PRODUCT MANUAL FOR LIQUEFIED PETROLEUM GAS (LPG) CONTAINERS FOR AUTOMTOTIVE USE ACCORDING TO IS 14899:2014

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	**Product**	:	IS 14899:2014
	Title	:	Liquefied Petroleum Gas (LPG) Containers for Automotive use
	No. of Amendments	:	Nil
2.	**Sampling Guidelines:**		
a)	**Raw material**	:	Please refer ANNEX – A
b)	**Grouping guidelines**	:	Each Variety of Container shall be tested for GoL/CSoL
c)	**Sample Size**	:	Please refer ANNEX – B
3.	**List of Test Equipment**	:	Please refer ANNEX – C
4.	**Scheme of Inspection and Testing**	:	Please refer ANNEX – D
5.	**Possible tests in a day:**		Please refer ANNEX – E
6.	**Scope of the Licence:**		
	Licence is granted to use Standard Mark as per IS 14899: 2014 with the following scope:		
	Name of the product		Liquefied Petroleum Gas (LPG) Containers for Automotive use
	Type		Water Capacity
	Any other aspect		PESO approved drawing number and approval number

BUREAU OF INDIAN STANDARDS
Manak Bhawan, 9, Bahadur Shah Zafar Marg,
New Delhi – 110002

ANNEX A

Raw Material

1. Steel - IS 6240 or IS 15914 or Stainless-Steel (Cl. 4.1 or 4.1.1 of IS 14899) or Suitable low carbon steel (Cl.4.1.1 of IS 14899)
2. Multifunction valve- IS 15100 or any other multi-function valve assembly approved by the statutory authority (Cl.14 of IS 14899)
3. Backing strip (if provided), Valve boss/plate (Valve pad), Inner shell, cover plate etc (for Special containers)- compatible material with Parent material

ANNEX B

Sample Size

For considering GoL/CSoL, a trial batch of prototype Containers as per the approved drawings shall be manufactured during the joint inspection of BIS and Statutory Authority after in-principle approval is received from the statutory authority. Unless otherwise stated by the statutory authority, the trial batch shall be of minimum 50 prototype containers. Following samples sample shall be drawn for factory testing and independent testing:

Samples for Type approval (Type tests):

Sl. No.	Description of test	Clause reference	No. of samples
1.	Radiography Test	10.5.1	Two
2.	Mechanical Test	10.1	Two
3.	Hydrostatic stretch Test and Burst Test	10.2	Two
4.	Bonfire Test	10.6.1	One
5.	Fatigue (Cycle) Test	10.6.2	Three
6.	Crash Test	10.6.3	Three
7.	Strength Assessment Test (for Special Containers)	10.6.4	Two

Note: Currently being done in Factory in view of partial test facilities at BIS/OSLs

Samples for Independent Tests (IT Samples):

Sl. No.	Description of test	Clause reference	No. of samples
1.	Mechanical Test	10.1	One
2.	Burst Test	10.2.1	One

ANNEX C

List of Test Equipment

Major test equipment required to test as per the Indian Standard

Sl. No.	Tests used in with Clause Reference	Test Equipment
1.	Workmanship, Clause 7	Measuring tape, Steel scale Micrometer, Vernier calliper Vernier height gauge Pistal calliper (Goose neck gauge) Temperature Indicator (water bath) Volt meters, Ammeters Depth gauge, Ultrasonic thickness gauge
2.	Heat treatment, Clause 9	Temperature recorder Temperature controllers Thermocouples
3.	Mechanical test, Clause 10.1	Universal testing machine Vernier calliper, Micrometer Vickers hardness tester Standard reference material
4.	Water capacity, Clause 10.1.8	Measuring jars Standard weights Weighing machine
5.	HSST, Clause 10.2	Pressure gauges Measuring jars Standard weights Weighing machine Measuring glass tube
6.	HST (Clause 10.3) and Pneumatic test (Clause 10.4)	Pressure gauges Dead weight pressure tester
7.	Coating thickness, Clause 11	Coating thickness gauge
8.	Tare weight, Clause 12.1 (c)	Tare weight machine
9.	Bonfire test, Clause 10.6.1	Thermo couples Temperature controllers Digital pressure indicator
10.	Fatigue test, Clause 10.6.1	Thermo couples Pressure gauges Temperature indicators Electrical counter
11.	Crash test, Clause 10.6.1	Milli seconds counter Pressure gauges

The above list is indicative only and may not be treated as exhaustive.

ANNEX D

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments. The following equipments shall be calibrated at a frequency shown against each and records kept:

1.1.1 Tensile Testing Machine - Once in a year

1.1.2 Pressure Gauges - At least once in a month

1.1.3 Pyrometer used for heat treatment furnace - Once in six months

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity. All records of tests and inspection shall be kept as shown in Annex 1 and Annex 2 of SIT. Records of all the tests made at the manufacturer's work shall be kept for the life time of the containers and copies of test certificates shall be forwarded to the purchaser of the containers and the inspecting authority.

3. LABELLING AND MARKING – As per the requirement of IS 14899: 2014.

4. CONTROL UNIT – For the purpose of this scheme, Batch shall be as under:

4.1 Batch – 202 Containers or less of identical type and design heat treated during one continuous running in the same manner and under similar conditions and constructed from steel of similar analysis and made by the same steel manufacturer shall constitute one batch.

4.2 The identity of each batch shall be maintained. The period of manufacture/inspection/test shall be taken from the date of release of steel to the date of final inspection/testing.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1 and the tests as per Annex 1 of SIT, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 A certificate as per Annex 3 of SIT shall be issued by the BIS Inspecting Officer in respect of every batch of Containers marked with BIS Standard Mark.

6. DOCUMENTATION - The following documents shall be made available to BIS IO:

a) Chemical cast analysis certificates as per clause 4.1.2 of IS 14899: 2014
b) Document showing approval of Statutory Authority as per the following clauses of IS 14899:2014:
    - Clause 4.1.1
    - Clause 5
    - Clause 6.1.1
    - Clause 6.3.2.2
    - Clause 8.2.1
    - Clause 11
c) Document showing approval of Statutory Authority if any other multi-function valve assembly is used as per Clause 14 of IS 14899: 2014.
d) Document describing the welding methods, processes used and inspections carried out during production.

7. HEAT TREATMENT - The heat treatment of the cylinders shall be done as per clause 9 of IS 14899:2014. The cylinders shall be punched with serial number before heat treatment to maintain traceability throughout manufacturing process.

7.1 Adequate care shall be taken to ensure the consistency of heat treatment cycle. The deviation of temperature shall be within the specified temperature range. In case the temperature goes outside the specified limits, furnace shall be stopped and all such cylinders shall be segregated. Heat treatment shall be resumed only after attaining the requisite temperature and the furnace temperature is maintained between the specified limits. The complete records of heat treatment cycle and interruptions of cycle shall be maintained.

8. TYPE TESTS:

8.1 All the type tests as per clause 10.6 of IS 14899:2014 have to be carried out in case of change in the design parameters or change in the manufacturing process of containers.

9. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

(1)				(2)	(3)		
Test details				**Test equipment requirement: Required (R) or Subcontracting permitted (S)**	**Levels of control**		
Cl.	**Requirement**	**Test Methods**			**No.of samples**	**Frequency**	**Remarks**
		Clause	**Reference**				
4	**Material**						
4.1	***Steel sheets for shell and dished end.*** Chemical composition and physical properties	4.1.1	IS 14899	S	One	Each heat of material received	The materials shall be ISI marked and the cylinder manufacturer shall obtain test certificates for each consignment
	Thickness Surface defects				Each sheet		
4.2	***Components*** Compatibility of components	4.2	IS 14899	S	One	Each consignment	No further testing is required if the consignment is accompanied with test certificate
7	**Construction and Workmanship**						
7.1	General requirements	7.1.1 to 7.1.3	IS 14899	R	Each container		Checking may be done by gauging. Records are to be maintained for the first five pieces whenever production starts for each batch or whenever there is change in tool or its setting.
7.2	**Parts subjected to pressure**						
7.2.1	Welding requirements	7.2.1.1 to 7.2.1.5	IS 14899	R	Each container		All welds shall be thoroughly examined visually for any defects like blow holes, pin holes, under cuts, incomplete penetration etc. and records for inspection shall be maintained.
7.2.2	Welds joining parts making up the shell of the container	7.2.2.1 to 7.2.2.5	IS 14899	R	Each container		
7.2.3	Inspection of welds	7.2.3& 10.5.5	IS 14899	R	Each container		

7.2.3.2	Radiographic Examination	7.2.3.2, 10.5.1 to 10.5.4	IS 14899	S	For Weld joint factor, z= 0.85, one container taken from the first five consecutively welded containers and one container taken from the last five consecutively welded containers of a production run shall be subjected to radiographic examination. From the remaining samples one in fifty shall be selected at random For weld joint factor, z= 1, 10 % of container production shall be subjected to radiographic examination. On re-commencement of welding operation following shutdown exceeding four hours, the extent of radiographic examination specified in Cl. 7.2.3.2.1, 7.2.3.2.2 and 7.2.3.2.3 shall apply.		
7.2.3.3	Treatment of imperfections disclosed by radiographic examination	7.2.3.3	IS 14899	R	Retest for Radiography shall be as per 7.2.3.3 of IS 14899. Procedure of repairing of imperfections disclosed by Radiographic examination shall be submitted by the manufacturer for the approval of the inspecting authority. This shall include removal of welding by grinding/machining and making a separate batch etc.		
7.3	Out of roundness	7.3	IS 14899	R	Each container		Each container may be checked by gauging. Records are to be maintained for the first five pieces whenever production starts for each batch or whenever there is a change of tool or its setting.
8.	Fittings	8.1.1 to 8.1.7	IS 14899	R	Each fitting		Visual examination only.
8.2	Openings	8.2.1 & 8.2.2	IS 14899	R	Each container		Each container may be checked by gauging. Records are to be maintained for the first five pieces whenever production starts for each batch or whenever there is a change of tool or its setting.
9.0	Heat Treatment	9.1	IS 14899	R	Each container		If SS sheets are used, post-fabrication heat treatment may not be required.
10.1	Mechanical tests	10.1.1 to 10.1.6	IS 14899	R	One	Each batch	Retesting permitted as per 10.1.7 of IS 14899.

10.1.8	Checking of water capacity	10.1.8	IS 14899	R	One	Out of every 100 containers	Method for deterring the water capacity on each container shall be declared by the manufacturer. In case the sample fails, the production shall be stopped and the matter investigated for determining the cause of the failure. The remaining containers of this batch shall be checked 100% for this requirement. The production shall be resumed only after the corrective action has been taken and 100% checking for this requirement is done for the next consecutive five batches. The rejected containers shall be scrapped by deshaping in the presence of BIS IO.
10.2.1	Hydrostatic Stretch Test	10.2.1	IS 14899	R	One container taken at random from each lot of 403 or less		In case of failure in stretch test : (a) Either subject the entire batch to hydrostatic stretch test in accordance with 10.2.1 and reject those containers that fail in the test or b) Re-heat treat the lot and offer for retest in accordance with 10.2. In case of failure in the retest the entire batch shall be rejected.
10.2.2	Burst Test	10.2.2	IS 14899	R	One container taken at random from each lot of 403 or less		Retest is permitted for the burst test as per clause 10.2.3.6 of IS 14899.
10.3	Hydrostatic test	10.3	IS 14899	R	Each container		i) In case a container is found leaking, the batch to which the container belongs shall be tested for hydrostatic test by increasing the retention period of test pressure from 60 sec to 120 sec till no container is found leaking in two consecutive batches. ii) Containers which have been rejected due to leaks for pin holes, blow holes and under cuts in welding or leakage from any part of the container except valve pad during hydrostatic test shall be rejected and deshaped in the presence of BIS IO..

10.4	Pneumatic leakage test	10.4.1& 10.4.2	IS 14899	R	Each container		
10.5.1	Non-destructive test	10.5.1	IS 14899	S	At least one from each batch		
10.6	**Type test**						**Please see note 3**
10.6.1	Bonfire test	10.6.1.1 to 10.6.1.6	IS 14899	R	One sample once in three years for each design/ size or in case of change in design		A container representative of each type fitted with all accessories shall be subjected to this test.
10.6.2	Fatigue test	10.6.2.1 to 10.6.2.2	IS 14899	R	Three containers., once in three years for each design/ size or in case of change in design		
10.6.3	Crash test	10.6.3.1, 10.6.3.2	IS 14899	R	Three containers., once in three years for each design/ size or in case of change in design		
10.6.4	Strength assessment	10.6.4.1 to 10.6.4.4	IS 14899	S	One	Once in a year	This test is meant for special containers as per Annex D of IS 14899.
11	Surface coating and color – Minimum thickness of coating	11	IS 14899	R	One	Every 10 containers	Please see Table 1A below for levels of control applicable to requirements of powder coating as per IS 13871.
12.	Marking	12.1 to 12.3	IS 14899	R	Each container		
14	Accessories	14	IS 14899	S	Each consignment of similar design		No further testing is required if accompanied with test certificate

TABLE 1 A
(For powder coating as per IS 13871)

(1)				(2)	(3)		
Test details				Test equipment requirement: Required (R) or Subcontracting permitted (S)	Levels of control		
Cl.	Requirement	Test Methods			No.of samples	Frequency	Remarks
		Clause	Reference				
Clause 11 of IS 14899 - Surface Coating and Color							
	Dry Film Thickness	Table 1	IS 13871	R	One	Every 10 containers	
	Finish			S	One	Once in a month	No further testing is required if material is received with test certificate or is ISI Marked. Additional sample shall be tested whenever there is change in composition of coating material/ process of coating.
	Gloss 60°				One		
	Scratch Hardness 3000g				One		
	Flexibility 6.25 mm mandrel				One		
	Cross cut adhesion				One		
	Erichsen Test mm				One		
	Impact Resistance (directive/reverse), kg/cm				One		
	Protection against corrosion, 1000h				One	Once in six months	
	Protection against humidity				One		
	Resistance to boiling water ½ h at 100° C				One	Once in three months	
	Resistance to lubricating oil,SAE 30				One		
	Resistance to petrol				One		
	Resistance to heat double bake schedule				One		
	Resistance to bleeding				One		

11	Resistance to detergents	Table 1	IS 13871	S	One	Once in three months	Same as above
	Resistance to acid/alkali				One		

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

Note-3: In case of failure in type test, design shall be modified after investigation and corrective actions and shall be verified by BIS before manufacturing of containers.

ANNEX - 1

Stage inspection for manufacture of LPG containers for Automotive use

1. Raw Material

a) Check test for physical and chemical properties for each heat before use.
b) Check for dimensions and surface defects (visual).
c) Components material to be checked for chemical properties.

2. Manufacture of components:

Body

a) Check pressing and shell for Thickness and surface defects such as cracks and laminations.
b) Check of height to maintain Water capacity.

Components

a) Check dimensions and surface defects.
b) Random check for data stamped.

3. Assembly and manufacture:

a) Check top and bottom dished ends and the shell for defects and traces of oil.
b) Inspect tack welding of backing strip if provided.
c) Inspect welding defects of the body and components.
d) Select containers for hardness test, radiographic examination, acceptance test, bursting test and water capacity and hydrostatic stretch test.
e) Check for defect after hydraulic test and pneumatic test.
f) Check for Quality of protective metal coating, finishing and painting.
g) Check valve pad threads, leakage between valve and valve pad and leakage of the container (Pneumatically).
h) Check weight and details stamped on the container.

4. Type tests :

Select containers for type tests viz., Bonfire test, Fatigue test, Crash test and Strength essential (as applicable) for each design out of a batch of at least 50 containers.

ANNEX 2

STAGE INSPECTION FOR MANUFACTURE OF LPG CONTAINERS FOR AUTOMOTIVE USE

Table 1- Record of General Requirements of Construction and Workmanship (Clause 7.1 of IS 14899)

Name of testing person:
Date of testing

Sl. No.	Batch No./ Sl. No.	Whether parent plates and pressed parts used are free from defects	Approved dimension of the contour of dished end	Observed dimension of the contour of the dished end	Deviation observed		Whether conforming
					Radial dimensions	Axial dimension	
1	2	3	4	5	6	7	8

Table 2A- Record of Construction and Workmanship for Parts subjected to Pressure- Welding Requirements (Clause 7.2.1 of IS 14899)

Name of welder:
Qualification of welder:
Details of Approval tests passed:

Sl. No.	Batch No./ Sl No	Whether butt weld executed by automatic welding process	Location of butt welds on the stress resistant shell	Whether there is superimposition of filler welds on butt welds/ if not the spacing between them	Whether MIG or TIG welding with argon as inert gas employed (in case of stainless-steel containers)	Whether conforming
1	2	3	4	5	6	7

Table 2B- Record of Construction and Workmanship for Parts subjected to Pressure- Welds joining parts (Clause 7.2.2 of IS 14899)

Name of welder:
Qualification of welder:
Details of Approval tests passed:

Sl. No.	Batch No./ Sl. No.	Longitudinal weld				Circumferential welds						Whether conforming
		Whether weld executed in the form of a butt weld on the full section of the material	Rotation of longitudinal welds	No. of pieces in the ends	No. of longitudinal welds on any shell section	Whether weld executed in the form of a butt weld on the full section of the material	Whether weld of studded valve plate is as per Annex E of IS 14999	Type of weld fixing the collar or supports to the container	Type of weld in welded mounting supports, if provided	Gravitational force required to withstand vibration, braking actions	Misalignment of joint faces in case of butt welds	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**

Table 2 C - Record of Construction and Workmanship for Parts subjected to Pressure-Inspection of welds (Clause 7.2.3 of IS 14899)

Name of welder
Qualification of welder:
Details of Approval tests passed:

Sl. No.	Batch No./ Sl. No.	Conformity to 7.2.3.1	Frequency and extent of radiographic examination: conformity				Treatment of imperfection disclosed by radiographic examination	Whether deemed unacceptable	Whether conforming
			7.2.3.2.1	7.2.3.2.2	7.2.3.2.3	7.2.3.2.4			
1	2	3	4	5	6	7	8	9	10

Table 3- Record of Out-of-Roundness
(Clause 7.3 of IS 14899)

Sl. No.	Batch No./ Sl. No.	Out of roundness value	Whether conforming
1	2	3	4

Table 4- Record of Fittings
(Clause 8 of IS 14899)

Sl. No.	Batch No./ Sl. No.	General Fittings							Openings (8.2)										
		8.1.1	8.1.2	8.1.3	8.1.4	8.1.5	8.1.6	8.1.7	a	b	c	d	e	f	g	h	8.2.1	8.2.2	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Table 5- Record of Containers subjected to Heat treatment
(Clause 9 of IS 14899: 2014)

Approval of Statutory Authority:
Stress relieving temperature:
Duration in minutes:
Name of Operator:
Date: Shift:

Sl. No.	Batch No./ Quantity/ Sl. Nos.- From - to	Date of heat treatment	Time in	Time out
1	2	3	4	5

Table 6- Record of Mechanical tests
(Clause 10.1 of IS 14899)

Sl. No.	**Batch no./ Sl. No.**	**Tensile tests**		**Hardness test**	**Bend test**	**Macroscopic examination**	**retesting**		**Checking for water capacity**	**Whether conforming**
		On parent metal	**On welds**				**Tensile test**	**Bend test**		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**

Table 7- Record of Permanent Stretch test and Burst Test
(Clause 10.2 of IS 14899)

Sl. No.	Batch No./ Sl. No.	Hydrostatic stretch test	Burst test	Whether conforming
1	2	3	4	5

Table 8- Record of Hydrostatic test and Pneumatic test
(Clause 10.3 and 10.4 of IS 14899)

Sl. No.	Batch No./Sl. No.	Hydrostatic test	Pneumatic test	Whether conforming
1	2	3	4	5

Table 9- Record of Non-destructive Examination
(Clause 10.5 of IS 14899)

Sl. No.	Batch no./ Sl.no.	Radiographic examination	Defects	Defects for container wall thickness ≥4mm	Defects for container wall thickness ≤4mm	Examination of outside surface of weld	Whether conforming
1	2	3	4	5	6	7	8

Table 10- Record of type tests
(Clause 10.6 of IS 14899: 2014)

Sl. No	Batch No./ Sl. No.	Bonfire test	Fatigue test	Crash test	Strength assessment	Whether conforming
1	2	3	4	5	6	7

Table 11- Record of Surface coating and Colour
(Clause 11 of IS 14899)

Sl. No.	Batch No./Sl. No.	Minimum thickness of synthetic enamel paint	Colour scheme as specified by the Statutory Authority	Whether conforming
1	2	3	4	5

Table- 11A- Record of surface coating (Powder coated)
(Clause 11 of IS 14899)

Sl no.	Dry Film Thickness	Finish	Gloss 60°	Scratch Hardness 3000g	Flexibility 6.25 mm mandrel	Cross cut adhesion	Erichsen Test mm	Impact Resistance (directive/ reverse, kg/cm	Protection against corrosion, 1000h	Protection against humidity
1	2	3	4	5	6	7	8	9	10	11

Resistance to boiling water ½ h at 100° C	Resistance to lubricating oil,SAE 30	Resistance to petrol	Resistance to heat double bake schedule	Resistance to bleeding	Resistance to detergents	Resistance to acid/alkali
12	13	14	15	16	17	18

Table 12- Record of Marking
(Clause 12 of IS 14899)

Sl. No.	Batch no. / sl.no.	Unique Sl. No.	Minimum/ nominal water capacity in litres	Tare weight (excluding fittings) in Kg	Marking: LPG	Test pressure in MPa	Wording: Maximum degree of filling 80 %	Year and month of testing
1	2	3	4	5	6	7	8	9

Standard Mark	Name And trade Mark of the Manufacturer	Specification number	Space for requalification mark	Max Working pressure in MPa	Dia/ height/ width and length	Orientation mark
10	11	12	13	14	15	16

Table 13- Records of Accessories
(Clause 14 of IS 14899)

Sl No	Batch No./ Sl. no	Multifunction valve assembly	80 % stop valve	Level indicator	Pressure relief valve	Remotely controlled services valves with excess flow valve	Gas tight housing	Power supply bushing	Non-return valve
1	2	3	4	5	6	7	8	9	10

ANNEX 3

TEST CERTIFICATE

Purchaser: _____Certificate No. :_____ Date: _____
Order No. : _____ Date: _____
Batch No.: _____
Container Description: _____litres water capacity. Two/three piece, Working pressure_____
Test pressure _____ MPa . Manufacturer's Identification Mark _____

This is to certify that the containers manufactured, inspected and tested as mentioned below during the period from _____ to _____at M/s _____ meet the requirements of specification IS 14899:2014, Drawing No. _____. The containers been fitted with ISI marked/ approved valves.

Method of Manufacture

1. Welding process:
2 Method of Support: :
   Max
3 Heat treatment: Normalized/Stress Relieved at _____ ºC for_____ min.

Acceptance Test

Sl. No. of Containers:
Min

Yield Stress (MPa)
Tensile Strength (MPa)
% Elongation
Vicker's Hardness (HV)

INSPECTION

The containers have been inspected and tested in accordance with Scheme of Inspection and Testing attached with BIS licence no. CM/L-_____

Bend Test

Face: Satisfactory
Root: Satisfactory

Material for Container : IS 6240/IS 15914

Macro Examination

Body: Satisfactory
Neck: Satisfactory

TESTS

Hydrostatic Test: Satisfactory
(Test Pressure_____Mpa)
Pneumatic leakage test: Satisfactory
(Test Pressure _____ Mpa)

Min. Thickness: ___ mm

Radiographic Examination

Sl. No. of containers tested:

Bursting Test:
Sl. No. of Container
Burst Pressure (MPa): Permanent stretch(%)

Nominal Hoop Stress (MPa) Min. Thickness: ___ mm

Container Nos. _____ to_____ of _____ Batch are covered under Acceptance test container no. _____ and burst test container no. _____ of _____ Batch. These have been heat treated in the same manner and manufactured from steel of similar chemical composition and mechanical properties which had been produced by same steel manufacturer _____

QUANTITY INSPECTED: Containers Serial No. from _____ to _____inclusive
Serial No. of REJECTED Containers _____
TOTAL No. of Containers Passed _____

(Signature)
Name & Designation of the firm's representative

(Signature)
INSPECTING OFFICER (BIS)

ANNEX D

Possible tests in a day

Test	Clause reference
Workmanship	7
Hydrostatic Stretch test	10.2.1
Hydrostatic test	10.3
Pneumatic leakage test	10.4
Water capacity test	10.1.8
Mechanical tests	10.1
Burst test	10.2.2
Bonfire test (Type Test)	10.6.1
Crash Test (Type Test	10.6.3
Coating thickness	11