

Tube Laser Cutting Machine Specification

For eTenders Procurement Documentation

Project: Supply, Delivery, Installation, Commissioning, Training and After-Sales Support of CNC Fibre Tube Laser Cutting System

Client: Greene's Forge Ltd.

1. Scope of Supply

The Contractor shall supply, deliver, install, commission and provide operator training for a new CNC Fibre Tube Laser Cutting System suitable for high-volume fabrication of structural steel, tubular steel and engineering products.

The machine shall be supplied complete with all software, tooling, material handling equipment, extraction equipment, safety systems, operator training, documentation, warranty, service support and ancillary equipment required for full operation.

The equipment supplied shall be new, unused and currently in production by an established manufacturer with a proven track record in industrial tube laser cutting systems.

2. Minimum Technical Requirements

2.1 Laser Source

The machine shall be equipped with:

- Fibre laser source.
- Minimum laser power: **12kW**.
- High efficiency electrical to laser conversion technology.
- Suitable for cutting:
 - Mild steel
 - Galvanised steel
 - Stainless steel
 - Aluminium

- Brass
 - Copper
- Minimum laser life expectancy of 100,000 operating hours.
- Servo controlled automatic focus cutting head.
- Automatic height sensing and collision protection.

The laser source shall be capable of processing both standard tube sections and structural profiles.

3. Tube Processing Capacity

The machine shall be capable of processing:

Round Tube

- Minimum diameter: 30mm
- Maximum diameter: 350mm

Square Tube

- Minimum 30mm x 30mm
- Maximum 350mm x 350mm

Rectangular Hollow Sections

Suitable for processing common structural hollow sections up to:

- 350mm overall section size.

Structural Sections

Machine shall be capable of processing:

- Angle
- Channel
- PFC
- RHS
- SHS
- CHS
- T-sections
- I-Beams
- H-Beams
- Custom profiles

Machine shall provide software compensation for profile variation and complex intersections.

4. Flat Bar Processing Requirement

In addition to standard tube processing requirements, the machine shall be capable of processing and automatically cutting holes, slots, copes and profiles in:

Flat Bar

- Size: 40mm x 12mm
- Length: 6.1 metres

The tenderer shall:

- Confirm suitability of equipment for processing flat bar.
- Confirm any additional clamping devices, jigs, tooling or software modules required.
- Include all necessary modifications within their tender.
- Demonstrate how positional accuracy will be maintained throughout cutting operations.
- Confirm maximum working lengths achievable.

Where additional automatic support systems are required these shall be included within the tendered price.

5. Machine Configuration

Machine shall include:

Cutting Length

- Minimum cutting length: 7.5 metres.

Output Length

- Minimum unloading length: 7.5 metres.

Chuck Arrangement

- Three chuck configuration.
- Full-stroke automatic centering chucks.
- Pneumatic operation.

- Automatic compensation for varying section sizes.

Material Waste Reduction

Machine shall incorporate technology enabling:

- Minimal tailing material.
- Maximum material utilisation.
- Near-zero remnant waste wherever practicable.

Tube Supports

- Servo-controlled floating supports.
- Automatic positioning.
- Automatic height adjustment.

Load Capacity

Machine shall accommodate heavy structural tube sections with a minimum single piece capacity of 850kg.

6. Motion Control System

Machine shall provide:

- Fully digital CNC control.
- EtherCAT or equivalent industrial communication architecture.
- Multi-axis interpolation.
- High speed positioning.
- Precision servo motors.
- Rack and pinion drive systems.
- Automatic lubrication system.

Minimum accuracy requirements:

Item	Requirement
Position Accuracy	±0.03mm per metre
Repeatability	±0.02mm per metre

7. Material Loading and Unloading

Machine shall include:

Automatic or Semi-Automatic Loading

- Loading length minimum 7.5m.
- Loading weight minimum 1,500kg.
- Automatic profile indexing.

Automatic Unloading

- Minimum unloading length 7.5m.
- Automatic finished part sorting.
- Support tables.
- Finished component collection area.

Tenderers shall detail cycle times and loading capacities.

8. Cutting Head

The cutting head shall include:

- Automatic focus adjustment.
- Automatic piercing technology.
- Height control sensing.
- Anti-collision protection.
- Intelligent nozzle management.
- Advanced bevel cutting capability.

The head shall be capable of producing:

- Copes.
 - Slots.
 - Fish mouths.
 - Mitres.
 - Compound mitres.
 - Bevel preparations for welding.
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9. Safety Requirements

Machine shall be fully CE compliant and supplied complete with:

- CE Declaration of Conformity.
- Risk Assessments.
- Operating Manuals.
- Maintenance Manuals.

Machine shall incorporate:

- Interlocked safety fencing.
- Light guard protection systems.
- Emergency stop systems.
- Laser viewing windows.
- Lockable electrical isolators.
- Safety relays.
- Operator warning systems.

Equipment shall comply with all applicable European safety standards.

10. Extraction and Environmental Requirements

Tenderers shall provide:

- Integrated fume extraction system.
- Dust filtration system.
- Extraction ductwork.
- Filter monitoring system.
- Suitable disposal arrangements for collected dust.

Minimum extraction performance shall be suitable for continuous industrial operation.

Tenderers shall state:

- Airflow rates.
 - Filter efficiency.
 - Filter replacement intervals.
 - Annual maintenance requirements.
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11. Software Requirements

Included Software Licences

All software licences shall be perpetual wherever available.

Tenderers shall clearly identify:

- Number of licences included.
 - Annual maintenance costs.
 - Subscription requirements.
 - Upgrade arrangements.
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Tube Programming Software

Software shall provide:

- 3D tube nesting.
- Automatic profile recognition.
- Part library management.
- Intelligent nesting.
- Material utilisation reports.
- Production reporting.
- Cutting simulation.
- Collision detection.
- Automatic remnant management.
- Batch production processing.

The software shall support:

- Round tube.
- SHS.
- RHS.
- Angle.
- Channel.
- I-Beam.
- H-Beam.
- Flat bar.

Software shall support import of:

- DXF
- DWG
- STEP
- IGES
- SAT

- NC
- IFC

and other commonly used engineering file formats.

CAD/CAM Integration Software

Tenderers shall provide software capable of converting engineering drawings into machine-ready programs.

Software shall support direct import from:

- Tekla Structures.
- Autodesk Inventor.
- SolidWorks.
- AutoCAD.
- Advance Steel.
- Revit.
- IFC models.

Software shall automatically generate:

- NC programs.
 - Cutting reports.
 - Production reports.
 - Material requirement reports.
 - Barcode or QR part identification.
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Workshop Integration

Preference shall be given to software providing:

- ERP integration.
- Production tracking.
- Material traceability.
- Job costing.
- Digital work packs.
- Cloud backups.
- Remote diagnostics.
- Network licensing.

Tenderers shall provide details of all optional software modules available.

12. Consumables

Tenderers shall provide pricing for:

Initial Consumables Package

Including:

- Nozzles.
- Ceramic rings.
- Protective lenses.
- Focus lenses.
- Filters.
- Lubricants.
- Gas fittings.

Ongoing Consumables

Tenderers shall provide:

- Consumption rates.
- Expected annual usage.
- Current replacement costs.
- Lead times.

A five-year projected consumables cost schedule shall be included.

13. Warranty Requirements

Minimum warranty period:

Machine

- 24 months minimum.

Laser Source

- Manufacturer's full warranty.

CNC Control System

- Minimum 24 months.

Servo Systems

- Minimum 24 months.

Tenderers shall clearly state:

- Warranty exclusions.
- Response times.
- Parts availability.
- Spare parts stocking arrangements.

The warranty shall include both parts and labour.

14. Service and Maintenance Support

Tenderers shall provide details of:

- Irish service support.
- European service support.
- Remote diagnostics.
- Telephone support.
- Online support.
- Engineer call-out arrangements.

Tenderers shall provide options for:

Year 1

- Included service.

Years 2-5

- Annual maintenance agreement.

Service proposals shall include:

- Preventative maintenance visits.
- Calibration checks.
- Software updates.

- Operator refresher training.
 - Emergency breakdown response.
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15. Training

Tender shall include:

- Installation supervision.
- Machine commissioning.
- Operator training.
- Programming training.
- Maintenance training.
- Software training.

Training shall be provided on-site at Greene's Forge Ltd.

Electronic and printed manuals shall be supplied.

16. Delivery and Installation

Tenderers shall provide:

- Manufacturing lead time.
- Shipping arrangements.
- Offloading requirements.
- Foundation requirements.
- Electrical requirements.
- Compressed air requirements.
- Extraction requirements.
- Installation duration.
- Commissioning duration.

Tenderers shall identify all client requirements before order placement.

17. Tender Return Information Required

Tenderers shall provide:

1. Detailed technical specification.
 2. Machine layout drawing.
 3. Utility requirements.
 4. Foundation requirements.
 5. Software specification.
 6. Consumable costs.
 7. Service contract options.
 8. Warranty details.
 9. Installation methodology.
 10. Training proposal.
 11. Reference installations.
 12. Total supply and installation price.
 13. Annual software costs.
 14. Annual service costs.
 15. Lead time from order.
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