

## **ORGANISATION PROFILE**

### **DADHIVALA MFRS & CONS. PVT. LTD.**

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### **Activity:**

Manufacturer of Galvanizing plant and all spares and FRP/PPFRP/PVDF-FRP tanks

And FRP translucent UV stabilized sheet.

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## **PROCESS VESSELS AND STORAGE TANKS - FOR EVERY APPLICATION**

DMCPL is a fabricating in GALV. PLANT for over 15 years. F.R.P & PP Division located in NCR region approximately 60 Km from Delhi airport and 40 Km from railway station. Geographically it is located in the commercial capital of the State of Uttar Pradesh India i.e. Ghaziabad

### **Capabilities**

DMCPL has the depth and breadth of experience and expertise in the design and manufacture of FRP process and storage vessels and is able to offer capacities up to 1 Lakh liters although the majority is in the 100 to 50,000 liters range with additional features includes agitation, heating/cooling systems.

### **A complete range of vessel types is available:**

- Horizontal Cylindrical with torrispherical dished ends
- Vertical cylindrical with conical or torrispherical heads
- Insulated
- Conical bottom lug mounted
- Thermoplastic lined vessels in above category

The vessels fabricated are for specific use and specified chemistry .A systematic selection of resin system ensures extended life and trouble free installation for corrosive fluids.

The quality of DMCPL FRP vessels is renowned and they can now be found in such diverse industries as paper, pharmaceutical, fine chemical, personal care, steel picklers and offers ultimate solution for storing and handling corrosive fluids which the company was founded.

DMCPL offers a complete in-house design, including 3D CAD engineering and our Engineering staff works closely with our clients to ensure requirements are fully satisfied.

This overall capability is backed by our Quality Assurance System. SSPE (DMCPL) implemented QA over 10 years ago and today a certification process from a competent authority is under progress for manufacturing of FRP Equipment.

Wherever the requirements of a particular industry dictate the need for high quality manufacturing of Process vessels and storage tanks, DMCPL is the customer's facility of choice.

DMCPL is a leading provider of quality capital equipment and turnkey systems to the corrosive liquid process industries and supplies a large number of household names.

In addition to Process Vessels and Storage Tanks, DMCPL offers a range of equipment and services in the following fields:

- Intake and Storage
- Mixing and Blending
- Process Vessels for elevated temperature

A full range of support services are available to complement all or any of our process systems including:

- Process Design
- Project Management
- Automation and Control
- Construction Design and Management
- Hygienic Fabrication
- After Sales Service

DMCPL offers a complete design and manufacture service from its fully equipped works 5500 square meter fabrication shop with additional assembly/testing and finishing workshops.

## **1.0 PURPOSE**

This Specification, together with the purchase order listing the applicable codes, standard and drawings, covers the design and fabrication requirement for equipment fabricated out of fiberglass composites with or without thermoplastic lining for above ground and underground installation. However the fabricators responsibility remain in all aspects of design, selection of raw material, selection of sequence of fabrication and any other factors related to the quality parameter of the equipment's.

## **2.0 SCOPE**

- 2.1 Resin and lining system, chemical barriers, backing layers, external finish layers including UV inhibitor layer (for above ground) etc. preparation of general arrangement drawing, considering all design, construction and design calculation as per related design code ( BS 4994 ) review in accordance with suppliers data requirements, procurement of materials required for the job, fabrication, inspection and testing at vendors works, as per approved drawings, standard specification and requirements of the requisition. Providing any special accessories like pipe sport, ladder and nameplate cleats, wooden saddles for safe transportation and installation procedures and any other special instructions regarding safe handling of the equipment is also included in the scope. in case of underground equipment straps and turn buckles required to keep equipment .underground against buoyancy force is also in vendors scope.
- 2.2. DMCPL will guarantee the equipment for the quality of ingredients used for making the composites, thermoplastic lining and the composites design, workmanship and satisfactory performance for a period agreed.
- 2.3. Any statutory clearances/ approvals required for design and fabrication of fiberglass composites, tanks and vessels shall also be in the scope of vendor.
- 2.4 The DMCPL will provide the all nozzle cutouts after complete building of layers but before providing Surface Finish.
- 2.5 A separate list shall be submitted:
  - (a) Operational spares if any
  - (b) Constructional spares if any

### **3.0 TECHNICAL REQUIREMENTS:**

#### **3.1 Design codes and design methodology**

3.1.1 The equipment can be designed and consigned and constructed to international codes which are applicable worldwide, taking into account all the design parameters for which design calculations shall be provided for pressure containing components and support members to include but not be limited to :

- (a) Vessel shell
- (b) Vessel heads
- (c) Thermoplastic lining (if applicable)
- (d) Opening and their reinforcements.
- (e) Internal and external attachments packing supports, vessel skirts, hold down lugs, supporting, anchor chairs, stiffening rings, etc.

#### **3.2 FABRICATION DRAWINGS :**

3.2.1 The general arrangement drawing shall be reviewed and approved by the **DMCPL** before submission and shall include the following:

Vessel title, item number, design data, all major dimensions, head shapes, thicknesses, vessel supporting details, nozzle index, nozzle details and their location, details of fixed and removable internals, reinforcing detail, details and location of fixing anchor bolts, details and location of stiffening rings, if applicable, details of resin system and lining, if applicable, details of chemical barrier, detail of glass used for various fibers (unidirectional roving and fabrics, woven roving and non-woven fabric and chopped-strand-mat or continuous stand mat etc.) details of backing layers, external finish including UV inhibitor and pigment (if specifically agreed) i.e., complete lay up details.

However, application of pigmentation on top layer shall be avoided as it detection of a defect during actual service.

Empty weight, shipping weight, weight of internals, hydrostatic weight, wind load, wind moment, seismic load, seismic moment. All testing information like hydrostatic test and tests on representative nozzle neck for detail of various layers and any tests as per code requirements. **DMCPL** design documents shall be mainly reviewed for completeness of engineering information as mentioned above and shall not absolve the vendor from his ultimate responsibility of completeness and compliance with codes, rules and requirements of the enquiry document, without prejudice to the scheduled completion data.

#### **3.3 MATERIALS**

Vendor will be fully responsible for the selection of all applicable materials which go into the composites like resin, thermoplastic lining if applicable, various types of glass fibers considering most appropriate basic glass considering its chemical resistance and desirable mechanical properties like E glass conforming to IS:11551:1951 or

better. Glass content by mass shall be within the range 28 to 45% for chopped strandmat (CSM), 45 TO 55% for woven roving's cloth (WR) and 65-75% for recommended in BS 4994.

Heat distortion temperature of the fully cured resin system used for the reinforced laminate shall be not less than 20% higher than design temperature of the equipment. Unless agreed otherwise, the construction and lusting requirements as specified in BS:4994 shall apply. Compatibility of the complete composite system and lining shall be ensured by the vendor for design and service requirements.

### **3.4 FABRICATION PROCEDURE:**

- One coat of vinyl ester resin on the mould
- First surface tissue lining using vinyl ester resin
- Second layer for glass fiber using 450 g/m<sup>2</sup> material with vinyl ester resin
- Third layer of glass fiber using 450 g/m<sup>2</sup> material with vinyl ester resin
- Fourth layer of glass fiber using 450 g/m<sup>2</sup> material with vinyl ester resin
- Fifth layer of woven using 610 g/m<sup>2</sup> material with vinyl ester resin
- Sixth, seventh and eight layer of glass fiber using 450 g/m<sup>2</sup> material with vinyl ester resin to meet the necessary thickness as per design. The requisite amounts of resin, catalyst or hardeners and any other ingredient such as accelerator or permitted filler, shall be accurately measured and thoroughly mixed. The amounts of mixed resin and reinforcement used in each layer of the laminate and the number and types of layers applied shall be recorded. The record shall be made available to.
- Whilst good rolling is essential, excessive rolling pressure shall be avoided so as not to disturb the distribution of the reinforcement or to break the fiber strands .Good adhesion is to be ensured between successive layers of the laminate and between shall and added fitting by appropriate scheduling of the manufacturing operation, otherwise the surface of the cured resin shall be removed to expose the fibers.
- Joints shall be staggered through the thickness of the laminate so far as is practicable and in no case joints shall coincide in adjacent layers.
- Length of individual strand shall not be less than 32 mm, when roving is chopped for spray applicable.
- Care shall be taken to ensure that the high strength fibers are adequately aligned in the correct direction to give the required strength when directionally biased reinforcement is used.
- Any spillage, drips runs shall be removed.
- Since the tanks are proposed to be installing in open, UV inhibitors shall be added with the last exterior FRP layer of the tank.

### **3.5 SUPPORTS :**

Special attention shall be given to the design of supports for vessels and tanks in reinforced plastics, so as to avoid excessive loads at point of support. All supports shall be designed to accommodate temperature change and to permit free expansion and contraction. Vessels and tanks fitted with agitator shall have supports designed with a load multiplication factor of 1.25. Flat bottom configuration shall support over the whole area of flat bottom.

### **3.6 INTERNALS :**

3.6.1 All removable internals shall be so designed that they can be passed through the man way or other access openings provided. Fixing of internals shall be done through bolting, VESSELS Edges or clamps taking care that they don't get loosened in service.

3.6.2 All decks and other internals shall be provided with weep holes for drainage, where necessary

### **3.7 PIPING & INSTRUMENT CONNECTION**

3.7.1 Bolt holes in nozzles flanges shall be located as follows :

(a) Nozzles in the shell of vertical or horizontal vessels, bolt holes shall be located to straddle the vessel longitudinal axis or a line parallel thereto.

(b) Horizontal nozzles in sheet of horizontal vessels which are set to slope toward one end with a slope greater than 1:100, bolt holes shall be located to straddle a vertical line through the nozzle.

3.7.2

(a) Nozzles in the ends of vertical vessels shall have their bolt holes located to straddle the north south centerline

( b) Nozzle in the ends of horizontal vessels, the bolt holes shall be located to straddle the vertical centerline of the vessel or a line.

3.7.3

When horizontal vessel are to slope greater than 1:100 nozzles shall be set to be truly vertical when the vessel is in position not normal to longitudinal axis. Nozzles is the end of these vessels shall be set horizontal when the vessels in position, not parallel to longitudinal axis.

### **3.8 INSPECTION AND TESTING :**

**3.8.1** Inspection and testing shall be carried out in accordance with approved quality plan which shall be prepared in line with the requirements of BS 4994 unless agreed otherwise, enquiry document and criticality of equipment and its specific requirements. For each activity point of responsibility and acceptance criteria shall be specified. The vender shall offer full facilities to the inspection authority during the course of manufacture and shall arrange for access to sub-contractors works where necessary. The **DMCPL** shall ensure that adequate notice is given to inspection authority to enable them to arrange their visit to suit the manufacturing program in accordance with the conditions of the order.

**3.8.2** Following minimum inspection stages are envisaged:

#### **3.8.2.1**

Review of material test certificates for all raw materials(resin, reinforcements and lining)

**3.8.2.2**

Approval of laminating procedures and tests for welders of thermoplastic lining and check for validating documentation.

**3.8.2.3**

Approval of weld procedures and tests for welders of thermoplastic linings and check for validating documentation.

**3.8.2.4**

Witnessing of spark tests on welds in thermoplastic liner.

**3.8.2.5**

Examination during hand layup, spray application, winding and joining of resin glass laminates

**3.8.2.6**

Examination of any repairs carried out during construction.

**3.8.2.7**

Verification of cure of laminate.

**3.8.2.8**

The nozzle cut outs are to be carefully preserved with individual marking and indicating stage of cutting.

**3.8.2.9**

On the equipment, spark test of welds, visual checks, dimensional checks and barsol hardness test, hydraulic tests, etc. shall be conducted as minimum

**3.8.2.10**

Examination on completion of construction, during pressure testing and after boiling out tests before any pigmented coating is applied. However, a pigment coating shall not be applied to the vessel unless specifically specified in the enquiry document.

**3.8.2.11**

In shop inspection, transportation and erection procedures.

**3.8.2.12**

Final dimensional and hydrostatic tests.

**3.8.2.13**

Support system during transportation.

**3.9 FINAL DOCUMENTATION**

This is essentially a record of what goes into the manufacture of the equipment.

Record will

consist of minimum following documents.

(a) List of contents

(b) Certified copy of quality assurance plan

(c) Certified copy of design calculations and final as-built drawings.

(d) Various procedures as listed in para 3.8

(e) Hydraulic test certificates.

(f) All NDT and destructive testing records.

(g) If any project specific requirements have been specified in enquiry document.

**DADHI VALA MFRS & CONS. PVT. LTD.**