



BUDGETARY QUOTATION

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Prepared For Micron Penang

Partner In partnership with ABB for this project

Project Name Automated Bend & Torsion Reliability Testing Cell

Quotation Ref. AETEC-MICRON-BT-2026-08 · Revision O

Date / Currency 22 September 2026 · United States Dollar (USD)

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1. Quotation

Project: One automated bend-and-torsion testing cell around Micron's existing serviceable Instron. One gripper serves both modes; the common shuttle carries a 150 mm raised bending module and the lower torsion fixture, with mode-specific Instron work positions.

1.1 Common Automation Machine Platform

No.	Description	Qty	Unit	Amount (USD)
01	System engineering and project management	1	Lot	20,000.00
02	ABB GoFa 5 robot package and integration	1	Lot	50,000.00
03	Loading/indexing, EOAT master changer, compact pull-stud service gripper and magazine	1	Lot	38,000.00
04	Common shuttle/platen, twin 150 mm bend risers, lower torsion fixture, six-pin retractable contact assembly and automatic jig-change interfaces	1	Lot	55,000.00
05	PLC/HMI/IPC, work/TRANSFER/SERVICE head interface, batch traceability and automatic changeover controls	1	Lot	38,000.00
06	Safety guarding, pneumatics and agreed base ESD provisions	1	Lot	27,000.00
07	Assembly, wiring, integration, internal trials and FAT	1	Lot	22,000.00
08	One Penang installation/SAT window, training and handover	1	Lot	15,000.00
COMMON MACHINE PLATFORM TOTAL				265,000.00

The common machine includes the master-side automatic tool-changing hardware, tool magazine and common bend/torsion base fixtures. Product-contact tooling is supplied in the product-specific kit below.

1.2 Product-Specific Tooling Kit - Product 1

Each product requires its own dedicated tooling kit. The initial project includes one kit for Product 1 only.

Product-Specific Component	Standard Inclusion	Price Basis
Robot gripper / clip tooling	One open-centre fork gripper/EOAT serving both modes, with dedicated fingers/contact clips, automatic-change plate, docking adaptor and tool ID.	Included
Holding / test fixture tooling	One product-specific bend/torsion holding-jig and test-insert set, with repeatable latch-on/zero-point location and automatic couplings as applicable.	Included
Custom trays / nests	Ten custom trays/nests total for the product; incoming/output quantity split to be agreed.	Included
Recipe and prove-out	Tool ID setup, product recipe, robot teaching, fit/function checks and normal automatic prove-out using approved samples and test methods.	Included
PRODUCT 1 TOOLING KIT TOTAL	One dedicated kit is required for each product.	USD 20,000.00

INITIAL PROJECT PRICE: USD 285,000.00 (United States Dollars Two Hundred Eighty-Five Thousand Only).

Comprising one Common Automation Machine Platform at USD 265,000 and one Product 1 Tooling Kit at USD 20,000. Future product kits are not included. All figures exclude taxes, duties and freight.



2. Scope of Supply

AETEC will design, supply, build, program, integrate and commission the USD 265,000 common machine platform plus one USD 20,000 Product 1 tooling kit. Every additional product requires its own separately ordered kit.

2.1 Engineering and Common Automation

- URS support, concept and detailed design, design reviews, project management and documentation.
- One ABB GoFa 5 robot package, controller/base interface, safety handshakes and commissioning. ABB PoWa 10 is an alternative subject to engineering and price review.
- Front loading/indexing platform, robot-side automatic EOAT master changer, common compact pull-stud service gripper and agreed magazine/docking positions.
- Tool identification, presence, docking, positive-lock and agreed ESD/contact verification before cycle enable.

2.2 Bend/Torsion Platform and Pneumatics

- One common powered shuttle with station locking/verification, an extended and rib-supported platen, twin bolted risers raising the complete bend module 150 mm, and a relocated lower torsion fixture that retains its active test datum.
- Automatic exchange of product-specific bend and torsion inserts through repeatable latch-on/zero-point interfaces and storage docks, at locked SERVICE +40 mm with independently verified head SERVICE +214 mm.
- The bases remain on the shuttle. A same-product mode change retains tooling: empty cell, released force and robot clear; verify TRANSFER, index/lock, then verify the selected work pose. New products require applicable gripper and insert exchange.
- Bi-directional three-point bending with three upper and three lower contact rollers. Instron drives the central pair. The lower center cassette retracts for transfer and torsion, with positive mechanical locking and position proof. The upper roller loads the torsion moment arm; regulated pneumatic end clamps retain the specimen. Load capacity and OEM method approval are required.

2.3 Controls, Instron Interface and Data

- PLC, HMI and IPC software coordinating handling, shuttle selection, tooling exchange, eight-position batch logic and per-job tray/pocket traceability.
- Compatible Instron/Bluehill interface for verified BEND +150, TORSION 0, TRANSFER +220 and SERVICE +214 mm head poses, short test/relief travel, and specimen-linked native force/displacement/time records. Derived stress, moment and angle require the approved dimensions and calibration. OEM/API travel and method approval are required.
- A single HMI request coordinates a validated product/mode sequence. It verifies gripper/insert IDs, matching product trays, station locks and the approved method. Each specimen receives its own job and source/destination pocket allocation.
- Product 1 prove-out covers raised, level bend insertion and the local empty-EOAT lift/return; torsion uses side-offset approach and short vertical seating. The selected near-work head pose is verified before pickup/loading. Only small test/relief travel occurs during each test cycle.
- Product/result association and standard CSV/Excel-compatible export retain the job, product, test mode and original source/destination tray-pocket identities, subject to the supported Instron interface.

2.4 Safety, ESD and Handover

- Guarding, monitored access, emergency-stop circuit and agreed safety interlocks for the AETEC-supplied cell.
- Machine grounding, bonding and agreed base ESD provisions. Extra ionisation/monitoring and independent cleanroom/ESD certification are excluded unless expressly quoted.
- Assembly, wiring, internal trials, FAT, one planned Penang installation/SAT window, basic training and handover documentation.

2.5 Product-Specific Tooling Kit - Product 1

The initial project includes one kit for Product 1 only; one dedicated kit is required for every product.

- Ten custom product trays/nests total per kit, with the incoming/output split agreed for Product 1.
- One Product 1 open-centre fork gripper/EOAT serving both modes, with dedicated fingers/contact clips, a compatible automatic-change plate, docking adaptor and tool identification.
- One complete Product 1 holding/test jig and fixture-insert set for the agreed bend/torsion configurations, with latch-on/zero-point locating and automatic quick couplings as required.
- Product 1 tool setup, recipe, robot teaching, fit check and normal automatic prove-out using approved samples and test methods.

3. Deliverables

- Mechanical/electrical/pneumatic design package, PLC/HMI/IPC backups, agreed interface documents and process/layout simulator for design review.
- FAT/SAT records, operating/maintenance manuals, recommended spares and basic training. Prove-out includes batch allocation, product/tray matching and controlled inventory recovery. Simulator readings remain illustrative; real-cell validation governs release.



4. Product Scope Boundary

The initial USD 285,000 project comprises the USD 265,000 common machine platform and one USD 20,000 Product 1 tooling kit. Each additional product requires its own separately ordered product-specific kit.

Common machine platform - USD 265,000	Product-specific kit - USD 20,000 per product
Robot-side automatic tool-changing master, docking infrastructure and agreed initial magazine capacity	One Product 1 automatic-change gripper/EOAT serving both modes, with dedicated fingers/contact clips
Powered common shuttle, raised bend support and lower torsion fixture with mode-specific head poses	One dedicated holding/test jig and fixture-insert set for the product
PLC/HMI/IPC, Instron interface, automatic tool verification and recipe-control architecture	Ten custom product trays/nests total, product recipe and normal prove-out
Safety, pneumatics, base ESD provisions, integration, FAT, installation/SAT and training	Each additional product requires another separately ordered product-specific kit
Common machine is reusable with approved and validated product kits	Extra trays, magazine expansion, new base fixtures, new test modes or extra validation are separately quoted

4.1 Additional Products and Variants

Each additional standard product kit is budgeted at approximately USD 20,000, subject to geometry, test requirements, design review and magazine capacity. It includes ten custom trays/nests total, one product-specific automatic-change gripper with dedicated fingers/contact clips, one holding/test jig and insert set for the agreed bend/torsion modes, and normal setup/prove-out.

Additional tray quantity beyond ten, magazine/rack expansion, a complete new base fixture, master-side changer modification, a new test mode, unusual product complexity, extra validation or requalification will be separately quoted.

5. Customer Inputs and Responsibilities

- Provide a serviceable Instron with compatible controller, measurement channels, approved work/TRANSFER/SERVICE and released-force feedback, and required OEM/API licences. Confirm available head travel and the bend and calibrated torsion methods.
- Freeze the initial Product 1 part number and provide CAD, samples, test methods, contact zones, allowable clamp limits, gauge ranges and acceptance criteria.
- Approve Product 1 contacts, raised supports, slotted platen, six-pin bidirectional load path, retractable center cassette, shuttle range, head poses, loading gaps, clearances, docking and magazine interfaces before FAT.
- Provide utilities, network access, ESD/safety specifications, site readiness, timely reviews and FAT/SAT witness resources.

6. Key Exclusions and Assumptions

- New Instron/load cell, calibration/repair, OEM support/API licences, interface upgrades and independent torque/angle instrumentation unless expressly agreed.
- Product 2 and later tooling kits, tray quantity above ten per standard kit, replacement tools/trays/inserts and complete new base fixtures.
- ABB PoWa 10 alternative; optional vision/AI inspection; extra magazine capacity; new test modes; major robot/reach changes; cleanroom/ESD certification; taxes, duties, freight, insurance and facility works.
- The USD 20,000 Product 1 kit includes one gripper, both agreed fixture-insert configurations and ten trays/nests total. Additional equipment or requirements outside the approved baseline, selected upgrades and delays require written price/programme variation. CAD and simulation remain subject to engineering and physical validation.



7. Commercial Conditions

Initial Project Price	USD 285,000.00, excluding taxes, duties and freight
Validity	30 days from issue date
Estimated Lead Time	34-38 weeks, subject to the conditions below
Delivery Basis	Freight, insurance, duties and customs excluded
Site	Micron Penang; one planned installation/SAT window
Warranty	12 months from SAT or 15 months from shipment, whichever occurs first
Price Basis	USD 265,000 common machine platform + USD 20,000 Product 1 tooling kit

The estimated 34-38 week programme starts after receipt of purchase order/down payment, approved URS, complete Product 1 CAD/samples and timely approval of the gripper, jig and magazine interfaces. Component lead times and customer review delays may affect the programme.

8. Payment Schedule

Milestone	Payment	Trigger
01	30%	Purchase order and down payment
02	30%	Approved URS and detailed design
03	20%	FAT acceptance / ready for shipment
04	20%	Completion of site commissioning/SAT, or SAT delayed over 30 days for reasons not attributable to AETEC

9. Acceptance and Warranty Basis

- Platform FAT and SAT will be carried out against the jointly approved URS and acceptance criteria.
- Product 1 FAT/SAT verifies bidirectional bending, lower torsion, center-cassette retraction/locking, revised shuttle range and head poses, loading/tool clearances, automatic changeover, and trace/result association against the approved Instron methods.
- Warranty covers AETEC-supplied equipment and workmanship only. It excludes the customer-owned Instron, normal tray/insert/tooling wear, consumables, misuse and unauthorised modification.

10. General Terms and Conditions

- Cancellation charges will be based on committed engineering, procurement, fabrication and third-party costs at the cancellation date.
- Each additional product requires a separately ordered product-specific tooling kit. A standard kit has an indicative budget of USD 20,000 per product, subject to design review, available magazine capacity and a separate quotation.
- Automatic changeover applies to pre-engineered, installed and validated tools, product trays and recipes. Replenishment introduces new tray identities while retaining prior records. Maintenance and confirmed fault recovery remain authorized operator activities.
- AETEC retains ownership of its pre-existing intellectual property, standard software modules and reusable engineering know-how. Project-specific source backup is supplied as stated in the scope.
- Subject to approved URS, design freeze and OEM confirmation of the existing Instron interface and measurement method. CAD/simulation review does not constitute fabrication or safety release. Out-of-scope requests require written variation.