Appendix-I

Sr. No.	Name of the item with Specification	Qty.
	Universal Testing Machine (600 kN)	01 Unit
1.	Capacity: 600kN with single or dual test space	
2.	Load Measuring Range: 2% to 100% of Full Scale or better	
3.	Load Accuracy: ±0.5% of indicated load on load cell	
4.	Least count: 0.1kN or better.	
5.	Range of test speed: 1-50 mm/min or better.	
6.	Piston stroke: 200 mm or better. The stroke of the machine shall be measured using linear variable displacement transducer (LVDT).	
7.	Crosshead Displacement Resolution: 0.01mm or better	
8.	16 bit effective resolution or better	
9.	Tensile Space: 800mm or better	
10.	Compression Space: 400 mm or better	
11.	Grips: Hydraulic Grips	
12.	UTM control console. Shall be complete with upper and lower hydraulically operated front open jaws, Inserts sets for Round samples (Dia.), sizes 10 - 25, 25 - 40, 40 - 55 mm and Inserts sets for flat samples, sizes : 0 - 15, 15 - 30 mm (shall accepts samples up to 60 mm wide)	
13.	Transverse test attachment and high precision load cell for load measurement. Closed-loop P.I.D.control with 1 channel for load cell, 1 channel to measure crosshead separation travel with high precision displacement transducer, minimum 2 spare channels for external measurement of deformation/strain	
14.	Tensile, compression and flexure test execution under load and deflection control	
15.	Load frame shall be free standing and self-reacting type. (No Special Foundation or Grouting shall be required)	
16.	Load frame shall be aligned to high precision with adequate factor of safety and high stiffness (both lateral and vertical). It shall be free from self-induced shocks and vibrations. All steel frames shall be hard chrome coated and are weather resistant	
17.	**Hydraulics** Dual stage pump: centrifugal low pressure for fast approach automatically switching to radial multi- piston high pressure	
18.	The pumping units are designed to be located in the lab with lower noise level below 70 dB	
19.	**Software:** Data acquisition and processing software for tensile/compression/flexure test according to IS/EN/ASTM Standard allowing: Input of specimen identification, test and name of customer real time downloading of test data simultaneous display of stress/time and stress/elongation by using coaxial extensometer series or universal extensometer series or displacement transducer reading crosshead separation travel elaboration of tension test results once test is completed	
20.	Simultaneous display of load, stress and specimen elongation	
21.	Data acquisition panel should be easy to setup, monitor and save test data in different file formats, for example .dat, .txt, .csv etc. Internal memory of the system shall be at least equal to 2 GB	
22.	**Safety Features:** **a.** Emergency Stop Option **b.** Stroke Protection at limit points **c.** Overload protection	

23.	The compression platens of full load capacity shall be made from hardened alloy steel with chrome coating (Vickers hardness shall not be less than 550). The upper platen shall be with a self-aligning action and suitably sized spacers to accommodate a variety of different sizes of specimen. **a.** Compression Platten Diameter: 200mm better **b.** Compression Platten Thickness: 30mm or better	
24.	Bending Attachment: **a.**Bending Span: 30-450 mm or better **b.** Roller Diameter: 25 mm or better **c.** Roller length: 120mm or better	
25.	**Grips for strand wires:** Insert holder for Suitable for 600 kN with inserts for dia. 6.35 mm, 7.95 mm, 9.5mm, 11.1mm.	
26.	**Electronic Extensometer:** Electronic universal extensometer to measure the elongation of wires, steel rebars and round steel specimens -Measuring base: 50 to 200 mm - Linearity: better than +- 1% - Max. Travel: 10 mm or better	
27.	The computer system should have following minimum requirements: • All-in-one-desktop with i7 processor and Windows 10 operating system • 23.8-inch screen monitor with Intel HD Graphics • 8GB DDR3L RAM • 1TB hard drive • 3 USB 3.0 ports	
28.	Specify compliance report with adherence to relevant quality standards (IS/ASTM/EN)	
29.	Vendor must have supplied atleast 3 same or higher capacity machine to Central/State Funded academic institutes/industries of repute during last five years. Purchase order clearly indicating the date of issuance shall also be attached.	