



EPD - BANGALORE

**Purchase Specification for
Silicone Rubber Injection
Moulding Machine- 630 T**

**SPECIFICATION NO.
EP-WEX-IM/2015-16**

Technical specification for Rubber Injection Moulding Machine

Sl No	Specification	Requirement
1	Purpose	To manufacture Polymer composite Station Post and similar insulators using Injection moulding machine with Silicone rubber compound and FRP rods. Refer Annexure – I for GA drawing
2	Description of Operation	The FRP rod on which the metal part is already crimped shall be cleaned and after treating the required surface the component shall be taken up for Injection moulding. The required mould shall be mounted on the machine platen and shall be heated to achieve requisite uniform temperature. Mould release agent is sprayed on the molding surface and the FRP rod is placed in the mould, the top and bottom halves are closed. The HTV silicone rubber compound is injected into the mould and the sheds are formed. After the pre-set curing time, the component is released from the mould. For lengthy Products injection molding is done by multiple shots.
3.	Scope of Supply	<p>Complete equipment as follows</p> <ol style="list-style-type: none">1. Injection molding machine – One number (consisting suitable clamping unit, Plastisizing and injection unit, Hydraulic unit, core pullers and core lifter units etc)2. Cold Runner Block – One Number3. Molds – 1 mold <p>(To manufacture all different lengths of the products mentioned in the attached drawings)</p> <p>Mould and Cold runner block as per specification given at 18.0 and 19.0 respectively</p> <p>Mould supply shall be optional, at the discretion of BHEL for price bid evaluation. Only items 1& 2 will be considered.</p> <p>Equipment to be supplied along with standard accessories. The list of standard accessories offered shall be provided in Techno-commercial offer Part - A.</p> <p>Detailed technical parameters of the equipment to be quoted are given in clause 13.0 of this specification.</p>

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4	Training	Two BHEL engineers are to be trained for acquaintance on operation and maintenance of the equipment at vendors' works during Pre-Dispatch Inspection. Further, training shall be provided to the operators during installation and commissioning at BHEL.
5	Inspection	The equipment shall be inspected in the vendors' works and injection molding as described above is to be demonstrated satisfactorily. The requisite raw material viz., FRP rods crimped with metal parts and silicone compound shall be supplied by BHEL. The Equipment to be dispatched only after final inspection and acceptance by BHEL
6	Utilities Requirement :	Information on requirement of various utilities such as power, compressed air, cooling water, handling facilities such as cranes are to be furnished in the Part - A : Techno-commercial bid.
7	Equipment Layout Plan	Information on the requirements for proper layout plan for installation and commissioning of the equipment and its associated accessories to be suggested by the bidders and the same to be provided in the Part - A : Techno-commercial bid.
8	Manufacturing process Control assistance:	Manufacturer has to assist BHEL in establishing suitable process control parameters during trial run of the injection moulding in the plant using the Silicone material provided by BHEL
9	Commercial Production capacity	Equipment has to be demonstrated for continuous satisfactory operation of 24 hours.
10	DATA acquisition System	Suitable DATA acquisition system to be provided along with the equipment for local/remote monitoring using computer interface.
11	Safety features	Bidders to provide the details of safety devices & features incorporated in the equipment.
12	Any other information	Supplier can furnish any other additional information, considering the overall requirements for better output

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13	Clamping unit, Injection Unit and Hydraulic unit.	<p><u>Clamping Unit</u> Installed Vertically, with hydraulic clamping and locking system. Clamping force : 6300 kN or above Heating platen minimum size:800mm x 1600 mm</p> <p><u>Injection Unit</u> Injection volume : 12500 CC or more Injection Pressure : 1250 bar or more Injection flow rate : min 300 to 320 cc/ sec Day light : 1000 mm min</p> <p><u>Hydraulic Unit</u> Hydraulic Unit compatible to the system specification shall be provided. The hydraulic system integration shall be with preferred make of components as in Sl no 16 provided in this specification. Hydraulic unit shall be with electronically adjustable hydraulic pump and regulating valve for oil supply of the clamping unit and the injection unit. Proportional pressure and proportional flow delivery shall be incorporated.</p>
14	Total connected load in KW	Bidders to specify
15	Operating Control unit	<p>The control unit incorporating PLC controls interfaced with HMI for providing inputs to the equipment, operation of the equipment in auto & manual modes and display of process parameters with a mimic diagram shall be provided. The control unit shall provide information of fault codes and graphic displays for errors / faults / alarms. The indicative requirements of the control unit is described below, bidders may suggest additional / advanced features for improving the operational efficiency of the equipment. Some of the indicative features to be incorporated are :</p>
		<ul style="list-style-type: none"> - Process data acquisition on USB interface. - Auto programming for re-clamping function during cure time at pre-defined intervals. - Real time temperature trend graphics on HMI - Multi level software password. - Display of Production overview mimic on HMI

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		<ul style="list-style-type: none"> - I/O diagnostic in graphical fashion - Display of actual and set process parameters. - Stroke measurement for injection cylinders and for mold movement via potentiometric transducers or non-contact linear transducer of suitable resolution. -Microprocessor terminal for closed loop control of Pressure. - Variable adjustment of the machine sequence Through program input via HMI.
16	Preferred make of components	<ul style="list-style-type: none"> -PLC : Siemens, Schneider, ABB, Allen Bradley, OMRON -Hydraulic components: Vickers, Rexroth -Pneumatic components : Festo, SMC - Electrical components: L&T, Siemens, ABB
17	Basic Machine features	<p>Basic Machine must comprise stable construction of the main RAM having mould opening and closing by vertical UP and down movement controlled by potentiometric transducers / non-contact linear transducer measurement with effective resolution. Hydraulic movement must provide clamping force as specified minimum.</p> <p>Machine must have stuffing box to feed silicone rubber, followed by plasticizing zone with effective temperate unit and mechanism to inject the required volume of the rubber in the mould placed on the platen through the nozzle. Volume of the material must be controlled by the potentiometric transducers / non-contact linear transducer measurement with effective resolution.</p> <p>Construction of this machine must have mechanism to control temperature of various parts of the machine mainly plunger, the nozzle portion, CRB and any other area depending upon the design of the machine. Heating / cooling must be through oil based temperation units to various part of the machine.</p> <p>Indicative construction features required are as mentioned below, however bidders may suggest any improved features :</p> <p>Oil temperation Unit for plasticizing unit, CRB and injection unit</p>

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