



**PRODUCT MANUAL FOR
WELDED LOW CARBON STEEL CYLINDERS
EXCEEDING 5 LITRES WATER CAPACITY
FOR LOW PRESSURE LIQUEFIABLE GASES –
CYLINDERS FOR LIQUEFIED PETROLEUM GASES (LPG)
ACCORDING TO IS 3196 (PART 1): 2013**

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 3196 (Part 1): 2013
	Title	:	Welded Low Carbon Steel Cylinders exceeding 5 Litres Water Capacity for Low Pressure Liquefiable Gases - Cylinders for Liquefied Petroleum Gases (LPG)
	No. of Amendments	:	3
2.	Sampling Guidelines:		
a)	Raw material	:	Please refer ANNEX- A
b)	Grouping guidelines	:	Each Variety of Cylinders 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:	:	Please refer ANNEX- F
7.	Any other guidelines	:	Please refer ANNEX - G

ANNEX A**Raw Material**

Raw Material	Requirement
Steel	IS 6240 or IS 15914 (Other suitable low carbon steel as per Cl. 4.1.1 may be used with the prior permission of the statutory authority)
Bung/Valve pad	Class 1A or Class 2 of IS 1875 or IS 2062
Foot ring, Stout metal cap shroud and/stay plate	Grade 'O' of IS 1079 or IS 2062 or IS 6240 (Any other material as approved by the statutory authority may also be used)
Valve fittings	IS 8737
Zinc wire	IS 12447
Primer	IS 2074 (Part 1) or IS 12744 (Part 1) - for enamel paint
	IS 13238 - for polyurethane paint
Paint	IS 2932 (Part 1) or IS 13213
Powder Coating	IS 13871
V P Ring	As per approved designs

ANNEX B

Sample Size

1. For considering grant of licence/inclusion of additional varieties, a trial batch of prototype cylinders 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 consist of minimum one-hour production (heat treatment) of prototype cylinders in continuous cycle furnace or 56 prototype cylinders whichever is higher. Where Oil Marketing Companies are the purchasers, the trial batch may be made according to the approved drawing of any of the Oil Companies.
2. During the joint inspection, in addition to stage inspections, the following tests shall be done in factory from the cylinders of prototype batch:
 - i) Acceptance test- On three cylinders selected at random, one each from first one-third, middle one-third and last one-third of the prototype batch.
 - ii) Burst test- On two cylinders selected at random, one each from one-half of the prototype batch.
 - iii) Fatigue test- On three cylinders selected at random, one each from first one-third, middle one-third and last one-third of the prototype batch.
3. Review sample for independent testing (See G1 of this Manual) consists of the following cylinders which shall be drawn from the above batch of prototype cylinders:
 - i) One painted cylinder with valve - For all tests except Acceptance test, Fatigue/Cycle test and Bung requirements.
 - ii) One cylinder (Unpainted; but metallized) without valve - For Acceptance tests, Zinc coating thickness and Bung requirements.
 - iii) Three cylinders - For Fatigue/ Cycle test.

ANNEX C**List of Test Equipment***Major test equipments required to test as per the Indian Standard*

Sl No.	Tests used in with clause reference	Test Equipment(s)
1.	Valve pad/bung – Cl. 9, 10.3	Thread Plug Gauges
2.	Pressings/Halves/Cylinder shell, Circularity, Profile regularity, Straightness, Verticality – Cl. 8.5, 12	Vernier caliper, Surface plate, Spirit level, Try square, Height Vernier gauge, Goose neck gauge, Ultrasonic thickness gauge
3.	Foot ring – Cl. 10.2	Vernier caliper, Angle protector
4.	Heat treatment – Cl. 11.1,11.2, 11.3	Furnace with temperature controller and temperature recorder, graphs, thermocouples, temperature indicators
5.	Checking for water capacity – Cl. 14	Weighing balance or measuring cans of appropriate capacity
6.	Hydrostatic test – Cl. 15	HST test setup with pressure gauges
7.	Valve fixing and Pneumatic leakage test – Cl. 9, 16	Torque Wrench, Pressure gauge
8.	Fatigue Testing/Cycle Testing – Cl. 17	Test setup with counter, Pressure gauge, temperature indicators
9.	Burst Test Under Hydraulic Pressure - Cl. 17.2	Burst test setup with pump, pressure gauge, weighing balance
10.	Acceptance Test – Cl. 18	Universal testing machine with graph plotter, Suitable mandrels for bend test, Vernier caliper, CuSO ₄ Solution
11.	Impact and Drop test - Cl 19, Annex C	Arrangement for drop test
12.	Internal cleaning, drying - Cl 23.1	Rod fitted with light source at one end
13.	Coating thickness - Cl 23.2	Elcometer with standard thickness strips

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

1.2 **QUALITY CONTROL**- All units manufacturing and supplying cylinders shall obtain and hold valid Quality Management System certification in accordance with IS/ISO 9001 from BIS to ensure that the manufacturer adheres to various steps during each stage of manufacturing process constantly.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity. Records of all the tests made at the cylinder manufacturer’s work shall be kept for the life time of the cylinder and copies of test certificates shall be forwarded to the purchaser of the cylinder and the inspecting authority.

3. LABELLING AND MARKING – As per the requirements of IS 3196 (Part 1): 2013.

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

4.1 Batch – A batch shall consist of finished cylinders not exceeding 3000 cylinders made consecutively by the same manufacturer using the same manufacturing technique, to the same design, size and material specifications on the same type of automatic welding machines and subject to the same heat treatment conditions. A batch may contain material from more than one cast [Clause 3.7 of IS 3196 (Part 1): 2013].

4.2 Inspection Lots - For acceptance purposes the batch shall be divided into inspection lots not exceeding 1000 cylinders. For selection of sample cylinders for either burst or mechanical tests, each lot is divided into sub-lots of 250 cylinders [see Fig.1 of IS 3196 (Part 1):2013]. The samples taken for ‘mechanical or burst test’ shall be alternated between the mechanical and burst tests [Clause 3.7.1 of IS 3196 (Part 1): 2013].

4.3 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 Annexure 1, 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 Annexure 2 shall be issued by the BIS Inspecting Officer in respect of every batch/inspection lots of cylinders marked with BIS Standard Mark.

6. HEAT TREATMENT - The heat treatment of the cylinders shall be done as per clause 11 of IS 3196 (Part 1): 2013. The cylinders shall be punched with serial number before heat treatment to maintain traceability throughout manufacturing process.

6.1 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.

7. 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 Sub-contracting permitted (S)	Levels of Control		
Cl.	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
5, 6	Design and Drawing	5, 6	IS 3196 (Part 1)	--	--	--	Drawings shall be approved by statutory authority. The agreed finished thickness shall not be less than that calculated as per clause 6 of IS 3196 (Part 1).
4	Material						
	Material for cylinder shell	4.1, 4.1.1, 4.1.2	IS 3196 (Part 1)	S	--	Each consignment	i. The materials shall be ISI marked and the cylinder manufacturer shall obtain test certificates for each consignment. ii. Approved material as per drawing shall only be used.
	Bung/ Valve pad	4.2	IS 3196 (Part 1)	S	--		
	Foot ring/ Stout metal cap shroud/ Stay plate	4.3	IS 3196 (Part 1)	S	--		
	Protective ring	9.3.3	IS 3196 (Part 1)	S	--		
	Valves	9.1	IS 3196 (Part 1)	S	--		
23.2	Zinc Wire/Powder coating/grit	23.2	IS 3196 (Part 1)	S	--		No further testing is required, if accompanied with test certificate or ISI marked. The approved material as per drawing shall only be used.
	Primer/ Paint	23.2	IS 3196 (Part 1)	S	--	Each consignment	Shall be ISI Marked. The approved material as per drawing shall only be used.

7, 8, 12	Welding/ Manufacture/ Inspection					
	Pressings/ Halves/ Cylinder shell	8.3, 8.4, 8.5, 12.1.3	IS 3196 (Part 1) IS 9639	R	<p>i. Each pressing, half and cylindrical shell shall be examined for surface defects (external and internal) before closing in operation and only those conforming shall be used for further processing. All rejections shall be deshaped in such a way that it cannot be used at any stage.</p> <p>ii. 2% or more of the pressings, halves and cylinder shell shall be examined at random for minimum thickness before any seam is welded. If any piece is less than the minimum specified thickness, the whole output from the relevant batch of material shall be examined for minimum thickness and any piece which is less than the specified minimum thickness shall be deshaped in such a way that it cannot be used at any stage.</p> <p>iii. Circularity, profile regularity, straightness and verticality shall be checked according to 8.5.1, 8.5.3, 8.5.4 and 8.5.5. All rejections shall be deshaped in such a way that it cannot be used at any stage.</p> <p>iv. The above examination shall be done after degreasing.</p>	
	Bung Hole Punching	8.5	IS 3196 (Part 1)	R	Each Piece	Each piece shall be checked by gauging. In case of any non-conformance, the piece shall be rejected and deshaped in such a way that it cannot be used at any stage.
	Welding of Cylinder and attachments/ fittings	7, 8.1, 8.2, 10.1 10.2, 10.3	IS 3196 (Part 1)	R	Each Cylinder	Joggle joint shall be according to 7.3 of IS 3196 (Part1) and as per approved drawing.
11	Heat Treatment	11.1, 11.2, 11.3	IS 3196 (Part 1)	R	Each cylinder	Please see clause 6 of SIT also.

13	Radiographic examination (when required)	13.1, 13.2, 13.3 10	IS 3196 (Part 1) IS 3196 (Part 1)	S	As per 13.2.1, 13.2.2 of IS 3196 (Part1)		If the sample is found defective, procedure as per clause 10.4 of IS 3196 (Part 3) shall be followed.
14	Checking of Water Capacity	14	IS 3196 (Part 1)	R	One cylinder	Each inspection lot	In case of failure, all the remaining cylinders shall be checked for water capacity and the rejected cylinders shall be deshaped. The production shall be stopped and the reasons for failure shall be ascertained. Normal production shall be resumed only after taking corrective actions and 100% cylinders shall be checked for water capacity for the next four inspection lots.
15	Hydrostatic test	15 7	IS 3196 (Part1) IS 3196 (Part3)	R	Each cylinder		The test may be carried out using suitable adapter at the bung. For rejected cylinders, procedure as per Clause 7.2 and 7.3 of IS 3196 (Part 3) shall be followed.
16	Valve fixing and Pneumatic leakage test	16, 8	IS 3196 (Part 1) IS 3196 (Part 3)	R	Each cylinder		For rejected cylinders, procedure as per Clause 8.4 of IS 3196 (Part 3) shall be followed.
17.1	Fatigue Testing/ Cycle testing	17.1 9.3	IS 3196 (Part 1) IS 3196 (Part 3)	R	Three cylinders as per clause 17.1.1 of IS 3196 (Part 1).		This is a Type Test and shall be done for initial approval or whenever there is a change in design/ raw material of cylinder or asked by BIS for specific reason. In case of failure, procedure as per Clause 9.3 of IS 3196 (Part 3) shall be followed.
17.2	Burst Test Under Hydraulic Pressure	17.2 9.1	IS 3196 (Part 1) IS 3196 (Part 3)	R	As per Clause 3.7.1 and Fig.1 of IS 3196 (Part 1)		In case of failure, procedure as per clause 9.2 of IS 3196 (Part 3) shall be followed.
18	Acceptance Test (Mechanical Tests)	18 5	IS 3196 (Part 1) IS 3196 (Part 3)	R			Where a batch contains material from more than one cast, the samples tested shall represent each cast of material used. In case of failure, procedure as per clause 5.7 of IS 3196 (Part 3) shall be followed.

10.1	Test for Handle or other suitable arrangement	10.1	IS 3196 (Part 1)	R	One	Each inspection lot	In case of failure, all the remaining cylinders shall be checked and the rejected cylinders shall be reshaped.
19	Additional Test (Cylinder body integrity impact test and drop test)	Annex C	IS 3196 (Part 1)	R	As per Annex C of IS 3196 (Part 1)		i) This test is applicable for cylinders manufactured from steel as per IS 15914. ii) This is a Type Test and shall be done for initial approval or whenever there is a change in design/ raw material of cylinder or asked by BIS for specific reason.
21	Colour Identification	21	IS 3196 (Part 1)	R	Each cylinder		--
23	Preparation for despatch						
	Internal cleaning and drying	16.1, 23.1	IS 3196 (Part 1)	R	Each cylinder		--
	Grit blasting	23.2	IS 3196 (Part 1)	R	Each cylinder		--
	Protective Coating	23.2	IS 3196 (Part 1)	R	Each cylinder		--
	Coating thickness	23.2	IS 3196 (Part 1)	R	One	Each inspection lot	--
20.2	Tare weight	20.2	IS 3196 (Part 1)	R	Each cylinder		With valve fitted to the cylinder
20	Marking	20	IS 3196 (Part 1)	--	Each cylinder		--

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.

ANNEXURE 1

STAGE INSPECTION FOR MANUFACTURE OF LPG CYLINDERS

1. **Material:** Check dimensions and surface defects (visual).

2. **Manufacture/Assembly of Components:**

Pressings/ Halves/ Cylinder shell	Valve Pad/ Bung	Joggle Joint	Foot Ring	Valve Protection
Check blanking (circle making), drawings/ pressings and trimmed halves for surface defects (each piece - visual)	Check forgings for surface defects (each piece- visual)	Check for dimensions (may be checked by gauging) and surface defects (each piece - visual)	Check for dimensions (hourly 5 pieces) and surface defects (each piece -visual)	Check for dimensions (hourly 5 pieces) and surface defects (each piece- visual)
Check height to maintain water capacity (first five pieces at the start of production and two pieces every hour -may be checked by gauging)	Each piece to be checked for finish as per Annex B of IS 3196 (Part 1). Dimensions to be checked for 5 pieces hourly	--	Check for Marking (hourly 5 pieces)	Check for Marking (hourly 5 pieces)
Degreasing (each piece – in case of any oil trace, the piece to be degreased again)	Welding - each piece	--	Welding - each piece	Welding - each piece

3. **Assembly & Manufacture**

- a) Inspect welding defects of the body, bung, foot-ring and valve protection ring.
- b) Heat treatment
- c) Select cylinders for acceptance test, bursting test and water capacity.
- d) Check for quality of grit blasting, protective coating and painting.
- e) Check tare weight (with valve fitted to the cylinder)

ANNEXURE 2

TEST CERTIFICATE

Purchaser: _____ Certificate No. : _____
 Order No. : _____ Date: _____
 Batch No.: _____ Inspection Lot No.: _____
 Cylinder Description: _____ litres water capacity. Two/three piece LPG Cylinder, working pressure _____
 Test pressure _____ MPa . Manufacturer's Identification Mark _____

This is to certify that the cylinders manufactured, inspected and tested as mentioned below during the period from _____ to _____ at M/s _____ meet the requirements of specification IS 3196 (Pt.1):2013, Drawing No. _____. The cylinders have been fitted with ISI marked valves.

Method of Manufacture

Acceptance Test

- | | |
|--|-----------------------|
| 1. Welding process: | Sl. No. of Cylinders: |
| 2. Method of Support: : Jogging | |
| 3. Heat treatment: Normalized/Stress Relieved at _____ °C for _____ min. | |

INSPECTION

Min

Max

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

Yield stress (MPa)
 Tensile Strength (MPa)
 % Elongation

Material for Cylinder: IS 6240/IS 15914

TESTS

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

Bend Test

Face: Satisfactory
 Root: Satisfactory

Bursting Test:

Sl. No. of Cylinders _____
 Burst Pressure (MPa): Min. - _____ Max. - _____
 Cylinder bursted without fragmentation
 Nominal Hoop Stress (MPa) _____

Macro Examination
 Body: Satisfactory
 Neck: Satisfactory
 Min. Thickness: _____ mm

Cylinder Nos. _____ to _____ of _____ Batch are covered under Acceptance test cylinder no. _____ and burst test cylinder 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: Cylinders Serial No. from _____ to _____ inclusive

Serial No. of REJECTED CYLINDERS _____

TOTAL No. of Cylinders Passed _____

(Signature)

Name & Designation of the firm's representative

(Signature)

INSPECTING OFFICER (BIS)

ANNEX E

Possible Tests in a Day

1. Water capacity (Cl. 14)
2. Hydrostatic test (Cl. 15)
3. Valve fixing and Pneumatic leakage test (Cl 16)
4. Burst test (Cl 17.2)
5. Acceptance test (Cl 18)
6. Internal cleaning and drying (Cl 16.1 & 23.1)
7. Tare weight (Cl 20.2)
8. Coating thickness (Cl 23.2)
9. Test for handle (Cl 10.1)
10. Additional test - Impact and Drop test (Cl 19)

ANNEX F**Scope of Licence**

“Licence is granted to use Standard Mark as per IS 3196 (Part 1): 2013 with the following scope:	
Name of the product	Welded Low Carbon Steel Cylinders Exceeding 5 Litres Water Capacity for Low Pressure Liquefiable Gases - Cylinders for Liquefied Petroleum Gases (LPG)
Variety	Water capacity (litres)
Any other aspect	PESO approved drawing number and approval number

ANNEX G

Any Other Guidelines

G1. Guidelines for Grant of Licence/Extension in Scope of licence based on factory testing

G2. Guidelines to deal with the case of First Fill Leakage of LPG Cylinders

G3. Guidelines for Lot inspection

G4. General Guidelines

G1. Guidelines for Grant of Licence/Extension in Scope of licence based on factory testing

- i) Grant of Licence (GoL)/ Inclusion of additional variety in Scope of Licence shall be processed based on the results of complete Factory Testing (FT) of the prototype LPG Cylinders carried out during the joint inspection of BIS with PESO.
- ii) The samples drawn for Independent Testing (IT) during the joint inspection with PESO shall be considered as a review sample. Suspension shall be imposed in case of non-conformity of review sample. Revocation of suspension shall be permitted as per prevalent guidelines on Suspension (SUS) and Revocation of Suspension (ROS) of Licence – For Scheme - I of Schedule - II of BIS (Conformity Assessment) Regulations, 2018.
- iii) The review sample shall be drawn only for GoL/Inclusion of additional varieties. For all other cases such as addition of machinery, change in process/raw material etc. review sample need not be drawn. In such cases, permission may be granted on the basis of results of complete factory testing of the prototype LPG Cylinders carried out during joint inspection with PESO.
- iv) **As the grant of approval to the manufacturer by PESO is mandatory as per the provisions contained in the Gas Cylinder Rules, 2016, BIS shall grant the licence/consider inclusion of additional variety only after receipt of final approval from PESO.**
- v) **Every change in the drawing such as change in the marking on cylinders, size of stenciling etc. may not necessitate a joint inspection for considering CSoL. However, in each case, change in drawing needs to be approved as the drawing number is unique and cylinders are released as per the particular approved drawing number.**

G2. Guidelines to deal with First Fill Leakage of LPG Cylinders

When a new cylinder is taken up for gas filling at any bottling plant for the first time, then the leakage observed from the cylinder shall be termed as First Fill Leakage (FFL). Following guidelines shall be followed in case of First Fill Leakage (FFL) and recurrence of FFL within one year from the previous FFL:

First Fill Leakage (FFL)

1. Immediately on receipt of information about FFL, Branch Office (BO) to inform the licensee clearly stating the nature/location of non-conformity. BO to also advise the licensee to thoroughly review its manufacturing process and testing system to identify the cause of such FFL and the remedial actions required to prevent recurrence of FFL. The licensee should also be advised to ensure adequate training to the QC staff, welders/ welding machine operators and other personnel involved in the manufacturing process. The licensee shall confirm corrective actions taken (including radiography when required) to avoid recurrence of similar non-conformity within 15 days.

2. On receipt of information about corrective actions (including radiography when required) taken by the licensee, surveillance inspection to be carried out within 15 days by an officer conversant with the product/subject and corrective actions taken by the licensee to be verified. As the licensee is required to do 100% inspection of cylinders before lot inspection by BIS, occurrence of FFL indicates that such testing was either not done or not done properly. It is therefore, necessary to carry out a stringent checking of the entire Quality Control system of the licensee. Samples shall also be drawn for independent testing during the surveillance inspection and case reviewed on receipt of test reports for further action.

Recurrence of FFL(RFFL)

3. Recurrence of FFL (RFFL) after corrective actions as mentioned above within one year shall be viewed as lack of adequate control on the quality of production and suspension (SUS) shall be imposed. While communicating SUS, BO to inform the licensee clearly stating the nature/location of nonconformity. BO to also advise the licensee to confirm corrective actions (including radiography when required) taken to avoid recurrence of similar non-conformity and to offer for inspection two fresh lots, each lot consisting of minimum one-hour production (heat treatment) or 56 cylinders whichever is higher, manufactured after taking corrective actions. Revocation of Suspension will be considered after satisfactory verification of corrective actions and inspection/testing of fresh lots offered as mentioned above. Inspection charges shall be applicable per man day basis as per rates applicable to Lot Inspection charges for LPG cylinders.

Further Recurrence of FFL(FRFFL)

4. Further recurrence of FFL(FRFFL) after corrective actions as mentioned above within one year, shall be considered as positive lack of monitoring & control on the quality of production. Suspension (SUS) shall be imposed and cancellation notice to be issued. Based on decision of Competent Authority, BO shall take further action.

Action to be taken for lots manufactured prior to receipt of information of FFL:

5. The following procedure shall be adopted in respect of lots which had been manufactured prior to receipt of information of FFL:

5.1 Action at Licensee End- While communicating information about FFL, the licensee shall be advised to carry out 100% leakage test for all lots manufactured and pending BIS lot inspection. The licensee shall also be advised to recheck in-process cylinders for 100% leakage test.

5.2 Lot inspection by BIS - Sample size shall be increased as given below during verification of lots which had been manufactured prior to FFL information and pending lot inspection by BIS, for the following tests: -

- Hydrostatic Test: 20 (In case of any failure, the cylinder shall be rejected and rendered unserviceable. The lot shall also be rejected. The licensee, after 100% inspection of the remaining cylinders, may reoffer the lots. During subsequent lot inspection, the sample size shall be increased to 30).
- Valve fitting and Pneumatic Leakage Test: 20 (In case of any failure, the lot shall be rejected. The licensee, after 100% inspection of the cylinders, may reoffer the lot. During subsequent lot inspection, the sample size shall be increased to 30).
- Stage inspection for the purpose of cross checking and other checks/inspection as per earlier practice of lot inspection to be continued.

6. Recurrence of FFL(RFFL), after corrective actions, reported after one year, shall be considered as FFL and actions to be taken as above.

G3. Guidelines for Lot inspection

1. A batch of LPG cylinders shall consist of finished cylinders not exceeding 3000 cylinders made consecutively by the licensee using the same manufacturing technique, to the same design, size and material specifications on the same type of automatic welding machines and subject to the same heat treatment conditions. A batch may contain material from more than one cast. For acceptance purposes, the batch shall be divided into inspection lots not exceeding 1,000 cylinders and sampling shall be done as per provisions laid down in IS 3196 (Part 1): 2013.

2. In order to make judicious use of time during visit for lot inspection, the inspecting officer shall obtain information from the licensee, in advance, such as batch number, its size and the serial number of the cylinders intended to be offered (lot wise) for inspection, preferably one day in advance or latest by the morning of the day of lot inspection. Inspecting officer shall then identify the serial numbers of LPG cylinders for Acceptance Tests (A/T) and Burst Test (B/T) and communicate it back to the licensee so that, licensee gets ample time to locate and segregate such cylinders from the stock and offer during visit to the officer for its verification and proper marking/identification in his presence for further testing.

3. For proper inspection/sampling, it should be ensured that licensee has got adequate storage/stacking space within the factory premises so that the cylinders are stacked & offered batch-wise to the officer for inspection/ clearance. Mixing of batches shall not take place and each batch should be distinctly identifiable to facilitate its proper inspection & sampling.

4. The licensee shall offer a minimum of one week's production at a time for lot inspection by BIS. Accordingly, BIS may send one or more officers for one or more days against payment of lot inspection charges, as applicable. Normally not more than two inspections per licence may be planned every week. For such inspections, licensee shall make arrangement for travel and stay of the certification officer, as applicable. Otherwise, the payment towards travel and stay (for boarding and lodging per night stay) on actual basis shall be charged in addition to inspection charges (₹ 10,000/-) as specified in Scheme - I of BIS (Conformity Assessment) Regulations. All these charges are over & above the marking fees.

5. Depending upon the availability of testing stations, release of cylinders should be considered by the officer. For release of up to 3 batches of cylinders (9000 cylinders) in a day, availability of at least 1 UTM & 2 Burst test stations may be considered adequate. For release of more than 3 batches in a day, adequate increase in number of UTMs & Burst test stations with commensurate increase in competent technical manpower is to be ensured.

6. In order to make effective use of the time available with the officer during visit and to expedite testing, licensee may ensure that location of UTMs & Burst test stations is such that different ongoing testing activities are possible to be witnessed simultaneously.

7. In case a manufacturer has more than one licence at the same premises and quantum of work is less on the day of visit, the remaining period may be utilized by the officer for lot inspection of other licence(s) held by the licensee against one man-day charge already paid by the licensee to BIS.

8. The licensee may be permitted to use computerized test certificates in the format attached with the STI document for LPG cylinders. The test certificate issued shall contain continuous number (serially), customer-wise. In order to have uniformity, officers may indicate 'Certificate Number' in test certificate in the following manner: 'BISBO/Licensee (abbreviation)/Customer (abbreviation)/Test Certificate Number'

9. Lot Inspection & Report: - Lot inspection report shall be submitted in format at Annexure 3 and shall consist of the following:

- i) Auditing of records for the concerned batch/inspection lots (Refer Table 1 of Annexure 3).
- ii) Stage auditing of manufacturing process (Refer Table 2 of Annexure 3).
- iii) Inspection & testing prior to the release of batch (Refer Table 2 of Annexure 3).

ANNEXURE 3**Format for Lot inspection of LPG Cylinders**

- 1) Name of the Unit-
- 2) Licence Number-
- 3) Date of Lot Inspection –
- 4) Batch Number–
- 5) Inspection Lot No:

Table 1**Audit of Records**

Sr. No.	Requirements	Clause Reference of IS 3196 (Part 1)	Test certificates	Observation
01	Material			
	Steel used in the manufacture of cylinders	4.1	Test certificates Available/ Not available	Satisfactory/ Not Satisfactory
	Bung/Valve Pad	4.2	Test certificates Available/ Not available	Satisfactory/ Not Satisfactory
	Foot Ring	4.3	Test certificates Available/ Not available	Satisfactory/ Not Satisfactory
	Valve Protection Ring	7.2/9	Test certificates Available/ Not available	Satisfactory/ Not Satisfactory
02	Valves	9.1	Test certificates Available/ Not available	Satisfactory/ Not Satisfactory
03	Calibration of Instruments		Calibration certificate/records Available/ Not available	Satisfactory/ Not Satisfactory
04	Record of Stage Inspection	As per SIT/ Levels of Control	Stage Inspection Record Available/ Not available	Satisfactory/ Not Satisfactory

Table 2

Stage Auditing of Manufacturing Process

Sr. No.	Requirement / Stage	Observations
1.	Fittings	Satisfactory/ Not Satisfactory
2.	Cylinder portion/halves	Satisfactory/ Not Satisfactory
3.	Welding	Satisfactory/ Not Satisfactory
4.	Examination of cylinders before closing in operation	
	Circularity	Satisfactory/ Not Satisfactory
	Surface defects	Satisfactory/ Not Satisfactory
	Profile regularity	Satisfactory/ Not Satisfactory
	Straightness	Satisfactory/ Not Satisfactory
	Verticality	Satisfactory/ Not Satisfactory
5.	Heat Treatment	Satisfactory/ Not Satisfactory
6.	Hydrostatic Test	Satisfactory/ Not Satisfactory
7.	Grit Blasting	Satisfactory/ Not Satisfactory
8.	Metalizing Coating Thickness	Satisfactory/ Not Satisfactory
9.	Primer Coating/ Paint Coating	Satisfactory/ Not Satisfactory
10.	Internal cleaning	Satisfactory/ Not Satisfactory
11.	Tare Weight	Satisfactory/ Not Satisfactory
12.	Radiographic examination (if applicable)	Satisfactory/ Not Satisfactory
13.	Checking of water capacity	Satisfactory/ Not Satisfactory
14.	Valve Fixing	Satisfactory/ Not Satisfactory

Note: IO may randomly check/witness the above requirements

Table 3

Inspection & Testing prior to the release of Batch

Sr. No.	Tests	Clause Reference of IS 3196 (Part 1)	Number of samples	Observation
1.	Valve fixing using approved jointing compound at specific torque	9.1.1	1 cylinder out of every 250 cylinders or part thereof an inspection lot	Satisfactory/ Not Satisfactory
2.	Pneumatic leakage test	16	1 cylinder out of every 250 cylinders or part thereof an inspection lot	Satisfactory/ Not Satisfactory
3.	Burst test under Hydraulic pressure	17.2	Sample size as per fig. 1 of IS 3196 (Part 1): 2013	Satisfactory/ Not Satisfactory Bursting Pressure: Minimum: Maximum:
4.	Total minimum combined coating thickness	23.1	1 cylinder out of every 250 cylinders or part thereof an inspection lot	Satisfactory/ Not Satisfactory Coating: Minimum: Maximum:
5.	Acceptance tests	18	Sample size as per fig. 1 of IS 3196 (Part 1): 2013	Satisfactory/ Not Satisfactory <ul style="list-style-type: none"> • Y.S.: Min/Max • T.S.: Min/Max • % Elong: Min/Max • Bend Test: Satis/Not Satis
6.	Markings	20	1 cylinder out of every 500 cylinders or part thereof an inspection lot	Satisfactory/ Not Satisfactory

Remark:

1. Batch – Accepted / Not Accepted
2. Test Certificate – Enclosed

Deviations if any:

Signature of QCI
Name-
Date-

Signature of BIS IO-
Name & Designation -
Date-

G4. General Guidelines

a) Preparation of schedule and allocation of visits for lot inspections- Monthly schedule shall be prepared by Head (BO). While preparing the schedule and allocation of visits, guidelines circulated vide CMD I note no: CMD-I/2: 12: 6 dated 28 Aug 2019 shall be adhered to. Request from licensees for change in date of inspection with proper reason may be considered by Head (BO) by recording the justification. All such schedules and changes in the schedules, if any, done by Head (BO) shall be informed to DDGRs. DDGRs may review the schedules/changes in schedules periodically.

b) Uniformity in log books being used at licensees' units- During every lot inspection at licensee's unit, BIS officers are required to fill in details of the activities conducted during the visit in a log book. In order to ensure uniformity and not to miss any essential details, the format at Annexure 4 shall be used by all BOs. Log book pages shall be in duplicate. The original page shall be retained with licensees in safe custody and the duplicate copy of the relevant page of log book shall be attached with the inspection reports submitted. This log details shall be reviewed by Head (BO) especially with respect to the IO visited vis-à-vis the IO allotted, Special inspection charges received etc.

c) Video record of joint inspection- During the joint inspection carried out by BIS and PESO at the time of preliminary inspection or visit for inclusion of new variety, video graphic record of activities shall be created and stored in a CD/DVD and shall be kept by BOs for records.

d) Compliance to instructions of Suspension of Marking orders- To rule out the possibility of misuse of Standard Mark and violation of Suspension of Marking orders, details of stock of furnace oil (of Heat Treatment Furnace) and meter reading of energy meter at the time when Suspension was acknowledged by the licensee, shall also be declared by the licensee along with details of stock of ISI Marked product in hand at the time of Suspension of Marking orders. Photographic evidences of energy meter reading and copy of the relevant page of the record of furnace oil stock shall also be submitted by the licensee to BIS while acknowledging compliance to suspension orders. During the visit to consider resumption of marking, the same shall be verified by BIS IO.

A video graphic record of the stock of materials including cylinders (finished and semi-finished at various stages of production) shall also be submitted by the licensee to BIS along with the acknowledgement to Suspension of Marking letter. If inconsistencies between the stock declared and those appearing from the video graphic record submitted are observed, then a surprise visit may be carried out for verification immediately or clarification may be sought, as the case may be.

ANNEXURE 4

Format of Log Book

In book form

To be in duplicate (Copy to be taken by BIS, Original to be kept in safe custody of licensee)

Page No. (To be printed)

BUREAU OF INDIAN STANDARDS

BO:

CM/L-

Name of the licensee: -

Date of inspection:

Date of request on manakonline:

Name of certification Officer to whom visit was assigned

Name of Certification Officer actually visited

Batches offered on manakonline

Batches offered actually during inspection

Testing and release:

Batch No.	Cylinder Sr No.		Oil Company	Water Capacity	Test Certificate No.
	From	To			

No. of cylinders tested (A/T)

No. of cylinders tested (B/T)

Deshaping details:

Special Inspection Charges Payment details:

Remarks:

Signature of BIS IO

Name and Designation: