NATIONAL STANDARDS COMMISSION

WEIGHTS & MEASURES (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

GENERAL CERTIFICATE OF APPROVAL No 9/0/A

This is to certify that an approval has been granted by the Commission that the patterns of

Vehicle Tanks of Capacities 0.5 to 105 kilolitres

described herein, are suitable for use for trade.

In this Certificate the requirements for vehicle tanks specified in Certificate No 9/0 have been reviewed, with the result that Certificate No 9/0 will be cancelled on 1/10/83 and no new tanks submitted for verification after that date will be acceptable for verification unless they comply with this Certificate.

The approval was granted on 1/8/83 and is subject to review on or after 1/10/88.

Signed

Executive Director

SCOPE OF APPROVAL

A vehicle tank is a measuring instrument in the form of a tank or the compartment of a tank, fitted to or forming part of a vehicle and intended to be used for the measurement of liquid.

This Certificate relates only to the metrological performance of vehicle tanks of capacities from 0.5 kilolitres to 105 kilolitres.

DESCRIPTION

1. Tank Design

1.1 Rigidity

Where a vehicle tank is divided into two or more compartments, the capacity of any compartment shall not vary by more than 0.25 scale interval if any adjacent compartment is empty or full.

1.2 Inspection Opening and Cover

Every tank shall have an inspection opening of sufficient size to facilitate examination of the inside of the tank; and when the cover of the inspection opening is fitted with a diptube or dipstick guide which is not centrally located in the cover, it shall only be possible to fit the cover in the opening in one position.

1.3 Internal Venting

Every tank shall be provided with effective venting to prevent the formation of vapour pockets under all conditions of levelling which can be reasonably anticipated.

The top of the fill pipe, and the internal skirt surrounding the inspection opening shall each be vented into the tank by a hole of at least 10 mm diameter.

The diptube shall be vented for not less than 90% of its length by a continuous slot or a series of overlapping slots not less than 6 mm wide.

Baffle plates shall be so constructed as to prevent the trapping of vapour or liquid.

1.4 Sump

No sump shall be permitted to project above the bottom of the tank, except that a retaining weir is permitted for tanks intended for aviation fuel only.

2. Piping Design

2.1 Tanks with Manifold

Where a vehicle tank with two or more compartments is used for delivering liquids other than black oil, and is constructed to discharge through a manifold common to two or more compartments, means shall be provided to ensure that:

(a) Liquid can flow through the outlet pipe from only one compartment at a time, and that flow of liquid from one compartment to another is automatically prevented; or that

(b) All compartments connected to a common manifold discharge simultaneously.

2.2 Tanks without Manifolds

Where a vehicle tank with two or more compartments is not constructed to discharge through a manifold in accordance with Clause 2.1, the following notice in letters not less than 4 mm high shall be affixed adjacent to the discharge valve:

NOTICE

THIS VEHICLE TANK IS NOT APPROVED AS A MEASURING INSTRUMENT
FOR DISCHARGE THROUGH A MANIFOLD

2.3 Outlet Pipe

The outlet pipe shall be sloped to the discharge valve at a gradient of not less than 1 in 30 to a horizontal plane to ensure complete drainage of the measured quantity when the vehicle is standing unladen on a level surface.

3. Measuring System

3.1 Calibration

3.1.1 Maximum Permissible Error

The maximum permissible error for each scale mark on a dipstick is $\pm$ 0.5 scale interval.

3.1.2 Exclusion of Unmeasured Liquid

Where an aviation fuel tank is constructed so that a quantity of liquid is retained by a weir after a complete delivery, the calibration shall exclude that quantity.

3.1.3 Effect of Internal Valve

Where a tank is fitted with an internal valve as well as a valve on the discharge end of the outlet pipe, the tank shall be calibrated with the internal valve open, provided that this clause shall not apply to rail tank cars, which shall be calibrated with the internal valve closed.

3.2 Dipstick

3.2.1 Design

It shall be of rigid construction and made of metal of solid, hollow or T-shape cross-section; the bottom of a hollow dipstick shall be sealed to prevent leakage into the dipstick.

The bottom of a bottom-datum dipstick shall be fitted with a foot with a bearing area not less than the area bounded by straight lines joining the extremities of the dipstick cross-section.

A top-datum dipstick (an ullage stick) shall be rigidly fitted with a cross-piece with its bottom surface at right angles to the dipstick, and not less than 150 mm from the top of the handle.

3.2.2 Graduation Requirements

(a) It shall be graduated for use with one compartment only.

(b) The scale spacing shall be not less than 3 mm.

(c) The scale interval shall be in accordance with the following Table.

(d) The arrangement of scale marks shall comply with Document 105 and shall be numbered in accordance with the following Table.

SCALE INTERVALS FOR DIPSTICKS

Capacity of Tank	Scale Interval	Numbering Interval
1 kL and under	5 litres	50 litres
Over 1 kL but not over 2.5 kL	10 litres	100 litres
Over 2.5 kL but not over 5 kL	20 litres	100 litres
Over 5 kL but not over 12 kL	50 litres	500 litres
Over 12 kL but not over 25 kL	100 litres	1000 litres
Over 25 kL but not over 50 kL	200 litres	1000 litres
Over 50 kL but not over 105 kL	500 litres	5000 litres

(e) Except for tanks designed to carry bituminous liquids, the dipstick for tanks of capacity greater than 10 kL shall not be graduated between 10% and 75% capacity.

3.2.3 Marking

(a) The dipstick shall be marked with the serial number of the vehicle tank and the compartment (if any) with which it is to be used.

(b) A bottom-datum dipstick, when constructed to be removed from the diptube when not in use, shall have a clearly scribed mark passing around it, corresponding with the distance of the top of the diptube above the dip plate.

(c) A bottom-datum dipstick shall have a scribed line on one of its ungraduated sides not less than 100 mm and not more than 150 mm from the bottom, and have the distance between the line and the bottom of the dipstick legibly stamped adjacent to the line; the line shall be within $\pm$ 1 mm of the stamped distance.

(d) A top-datum dipstick shall have a scribed line on one of its ungraduated sides, not less than 100 mm and not more than 150 mm from the bottom surface of the cross-piece, and have the distance between the line and the surface of the cross-piece legibly stamped adjacent to the line; the line shall be within $\pm$ 1 mm of the stamped distance.

3.2.4 Meniscus Effect

During verification (or reverification) the dipstick shall be surface-treated, if necessary, to ensure that the line-of-contact of the liquid is between 1 mm and 2 mm above the liquid surface.

~~If check-calibrated in service with the liquid for which the tank is intended, the maximum permissible error shall be ±0,75 scale interval.~~

3.2.5 Dipstick Guide

(a) Tanks with a bottom-datum shall have a diptube of not less than 70 mm and not more than 100 mm internal diameter.

(b) The guide on which a top-datum dipstick rests shall be horizontal when the vehicle is unladen and standing on a level surface; the guide shall prevent the dipstick from deviating more than 1 in 20 (approximately 3°) from vertical when the dipstick is in the measuring position.

(c) There shall be nothing in a diptube likely to obstruct the dipstick.

(d) The axis of the diptube or guide shall be within 25 mm of the point determined from Figure 1 and shall be vertical when the vehicle is unladen and standing on a level surface.

(e) Where a tank is so constructed that the dipstick may be accidentally inserted in the fill-pipe, the diptube opening shall be marked D or DIP in letters not less than 10 mm high ~~(reading height)~~ raised not less than 1 mm above the surface.

3.2.6 Dip Plate

A tank with a bottom-datum dipstick shall have a dip plate welded to the bottom of the tank. The dip plate shall -

(a) cover the projected area of the diptube;

(b) be 90° to the axis of the diptube, such that the difference between measurements from a plane at the top of the diptube and 90° to any part of the dip plate shall not exceed 1 mm; and

(c) be not less than 5 mm thick and mounted on legs or flush with the tank bottom to facilitate drainage.

4. Tank Markings

4.1 Nameplate

Every vehicle tank shall have a nameplate bearing a verification stamping plug, the tank number, the approval number NSC No 9/0/A, and the manufacturer's name, rivetted or welded to the tank in a position visible to a person standing on ground level. The tank number shall be not less than 10 mm high and the remaining letters and numbers not less than 4 mm high.

4.2 Notices

(a) Every vehicle tank shall have the following notice:

WARNING

REPAIRS OR ALTERATIONS TO PIPING, MANIFOLDS OR VALVES MUST NOT BE MADE WITHOUT PRIOR OBLITERATION OF VERIFICATION AND DATE STAMPS.

(b) Every vehicle tank other than a rail tank car shall bear the following additional notice.

THIS TANK IS CALIBRATED WITH THE INTERNAL VALVE OPEN

The notices shall have letters not less than 4 mm high and be securely fixed adjacent to the outlet valves and clearly visible to a person attending an outlet valve.

4.3 Numbering

Where a vehicle tank is divided into two or more compartments -

(a) each compartment shall be numbered from front to rear on the body of the compartment adjacent to each inspection cover,

(b) where the diptube is attached to the inspection cover the cover shall also be marked with the compartment number, and

(c) each external valve shall be marked with the compartment number.

The numbers shall comprise welded digits raised not less than 1 mm and be not less than 15 mm high ~~(reading height)~~ or digits not less than 10 mm high engraved on a securely fixed plate.

NATIONAL STANDARDS COMMISSION

NOTIFICATION OF CHANGE

GENERAL CERTIFICATE OF APPROVAL No 9/0/A

CHANGE No 1

The following changes are made to the approval documentation for

Vehicle Tanks of Capacities 0.5 to 105 kilolitres.

In General Certificate of Approval No 9/0/A dated 22/8/83:

(i)	Clause 3.2.1	third paragraph, delete "and not less than 150 mm from the top of the handle".
(ii)	Clause 3.2.4	delete the second paragraph.
(iii)	Clause 3.2.5(e)	delete "(reading height)".
(iv)	Clause 4.3	delete "(reading height)" from last paragraph.

Signed

Executive Director

NATIONAL STANDARDS COMMISSION

NOTIFICATION OF CHANGE

GENERAL CERTIFICATE OF APPROVAL No 9/0/A

CHANGE No 2

The following changes are made to the approval documentation for

Vehicle Tanks of Capacities 0.5 to 105 kilolitres

given in General Certificate of Approval No 9/0/A dated 2/7/84.

1. Amend clause 3.1.1 Maximum Permissible Error by adding a second sentence, viz;

   The maximum permissible error applicable to tanks provided with a capacity mark (refer clause 3.3) is ± 0.2%.

2. Add new clauses as set out below:

   3.3 Capacity Marks

   Tanks which are not provided with a dipstick may have their capacity determined by a capacity mark located inside the neck of each inspection opening.

   3.3.1 Design

   The capacity mark shall consist of a clearly visible line not less than 100 mm in length.

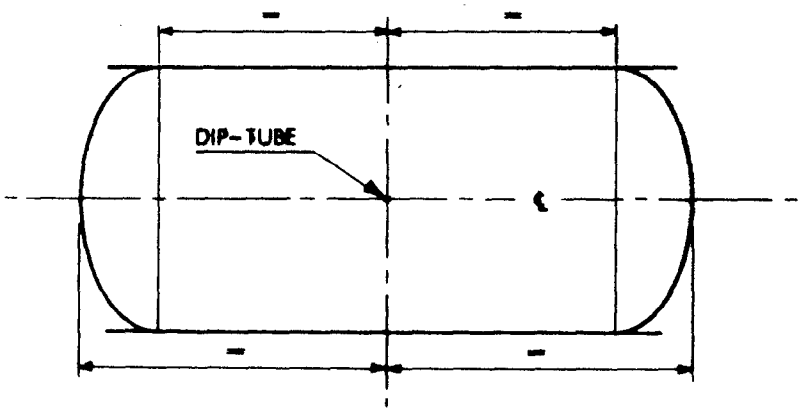
   3.3.2 Marking

   The capacity of the tank shall be marked adjacent to the capacity mark in letters and numerals not less than 10 mm high.

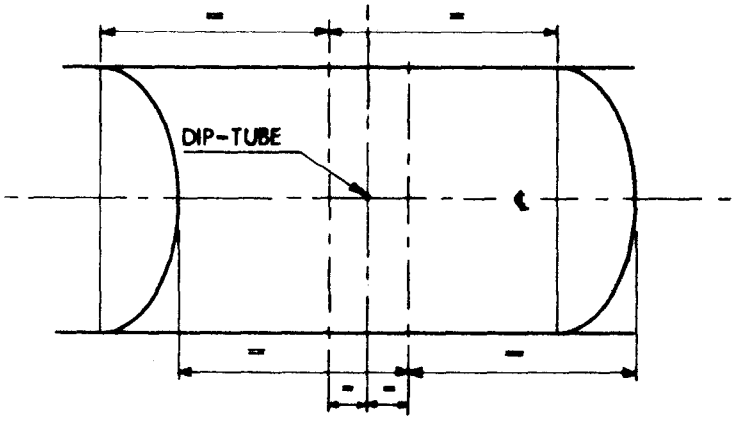
Signed

Executive Director

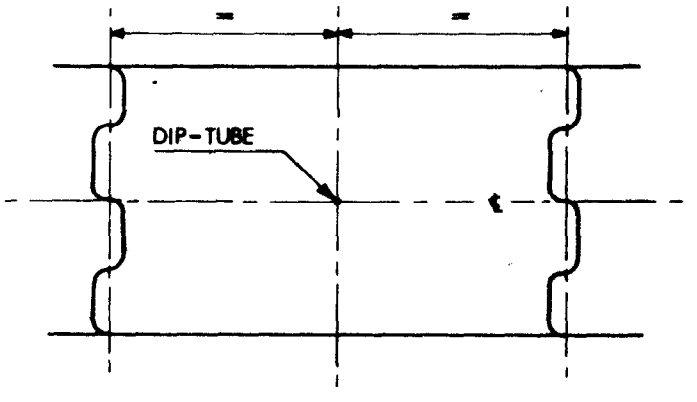
FIGURE 9/0/A - 1



SYMMETRICAL



NON-SYMMETRICAL



CORRUGATED

Location Of Diptube In Vehicle Tanks
(horizontal cross-sections through mid-height)

22/8/83