to which the tank was constructed.
 - (vi) any other data considered necessary.
- 4.7.2. Periodic

Each tank shall be subjected to periodic inspection and testing in accordance with the appropriate regulations framed in this standard.

Note: It must be noted that only the approving authorities may grant permission for deviation from requirements for inspection and testing.

5. FILLING RATIOS AND FILLING OF TANKS

5.1 **Filling Ratios**

The safe filling ratio of a tank is a function of ambient temperature conditions. Table 2 gives the appropriate values for the

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15°C/4°C	Maximum Permissible Filling Ratios		
	Tanks of Capacity Less than 5000 litres	Tanks of Capacity litres or more	
0.495-0.499	0.40		
0.500 - 0.504	0.42	0.45	
0.505 - 0.509	0.43	0.45	
	0.43	0.46	
0.510 - 0.514			
0.515 - 0.519	0.44	0.47	
0.520 - 0.524	0.44	0.47	
	0.45	0.48	
0.525 - 0.529			
0.530 - 0.534	0.46	0.49	
0.535 - 0.539	0.46	0.49	
0.000	0.47	0.50	
0 540 - 0 544			
0.545 - 0.540	0.47	0.50	
0.550 0.564	0.48	0.51	
0.550 - 0.554	0.49	0.52	
0 555 - 0 559	0.40		
0 560 - 0 564	0.49	0.52	
0.565 - 0.569	0.50	0.53	
0.505 - 0.509	0.50	0.53	
0.570 - 0.574	0.51	0.54	
0.575 - 0579	0.52	0.55	
0.580 - 0.584	0.52	0.55	
0.585 - 0.589	0.52	0.56	
0.590 - 0.594	0.53	0.56	
0.595 - 0.599	0.54	0.57	
0.600 - 0.604	0.55	0.58	

TABLE 2. FULLING DUMON

1

5.2 Filling by Mass

The maximum mass, M (in kilograms), of liquid that may be introduced into a tank may be calculated from the following formula:

 $M = C \times D$

where

C = water capacity of the tank, kg

D = filling ratio

Filling by volume 5.3

The maximum volume (at a particular temperature, T) of liquid, V_{r} (expressed as a percentage of total tank capacity) that may The maximum volume (at a particulated from the following formula, the temperature of the LPG being obtained by means be introduced into a tank may be calculated from the following formula, the temperature of the LPG being obtained by means 5.3.1 of a thermometer placed in a thermometer pocket installed in the tank:

$$V_{T} = \frac{Dx100}{GxF}$$

where

- Filling ratio D =
- Relative density of the LPG a t 20%20°C liquid volume correction factor (see IP 250 and consider the relative density at 20%/20%C to be the density at 20%C) G =
- temperature of liquid LPG in the tank, °C F =
- T =

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532	The actual maximum volume of LPG that may be introduced into the tank is obtained by multiplying the water of the

- tank by V₁/100
- 6. VEHICLES
- 6.1 General
- (a) Vehicles used for the transportation of LPG shall comply with the appropriate requirements of the Public Roads Act No 12 of 2002 and the Road Traffic Act No 11 of 2002
 - (b) LPG shall not be transported in a tank mounted on a conventional draw-bar trailer.
 - (c) More than one tank may be mounted on a single chassis.
 - (d) Separate hand-operated rear wheel braking, controlled from the cab, is recommended for semi-trailers.
 - (e) The tank(s) shall be either a component part of the chassis of the vehicle or securely attached to the chassis.
 - (f) A composite vehicle carrying a tank or tanks shall be deemed to comply with (e) above if each tank, though removable, is securely fastened to a cradle that is fixed to the chassis, or, in the case of an ISO container tank designed for the conveyance of LPG, it is properly secured (see ISO 3874) to the carrying vehicle through its bottom corner fittings by means of acceptable securing devices, e.g. twist locks or pin securing devices.
- 6.2 PROTECTION AGAINST FIRE AND ELECTRICAL HAZARDS (SEE ALSO ZS 402 AND SANS 10089: PART II)

6.2.1 Fire Precautions

- (a) A quick-action cut-off valve is not required in the fuel line if the fuel supply of the vehicle is not gravity-fed but supplied by a feed pump driven directly from the engine. However, such a valve shall be fitted to any vehicle that has a gravity-fed fuel supply.
- (b) If the fuel used to propel the vehicle gives off a flammable vapour at a temperature below 55°C, the vehicle shall not be allowed to tow an LPG trailer.
- (c) If a window is provided in the back of the cab, it shall be non-opening and of wired glass (or other approved heat resisting material) fitted in fire-resisting framing.
- (d) The exhaust system of the vehicle, including the muffler and the exhaust pipe, shall have ample clearance from the fuel system and any combustible material in the vehicle. The exhaust discharge shall be directed away from any tank and its appurtenances, and to the outside of the frame of the vehicle and any skirting of the vehicle. A muffler cut-out shall not be used.
- (e) Stout steel guards or the frame of the vehicle shall be used to protect the lower part of the rear of the tank from damage.
- (f) One fire extinguisher (dry chemical powder type with a B:C rating of at least 1kg) shall be provided in the cab of the vehicle to be used as a first defense against a fire in the engine compartment.
- (g) At least two 9 kg serviceable fire extinguishers of the dry chemical powder type, located in an accessible position, shall be carried on each side of the vehicle.
- (h) Vehicle drivers and their assistants shall not smoke or allow smoking on or near the vehicle (within 15 metres around the vehicle) whether it is stationary or in motion, or while deliveries are being made or filling of the tank(s) is in progress, or while any repairs to the vehicle are being carried out.
- (i) Vehicle drivers and their assistants shall not use cell phones or allow usage of cell phone in or near (within 15 metres) the vehicle whether it is stationary or in motion, or while deliveries are being made or filling of the tank(s) is in progress, or while any repairs to the vehicle are being carried out. The cell phone shall remain off during the afore-mentioned operations.
- (i) Each vehicle shall carry non-metallic chocks and anti-tow away device which shall be used to prevent rolling of the vehicle when it is parked and during loading and unloading.

6.2.2 Electrical Precautions

(a) Electrical equipment

Electrical System

The electrical system shall comply with the requirements given below and shall be certified through a valid electrical certificate issued by a qualified auto-electrician registered with the Engineering Institution of Zambia

(b) Wiring

The conductors shall be large enough to avoid over heating. Conductors shall be adequately insulated. All circuits shall be protected by fuses or by automatic circuit breakers, except for the following;

- (i) From the battery to the cold start and stopping systems of the engine.
- (ii) From the battery to the alternator
- (iii) From the alternator to the fuse or circuit breaker box and
- (iv) From the battery to the starter motor and from the battery to the power control housing of the endurance braking system if this system is electrical or electromagnetic.

The above protective systems shall be as short as possible.

The cables shall be securely fastened and positioned in such a way that the conductors are adequately protected against

- (c) Battery master switch
- The vehicle shall be fitted with a master switch comprising the following requirements: (i)
- A four pole isolating switch for breaking the electrical circuits shall be placed as close to the battery as is practicable. It shall be protected against inadvertent operation and shall be easily operated by someone standing next to the vehicle.
- (ii) The switch shall have a casing with protection degree IP65 (dust tight and protected against water) in accordance with IEC 60529
- (iii) The cable connections on the switch shall be of protection degree IP54 (Protects against water and dus). However this does not apply if these connections are contained in housing, such as the battery box. In this case it is sufficient to insulate the connections against short circuits, for example with rubber cap.
- (iv) Shall be labelled
- (d) Battery

The battery terminals shall be electrically insulated or covered by a non conducting battery box cover. If the batteries are not located under the engine bonnet they shall be fitted with vented box.

The battery shall be easily accessible

The batteries shall be properly secured by clamping to ensure minimum movement.

Batteries with cell to cell connection exposed shall not be allowed.

- (e) All portable lighting equipment shall conform to ZS 402, or any other relevant standards.
- (f) Lighting circuits shall have suitable over-current protection such as fuses or automatic circuit-breakers.
- (g) All electrical circuits shall be heavily insulated and independent of the chassis except that the chassis may be used as the earth return for starter and ignition high voltage circuits.
- (h) The wiring shall have adequate carrying capacity and mechanical strength and shall be so fixed, insulated and protected as to minimize accidental damage and undue wear.
- The generator switches and fuses shall be in front of the cab. The battery shall, preferably, also be in front of the cab, but (i) where this is impracticable, adequate precautions shall be taken.
- The tank, ancillary equipment, pipe circuit and hoses shall have electrical continuity with the chassis, including the axles (i)and springs.

6.3 Warning Notices

Each vehicle shall display at least two notices, one on each side of the vehicle, that are painted on or securely attached to the sides of the vehicle and that consist of the following words or of the corresponding pictogram (i.e. Types PV1, PV2 and PV3) given in SANS 1186:

DANGER - NO SMOKING - NO NAKED LIGHTS - SWITCH OFF CELL PHONE

printed in black letters on a yellow background (see also SANS 10140) and in English, in letters of height at least 60 mm in the case of the word 'DANGER' and of height at least 30 mm in the case of the remainder of the wording. (Warning Signs)

Inspection 6.4

The roadworthiness of the vehicle shall be checked daily as per Road Traffic Act No.11, 2002, an example of a checklist is given in Annex A

Maintenance 6.5

Each vehicle, its pipe-work, hoses and ancillary equipment shall be overhauled at frequent and regular intervals as per manufacturer specification.

ANCILLARY EQUIPMENT 7.

7.1

- (a) The design and construction of each pump shall be suitable for the duty for which it is required (see ZS 402 or any other relevant standard).
- (b) The pump body shall be made of non-porous, non-flammable materials capable of withstanding the jarring and vibration effects incident to vehicular use.
- (c) The rotational speed of the drive shall be suitably controlled to prevent the rating of the pump from being exceeded.
- (d) Pumps shall be protected from accidental damage by suitable positioning.
- If electrically operated pumps are employed, the electrical installation shall be flame-proof (see also ZS 402 and SANS (e)
- In the case of a hose that is carried on the vehicle and that is connected to the pump discharge piping, an automatic device In the case of a nose that is cannot device) shall be installed between the discharge piping and the hose connection (such as a differential regulator or equivalent device) shall be installed between the discharge piping and the hose connection (such as a differential regulator or equivalent device) shall be installed between the discharge piping and the hose connection (such as a differential regulator of liquid when the pump is not in operation. If a meter is fitted to the discharge piping, the device shall to prevent discharge of liquid when the hose connection. An excess flow value may also be used to be a start outlet and the hose connection. *(f)* to prevent discharge of light the note of the hose connection. An excess-flow valve may also be used but shall not be the be installed between the meter outlet and the hose connectioned above into practice. exclusive means of putting the recommendations mentioned above into practice.

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18th June, 2010

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Zambia Gazette

Hoses must be rejected at the end of a service period not exceeding 3 years or as per manufacturers expiry date (which ever comes first)

- (d) On a vehicle, hoses shall be so carried that they are protected from accidental damage.
- DRIVER INSTRUCTION AND TRAINING 8.1

A high standard of driving skill (shall have passed handling of dangerous goods training and shall be in possession of a PSV driving licence for the value of the licence for the vehicle code that corresponds to the type of vehicle he intends to drive) and physical fitness is required for drivers. Other requirements shall be as detailed in ZS 372.

- 8.2 Drivers shall be certified medically fit to drive by a doctor recognized by the Medical Council of Zambia. Extra medical checks, such as annual checks and proficiency test for the driver shall be done (if considered necessary) after absence from work for over 30 days owing to illness or any other cause.
- 8.3 Every vehicle while engaged in the conveyance of LPG shall, except while halted at a place approved for the purpose by the local authority or as allowed in terms of 9.1, be constantly attended to by the driver or other competent person who is at least
- 8.4 When a vehicle is stationary, the driver (or other competent person who is at least 25 years of age) may be regarded as being in attendance of it if he is within 15 metres from the tank in whatever direction.
- 8.5 A semi-trailer, while attached to a drawing vehicle, shall be regarded as forming part of the vehicle to which it is attached and shall not be regarded as a separate vehicle.
- 8.6 Safe operating methods for the conveyance of LPG, the filling of tanks with LPG, the discharge of LPG, use of correct PPE and emergency procedures shall be covered during instruction and training of the driver.
- 9. FILLING OF TANKS WITH LPG AND DISCHARGE OF LPG
- 9.1 A vehicle shall be positioned with its hose within easy reach of the filling connection of the tank to be charged or of the discharge connection of the tank to be discharged.
- 9.2 The hand brake of the vehicle shall be on, and the engine of the vehicle shall not be running and master switch switched off, except when the engine is being used to drive the pump.
- 9.3 The surroundings, the tank and the connections shall be visually checked to ascertain that there are no unusual or dangerous situations.
- 9.4 Appropriate pictograms (or warning notices in English) shall be displayed.
- It shall be ensured that there is a bond path between the discharge or filling connection (as relevant) and the vehicle before flow 9.5 of the product commences.
- The accumulation of static electricity is reduced by earthing and bonding filling/discharge equipment in accordance with the 9.6 recommendations given in SANS 10089: Part 2 - to check if exists and the connection of bonding leads shall be the first connections made between a storage tank and the vehicle.
- When operations are commenced, a further examination for leakage at connections shall be carried out. 9.7
- After completion of the transfer of LPG, all connections shall be disconnected and a full examination shall be made to ensure that 9.8 the vehicle is in a fit condition to be driven away.
- PARKING AND GARAGING OF LPG VEHICLES 10.
- Except during an emergency, or in the case of stops made at designated points in connection with a delivery, or a stop for rest except during an energency, or a stop for rest or a meal, a vehicle containing LPG shall not be left unattended by day or by night on any street, highway, avenue or alley. A 10.1 vehicle when unattended shall be securely and safely parked and shall be well lit.
- Vehicles containing LPG shall not be stored, parked or garaged in any building other than a building designed for or specifically approved by the local authority or ERB for such use. 10.2
- When it is necessary to garage LPG vehicles for service on the chassis or engine the following essential precautions shall be 10.3
 - (a) All primary shut-off valves shall be closed and liquid and vapour in the hose and piping shall be vented to a safe location before the vehicle is moved inside the building.
 - The system shall be checked for any leaks and shall any be found it is essential that they be repaired before the vehicle is moved inside the building.
 - The cargo tank shall be gauged to ensure that it is not filled beyond its maximum filling ratio. If it is found to be so filled, this shall be corrected before the vehicle is moved inside the building. (c)
 - (d) The vehicle shall not be parked near a source of heat, near an open flame or near a similar source of ignition, or within the path of hot air being blown from a blower type heater.
 - Unless the LPG is removed from the cargo tank and the pressure is reduced to atmospheric pressure, the driver shall inform Unless the LFO is relieved a garage as to the nature of the contents of the tank and shall instruct them not to tamper with the responsible people in the garage as to the nature of the contents of the tank and shall instruct them not to tamper with
 - the valves and fittings. Repair work shall not be carried out on a cargo tank or its primary shut-off valves if the tank contains LPG.
- When a vehicle is stationary at public places, the horse shall not be unhooked from the trailer. 10.4
- 10.5

ANNEXA.

APPLICABLE STANDARDS

Reference is made to the latest issues of the following standards:

ASME 1331: Piping and piping systems

BS 3351: Piping systems for petroleum refineries and petrochemical plants

BS 3602: Specification for steel pipes and tubes for pressure purposes: carbon and carbon manganese steel with specified elevated temperature properties

BS 4089: Rubber hose and hose assemblies for liquefied petroleum gas lines

IP 250: Petroleum measurement tables based on a reference temperature of 20°C

ISO 3874 Series 1: Freight containers - Handling and securing

SANS 1156: Rubber hoses for liquefied petroleum gas (LPG), Part I: Hoses used in road and rail transport

SANS 1186: Symbolic safety signs

SANS 10044 Part III: Welding - The fusion welding of steel (including stainless steel): Tests for the approval of welding procedures and production welds

SANS 10089: Code of practice for the petroleum industry, Part II: Electrical code

SANS 10140: Identification of colour marking

ZS 402: The Classification of Hazardous Locations and the Selection of Apparatus for Use in Such Locations - Code of Practice

ZS 426: Liquefied petroleum gas mixtures

ZS 372: Transportation of Petroleum Products. Operational requirements for road tank vehicles - Code of Practice

ANNEX B

(Informative)

TYPICAL DAILY PRE-TRIP INSPECTION SHEET

An example of a typical daily inspection schedule is given below: Date of Inspection:

Registration Number of Horse:

Registration Number of Trailer:

B.1 When you approach the vehicle

- (a) Look for water, oil, fuel and other leaks and for bodywork damage at the front of the vehicle.
- (b) Look for any other obvious faults.
- **B.2** Check the condition at the front of the vehicle
 - (a) Windscreen
 - (b) Windscreen wiper arms and blades
 - (c) Rear view mirrors
 - (d) RH and LH front white reflectors
 - (e) Headlamps
 - Lamp and indicator lenses (1)
 - (g) Number plate licence and permit disc present on the screen

B.3 Enter the cab and while seated:

- (a) Check that there are no loose items in the cab
- (b) Check, the parking brake: has it been applied and does it work?
- (c) Check the oil and water levels (on some vehicles this is done from outside)
- (d) Start the engine: check the reading of the oil pressure gauge, is there any unusual engine noise?
- (e) Check the reading of the air pressure gauge: check the build-up time of the air pressure
 - (i) Max 12 min in the case of a drawing vehicle and
 - (ii) Max 8 min in the case of other vehicles
- (f) Check the gauge and warning lights for correct operation
- (g) Depress the service brake a couple of times until the warning buzzer sounds
- (h) Stop the engine: keep the service brake pedal depressed and check for leaks of air system
- (i) Check the operation of the clutch pedal and the horn; check the steering for free play
- (j) Check the tachograph for damage and insert the correct chart where fitted.
- (k) Check that the warning triangle(s) are stowed in the cab
- (1) Check for cab fire extinguisher

B.4

551

- (m) Check that seat belts are functional
- (n) Switch on all the lights and leave the cab
- Walk around inspection
- (a) Check the RH and LH front tyres and the wheel nuts: check that the fifth wheel is properly locked, (applies to articulated vehicles only)
- (b) Make sure that the pump meter on RH side of the vehicle is secured. Inspect the pump hose and nozzle stowed on the tank top
- (c) Make sure that all manhole lids are correctly closed and locked: check for obvious damage
- (d) Check the condition of the air reservoirs and operate the drain valves
- (e) Make sure that the yellow side reflectors are fitted and are undamaged
- (f) Check the RH and LH rear tyres and the wheel nuts (applies to rigid vehicles, tractors and semi trailers): check the mudguards for damage. (and wheel nut indicators)
- (g) Make sure that the two wheel chocks are properly stowed on the rigid chassis of the semi-trailer frame
- (h) Make sure that all the lights are operative and that the reflectors and the chevron are not damaged; check the rear bumper for damage and make sure that the registration plate light is operative (i)
- Check the stowage of the gravity hose and check for obvious damage (fraying etc)
- (j) Check the security of the fuel filler cap and make sure that the tank is properly filled
- (k) Make sure that the gravity meter is secure
- (1) Make sure that the control box for the pneumatic system is secure
- (m) Check the locks of the manifold valves, especially for leaks
- (n) Make sure that the fire extinguisher is correctly fitted and check it for obvious damage. is the inspection date overdue?
- (o) Make sure that all the front lights are operative
- (p) Make sure that the RH and LH front and rear indictors are working (get assistance if possible to look at the rear indicators)
- (q) Enter the cab and switch off all the lights
- (r) Make sure that the brake lights are operative (get assistance to depress the service brake pedal and check if the lights are operative)
- (s) Fill in the logbook and faults book

Name of driver:

Signature of driver: Date:

GAZETTE NOTICE NO. 335 OF 2010

[0162609

The Standards Act. (Cap 416)

IT IS HEREBY NOTIFIED for public information that in exercise of the powers conferred upon the Zambia Bureau of Standards by the Standards Act (Cap 416), the documents listed in the schedule below have been declared Zambian Standards. Copies of the documents are obtainable at Zambia Bureau of Standards, Lechwe House, Freedom way, P.O. Box 50259, Lusaka. Telephone: 260 211 231385/227075. E-mail: infozabs@zamnet.zm

10th June, 2010

ZS 737: 2010

M. M. MUKELABAI, Director Zambia Bureau of Standards

SCHEDULE

- Jams, Jellies and Marmalades (fruit Preserves) Part 1 & 2 ZS 037: 2010
- Automotive Gasoil (Diesel Fuel) Specification ZS 369: 2010
- Cooked Cured Chopped Meat Specification
- ZS 611: 2010 Fresh Meat - Code of hygienic practice
- Code of Hygienic practice for Poultry Processing ZS 711: 2010
- ZS 712: 2010 Low Sulfur Gasoil - Specification
- ZS 718: 2010 Pasteurised Milk - Specification
- ZS 730: 2010 Yoghurt - Specification
- ZS 731: 2010 Raw Milk - Specification
- ZS 732: 2010 Butter - Specification
- Dairy Ice & dairy ice cream Specification ZS 733: 2010
- ZS 734: 2010 UHT Milk - Specification
- Sweetened condensed milk Specification ZS 735: 2010
- ZS 736: 2010 Milk powder - Specification

[0161811

GAZETTE NOTICE NO. 335 OF 2010

Zambia Revenue Authority Cutoms Services Division

Chanida Port Office - Auction Sale Notice

NOTICE IS HERE BY GIVEN that the following goods, under seizure, listed in the schedule are offered for sale. In terms of Section 33 and 162 of the Customs and Excise Act, goods listed in the schedule presently in the Customs Warehouse at Chanida Port Office, will be disposed of unless duties, charges and other legal obligations due on them are taken care of within a period of forty-five days from the publication of this notice.

Persons wishing to obtain more details regarding the sale should contact the Station Manager – Chanida Port Office, Customs and Excise Division – Chanida Office.

Note:

The Zambia Revenue Authority or its Agent does not in any way warrant goods title in respect of the goods being sold. In the event that there is a subsequent claim of superior title by a third party or Sovereign Government other than The Republic of Zambia, The Authority or its Agent shall not be liable in any way whatsoever to anyone purchasing any of the goods mentioned in the schedule.

MUYANGWA MUYANGWA, Commissioner-Customs Services

[0161811/2

RECOMMENDED FOR DISPOSAL – APRIL 2010						
Seizure	SeizureDate	Importer	Description	Specifications	Quantity	VDP(ZMK)
Number						
018545	4-Mar-10	UNKNOWN	TAMBIRANE GIN	12/340MLS	100	2,200,000
018546	3-Apr-10	UNKNOWN	TAMBIRANE GIN	12/340 MLS	51	1,122,000

GAZETTE NOTICE NO. 000 OF 2010

Zambia Revenue Authority

Customs Services Division

Livingstone Port Office - Auction Sale Notice

NOTICE IS HERE BY GIVEN that the following goods, under seizure, listed in the schedule are offered for sale. In terms of Section 33 and 162 of the Customs and Excise Act, goods listed in the schedule presently in the Customs Warehouse at Livingstone Port Office, will be disposed of unless duties, charges and other legal obligations due on them are taken care of within a period of forty-five days from the publication of this notice.

Persons wishing to obtain more details regarding the sale should contact the Assistant Commissioner – Livingstone Port Office, Customs and Excise Division – Livingstone Office.

Note:

The Zambia Revenue Authority or its Agent does not in any way warrant goods title in respect of the goods being sold. In the event that there is a subsequent claim of superior title by a third party or Sovereign Government other than The Republic of Zambia, The Authority or its Agent shall not be liable in any way whatsoever to anyone purchasing any of the goods mentioned in the schedule.

MUYANGWA MUYANGWA, Commissioner-Customs Services

RECOMMENDED FOR DISPOSAL - APRIL 2010

Seizure	Seizure	Importer	Make	Engine		
Number	Date			Number	Chassis Number	
4739	-	NATASHA.S.C.MULENGA	M/BENZ	339664	WDP211016	VDP(ZMK)
4736	18-Mar- 2010	LUNDA.M.MUSHILIPA	IVECO TRUCK	583906	SBCAIDCOM	52,655,566
4726	30-Feb-2010	GEORGINA TEMBO	MAZDA TITAN	4HF22221	WG3AT100775	92,382,277.89
					WOJAT 100770	31,300,000.00

18th June, 2010

GAZETTE NOTION N. 2010	Zambi	a Gazette	553
The NOTICE NO. 337 OF 201	0 [0082996	GAZETTE NOTICE No. 340 of 2010	[0162121
Cap. 50 of the Appointment of Perso	rriages Act 2 Laws of Zambia) n to Solemnise Marriages	The Lands and Deeds Registry Act (Chapter 185 of the Laws of Zambia) (Section 56)	
IT IS HEREBY NOTIFIED for publi	c information that in exercise of the	Notice of Intention to Issue a Duplicate Certifi	cate of Title
Section 5(2) of the Marriages Ac is hereby appointed to solemnise	n Clerk for Lusaka City Council by et, the person named in the Schedule marriages in the Republic of Zambia.	FOURTEEN DAYS after the publication of this not issue a Duplicate Certificate of Title No. L305 in the nat Elizabeth in respect of property No. L/2727/M in e	ice I intend to me of Mandona extent of 2.632
CIVIC CENTRE P.O. Box 30077	B. L. LUANGA, Acting Town Clerk	All persons having objections to the issuance of	f the duplicate
SCH	EDULE	certificate of title are hereby required to lodge the sa with the Registrar of Lands and Deeds within fourteer	he same in writing rteen days from the
Rev. Lazarous Shumba B P Z	Church Fible Gospel Church in Africa .O. Box 30218 ambia	date of publication of this notice A, NTU REGISTRY OF LANDS AND DEEDS P.O. Box 30069 of Lan	ITUMA (MS), Registrar ads and Deeds
GAZETTE NOTICE No. 338 OF 201	0 [0162187	LUSAKA	
The Lands and	Deeds Registry Act	GAZETTE NOTICE No. 341 OF 2010	
(Chapter 185 of	the Laws of Zambia)	Zambia Public Procurement Authori	ty
(Sec	tion 56)	Invitation for Bids	linew of ano
Notice of Intention to Issue	a Duplicate Certificate of Title	Motor Grader—Kalulushi Municipal Counci	l
FOURTEEN DAYS after the pu issue a Duplicate Certificate o Caroline Chande Tepa in respe	blication of this notice 1 intend to of Title No. 19670 in the name of ect of property No. LUS/25549 in	THE Kalulushi Municipal Council has received fur Government of the Republic of Zambia towards the p Motor Grader.	iding from the urchase of one
extent of .630 square meters situ of the Republic of Zambia. All nersons having objectio	ate at Lusaka in the Lusaka Province	Registered Companies/Agents/Franchise holders for delivery of one Motor Grader.	s from Zambia the supply and
All persons having objections to the issuance of the duplicate certificate of title are hereby required to lodge the same in writing with the Registrar of Lands and Deeds within fourteen days from the date of publication of this notice L. M. B. S. HABANJI (MS), REGISTRY OF LANDS AND DEEDS Chief Registrar		Interested Zambian Registered Companies/Age Holders only may obtain informatin and inspec documents at the Zambia Public Procurement Aut First Floor, Room 20, Red Cross House, P.O. Box 3 Zambia. The telephone numbers are +260-211-25 number is +260-211-250633. However electronic offic accepted.	nts/Franchise t the bidding hority (ZPPA) 1009, Lusaka, 60632/42, Fax ers shall not be
Р.О. Вох 30069 Lusaka	0 [0162120	A complete set of bidding documents may be pr Zambia Public Procurement Authority upon payn refundable fee of K1,000,000 or its equivalent in any free	urchased from nent of a non sely convertible
GAZETTE NOTICE No. 339 OF 201 The Lands and (Chapter 185 of (Sec	Deeds Registry Act the Laws of Zambia)	currency. The bids must be sent clearly marked "Tender for the Delivery of One Motor Grader" addressed to the Dir Zambia Public Procurement Authority, Red Cross He 31009, Lusaka, Zambia and deposited not later that June, 2010 at 1400 hours local time.	he Supply and ector Genearl, ouse, P.O. Box n Friday, 25th
Notice of Intention to Issue FOURTEEN DAYS after the pu- issue a Duplicate Certificate of Mandona Elizabeth in respect of of 8.1883 hectares situate at Lu Republic of Zambia. All persons having objection certificate of title are hereby rea- with the Registrar of Lands and the date of publication of this n	a Duplicate Certificate of Title oblication of this notice I intend to of Title No. L290 in the name of f property No. L/2161/M in extent saka in the Lusaka Province of the ns to the issuance of the duplicate quired to lodge the same in writing d Deeds within fourteen days from otice A, NTUTUMA (MS),	Bids must be deposited in the Tender Box on a Zambia Public Procurement Authority, Red Cross Hous boulevard, Lusaka on or before Friday, 25th June, hours local time and must be accompanied by a bid less than two percent of the bid price duly signed and guarantor(s). The closing date for the receipt of bids is Friday, 2 at 1400 hours local time and any bid received after the stipulated above will not be accepted. Bids will be conference Room on the 2nd Floor, Zambia Public Authority, Red Cross House, Los Angeles Boulevar the same date soon after closing in the presence of b representatives who choose to attend.	he 2nd Floor, se, Los Angeles 2010 at 1400 security of not d sealed by the 25th June 2010 e time and date opened in the c Procurement rd, Lusaka, on bidders or their
DEEDS AND DEEDS	Registrar		S. CHIBUYE,
P.O. Box 30069 Lusaka	of Lanus and Deeus	Zambia Public Procure.	ment Authority

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GAZETTE NOTICE NO. 342 OF 2010

10082577

Zambia Public Procurement Authority

Invitation for Bids

Tender TB/CE/007/10:for the Periodic Maintenance of M12 Road Km 90.000—Lundazi and Rehabilitation of selected Urban Roads in Lundazi District of Eastern Province—Road Development Agency.

THE Government of the Republic of Zambia wishes to apply Road Fund revenues as managed by the Ministry of Finance and National Planning to finance a project in support of the Road Sector Investment Project (RoadSIP).

The Government, through the Road Development Agency is embaking on a broad Road Sector Investment Programme (Road SIP). The key objective of RoadSIP is to construct, maintain, rehabilitate and improve or upgrade the national road network. The focus is on improving the Core Road Network which has been indentified as taking into account such aspects as connectivity (international or provincial linkages), poverty alleviation and agricultural marketing activities.

The Zambia Public Procurement Authority, on behalf of the Road Developmet Agency now invites sealed bids eligible and qualified firms to undertake the Periodic Maintenance of M12 Road Km 90.00—Lundazi and Rehabilitation of Selected Urban roads in Lundazi district of the eastern province.

The scope of works includes, but is not limited to, the following:

- (a) repair of distressed areas of existing pavement layers;
- (b) removal for re-use by milling of existing bituminous surfacing and part of the base course;
- (c) construction of a new base course:
- (d) construction of double surfacing:
- (e) laying of cape seal;
- (f) repairs to existing drainage structures:
- (g) cleaning of open drains and in-and outlet drainage structures; and
- (h) completion to bituminous standards with double surface.

The tender is open for firms that are registered in Zambia as contractors of roads with the National Council for Construction in Category R, Grades 1 and 2.

Prospective bidders may view the Solicitation document from the Zambia Public Procurement Authority Offices in Room 21 1st Floor, Red Cross House, Plot No. 2837, Los Angeles Boulevard, Longacres, P.O. Box 31009, Lusaka. A complete set of solicitation documents may be purchased by interested bidders upon payment of a non-refundable fee of K1,000,000 or its equivalent in any convertible currency at the prevailing exchange rate in cash or bank certified cheque.

The telephone numbers are 260-211-250632/42/87 and the telefax is 260-211-250633. Bidders may also access our wibsite at www.tenderboard.gov.zm. Our E-mail address tenders@ppa.org.zm. However, telefax/electronic offers shall not be accepted.

Bids accompanied by a bid security of two per cent of the bid sum or an equivalent amount in any freely convertibe currency at the prevailing exchange rate, should be clearly marked "TB/CE/007/10— Tender for the Periodic Maintenance of M12 Road from Km 90.000— Lundazi and Rehabilitation of Selected Urban Roads in Lundazi District of Eastern Province, to be deposited in the tender box on the 2nd Floor, Red Cross House, Plot No. 2837, Los Angeles Boulevard, Lusaka on or before Friday, 21st May, 2010 at 1400 hours local time. Site Visite is mandatory and a signed site visit certificates shall be submitted together with the bid. Prior to closing date, a Pre-bid meeting will be held at the Office of the Regional Engineer Eastern Province of the Road Development Agency to clarify all issues that bidders may raise. The date for the site meeting will be Thursday 29th April, 2010 and the date for the Pre-bid meeting will be Friday 30th April, 2010 at 1000 hours local time.

The closing date for receipt of bids shall be on Friday, 21st May, 2010 at 1400 hours local time. The bids shall be opened immediately thereafter in the conference room of the Zambia Public Procurement Athority on the 2nd Floor, Red Cross House in the presence of bidders and/or their representatives who chhose to attend. Late bids shall not accepted.

S. CHIBUYE, Director-General Zambia Public Procurement Authority

[0083968/1

Zambia Public Procurement Authority

GAZETTE NOTICE NO. 343 OF 2010

Invitation for Bids

Tender TB/ORD/011/10:for the Supply, Delivery, Installation and Commissioning of the Solar Photovoltaic Systems for Electrification of ten Basic Schools and one Rural Health Centre in various provinces—Rural Electrification Authority.

THE Rural Electrification Authority under its Solar Electrification Programme intends to electrify ten Basic Schools and one Rural Health Centre in various provinces of Zambia.

The Zambia Public Procurement Authority, on behalf of the Rural Electrification Authority, now invites sealed bids from eligible bidders for supply, delivery, installation and commissioning of solar photovoltaic systems for electrification of ten basic schools and one rural health centre in various provinces of Zambia.

Interested bidders may obtain further informatin from and inspect the bidding documents at the Zambia Public Procurement Authority First Floor, Room 20, Red Cross House, Los Angeles Boulevard, Longacres, P.O. Box 31009, Lusaka, Zambia. The telephone numbers are +260-211-250632/250642/250687 and telefax number is +260-211-250633. However electronic offers shall not be accepted.

A complete set of solicitation documents may be purchased upon payment of a non-refundable fee of K1,000,000 or its equivalent in any freely convertible currency at the prevailing exchange rate in cash or bank certified cheque.

Bids clearly marked "Tender for the supply, delivery, installaltion and commissioning of the solar photovoltaic systems for electrification of ten basic schools and one rural health centre in various provinces— Rural Electrification Authority" addressed to the Director-General, Zambia Public Procurement Authority, Red Cross House, Los Angels Boulevard, Longacres, Lusaka on or before Friday, 18th June, 2010 at 1400 hours local time.

Bids accompanied by a bid security of not less than two per cent of the bid price, duly signed by the guarantor(s), must be deposited in the tender box on the 2nd Floor of the Zambia Public Procurement Authority, Red Cross House, Los Angeles Boulevard, Longacres, Lusaka on or before Friday, 18th June, 2010 at 1400 hours local time.

The closing date for the receipt of bids is 18th June, 2010 at 1400 hours local time. The bids shall be opened immediately thereafter in the Conference Room of the Zambia Public Procurement Authority on the 2nd Floor, Red Cross House in the presence of bidders or their representatives who choose to attend. Late bids shall not be accepted.

S. CHIBUYE, Director-General Zambia Public Procurement Authority

Zambia	a Gazette 555
Advr-937-0161394	ADVT9410083718
The Money Lenders Act (Cap. 398)	The Lands and Deeds Registry Act (Chapter 185 of the Laws of Zambia)
TAKE NOTICE that Stephen Silomba, Zambian National residing at House No. 6060, Chitemene Road, Northmead, Lusaka has filed an application for a Moncy-Lender's Certificate before the Surbordinate Court of the First Class sitting at Lusaka before the Hon Simusamba under cause No. 2010/CRMP/ML/40.	Notice of Application for a Duplicate Copy of Lost Certificate NOTICE IS HEREBY GIVEN that Mulenga Mundashi and Company, Zimbabwe House Haile Selassie Avenue, Longacres, P.O. Box 34972, Lusaka intends to apply to the Registrar of Lands and Deeds for the Certified copy of the Certificate of Title relating to Stand No. 2673,
Take further notice that the Court will sit to hear the said application on the 30th day of June 2010 at 0800 hours.	All persons having objections to issue of the said duplicate are hereby requested to lodge the same in writing with the Registrar of lands and Deeds within fourteen days from the date of this
P.O. Box 50359 Luisaka Messrs H. M. MUNSANJE AND Co., Advocates for the Applicant	publication. Dated at Lusaka this 3rd day of June, 2010. MULENGA MUNDASHI AND Co.,
Apyr-938-0161576	P.O. Box 34972 Advocates
The Money Londow Act	LUSAKA A DVT
(Cap. 398) Notice of Intention to Apply for a Money-Lender's Certificate	The Lands and Deeds Registry Act (Chapter 185 of the Laws of Zambia)
TAKE NOTICE that the Surbordinate Court will be moved on the day of 29th June 2010 at 1430 hours in Chambers before the Learnt Magistrate D. Muchaba, to hear application by the applicant for a Certificate Money Lending as duly deposed in the statement Support of the same Dated at Kitwe on the 10th May, 2010.	Notice of Application for Lost Certificate of Title NOTICE IS HEREBY GIVEN that we intend to apply for a Duplicate Certificate of Title relating to Stand No. 4104, Ndola situate on the copperbelt Province of the Republic of Zambia, issued in the name of Gillian Chishimba Mukula. All person having objections to the issue of such duplicate
P.O. Box 20135 Kitwe	certificate of title are required to lodge the same in writing with the Chief Registrar of Lands and Deeds within fourteen days from the date of publication of this notice.
ADVT939	Dated at Lusaka this 21st day of May, 2010.
The Lands and Deeds Registry Act (Chapter 185 of the Laws of Zambia) (Section 56)	P.O. Box 310263 LUSAKA Advocates for the Applicant
Application for Duplicate Copy of Lost Certificate of Title NOTICE IS HEREBY given that National Housing Authority intends to apply for a duplicate copy of the Certificate of Title No. 31245 relating to Indeco Estate Development Company Limited, Stand	ADVT9430083676 The Lands and Deeds Registry Act (Chapter 185 of the Laws of Zambia) (Section 56) Application for Notice of Intention to Issue Duplicate
No. 4011, Ndola, a City and Province of Copperbelt in Zambia. Particulars of which are described in Schedule hereto. All persons having objections to the issue of the duplicate certificate are hereby required to lodge the same in writing with the Registrar of Lands and Deeds within fourteen day of the publication of this notice.	Application for rotice of internion to issue Duplicate Certificate of Title FOURTEEN DAYS after the publication of this notice Ministry of Lands and Deeds intend to issue a Duplicate Certificate of Title in the name of Ballyspellan Enterprises Limited in respect of Subdivision 'A' of Subdivision No. 11 of farm No. 488a Twin Palm, in extent 0.4573 hectares, situate at Lusaka Province of the Republic of Zambia.
Certificate of Title No. 31245 in respect of Stand 4011, Ndola, Copperbelt Province of Zambia.	All persons having objections to the issuance of the duplicate of title are required to lodge the same in writing to the Registrar of Lands and Deeds within fourteen days of this publication.
P.O. Box 50074 C/o National Housing Authority	P.O. Box 34279 LUSAKA AND CO., Advocates for Applicant
ADVT-940-0162637 The Lands and Deeds Registry Act (Chapter 185 of the Laws of Zambia)	Abvr9440083466 The Lands and Deeds Registry Act (Chapter 185 of the Laws of Zambia) (Section 56)
(Section 56 (0)) Application for Lost Certificate of Title NOTICE IS HEREBY GIVEN that we, The Council for Zambia Jewry Limited intend applying for a duplicate certified copy of the Certificate of Title No. 50017 Registration No. 488a/8/B/18 dated 12th February, 1981 issued in favour of the Council for Zambia Jewry Limited in respect of all that piece of land in extent 0.4784 Jewry Limited in respect of all that piece of land in extent 0.4784 hectare more or less being the remaining extent of Subdivision "B" of Subdivision No. 8 of Farm No. 488a situate in Lusaka Province of Zambia represented on Diagram No. 65 of 1954. All persons having objections to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Lands and Deeds within fourteen days of the date of publication of this notice. MUSA DUDHIA AND Co., Advocates for the P.O. Box 31198 Council for Zambia Jewry Limited	Application for Certified Copy of Lost Title Deed NOTICE IS HEREBY GIVEN that, Mariana Nalube Mukonka and Bornwell Ndaabona Mukonka both of 25 Balfour Road, Blackbird Leys, Oxford in the United Kingdom intends to apply to the Registrar of Lands and Deeds for issuance of Duplicate Certificate of Title in respect of all that piece of land in extent 60 hectares more or less being Lot Number 32 situate in the Central Province of the Republic of Zambia which piece of land is more particularly delineated and described on Sketch Plan Number 7975 dated 2nd day of June, 1989 and registered in the name of Mariana Nalube Mukonka and Bornwell Ndaabona Mukonka. All persons having objections to the issue of the said copy are hereby requested to lodge the same in writing with the Registrar of Lands and Deeds within thirty days from the date of this notice MESSRS CHIFUMU BANDA AND Co., P.O. Box 31025 LUSAKA

P.O. Box 31198 LUSAKA

Manager

ADVT-945-0162784

Notice of Change of Name by Deed Poll

BY THIS DEED POLL made this 18th day of June, 2010, by the undersigned Sara Kafunda holder of NRC No. 862670/11/1 of House No. 2644/136, Ellaine Brittel, Livingstone, in the Livingstone City of Southern Province of the Republic of Zambia, do hereby for myself absolutely and entirely relinquish and abandon the use of my former names of Sara Kafunda and in lieu thereof do assume as from the date hereof the names of Sara Gracious Kafunda and in pursuance of such a change of names as aforesaid I hereby declare that I shall at all times hereinafter in all records, deeds and instruments in writing and in all dealings and transaciton and upon all occasions whatsoever to assign and use and subscribe the names of Sara Gracious Kafunda, as my names in lieu of the said names as renounced as aforesaid.

And I hereby authorise and request all persons to designate, decribe and address me by such names to the extent that my names shall be Sara Gracious Kafunda.

In witness whereof I have signed my assumed names of Sara Gracious kafunda and has set my hand and seal this 18th day of June, 2010.

Signed, sealed and delivered by the said Sara Gracious Kafunda, at Lusaka this 18th day of June, 2010 in the presence of:

	D. LUMPA,
P.O. Box 50067	Civil Servant
LUSAKA	

ADVT-946-0083454

Notice of Change of Name by Deed Poll

By THIS DEED POLL made this 4th day of June, 2010, by the undersigned Felemenga Velentina of Chief: Undaunda, Village: Chivota, District: Chongwe holder of National Registration Card Number 350739/11/1 of Plot No. 14/06, Ng'ombe Compound, Lusaka in the Lusaka District of Lusaka Province of the Republic of Zambia do hereby for myself absolutely and entirely relinghish and abandon the use of my former name of Chief, Village and District of Chief: Undaunda, Village: Chiyota and District: Chongwe and in lieu thereof do assume as from the date hereof the name of Chief: Mburuma, Village: Chilimanga and District: Luangwa and in pursuance of such a change of chief as aforesaid I hereby declare that I shall at all times hereinafter in all records, deeds and instruments in writing and in all dealings and transactions and upon all occasions whatsoever to assign and use and subscribe the name of chief as Chief: Mburuma, village: Chilimanga and District: Luangwa as my particulars in liue of the said chief, Village and district as renounced as aforesaid.

And I hereby authorise and request all persons to designate, describe and address me by such particulars to the intent that my Chief, Village and District shall be Chief: Mburuma, Village: Chilimanga and District: Luangwa.

In witness whereof I have signed my assumed particulars of Chief: Mburuma, Village: Chilimanga and District: Luangwa and have set my hand and seal this 4th day of June, 2010.

Signed, scaled and delivered by the said Felemenga Velentina at Lusaka this 4th day of June, 2010 in the presence of:

J. FELELMENGA,

P.O. Box 50579 LUSAKA

ADVT-947-0162532

Notice of Change of Name by Deed Poll

TAKE NOTICE that by a Deed Poll registered at the District Registry of the High Court for Zambia at Kabwe Stephen Yobe Lungu holding NRC No. 223550/53/1 of Village Mkokoko Chief Zingalume Chipata District now resident at House No. K105 Kasanda Township kabwe has renounced the first and second names of Luke Douglas and in lieu thereof adopted those of Stephen Yobe to the extent that he shall now be called and use the full names of Stephen Yobe Lungu.

In Witness whereof he has appended his signature to the same at Kabwe.

Signed, sealed and delivered by Stephen Yobe Lungu at Kabwe this 9th day of September, 1992 in the presence:

	F. B. NAGU ZGAMBO,
O. Box 80530	Advocate
Vinum	

ADVT-948-0162784

Notice of Change of Name by Deed Poll

BY THIS DEED POLL made the 7th day of September, 2009 by the said George Sampa Mupinde holder of National Registration Card Number 563932/11/1 House No. 10 Mary Aikenhead, Roma Girls School in Lusaka in the Lusaka District and Province of the Republic of Zambia do hereby for and on behalf of my Son Kaluluma Edward Mupinde absolutely and entirely relinquish and abandon the use of his former names kaluluma Edward Paul Mupinde appealing on his Birth Certificate Number Lus/4601/2008 and in lieu thereof do assume as from the date hereof the names of Kaluluma Edward Mupinde and in pursuance of such a change of names as aforesaid I hereby declare that he shall at all times hereinafter in all records, deeds and instruments in writing and and in all dealings and all transation and upon all occasions whatsoever to assign and use and subscribe the name of Kaluluma Edward Mupinde as his names in lieu of the said names as renounced as aforesaid.

And I hereby authorise and request all persons to designate, decribe and address him by such names to the intent that his names shall be Kaluluma Edward Mupinde and have set my hand seal this 17th day of September, 2009.

Signed, sealed and delivered by the said George Sampa Mupinde at Lusaka this 17th day of September, 2009 in the presence of:

PO Box 30077	М. М. Сносно,
LUSAKA	Advocate
LUMAN	

The Liqour Licensing Act (Section 20 (4) and (6)

Notices of Intention to Apply for Grant or Renewal of a Liquor Licence

ADVT-949-0162544

NOTICE IS HEREBY GIVEN that MOSES KAFUNDA (Old Trafford (II) Bar and Restaurant)), of Box 60795, Livingstone, intends to apply to the Provincial Licensing Board of the Southern Province for the renewal of a restaurant and liquor licence in respect of the premises situate at Stand No. 4549, Mwera Street 2nd Class Business Area, Livingstone.

Notices and other documents may be served on the above named at the above address.

ADVT-950-0082654

NOTICE IS HEREBY GIVEN that HERBERT KAPUNDU of P.O. Box 33292, Lusaka, intends to apply to the Provincial Licensing Board of the Lusaka Province for the renewal of a retail liquor licence in respect of the premises situate at Plot No. 53, off Nsefu Crescent, Matero, Lusaka.

Notices and other documents may be served on the above named at the following address:

The Secretary, Lusaka Province Liquor Licensing Board, 7th Floor Findeco House, P.O. Box 34430, Lusaka, Fax: 224647.

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P KABWE

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