

## 1. SCOPE

The scope is to convert wrought 12-10PH stainless steel to 12-10PH metal powder suitable for Laser Powder Bed Fusion (L-PBF) and Laser Powder Directed Energy Deposition (LP-DED) process. Two batches of 12-10PH powder shall be produced through argon gas atomization process on development mode.

Sl.No	Material	Input material size	Input material quantity	Quantity
1	12-10PH	Ø25 - Ø 100 x 550mm, tested sample, end cut pieces	400 Kg	2 Batch

## 2. SPECIFICATION OF 12-10PH

2.1. Argon gas atomization process shall be used for conversion. Details of atomization process shall be provided along with test certificate.

2.2. Chemical Composition: The metal powder shall have the following chemical composition of **12-10PH** as per the table mentioned below.

Element	% by weight	
	Min.	Max.
Carbon (C)	---	0.03
Silicon (Si)	---	0.15
Manganese (Mn)	---	0.15
Sulphur (S)	---	0.010
Phosphorous (P)	---	0.010
Chromium (Cr)	11.5	12.5
Nickel (Ni)	9.0	10.3
Molybdenum (Mo)	0.5	0.8
Titanium (Ti)	0.15	0.25
Aluminium (Al)	---	0.2
Boron (B)	---	0.001
Zirconium (Zr)	---	0.05
Calcium (Ca)	---	0.05
Iron (Fe)	Base	

2.3. The oxygen, hydrogen and nitrogen content of the powder shall be measured and reported.

2.4. Particle size envisages for L-PBF is 15 to 53  $\mu\text{m}$  and for LP-DED is 53 to 90 microns. However, the vendor shall specify the Particle Size Distribution required for L-PBF & DED and the same shall be measured & reported.

2.5. Since it is a development order, actual achievable quantity of 12-10PH powder shall be supplied along with over and under size powders.

### **3. FREE ISSUE MATERIALS**

3.1. 400 Kg materials to be converted to powder shall be issued as free issue material (FIM) from LPSC stores.

3.2. The Free issue materials (FIM) will be supplied by LPSC against submission of Bank guarantee. The FIM required for one charge shall be supplied in one lot, duly confirmed by XRF. Cost of total FIM is worked out to be Rs. 2,00,000/-.

### **4. RESPONSIBILITIES OF THE VENDOR**

4.1. The vendor shall ultimately be responsible for

- Generation of all necessary documents for manufacturing & quality control
- Characterization and testing.
- Quality control during all the above activities
- Delivery of products with all relevant documentation

4.2. The vendor shall ensure traceability of the product.

4.3. The vendor shall provide all necessary infrastructure and consumables to execute the work.

4.4. The vendor shall intimate the readiness of items in advance for deputing LPSC Quality Surveyors.

4.5. Any trials, qualifications and retests felt necessary any time during the execution of the work, to ensure conformance to the agreed specification, shall be carried out by the vendor at no extra cost.

### **5. Responsibilities of LPSC**

5.1. Despatch of FIM (materials) from LPSC to party site.

5.2. Discretionary participation and clarifications regarding manufacturing and testing

5.3.Periodic review of progress of work for effective monitoring

## **6. ACCEPTANCE**

6.1.The acceptance of the materials shall be strictly based the chemical composition mentioned in Clause 2.1. LPSC shall not accept items which deviate from the specification. However, LPSC reserves the sole right to accept deviations which may not affect the functional performance of the hardware.

6.2.The dispatch of materials from vendor's works to LPSC shall be made only after the acceptance of the items by LPSC, and as communicated in writing by the identified focal point.

## **7. FOCAL POINT**

7.1.The focal point from both the vendor and LPSC for this work shall be identified in the purchase order.

7.2.All commercial terms shall be referred to the purchase department with a copy to the contact point.

## **8. DELIVERY PERIOD**

8.1.The vendor shall deliver the material within four months from date of positioning of FIM.

8.2.Part shipment is permitted

## **9. PACKING AND TRANSPORTATION**

The vendor shall arrange packing of accepted products in adequate packaging so as not to cause damages like notches, dents, nicks, corrosion etc. in course of transportation and storage.