INDUSTRY // AGRO-PROCESSING

Machine vision inspection for agro-processing lines

Camera checks for grain milling, sugar, animal feed, fruit and nut packing and dried goods.

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Request an assessment

// SHORT ANSWER

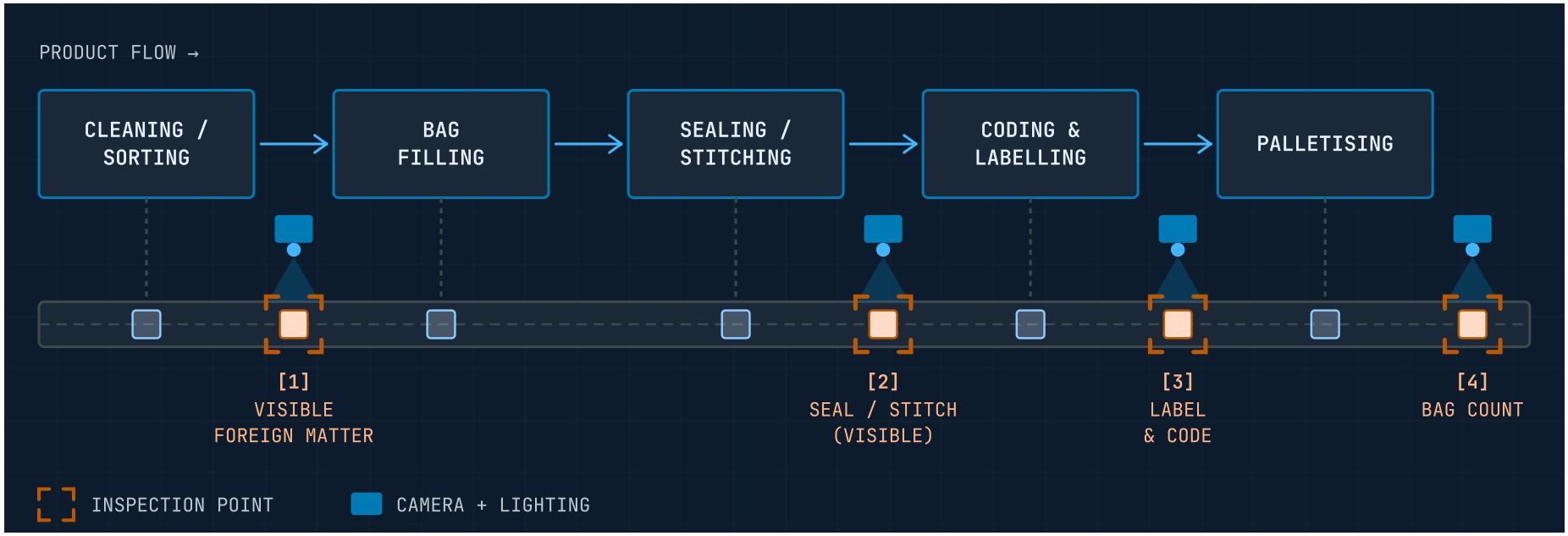
On agro-processing lines, camera checks usually confirm the bag label and date or batch code, check that a heat seal or stitch line looks complete, and look for foreign matter visible on the surface of product on a belt. Vision cannot see inside a bag or under the product, and a visible seal check is not a leak test. Dust, humidity, cleaning and vibration decide how the station is built.

// WHERE IT FITS

Inspection points on a bagging and packing line

A typical sequence for milled products, sugar, feed, nuts or dried fruit; your line may differ.

[Schematic] PROCESS FLOW · NOT TO SCALE



[1] Foreign matter: visible objects on the product surface before filling.

[2] Seal / stitch: seal or stitch line present, complete and clean.

[3] Label & code: the right bag print, a readable and correct code.

[4] Bag count: every position in a pallet layer filled.

// DEFECT RISKS

What goes wrong at each step

Visible faults by step, and the application that checks for them.

PRODUCTION STEP	TYPICAL VISIBLE FAULTS	INSPECTION
Cleaning and sorting	Stones, husks, sticks, plastic or string on top of the product	**Surface defect detection** (visible surface only)
Bag filling	Product in the seal area; bag top folded	**Fill level, cap & seal**
Sealing and stitching	Open, creased or contaminated seals; missing stitch lines	**Fill level, cap & seal**
Coding and labelling	Missing, smudged or wrong codes; the wrong bag print after a changeover	**OCR/OCV & date codes** **Label & print inspection**
Palletising	Missing bags in a layer	**Presence, absence & counting**

// INSPECTIONS

Checks that apply on agro-processing lines

Label, code and seal checks can often share one station.

Label & print inspection

The right bag print or label for the product and pack size.

OCR/OCV & date codes

Dates and batch codes on paper, woven and film bags, checked against the run.

Visible seal & stitch

Heat seal visibly complete, stitch line present. Not a leak test.

Visible foreign matter

Objects that differ in colour or shape, on top of product on a belt.

At: labeller or bag magazine

Label & print inspection →

At: after the coder

OCR/OCV & date codes →

At: after the sealer or sewing head

Visible seal & stitch →

At: inspection belt before filling

Visible foreign matter →

// APPLICATION MAP

Agro-processing inspection scenarios by product

Typical products from South African mills, sugar plants, feed mills and packhouses, what a camera checks on each, and the application page with the detail. The method in each row is a starting point, confirmed on your own bags and product. Moisture, grade, net weight and anything inside a bag need other instruments.

PRODUCT / LINE POSITION	WHAT IS INSPECTED	TYPICAL FAULT CAUGHT	INSPECTION METHOD	RELATED APPLICATION
Maize meal bags after the filler and bag closer	The grade printed on the bag, such as super or special, and the date code	The wrong grade bag after a changeover; missing or smudged code	Camera over the bag face with diffuse light; OCV on the code	**Label & print inspection**
White and brown sugar packs after the packer	Printed date and batch code; top seal	Missing code, open or creased top seal	Camera over the pack with light across the seal	**OCR/OCV & code inspection**

PRODUCT / LINE POSITION	WHAT IS INSPECTED	TYPICAL FAULT CAUGHT	INSPECTION METHOD	RELATED APPLICATION
Cake and bread flour bags after dust extraction at the packer	Printed code on the bag face or gusset	Code hidden or smudged by flour dust, missing code	Camera in a purged housing with diffuse light	**OCR/OCV & code inspection**
Animal feed bags at the sewing head	Stitch line across the top and the sewn-in label	Missing stitch, missing sewn-in label, unfolded bag top	Side camera just after the sewing head	**Fill level, cap & seal**
Seed maize bags at bagging	Cultivar name and lot number on the bag or tag	The wrong cultivar print or tag, missing lot number	Camera over the bag face; OCR/OCV on the lot number	**OCR/OCV & code inspection**
Rice and dried bean pouches after the vertical form-fill-seal machine	End seals and the printed code	Grains trapped in the seal, missing code	Camera at the jaw exit with light across the seal	**Fill level, cap & seal**
Raisins and dried apricots on the inspection belt before packing	Visible stems, stones and foreign matter on a single layer	Cap stems, stones, twigs	Colour camera over the belt with diffuse light	**Surface defect detection**

PRODUCT / LINE POSITION	WHAT IS INSPECTED	TYPICAL FAULT CAUGHT	INSPECTION METHOD	RELATED APPLICATION
Macadamia and pecan kernels on the belt before retail packing	Visible shell pieces and discoloured kernels	Shell fragments on the surface, dark kernels. Kernel-by-kernel ejection is a job for an optical sorter	Colour camera over a single layer	**Surface defect detection**
Rooibos tea cartons after the cartoner	Flaps closed; printed best-before and batch code	Open flap, missing or wrong code	Camera over the carton end with diffuse light	**OCR/OCV & code inspection**
Citrus export cartons in the packhouse, before palletising	Carton label present and readable, with the packhouse and grower codes	Missing, unreadable or wrong carton label	Camera or code reader beside the conveyor	**Carton & pallet verification**
Egg trays after the egg packer, before closing	Every cell filled	Empty cell. Cracked shells need a dedicated egg grader	Overhead camera with diffuse light	**Presence & counting**
Bulk bags (FIBCs) at the bulk bag filler	Label in the document pocket present and readable	Missing label, or the wrong one for the batch	Camera or code reader at the filling frame	**Carton & pallet verification**

// SORTING

Optical sorting and fruit grading: sorting machine or inspection station?

Where a dedicated optical sorter or fruit grader belongs, and where an integrator-built station helps instead.

Bulk sorting is a machine you buy. An optical sorter feeds loose product, such as maize, beans, nuts or raisins, down a chute or along a belt in a thin layer. Cameras or sensors look at every piece, and a bar with many air valves, one beside the next across the width, blows individual rejects out of the stream. Fruit graders do the same for whole fruit on rollers or cups. These are purpose-built machines from sorter and grader manufacturers, bought with their own software and service. addaScan does not build bulk optical sorters, colour sorters or fruit graders.

An integrator-built station fits after the sorter. Once product is packed, the questions change: is the bag label right, is the date and batch code readable, is the seal or stitch line complete, is the carton marked for export, are all cells in the tray filled? Those are the checks on this page. Where units arrive one at a time, such as trays, cartons or single pieces on a conveyor, a station can also sort them into classes if the sample test shows the classes can be told apart reliably.

So if your problem is loose product quality, whether it calls for a fruit sorting machine, a fruit grading machine, grain sorting or nut sorting, talk to sorter and grader suppliers first. If it is packing, labelling, coding and dispatch, this is where an inspection station helps.

Packhouse export marking (PPECB)

For fresh produce exports, the PPECB carries out end-point export inspection covering quality, phytosanitary aspects and marking requirements, and approved product is stamped as passed for export. A camera or code reader beside the carton conveyor can confirm, before palletising, that each carton carries a readable label with the codes expected for the run. It does not judge fruit quality inside the carton, and it does not replace the PPECB inspection.

Source: PPECB product inspection services (https://ppecb.com/services/product-inspection-services/) (read 2026-09-25).

// ENVIRONMENT

Conditions specific to mills, sugar plants and packhouses

These decide whether a station keeps working through a season.

DUST

Flour, sugar and feed dust

Dust dims lenses and lights. Sealed housings and filtered air across the window help.

HUMIDITY

Moisture and condensation

Cold rooms, steam and humid packhouses fog windows. Housing and position allow for this.

CLEANING

Washdown or dry cleaning

Packhouses are often washed down; mills are usually cleaned dry. Housings and cable glands suit your method.

WE ASK

Dust sources and the area classification

WE ASK

Where humidity or cold rooms meet the line

WE ASK

Cleaning method and chemicals

TEMPERATURE

Hot days and cold mornings

Unconditioned sheds swing between heat and cold. Electronics are rated for the range.

WE ASK

Conditions in summer and winter

VIBRATION

Mills, sifters and baggers

Vibration blurs images and loosens focus. Cameras mount on rigid stands with focus locked.

WE ASK

Where the station could be mounted

// LIMITS

What vision does not do on an agro-processing line

We agree these boundaries before a project starts.

× Needs another method

- **Foreign bodies inside a bag or under the product.** These need metal detection or X-ray inspection.

✓ Works reliably when

- **Bags arrive flat and consistent.** A guide or flattener presents print and seal the same way.

- **Seal integrity.** A seal or stitch can look right and still leak. Leak testing is a separate method.
- **Net content.** Declared quantity needs a checkweigher.
- **Product quality.** Moisture, grade and hidden insect damage need sampling or other instruments.

- **Optics are protected and cleaned.** Cleaning is part of the routine.
- **Recipes follow the product.** Each print and pack size has a recipe, selected at changeover.

// SAMPLES & ACCEPTANCE

What to send for a sample test

We test your own bags and product before proposing a station. The same samples later define acceptance.

Sample preparation guide

Good bags
Sealed bags from normal production, for each pack size and print.

Defect samples
Missing or smudged codes, wrong prints and poor seals, each marked.

Foreign matter
Examples of what must be caught, next to normal product.

Acceptance
False rejects and missed defects at line speed; levels agreed per project.

// MANUAL INSPECTION

Why manual inspection struggles on these lines

Conditions on mills, sugar plants and packhouses that make checking by eye unreliable over a full shift.

- **Dust.** Flour, sugar and feed dust settles on bags and in the air, covering codes and print and tiring the eyes.
- **Speed at the bagger.** Bags follow each other quickly, so seals, stitch lines and codes get a glance at best.
- **Natural variation.** Grain, fruit and other produce vary in colour and shape, which makes small foreign matter on a moving belt hard to spot.

- **Heat, cold and humidity.** Unconditioned sheds, cold rooms and steam make long periods of close inspection uncomfortable.
- **Long shifts in season.** Peak season brings long shifts and many prints and pack sizes, which is when attention runs lowest.

These are reasons to automate the checks that are defined and visible, and to keep people for judgement and for fixing causes. The guide to manual or camera inspection compares the two.

// LINE SOLUTIONS

Line solutions for agro-processing

Complete stations for lines in this industry, each with the HIKROBOT hardware, installation and an indicative installed budget for a typical application in rand, excluding VAT. **All line solutions →**

LINE SOLUTION	FAULTS IT CATCHES	HIKROBOT CONFIGURATION	INDICATIVE BUDGET (EXCL. VAT)
Fruit carton marking inspection	Missing, faint, skewed or wrong carton marking; unreadable carton barcode	Code reader + camera at the carton end, carton pusher	R 210 000 – R 940 000

// FAQ

Agro-processing inspection questions

Can a camera check the print and batch code on maize meal or sugar bags?

Yes, where the code lands on a flat, visible area of the bag. Creased paper, woven sacks and shiny film change how print looks, so we test your own coder on your own bags.

Can vision confirm that a bag or pouch is properly sealed?

It can confirm that the seal or stitch line looks right: present, complete and free of product. It cannot prove the bag is airtight; leak testing is a separate method.

Can machine vision detect foreign material in grain, nuts or dried fruit?

Only on the surface the camera sees, and only when the object differs from the product in colour or shape. Anything inside a bag or under other product needs metal detection or X-ray.

How do cameras cope with flour, sugar and feed dust?

With sealed housings and filtered air across a cleanable window. Dust on a bag can look like a defect, so we test on samples. In a classified combustible-dust zone, that classification decides which equipment may be installed.

What is an optical sorter?

An optical sorter is a dedicated machine for optical sorting: the automatic removal of individual pieces, such as kernels, nuts, beans or fruit, from a product stream by cameras or other optical sensors and air jets or mechanical ejectors. The product flows through it, or through a fruit grader, usually in bulk and at high throughput.

Is an optical sorter the same as an inspection station?

No. An optical sorter is a dedicated machine that ejects individual kernels or nuts from a product stream. The stations on this page check packs and visible surfaces on a conveyor and signal a reject.

Can a camera check the labels on citrus or fruit export cartons?

Yes. A camera or code reader beside the conveyor confirms that the carton label is present, readable and carries the expected codes before the carton reaches the pallet. Grading the fruit itself by size, colour and blemish is done by a packhouse grading machine, not by this station.

RELATED: OCR/OCV & date codes → Fill level, cap & seal → Surface defect detection → Machine vision lighting guide → How we deliver a project → Support & changes →

// AGRO-PROCESSING

Request an assessment for your line

Tell us the products, bag types, faults and conditions around the line. We will say which checks apply and what a sample test needs.

Request a Vision Assessment