

**QUALITY FOR ALL,
THROUGH INTELLIGENT VISION**

We are in the
business of helping
businesses deliver

Quality Products





We Accelerate

Time To Market



Manual Inspection Is Time-consuming:

- USP, IP and various other International Pharmacopoeias specify a reference time of 10 s/container for manual inspection



Spookfish Can Speed Up The Inspection Process:

- Check up to 300 packages per minute – that's .2 seconds/package – reducing the inspection time within the production cycle by 98%.



Production Line To The Market, Faster

- Responsive supply of vital products according to demand, which helps you capture a larger market share.
- A shorter operating cycle, which in turn reduces your cash flow cycle.





We bring completeness and accuracy to your **Quality Control Process**

Quality control on manufacturing lines is still heavily reliant on random sampling, which means quality may be compromised in some units within the batch and escape our notice.



The majority of FMCG and pharmaceutical products consumed by the world are still only checked on a random-sampling basis for quality.



Undetected defects could result in illness and, in some cases, fatalities.



Spookfish can increase accuracy by ensuring 100% inspection, and therefore, safer products.



Manual Testing

Random Sample Testing

Destructive Testing

- Manual Testing**
 - ⊗ Susceptible to Fatigue
 - ⊗ Limited in accuracy
 - ⊗ Limited in consistency
 - ⊗ Reduced production throughput
 - ⊗ Limited to what the eye can see
- Random Sample Testing**
 - ⊗ Faulty products being missed
 - ⊗ Destruction of IPC samples
- Destructive Testing**
 - ⊗ Product loss
 - ⊗ Time consuming process
 - ⊗ Increased regulatory compliances

The Result

<p>Flawed products</p>	<p>Quality complaints</p>	<p>Batch recalls</p>
<p>Lawsuits</p>	<p>Damaged reputation</p>	<p>Business losses</p>



We Protect **Your Brand**



When a defect is found by a consumer, distributor or regulator, manufacturers face batch recalls and major losses — both tangible and intangible.



Recalls have hurt businesses in the past, costing up to USD 500,000 in logistical costs, investigation costs and product destruction and re-production.



Even worse, the costs of an investigation and a loss of licence, along with the opportunity cost incurred in the 6 months it takes to relicence, could add up to millions. Of course, the loss of reputation and brand value is priceless.



Using Spookfish can ensure the quality of your products in the market and prevent such losses.



We prevent cost and reputation damage with **100% quality control**





We help visionary brands
see beyond the horizon

Beyond the visible

Remove quality barriers and realise
production targets with computer vision.

Spookfish

Applying the power of intelligent machine vision to solve quality challenges in manufacturing

The Spookfish Advantage

SNiPE

MARLIN

PAL

Automated Checks

- ✔ 100% coverage of products and packaging
- ✔ Supports high production throughput
- ✔ Minimises human error
- ✔ Minimises human contamination
- ✔ Protects personnel from hazards

Machine Vision Inspection

- ✔ Surpasses the ability of human vision
- ✔ Spots defects that the human eye can't see, down to 10 microns
- ✔ Spots defects by going beyond human vision, by using infrared and other wavelengths of light
- ✔ Better suited for repetitive inspection tasks which test the focus of human inspection, without the element of fatigue
- ✔ Reliable and consistent

Machine Learning

- ✔ Reduced setup and learning time
- ✔ Reduced need for operator training
- ✔ Can be trained to check for multiple types of defects
- ✔ Efficient, accurate, error-proof

A Look Into Spookfish's Capabilities

Multi-spectral machine vision that goes beyond what the human eye can see. Machine vision systems rely on digital sensors protected inside industrial cameras with specialised optics to acquire images, so that computer hardware and software can process, analyse and measure various characteristics for decision making.



Visible spectrum turns sharper



Infrared and thermal imaging
reveal the hidden



One-shot spectral imaging provides
insights into materials and composition

The Synapse Of Spookfish's Capabilities

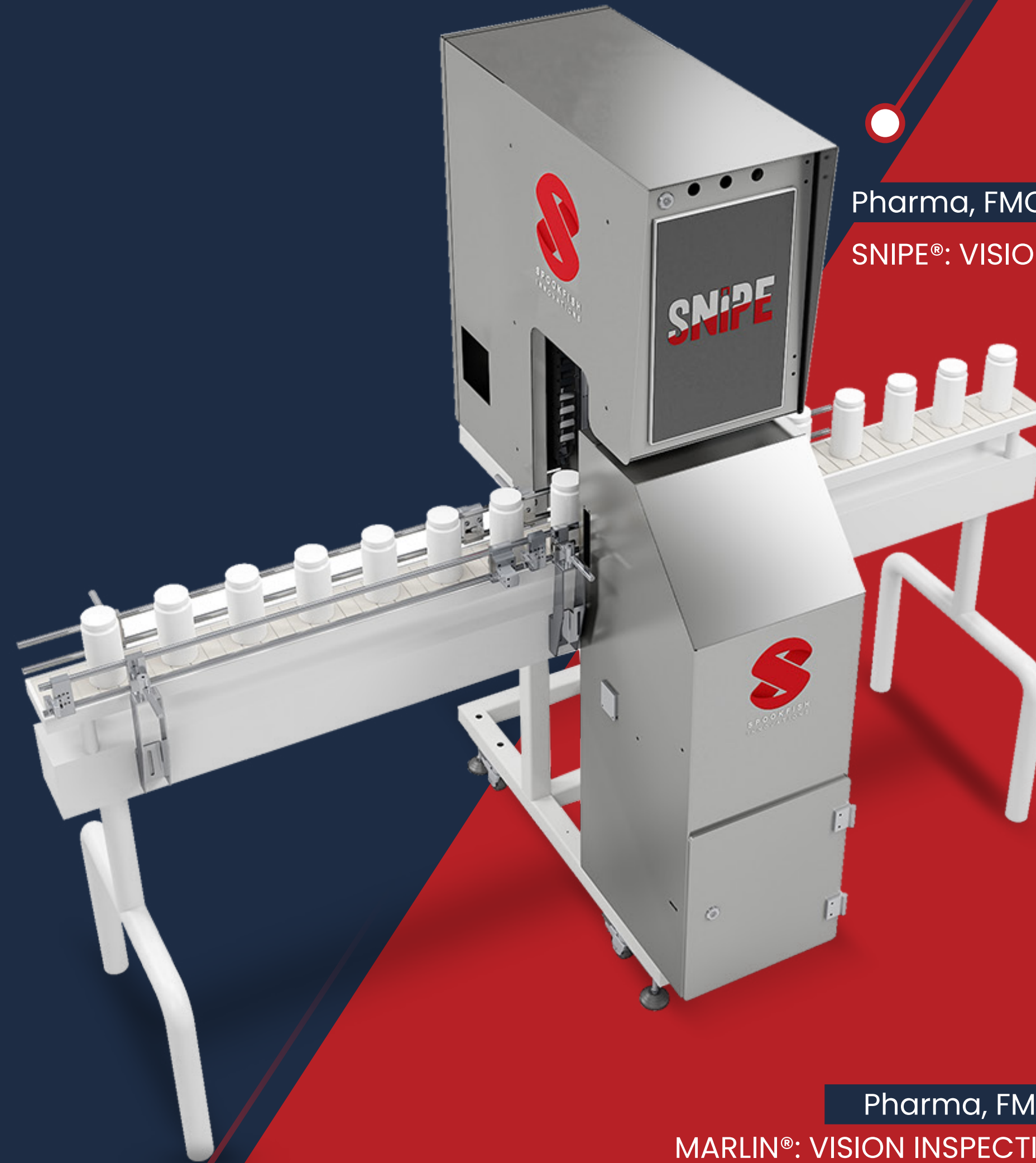


AI & Machine Learning

Identifying defects by learning what's good and what's not

The system learns and tunes itself based on the signals obtained from a few "good" samples which are run through it. It is then able to differentiate between "good" and "defective" products without any further manual input. This machine learning model is updated with every inspection, which makes it adaptable to manufacturing patterns.

The Spookfish product suite



Pharma, FMCG

SNiPE®: VISION INSPECTION FOR PACKAGING QUALITY



Pharma, FMCG

MARLIN®: VISION INSPECTION FOR PRODUCT QUALITY



SNIPE | Heat seal verification based on thermal imaging

Cameras working in the infrared and near-infrared spectra detect defects the human eye can't see, so that every single unit on the production line meets quality standards and safeguards consumer health.

○ Produce.
○ Pack.
○ SNIPE.



Faulty sealing can cost millions

Heat seals are meant to ensure the integrity of a wide range of products — from medicines to food and beverages to cosmetics.



However, a compromised seal can lead to: Product-level Issues

- ⊗ Product degradation and contamination — leading to consumer health and safety issues
- ⊗ Reduced and altered product efficacy — impacting the performance of medicines
- ⊗ Leakage, loss of product and messy packages — leading to product rejects and production losses



Organisation-level Issues

- ⊗ Loss of production licenses
- ⊗ Warning letters from the regulatory authorities
- ⊗ Loss of reputation and new business

Better Than Destructive Testing

SNIPE automates quality inspection with intelligent machine vision

With SNIPE, you can check whether your products are sealed properly, without resorting to destructive testing. SNIPE quantitatively measures temperature in the sealing area, which is better than any other seal integrity testing technology available in the market.

The speed, accuracy and non-destructive aspect of SNIPE helps:

- ✔ Spot problems immediately in the heat seal process
- ✔ Check every unit coming from the production line
- ✔ Prevent flawed products from leaving the factory
- ✔ Reduce the time and cost needed to rectify any damage
- ✔ Eliminate the need for human contact or manual testing





Is **SNIPE** for you?

Do You:



Make or pack medicines, food or FMCG products such as toothpaste, gel, lotion and more?



Believe in 100% quality compliance, which safeguards the health of your consumers?



Wish to prevent quality-related complaints that can increase your business costs and harm your reputation?

If so, SNIPE checks every bottle cap, pouch, pod, tray or sachet, in line.

Every package can be SNIPED

SNIFE can be used for any product which uses heat sealing – from life-saving drugs to shampoo sachets, and from bags of crisps and yoghurt pots to even oil lubricants.

Technology

Use of thermal cameras in the LWIR and MWIR spectra to inspect 100% of heat seals on packaging.

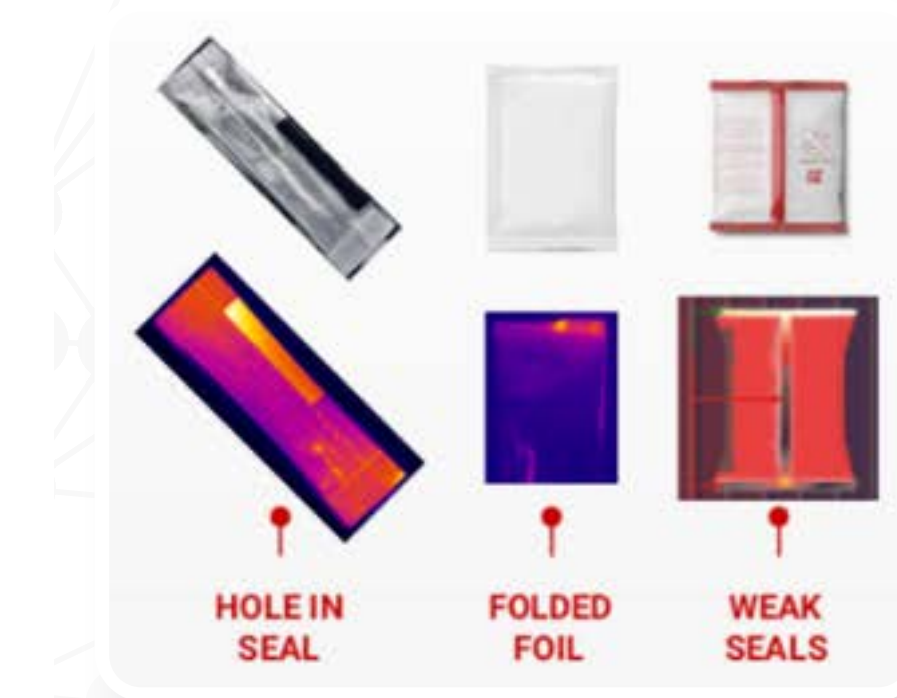
Use Case: Pharma

100% integrity checks on induction seals and heat seals on bottles, blister packs, sachets and stick packs.



Use Case: FMCG

100% integrity checks on bottles, pouches, pots, pods etc



Use Case: Others

100% integrity checks on heat seals on gaskets in the oil/ gas industry and anywhere there is heat sealing involved.



The SNIPE edge

-  Range of products — can verify products of different sizes and configurations
-  100% inspection — nothing is left to chance
-  Supports continuous production — no need to stop operations for quality checks
-  Fast product introduction — new products can be easily configured for checking
-  Intuitive interface — no technical knowledge is required to operate the machines
-  Retrofit on existing production lines — no additional facilities cost is incurred

Stacking up the options

Consider a global pharmaceutical manufacturer weighing whether to incorporate SNIPE into the production line:

Weighing the tangible benefits:

Manpower costs

Number of operators involved in checking sealing quality: 1 per shift
Monthly salary for one operator + overheads: **USD 4,000 + USD 2,000** per head

Total salary outflow per month for seal inspection: **USD 18,000 (3 shifts)**

Total salary outflow per year for seal inspection: **USD 216,000**

Destructive testing costs

Bottle line speed (on average): **120 bottles** per minute.

Number of bottles sampled for sealing checks every hour using blue dye baths (on average): **6**

Value of every destroyed bottle (on average): **USD 10**

Value lost in destroyed bottles per day (assuming 12 hours of production): **6 x 10 x 12 = USD 720**

Value lost in destroyed bottles per month (assuming 26 days of production): **USD 18,720**

Weighing the intangible benefits

Scenario 1

Faulty Batch Identified Before A Market Release

Assume a case where, in a batch of 5000 bottles, one randomly sampled bottle fails the blue dye test.

Cost of production batch to be destroyed: **5000 x 10 = USD 50,000**

Cost of 3 operators in one shift to destroy the batch: **USD 600**

Cost of re-production of the same batch: **5000 x 8 = USD 40,000**

Opportunity cost, as the line is effectively out of production for this time: **USD 50,000**

TOTAL: USD 140,600

Scenario 2

Batch Recalled After A Market Complaint

Assume a case where a market complaint is received for bad sealing in a batch of **5000 bottles.**

Cost of market recall for the entire batch from the end customer(s), including loss of product, loss of packaging, transportation of recalled goods, destruction costs and manpower costs: **USD 200,000**

Cost of investigation, root cause analysis and report submission to regulatory authorities: **USD 100,000**

Cost of re-production of the same batch: **5000 x 8 = USD 40,000**

TOTAL: USD 340,000

Scenario 3

Batch Recall And Licence Loss After A Market Complaint

Assume a case where a market complaint results in a loss of licenses to produce/export.

Cost of market recall for the entire batch from the end customer(s), including loss of product, loss of packaging, transportation of recalled goods, destruction costs, manpower costs: **USD 200,000**

Cost of investigation, root cause analysis and report submission to regulatory authorities: **USD 500,000**

Opportunity cost over 6 months (minimum time to re-license): **USD 9,000,000**

Loss of reputation: priceless

TOTAL: USD 9,700,000 + reputation

Did you know?

63% of the 310 recalls listed by FDA in 2022 could have been avoided if they had the right visual inspection machine.*

SNIFE has already been adopted by these organisations that value quality, customer safety, profitability and reputation.



*<https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts>



Spookfish:

Intelligent Vision Machines

- ✓ Chasing innovation to constantly solve quality problems, as well as business problems
- ✓ Dedicated R&D team focused on machine vision, AI and machine learning
- ✓ Founding team with expertise in computer vision, healthcare and manufacturing, and data analytics
- ✓ Proven in action – Spookfish products have already brought in quality savings for these customers





 Locations

 Installations



Europe

Massimo Bartalini
massimo.bartalini@spookfish.vision
+41 79 222 35 13

Asia Pacific

Suraj Suresh
suraj@spookfish.vision
+91 951 338 6016

Global

Dr. Anupriya Balikai
anupriya@spookfish.vision
+91 91089 93343

 Bangalore, Asia Pacific | Eindhoven, EU
Bristol, UK | New York, USA

 www.spookfish.vision

 innovate@spookfish.vision

Spookfish Innovations offers a fresh approach to solving manufacturing challenges by dramatically improving the quality inspection of products. This is achieved by applying the latest industrial computer vision and machine learning techniques to deploy intelligent vision machines across various use cases and manufacturing verticals. Our team of scientists and engineers endeavour to deliver rich expertise in machine vision with a boundless passion for cutting-edge technology.