

**DEPARTMENT OF PRODUCTION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI - 620 015**

27.12.2013

Tender Notification No.: NITT/F.NO:SIF016/PLAN2013-14

dt: 19.12.2013

With reference to the above tender notification and the pre-bid conference held on 27.12.2013 at 2.00 PM in the committee room of Physics department, the following amendments are made. **The Delivery period is 24 weeks subject to export license clearance.** All other terms and conditions mentioned in the tender document remains same.

Specification for Laser Material Processing Workstation

Original tender specification	Amended specification
<p>1. Laser Source</p> <p>Type : Diode pumped Disk or Diode pumped Fiber Power : 4 kW (in CW) Wave length : 1030 ± 10 nm (if disk) or 1070 ± 10 nm (if fiber) Mode : CW and modulated Modulation frequency (min.) : 1 kHz Minimum Pulse Width (µs) : 50 µs Beam quality M² : ≤ 2</p> <p>Fiber optic beam delivery</p> <p>Fiber core diameter (µm) : 50 µm and 100 µm Beam parameter product : ≤ 4 mm*mrad (for a 50 µm fiber) Optical fiber cable length: 30 meters (minimum)</p> <p>Other Mandatory requirements</p> <p>Options for power sharing & time sharing for future upgradation. Integrated power supply and real time controller for checking and monitoring of function data. Safety shutter. Control interface. CPU with real time system software. 4 Nos. of appropriate safety goggles.</p>	<p>1. Laser Source</p> <p>Type : Diode pumped Disk or Diode pumped Fiber Power : 2 kW or more (in CW) Wave length : 1030 ± 10 nm (if disk) or 1070 ± 10 nm (if fiber) Mode : CW and modulated Modulation frequency (min.) : 1 kHz Minimum Pulse Width (µs) : 50 µs or less Beam quality M² : ≤ 2</p> <p>Fiber optic beam delivery</p> <p>Fiber core diameter (µm) : 50 µm and 100 µm Beam parameter product : ≤ 5 mm*mrad (for a 50 µm fiber) Optical fiber cable length: 30 meters (minimum)</p> <p>Other Mandatory requirements</p> <p>Options for 4 way power sharing & 4 way time sharing for future upgradation. Integrated power supply and real time controller for checking and monitoring of function data. Safety shutter. Control interface. CPU with real time system software. 4 Nos. of appropriate safety goggles.</p>
<p>2. Working chamber</p> <p>The laser source should be integrated in a robot with necessary interfacing. A protective housing around the working area should be provided which should comply with Class-4 laser safety. It should include automatic lift door in the front and side protection doors. It should have suitable illumination of total workspace. An integrated cooler (water-air) should be provided to cool the optics. Provisions should be given to exhaust the dust and fumes. A suitable control unit and software should be provided for programming the laser and robot with windows based PC. A shielding gas supply unit with fixed and flexible gas nozzle is to be provided with a</p>	<p>2. Working chamber</p> <p>The laser source should be integrated in a robot with necessary interfacing. A protective housing around the working area should be provided which should comply with Class-1 laser safety. It should include automatic lift door in the front and side protection doors. It should have suitable illumination of total workspace. An integrated cooler (water-air) should be provided to cool the optics. Provisions should be given to exhaust the dust and fumes. A suitable control unit and software should be provided for programming the laser and robot with windows based PC. A CCD camera attached to the Robot with display for overall process monitoring should be included. A</p>

<p>possibility to integrate with the processing optics/head. A swiveling operator panel should be provided for convenient access to the operator. The provided software should support the help function and diagnostic function for maintenance and error analysis. A provision should be given to connect to internet for on-line maintenance solution. A waste container should be provided to collect the debris.</p>	<p>shielding gas supply unit with fixed and flexible gas nozzle is to be provided with a possibility to integrate with the processing optics/head. A swiveling operator panel should be provided for convenient access to the operator. The provided software should support the help function and diagnostic function for maintenance and error analysis. A provision should be given to connect to internet for on-line maintenance solution. A waste container should be provided to collect the debris.</p>
<p>3. Robot</p> <p>Number of axes: 6 Repeat accuracy: $\pm 50 \mu\text{m}$ (minimum) Load carrying capacity: 30 kg (minimum)</p> <p>3.1 Rotary table</p> <p>Number of axis: 1</p> <p>Rotation range: $\pm 170^\circ$ Working height: 750 mm(minimum) Load carrying capacity: 250 kg (minimum) Mode of operation: semi-automatic</p> <p>3.2 Rotate/tip positioner</p> <p>Number of axes: 2 Rotation axis: $\pm 180^\circ$ (minimum) Tipping axis: $\pm 90^\circ$ (minimum) Working height: 850 mm(minimum) Load carrying capacity: 300 kg (minimum) Mode of operation: Automatic Repeat accuracy: $\pm 100 \mu\text{m}$ (minimum) @ 500 mm radius</p>	<p>3. Robot</p> <p>Number of axes: 6 Reach: 2000 mm (minimum) Repeat accuracy: $\pm 50 \mu\text{m}$ (minimum) Load carrying capacity: 30 kg (minimum)</p> <p>3.1 Rotary table</p> <p>Number of axis: 1 Diameter of the base plate 750 mm (minimum) with suitable options for clamping</p> <p>Rotation range: $\pm 170^\circ$ Working height: 600 - 750 mm(minimum) Load carrying capacity: 250 kg (minimum) Mode of operation: fully-automatic Rotational accuracy: $\pm 100 \mu\text{m}$ (minimum) @ 500 mm radius</p> <p>3.2 Rotate/tip positioner (optional)</p> <p>Number of axes: 2 Rotation axis: $\pm 180^\circ$ (minimum) Tipping axis: $\pm 90^\circ$ (minimum) Working height: 850 mm(minimum) Load carrying capacity: 300 kg (minimum) Mode of operation: Semi-Automatic Repeat accuracy: $\pm 100 \mu\text{m}$ (minimum) @ 500 mm radius</p>
<p>4. Laser heads</p> <p>4.1 Cutting head: Focal length: 150 mm Should include distance sensor, collision protection, internal cutting gas (N₂, O₂, Ar and compressed air) supply for pressure control, selection of cutting gas via machine control system and digital camera for process monitoring. A line laser should be provided to determine the tool center point.</p> <p>4.2 Welding head: Focal length: 150 mm Collision protection via bursting screws, internal gas supply (Ar, N₂, CO₂ and He), programmable valves to choose process gas, volume and mixture in the control and digital camera for process monitoring. A line laser should be provided to determine the tool center point.</p>	<p>4. Laser heads</p> <p>4.1 Cutting head: suitable focal length to achieve spot diameter of 50 – 100μm Should include distance sensor, collision protection, internal cutting gas (N₂, O₂, Ar and compressed air) supply for pressure control, selection of cutting gas via machine control system and digital camera for process monitoring. A line pilot laser should be provided to determine the tool center point.</p> <p>4.2 Welding head: Focal length: In the range of 200 – 300 mm Collision protection via bursting screws, internal gas supply (Ar, N₂, CO₂ and He), programmable manual control of valves to choose process gas, volume and mixture in the control and digital camera for process monitoring. A line pilot laser should be provided to determine the tool center point.</p>

<p>4.3 Surface treatment head: Suitable surface treatment head should be provided for transformation hardening and remelting. Internal gas supply (Ar and He), programmable valves to choose process gas and digital camera for process monitoring. A line laser should be provided to determine the tool center point. Line beam optics (optional) can be included.</p>	<p>4.3 Surface treatment head: Suitable surface treatment head should be provided for transformation hardening and remelting. Internal gas supply (Ar and He), programmable manual control of valves to choose process gas and digital camera for process monitoring. A line-pilot laser should be provided to determine the tool center point. Line beam optics (optional) can be included.</p>
<p>Note: Any other accessories apart from the mandatory accessories and systems mentioned above may be quoted separately. Pre-installation/post-installation training expenses (including travel, boarding and lodging) should be borne by the supplier</p>	<p style="text-align: center;">No amendment</p>

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27/12/13

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