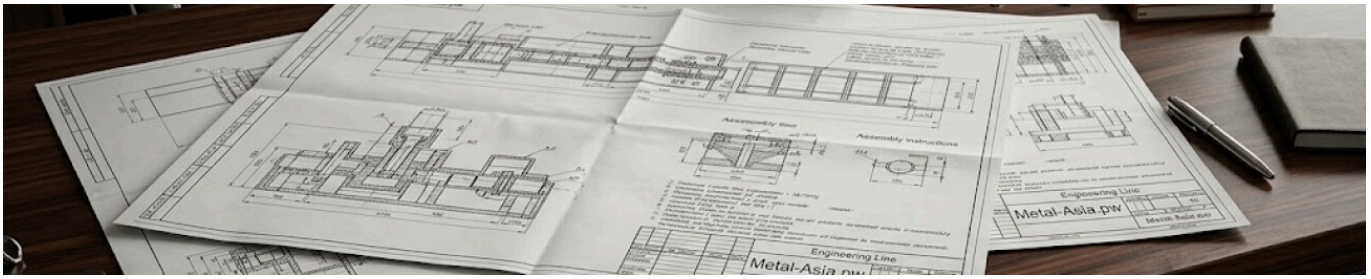
Metal-Asia

Technical Requirements for LATP Line Procurement

Complex LATP Line: Laser, Thermoplastics, Full Robotic Integration



Complex production lines with extended robotic configuration for LATP manufacturing

Introduction

This document defines the comprehensive technical, commercial, and organizational data that the Buyer must provide to Metal-Asia.pw for the preparation of a complete quotation covering supply, installation, and commissioning of a complex LATP line with extended robotic configuration for high-volume production of thermoplastic composite components. Without complete and accurate completion of all sections herein, calculation of final cost, delivery timelines, and scope of work is not possible.

Metal-Asia.pw delivers comprehensive sourcing and procurement of extended composite manufacturing lines from China with full project lifecycle support.

Pain Points in Direct Procurement from China

Key risks include: misalignment between stated and actual production performance, absence of regional service infrastructure, complexities in customs clearance for complex lines, risk of shipment without FAT acceptance, and lack of English-language documentation and training. Metal-Asia.pw eliminates these risks through engineering audit and turnkey installation.

Section 1. Buyer Credentials and Contracting Parties

The Buyer shall provide complete corporate credentials of the legal entity — the Payer: full and abbreviated company name, legal form, registration number, tax ID, legal and actual addresses, contact details of responsible personnel. Specify the Importer counterparty if the Payer and Consignee differ. Provide bank account details for settlements, contract currency, payment terms, and customs clearance requirements.

Section 2. Equipment Purpose and Application Scope

The Buyer shall clearly articulate the technological purpose of the system: serial production, low-volume manufacturing, R&D development, laboratory testing, or educational objectives. Specify target industries: aerospace, automotive, energy, marine, medical, robotics, or general-purpose applications. Describe the

types of components to be manufactured. This determines the working envelope configuration, laser power requirements, and accuracy specifications.

Complex Line Application Areas

Application Area	Description
Aerospace industry	Fuselage panels, wing skins, stringers, engine nacelles
Automotive industry	Structural body components, battery trays, frames
UAV and eVTOL	Primary and secondary structures, propeller blades
Energy and pressure systems	Pipes, cylinders, pressure vessels, tanks
Marine and offshore	Hull elements, superstructures, piping systems
Medical	Surgical instruments, medical equipment components
Robotics	Lightweight components, manipulators, frames

Section 3. Tape Feed System Technical Specifications

The Buyer shall specify the format and type of tape to be used: single-row UD tape width 1/4 inch (6.35 mm), 1/2 inch (12.7 mm), 1 inch (25.4 mm), or other custom dimensions. Thermoplastic matrix: PEEK, PEKK, PPS, PA, PP, or alternative polymer. Tape thickness, allowable tension range during feeding, reel requirements and capacity. Feed method: continuous, step-cut, or programmable step. Minimum course length, minimum cut step, feed accuracy, and cut repeatability.

Section 4. Laser Heating System

The Buyer shall specify laser type: continuous-wave fiber laser with wavelength in the NIR range (1080 nm) or alternative spectrum. Laser power: 3–6 kW per cell. Number of lasers: 2–4 pcs. (matching cell count). Laser spot dimensions, required substrate and tape heating temperature range, temperature control accuracy (less than ±15°C), thermal control system response time. Water cooling requirements for the laser, optics, and compaction roller. Power adjustment range: 10–100% of nominal. Laser diagnostics system: built-in, remote monitoring.

Section 5. Robotic Positioning System and Working Envelope

The Buyer shall define the industrial robot type: KUKA KR70–KR210 or equivalent with KR C5 controller. Number of robots: 2–4 pcs. (matching cell count). Standard working envelope per cell: 2×1 m, or custom configuration up to 15×2 m. Total working envelope: up to 30×4 m. Requirements for linear tracks, 1–3 axis positioners, additional robots for synchronized operation. Axis positioning accuracy, course-to-course placement accuracy (±0.05 mm), layup speed up to 1000 mm/s. Automatic reel change system: integrated, non-stop operation.

Section 6. Compaction System and Layup Quality Control

Specify compaction force range: 100–1500 N for industrial systems. Compaction drive type: pneumatic control. Compaction roller requirements: material, diameter, coating, replaceability. Monitoring systems: IR pyrometer with response time ≤5 ms, IR thermal imager, optical camera for visual defect detection.

High-precision tape tension sensors (5–50 N, ±0.5%). Data collection and process analytics system: real-time logging of temperature, speed, force, tension. AI diagnostics: predictive process analytics.

Section 7. Control System and Software

Controller requirements: open architecture with user-configurable settings, PID temperature regulator. Operator interface: localization language (English, Chinese, or other), panel type (touchscreen, industrial PC). Software for offline layup trajectory programming, process simulation, CAD model import (STEP, IGES, CATIA, NX). MES/ERP system integration capability, data exchange protocols (OPC UA, Ethernet/IP). Requirements for program backup, software updates, technical support. Remote monitoring: VPN access, cloud analytics. Digital twin: virtual model of the production line.

Section 8. Electrical and Utility Requirements

Power supply: 380 V, 3-phase, 50/60 Hz for industrial systems. Maximum power consumption of the complete system: 50–100 kVA. Grounding requirements, surge protection, UPS availability for critical nodes (≥ 10 kVA, autonomous operation time ≥ 30 min). Water cooling system: flow rate ≥ 30 L/min, pressure 3–5 bar, coolant temperature, water preparation requirements (distilled, deionized). Pneumatic system: compressed air pressure 6 bar, flow rate 1000 L/min, air quality requirements (drying, filtration). Vacuum system: vacuum pump, receiver, regulator. Data transmission network: Gigabit Ethernet, industrial protocols.

Section 9. Safety and Certification Requirements

The Buyer shall specify required certifications: CE, ISO 9001, ISO 14001, AS9100 (for aerospace applications), EAC (for Customs Union). Safety systems: laser zone protective enclosure (laser safety Class 4), emergency stop buttons, operator presence sensors (infrared barriers, laser scanners), door interlock. Fire suppression system for high-temperature thermoplastic processing. Electromagnetic interference protection, compliance with IEC 60204-1 electrical safety standards. Video surveillance system: IP cameras, archive ≥ 30 days.

Section 10. Delivery Terms, Shipping, and Customs Clearance

Specify Incoterms 2020 delivery basis: EXW, FCA, FOB, CIF, DAP, DDP. Port of departure in China and destination point. Packaging requirements: wooden crates, moisture barrier, fragile cargo labeling, shock and tilt indicators. Equipment manufacturing lead time. Customs clearance requirements: HS code, certificate of conformity necessity, Customs Union Technical Regulation compliance declaration. Cargo insurance terms during transit.

Section 11. Installation, Commissioning, and Training

The Buyer shall define installation requirements: supplier specialist dispatch to the Buyer's facility, installation and commissioning timelines. Foundation preparation, utility routing, ventilation system completion prior to installation crew arrival. Personnel training: number of trainees, training program (operators, setup technicians, programmers), training language, certificate issuance. Number of working shifts for process parameter optimization on the Buyer's actual component.

Section 12. Warranty Obligations and Service Support

Warranty period: standard 12 months from commissioning date, extendable to 24–36 months. List of warranty cases, claim submission procedure, supplier response time. Post-warranty service: annual service contract cost, scheduled maintenance frequency (quarterly), remote diagnostics, spare parts warehouse availability in the delivery region. Critical spare parts: laser source, optics, robot, controller, sensors — delivery lead times and pricing.

Section 13. Documentation and Technical Documentation

List of documents to be delivered with the equipment: technical passport, operation manual, programming manual, service manual, electrical and pneumatic schematics, component certificates, laser radiation safety passport, compliance declaration. Documentation language: English, Chinese, or bilingual. Format: printed and electronic (PDF). Process documentation requirements: tape selection recommendations, layup parameters for standard materials, material database. MES/ERP integration guide.

Section 14. Options, Configuration, and Future Upgrade Path

The Buyer shall list required options: IR thermal imager, machine vision optical system, data collection and analytics system, additional positioners, extended working envelope, automatic reel change system. Scalability requirements: laser power upgrade capability, working envelope expansion, integration with other technological cells. Request for consumables supply for trial operation: tapes, laser protective windows, filters.

Section 15. Composite Component-Specific Requirements

Specify required properties of finished components: layup density (void content <1%), interlaminar shear strength (ILSS), tensile and flexural strength, thermal resistance, chemical resistance. Post-processing requirements: vacuum bagging necessity, thermoforming, machining, quality control (ultrasonic testing, X-ray, tomography). Productivity: target first-pass yield, cycle time per component, planned annual production volume.

Section 16. Acceptance Conditions and Final Criteria

The Buyer shall define acceptance testing procedure: Factory Acceptance Test (FAT) at the manufacturer's facility in China, Site Acceptance Test (SAT) at the Buyer's facility. Acceptance criteria: geometric accuracy of test component layup, process repeatability on a series of N components, compliance with stated technical specifications, absence of layup defects. Penalty clauses for non-compliance with technical requirements, Buyer's right to reject acceptance. Property transfer conditions, risk of accidental loss during transit.

Complex Line Technical Specifications

Parameter	Value	Notes
Line type	LATP with laser heating, multi-cell	Automated layup
Number of cells	2–4 robotic cells	Synchronized
Laser power	3–6 kW per cell	Fiber, NIR

Parameter	Value	Notes
Wavelength	1080 nm	NIR range
Tape formats	1/4", 1/2", 1" UD tape	Multi-format system
Maximum layup speed	500–1000 mm/s	Industrial productivity
Compaction force	100–1500 N	Wide adjustable range
Layup accuracy	±0.05 mm	High precision
Working envelope per cell	2 × 1 m to 15 × 2 m	Modular configuration
Total working envelope	up to 30 × 4 m	With multiple cells
Temperature control	PID, closed-loop	±10°C
Vacuum system	Vacuum bag	Additional consolidation
Quality control system	IR pyrometer, thermal imager, optical camera, machine vision	Comprehensive monitoring
Data collection system	Real-time process analytics, AI diagnostics	Logging all parameters
Robot	KUKA KR70–KR210	Per cell
Positioners	1–3 axes per cell	Synchronization with robot
Linear track	Up to 15 m per cell	Extendable
Automatic reel change system	Yes	Non-stop operation
Machine vision system	Yes	Real-time defect detection
MES/ERP integration	Yes	Full digitalization

Laser System Requirements

Parameter	Requirement
Laser type	Continuous-wave fiber laser
Wavelength	1080 nm (NIR range)
Power	3–6 kW per cell, adjustable
Number of lasers	2–4 pcs. (matching cell count)
Safety class	Class 4, protective enclosure mandatory
Cooling system	Water-cooled, closed-loop

Parameter	Requirement
Coolant temperature	18–22°C, flow rate ≥ 15 L/min per laser
Water quality	Deionized or distilled
Power adjustment range	10–100% of nominal
Laser diagnostics	Built-in, remote monitoring

Robotic System Requirements

Parameter	Requirement
Robot model	KUKA KR70–KR210 with KR C5 controller
Number of robots	2–4 pcs. (matching cell count)
Number of axes	6 axes + additional positioner axes
Payload capacity	≥ 70 kg per robot
Working envelope per cell	2 × 1 m (standard)
Maximum working envelope	15 × 2 m (with linear track)
Positioning accuracy	±0.05 mm
Course-to-course layup accuracy	±0.05 mm
Maximum layup speed	1000 mm/s
Positioners	1–3 axes, synchronization with robot
Linear track	Modular, extendable up to 15 m
Automatic reel change	Integrated, non-stop
Cell synchronization	Common control system

Control System Requirements

Parameter	Requirement
Architecture	Open, user-configurable
Temperature control	PID regulator with manual tuning
Interface	Industrial touchscreen display
Interface language	English / Chinese / Other
Data logging	Collection of all process parameters
Data export	CSV, XML, OPC UA
MES/ERP integration	OPC UA, Ethernet/IP, PROFINET

Parameter	Requirement
Offline programming	CAD model import (STEP, IGES, CATIA, NX)
Process simulation	Virtual trajectory verification
Machine vision system	Real-time defect detection
AI diagnostics	Predictive process analytics
Remote monitoring	VPN access, cloud analytics
Digital twin	Virtual model of production line

Electrical and Utility Requirements

Parameter	Requirement
Power supply	380 V, 3-phase, 50/60 Hz
Maximum power consumption	50–100 kVA
Grounding	Mandatory, resistance ≤ 4 Ohm
Surge protection	Class III
Water cooling	Flow rate ≥ 30 L/min, pressure 3–5 bar
Pneumatic system	Pressure 6 bar, flow rate 1000 L/min
Air quality	Drying, 5-micron filtration
Compressed air	ISO 8573-1 quality class: 1.4.1
Vacuum system	Vacuum pump, receiver, regulator
Data network	Gigabit Ethernet, industrial protocols
UPS for critical nodes	≥ 10 kVA, autonomous operation ≥ 30 min

Safety and Certification Requirements

Requirement	Details
CE Certificate	Mandatory for export to Europe
EAC Declaration	Mandatory for Customs Union
ISO 9001	Quality management system certificate
ISO 14001	Environmental management system
AS9100	For aerospace industry
Laser safety	IEC 60825-1, Class 4 protective enclosure
Electrical safety	IEC 60204-1

Requirement	Details
EMI protection	Compliance with EN 61000-6-2/4
Fire suppression	Automatic system for laser zone
Emergency stop	Buttons around each cell perimeter
Presence sensors	Infrared barriers, laser scanners
Video surveillance	IP cameras, archive ≥ 30 days

Delivery Terms and Shipping

Parameter	Requirement
Delivery basis	CIP / DAP Incoterms 2020
Port of departure	Shanghai, Ningbo, or Shenzhen
Destination point	Specified by Buyer
Packaging	Wooden crates, moisture barrier, labeling
Indicators	Shock, tilt, temperature
Manufacturing lead time	24–32 weeks made-to-order
HS customs code	8477 59 000 0
Additional code	8479 89 970 9

Installation, Commissioning, and Training

Stage	Requirement
Turnkey installation	Metal-Asia.pw specialist team dispatch to facility
Site preparation	Foundation, utilities, ventilation, network
Commissioning	Full parameter tuning on Buyer's materials
Personnel training	Up to 15 persons: operators, programmers, setup technicians, technicians, engineers
Training language	English with technical translation
Process optimization	15 working shifts on actual component
Certificates	Issued upon training completion
Process optimization	Parameter tuning for specific components

Warranty Obligations

Parameter	Terms
Warranty period	12 months from commissioning date
Extended warranty	Up to 24 months
Post-warranty service	Annual service contract
Response time	24 hours critical, 48 hours standard
Spare parts	Regional warehouse, delivery ≤ 14 days
Critical components	Laser, optics, robot — delivery ≤ 7 days
Remote diagnostics	VPN access, online monitoring
Scheduled maintenance	Quarterly

Documentation

Document	Format	Language
Technical passport	Printed + PDF	English / Chinese
Operation manual	Printed + PDF	English / Chinese
Programming manual	Printed + PDF	English / Chinese
Service manual	Printed + PDF	English / Chinese
Electrical schematics	PDF + CAD	Universal
Pneumatic schematics	PDF + CAD	Universal
Laser safety passport	PDF	English / Chinese
Material recommendations	PDF	English / Chinese
Layup parameter database	Electronic	English / Chinese
FAT protocol	PDF	English / Chinese
SAT protocol	PDF	English / Chinese
MES/ERP integration guide	PDF	English / Chinese

Supply Scope — Complex Line

No.	Item	Quantity	Notes
1	Complex LATP line, complete	1 set	Full system
2	Laser source 3–6 kW	2–4 pcs.	Matching cell count
3	Focusing optics system	2–4 sets	Per laser
4	Multi-format tape feed system	2–4 sets	Per cell

No.	Item	Quantity	Notes
5	Pneumatic compaction system	2–4 sets	Range 100–1500 N
6	Non-contact IR pyrometer	4 pcs.	Primary + backup
7	IR thermal imager	2 pcs.	Per cell
8	Optical camera	2–4 pcs.	Machine vision
9	Water cooling system	1 set	Central system
10	KUKA KR C5 controller	2–4 pcs.	Per robot
11	Central control system	1 set	Common for all cells
12	Touchscreen operator panel	4 pcs.	Per cell
13	Laser zone protective enclosure	2–4 sets	Class 4
14	Air filtration system	1 set	Central
15	Emergency stop system	1 set	Common for all cells
16	Vacuum system	1 set	Central
17	Linear track	2–4 sets	Up to 15 m each
18	1–3 axis positioners	4–8 pcs.	Per cell
19	Automatic reel change system	2–4 sets	Per cell
20	Data collection and analytics system	1 set	Central, AI diagnostics
21	Machine vision system	1 set	Central processing
22	Spare parts kit	1 set	1-year operation
23	Consumables kit	1 set	Trial tape reels
24	Technical documentation	1 set	Complete package
25	Analytics server	1 pc.	Central
26	Backup system	1 set	Automatic

Customs Clearance and HS Codes

HS Code	Description	Notes
8477 59 000 0	Plastics processing machines	Primary code
8479 89 970 9	Other machinery and mechanical appliances	Secondary
8515 80 000 0	Laser welding apparatus	Laser sources
8479 50 000 0	Industrial robots	KUKA manipulators
9031 80 000 0	Regulating and controlling instruments	Measurement system

HS Code	Description	Notes
8477 90 000 0	Parts of plastics processing machines	Spare parts
8414 10 000 0	Vacuum pumps	Vacuum system
8471 30 000 0	Portable digital automatic machines	Analytics server

Metal-Asia.pw Procurement Support Services

Metal-Asia.pw delivers comprehensive procurement from China, including tender bid support for public procurement frameworks, defense procurement compliance, and government contracting. Services encompass quality control (NDT, ultrasonic testing), chemical composition verification against international standards, and turnkey customs clearance.

Why Metal-Asia.pw vs. Direct Chinese Suppliers

Criterion	Direct Chinese Supplier	Metal-Asia.pw
Technical audit	Absent	Free engineering audit
Quality control	At factory discretion	Independent control
FAT acceptance	Not conducted	Mandatory FAT
Customs clearance	Buyer handles independently	Full customs support
Turnkey installation	Not provided	Turnkey with training
Regional service	Absent	Regional service network
Documentation	English only	Localized translation
Warranty	12 months standard	Up to 24 months with service contract
Communication	Language barrier	English-speaking project managers

FAQ — Frequently Asked Questions

Q1: What is the complex line productivity per shift? A: Productivity depends on configuration and component complexity. For typical aerospace panels — 8–15 m² of laid tape per hour per cell. With 2–4 cells, total line productivity is 16–60 m²/hour.

Q2: Can the line be expanded after initial delivery? A: Yes, the modular architecture allows adding cells, expanding working envelopes, and integrating additional systems (automatic reel change, machine vision) without replacing primary equipment.

Q3: How is multi-cell synchronization organized? A: The central control system coordinates all cells through a common network. Parallel layup on a single component or independent cell operation on different components is supported.

Q4: Is specialized software required for trajectory programming? A: Yes, specialized software for offline programming with CAD model import is supplied. Integration with CATIA, NX, SolidWorks is supported. Layup trajectory programming is optimized for component geometry.

Q5: How is real-time defect detection organized? A: The machine vision system analyzes each layup course for gaps, overlaps, wrinkles, and foreign inclusions. AI algorithms classify defects and generate operator alerts.

Q6: Is digital twin integration possible? A: Yes, the data collection system forms a digital twin of the production process. Virtual simulation, predictive analytics, and parameter optimization based on accumulated data are supported.

Q7: What are the IT infrastructure requirements for the facility? A: Local Gigabit Ethernet network, data storage server (≥ 10 TB), VPN access for remote diagnostics, backup system. A dedicated VLAN for industrial equipment is recommended.

Q8: What is the investment payback period for a complex line? A: Payback period depends on production volume. For high-volume aerospace component production, typical payback is 18–30 months through reduced material costs, labor intensity, and elimination of autoclave processing.

Author

Prepared by: Milosh Kovachevic, Procurement Project Manager, www.metal-asia.pw

For comprehensive service information, visit Metal-Asia.pw.

Contact Information

For all inquiries, please contact our customer relations department:

- **Customer Relations Department:**
- WhatsApp: +86 132 50100874
- Telegram: @China_metal_supply
- Email: zakaz@metal-asia.pw
- Official Website: www.metal-asia.pw

Request consultation on financing and delivery of complex LATP lines from China