

## ExTeM-CAPEX-007

### **TECHNICAL SPECIFICATION FOR CUSTOM DESIGNED EXTRUSION UNIT WITH CONTROLLED ENVIRONMENT**

#### **1. Equipment requirement**

The custom specific horizontal extrusion and squeeze casting press must have the following requirement:

1. Able to take molten material (Al and Mg alloys) in the range of 200 gm to 2 kg from the bottom pouring casting furnace under vacuumed atmosphere (bottom pouring section) with inert gas/SF<sub>6</sub> supply (Extrusion section) and extrude specimens with following geometries:
  - 1.1 6mm thick X 40 mm width X appropriate length as per feasibility and requirement
  - 1.2 Ø 5 mm X appropriate length as per feasibility and requirement
  - 1.3 Ø 3 mm X appropriate length as per feasibility and requirement
  
2. In order to make the above mentioned specimen geometries, the input die geometry of the extrusion unit should have the following geometries:
  - 2.1. Extrusion Die-1: 20mm height X 40mm width X 300mm (for making specimen geometry of 1.1)
  - 2.2. Extrusion Die-2: 50 mm dia X appropriate length as per feasibility (for making specimen geometry of 1.2)
  - 2.3. Extrusion Die-3: 50 mm dia X appropriate length as per feasibility (for making specimen geometry of 1.3)
  
3. The power mode must be hydraulic with load capacity of minimum 100 Tonnes.
4. The Ram diameter must be 200 mm or higher and stroke length should be 300 mm or higher.
5. They motor capacity must be 10 HP (or more).
  
6. Furnace Capabilities inside the extrusion press:
  - 6.1 The maximum furnace inside the extrusion press must reach at least 650 °C or more.
  - 6.2 The equipment must have PID based temperature controller and the power control should be SSR based.
  - 6.3 They must provide k type thermocouples with minimum of two numbers.
7. The die material must be able to withstand the high specified temperature and load.
8. There must be proper provision of temperature control and extrusion parameter control.
9. Control Panel:
  - 9.1 The control panel should be Human Machine Interface based
  - 9.2 Capable to measure the following with proper accuracy: (i) furnace temperature (ii) actual melt temperature, (iii) extrusion pressure, (iv) extrusion process parameters.
  - 9.3 All heaters temperature must be controlled by the HMI with PID based logic to attain a great control accuracy of +/- 1 °C.
  - 9.4 There must be proper digital controller to indicate power, voltage and current
  - 9.5 Necessary HRC fuse must be provided.
10. The manufacturer must provide minimum laptop/monitor with i7 Processor, 8GB Ram, 1TB Hard disk, 2GB Graphics card, Anti-virus, windows 10 OS, UPS system. The functional and operation related software's must have loaded in the computer system at the time of delivery of the unit to IIT Madras
11. The supplier must supply the following essential accessories for maintenance of the said equipment:

- Tool Box: 1
- Melt Thermocouple (K type, Stainless Steel Sheathed & L Shaped): 3
- Furnace Cleaning Tool Kit: 3
- High temperature non-stick coating: 3 Kg,
- Gas Cylinder filled with SF6 gas: 1
- Gas Cylinder filled with Ar gas: 2
- S.S Double stage regulators for the above: 2

## **12. Other conditions**

- 12.1** Entire machine inclusively all systems/ accessories should be warranted for 24 months from the date of installation/commissioning against all the design, material or manufacturing defects.
- 12.2** Supplier should attend the maintenance issue within 7 days of complain.
- 12.3 Installation should be done by factory trained engineers at our institute, free of charge.
- 12.4 Operation, service and maintenance training should be provided to at least five persons for a minimum of two days.
- 12.5 One set of maintenance and operating manuals in English (with a hard copy)
- 12.6 The offer should be made @ 5 % GST against a concessional GST certificate.
- 12.7 Equipment to be delivered in test ready, factory calibrated condition.
- 12.8 Supplier must have supplied any kind of extrusion unit to at least 1 IIT or 2 NITs or 2 government R& D laboratories in India.
- 12.9 The supplier must provide the detailed address of the customers from IITs, NITs and government R& D laboratories in India to whom they have supplied any kind of extrusion unit.
- 12.10 The supplier should be equipped with well-trained engineers to offer post warranty maintenance and service support.
- 12.11 The nearest service centre is to be mentioned.
- 12.12 Compliance statement needs to be provided clearly specifying COMPLY/NON-COMPLY with remarks/reasons of all of the points mentioned above (from 1.0 to 12.12).