



TECHNICAL SPECIFICATION

FOR

FRP COVERS FOR STEEL/PE BALL VALVE CHAMBERS

Document No: GGL/TS/PE-PNG/SUPPLY/FRP SLEEPER/SPEC

Table of Contents

1.0	SCOPE	3
2.0	APPLICABLE CODES AND SPECIFICATIONS	3
3.0	COMPOSITE RESIN CHAMBER/MANHOLE COVERS AND FRAMES	3
3.1	Material:	3
3.2	Color of Cover & frame	3
3.3	Locking Devices.....	4
3.4	Size and shape	4
3.5	Frame seating area.....	4
3.6	Slot area as waterway in grating	4
3.7	Marking	4
3.8	Installation of covers & Frame	5
3.9	Transporting & handling	5
3.10	Destructive Testing	6

Approved

1.0 SCOPE

This specification covers general requirements of FRP Sleeper cover for Steel and PE Valve chambers, specifically used for Steel/PE Ball valves used in gas pipeline network.

2.0 APPLICABLE CODES AND SPECIFICATIONS

- 2.1 The following details, standards, and codes are part of this specification. All standards, specifications and codes of practice referred to herein shall be the latest edition including all applicable official amendments and revisions.
- 2.2 In case of discrepancy between this specification and those referred to herein, this specification shall govern.
- IS 1726:latest -Cast iron manhole covers and frames- specification.
 - EN 124: latest- Gully tops and manhole tops for vehicular and pedestrian areas- Design requirements, type testing, marking, quality control.
 - IS- 15658:latest- Abrasion resistant layer of decorative gray granite finish.

3.0 COMPOSITE RESIN CHAMBER/MANHOLE COVERS AND FRAMES

The composite resin covers and frame shall be manufactured from appropriate grade of glass fiber reinforced polyester (GFRP) modified for durability & abrasion resistance using special grade of resin.

3.1 Material:

- 3.1.1 The quartz, aggregate used as filler in polymer concrete shall meet the requirements of Resin additives, such as curing agents, pigments, dyes, fillers and thixotropic agents, used as required shall not be detrimental to the manholes.
- 3.1.2 The top surface layer of cover shall be UV resistant & shall have sufficient abrasion resistance to vehicular traffic movement.
- 3.1.3 The core inside the outer surface layer shall be complete solid & shall be made up of glass fiber & polymer concrete. No pours & hollow space shall be kept in the core layer.
- 3.1.4 The castings shall be sound, clean and free from porous space, air holes and other defects. They shall be well dressed, fettled and shall be straight, regular and true in every respect.
- 3.1.5 Covers shall have on its operative top a raised chequered design to provide an adequate no-slip grip as per EN 124.
- 3.1.6 Key holes, keys and lifting devices as per EN 124 shall be provided in the covers to facilitate their placement in the frames and their operative maintenance.

3.2 Color of Cover & frame

The covers & frames shall be of Yellow color with yellow frame top for better visibility to suit the site conditions as specified in Annexure 1.

3.3 Locking Devices

Suitable locking arrangements including that with SS chain/ Wire Rope or a lock, or both shall be provided for the manhole cover fixing with the frame. The cost of locking arrangements shall not be paid separately.

- 3.3.1 Isophthalic grade of polyester resin reinforcing with glass fibers of appropriate grade & make shall be used for manufacturing of composite resin covers and frame.
- 3.3.2 Types of glass fiber used shall be specified by manufacturer's specifications and shall have melting point more than 500-600-degree F.
- 3.3.3 Resin: The manufacturer shall use only Isophthalic grade of polyester resin of appropriate grade designed for use with gas valve chamber application. Isophthalic grade of polyester resin shall be used for top layer.

3.4 Size and shape

The size & shape of manhole covers shall be (clear opening without frame): -

- 600 mm X 600 mm
- 1000mm X 1000mm (cover shall be made with two nos. of sleeper wherein; each sleeper shall measure 1000mm X 500 mm)
- 1200mm X 500 mm (for steel valve chamber)

The performance requirement of manhole covers and frames/ gratings with frame shall confirm to EN 124.

3.5 Frame seating area

The bearing area shall be designed in such a way that: a) the bearing pressure in relation to the test load shall not exceed 7.5 N/mm²; and it should provide an adequate contribution to stability under working conditions. Minimum 75mm frame seating is recommended.

3.6 Slot area as waterway in grating

The dimension of slots shall be selected considering hydraulic capacity and slots shall be evenly distributed throughout the clear size of grating. The total area of opening shall not be less than 30% of clear size of cover & the same shall be specified by manufacturers.

3.7 Marking

All chamber covers and frame shall have cast with the following information marked on them:

- a. GGL
- b. PE valve.
- c. Grade/ class designation
- d. Year of manufacture
- e. Name of Manufacturer
- f. Size of cover

The marking information should be as per figure:2 in attached Annexure – 1.

3.8 Installation of covers & Frame

Installation shall be carried out in accordance with the relevant Code of Practice. Until such Codes of Practice exist, the National Code of Practice or the manufacturer's guide should be used.

- 3.8.1 The cover with frame shall be fixed in M20 Grade of concrete for normal case however on the roads having heavy axle loads or heavy traffic, the cover with frame shall be fixed in M30 Grade of concrete.
- 3.8.2 The cover shall be air tight and water tight with SS nut-bolt / lever type locking arrangements.
- 3.8.3 The sizes of covers specified shall be taken as the clear internal dimensions of the frame.

Size of clear opening of chamber cover (mm)	Class / Grade
600 x 600	25 Ton for 30 seconds UDL (uniform Distributed Load)
1000 X 500 (2 nos.) for 1000 x 1000	
1200 X 500	

- 3.8.4 The weight of the various types of chamber covers and frames shall be Sufficient to sustain test load as per EN 124. These covers shall also be strong and light weight for ease of handling.
- 3.8.5 The cover shall be capable of easy opening and closing and it shall be fitted in the frame in good workmanship like manner.
- 3.8.6 The chamber covers with frame shall conform to EN 124.
- 3.8.7 Inspection and Testing for Covers and frames Covers & frames shall be subjected to following tests for acceptance:
 - a. Visual & Dimensional check
 - b. Load test and Permanent Set test as per EN 124
 - c. Mechanical properties test as per EN 124

3.9 Transporting & handling

- a. The Covers & frames should be preferably transported by road from the factory and stored as per the manufacturer specifications to protect damage.
- b. Contractor shall be responsible for the safety of covers & frames in transit, loading/unloading. Every care shall be exercised in handling covers & frames to avoid damage.
- c. The covers & frames shall be unloaded on timber skids with steadying ropes for by any other approved means.
- d. Suitable gaps in the covers & frames stacked shall be left at intervals to permit access from one side to the other.
- d. The covers & frames received on site shall be jointly checked for any visible damages shall be pointed out immediately to the Engineer at the site and recorded properly. Such defects shall be rectified or repaired to the satisfaction of the Engineer entirely at the Contractor's risk and cost. Any cover & frame which shows sufficient damage to preclude it from being used shall be discarded.

3.10 Destructive Testing

- Qualified vendor has to perform destructive test at MSME Lab / Approved Lab once for 1st supply for product approval
- Load test certificate need to be submitted for each and every size, before manufacturing as per call out order. Submitted load test certificate issued by MSME lab shall be verified by third party consultant.
- After confirmation of GGL representative, vendor can initiate manufacturing as per call out given.

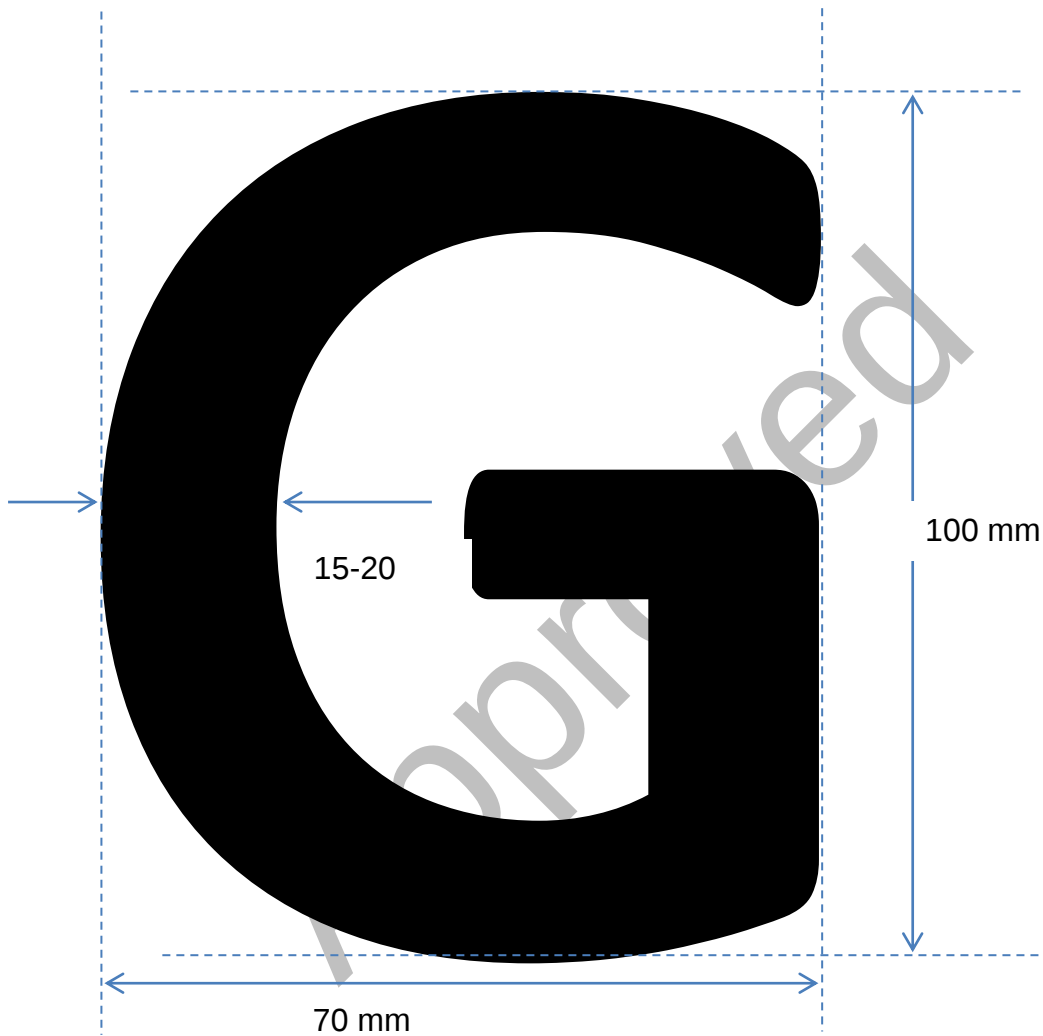
Annexure – 1



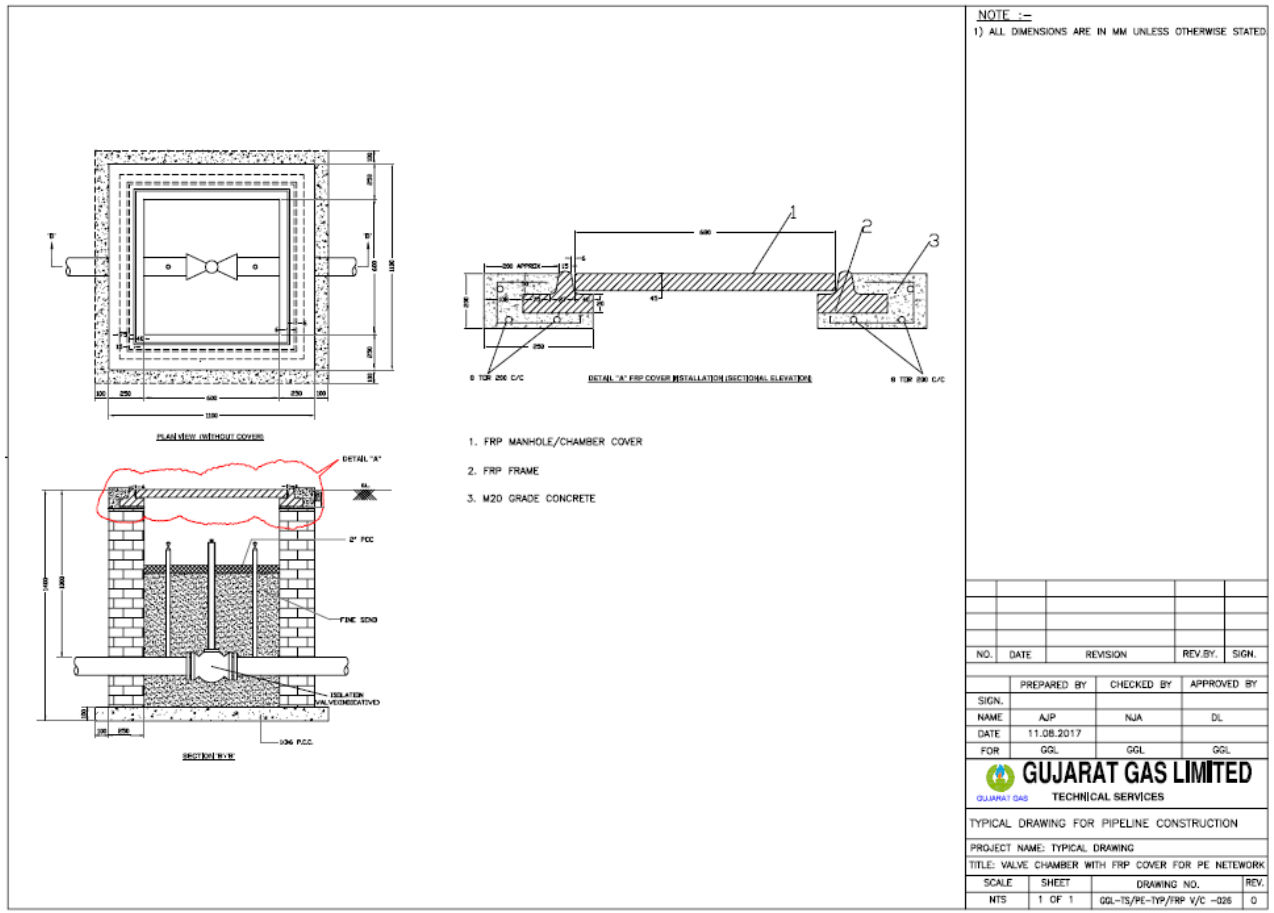
Figure: 1 - Sample FRP cover with frame



Figure: 2 - Write-up/markings on cover



Font size for GAS marking



For Steel Valve Chamber





QUALITY ASSURANCE PLAN (SPECIMEN COPY)
FRP MANHOLE COVERS

QAP NO:

PO NO.:

REV.NO.: 00

DATE:

PAGE:- 1 Of 1

SR. No.	ACTIVITY AND OPERATION	CHARACTERISTICS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	Inspection Agency			REMARKS
1	2	3	4	5	6	7	8	9	10			11
1	Material								M	TPA	C	
1	Fire Retardant Resin	Review of manufacturing material TC, Viscosity, gel time, acid value, volatile content	Major	As per Raw material Manufacturers TC	100%	As per Raw material Manufacturers TC	As per Raw material Manufacturers TC	Raw material Manufacturers TC	P	R	R	
2	Fibreglass mat	Review of manufacturing material TC, Weight, Moisture content,	Major	As per Raw material Manufacturers TC	100%	As per Raw material Manufacturers TC	As per Approved specification	Raw material Manufacturers TC	P	R	R	
3	FRP Test											
3.1	Dimension	Length, thickness, ID	Major	Measurement	100%	As per Approved drawing/specification	As per Approved drawing/specification +/- 5%	Internal Report	P	P	R	
3.2	Visual	Workmanship	Major	Visual	100%	As per Approved specification	As per Approved specification	Internal Report	P	R	R	
3.3	Marking	As required by Buyer	Major	Visual	100%	As per Approved specification/drawing	As per Approved specification/drawing	Internal Report	P	R	R	
3.4	Load Test	25 Tons	Major	Third Party testing	Once for 1st supply only	As per Approved specification/drawing	As per Approved specification/drawing	TPA Report	P	R	R	Test carried out at MSME Lab / Approved Lab
3.5	Destructive Test	continued until it breaks	Major	Third Party testing	Once for 1st supply only	As per Approved specification/drawing	As per Approved specification/drawing	TPA Report	P	R	R	Test carried out at MSME Lab / Approved Lab

LEGEND:-
Use the following term as appropriate in columns 10. P: Perform, W: Witness, R: Review, V: verification, A: Approval.

Annexure:(Reference standard: IS 2500)

Sr. No.	Batch Size	Sample Size	Acceptance No.	Rejection No.
1	2 to 500	20	0	1
2	501 to 3200	50	1	2
3	3201 to 10000	80	2	3
4	10001 to 35000	125	3	4
5	35001 to 150000	200	5	6

Explanation:

No. of samples inspected will be equal to the sample size given by the plan. If the no. of nonconforming product(s) is equal to or less than the acceptance no., the non-confirming product(s) will be removed from the lot and the remaining lot accepted. If the no. of non-confirming product(s) is equal to or greater than the rejection number, the whole lot will be retested for that particular parameter and rejected products, if any, will be replaced by fresh OK products.