

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY, LONGOWAL

NAME OF FIRM/AGENCY

Technical Bid		E-tender No.:PUR/23/2019-20		
Category:A		Department:Chemical Engineering(Project)		
S.No.	Name of Item/ Equipment	Detailed Specifications (Generic)		Quantity
1	Carbon capture laboratory and bench scale unit [incuding (a), (b), (c), (d), (e), (f) and (g)]	<p>a) Gas mixing station</p> <p>Three gas cylinder two stage regulators of good quality for N2, Zero Air and CO2. The CO2 regulator must be of heated type to take care of chilling due to expansion. The mixing station is to be supplied with inline isolation valves for each of the gas lines, pressure regulators of 0 - 5 bar gage, line pressure gages of good quality, non-return valves for three gases, namely CO2, N2, zero air. Suitable Mass Flow Controllers (MFC) for N2 (0 - 20 SLPM), Zero Air (0 - 50 SLPM) and CO2 (0 - 10 SLPM). A sample point for mixed gases with an isolation valve and a rotameter of 10 to 100 SCCM with suitable end fitting to a hose nipple to convey gas to gas analyser must be provided</p> <p>b) Gas liquid equilibrium cell</p> <p>Gas liquid-equilibrium Cell must be used for generating Gas Liquid Equilibria at different temperatures and pressures. For degassing a large portion of gas laden solvent from the packed bed Absorption tower, described below: It must be of a 2 L vessel made of special glass, capable of withstand the required pressure, with SS lid. It must be a leak tight vessel which is assembled and immersed inside an agitated thermostat bath to vary temperatures from +5 to + 80 deg. C. The lid must be insulated as much as possible to reduce heat/cold losses. The vessel must be designed for operation at 3 bar Abs. pressure. The cell must contain a gas induction impeller with a variable speed agitator motor to operate from a minimum RPM of 0 - 800 RPM. With two RTD's, one for vapor space and the other for liquid phase temperatures, one pressure sensor in vapor space, two sampling systems for vapor and liquid samples (VS and LS) Sampling bombs (SS 304, 3 nos.) with accessories be provided for off line analysis.</p>		1

c) Multipacked tower absorption unit

Two absorption columns of glass in series are to be provided with all accessories including inter-stage accumulator vessels and pumps. These columns are to be supplied in two sections of 500 mm packed columns each (total of 1 m packed height each) with a small section for sampling and temperature and pressure sensor mounting for each column. The column packings can be combinations of random high-performance packing and structured high-performance packing with technical data of packing. The column is to be given with a diameter of 80 mm to get engineering data and the columns may be insulated with SHOE LACE type hot fabric insulation to get some idea of heat of absorption with strategically placed RTD's in sections if possible.

Apart from this, one glass absorption column of 80 mm diameter x 1200 mm long with interchangeable trays is also required with at least 10 trays of normal sieve and slanted sieve trays. Sampling points are to be placed on the 3rd and 7th trays. With multiple feed point on the 4th and 6th trays from the top. Facility to use only one of the above three column and also to do multi feed of fresh solvent and fresh feed is to be provided. Each multi feed line must be provided with a suitable simple MFC/ turbine flow meter that can be connected to a display and PC connectivity.

Sampling provision is required for first and second column gas and liquid samples at appropriate places.

A solvent regeneration unit with air stripping system for the enriched solvent recovery and recycle is required. Appropriate preheat is to be there (with immersion electric heater) and also post cooling of depleted solvent. Online gas analysis and depleted liquid off line samples must be provided. A mini diaphragm vacuum pump with simple manual control is required to ensure better stripping.

d) Offline analysis equipment

A good automatic titrator unit required with suitable electrodes and acid/alkali holder; and auto micro dispenser pump to analyse CO₂ by back titration.

e) Structure and SCADA

The whole unit must be mounted on self - standing sturdy support structure. All signal and displays must be in a good weather proof panel and a front-end PC with a good mini SCADA software with feature of data export in .xls/.csv format with data logging, control, trend display and DAQ function should be there.

Software module for post run analysis with user definable interface, extra copy of operational software must be provided by supplier.

Commissioning assistance, training and sample analysis protocol are required during installation.

Spares and tools must be given for 3 years operation.

f) Ambient temperature maintaining

One nos. of 1.5 Ton split air conditioner required for maintaining ambient temperature of facility including one nos. of voltage stabilizer for 1.5 Ton split air conditioner.

		<p>g) Desktop computer</p> <p>Dell Inspiron 3470 Small Desktop or equivalent having technical specifications listed below: Processor: 9th Gen Intel® Core™ i3-9100 (4-Core, 6MB Cache, up to 4.2GHz with Intel® Turbo Boost Technology) RAM: 8GB 1x8GB DDR4 2666MHz Hard drive: 256GB M.2 SATA SSD (Boot) + 1TB 7200RPM SATA 6Gb/s Optical Drive: Tray load DVD Drive (Reads and Writes to DVD/CD) Graphics: Intel® UHD Graphics 630 Monitor: Dell Monitor E2216HV Operating system: Windows 10 Application software: Microsoft office or equivalent application software capable of handling .xls and .doc file format. Accessories: Wired keyboard and mouse</p>	
2	Combustion gas analyser with digital data recorder	<p>Combustion gas analyser with digital data recorder</p> <p>A suitable NDIR based combustion gas analyser for online CO2 analysis having digital display and PC connectivity with data recording. For integration feasibility with above mentioned CCS pilot unit, analyser must be provided along with the CSS and the two be integrated.</p> <p>Commissioning assistance and Preventive maintenance/AMC for both equipment mentioned at 1 and 2 above:</p> <p>After successful commissioning and training of the concerned persons warranty for one year be provided. AMC must be provided for duration of 1 year after warranty period, commencing total 3 mandatory visits for calibration and preventive maintenance.</p>	1