# Product Requirements Document: ERP/IMS for PineCone Pro Supplies

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## 1. Purpose and Scope

PineCone Pro Supplies (PCS) has grown from a local distributor into a multi‑channel wholesaler and retailer with more than 12 000 active SKUs. This rapid expansion exposed gaps across purchasing, inventory accuracy, order orchestration, tax compliance and returns. The business intends to implement a modular ERP/Inventory Management System (IMS) that unifies product data, inventory control, order management, purchasing, warehouse operations, shipping, accounting integration and analytics. This document defines the detailed product requirements for the initial Minimum Viable Product (MVP) and outlines Phase 2 enhancements.

This document covers functional and non‑functional requirements, user personas, acceptance criteria, assumptions, dependencies, constraints, and out‑of‑scope items. It serves as the basis for design, development, testing and deployment of the new ERP/IMS.

## 2. Objectives

* Achieve **≥ 98 % inventory accuracy** through cycle counts and RF scanning.
* **Meet a sub‑24 h SLA** for 95 % of orders placed during business days.
* Automate purchasing using **reorder points**, economic order quantity (EOQ) and vendor lead‑time data.
* Implement **lot/expiry and serial tracking** for hazardous finishing chemicals and high‑value tools.
* Provide **unified financials** and tax compliance via accounting integration.
* Offer a **single source of truth** for product data and pricing across all sales channels.
* Lay foundations for Phase 2 capabilities: demand forecasting, EOQ optimisation, promotion engine, contract pricing, light manufacturing/kitting, 3PL integration, customer service console and EDI.

## 3. Stakeholders & Personas

| Persona | Role/Responsibilities | Key System Interactions |
| --- | --- | --- |
| **Owner/GM (Olivia)** | Oversees P&L, approves high‑value purchases, audits financials. | Reviews dashboards, approves POs, monitors KPIs. |
| **Ops Manager (Marcus)** | Manages warehouse KPIs, slotting strategies and carrier performance. | Supervises inventory, warehouse, shipping modules. |
| **Purchasing Lead (Dina)** | Manages vendor relationships, forecasts demand, plans POs. | Uses purchasing & vendor management, vendor scorecards. |
| **Warehouse Associates (RF)** | Receives and puts away inventory, picks/ships orders, performs cycle counts. | Uses RF scanning for inventory, picking and RMA processing. |
| **CSR (Ben)** | Handles order edits, returns/RMAs and customer communications. | Uses order management and RMA workflows. |
| **E‑Commerce Manager (Tracy)** | Manages catalog, pricing, promotions and channel synchronisation. | Uses PIM, pricing module, promotion engine (Phase 2). |
| **Accountant (Priya)** | Handles reconciliation, tax filings and journal exports. | Uses accounting integration and tax engine. |
| **IT Admin (Kong)** | Manages user access, roles, environments and deployments. | Administers security, RBAC and system configuration. |

## 4. In‑Scope vs Out‑of‑Scope

### 4.1 In‑Scope (MVP)

1. **Product Information Management (PIM)** – master data management for all SKUs.
2. **Inventory & Warehouse Management** – multi‑warehouse control with bin/zone logic, RF scanning and cycle counts.
3. **Order Management** – B2B/B2C order processing, payments, fraud checks.
4. **Purchasing & Vendor Management** – vendor scorecards, lead times, MOQs, automated purchasing, ASN receiving and drop‑ship support.
5. **Lot/Expiry & Serial Tracking** – for chemicals and high‑value tools.
6. **Shipping & Rate Shopping** – carrier integration, hazmat rules and cross‑dock/3PL support.
7. **Returns/RMA Workflow** – standardised process with disposition codes.
8. **Tax Calculation & Reporting** – county‑level NC tax plus multi‑state readiness.
9. **Accounting Integration** – GL/AP/AR synchronisation.
10. **Operational Analytics & Alerts** – dashboards for KPIs and proactive notifications.

### 4.2 Phase 2 Enhancements

1. **Demand Forecasting & EOQ Optimisation**.
2. **Promotion Engine & Contract Pricing (B2B)**.
3. **Light Manufacturing/Kitting with BOM Versioning**.
4. **3PL Bidirectional Integration**.
5. **Customer Service Console with SLA Timers**.
6. **EDI with Large Vendors**.

### 4.3 Out‑of‑Scope (Initial Release)

* Full manufacturing MRP/APS.
* HR/Payroll.
* Field Service Management.

## 5. Functional Requirements (MVP)

### 5.1 Product Information Management (PIM)

**Description:** Provide a single source of truth for more than 12 000 SKUs across web storefront, B2B portal, POS and Amazon channels. Support complex product structures (kits/bundles), hazardous classifications, unit conversions (quart/gal/5‑gal) and pricing tiers.

**Key Features & Functionalities**

* **Master product catalog:** Create and manage SKU records with attributes (name, description, category, brand, dimensions, weight, hazard class, expiry period, images).
* **Variant & bundle management:** Support parent/child relationships, kits and bundles, and BOM (bill of materials) references for kit assembly.
* **Unit conversion:** Automatically convert units (e.g., quart to gallon) for ordering and pricing.
* **Channel synchronisation:** Publish and update product data across web store, Amazon, POS and B2B portal.
* **Data governance:** Roles & permissions for product creation/editing; audit trails of changes.

**Acceptance Criteria**

* All SKUs have unique IDs and required attributes; data is consistent across all channels.
* Hazardous classifications and expiry periods are stored and exportable for shipping compliance.
* Kits/bundles can be created with dynamic component quantities and updated BOM versioning.
* Unit conversions are handled automatically during order processing and pricing.
* Product updates are propagated to channels within 15 minutes.

### 5.2 Inventory & Warehouse Management

**Description:** Maintain real‑time inventory visibility across multiple warehouses (Greensboro DC, Charlotte cross‑dock, Reno 3PL) with bin/zone location management and RF scanning. Aim for ≥ 98 % inventory accuracy and reliable available‑to‑promise (ATP).

**Key Features & Functionalities**

* **Multi‑location inventory tracking:** Real‑time quantities and statuses per SKU, per location (stock, reserved, on order).
* **Bin/zone management:** Define zones (receiving, forward pick, overstock, returns) and bins within each warehouse. Slot items based on velocity and hazard class.
* **RF scanning workflows:** Receiving, put‑away, picking, cycle count and RMA processing via handheld devices.
* **Cycle counting:** Configurable frequency by ABC class with automatic variance adjustments and recount workflows.
* **Cross‑dock & 3PL integration:** Manage trans‑shipments from Greensboro to cross‑dock and update inventory based on 3PL feeds.
* **Expiry and serial control:** Enforcement of FIFO/FEFO picking for lot‑controlled items; tracking serial numbers for high‑value tools.
* **ATP calculation:** Real‑time available‑to‑promise across all channels including pending POs and reserved stock.

**Acceptance Criteria**

* Inventory accuracy measured by cycle count variance is ≥ 98 %.
* RF scanning transactions update inventory within 1 minute.
* Serial and lot numbers are captured at receiving and available for look‑up during shipping and RMA.
* Cross‑dock and 3PL transfers update inventory within 15 minutes of receipt.
* ATP is recalculated upon order entry and displays accurate available quantities to prevent oversells.

### 5.3 Order Management & Payments/Fraud

**Description:** Orchestrate orders from B2B/B2C channels (web, B2B portal, POS, Amazon FBM/FBA), including payment processing and fraud checks. Achieve a sub‑24‑hour SLA for 95 % of orders.

**Key Features & Functionalities**

* **Channel integration:** Consolidate orders from e‑commerce, Amazon, B2B portal and POS via APIs or file exchanges.
* **ATP & back‑order management:** Reserve stock upon order creation; manage partial shipments; allocate replenishment to back orders.
* **Payments and fraud screening:** Integrate payment gateways (credit card, ACH) and fraud services; support deposit holds for B2B orders.
* **Order workflow:** Support statuses from pending → processing → picking → packed → shipped; allow CSR to edit orders (address changes, item swaps) before shipment.
* **Shipment & tracking:** Create shipments, print labels, assign carriers (lowest rate or fastest), and update customers with tracking numbers.
* **Customer communication:** Send order confirmations, shipping notifications and out‑of‑stock alerts.

**Acceptance Criteria**

* Orders from all channels are visible in a single queue.
* Payment is authorised or charged at order capture and logged in the accounting integration.
* Fraud check results are recorded; flagged orders require CSR approval.
* 95 % of orders are shipped within 24 hours of receipt (business days).
* CSR can modify orders prior to picking; modifications update pricing and taxes accordingly.

### 5.4 Purchasing & Vendor Management

**Description:** Provide vendor scorecards, handle minimum order quantities and lead‑time data, and automate purchasing using reorder points and EOQ. Support ASN (Advanced Shipping Notice) receiving and vendor drop‑ship.

**Key Features & Functionalities**

* **Vendor master data:** Maintain vendor profiles with contact information, terms, lead time, minimum order quantities (MOQs) and pricing.
* **Reorder point & EOQ:** Calculate reorder points per SKU based on safety stock and lead time; recommend order quantities using EOQ.
* **Purchase order automation:** Generate POs automatically when on‑hand + on‑order falls below reorder point; route POs for approval based on monetary thresholds.
* **Vendor scorecard:** Track delivery performance (on‑time, complete, accurate), quality incidents and price variance; display vendor ratings.
* **ASN & receiving:** Accept supplier ASNs; book in quantities by lot/serial; update inventory and notify purchasers of discrepancies.
* **Drop‑ship & vendor‑managed inventory:** Send orders directly to vendor for drop‑ship fulfilment; record cost and revenue.

**Acceptance Criteria**

* Reorder points and EOQ are configured for all stocked SKUs; the system generates draft POs automatically.
* POs require approval if above defined thresholds; approvals are logged.
* ASN lines match receipts; discrepancies trigger variance reports.
* Vendor performance metrics are updated with each receipt and available for reporting.

### 5.5 Lot/Expiry & Serial Tracking

**Description:** Track lot numbers and expiration dates for finishing chemicals and serial numbers for high‑value tools, enabling recalls and warranty/service support.

**Key Features & Functionalities**

* **Lot control:** Capture lot number, manufacture date and expiry date at receiving; enforce FIFO/FEFO picking for lot‑controlled items.
* **Serial number tracking:** Record serial numbers for high‑value tools at receipt and shipment; maintain warranty start dates.
* **Recall management:** Provide search/report to identify all customers and shipments associated with a lot or serial number.
* **Warranty & service integration:** Provide lookup for serial numbers to check warranty status and service history.

**Acceptance Criteria**

* Lot numbers and expiry dates are recorded for all regulated products.
* Serial numbers are captured and stored for high‑value tools; scanning ensures correct serial number is shipped.
* Recall report can be generated within 30 minutes identifying all shipments containing a specified lot/serial.

### 5.6 Shipping & Rate Shopping

**Description:** Integrate with carriers to compare shipping rates, manage hazardous‑materials documentation and support cross‑dock/3PL workflows.

**Key Features & Functionalities**

* **Carrier integration:** Connect to carrier APIs (UPS, FedEx, USPS, LTL) for rate quotes, label printing and tracking.
* **Rate shopping:** Determine best shipping method based on cost, destination and delivery time; present options to CSR or pick automatically.
* **Hazmat compliance:** Support hazmat labels and documentation; maintain material safety data sheet (MSDS) links; ensure carriers that handle hazardous goods are selected.
* **Cross‑dock & 3PL support:** Generate trans‑shipment documents; coordinate shipments from DC to cross‑dock or 3PL and capture carrier pickups/deliveries.

**Acceptance Criteria**

* Shipping labels and documents are produced for all orders, including hazmat paperwork where required.
* Rate shopping is configurable to choose lowest cost or fastest service; logs decisions for audit.
* 3PL shipments update tracking info and inventory statuses within 30 minutes.

### 5.7 Returns/RMA Workflow

**Description:** Provide a standardised returns management process with disposition codes (restock, refurbish, scrap) to reduce friction and improve inventory accuracy.

**Key Features & Functionalities**

* **RMA initiation:** Generate RMA numbers for customer returns; send return instructions.
* **Receiving & inspection:** Capture returned goods, record condition, lot/serial numbers and reason codes.
* **Disposition & inventory update:** Apply disposition codes to returned items (restock to available stock, refurbish to inspection queue, scrap to disposal); adjust inventory accordingly.
* **Refunds & replacements:** Integrate with accounting to issue refunds or credits; link replacement orders to original RMA.
* **Reporting:** Track RMA volumes, reasons and dispositions to identify quality issues and reduce returns.

**Acceptance Criteria**

* RMAs are created for all returns and tracked through resolution.
* Disposition codes determine inventory movements and triggers for refurbishment or scrap.
* Refunds/credits are posted in the accounting system and visible in customer accounts.

### 5.8 Tax Calculation & Reporting

**Description:** Automate county‑level sales tax for North Carolina; prepare for expansion to Virginia and South Carolina. Provide hazmat documentation and audit trail.

**Key Features & Functionalities**

* **Tax engine:** Apply appropriate tax rates based on customer address (city, county, state); update rates when new jurisdictions are added.
* **Multi‑state compliance:** Maintain nexus rules and tax registration details for each state; support tax‑exempt customers with certificate management.
* **Hazmat documentation:** Produce shipping papers required for hazardous goods; capture driver and placard information.
* **Reporting & filing:** Generate monthly/quarterly tax reports; summarise taxable vs non‑taxable sales; produce audit trails of tax calculations.

**Acceptance Criteria**

* Tax is calculated accurately for all orders based on ship‑to address and product taxability.
* Reports can be generated showing tax due per jurisdiction.
* Hazmat shipments include required documents and are flagged for compliance.

### 5.9 Basic Accounting Integration

**Description:** Synchronise general ledger, accounts payable and accounts receivable data to provide unified financials.

**Key Features & Functionalities**

* **Journal entry generation:** Create journal entries for sales invoices, returns, POs, AP bills and inventory adjustments; map to appropriate GL accounts.
* **GL/AP/AR integration:** Export transactions to or synchronise with the accounting system; update balances daily.
* **Bank reconciliation:** Import bank statements; match deposits and payments; reconcile differences.
* **Revenue recognition & cost of goods:** Recognise revenue upon shipment; calculate COGS based on inventory valuation method.
* **Audit trails:** Maintain detailed transaction logs for audits.

**Acceptance Criteria**

* Journal entries are generated for all financial transactions with correct GL mapping.
* AP/AR data is synchronised daily without manual intervention.
* All sales orders and POs are reflected in the accounting system within 24 hours.

### 5.10 Operational Analytics & Alerts

**Description:** Provide dashboards and alerts for key performance indicators such as cycle‑count accuracy, order fulfilment times, vendor performance and tax liabilities.

**Key Features & Functionalities**

* **Dashboards:** Customisable dashboards by persona (GM, Ops Manager, Purchasing Lead, etc.), showing current KPIs, charts and trends.
* **Alerts & notifications:** Configurable threshold alerts (e.g., low stock, order delays, vendor lead time variance, tax liability approaching threshold).
* **Ad‑hoc reporting:** Allow users to build and save reports; export data to CSV/PDF.
* **Data warehouse integration:** Provide API/ETL access for advanced analytics tools.

**Acceptance Criteria**

* Dashboards display real‑time data; each persona can access relevant metrics.
* Alerts notify the appropriate user when thresholds are exceeded; logs are available for audit.
* Reports can be generated and exported without technical assistance.

## 6. Phase 2 Requirements

The following requirements are planned for Phase 2. They are not part of the MVP but are included for future planning and should be considered in the architecture.

### 6.1 Demand Forecasting & EOQ Optimisation

* **Description:** Use historical sales data, seasonality and promotions to predict future demand by SKU; recommend EOQ and reorder points accordingly.
* **Acceptance Criteria:** Forecast accuracy within ±10 % for the top 100 SKUs; reorder suggestions generated monthly; user can override forecasts.

### 6.2 Promotion Engine & Contract Pricing (B2B)

* **Description:** Configure promotions (discounts, buy‑one‑get‑one, free shipping) and customer‑specific contract pricing tiers for B2B customers.
* **Acceptance Criteria:** Promotions and contract prices are applied automatically during order entry; promotion stacking rules are supported; expiry dates enforced.

### 6.3 Light Manufacturing/Kitting with BOM Versioning

* **Description:** Support light manufacturing assembly and disassembly of kits; manage bill of materials (BOM) versions and track component consumption.
* **Acceptance Criteria:** Kits can be assembled/disassembled; BOM versions updated and effective‑dated; inventory for components and finished kits updates accordingly.

### 6.4 3PL Bidirectional Integration

* **Description:** Integrate with third‑party logistics providers via API or EDI to synchronise inventory, orders, shipments and returns.
* **Acceptance Criteria:** Inventory quantities at 3PL align with ERP; shipments created by 3PL update status and tracking automatically; returns processed via 3PL update inventory.

### 6.5 Customer Service Console with SLA Timers

* **Description:** Provide a unified console for customer service representatives to manage tickets, order issues and returns; track response and resolution times against SLAs.
* **Acceptance Criteria:** Tickets are logged and assigned; SLA timers displayed; escalations triggered when SLA thresholds are exceeded.

### 6.6 EDI with Large Vendors

* **Description:** Exchange purchase orders, invoices, ASNs and other documents via EDI with key vendors.
* **Acceptance Criteria:** EDI documents are transmitted and acknowledged automatically; error handling alerts users; trading partner requirements are configurable.

## 7. Non‑Functional Requirements

* **Performance:** The system must support up to 200 concurrent users; order processing latency ≤ 2 seconds; inventory updates propagate within 1 minute.
* **Scalability:** Modular architecture to add new modules (e.g., manufacturing) without system downtime; support additional warehouses and 3PLs.
* **Availability:** 99.9 % uptime with scheduled maintenance windows.
* **Security:** Role‑based access control (RBAC) for all modules; data encryption at rest and in transit; audit logs.
* **Compliance:** Adhere to OSHA and DOT regulations for hazardous materials; comply with tax laws; support audit trails.
* **Internationalisation:** Initially US‑only; architecture should allow future localisation (currency, language, tax).

## 8. Assumptions

* Existing web storefront, Amazon and POS systems provide API access for integration.
* Users will be trained on new workflows and new roles will be defined where needed.
* The accounting system supports API integration for GL/AP/AR synchronisation.
* Carrier APIs and EDI specifications are available for shipping and vendor integration.

## 9. Dependencies & Risks

* **Vendor data accuracy:** Success depends on accurate lead time, MOQ and cost data from suppliers.
* **Integration complexity:** Multiple third‑party systems (web store, Amazon, POS, 3PL, accounting) may increase integration effort.
* **Change management:** Users may resist new processes; training and change management are critical.
* **Regulatory changes:** New tax jurisdictions or hazmat regulations could impact design.
* **Data migration:** Legacy data quality must be assessed; migration plan required.

## 10. Acceptance & Success Metrics

The project will be considered successful when the following criteria are met:

* Inventory accuracy maintained at or above 98 % for three consecutive months.
* 95 % of orders processed and shipped within 24 hours (business days) for three consecutive months.
* 80 % reduction in purchase order lead‑time variance through automation and vendor management.
* All products available to promise across channels with no oversells.
* Tax reports filed accurately on time; no compliance penalties.

*End of Document*