

# Inventory Module — Epics, User Stories, Acceptance Criteria & FE Test Cases (v1)

*Last updated: 2025-09-28*

## 0) Overview

This document translates the **Inventory Module** workflow into phased **Epics → User Stories → Acceptance Criteria → Front-End Test Cases**. It aligns to the phases shown in the diagram: **Procurement, Usage, Maintenance, and End of Life**. A cross-cutting section covers billing, depreciation, history, movement transactions, notifications, and permissions.

### Key Actors

- **Procurement Officer** — purchases tools and records procurement data
- **Warehouse Clerk** — receives, stores, and dispatches tools
- **Quality Inspector** — performs quality checks (initial, return, post-repair)
- **Project Manager** — assigns tools to projects and employees
- **Technician** — uses tools and returns them
- **Billing Clerk** — manages billing for client tool use and repair cost recovery
- **Inventory Manager** — oversees lifecycle, pricing, depreciation, EoL decisions

### Assumptions

- Each **Tool** has a unique system ID and a scannable **QR/Barcode** label.
- **Movement** is recorded as a transaction with from/to locations (Warehouse, Client Site, Internal Dept, Repair Vendor, Disposal, etc.).
- **Projects** can be **Client, Internal, or Warehouse** (stock).
- Pricing supports **rental rate, depreciation, and discounts** (e.g., reduced-price sale at EoL).
- Email notifications are sent for damage, repair completion, and billing events.

## 1) Traceability: Diagram Nodes → Epics/Stories

Diagram Node	Epic	Story ID
Purchase Tool from Supplier	P1 Procurement	P1-S01, P1-S02
Receive Tool in X	P1 Procurement	P1-S03
Initial Quality Check	P1 Procurement	P1-S04

Diagram Node	Epic	Story ID
Register Tool in System / Assign Unique ID	P1 Procurement	P1-S05
Return to Supplier	P1 Procurement	P1-S06
Set Pricing Parameters / Set Rental Price	P1 Procurement	P1-S07
Calculate Depreciation / Procurement Price Recording	P1 Procurement	P1-S08
Store in Warehouse / Assign Storage Location / Ready for Use / Warehouse Inventory Y	P1 Procurement	P1-S09, P1-S10
Client Project / Project Assignment / Tool Assign	U1 Usage	U1-S01, U1-S02
Movement Record / Tool Movement Transaction / New Location / Employee Tracked	U1 Usage	U1-S03, U1-S04
Return to Warehouse	U1 Usage	U1-S05
Internal Tool Use / Cost Tracking	U1 Usage	U1-S06
Client Tool Use / Billing	U1 Usage	U1-S07
Tool Return / Quality Check	M1 Maintenance	M1-S01
Damage Assessment / Damaged / Damage Report / Email Report	M1 Maintenance	M1-S02
Notify Client of Damage	M1 Maintenance	M1-S03
Send for Repair / Repair Completed	M1 Maintenance	M1-S04
Repair Cost Added to Next Invoice / Cost Recorded	M1 Maintenance	M1-S05
Post-Repair Quality Check (Pass/Fail) / Reassess Tool Condition	M1 Maintenance	M1-S06, M1-S07
Periodic Review	M1 Maintenance	M1-S08
End of Life Assessment / Apply Depreciation / Update Rental Price	E1 End of Life	E1-S01, E1-S02
Extended Use (Yes)	E1 End of Life	E1-S03

Diagram Node	Epic	Story ID
Remove from Inventory / Discard / Sell at Reduced Price	E1 End of Life	E1-S04
Tool History	Cross-Cutting	C1-S01

## 2) Epics & User Stories (with Acceptance Criteria & FE Test Cases)

### Epic P1 — Procurement Phase

#### P1-S01 — Create Tool Profile

*As a Procurement Officer, I want to create a tool profile with core attributes (make, model, category, supplier, warranty), so that the tool is identifiable and managed across its lifecycle.*

**Acceptance Criteria** 1. **Given** I open “New Tool” form **when** I provide required fields **then** Save is enabled. 2. **Given** mandatory fields missing **when** I click Save **then** inline validation highlights missing fields. 3. **Given** tool profile is saved **when** I view the tool page **then** a system-generated Tool ID is displayed.

**FE Test Cases** - Validate required fields and tool category dropdown loads. - Verify Tool ID appears after save. - Attempt save with invalid characters/lengths (name, model, SKU). - Check cancel/back does not persist draft.

#### P1-S02 — Record Procurement Details

*As a Procurement Officer, I want to record procurement info (PO No., supplier, procurement date, unit cost, currency), so that acquisition is traceable.*

**Acceptance Criteria** 1. Unit cost accepts numeric with currency; conversion shows base currency value. 2. PO No. uniqueness validated per supplier. 3. Procurement date cannot be in the future.

**FE Test Cases** - Enter decimal cost, verify format and base currency preview. - Duplicate PO No. in same supplier → error; different supplier → allowed. - Future date rejected; past/today accepted.

#### P1-S03 — Receive Tool

*As a Warehouse Clerk, I want to mark a tool as received against a PO, so that receiving is reconciled.*

**Acceptance Criteria** 1. Receiving requires matched PO line. 2. Quantity cannot exceed ordered. 3. On successful receive, status becomes **Received – Pending QC**.

**FE Test Cases** - Receive exact qty; receive over-qty → blocked with message. - Partial receive; remaining balance displayed.

#### **P1-S04 — Initial Quality Check (Pass/Fail)**

*As a Quality Inspector, I want to record QC with checklist and outcome, so that only conforming tools continue.*

**Acceptance Criteria** 1. QC form shows checklist; selecting **Fail** requires reason & photo. 2. On **Pass**, status → **QC Passed**; on **Fail**, status → **QC Failed**. 3. QC record timestamped & user-stamped in history.

**FE Test Cases** - Toggle pass/fail; fail without reason → validation error. - Attachments: accept images/PDF; large file warning.

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#### **P1-S05 — Register Tool & Assign Unique ID (QR/Barcode)**

*As a Warehouse Clerk, I want to generate and print a unique label for the tool, so that it can be scanned during movements.*

**Acceptance Criteria** 1. System generates immutable **Tool UID** and printable QR/Barcode. 2. Print preview shows label with UID + friendly name. 3. Scanning the code navigates to the Tool profile.

**FE Test Cases** - Generate code; confirm uniqueness. - Print dialog opens; PDF export works. - Mobile scan route opens tool page.

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#### **P1-S06 — Return to Supplier (If QC Fail)**

*As a Procurement Officer, I want to initiate supplier return with RMA details, so that failed items are sent back properly.*

**Acceptance Criteria** 1. Return requires QC Failed status. 2. RMA No. and reason mandatory. 3. Status changes to **Returning to Supplier**; movement created.

**FE Test Cases** - Start return without QC fail → blocked. - RMA printable note generated.

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#### **P1-S07 — Set Pricing Parameters & Initial Rental Price**

*As an Inventory Manager, I want to set rental pricing (daily/weekly/monthly), deposits, and discounts, so that billing uses correct rates.*

**Acceptance Criteria** 1. Pricing model selection required; rate > 0. 2. Effective-from date cannot precede procurement date. 3. UI shows calculated examples per period.

**FE Test Cases** - Switch pricing model; verify derived examples change. - Overlapping effective dates prevented.

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#### **P1-S08 — Configure Depreciation**

*As an Inventory Manager, I want to set depreciation method (e.g., straight-line) and useful life, so that book value is tracked.*

**Acceptance Criteria** 1. Method & useful life required; life > 0. 2. Preview schedule table visible. 3. Book value recalculates after save.

**FE Test Cases** - Change useful life; preview updates. - Save & verify book value on profile.

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#### **P1-S09 — Assign Storage Location**

*As a Warehouse Clerk, I want to assign bin/rack/zone, so that the tool is locatable.*

**Acceptance Criteria** 1. Location mandatory before status can be **Ready for Use**. 2. Location code validated against warehouse map.

**FE Test Cases** - Enter invalid bin → error. - Update location and verify on profile & inventory grid.

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#### **P1-S10 — Mark Ready for Use / Inventory Confirmation**

*As a Warehouse Clerk, I want to mark a tool ready, so that it becomes available for assignment.*

**Acceptance Criteria** 1. Status sequence enforced: Received → QC Passed → Labeled → Located → Ready. 2. Ready tools appear in **Available Inventory** grid and search.

**FE Test Cases** - Attempt Ready without location → blocked. - Search/filters return the tool.

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### **Epic U1 — Usage Phase**

#### **U1-S01 — Project Assignment (Client/Internal)**

*As a Project Manager, I want to assign a tool to a project, so that its usage is tracked for billing or internal cost.*

**Acceptance Criteria** 1. Assignment form requires project (client or internal) and expected return date. 2. On save, status → **Allocated** and inventory availability updates.

**FE Test Cases** - Missing return date → validation. - Switching client/internal updates downstream fields (billing vs cost center).

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#### **U1-S02 — Assign Tool to Employee**

*As a Project Manager, I want to assign a tool to a named employee, so that responsibility is tracked.*

**Acceptance Criteria** 1. Employee field required; must belong to project. 2. Assignment creates responsibility record.

**FE Test Cases** - Autocomplete employee list filtered by project. - Reassigning warns if active usage exists.

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### **U1-S03 — Record Movement (Checkout/Check-in)**

*As a Warehouse Clerk, I want to scan and record outbound/inbound movements, so that location history is accurate.*

**Acceptance Criteria** 1. **Checkout** requires Available/Allocated status; **Check-in** requires Out-On-Use. 2. Each movement stores from/to, timestamp, user, and geotag (if enabled). 3. On checkout, status → **Out – On Use**; on check-in, → **Returned – Pending QC**.

**FE Test Cases** - Scan UID to auto-populate tool; offline mode queue then sync. - Geolocation permission prompt; handle deny gracefully.

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### **U1-S04 — Capture New Location**

*As a Technician, I want to update the tool's current site/location, so that tracking remains current.*

**Acceptance Criteria** 1. Location can be updated while **Out – On Use**. 2. Audit entry added to history.

**FE Test Cases** - Map picker and manual entry supported. - Invalid coordinates → error message.

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### **U1-S05 — Return to Warehouse Flow**

*As a Technician, I want to return a tool and hand it over, so that post-use QC can begin.*

**Acceptance Criteria** 1. Return form requires actual return date/time and condition. 2. Status → **Returned – Pending QC** and triggers QC task.

**FE Test Cases** - Overdue warning if after expected date. - Photo upload of tool condition.

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### **U1-S06 — Internal Tool Use Cost Tracking**

*As a Billing Clerk, I want to accrue internal cost per project/time, so that internal chargeback is possible.*

**Acceptance Criteria** 1. Internal use generates cost entries using internal rate card. 2. Cost entries visible in project ledger UI.

**FE Test Cases** - Rate change reflects on new entries (not historical). - Export CSV/PDF buttons function.

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### **U1-S07 — Client Tool Use Billing Setup**

*As a Billing Clerk, I want to configure billable usage rules for client projects, so that invoices include tool rental.*

**Acceptance Criteria** 1. Rule requires pricing model and bill cycle. 2. System simulates billing for selected date range.

**FE Test Cases** - Toggle daily/weekly/monthly and verify preview totals. - Validation for missing client billing account.

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## **Epic M1 — Maintenance Phase**

### **M1-S01 — Return QC (No Damage/Damaged)**

*As a Quality Inspector, I want to perform QC on returned tools, so that they are safe for reuse.*

**Acceptance Criteria** 1. Checklist required; outcome **Pass** or **Damage Found**. 2. On Pass → status **QC Passed**; on Damage → create Damage Assessment task.

**FE Test Cases** - Required photos for certain failed checks. - Bulk QC for multiple returns.

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### **M1-S02 — Damage Assessment & Report**

*As a Quality Inspector, I want to assess damage severity and record a damage report (with photos), so that decisions can be made.*

**Acceptance Criteria** 1. Severity (minor/major), parts affected, estimated cost required. 2. Email report can be generated as PDF summary.

**FE Test Cases** - Generate PDF; check logo, tool ID, images. - Est. cost must be numeric; currency formatting.

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### **M1-S3 — Notify Client of Damage**

*As a Billing Clerk, I want to notify the client of damage with evidence, so that expectations are set for charges.*

**Acceptance Criteria** 1. Notification includes damage report and next steps. 2. Email preview & recipient confirmation required before send.

**FE Test Cases** - Multi-recipient, CC project manager. - Resend and view history of notifications.

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### **M1-S04 — Send for Repair & Track**

*As a Warehouse Clerk, I want to create a repair dispatch to vendor and track status, so that repair turnaround is monitored.*

**Acceptance Criteria** 1. Dispatch requires vendor, shipping ref, and ETA. 2. Tool status → **Under Repair**; movement reflects vendor location.

**FE Test Cases** - Print packing slip. - Update status to **Repair Completed**; date auto-stamps.

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### **M1-S05 — Record Repair Cost & Add to Next Invoice**

*As a Billing Clerk, I want to record actual repair cost and mark it recoverable, so that it is added to the next client invoice.*

**Acceptance Criteria** 1. Enter repair invoice details; mark **Bill to Client** with reference project. 2. System queues charge for next billing cycle.

**FE Test Cases** - Toggle billable/not billable and verify preview of next invoice. - Currency & tax handling validation.

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### **M1-S06 — Post-Repair Quality Check (Pass/Fail)**

*As a Quality Inspector, I want to QC after repair, so that the tool is safe to return to service.*

**Acceptance Criteria** 1. Pass → status **QC Passed** and availability recalculated. 2. Fail → create follow-up repair or EoL assessment task.

**FE Test Cases** - Conditional required fields on Fail path. - History timeline displays both pre- and post-repair QCs.

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### **M1-S07 — Reassess Tool Condition & Update Profile**

*As an Inventory Manager, I want to update tool condition grade and notes, so that future pricing/EoL considers wear.*

**Acceptance Criteria** 1. Condition grade options (A–D) reflected on profile. 2. Changes logged with user and timestamp.

**FE Test Cases** - Changing grade updates list badges. - Attempt to edit without permission → blocked.

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### **M1-S08 — Periodic Review Scheduler**

*As an Inventory Manager, I want scheduled reviews by category/age, so that maintenance is proactive.*

**Acceptance Criteria** 1. Create recurring review tasks (e.g., every 6 months). 2. Overdue badges shown on dashboard.

**FE Test Cases** - Create/edit/delete schedules. - Calendar view shows tasks; filters by category.

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## **Epic E1 — End of Life (EoL) Phase**

### **E1-S01 — EoL Assessment**

*As an Inventory Manager, I want to assess EoL based on age, repair count, and book value, so that disposition is justified.*



**Acceptance Criteria** 1. Assessment form shows KPIs (age, cumulative repair cost, book value). 2. Decision options: **Extend Use**, **Remove from Inventory**.

**FE Test Cases** - KPI thresholds display correctly. - Save decision and verify status change to **EoL Review Complete**.

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#### **E1-S02 — Apply Depreciation & Update Rental Price**

*As an Inventory Manager, I want to apply latest depreciation and optionally adjust rental price for remaining life, so that pricing stays fair.*

**Acceptance Criteria** 1. Recalculate book value; lock prior periods. 2. Optional rental price update with effective date.

**FE Test Cases** - Recalc preview before commit. - Audit shows who applied the change.

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#### **E1-S03 — Extended Use**

*As an Inventory Manager, I want to mark extended use with new review date, so that the tool continues service under monitoring.*

**Acceptance Criteria** 1. New review date required; dashboard reminder created.

**FE Test Cases** - Reminder appears in list; snooze/dismiss works.

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#### **E1-S04 — Remove from Inventory (Discard/Sell Reduced)**

*As an Inventory Manager, I want to remove a tool from inventory with disposition (discard/sell reduced), so that records are closed correctly.*

**Acceptance Criteria** 1. Disposition required; if **Sell**, enter sale price and buyer. 2. Tool becomes **Inactive**; further assignment disabled; movement closed.

**FE Test Cases** - Attempt to assign inactive tool → blocked. - Sale price numeric and  $\leq$  list price.

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### **3) Cross-Cutting Epics**

#### **C1-S01 — Tool History Timeline**

*As any user, I want a timeline of all events (procurement, QC, movements, repairs, billing), so that I can audit a tool's life.*

**Acceptance Criteria** 1. Timeline shows event type, user, timestamp, refs (PO, Project, Invoice). 2. Export timeline to PDF.

**FE Test Cases** - Filter by event type/date range. - Pagination/virtual scroll performance.

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### **C1-S02 — Notifications & Email Templates**

*As an Inventory Manager, I want configurable templates for damage and repair notifications, so that communications are consistent.*

**Acceptance Criteria** 1. Placeholders (tool id, project, costs) render in preview. 2. Test send to self available.

**FE Test Cases** - Template save/versioning. - Placeholder validation (missing variable warning).

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### **C1-S03 — Roles & Permissions**

*As an Admin, I want role-based access to actions (QC, pricing, EoL), so that controls are enforced.*

**Acceptance Criteria** 1. Unauthorized users cannot see restricted buttons. 2. Audit log records permission denials.

**FE Test Cases** - Verify each role's UI visibility. - Attempt protected actions → error toast + audit entry.

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## **4) Non-Functional Requirements (Selected)**

- **Usability:** Mobile-friendly movement scanning; keyboard-first data entry.
  - **Performance:** Inventory grid loads < 2s for 10k items with server-side paging.
  - **Security:** All edits audited; PII in notifications redacted by default.
  - **Reliability:** Offline capture for movements with auto-sync within 60s.
  - **Compliance:** Immutable history for financial events (depreciation, invoicing).
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## **5) Release Phasing (suggested)**

- **Phase 1 (P1/U1 core):** P1-S01...S10, U1-S01...S05, C1-S03
- **Phase 2 (Billing/Cost):** U1-S06...S07, P1-S07...S08, C1-S02
- **Phase 3 (Maintenance):** M1-S01...S08
- **Phase 4 (EoL & History):** E1-S01...S04, C1-S01

**Note:** This structure is intentionally modular: each story has clear UI acceptance and concrete FE test cases suitable for E2E automation later (e.g., Playwright/Cypress).