

A. SCOPE OF WORK FOR DIPLOMA

- 1.0 To perform Dimensional Inspection of Liquid Propulsion System Elements - Control components and Engine and Stage Elements and Online Quality Surveillance of Liquid Propulsion System Assemblies - Control components, Modules and Packages, Engine and Stage assemblies at Industries based in and around Chennai, Mumbai, Coimbatore & Hyderabad (approximately 60 km from city limits).
- 1.1 As and when need arises, the service provider need to depute their personnel at outstation work centres located at the following place to carry out the dimensional inspection and Online Quality Surveillance activities on call basis at Pune, Vadodara&Ahmedabad for Mumbai Based Industries; Erode & Salem for Coimbatore based Industries; Visakhapatnam & Bhubaneswar for Hyderabad based industries.

2.0 DIMENSIONALINSPECTION OF PROPULSION SYSTEM ELEMENTS

Service provider has to carryout broadly;

- 2.1 Measurement of length, diameters, depth, width, radius, angle, profile, pitch circle diameters etc.
- 2.2 Measurement of geometrical parameters like roundness, concentricity, cylindricity, straightness, flatness, squareness, parallelism etc.
- 2.3 Measurement of Surface Finish parameters.
- 2.4 Measurement of linear dimensions, radius, angle, surface finish and geometrical parameters using micrometers, comparators, gauges, co-ordinate measuring machine, roundness tester, form and surface finish tester, video measuring equipment, optical profile projector, height measuring equipment, surface plate and other conventional instruments as applicable according to inspection plan approved by LPSC.

3.0 MEASUREMENT OF PARTS POSSESSING TOLERANCES;

- 3.1 Dimensional 5 to 100 micron and above.
- 3.2 Angular 15 to 30 minutes and above.
- 3.3 Surface finish Ra 0.1, 0.2, 0.4, 0.8, 1.6 micron and above.
- 3.4 Geometry 2 to 30 microns and above.

4.0 DIMENSIONAL INSPECTION TO BE PERFORMED AT INDUSTRIES

- 4.1 Verification of raw material clearance certificate for all parts and for stainless steel, identification using magnet test.
- 4.2 Visual inspection of parts to ensure completion of all operations as per applicable drawings & documents.

- 4.3 Visual inspection of parts using Stereomicroscope/Endoscope/ under 10x, 20x magnification as applicable/ for surface defects like scratches, tool marks, foreign materials, dent marks in critical areas and preparation of inspection report.
- 4.4 Party shall have to carry out 100% inspection of dimensions identified by LPSC as process critical dimension (PCD).
- 4.5 Inspection of critical parameters after rework.
- 4.6 Inspection after surface treatment operations.
- 4.7 In addition to PCD, 10% random counter inspection shall have to be carried out.
- 4.8 Should ensure that only calibrated equipments/gauges with valid certificate are used.
- 4.9 Applicable documents like quality plan, approved drawing, check list, etc. will be made available by LPSC for inspection.
- 4.10 Functionally Critical Dimensions (FCD) inspection of parts.
- 4.11 Preparation of PCD, FCD, Visual inspection reports for all inspection carried out.
- 4.12 Party shall carry out FCD Inspection of dimensions identified by LPSC as assembly critical dimension.
- 4.13 Preparation of non-conformance reports.

5.0 ONLINE QC SURVEILLANCE OF PROPULSION SYSTEM ELEMENTS

- 5.1 Ensuring the parts taken for assembly are cleared by LPSC QA.
- 5.2 Verification of clearance status of the parts taken for assembly.
- 5.3 Visual inspection of the parts using stereo microscope before clearing for assembly, and report defects.
- 5.4 QC surveillance during calibration of springs, bellows, filters etc. to ensure the approved procedure is followed and record the results.
- 5.5 QC surveillance during hydraulic proof test & pneumatic leak tests.
- 5.6 QC surveillance during cleaning, purging vacuum drying etc.
- 5.7 QC surveillance during de-burring & crimping.
- 5.8 Microscopic inspection after EB welding wherever applicable.
- 5.9 Calculation of sliding clearances and preparation of NCR if it is out of specification.
- 5.10 QC surveillance during assembly to ensure the approved procedure is followed.
- 5.11 Inspection of dimensions like strokes, gaps & spacer thickness etc during assembly.
- 5.12 QC Surveillance during functional checks, contamination checks, environmental tests, like Thermo vacuum, Thermal cyclic & Vibration test etc. as applicable.
- 5.13 Entry of data in assembly check list.
- 5.14 Preparation of NCRs for the deviations during activities.
- 5.15 Visual inspection of the components/Modules after completion of all assembly & test sequences.

5.16 To ensure the tools, instruments, gauges etc. are properly calibrated, the environment is properly maintained and the fluids used are with specified quality.

6.0 MANPOWER AND QUALIFICATION

6.1 **Party deputed personnel shall have minimum qualification of Diploma in Mechanical Engineering (DME) with minimum 2 year experience/ Diploma in Tool & Die Making (DTDM) issued by Government Tool Room & Training Centre, with minimum 1 year experience in Inspection of precision components. Personnel shall possess sufficient operational knowledge in conventional metrology inspection tools and special purpose inspection machines as listed in section 2.4.**

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 at Chennai, Mumbai, Coimbatore& Hyderabad based industries. Personnel meeting the aforesaid pre-requisites should be able to demonstrate their skills in the presence of LPSC 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 as a redundant measure for substituting the absentees.

7.0 WORKING HOURS

08.45 to 17.15 Hrs with 6 days per week. The exact time and days shall be applicable to the Industry concerned. If required, work shall be arranged on holiday and beyond normal working hours at the same rate as agreed for the normal working Hours.

8.0 ACTIVITY LIST AND WORK UNITS

8.1 Service provider shall provide all the required manpower for dimensional Inspection and Online Quality Surveillance activities.

8.2 Service provider shall submit the details regarding the qualification and experience of the work force being deployed, as and when manpower is positioned/changed at Chennai, Mumbai, Coimbatore& Hyderabad based Industries.

8.3 Following is the Work units to be positioned by the SERVICE PROVIDER for Dimensional Inspection and Online Quality Surveillance at Chennai, Mumbai, Coimbatore& Hyderabad based Industries (approximately 60 km from city limits) and this will be more or less uniformly spread over the whole year.

Sl. No.	Work Description	Estimated Inspection Quantity for 2 years approx.*	Work units for Two years*
1.	Dimensional Inspection of Liquid Propulsion System Engine and Stage elements at Chennai based industries.	14,400 Numbers	4992
2.	Dimensional Inspection of Liquid Propulsion System Engine and Stage elements at Mumbai based industries.	15,000 Numbers	9984
3.	Dimensional Inspection of Liquid Propulsion System Control Components, Assemblies, Modules and Engine and Stage elements at Coimbatore based industries.	1,44,000 Numbers	19968
4.	Dimensional Inspection of Liquid Propulsion System Control Components, Assemblies, Modules and Engine and Stage elements at Hyderabad based industries.	25,000 Numbers	19968
5.	Online Quality surveillance during assembly and testing of Liquid Propulsion System Control components /modules at Hyderabad based Industries	410 Nos. Components / Modules	9984
6.	Dimensional, FCD & ICD Inspection of Liquid Propulsion System Component parts, Components and Modules at Hyderabad based Industries	7500 Nos parts	4992
7.	Online Quality surveillance during assembly and testing of Liquid Propulsion System Control components /modules at Coimbatore based Industries	3000 Nos. Components / Modules/ Engine and Stage assemblies	9984
8.	Online Quality surveillance during assembly and testing of Liquid Propulsion System Engine and Stage assemblies at Chennai based Industries	1200 Nos. Engine and Stage assemblies	4992

*for information only

9.0 WORK UNITS AND COMPUTATION

9.1 **One work unit is defined as one hour duration of work perperson** 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.

9.2 Service provider shall deploy the required manpower primarily at the Industries based in and around Chennai, Mumbai, Coimbatore & Hyderabad. Additionally incase of any requirements in the nearby cities as tabulated below, the service provider shall depute the personnel from the above mentioned places at the same rate. However, for travel and logistics **TA shall be quoted separately on per visit rate, DA shall be quoted separately on per day rate.** For each visit, the duration shall normally be between one to five days and therefore for the quote shall be per day basis only for DA and per visit basis only for TA.

Sl. No.	Major Work Centre Location	Nearby Work Centre to be visited	Approximate No. of visits envisaged per year.
1.	Mumbai	Pune, Vadodara & Ahmedabad	Total 5 visits
2.	Coimbatore	Salem & Erode	Total 5 visits
3.	Hyderabad	Visakhapatnam & Bhubaneswar	Total 5 visits

9.3 **Service provider shall quote Amortised Work Unit rate separately for Chennai, Mumbai, Coimbatore & Hyderabad based Industries for performing dimensional inspection & online quality surveillance as per the guidelines and work content indicated in section A 1.0, A 1.1 (additionally separate quote for TA at per visit rate for each outstation work centre visits & separate quote for DA at per day rate for each outstation work centre visits for the table mentioned in 9.2), A 2.0, A 3.0, A 4.0, A 5.0.**

9.4 **The Amortised Work Unit rate quoted shall include all aspects like Man power, their logistics like daily travelling expenses to go to the industries specified as per the approximate distance given in section A1.0, accommodation if any, mandatory payments as per all statutory requirements etc. No other charges shall be payable by LPSC. Also the price quoted shall be applicable for 2 years.**

9.5 Payment shall be applicable only for the no. of Work units.

B. EXPERIENCE OF THE FIRM/COMPANY

Service provider shall have the core Competence in Metrology Inspection and Online Quality Surveillance for two years (from Jan. 2015 onwards) as on date of release of tender and the relevant PO copies/proof shall be attached along with offer.