

ClearQuality™

BUILT ON CLEARVISION™ EDGE INFERENCE

Factory-ready AI that inspects 100% of product at line speed. We build the bridge between physical AI and software intelligence, so inspection problems that off-the-shelf vision cannot reach get solved on your line.

HOW WE DIFFERENTIATE

From lens to dashboard, one partner.

PHYSICAL AI

Engineered and procured with ClearObject



Lighting & optics

Lighting and lens selection engineered for a consistent, repeatable image



Cameras & positioning

Industrial cameras, mounting, and enclosures designed to your line geometry



Hardware procurement

We spec it, you own it. No proprietary ClearObject hardware



Edge compute

Ruggedized GPU appliance sized to run at full line speed



SOFTWARE INTELLIGENCE

Built and managed by ClearObject



Inference engine

The ClearVision engine translates pixels into valuable data, in real time at the edge



Line integration

Verdicts to your PLC and reject gate over OPC-UA



ClearVision Hub

Dashboards, cross-line insight, and audit-ready quality records

Operationalization

Value comes from physical AI and software intelligence working together.

Top-to-bottom support

We support every layer, from hardware to software, to keep your model running.

Mutual success

Our agreements are structured around shared outcomes and a model that returns.

PERFORMANCE ENVELOPE

< 100 ms	10–20 fps	< 30 ms	< 500 ms	100%	5 months
INFERENCE TIME	THROUGHPUT	REJECT SIGNAL	EDGE TO HUB	UNITS INSPECTED	TO LINE 1 GO-LIVE

Typical envelopes, not fixed specifications. Maximum bounds are agreed at implementation onset and validated on your own imagery before production.

Inspection modules

EIGHT MODULES · ONE EDGE PLATFORM

Defect Detection STANDARD

Segmentation and classification run in parallel on every frame: where the defect sits, how large it is, and what kind it is.

Detects Scratches, dents, cracks, voids, seal and fill faults, surface contamination

Outputs Defect class, confidence 0–1, defect area from the mask

Operator Quality Control STANDARD

Encodes the judgment of your best operators. Their accept and reject calls become training labels, so criteria that resist written rules are applied to every unit, every shift.

Detects Cosmetic and product-specific rejects only experienced operators can call

Outputs Verdict with confidence, operator agreement rate per shift

Anomaly & Foreign Material STANDARD

Trained on good product only. Anything the model has not seen before is flagged, with no library of defect examples required.

Detects Foreign objects, debris, previously unseen defect types, process drift

Outputs Anomaly score, located region, pass or fail

Sensor Fusion: Vision + LiDAR ADVANCED

For harder use cases. Combines semantic properties from vision with geometric properties from LiDAR for higher confidence and accuracy than either sensor alone.

Detects Volume, shape, and depth defects, 3D placement, low-contrast faults vision alone misses

Outputs Fused verdict, confidence, 3D measurement

Training data PREREQUISITES

- 200–500 labeled examples per defect class as a working minimum; 1,000+ where higher accuracy is required. Anomaly detection needs good product only.
- Representative footage across every SKU in scope, every shift, and the full range of normal line variation.
- Rare classes need deliberate defect runs, archive imagery, or synthetic augmentation.
- Capture happens on-site in Phase 1. Annotation and training are performed by ClearObject. No data science team required on your side.

Code Date & Label STANDARD

Confirms every printed code and label is present, readable, and where it belongs before product leaves the line.

Detects Missing or smeared code dates, blur and contrast out of band, missing or skewed labels

Outputs Present and legible verdict, placement offset, optional OCR read

Dimensional Analysis STANDARD

In-line geometry from a calibrated camera view, checked against tolerance bands you configure. In-line gauging, not certified metrology.

Detects Length, width, diameter, gap, position, fill height, count

Outputs Measured value, deviation from nominal, in or out of band

SOP & Human Behavior STANDARD

Verifies that people follow the procedure: the right steps, in the right order, with the right protective equipment.

Detects Skipped or out-of-sequence steps, missing PPE, unsafe zone entry, handling errors

Outputs Step compliance per cycle, event clip, alert

Custom Complex Module CUSTOM SCOPE

Multi-stage pipelines for problems beyond a single model: multi-camera fusion, sequenced checks, and logic across inspections.

Detects Assembly completeness, component and kit verification, multi-view inspection

Outputs Composite verdict mapped to your defect taxonomy

What stays yours OUT OF SCOPE

- Reject hardware and its mounting: gates, diverters, air blast, pushers. We publish the signal; the mechanism is yours.
- PLC program and control logic, safety interlocks, and the fail-open or fail-closed decision.
- Certified metrology to a traceable standard, and character verification against an external data source.
- MES and ERP write-back, line electrical drops, mechanical installation, and OT network changes.

Active learning

GOLDEN IMAGES, LINE TO CLOUD

The model keeps learning from your line. Golden images are captured at the edge and stored directly to the cloud for retraining, so accuracy improves with production rather than stopping at go-live.

01	02	03	04	05	06
Capture	Select	Store	Label	Retrain	Deploy
Every unit inspected at the edge. The verdict never waits on the cloud.	Low-confidence frames, operator overrides, and good-product samples are flagged.	Golden images upload to the Hub through buffered store-and-forward.	Quality analysts confirm or correct labels in the Hub review queue.	Versioned models retrain against the growing golden-image library.	Validated in shadow mode, then pushed by signed OTA with rollback.

Platform capabilities

INCLUDED WITH EVERY MODULE

 Edge inference	 Thresholds as configuration	 Multi-SKU generalization	 Scene-level gating
Runs on specified hardware on your OT network. No cloud dependency for inspection or reject control.	Tolerance and severity bands change without a model rebuild. Your team owns the values.	One trained model across SKUs and shifts. No per-SKU rule programming.	Line running, lens obstruction, and lighting faults are checked before inference.
 Managed model lifecycle	 ClearVision Hub	 PLC integration	 Store-and-forward
Retraining, versioning, and signed OTA updates with a rollback path.	Yield trends, drill-down to image, cross-line and cross-site views. OIDC SSO, role-scoped access.	OPC-UA preferred. Modbus TCP, EtherNet/IP, and S7 supported.	Local event logging buffers through WAN outages. REST, JSON, and CSV export.

PLC output signals

PUBLISHED INTO YOUR CONTROL LOGIC

SIGNAL	PAYLOAD	TYPICAL ACTION
Defect verdict	Boolean pass / fail, per unit	Reject gate fires, alarm, line pause
Defect class	Enumerated class identifier	Route to rework versus scrap lane
Confidence score	Float, 0–1	Threshold comparison in ladder logic
Area or measurement	Numeric, from mask or gauge	Severity-banded action tiers
System heartbeat	Boolean plus status code	Fail-safe branch, maintenance alarm

Three-phase timeline

FIVE MONTHS TO LINE 1 GO-LIVE

Design & procurement	2 MO	Installation	1 MO	Training & calibration	2 MO
Line survey, footage capture, hardware BOM, model training and accuracy assessment on your own defects.		Cameras, lighting, edge provisioning. PLC in monitoring-only mode.		Tuning on live variation, threshold recommendations, operator training. Closed loop activates on your written sign-off.	

Lines 2 and beyond compress by roughly 70%. Models, network topology, PLC templates, and OPC-UA maps carry directly across.