**Re-tender CUI/Atd/37/Civil Engg (2020-2021)**

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| **Computer Control Electro-hydraulic Servo** |
| **Universal Testing Machine with standard accessories** |
| **Computer Control Electro-Hydraulic Servo UTM with 3000kN Compression Frame (Or Equivalent)** |
| ***Specifications:*** |
| ² Sampling rate: 1000Hz |
| ² Communication Processor, 100MHz |
| ² Load resolution 180,000 steps, two ranges 2mV/V and 4mV/V |
| ² RS485 Interface for external keyboard/Display supports only one device |
| ² Drive Interface ±10V (16bit) analogue command output OR, digital command output |
| ² Safety functions like 4DI |
| ² Two Option slots for second analogue channel for strain gauge extensometer OR, two encoder channels for extensometer with one or two encoder. |
| ² PC communication via USB or Ethernet |
| ² Internal socket for serial Sensors (COM 1) |
| ² Internal socket for Debug (COM 2) |
| ***Technical specification*** |
| 1000H Frame |
| Max. Load(kN) 1000 |
| Load measuring range 0.4~100%F.S. |
| Load accuracy (%) ±0.5 |
| Deformation measuring range 0.4~100%F.S |
| Deformation accuracy (%) ±0.5 |
| Displacement resolution (mm) 0.01mm (0.001mm with advanced encoder) |
| Test loading speed(mm/min) for WAW-1000H 0.5-50 (0.1-50 based on Doli controller and Moog valve) |
| Max. Crosshead moving speed (mm/min) 200 |
| Stress control range 1~60(N/mm2)S-1 |
| Strain control range 0.00007/s~0.0067/s |
| Tensile space(mm) 1000 |
| Compression space(mm) 850 |
| Piston stroke(mm) 250 |
| Column Distance(mm) 590 |
| Column Diameter(mm) 100 |
| Working table size(mm) 670x880 |
| Flat jaw (mm) 0-30, 10-40 |
| Round jaw(mm) Φ9-20, 20-40, 40-60 |
| Jaw length(mm) 110 |
| Jaw width(mm) 110 |
| Platen size(mm) Dia. 220x40 |
| Bending span(mm) 50-500 |

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| Roller diameter (mm) Ф50 |
| Roller length (mm) 160 |
| Bending depth (mm) 180 |
| Net weight (kg) 3500 |
| Max. height(mm) 2800 |
| Dimension of load frame3(mm) 980X670X2700 |
| Size of power pack(mm) 700x750x1100 |
| Oil tank volume(L) 110 |
| Oil pressure (MPa) 26 |
| Power supply 3PH, 380VAC, 50H, 4kW |
| ***Standard accessories*** |
| 1. Hydraulic tensile fixture for round sample dia. 9-20, 20-40, 40-60mm, flat sample: thickness 0-30, 10-40mm |
| 2. Flexure/Bending fixture 1 set |
| Bending span: 50-500mm, roller dia. 50mm, upper punching head/mandrel: dia. 50mm, |
| 3.Compression fixture dia.220x40mm |
| 4.Computer system with English version software (19in LCD) |
| Computer: Dell, Intel (R) Celeron (R) 2.6Ghz, 2MB processor, 2GB, DDR3 1600MHz, SDRAM Memory, HD 250G, |
| 16X DVD-ROM Drive, Windows 7 home basic system; 19inch screen LED monitor,  photoelectrical mouse, and |
| Hydraulic shrinkage mould with measurement apparatus |
| multiple keyboard; Other advanced configuration can be offered upon request, but above configuration are quite enough for free operating of such machine. |
| ***3000kN Compression frame*** |
| Max. Load (kN) 3000 |
| Load measuring range 0.4-100% of F.S. |
| Load accuracy Class 1 |
| Constant loading rate 1-50kN/s (can be adjusted) |
| Back to zero relative error ±1% |
| Relative resolution 1% |
| Test space adjusting mode By dual action actuator & spacers |
| Compression platen (mm) Φ300mm |
| Distance between two platens(mm) 400mm |
| Distance between columns 350x350mm |
| Ram travel 250mm |
| Max. moving speed of piston 100mm/min |
| Dimension for load frame 630x630x1450mm |
| Weight 2800kg |
| ***Options:*** |
| Full-enclosed safety cover with metal sheet around the load |

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| frame of UTM with electromagnetic switch for protection |
| Air cooling system to cool down the hydraulic oil if for long term operation |
| Servo valve from Moog, USA |
| Load cell from Celtron, USA |
| Advanced encoder with 40000pulse/turn can achieve better |
| position resolution 0.001mm |
| **clip on axial extensometer from Epsilon, USA** |
| with 50mm gauge length, -5~+10mm travel, for flat |
| and round samples, accuracy: class 0.5 as per ISO 9513 |
| ***S p e c i f i c a t i o n s*** |
| Excitation: 5 to 10 VDC recommended, 12 VDC or VAC max. |
| Output: 2 to 4 mV/V, nominal, depending on model |
| Linearity: ≤0.15% of full scale measuring range |
| Temperature Range: Standard (-ST) is -40 °C to +100 °C (-40 °F to 210 °F) |
| Optional (-LHT) is -270 °C to +200 °C (-454°F to 400 °F) |
| Cable: Integral, ultra-flexible cable, 2.5 m (8 ft) standard |
| Standard Quick Attach Kit: Fits round samples up to 25 mm diameter (1.0 inch) and flats to |
| 12 mm thick by 31 mm wide (0.5 inch by 1.25 inch) |
| Operating Force: 30 g typical |
| EDC 220 Controller from Doli, Germany with self-recognition and |
| auto-calibration function for both load cell and extensometer |
| Industrial Touch Screen Pad 24inch |
| Shear test fixture for dia. 10mm sample |
| Shear test fixture for concrete dia. 50mm, dia. 100mm |
| Shear test fixture for bolt M6-M30 |
| Special tensile grip for fasteners as per ASTM F606 & ISO 898: M6, M7, M8, M10, M12, M14, M16, M18, M20, M22, M24, M27, M30 |
| Special grips for pre-stressed 7-wire strand dia. 9.5, 12.7, |
| 15.2mm as per ASTM A416 with high pressure power pack |
| CMOD testing Fixture as per EN 14651 |
| COD gage for determination of fracture toughness properties of materials |
| ***S P E C I F I C AT I O N S*** |
| Excitation: 5 to 10 VDC recommended, 12 VDC or VAC max. |
| Output: 2 to 4 mV/V nominal, depending on model |
| Linearity: 0.15% for measuring ranges less than 0.25 inch |
| (6 mm), 0.20% for greater measuring ranges |
| Temperature Range: Standard (-ST) is -40 °C to +100 °C (-40 °F to 210 °F) |
| Cable: Integral, ultra-flexible cable, 8 ft (2.5 m) standard |
| Operating Force: Exerts 2 to 3 lbs (9 to 14 N), depending on model |
| Axial Averaging Extensometer for Modulus of Elasticity, and together with model 3544-200M- 060M-ST Circumferential Extensometer for Poisson Ratio Determination |

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| ***Specifications*** |
| Excitation: 5 to 10 VDC recommended, 12 VDC or VAC max. |
| Output: 2 to 4 mV/V nominal, depending on model |
| Linearity: ≤0.20% of full scale measuring range, depending |
| on model |
| Temperature Range: Standard (-ST) is -40 °C to +100 °C (-40 °F to 210 °F) |
| Optional (-LHT) is -270 °C to +200 °C (-454°F to 400 °F) |
| Cable: Integral, ultra-flexible cable, 2.5 m (8 ft) standard |
| Specimen Size: Wide range of specimen sizes available, including AX, BX, NX and |
| larger, to 200 mm (and 8 inches) diameters standard (larger sizes on special order) |
| Operating Force: <30 g typical per side |
| RTTS-100D Dual Camera 3D DIC Video extensometer for axial & transverse strain, Modulus of Elasticity, Poisson ratio |
| measurement etc. for all metals and concretes |
| ***Specifications:*** |
| Frequency @ FOV Class 1 according to ISO 9513/ |
| Frequency @ FOV Class A according to ASTM E83 |
| 60Hz @ 100x50mm |
| Classification to ISO 9513/ASTM E 83 Class 0.5/Class B-1 |
| Field of View (FOV) 1-100mm |
| Gauge Range 0.5-100 % FOV |
| Resolution |
| 0.19 μm @ 53 mm FOV |
| 0.39 μm @ 100 mm FOV |
| Digital output RS232/485, TCP/IP |
| Camera resolution 5 MPx @9fps (Max. 200fps AOI) |
| Electro-hydraulic Servo Dynamic and Static |
| Universal Testing Machine with standard accessories |
| ***Main specifications:*** |
| 1. Max. Static load: ±100kN |
| 2. Max. Dynamic load: ±70kN |
| 3. Max. Stroke of the actuator: ±75mm with accuracy from less than ±0.5 % of full scale, total 150mm |
| 4. Load accuracy: ±1% |
| 5. Deformation measuring accuracy: ±1% |
| 6. Frequency range: 0.1-50Hz with EDC580 controller; |
| 7. Main wave shapes: sine wave, square wave, triangular wave, trapezoidal, static test oblique wave. |
| 8. Actuator Diameter of rod/cylinder: Φ70/110mm |
| 9. Horizontal Clearance: 600mm |
| 10. Vertical clearance: 1300mm/extended space: 1800mm |

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| 11. Working height between grips: 950mm |
| 12. Specimen clamping: Hydraulic forcing clamping. |
| 13. Crosshead moving: hydraulic driving for elevating. |
| 14. Stiffness of load frame: 450kN/mm |
| 15. Constant pressure servo pump station: Flow 45L/min, pressure 210Bar, Motor power 22kW, 380V, 50Hz |
| 16. Controller: Doli EDC 580 full-digital intelligent controller |
| 17. Size: load frame: 1000x650x2900/3400mm (standard/extended); hydraulic power pack: 1300x1030x1500mm |
| 18. Weight of load frame: 1500kg; Weight of hydraulic power pack: 500kg  **(Or Equivalent)** |