

Metal-Asia

Technical Requirements for LATP Line Procurement

Lab AFP — Laboratory-Scale Automated Fiber Placement System



Pre-shipment inspection and quality control of laboratory AFP systems at the manufacturing facility

Introduction

This document defines the comprehensive technical, commercial, and organizational data that the Buyer must provide to [Metal-Asia.pw](https://www.metal-asia.com) for the preparation of a complete quotation covering supply, installation, and commissioning of a laboratory-scale [AFP system](#) based on [Laser-Assisted Thermoplastic Automated Fiber Placement \(LATP\)](#) technology. 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](https://www.metal-asia.com) operates as a comprehensive procurement partner for [composite manufacturing lines](#) sourced from China, providing end-to-end project support from [engineering audit](#) of complex orders through to [turnkey LATP line installation](#).

Pain Points in Direct Procurement from China

Buyers face systemic risks when dealing directly with Chinese manufacturers: misalignment between stated and actual equipment specifications, absence of regional service infrastructure, complexities in [customs clearance](#) and HS code classification, lack of [Factory Acceptance Testing \(FAT\)](#) at the manufacturing facility, and delivery of equipment without required CE/EAC certification. [Metal-Asia.pw](https://www.metal-asia.com) eliminates these risks through [comprehensive sourcing and procurement](#) with quality control at every stage.

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 (full name, position, phone, email). Specify the Importer counterparty if the Payer and Consignee differ. Provide bank account details for settlements, contract currency, payment terms (advance payment, letter of credit, upon shipment, installment plan), and customs clearance requirements — whether shipment will proceed under export procedure from China or import procedure into the destination country.

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: skin panels, stringers, fuel tanks, battery enclosures, piping systems, medical components, UAV/eVTOL prototypes. This determines the working envelope configuration, laser power requirements, and accuracy specifications.

Lab AFP Application Areas

Application Area	Description
University laboratories	Research institutes, academic centers
Corporate R&D centers	Composite and materials development centers
Educational institutions	Training facilities, workforce development
Aerospace programs	Research programs, prototyping initiatives
UAV and eVTOL	Advanced mobility prototyping
Energy and hydrogen	Hydrogen storage, cryogenic research

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), 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: 2 kW for laboratory systems, 3 kW and above for industrial systems. Laser spot dimensions, required substrate and tape heating temperature range, temperature control accuracy (e.g., less than $\pm 15^{\circ}\text{C}$), thermal control system response time. Water cooling requirements for the laser, optics, and compaction roller.

Section 5. Robotic Positioning System and Working Envelope

The Buyer shall define the industrial robot type: KUKA KR16, KR70 R2100, or equivalent with KR C5 controller. Standard working envelope dimensions: 600x600 mm for laboratory systems, 2x1 m for industrial systems, or custom configuration up to 15x2 m. Requirements for linear tracks, 1–2 axis positioners, additional robots for synchronized operation. Axis positioning accuracy, course-to-course placement accuracy (e.g., ± 0.1 mm), layup speed: up to 300 mm/s for laboratory, up to 500 mm/s for industrial systems.

Section 6. Compaction System and Layup Quality Control

Specify compaction force range: 50–150 N for laboratory systems, 100–700 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, $\pm 0.5\%$). Data collection and process analytics system: real-time logging of temperature, speed, force, tension.

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 layout 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.

Section 8. Electrical and Utility Requirements

Power supply: 380 V, 3-phase, 50/60 Hz for industrial systems; 220–240 V AC for portable systems. Maximum power consumption of the complete system. Grounding requirements, surge protection, UPS availability for critical nodes. Water cooling system: flow rate, pressure, coolant temperature, water preparation requirements (distilled, deionized). Pneumatic system: compressed air pressure, flow rate, air quality requirements (drying, filtration).

Section 9. Safety and Certification Requirements

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

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, 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, 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.

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.

Lab AFP Technical Specifications

Parameter	Value	Notes
Tape format	Single-row, 1/4" UD tape	Width 6.35 mm
Laser power	2 kW	NIR laser, wavelength 1080 nm
Laser spot size	15 × 40 mm	Rectangular spot
Maximum layup speed	up to 300 mm/s	Adjustable range

Parameter	Value	Notes
Compaction force	50–150 N	Pneumatic control
Layup accuracy (course-to-course)	±0.1 mm	High repeatability
Cut repeatability	±2 mm	Automatic system
Minimum cut/feed step	10 mm	Programmable step
Minimum course length	135 mm	Minimum fragment
Robot	KUKA KR16 (KR C5)	6-axis industrial
Working envelope	600 × 600 mm	Compact laboratory format
Temperature measurement	IR pyrometer	Non-contact monitoring
Temperature control	PID, open architecture	User-configurable
Water cooling	Laser, optics, roller	Closed-loop system
Force control	Pneumatic	Adjustable range

Laser System Requirements

Parameter	Requirement
Laser type	Continuous-wave fiber laser
Wavelength	1080 nm (NIR range)
Power	2 kW nominal
Safety class	Class 4, protective enclosure mandatory
Cooling system	Water-cooled, closed-loop
Coolant temperature	18–22°C, flow rate ≥ 10 L/min
Water quality	Deionized or distilled

Robotic System Requirements

Parameter	Requirement
Robot model	KUKA KR16 with KR C5 controller
Number of axes	6 axes + additional axes if required
Payload capacity	≥ 16 kg
Working envelope	600 × 600 mm (standard)
Positioning accuracy	±0.05 mm
Course-to-course layup accuracy	±0.1 mm

Parameter	Requirement
Maximum layup speed	300 mm/s

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	Temperature, speed, force data collection
Data export	CSV, XML formats

Electrical and Utility Requirements

Parameter	Requirement
Power supply	380 V, 3-phase, 50/60 Hz
Maximum power consumption	8 kVA
Grounding	Mandatory, resistance ≤ 4 Ohm
Surge protection	Class III
Water cooling	Flow rate ≥ 10 L/min, pressure 3–5 bar
Pneumatic system	Pressure 6 bar, flow rate 200 L/min
Air quality	Drying, 5-micron filtration

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
Laser safety	IEC 60825-1, Class 4 protective enclosure
Electrical safety	IEC 60204-1
EMI protection	Compliance with EN 61000-6-2/4
Fire suppression	Automatic system for laser zone

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	14–16 weeks made-to-order
HS customs code	8477 59 000 0 — plastics processing machines
Additional code	8479 89 970 9 — other machinery

Installation, Commissioning, and Training

Stage	Requirement
Turnkey installation	Metal-Asia.pl specialist dispatch to facility
Site preparation	Foundation, utilities, ventilation prior to arrival
Commissioning	Parameter tuning on Buyer's materials
Personnel training	Up to 5 persons: operators, programmers, setup technicians
Training language	English with technical translation
Process optimization	3 working shifts on actual component
Certificates	Issued upon training completion

Warranty Obligations

Parameter	Terms
Warranty period	12 months from commissioning date
Extended warranty	Up to 24 months under additional agreement
Post-warranty service	Annual service contract
Response time	48 hours from claim submission
Spare parts	Regional warehouse, delivery \leq 14 days
Critical components	Laser, optics, robot — delivery \leq 7 days

Documentation

Document	Format	Language
Technical passport	Printed + PDF	English / Chinese
Operation 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

Supply Scope — Lab AFP

No.	Item	Quantity	Notes
1	Lab AFP system Lab AFP, complete	1 set	Including KUKA KR16 robot
2	Laser source 2 kW, 1080 nm	1 pc.	Fiber, NIR
3	Focusing optics system	1 set	Spot 15×40 mm
4	Single-row tape feed system	1 set	For 1/4" tape
5	Pneumatic compaction system	1 set	Range 50–150 N
6	Non-contact IR pyrometer	1 pc.	Response time ≤ 5 ms
7	Water cooling system	1 set	Closed-loop
8	KUKA KR C5 controller	1 pc.	Open architecture
9	Touchscreen operator panel	1 pc.	Industrial grade
10	Laser zone protective enclosure	1 set	Class 4
11	Air filtration system	1 set	5-micron, drying
12	Spare parts kit	1 set	1-year operation
13	Consumables kit	1 set	Trial tape reels
14	Technical documentation	1 set	Passport, manuals, schematics

Customs Clearance and HS Codes

HS Code	Description	Notes
8477 59 000 0	Plastics processing machines	Primary code for AFP system
8479 89 970 9	Other machinery and mechanical appliances	Secondary code
8515 80 000 0	Laser welding apparatus	For laser source

HS Code	Description	Notes
8479 50 000 0	Industrial robots	For KUKA manipulator
9031 80 000 0	Regulating and controlling instruments	For measurement system

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 or fee-based	Free engineering audit of order
Quality control	At factory discretion	Independent control at all stages
FAT acceptance	Not conducted	Mandatory FAT acceptance in China
Customs clearance	Buyer handles independently	Full customs support
Turnkey installation	Not provided	Turnkey with training
Regional service	Absent	Regional service network and parts stock
Documentation	English only	Localized translation , standards adaptation
Warranty	Standard 12 months	Extended to 24 months with service contract
Communication	Language barrier	English-speaking project managers
Legal protection	Difficult to enforce	Full contractual legal support

FAQ — Frequently Asked Questions

Q1: What is the minimum order quantity for a laboratory AFP system? A: Minimum order is 1 complete system set. Manufacturing lead time is 14–16 weeks made-to-order. Special terms apply for educational institutions.

Q2: Can the system operate with different thermoplastic types? A: Yes, Lab AFP is compatible with a broad spectrum of thermoplastic UD tapes: PEEK, PEKK, PPS, PA, PP. The open architecture enables temperature profile configuration for specific polymers.

Q3: Are specialized facility requirements necessary for system installation? A: Yes, a ventilated room with temperature 18–25°C and relative humidity $\leq 70\%$ is required. Foundation for the robot and utility routing (electricity, water, compressed air) are mandatory.

Q4: How is the FAT acceptance procedure conducted in China? A: [Metal-Asia.pw](#) organizes [FAT acceptance](#) at the manufacturer's facility. The Buyer or their representative witnesses parameter verification on a test component. The FAT protocol is a mandatory contract appendix.

Q5: What documentation is required for customs clearance? A: Required documents include: contract, commercial invoice, packing list, certificate of origin, and technical regulation compliance declaration for machinery and equipment safety.

Q6: Is integration with existing equipment possible? A: Yes, the open architecture of the KUKA KR C5 controller enables integration via standard industrial protocols (EtherNet/IP, PROFINET). Synchronization with external control systems is supported.

Q7: What is the personnel training duration and program content? A: Standard training program spans 5 working days, covering LATP technology theory, trajectory programming practice, layup parameter tuning, maintenance, and diagnostics. Certificates are issued upon completion.

Q8: How is spare parts supply organized post-warranty? A: Metal-Asia.pw maintains a [regional spare parts warehouse](#). Critical components (laser, optics) ship within 7 days, standard items within 14 days. Annual service contracts are available.

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Request a consultation on LATP line selection for composite manufacturing from China