

**A. SCOPE OF WORK**

**1.0** Service provider will be required to carry-out Non Destructive Testing of Liquid Propulsion System Elements like engine& Stage elements, assemblies, control componentsetc.at LPSC Valiamala.

**2.0 NON DESTRUCTIVE TESTING OF PROPULSION SYSTEM ELEMENTS**

**Service provider has to carryout broadly;**

2.1 Service provider has to carryout NDT of Liquid Propulsion System components such as machined components, welded assemblies, investment castings, forgings and other assemblies being offered. The service provider has to carry out/assist in the following NDT activities:

- Visual Inspection(VI)
- Dye Penetrant Testing / Fluorescent Penetrant (DPT/ FPT)
- X-Ray Radiography Testing (RT)

**3.0 VISUAL INSPECTION**

3.1 Visual inspection of parts for any observations like scratches, dents, appearances etc. and also to ensure completion of shape and size as per applicable drawings & documents.

3.2 Visual inspection of weld joints to verify the presence of any spatters, undercut, under fills, Lack of fusion and penetration, irregular bead profile, discoloration, corrosion and any other surface anomalies.

3.3 Recording of the observations in the log book.

3.4 Necessary Visual aids like magnifiers, mirrors, Stereomicroscope, illuminators etc. will be provided by the Industry concerned/LPSC

**4.0 DYE PENETRANT (DP) TESTING**

The Service Provider has to carry out DPT/FPT of machined and formed Components, Welded Assemblies, Investment Castings, Forgings, Fasteners and other components, involving:

4.1 Verification of Job with respect to request.

4.2 Verification of department's previous stage clearance reports, if any.

4.3 Carrying out DP/FP testing as per standard procedure, strictly adhering to all the safety precautions.

4.4 Interpretation and recording of observations as per applicable acceptance criteria under the supervision of department personnel.

4.5 In case of any rework, carry out the re DPT/FPT to ensure the successful repair.

4.6 Preparation of Inspection reports and Non-Conformance reports as per the applicable format.

4.7 All the consumables, necessary Personnel Protective Equipments (PPE) (such as goggles, gloves, face masks, aprons etc. as applicable), and facilities (including Illuminator, magnifiers, mirrors, Stereomicroscope etc.) for DP/FP Testing would be provided by LPSC.

## **5.0 X-RAY RADIOGRAPHY**

The Service Provider personnel have to assist the department personnel in the Radiography of Machined Components, Welded Assemblies, Investment Castings, Forgings and other assemblies, involving:

- 5.1 Verification of Job against the request with respect to configuration and part identification.
- 5.2 Verification of department's clearance reports, if any, issued for individual parts as per the assembly drawing.
- 5.3 Ensuring adherence to the Radiography inspection plan / instructions provided by the department personnel, including the usage of correct Films and intensifying screens.
- 5.4 Cutting and loading of films in the dark room, arranging Lead identification markers, selecting suitable IQIs etc. to perform the radiography.
- 5.5 Positioning the hardware in the radiography enclosure and adjusting the appropriate exposure set-up under the supervision of department personnel adhering to the all safety norms.
- 5.6 Processing of exposed films in the dark room using standard procedure.
- 5.7 Drying and arranging of radiographs in wrappers/envelops with all the relevant details stamped on it.
- 5.8 Measurement and recording of film density and sensitivity obtained and ensuring that all radiographs are free from any artefacts in the Area of Interest.
- 5.9 Preparation of Inspection reports and Non-conformance reports as applicable in the prescribed format as guided by LPSC.
- 5.10 Energizing of Radiography equipment and ensuring radiation safety in and around the NDT facility will be the responsibility of "Industry/LPSC personnel".
- 5.11 The service provider personnel shall not be allowed to enter the Radiography enclosure without permission.
- 5.12 Requisite facilities for radiography including X-Ray machines (of capacity 160kV to 320kV), Consumables, Dark Room with necessary accessories etc. would be provided by Industry concerned/LPSC.

## 6.0 MANPOWER AND QUALIFICATION

- 6.1 The personnel deputed shall have minimum qualification of ITI (Fitter Trade) with 2 years' experience in NDT of Aerospace components. Personnel shall also possess sufficient operational knowledge in NDT Equipments.
- 6.2 Service provider shall submit the details regarding the qualification and experience of the work force being deployed, as and when manpower is positioned/ changed. Personnel meeting the aforesaid pre-requisites shall be able to demonstrate their skills in the presence of department's representative. In case of any attrition in the skilled manpower, party shall seek for fresh skill demonstration of personnel, so as to ensure minimum number of skilled manpower available with them always and to have some buffer as a redundant measure for substituting the absentees.

## 7.0 ACTIVITY LIST & MAN HOURS

- 7.1 Service provider shall provide all the required manpower for Non-destructive testing activities.
- 7.2 Service providers shall submit the details regarding the qualification and experience of the work force being deployed, as and when manpower is positioned/changed.
- 7.3 Following is the work units to be executed by the SERVICE PROVIDER for Non-destructive Testing at LPSC Valiamala
- 7.4 No of personnel:3

Sl. No	Work Description	Inspection units per day Approx.	Inspection units for Two years approx.	Work unit requirement Per day	Total work unit for 2 years
1.	Non Destructive Testing of Liquid Propulsion Systems Components and Assemblies (Including Visual Inspection, DP/FP Inspection and Radiography) at LPSC, Valiamala.	75	46800	24 Manhours	14976

## 6. WORK UNITS & COMPUTATION

One work unit is defined as one hour duration of work per person and the total quantum of work carried out will be computed on monthly basis, based on the completed work unit. The Service provider shall be available for work not only during office hours but also during late office hours and on holidays if needed.