



THE AGRICULTURAL CHEMICALS GUIDE

The right active. A clean line. Every pack accounted for.

From active ingredient to shipped pack, record request and recall

A capability and evaluation guide for formulators, toll manufacturers and repackagers of crop protection products, adjuvants and other agricultural chemicals who want materials, formulation, cleaning, labels and distribution in one connected record.



ACTIVE TO PACK

CLEAN LINE, RIGHT LABEL

RECORDS AND RECALL

Global edition / October 2026

v5ultimate.com

Scope: practical orientation, not legal advice. Photos are staged; batches, values and numbers are worked examples. Your own PPE must follow the product's label and safety data sheet. Diagrams show control concepts, not V5 screenshots.

INSIDE THE GUIDE

Active to pack, batch by batch.

Agricultural chemical plants turn concentrated actives and co-formulants into products used on farms. This guide follows one batch, AG-5104, a herbicide concentrate filled into 5 L packs, and shows what each step must leave behind.

01 / FRAME

pp. 03–05

Rules, records, one day

Which rules apply where, U.S. establishment registration, production reports and books and records, EU and Canadian rules, hazard communication; one production day.

02 / MATERIAL

pp. 06–08

Supplier to store

Active and co-formulant specifications, supplier approval, goods-in with the receipt details the U.S. rule names, segregated storage, status and retest dates.

03 / MAKE

pp. 09–16

Formulate, clean, fill, label

Approved formulations, checked charging, in-process checks, cleaning between products, lab release, holds, filling and pack reconciliation, labels.

04 / CONTROL

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Fix, respond, change, train

Corrections and CAPA, complaints, formulation and supplier changes, people and permissions.

05 / SUSTAIN

pp. 21–27

Equipment, trace, share

Vessels and fillers, scales and meters, yield and OEE, shipment records and trace, a mock recall, portals, records and AI.

06 / APPLY

pp. 28–36

Evidence map, tools, sources

Evidence map, four worksheets, roadmap, four-week evaluation and 15 linked sources.

Who it is for. Plant, quality, regulatory and technical managers, formulators, operators, warehouse and dispatch teams, toll manufacturers and repackagers, and anyone choosing a system for agricultural chemical production.

How to read it. Every operational page ends with a teal Where V5 fits panel. Everything above it is practice and regulation, useful whether or not you ever use V5. U.S. pesticide rules are covered in most detail; other markets are summarised. Check the current text for your products and markets.

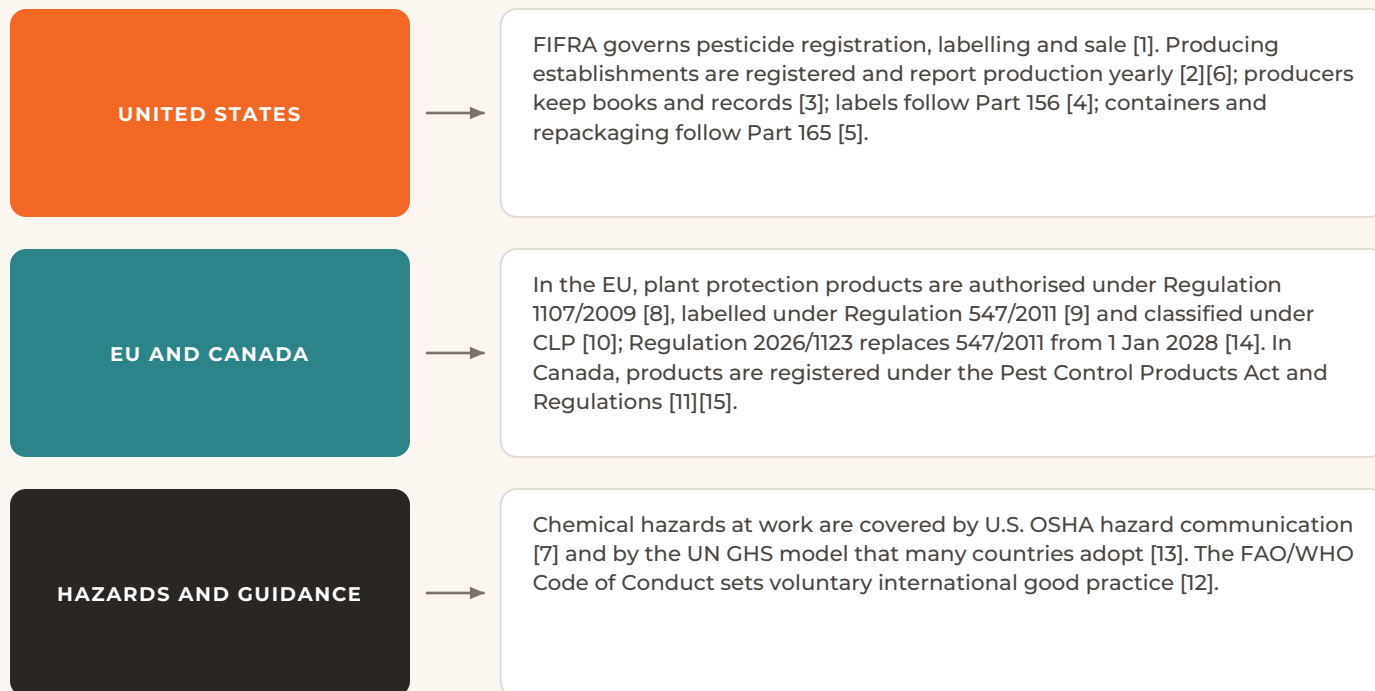
WHERE V5 FITS

V5 records the receiving, charging, cleaning, testing, filling, labelling and shipping work your procedures define, and links it to batches, lots and customers. It does not register products, classify hazards, approve labels, file establishment reports, release product or decide recalls. Your regulatory and quality teams do.

FRAME / 01

Which rules reach your products?

Pesticides and plant protection products are among the most tightly regulated chemicals. Products are registered or authorised before sale, and the plants that make them carry their own duties.



The registration is the product

A registered or authorised product has an approved formula and label. Production must match them.

Not every chemical is a pesticide

Fertilisers, adjuvants and biostimulants follow different rules in different markets. Check each product.

Write the scope down

Products, markets, registrations, establishments and customer standards, as a controlled document with an owner.

WHERE V5 FITS

Keep the scope list, registrations, approved formulas and procedures as controlled documents with revisions, owners and review dates. V5 does not decide which rules apply, register products or classify hazards.

Sources: [1], [2], [4], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15] (linked on pages 35–36)

FRAME / 02

U.S. plants: register, report, keep records.

In the U.S., each producing establishment is registered with EPA, reports what it produced each year and keeps production and distribution records [2][3][6]. The details below are from the current regulation text.

ANNUAL PRODUCTION REPORT, 40 CFR 167.85 [2]

Who	Each producer operating an establishment; custom blenders are not required to report production
What	Amount of each product produced and sold or distributed last year, and estimated this year
When	Within 30 days of registering the establishment; then by March 1 yearly, even with no production
Foreign sites	Report only products exported to the United States

BOOKS AND RECORDS, 40 CFR 169.2 (SUMMARY) [3]

Production	Product name, EPA Reg. No., amount per batch, batch ID on all production control records	2 years
Receipts	Brand or active name, shipper, carrier, date and quantity received	2 years
Shipments	Brand or active name, consignee, carrier, date and quantity shipped	2 years
Inventory	Types and amounts in stock that you produced	Until a newer inventory
Disposal	Method, dates, location, types and amounts disposed of	See rule

Shipping and receiving documents such as invoices and freight bills that hold the required details count as records [3]. Exports, guarantees, restricted-use advertising and experimental-use products have further items; read the full section.

WHERE V5 FITS

Batch, receipt, shipment and stock records hold the fields Part 169 names, linked by batch and lot, and production totals per product and year can be reported from them for your team to check. V5 does not file EPA reports or hold your establishment registration.

FRAME / 03

One production day.

A worked example: batch AG-5104, a herbicide concentrate, 6,000 L in mixing vessel MV-2, filled into 5 L packs. The previous product on the line was an insecticide. Times and values are an example only.

06:00	Cleaning of MV-2 and filler after the insecticide checked and released by QC
06:30	Batch record issued from formulation rev 4; label stock rev C issued
07:00	Active lot A-7731 weighed and scanned at the charge; identity confirmed
08:30	Co-formulants and solvent charged; mixing time recorded
09:30	In-process density and appearance in range; sample to lab
11:00	Lab assay for active content in specification; QC releases bulk
12:00	Filling: check weights, cap torque, label and batch code verified
15:30	Packs and labels reconciled; pallets to finished stock

Herbicide after insecticide

Residues of one product in another can harm crops or break the registration. Cleaning is a release step.

Orange is where risk lives

The line release, active content and pack reconciliation decide whether the product matches its label.

Recorded as it happens

Who charged what, which lot, how much, which label, when.

WHERE V5 FITS

Batches sit on the schedule with product, vessel, filler and materials. Kiosk steps capture cleaning checks, charges, readings, samples and pack counts as the batch runs, and the batch record grows with them.

MATERIAL / 01

Specify the active, approve the source.

The active ingredient carries the product's registration. Its source, purity and impurity profile are often part of what was approved, so a new source is rarely a simple purchasing decision.

Active

Name, source, purity, impurities

Co-formulants

Solvents, surfactants, carriers

Registration link

Approved source and formula

Hazards

SDS, classification, storage

Packaging

Drum, IBC, bag, lot label

Source is part of the approval

Registrations often name or assess the active's manufacturing source. Check with your regulatory team before changing it.

Co-formulants matter too

Some markets restrict specific co-formulants. Changing one can change the product.

Safety data sheets

Actives, co-formulants and solvents need current safety data sheets where hazard communication rules apply [7][10].

WHERE V5 FITS

Approved supplier lists, qualification, documents and scorecards tell receiving which supplier and source is approved for which material. Suppliers can upload certificates and data sheets through the supplier portal where configured; a person reviews each before it counts.

Sources: [7], [10] (linked on pages 35–36)

MATERIAL / 02

Goods-in decides what can be charged.

A drum of active looks like every other drum. Only its label, certificate and test say what it is. What is captured at receipt starts every trace and is a record in its own right [3].



Check against the order

Supplier, material, source and quantity match the purchase order and the approved list.

Capture the receipt

In the U.S., receipt records show the material, shipper, carrier, date and quantity [3].

Verify identity

Compare the certificate with the specification and test identity or assay when your plan says.

WORKED EXAMPLE: RECEIPT

Material	Herbicide active, technical grade, 16 drums
Supplier / lot	Approved source S-022, lot A-7731
Shipper / carrier	Recorded from the delivery documents
Certificate	Purity within specification; identity test planned
Status	Quarantine, then released by QC

WHERE V5 FITS

Receiving records supplier, material, lot, containers, carrier, date and quantity, and places material in quarantine until release. Certificate values can be read from an upload for a person to confirm; AI never releases a lot.

Sources: [3] (linked on pages 35–36)

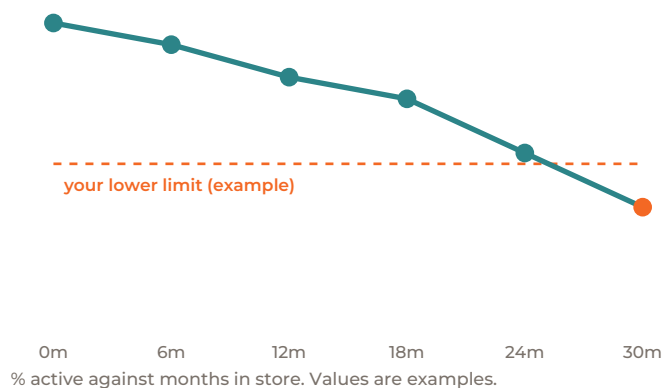
MATERIAL / 03

Store it apart, use it in date.

Concentrated actives and solvents need segregated, often banded storage. Some actives degrade over time, so retest dates decide whether a lot can still be used.



ACTIVE LOT A-6604 · ASSAY AT RETEST (WORKED EXAMPLE)



Retest, don't guess

Set retest intervals from stability data, and block use after the date until a new result is in.

Keep products apart

Separate herbicides from other products where cross-contamination could harm crops, and keep incompatible chemicals apart.

Containers and spills

Part 165 sets U.S. container and containment rules for some sites and products [5]; check which apply.

WHERE V5 FITS

Warehouse locations, lot status and retest or expiry dates support FEFO picking and holds; a lot past its retest date can be blocked at picking. Storage areas and segregation rules can be set per location.

Sources: [5] (linked on pages 35–36)

MAKE / 01

The approved formula, under revision.

The formulation is the recipe the registration approved: which active, which co-formulants, in what amounts and order. The batch record is issued from its current approved revision.



FORMULATION HC-240 · REV 4 · PER 6,000 L BATCH (WORKED EXAMPLE)

ORDER	MATERIAL	TARGET	TOLERANCE
1	Solvent	Per formula	Per formula
2	Herbicide active (as pure)	Per formula	Tight
3	Emulsifier blend	Per formula	Per formula
4	Stabiliser	Per formula	Per formula
5	Solvent to volume	6,000 L	Per formula

Adjust for purity

Technical actives vary in purity. Charge from the lot's assay to hit label content.

Order and time

Order of addition, mixing time and temperature can decide whether an emulsion is stable.

Confidential formula

Registered formulas are confidential business information; limit who can see them.

WHERE V5 FITS

Formulations live as controlled recipes with revisions, approvals and restricted access. Batch records are issued from the current approved revision, and the active charge can be calculated from the released lot's assay for a person to confirm.

MAKE / 02

Charge the right lot, in the right amount.

Most formulation errors are wrong material, wrong amount or wrong order. Scanning and weighing at the charge point stops them before they are mixed in.

CHARGE CHECKS, AG-5104 (WORKED EXAMPLE)

Vessel released	MV-2 cleaning approved	OK
Active lot	A-7731 released, in date	OK
Active amount	Calculated from assay	OK
Emulsifier lot	E-2208 scanned	OK
Stabiliser	Wrong item scanned	Block

The wrong stabiliser drum is blocked at the scan; the operator fetches the right lot and the charge continues.



Second check for actives

Many plants have a second person or a scale-linked check confirm the active charge.

Record actual amounts

Record what was charged, not just that it was. Part 169 asks for amounts per batch [3].

Dust and vapour

Charging concentrated actives needs the exposure controls and PPE the SDS and your risk assessment set.

WHERE V5 FITS

Weigh and dispense steps run at the kiosk with lot scanning, target and tolerance checks and blocks on the wrong or unreleased material; supported connected scales send weights. A second-person check can be required where configured.

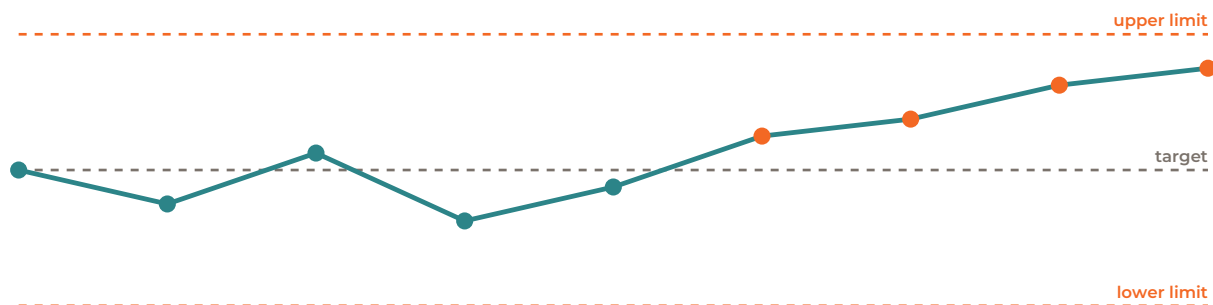
Sources: [3] (linked on pages 35–36)

MAKE / 03

Check before you fill.

Density, pH, viscosity, appearance and emulsion stability tell you the bulk is behaving before the lab assay and before a single pack is filled.

HC-240 · DENSITY AT 20 °C, LAST 9 BATCHES (WORKED EXAMPLE)



g/mL. Four rising batches: still in range, but worth a look at solvent and active lots.

Plan the checks

What, when and with which instrument, per product, written in the batch record.

Trends across batches

A drift over several batches points to a material or process change, not bad luck.

Stability matters

Emulsion or suspension stability checks catch products that separate in the farmer's tank.

WHERE V5 FITS

In-process checks run as kiosk steps with specifications; results feed control charts in quality, and an out-of-spec result can hold the batch. Supported connected meters and instruments can send readings where configured.

MAKE / 04

A clean line between products.

A trace of herbicide in an insecticide can damage the crop it is sprayed on. Cleaning between products, and proving it worked, is one of the most important controls in an agricultural chemical plant.



CHANGEOVER, INSECTICIDE TO HERBICIDE (WORKED EXAMPLE)

1 Drain and flush	Vessel, lines, filler
2 Strip parts	Valves, filters, nozzles
3 Wash and rinse	Per cleaning procedure
4 Inspect	Visual, photo on tablet
5 Rinse sample	To lab if required
6 Release	QC approves the line

Plan the sequence

Schedule products so the most sensitive follow the least risky, and set stricter cleaning where the risk is high.

Limits come from your team

Acceptable residue limits and test methods are set by your technical team; this guide gives none.

Rinsate is a waste

Record how cleaning rinsate is reused or disposed of; U.S. disposal records are part of Part 169 [3].

WHERE V5 FITS

Cleaning and changeover run as kiosk checklists with photos, sample IDs and a QC release, and the next batch can be blocked until the line is released. Cleaning history links to equipment so you can see what ran before.

Sources: [3] (linked on pages 35–36)

MAKE / 05

Test, review, release.

The lab confirms the active content matches the label and the product meets its specification. A named person reviews the whole batch record before the product can ship.



RELEASE REVIEW, AG-5104 (WORKED EXAMPLE)

Line release	Cleaning approved 06:00
Materials	Released lots, in date
Charges	All within tolerance
In-process	Density, pH in range
Assay	Active content in spec
Decision	Release by QC

Tests, methods and limits are yours and your registration's.

Label content is a promise

The ingredient statement on the label gives the active content. The assay proves the batch matches it.

Retained samples

Keep a retained sample of each batch for complaints and enquiries.

Certificates

Customers and distributors often ask for a certificate of analysis per batch.

WHERE V5 FITS

Lab & QC holds methods, specifications and results; release review can draw the batch record into one place, and the release is recorded by an authorised person. Certificates can be generated from batch data. V5 does not approve results or release product.

MAKE / 06

A hold that actually holds.

An out-of-specification result, a missed cleaning step or a label mix-up means product must stop. A hold that only lives in an email does not stop a forklift.

A WORKED HOLD

Batch AG-5097 assays at the low end and a retest is out of specification. The bulk and **620 packs already filled** are held. Investigation finds the active charge used the certificate purity rather than the in-house assay. QC decides, with the regulatory team, to adjust the bulk by an approved procedure; the filled packs are reworked. Every step and decision is recorded.

HOLD SCOPE, AG-5097 (WORKED EXAMPLE)

Bulk in MV-1	4,200 L held
Packs filled	620 x 5 L held
Packs shipped	0
Active lot used	A-7650, assay reviewed
Decision by	QC manager with regulatory

Hold by scope

Hold the bulk, every filled pack and anything made with the same suspect material.

One named decision

Only roles you authorise can release, rework or reject, with a reason kept.

Rework follows a procedure

Rework and blending must stay within the approved formula; check with your regulatory team.

WHERE V5 FITS

Lots and batches carry status; a held lot is blocked at picking and at the dispatch scan according to your rules. Holds link to the nonconformance that caused them, and release, rework or rejection is recorded by an authorised person.

MAKE / 07

Fill and count every pack.

Filling turns released bulk into labelled packs. Check weights prove each pack holds what the label says, and reconciliation proves no bulk, pack or label went missing.



RECONCILIATION, AG-5104 (WORKED EXAMPLE)

Bulk released	6,000 L
Filled into packs	1,180 x 5 L = 5,900 L
Line hold-up and flush	70 L, recorded to rinsate
Samples	30 L (lab and retained)
Unaccounted bulk	0 L
Labels issued / used / spoiled / returned	1,250 / 1,180 / 12 / 58

Net contents

U.S. labels state net contents [4]. Check weights or volumes prove each pack meets it.

Labels must balance

Issued labels equal used plus spoiled plus returned. A gap is a possible mislabelled pack.

Container rules

U.S. Part 165 has container and repackaging requirements for some products and sites [5].

WHERE V5 FITS

Filling runs as kiosk steps with check weights, torque and label verification; supported connected check-weighers send results. Pack and label reconciliation is calculated at batch close, and a gap holds the batch until explained.

Sources: [4], [5] (linked on pages 35–36)

MAKE / 08

The label is part of the product.

A pesticide label carries legal use directions and hazard information. Using the wrong version, or the right label on the wrong pack, is a serious failure.



U.S. LABEL CONTENTS, 40 CFR 156.10(a) (SUMMARY) [4]

- Product name, brand or trademark
- Producer, registrant or person for whom produced
- Net contents
- EPA registration number
- Producing establishment number
- Ingredient statement
- Hazard and precautionary statements
- Directions for use
- Use classification, where applicable

Approved text only

Label content is approved with the registration. Changes go through your regulatory team first.

EU and Canada

EU labels follow 547/2011 and CLP today [9][10]. From 1 Jan 2028 Regulation 2026/1123 applies; labels based on earlier applications stay under 547/2011, and all need a digital label by 1 Jan 2030 [14]. Canada has its own rules [11][15].

Batch code on every pack

The batch code links each pack to its batch record and to the customers who received it.

WHERE V5 FITS

Label templates are controlled with revisions and approval; printing pulls batch codes and dates from the batch, and the kiosk verifies the label version at the line. V5 does not write or approve label text.

Sources: [4], [9], [10], [11], [14], [15] (linked on pages 35–36)

CONTROL / 01

Correct now, prevent next time.

A wrong drum blocked at the scan is a correction. Three assay problems in a quarter need a cause. Telling the two apart keeps the system honest and the paperwork proportionate.

CORRECTION

Act on the spot: fetch the right lot, repeat a check, hold the batch. Record what happened, what was done and by whom.

CORRECTIVE ACTION

When it repeats, reaches a customer or shows a weak process: find the root cause, fix it, check the fix worked, and update the procedure, formula calculation or training.

WORKED EXAMPLE: ESCALATION

		Corrections
Q2	Three batches assay near the low limit	
Review	Trend reviewed; nonconformance opened	NC-114
Cause	Charge calculated from certificate purity	Found
Action	Charge uses in-house assay; check added	Done
Verify	Assays centred over the next 10 batches	Closed

The FAO/WHO Code of Conduct sets out voluntary good practice for manufacturers, including quality control [12].

WHERE V5 FITS

Nonconformances link to batches, lots, equipment and people, and can be escalated to CAPA with root cause, owners, due dates and effectiveness checks. AI can suggest a classification or draft a summary for a person to edit.

Sources: [12] (linked on pages 35–36)

CONTROL / 02

Complaints, causes and lasting fixes.

Crop damage after spraying, product that separates in the tank, a leaking pack, a wrong label. Each complaint links to a batch, its materials, its cleaning history and its customers.

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graph TD; Contain --> Investigate; Investigate --> Act; Act --> Verify; Verify --> Contain; CAPA((CAPA))
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Start from the batch code
It gives the batch record, materials, cleaning before it, tests and retained sample.

Test the retained sample
It shows whether the product left the plant as specified.

Know your reporting duties
Some markets require reports of certain incidents or adverse effects. Your regulatory team decides; V5 does not.

WORKED EXAMPLE: CAPA FROM A CUSTOMER COMPLAINT

Problem	Distributor reports product separating in spray tanks
Linked batches	AG-5061 and AG-5066
Cause found	Emulsifier lot from new site; not assessed as a change
Action	Emulsifier site changes go through change control
Effectiveness	Stability test added; no repeats over 6 months
Status	Closed after review

WHERE V5 FITS

Complaints link to batches, lots, cleaning and retained samples; CAPA links to its sources, with root-cause workflow, owners and effectiveness checks. Supplier corrective action requests can go through the supplier portal where configured.

CONTROL / 03

Change on purpose.

A new active source, a different co-formulant, a revised label or a new vessel can each change the product or its registration status. Changes need assessment before they reach production.



IMPACT QUESTIONS FOR CHANGE CC-061: SECOND ACTIVE SOURCE (WORKED EXAMPLE)

Registration	Is the new source covered, or does it need regulatory action?	OPEN
Formula	Does purity or impurity profile change the charge?	Check
Customers	Do distributors need notice?	Yes
Stock	What happens to existing material?	Use up
Effective	From which batch?	AG-5200

Regulatory first

Your regulatory team decides whether a change needs notification or amendment before it is made.

Labels follow change

An approved label change needs new label stock and withdrawal of old stock on a set date.

Train before you run

Changed formulas and instructions are read and understood before the first changed batch.

WHERE V5 FITS

Change control links requests to formulations, specifications, labels and suppliers with impact assessment, approvals and effectivity; approved changes release new revisions and can assign read-and-understood training.

CONTROL / 04

Trained, protected and permitted.

Operators handling concentrated actives need training in the process and in safe handling. Who may charge actives, release a line or release a batch must be clear and enforced.

Training to the task

Train on the batch record, cleaning procedure and instruments for each product, with records of who was trained on which revision.

Hazard training

Hazard communication rules require training on chemical hazards and safety data sheets where they apply [7].

PPE from the SDS

PPE for charging and cleaning follows the SDS and your risk assessment, not habit.

EXAMPLE COMPETENCE AND PERMISSION MATRIX

	Charge materials	Charge active	Release line	Release batch
Operator	Trained	Not permitted	Not permitted	Not permitted
Senior operator	Trained	Trained	Not permitted	Not permitted
QC analyst	Not permitted	Not permitted	Trained	Not permitted
QC manager	Not permitted	Not permitted	Trained	Trained

Seasonal peaks. Agricultural chemical demand is seasonal, and temporary staff arrive at the busiest time. Train and qualify them before the peak, not during it.

WHERE V5 FITS

Document control keeps batch records and procedures under revision with read-and-understood training. The skills matrix can block untrained people at the kiosk where configured, and role permissions decide who can record, approve or release.

SUSTAIN / 01

Look after vessels, mills and fillers.

Mixing vessels, mills, pumps, filters and fillers wear, leak and drift. Planned maintenance and a record of what ran in each piece of equipment protect quality and people.

EQUIPMENT RECORD, MIXING VESSEL MV-2 (WORKED EXAMPLE)

Last product	Insecticide IN-110, cleaned and released	OK
PM due	Agitator seal and gearbox, quarterly	12 days
Last repair	Bottom valve replaced	Done
Dedicated?	No; shared between herbicides and insecticides	Note
Next action	Seal inspection after leak report	OPEN

WHY 'LAST PRODUCT' MATTERS

A leaking agitator seal can hold residue that cleaning does not reach. Knowing which products ran in MV-2 since the seal started leaking tells you which batches to review. Equipment history and batch history together answer that question.

Dedicated or shared

Some plants dedicate equipment to herbicides or to sensitive products. Record which is which.

Maintenance is a risk too

Opening equipment for repair can spread residue. Clean before and after.

Spare parts

Seals and gaskets must suit the chemistry. Record which parts were fitted.

WHERE V5 FITS

Equipment records hold PM schedules, repairs, spare parts and the batches each item ran, so maintenance and product history sit together. Work orders are tracked in maintenance. Predictive failure analytics are not offered today.

Trust the scales and meters.

Every charge, check weight and assay is only as good as the instrument. Floor scales, flow meters, check-weighers, density meters and lab instruments need checks you can show.

DAILY AND PERIODIC CHECKS (WORKED EXAMPLE)

Floor scale FS-03 (check weight)	Within your tolerance	OK
Flow meter FM-1	Calibration certificate current	OK
Check-weigher CW-2	Test pack accepted and rejected	OK
Density meter DM-1	Reference check failed	HOLD
HPLC-2	System suitability passed today	OK

WHEN AN INSTRUMENT FAILS

Density meter DM-1 fails its reference check. Which batches did it measure since its last good check? Those results are reviewed and re-measured on another instrument if they were close to a limit. DM-1 is taken out of use until repaired and checked.

Identify every instrument

A unique ID on each, recorded with each reading, makes the look-back possible.

Flow meters drift

Where actives are charged by meter, regular verification against a scale matters.

Lab instruments too

Chromatographs and balances need calibration and system checks.

WHERE V5 FITS

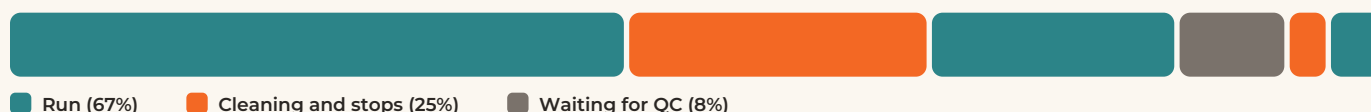
Each scale, meter and instrument can have an equipment record with calibration schedule, results, certificates and use history. Out-of-calibration equipment can be blocked at the kiosk, and checks link to the results they produced.

SUSTAIN / 03

Yield, changeovers and where the day goes.

In agricultural chemical plants, changeovers and cleaning often take more time than mixing. OEE and a batch yield balance show where time and material go.

FILL LINE 1 • ONE 8-HOUR SHIFT (WORKED EXAMPLE)



WORKED OEE ARITHMETIC

Availability

67%

5.36 h run of 8 h planned

Performance

92%

packs made ÷ rated speed

Quality

99%

good packs of packs made

OEE

61.0% $0.67 \times 0.92 \times 0.99$

WORKED ACTIVE BALANCE FOR AG-5104 (EXAMPLE)

Active charged (as pure) gives a theoretical content for 6,000 L. Packs filled hold 5,900 L at the assayed content; samples 30 L; hold-up and flush 70 L. Balance closes to 0 L. Bulk to pack yield = $5,900 \div 6,000 = 98.3\%$.

Cleaning is the big stop

Smarter product sequencing often saves more time than faster filling.

Waiting for the lab

Time waiting for QC release is a planning problem worth measuring.

Actives are expensive

A small, steady loss of active over many batches is worth finding.

WHERE V5 FITS

Downtime reasons, cleaning times, pack counts and OEE come from events your team and supported connected equipment record, with reports and dashboards where your plan includes them. AI demand and yield forecasting and process anomaly detection are coming soon, not available today.

SUSTAIN / 04

Trace both ways, then act.

An active supplier warns that lot A-7731 may contain an impurity above specification. Which batches, which packs, which distributors, and what is still in your warehouse?



Shipment records

U.S. shipment records show the product, consignee, carrier, date and quantity shipped [3].

Distributors and retailers

Most products reach farms through distributors. Agree how you will reach them before you need to.

Recalls and stop-sale

Regulators can order stop-sale or recall in many markets; your regulatory team leads the response.

WHERE V5 FITS

Genealogy links active and co-formulant lots to batches, packs, pallets and shipments, so a trace runs forward from a material lot or back from a batch code, with consignees and quantities listed and exportable. Recall decisions stay with your team.

Sources: [3] (linked on pages 35–36)

SUSTAIN / 05

Time a mock recall, drum by drum.

Pick an active lot nobody expects, start the clock, and see how long it takes to account for every kilogram and every pack made from it.

- 0:00 Start: active lot A-7731 named; quality manager opens the trace
- 0:04 Batches found: AG-5104 and AG-5110
- 0:10 Packs, pallets and consignees listed from shipment records
- 0:16 Packs and active still in the warehouse placed on hold
- 0:24 Distributor contacts confirmed
- 0:35 Balance: received vs charged vs in packs vs stock

BALANCE FOR ACTIVE LOT A-7731 (WORKED EXAMPLE)

Received	16 drums, 3,200 kg
Charged to AG-5104	1,240 kg
Charged to AG-5110	1,180 kg
Still in drums	779 kg in 4 drums, held
Retained sample	1 kg
Unaccounted	0 kg

Times are an example of what to measure, not a benchmark. Include your distributors: a trace that stops at your dock does not take a pack off a farm-store shelf.

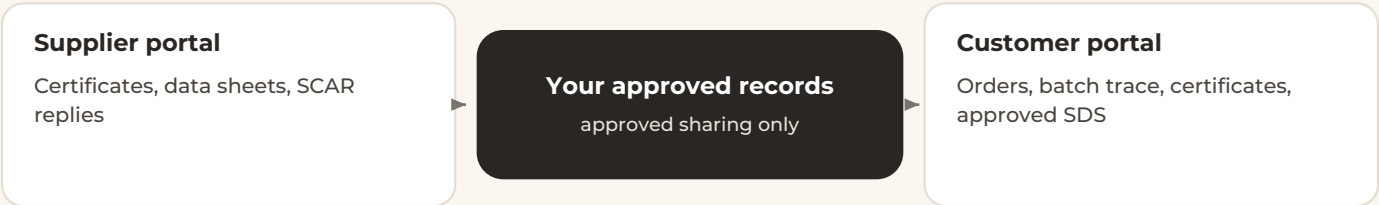
WHERE V5 FITS

Trace reports list batches, packs, pallets, consignees and quantities from a material lot or a batch code, and stock can be held from the trace. Mock recalls can be logged as exercises with times and findings that feed CAPA.

SUSTAIN / 06

Suppliers, customers, shared well.

Distributors ask for certificates, safety data sheets, ASNs and batch data; toll customers want batch records; active suppliers send certificates and answer corrective action requests. Each sees only what you approve.



Toll manufacturing

When you make a registrant's product, agree who holds which records and how batch records are shared.

Certificates per batch

Send certificates with each delivery from the batch record, not a spreadsheet.

Review before it counts

A supplier upload is a claim until a person reviews it against the specification.

A SHARING POLICY TO AGREE BEFORE ANYONE LOGS IN

Certificates of analysis	With each delivery	Customer QA
Safety data sheets	Current approved versions	Customer
Batch records (toll)	Agreed scope only	Registrant
Confidential formulas	Never	—
Supplier certificates and SCARs	Reviewed before they count	Your QA

WHERE V5 FITS

Customer and supplier portals give branded access to what you approve. EDI and ASN exchange (X12 850, 855, 856, 810) with GSI-128 SSCC labels is available where your plan includes it. Portal scope depends on configuration; check the current plan comparison.

SUSTAIN / 07

Trustworthy records. Honest AI.

Electronic records help only if they are made at the time, by a known person, with actual values, and if AI stays a helper under human control.

What a record holds

Who, what, which batch or lot, the measured value and limit, the instrument used, and when. Corrections keep the original visible.

Ready when asked

U.S. producers must keep production and distribution records and make them available to EPA when asked [1][3].

Make them findable

A batch record, a shipment list or a trace is only useful if it can be produced quickly.

AI CAN HELP

- Read certificate values for a person to confirm
- Draft a cleaning procedure or instruction for approval
- Suggest a nonconformance classification or draft a summary
- Explain a batch's history in plain language
- Find records and screens faster

AI NEVER

- Classifies hazards or writes label text
- Decides registration or reporting duties
- Changes a formula on its own
- Releases a batch or decides a recall
- Predicts defects or yield today (forecasting is coming soon)

WHERE V5 FITS

Every record keeps who, what and when in an audit trail every plan can view; tamper-evident trails, electronic signatures and a validation pack are available where your plan includes them. AI features need configured provider access and human review.

Sources: [1], [3] (linked on pages 35–36)

APPLY / 01

Evidence map.

One page to check that every theme a customer, auditor or regulator may ask about has an owner and a record. Map it to the rules that apply to you [2][3][4][5][8][11].

THEME	TYPICAL EVIDENCE	WHERE IT LIVES IN V5	OWNER
Scope	Products, registrations, sites	Document control	Regulatory
Suppliers	Approved sources, certificates	Suppliers, portal	Purchasing
Receipts	Shipper, carrier, date, quantity	Receiving	Warehouse
Storage	Status, retest, segregation	Warehouse	Warehouse
Formula	Approved revision, access	Recipes	Technical
Charging	Lots, amounts per batch	Weigh & dispense	Production
Cleaning	Steps, samples, line release	Kiosk checklists	Quality
Testing	Assay, specs, release	Lab & QC	Quality
Packs and labels	Reconciliation, version	Batch close, labels	Production
Shipments	Consignee, carrier, quantity	Shipping	Dispatch
Equipment	PM, calibration, history	Equipment	Engineering
Trace and recall	Exports, mock recalls	Trace reports	Quality
Change	Impact, approvals	Change control	Regulatory
Training	Per revision and role	Skills matrix, docs	HR + QA

Plan inclusion varies; some areas need Professional or Enterprise. Confirm against the current plan comparison before you scope a project.

WORKSHEET 01

Could you produce your records today?

Pick one batch shipped last quarter. Time how long each record takes to find. Mark Yes, Partly or No, then note the gap and its owner.

	YES	PARTLY	NO
Batch record Product name, registration number, batch ID, amounts.	☐	☐	☐
Formula used Approved revision used for this batch is known.	☐	☐	☐
Material receipts Shipper, carrier, date and quantity for each lot.	☐	☐	☐
Charges Lots and actual amounts charged are recorded.	☐	☐	☐
Line release Cleaning before the batch was checked and released.	☐	☐	☐
Tests Assay and other results, and who released the batch.	☐	☐	☐
Reconciliation Packs and labels balance, gaps explained.	☐	☐	☐
Shipments Consignee, carrier, date and quantity for each shipment.	☐	☐	☐
Stock What is left of this batch, and where.	☐	☐	☐
Annual totals Production and distribution totals per product can be produced.	☐	☐	☐

NOTES AND OWNERS

WORKSHEET 02

Ready for a contamination alert?

Walk through a real or invented case: residue of one product is found in another. Mark Yes, Partly or No.

	YES	PARTLY	NO
Prevent Cleaning and sequencing rules exist for each product pair.	☐	☐	☐
Detect Rinse or product tests are planned where the risk is high.	☐	☐	☐
Scope Batches made on the same equipment since the last good clean are known.	☐	☐	☐
Hold Those batches can be held, including stock at distributors.	☐	☐	☐
Equipment Hidden residue sources such as seals and filters are checked.	☐	☐	☐
Decide A named person decides disposition with the regulatory team.	☐	☐	☐
Customers Distributors and users can be reached if product left the site.	☐	☐	☐
Report Your team knows which authorities may need to be told.	☐	☐	☐
Cause A corrective action with root cause follows.	☐	☐	☐
Records Every step, decision and result is in one record.	☐	☐	☐

NOTES AND OWNERS

WORKSHEET 03

Ask to see it work.

Questions for any software demonstration. Ask the vendor to show each one with your products and equipment, not a slide.

	SHOWN	PARTLY	NOT SHOWN
Wrong material Scan the wrong drum at the charge; show the block.	☐	☐	☐
Assay-based charge Show the active charge calculated from a lot's assay.	☐	☐	☐
Line release Try to start a batch before cleaning is released.	☐	☐	☐
Retest date Pick a lot past its retest date; show what happens.	☐	☐	☐
Hold Put a batch on hold; try to ship a pack from it.	☐	☐	☐
Reconciliation Close a batch with a label gap; show the result.	☐	☐	☐
Label version Release label rev D; show which batches use it.	☐	☐	☐
Records Produce receipts and shipments for one batch.	☐	☐	☐
Trace From an active lot, list batches, consignees and quantities.	☐	☐	☐
Audit trail Show who changed a recorded value, when and why.	☐	☐	☐

NOTES AND OWNERS

APPLY / 02

Roll out in phases.

Start where value is visible and risk is contained, often materials and records for one product family. Run old and new side by side until each phase is verified.

PHASE 1 Foundations

Scope, registrations, roles, formulations and procedures under document control, training records, equipment register for vessels, fillers and instruments.

PHASE 2 Material

Approved suppliers and sources, goods-in with receipt details, quarantine and release, segregated locations, retest dates.

PHASE 3 Make

Batch records with checked charging, in-process checks, cleaning and line release, lab results and release; paper kept in parallel.

PHASE 4 Pack and control

Filling and reconciliation, label control, holds, nonconformances and CAPA, complaints linked to batches, change control.

PHASE 5 Connect

Shipments, trace export, mock recalls, annual totals, customer and supplier portals, EDI and ASNs, OEE and yield review.

Plan around the season. Go live outside the peak production months, and finish training before seasonal staff arrive. Tell distributors early if certificates, labels or ASN formats will change.

WORKSHEET 04

Find your first improvement.

Score each area today: E evidenced, P partial, G gap. Start with the gap that carries the most risk to crops, people or your registration.

	E	P	G
Supplier approval Approved sources, certificates	☐	☐	☐
Receipts Shipper, carrier, date, quantity	☐	☐	☐
Storage Status, retest, segregation	☐	☐	☐
Formula control Approved revision, access	☐	☐	☐
Charging Scan, weigh, second check	☐	☐	☐
Cleaning Steps, tests, line release	☐	☐	☐
Testing Assay, specs, release	☐	☐	☐
Packs and labels Reconciled, right version	☐	☐	☐
Shipments Consignee and quantity	☐	☐	☐
Equipment PM, calibration, history	☐	☐	☐
Trace Both ways, timed, exportable	☐	☐	☐
Annual totals Per product, per year	☐	☐	☐

NOTES AND OWNERS

APPLY / 03

A fair evaluation in four weeks.

A practical way to test any system with your own people and one real product, without touching live records.

WEEK 1

Agree the product, vessel, filler and the five questions that matter most. Load suppliers, materials, the formula and specifications.

WEEK 2

Run a batch end to end with test data: receipt, cleaning release, charging, checks, lab, filling, labels, dispatch.

WEEK 3

Break it on purpose: wrong drum, lot past retest, skipped cleaning, label gap, failed instrument.

WEEK 4

Run a timed mock trace from an active lot with an export, and a records request for one batch. Review with every team.

Rules for the evaluation. Use test data only. Keep your current records and trace process live until a verified change is approved. Record what was shown, not what was promised.

ASK V5

“We formulate [herbicides / insecticides / fungicides / adjuvants] as [liquids / granules / powders] on [number] lines, [as registrant / as toll manufacturer]. Our hardest moment is [e.g. cleaning between products]. Which workflows should we evaluate first?”

Start a 7-day free trial, no card required, or ask V5 on v5ultimate.com.

WHERE V5 FITS

Try V5 with your own product in a trial workspace using test data. The assistant can answer questions about features and plans; it does not give regulatory advice.

SOURCES

Keep the evidence close.

Primary sources behind this guide, checked October 2026. Click a title to open the publisher's page.

- | | | |
|-----|--|-------------------------|
| [1] | <u>EPA, Summary of the Federal Insecticide, Fungicide, and Rodenticide Act</u>
https://www.epa.gov/laws-regulations/summary-federal-insecticide-fungicide-and-... | EPA SUMMARY OF U.S. LAW |
| [2] | <u>U.S. eCFR, 40 CFR Part 167: Registration of establishments and reports</u>
https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-167 | BINDING U.S. REGULATION |
| [3] | <u>U.S. eCFR, 40 CFR Part 169: Books and records of pesticide production</u>
https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-169 | BINDING U.S. REGULATION |
| [4] | <u>U.S. eCFR, 40 CFR Part 156: Labeling requirements for pesticides</u>
https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-156 | BINDING U.S. REGULATION |
| [5] | <u>U.S. eCFR, 40 CFR Part 165: Pesticide management, containers and containment</u>
https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-165 | BINDING U.S. REGULATION |
| [6] | <u>EPA, Pesticide establishment registration and reporting</u>
https://www.epa.gov/compliance/pesticide-establishment-registration-and-reporting | EPA GUIDANCE |
| [7] | <u>U.S. eCFR, 29 CFR 1910.1200: OSHA Hazard Communication</u>
https://www.ecfr.gov/current/title-29/subtitle-B/chapter-XVII/part-1910/subpart... | BINDING U.S. REGULATION |
| [8] | <u>Regulation (EC) 1107/2009: plant protection products (EU)</u>
https://eur-lex.europa.eu/eli/reg/2009/1107/oj | BINDING EU REGULATION |

SOURCES

Sources, continued.

- | | | |
|------|---|-------------------------------|
| [9] | <u>Regulation (EU) 547/2011: labelling of plant protection products</u> | BINDING EU REGULATION |
| | https://eur-lex.europa.eu/eli/reg/2011/547/oj | |
| [10] | <u>Regulation (EC) 1272/2008: CLP classification and labelling (EU)</u> | BINDING EU REGULATION |
| | https://eur-lex.europa.eu/eli/reg/2008/1272 | |
| [11] | <u>Canada, Pest Control Products Act (S.C. 2002, c. 28)</u> | BINDING CANADIAN LAW |
| | https://laws-lois.justice.gc.ca/eng/acts/P-9.01/ | |
| [12] | <u>FAO/WHO International Code of Conduct on Pesticide Management</u> | VOLUNTARY INTERNATIONAL |
| | https://www.fao.org/pest-and-pesticide-management/pesticide-risk-reduction/code... | |
| [13] | <u>UNECE, Globally Harmonized System (GHS)</u> | UN MODEL SYSTEM |
| | https://unece.org/about-ghs | |
| [14] | <u>Commission Regulation (EU) 2026/1123: plant protection product labels (applies 1 Jan 2028)</u> | BINDING EU REGULATION, FUTURE |
| | https://eur-lex.europa.eu/eli/reg/2026/1123/oj | |
| [15] | <u>Canada, Pest Control Products Regulations (SOR/2006-124)</u> | BINDING CANADIAN REGULATION |
| | https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2006-124/ | |

How to read the status labels. Regulations and acts are law in their jurisdiction. Regulator pages explain them; the FAO/WHO Code is voluntary; the GHS is a UN model.

SCOPE AND LIMITS

Practical orientation for evaluating agricultural chemical manufacturing and software; not legal or regulatory advice, and not a list of every requirement. Requirements depend on product, market and site. Registration procedures, label text rules in detail, hazard classifications, residue limits, cleaning limits, transport rules and worker exposure limits are deliberately not given; take them from current rules. V5 capability statements reflect the V5 product reference reviewed on 1 October 2026 and depend on plan, configuration, devices and permissions. AI forecasting and anomaly detection are coming soon. V5 does not register products, classify hazards, write or approve labels, file reports, release product or decide recalls, and does not by itself make you compliant.



The right active. A clean line. Every pack accounted for.

See agricultural chemical workflows at v5ultimate.com · Global edition · October 2026