

## TERMS AND CONDITIONS

### 1.0 SCOPE OF WORK

Work envisages realization of Flow Formed shells of two different thicknesses with same inside diameter(204m) of 2.4 m length(minimum). Total requirements of flow formed shell including both types of flow forming of shells are 40 Nos and split up of same is given below.

#### **Flow formed shell of 15CDV6 material**

Type	Shell ID	Thickness	Length	Quantity
Type-I	204	1.6	2.4 meter	20
Type-II	204	2.4	2.4 meter	20

The work involves flow forming of shells by mandrel based flow forming and dimension & NDT inspection, and for first off flow formed shell only heat treatment and coupon testing etc. as per QA plan.

### 2.0 **MATERIAL**

The department shall supply two numbers additional pre-forms made out of 15CDV6 steel forgings against said flow forming trial/freezing process parameters requirement. These additional preforms forgings will be used for trial and demonstrating on actual flow forming of shell. The Fabricator shall keep the free issue materials in safe custody.

### 3.0 **Material Receipt, Storage, Insurance and Accountability**

The value of FIM to be supplied by the department is Rs. **50,000/- per preform forging and tooling** (mandrel) available with department can be supplied to the party for execution of order in case party is willing. FIM list is attached including tooling. The fabricator shall receive, unload, store and account for the FIM of the Department, which will be delivered at Fabricator's works, freight paid.

### 4.0 **AVAILABILITY OF FACILITIES**

All required facilities for converting the pre-form to the required final shape shall be available with the manufacturer. Offer shall include list of facilities available with the fabricator for executing the work. Type of equipment for flow forming and its major specification shall be clearly mentioned. Offer shall be scrutinized with due consideration to the possession of above mentioned resources and if found inadequate, the offer shall be rejected on technical grounds.

Specific activities may be sub-contracted to qualified vendors. The details of such activities shall be clearly indicated in the offer, along with the details of the proposed vendors.

## **5.0 FUNCTIONAL REQUISITES OF THE FABRICATOR FOR EXECUTION OF THE ORDER**

### **5.1 MANUFACTURING DRAWINGS**

5.1.1 Preform drawings to be referred are **as per annexure I.**

**Flow formed** drawings to be referred are **as per annexure II (A) & II (B).**

**QA plan** to be referred are **as per annexure III.**

**Mandrel(tooling) drawing details** to be referred **as per annexure IV (Usability/rework of existing mandrel is in party scope).**

Pre-forms designed by the department envisage flow-forming the shell to a final thickness of 2.4+0.05mm or 1.6+0.05mm of 2.4-meter length(minimum) of 204 mm Inside diameter etc. and same to be finish machined for ID in the pre-forms stage. Minor modification in thickness of flow formed shell can be made by the department during execution of order.

On receipt of the Order, detailed manufacturing drawings/process shall be prepared by the Manufacturer. Three sets of manufacturing drawings/process shall be submitted to the Department.

5.1.2 Any further modification in this drawings/process shall be made only with the knowledge of the Department.

### **5.2 PROCESS SHEETS**

5.2.1 On receipt of the order, the Fabricator shall prepare detailed process sheets for carrying out the work, based on documents indicated incorporating therein .

1. Identification of type of machinery/ equipment to be deployed for individual Processes.
2. Requirement of tooling and fixtures for specific stages.
3. Detailed inspection and QC procedures and stages to be followed with testing/measuring instruments identified.

5.2.2 The Fabricator shall submit four sets of process documents to the Department within one month of placement of Order.

5.2.3 These process sheets shall be reviewed and approved by the Department. Six sets of approved process documents shall be submitted hard bound to the Department immediately on approval of the same.

### **5.3 TOOLING**

- 5.3.1 Tooling as per attached Annexure
- 5.3.2 Three sets of tool drawings shall be submitted to the Department immediately on receipt of the Order.
- 5.3.3 All tooling shall be inspected and qualified by the manufacturer before use.
- 5.3.4. No separate cost will be given for any tooling realization, mandrel realized earlier for flow forming trials of same ID (204 mm) can be spared by the for realization of hardware under this activity and same need to be returned once work is completed. Details of Mandrel drawings is attached as per annexure-IV.

### **6.0 INSPECTION AND QUALITY ASSURANCE**

- 6.1 The Manufacturer shall be responsible for the dimensional compliance and total quality of the flow formed product as per quality plan as per annexure-III.
- 6.2 The Manufacturer shall also maintain a shop inspection logbook to record detailed in-process inspection data and observations that shall be accessible to the Department at any time.
- 6.3 **The Department's representatives shall have access to the job at any time.**
- 6.4 **The Fabricator shall make available to the Department all inspection records and documentation in not less than three copy of each.**
- 6.5 **Flow forming of above hardware is a development activity. Department representative shall have full information about flow forming process carried out by the industry. Information like processing parameters at all stages of flow forming, machine details etc. are to be shared with department representative.**
- 6.6 Ultrasonic thickness inspection, ovality, cylindrcity of flow formed shell region are to be separately inspected and to be reported as per drawing.

### **7. CHANGES AND MODIFICATIONS TO SPECIFICATION AND QUALITY REQUIREMENTS**

Minor changes in the quality requirements and specifications may have to be made during the execution of the order. Such modifications shall be accommodated by the Fabricator at no extra cost to the Department. Implications of major changes in specifications, if any, shall be mutually discussed and agreed upon.

## **8.0 ACCEPTANCE AND REJECTION**

Responsibility of acceptance and/ or rejection of components at various stages rest with the Department.

The final acceptance of the hardware shall be based on the hardware meeting

- (i) Drawing specifications
- (ii) All quality specifications specified by the Department

## **9.0 DELIVERY**

9.1 Development of 1<sup>st</sup> off Shell shall be completed within 4 months of supply of FIM.

9.2 Supply of remaining Shell shall be completed within two months of development of 1<sup>st</sup> off Shell or after clearance from the department to go ahead for production or supply of FIM whichever is later.

9.3 Payment will be based on acceptance of hardware and dispatch clearance by indenting officer or concerned competing authority.

## **10.0 PACKING AND FORWARDING**

10.1 The Manufacturer shall arrange for packing of completed hardware in suitable water resistant packing cases. Necessary wooden container shall be manufactured by the Fabricator for this purpose

10.2 **The Department shall arrange to collect the packed hardware, from the Fabricator's Works.** The Fabricator shall arrange loading of the packed hardware into the carrier arranged by the Department.

## **11.0 SECURITY**

All information related to execution of the work shall be treated as secret and the contents of designs, process sheets or any other documents shall not be divulged/ disclosed or parted with/to any third party whatsoever without the written authorization of the Department.

## **12. Warranty**

There shall be two months' warranty against manufacturing defects after receiving the items at our site.