

Metal-Asia

Commercial Proposal for Supply

LATP Production Lines for Thermoplastic Composites with Laser-Assisted Heating

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Executive Summary

LATP (Laser-Assisted Thermoplastic Automated Fiber Placement) represents the state-of-the-art in robotic automated fiber deposition technology for manufacturing high-performance thermoplastic composite structures. Metal-Asia.pw delivers comprehensive LATP production lines as part of our **Global Procurement Solutions**, covering end-to-end project scope: engineering design, equipment sourcing, factory acceptance testing, international logistics, customs clearance, on-site installation supervision, commissioning, and operator training at your production facility anywhere in the world.

Our approach ensures **Supply Chain Compliance, Full Transparency, and Direct Factory Access** — giving procurement teams and engineering managers complete visibility and control over every stage of the project lifecycle.



Robotic LATP cell for automated layup of thermoplastic prepregs with laser heating and in-situ consolidation

Process Capabilities and Technical Scope

LATP production lines automate the placement of unidirectional (UD) tapes manufactured from carbon, glass, or aramid fibers impregnated with thermoplastic matrices (PEEK, PEI, PPS, PA, PP). The process achieves simultaneous material consolidation under controlled laser heating, eliminating the need for autoclave post-processing and reducing overall manufacturing cycle times by 40-60% compared to thermoset prepreg systems.

Key Technical Specifications — LATP Production Lines

Parameter	Value / Range
Processable tape width (tow)	6.35 mm (1/4"), 12.7 mm (1/2"), 25.4 mm (1")
Tape thickness	0.15 – 0.40 mm
Laser source power (NIR fiber, 980-1080 nm)	2 – 6 kW
Laser spot size	10x30 mm – 20x50 mm (adjustable)
Layup speed	0.1 – 1.0 m/s (up to 60 m/min depending on material)
Consolidation zone temperature	200 – 450 degC (material dependent)
Compaction roller force	100 – 1500 N (pneumatic drive)
Positioning accuracy (TCP)	+/- 0.1 mm
Temperature control accuracy	+/- 5 degC (closed-loop)
Robotic platform type	6-axis industrial robot on pedestal or linear track
Working envelope (reach)	up to 4000 mm (standard), up to 15000 mm (with linear axis)
Workpiece positioner degrees of freedom	1-2 axes (optional)
Number of simultaneously placed tows	1, 2, 4, 8, 16, 32 (configurable)
Thermal monitoring system	IR pyrometer + thermal imager (closed-loop)
Tow cutting system	Pneumatic knife, ultrasonic cutter
Minimum cut length	25 – 50 mm

Complete Equipment Scope of Supply – LATP Line

Primary Equipment

Item	Description	Technical Specifications	Qty	Unit
1	6-axis industrial robot manipulator	Payload 90-210 kg, reach 2500-4000 mm, repeatability +/- 0.05-0.08 mm, IP65	1	pcs.
2	Linear track for robot (optional)	Travel 2000-12000 mm, speed 1.5 m/s, positioning +/- 0.05 mm	1	set
3	Robot pedestal	Height 400-800 mm, welded steel construction, anti-vibration mounts	1	pcs.
4	Placement head	Modular design, 1-32 tow, interchangeable guide rollers, tension system	1	pcs.
5	Fiber laser source (NIR)	Power 2-6 kW, wavelength 980-1080 nm, efficiency > 35%, water cooled	1	pcs.

Item	Description	Technical Specifications	Qty	Unit
6	Laser beam delivery optics	Collimator, scanning optics, protective window, compressed air purge	1	set
7	IR thermal monitoring system	IR pyrometer (150-1200 degC range), response < 5 ms, thermal imager (optional)	1	set
8	Compaction roller assembly	Pneumatic drive, force 100-1500 N, silicone/steel coated roller, width 50-100 mm	1	pcs.
9	Tape feeding and tensioning system	Electric feed drives, tension sensors (0.5-50 N), ceramic-coated guide rollers	1	set
10	Tow cutting system	CNC pneumatic knife, ultrasonic cutter (optional), accuracy +/- 1 mm	1	set
11	Prepreg spools	Capacity up to 10 kg tape, brake mechanisms, quick-change flanges	4-16	pcs.
12	Creel system	Modular construction, adjustable tension, elongation compensators	1	set

Safety and Auxiliary Systems

Item	Description	Technical Specifications	Qty	Unit
13	Laser safety enclosure	Class 1 (IEC 60825), laser-resistant viewing panels, door interlock system	1	set
14	Exhaust ventilation system	Flow rate 1000-3000 m3/h, fume and gas filtration, concentration monitoring	1	set
15	Laser cooling system (chiller)	5-12 kW cooling capacity, temperature control +/- 1 degC	1	set
16	Pneumatic system	Compressor 8-15 bar, receiver 200-500 L, dryer, air preparation filters	1	set
17	Fire suppression system	Smoke and heat detectors, gas-based extinguishing module (IG-541 or CO2)	1	set

Control System and Software

Item	Description	Technical Specifications	Qty	Unit
18	Control cabinet with PLC	Industrial PLC, analog I/O modules, 15" HMI panel, Ethernet/IP	1	set
19	Offline programming software	CAD/CAM for layup path planning, CATIA/Siemens NX import, simulation	1	lic.

Item	Description	Technical Specifications	Qty	Unit
20	Process monitoring system (MES)	Temperature, speed, compaction force, tension logging; batch traceability	1	lic.
21	Robot teach pendant	Portable programming panel, 10" color display, IP65 protection	1	pcs.
22	Machine vision system (optional)	2D/3D camera for layup quality control, real-time defect detection	1	set

Optional Equipment

Item	Description	Technical Specifications	Qty	Unit
23	Additional positioning axes	1-2 rotation axes for tubular and vessel processing (LATW mode)	1	set
24	Ultrasonic testing system (UT)	Manual or automated UT for laminate quality control, thickness gauge	1	set
25	Portable thermography system	IR thermal imager for heating uniformity control, delamination detection	1	pcs.
26	Post-consolidation press (optional)	Hydraulic press 50-200 tons, electrically heated platens up to 450 degC	1	pcs.

Customs Classification and HS Codes

HS Code	Product Description
8479.71.00	Machines for mechanical working of rubber or plastics
8479.89.97	Other machines with individual functions
8515.11.00	Laser equipment for thermal treatment of materials
8477.10.00	Industrial robot manipulators
8479.60.00	Machines for heat treatment (auxiliary equipment)
8466.20.00	Parts and accessories for robots and machine tools
9031.49.00	Instruments for automatic regulation or control
8419.39.80	Other equipment for thermal treatment of materials
9024.10.00	Machines for physical or chemical analysis
9027.80.00	Other instruments for physical or chemical analysis

Engineering Audit and Project Support

Before equipment delivery, Metal-Asia.pw engineers conduct a comprehensive [on-site engineering audit](#) of your production facility. The audit covers process requirement analysis, room dimensional assessment, infrastructure evaluation (power supply, ventilation, compressed air), and preparation of a detailed technical specification for LATP line design. This upfront diligence eliminates operational risks and ensures optimal equipment layout.

Technical Documentation Package

- Technical specification for LATP line tailored to your production requirements
- Technical datasheets for each unit and subsystem
- Process layup card with recommended parameters
- Robotic cell layout referencing existing plant utilities
- Operation and maintenance manuals in English

Inspection and Acceptance Protocol

- **FAT** (Factory Acceptance Test) — acceptance testing of the LATP line at the manufacturer's facility
- Test layup verification with laminate geometry and quality control
- Consolidation zone temperature profile verification
- Sample quality inspection using UT and thermography
- **SAT** (Site Acceptance Test) — acceptance at your facility after installation

Installation Supervision and Commissioning

Metal-Asia.pw provides full-cycle [installation supervision for LATP lines](#) at your production facility, including mechanical installation, electrical work, pneumatic connections, laser optics alignment, thermal monitoring system calibration, and complete software-hardware integration.

Commissioning Procedure

- Installation and alignment of robotic platform and positioners
- Laser optics alignment and heating parameter setup
- IR pyrometer calibration and temperature profile verification
- Tape feeding and tension system adjustment
- Programming of standard layup trajectories
- Operator and process engineer training (theory + practice, 40-80 hours)
- Trial production run with quality verification of manufactured parts

Training Program

Training includes theoretical coursework on LATP technology, hands-on robot programming, process parameter optimization, troubleshooting diagnostics, and quality control methods. Upon completion, your personnel receive certification.

Metal-Asia.pw Services: Integrated Global Procurement Approach

Metal-Asia.pw delivers **comprehensive industrial equipment procurement from China** as part of our **Global Procurement Solutions**. Our services cover the full project lifecycle: from manufacturer

identification and factory audit through quality control, customs clearance, and commissioning.

Full Scope of Services

- [Engineering audit of production facilities](#) — requirements analysis, technical specification preparation, layout
- [Comprehensive equipment sourcing and procurement](#) — optimal configuration selection
- [Customs and international logistics from China](#) — customs clearance and global delivery
- [B2B supplier audit in China](#) — manufacturer reliability verification before order placement
- [Integrated engineering systems](#) — auxiliary equipment design and supply
- [Installation supervision and commissioning](#) — full project handover
- Quality control (NDT, UT) — non-destructive testing of weld and composite joints
- Chemical composition verification to ASTM/ISO/DIN standards
- Full technical documentation package for customs clearance

Why Metal-Asia.pw: Direct Factory Access with Full Transparency

Evaluation Criteria	Direct Procurement from China	Metal-Asia.pw Turnkey Delivery
Language barrier	Risk of technical miscommunication	Bilingual engineering team — English and Chinese on-site
Manufacturer verification	No ability to audit facility	In-person factory audit, ISO certificate verification
Quality control	Cannot conduct FAT without travel	On-site representative at factory, video reports, pre-shipment samples
Customs clearance	HS code classification risks	Full customs brokerage, correct HS classification
After-sales support	Long spare parts lead times	Regional spare parts hub, engineer dispatch within 72 hours
Technical documentation	Chinese language only	Full English documentation package
Installation and commissioning	Not provided or at extra cost	Included in contract, on-site personnel training
Supply chain visibility	Limited tracking	Full milestone-based project reporting from PO to commissioning
Compliance certification	No support	CE/UL certification support, ASTM/ISO compliance documentation

Frequently Asked Questions (FAQ)

Q1: What is LATP technology and what advantages does it offer over conventional methods?

LATP (Laser-Assisted Thermoplastic Automated Fiber Placement) is a robotic process for automated placement of continuous fiber tapes impregnated with thermoplastic matrix, using laser heating and in-situ consolidation. Key advantages include: elimination of autoclave processing (40-60% cycle time reduction), recyclability of production scrap, high automation degree, repeatable quality, and reduced labor costs.

Q2: What materials can LATP lines process?

LATP lines process unidirectional (UD) tapes of carbon, glass, and aramid fiber with thermoplastic matrices including PEEK, PEI (Ultem), PPS, PA (Nylon), PP, and PEKK. Material selection is determined by the end-use application performance requirements.

Q3: What is the typical throughput of AFP systems?

Layup speed varies from 0.1 to 1.0 m/s (6-60 m/min) depending on material type, tape thickness, and accuracy requirements. For PEEK/CF tapes, typical speed is 200-400 mm/s while ensuring full consolidation.

Q4: Is autoclave post-processing required after layup?

With proper process parameter settings (temperature, speed, compaction force), LATP achieves in-situ consolidation and autoclave processing is not required. For critical aerospace applications, post-consolidation in a hot press may be performed to achieve maximum mechanical properties.

Q5: How is quality assurance managed during automated layup?

Quality control operates at multiple levels: closed-loop thermal regulation (IR pyrometer), real-time process parameter logging, machine vision system (real-time defect detection), post-process UT inspection, and thermography for delamination and porosity detection.

Q6: What staffing is required to operate LATP equipment?

An LATP line requires: a robotic cell operator (with industrial robot experience), a process technician (with composite manufacturing knowledge), and a quality engineer (proficient in NDT methods). Metal-Asia.pw provides comprehensive staff training as part of equipment commissioning.

Q7: What are the delivery and commissioning lead times for LATP lines?

Standard LATP line manufacturing lead time is 14-20 weeks from technical specification approval. International shipping takes 4-6 weeks. Installation supervision and commissioning requires 3-5 weeks. Total project timeline from contract to production: 5-7 months.

Q8: What warranty coverage is provided?

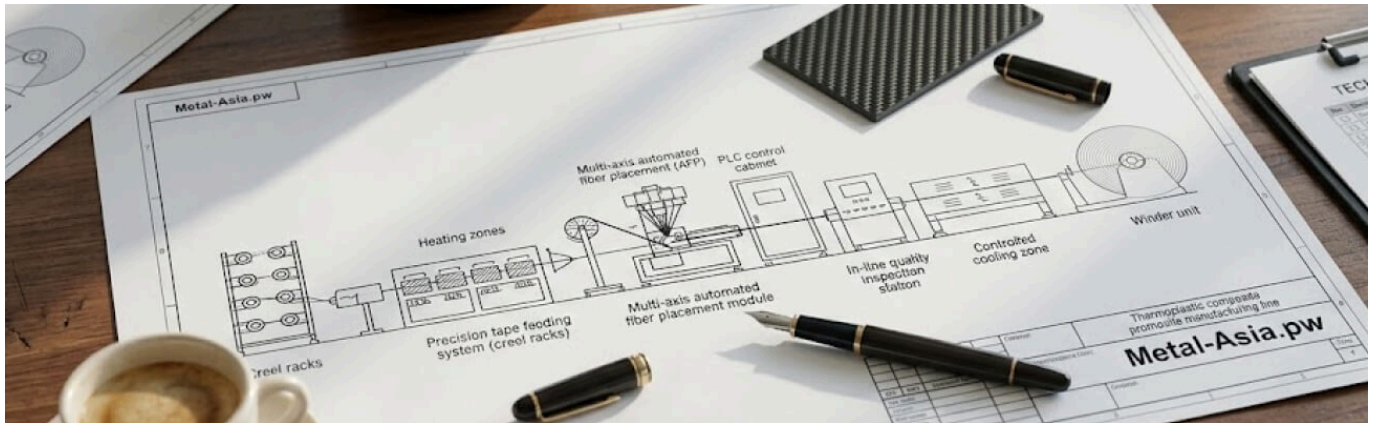
The warranty period for LATP lines is 12 months from commissioning or 18 months from shipment, whichever occurs first. Warranty coverage includes: replacement of defective components, engineer site visit, remote technical support. Post-warranty service is available under a separate service agreement.

Contact Information

For inquiries regarding LATP line supply, engineering audits, and project support, contact Metal-Asia.pw:

- **Official Website:** www.metal-asia.pw
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For a complete list of services, visit Metal-Asia.pw.



Turnkey LATP line supply from China: from engineering design to production startup — worldwide delivery