



Pharma Manufacturer & Distributor – AI ERP TicketingOS

API / Formulation · Batch Manufacturing · Quality Control · Cold Chain · Wholesale Distribution

GMP · WHO GDP · Batch traceability · Expiry management · 3PL integration

1. Master Pharma Execution Flow (Batch/Lot-Driven)

ID	Dept	Process	Activity	Action	Progress %
8001	Sales	ORDER	Customer PO	Distributor / hospital / pharmacy order	5
8002	Procurement	RAW MATERIAL	API / excipients purchase	Active pharmaceutical ingredients, packaging	10
8003	QA/QC	INWARD	Raw material testing	Identity, purity, potency, microbial	12
8004	Inventory	STORAGE	Cold / ambient store	2-8°C for biologics; ambient for dry powders	15
8005	Production	BATCH MANUFACTURING	Granulation / blending	API + excipients mixing, wet/dry granulation	25

ID	Dept	Process	Activity	Action	Progress %
8006	Production	COMPRESSION / FILLING	Tablet / capsule / liquid	Tablet press, capsule filler, liquid filling line	35
8007	Production	COATING / PACKAGING	Film coating, blister / bottle	Coating pan, blister pack, labelling	50
8008	QA/QC	IN-PROCESS	Assay, dissolution, hardness	HPLC, dissolution tester, Friability	55
8009	Production	FINAL PACKING	Cartoning & batch coding	Batch no., expiry, MRP, barcode	65
8010	QA/QC	FINAL INSPECTION	Stability sample, sterility (if injectable)	Retain samples, release certificate	75
8011	Inventory	WAREHOUSE	Finished goods storage	FEFO – first expiry first out	80
8012	Distribution	ORDER PICKING	Pick & pack	Barcode scan, batch allocation to order	85
8013	Logistics	COLD CHAIN DISPATCH	Reefer / ambient truck	Temperature data logger, e-way bill	90
8014	Delivery	TO DISTRIBUTOR	POD & temperature check	Customer signs, uploads temperature log	95
8015	Finance	INVOICE	Final billing	GST (5/12/18% slab), credit term settlement	100

2. Product Wise Manufacturing Workflows

Tablets / Capsules

Weigh API →
Granulate → Dry →
Blend → Compress →
Coat → Blister →
Carton

Liquid Orals (Syrups)

Purified water →
Dissolve API → Add
preservatives → Filter
→ Fill → Seal → Label

Injectables (vials)

Washing →
Sterilisation →
Aseptic filling →
Lyophilisation (if
powder) → Capping
→ Visual inspection

Distribution (Wholesale)

Order from hospital
→ Batch expiry check
→ Cold pack (if
needed) → Dispatch
→ Reverse logistics
for returns

Critical Quality Control Points (GMP / WHO)

- **Raw material:** COA verification, residual solvents, heavy metals.
- **In-process:** Blend uniformity, tablet hardness, disintegration time.
- **Finished product:** Assay (95-105%), dissolution, microbial limits, sterility.
- **Cold chain:** 2-8°C continuous monitoring – auto alarm if deviation.
- **Expiry management:** Block dispatch if within 6 months of expiry (policy).
- **Recall readiness:** Every batch traceable to raw material lots and customers.

3. Milestone-Based Payment Release (Pharma)

Stage	Condition	Payment %	Applicable For
Order confirmation	PO + advance agreed	20% advance	Export / bulk tender
Raw material procurement	API inward & QC passed	25%	Contract manufacturing
Batch manufacturing complete	In-process QC passed	20%	All
Final packing & QC release	COA issued, stability samples taken	25%	All
Dispatch & delivery	POD + temperature log	10%	All

Typical terms: 20% advance, 50% against dispatch, 30% after delivery & quality acceptance.

4. ERP Module Mapping (Pharma)

Procurement
(API /
excipients)

Production
(BOM, batch,
granulation,
compression)

QA/QC
(LIMS,
stability,
dissolution)

Inventory
(FEFO,
cold
chain,
expiry
alert)

Distribution
(wholesale,
hospital,
3PL)

Logistics
TMS (cold
chain,
GPS,
POD)

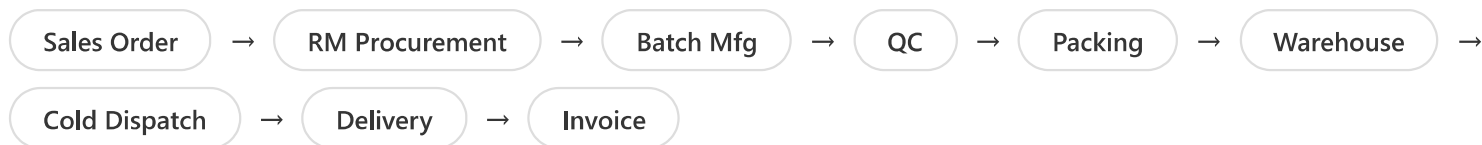
Finance (GST, excise, credit terms)

AI Engine (demand forecast, expiry prediction)

5. AI-Based Pharma Automation (TicketingOS)

Function	AI Automation
Expiry prediction & alert	AI forecasts which batches will expire before sale → auto discount / donation ticket
Cold chain anomaly	Reefer deviation → auto SMS to QA & logistics, blocks delivery until resolution
Demand forecasting (distributor)	Historical sales + seasonality + disease outbreak data → auto replenishment PO
Batch release recommendation	QC data (assay, dissolution) → AI passes/fails batch, suggests rework if borderline
Recall simulation & traceability	AI finds all customers of a raw material lot in seconds, generates recall communication
Visual inspection (injectables)	AI camera detects particles, cracks in vials → auto reject at 600 vials/min

6. Final Pharma ERP + TicketingOS Architecture



AI TicketingOS: AI Expiry Alert → AI Cold Chain → AI Demand Forecast → AI Batch Release → AI Recall → AI Visual QC

Batch Traceability (GS1 / DSCSA / Indian D&C Act)

Raw material lot – API batch, supplier COA

Manufacturing batch – unique batch no., date, equipment, operator

Final pack – barcode with batch, expiry, GTIN

Cold chain logger – temperature profile linked to batch

Recall ready – full chain < 2 min

Pharma Manufacturing Dashboards

- Batch yield % (actual vs BOM)
- First-pass QC release rate (target >98%)
- OEE for compression / filling lines
- Expiry at risk value (RM + FG)
- Cold chain compliance % (2-8°C trips)
- On-time delivery to distributors
- Supplier API rejection rate

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