ANNEXURE

Mass flow controller system

Technical Specifications

Supply & Installation and commissioning of mass flow controller system for Liquefied Petroleum Gas (LPG) Butane/ Propane gas. -- 1No		
Sl No	**Parameters**	**Final specifications**
1.	**Mass Flow rate/ volumetric flow rate**	
	Range	0 to 45 kg/hr or more or 0 to 400 l/min or more
	Accuracy	± 2% of FS or better
	Resolution	0.01 kg/hr or 0.1 l/min
2.	Repeatability	±0.25 of FS or better
3.	Operating Temperature	0 to 50^{o}C or more
4.	Total response Time with controller settling time	3 sec or less with ±2 of FS value
5.	Turn down ration	1:40 or better
6.	Max Gas Pressure	10 bar or more
7.	Pressure sensitivity/coefficient	±0.3% of RD
8.	Temperature sensitivity/coefficient	±0.2% of FS
9.	Material of Construction	Stainless steel
10	Seals	Viton
11	End Connection	3/4" Flange or threading or suitable adapter connection.
12	Valve	Motorized control valve
13	Mass Flow control	Pre-programmed set point controller with respect to time using software from PC using RS 232 communication port. Eg:0 to10 min --- 5 kg/hr;10 to 20 min --- 15 kg/hr.

14	Mains power supply and operation time	Mains 230 V±10 VAC, 50 Hz ±-3%. Capability of mass flow controller to operate on mains unit for long term measurement of two hour at least for continuous monitoring.
15	Data storage	Readings should be logged in the computer with date and time for a scan interval of minimum 1 second with mass flow rate data.
16	Display	Mass flow rate, volumetric flow, temperature, pressure, density with Simultaneous display of all the readings in real time on the controller as well as in computer.
17	Software	Should supply suitable and compatible software to receive, transfer and analyse the data in computer for WINDOW 8 or better operating system
18	Data Transfer	Complete system integration of the input/output from the mass flow controller placed at site to data logger room (5 m distance between line and data logger room) by software for simultaneous measurement and data logging through USB / MODBUS/ RS283/ RS232/ RS485 for data transfer.
19	Signal transmission	Signal Transmission shielded against any electromagnetic interference / earth leakage.
20	Weather Protection	Internal Protection box should be provided to protect the mass flow controller from weather conditions.
21	Complete Installation, demonstration; commissioning should be done by the supplier at experimental facility site at CBRI, Roorkee. It should also include the supply and installation of wiring / cables etc in underground insulated conduit for signal transfer from mass flow meter to data logging device placed in data logger. The fabrication work, if any required for installation should be done by the supplier. All the facilities / materials required for fabrication work, etc., should be provided by the bidder.	
22	The following document in hard and soft copies should be provided (i) Instruction manual for operation of equipment. (ii) Instruction manual for software (iii) Proper Calibration Certificates for the instruments and sensors	
23	Warranty for two years complete in all respect.	