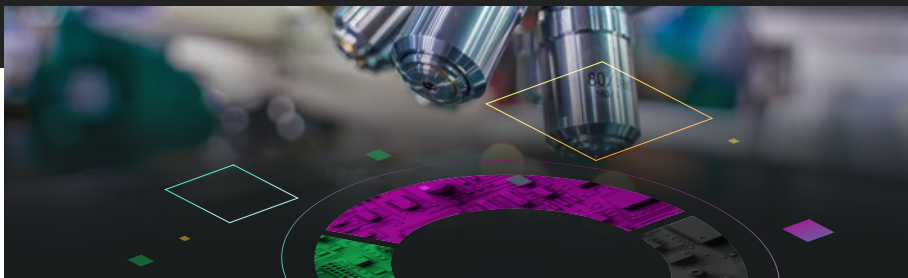


CASE STUDY

Puffco Discovers Root Cause In Record Time With Instrumental

Instrumental helped Puffco streamline defect detection during the NPI build of a first-generation product



OVERVIEW

Putting quality first during an NPI build

Puffco has spent nearly a decade carving out a space in a competitive market: cannabis. But they have an edge. They understand that manufacturing quality products is foundational to the success of their brand and business — so they've created a culture that's laser-focused on building products that give their customers a quality experience.

During an NPI build, Puffco found that a complex product design and pandemic-induced travel barriers limited their ability to gather data on underperforming units. Their blind assembly process also made it near-impossible to detect assembly anomalies.

By working with Instrumental, Puffco gained immediate insight into the underlying issue, discovered root cause in record time, and implemented process changes to improve product performance.

THE CHALLENGE

Uncovering unit-to-unit anomalies in blind assembly

As Puffco began their NPI build, they knew it was critical to get it right the first time.

Chris Fisher, Senior Test and Quality Manager at Puffco, understood that a low-quality product would not only damage customer trust, but would also jeopardize their chance to create and own a new product category. He wanted to invest in tools that would set them up to capture the market from the start.

However, their build was significantly impacted by the travel restrictions due to the COVID-19 pandemic. The product's complex design process was difficult to translate remotely to their overseas manufacturing partner, and they soon discovered there was significant variation in the product performance. These challenges were compounded by two factors: 1) the nature of

their blind assembly process — they couldn't see if variations in the assembled components were causing issues; and 2) the inability for their products to be tested on-site (cannabis testing is illegal in China, where their factory is located).

Chris and his team had suspicions about potential failure modes, and first attempted to discover them on their own.

Puffco asked their contract manufacturer to continue shipping the products to company headquarters for testing — but they took up to two weeks to arrive, which delayed the start of a weeks-long testing process, and hindered their ability to communicate process changes to the CM.

They even tried to find the issue by using microscopes to view the airpath of the assembled product, but they still weren't able to identify the root cause of the performance variations.



ABOUT CUSTOMER



- Founded In 2013
- HQ In Los Angeles
- Works With China-Based CM

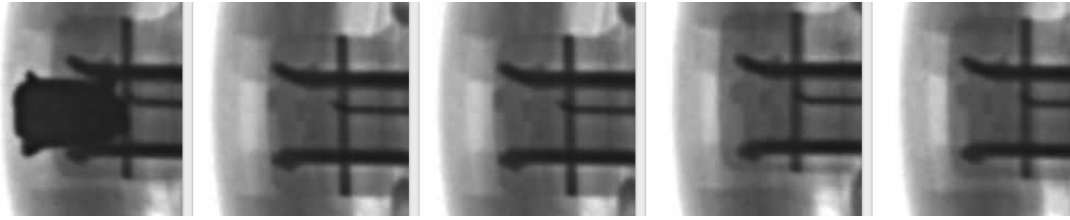
Puffco is a leading provider of electronic consumption devices for cannabis concentrate. The company aims to bring a potent and flavorful consumption experience to their consumers by extracting the best parts of the plant, and building high-end products that deliver on the consumers' desired experience.



Due to travel restrictions, Puffco couldn't visit their China factory to conduct failure analysis.



Chris and his team spent 3+ months trying to solve the problem with limited data.



**Dramatization of customer product*

THE SOLUTION

Identifying root cause with Instrumental and X-ray imaging

Chris knew that visual data of the internal components would help his team identify correlations between good and bad units.

He considered in-line X-ray, but wasn't convinced it would save him time — because he'd still have to manually sift through the images to discover problem areas. He was looking for a solution that could leverage images to automatically surface anomalies. He found that solution with Instrumental.

Puffco implemented Instrumental's Discover AI, which leverages visual and parametric data to automatically identify patterns that correlate with anomalous test populations, and provides engineering teams with a ranked list of possible

root causes. Instrumental also brought on their imaging partner, Creative Electron, a digital X-ray inspection system, to capture the images that proved to be critical to Puffco's defect discovery process.

With imaging in place, Instrumental aggregated hundreds of X-rays into an easy-to-navigate gallery, and narrowed them down to three failure modes that were worthy of further investigation.

After spending dozens of hours over the course of 3+ months trying to confirm the issues on their own, Puffco proved the root cause after one engineer's day of work within two weeks of deploying the Instrumental system.



Immediate Time Savings

Before Instrumental:

3+ months
of failure analysis



With Instrumental:

Defect identified in
1 day

Implementation timeline: 2 weeks

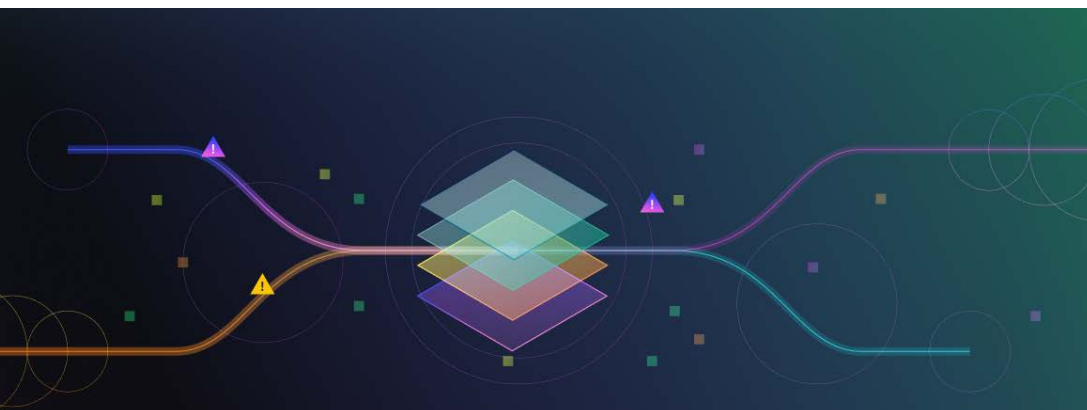
“Open access to data and quick identification of the failure mode allowed us to **cut nearly four weeks** off our project schedule.”

CHRIS FISHER

Senior Test And Quality Manager | Puffco



Chris Fisher focuses on Puffco's flagship products and NPI builds.



THE RESULTS

Product defect discovered in record time

Since leveraging Instrumental's Discover AI solution, Chris Fisher and the Puffco engineering team have seen short- and long-term benefits to their NPI build and the broader company.

1

Root cause discovery: From the hundreds of images uploaded to the Instrumental platform, Discover AI confirmed that components in the assembled units were tilted, which affected the heating mechanism and the product's ability to function.

This near-instantaneous discovery took weeks off the original process, which would have required waiting for units to ship to HQ for labor-intensive disassembling and testing.

2

Instant data access: With Instrumental, images that were scanned on the factory floor overseas were instantly available to Puffco's U.S.-based engineering team.

Defect rates could be communicated internally, based on reporting available through the Instrumental Discover dashboard, and teams could explore the data and drill down into potential points of failure.

3

Assembly process updates: These findings allowed Puffco to assess what caused the tilting, which initiated a change in assembly equipment and an improvement in fixture dimensions.

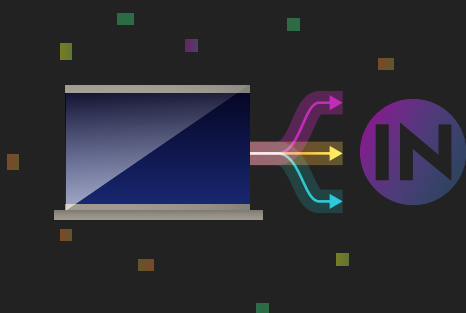
Because of the correlations identified by Instrumental, the individuals operating the fixtures were also equipped with examples of defects to look for during the assembly process.

DATA-BACKED RESULTS

"Instrumental helped us **quickly identify major impacts** to our units and gave us data to back up what to do next."

CHRIS FISHER

Senior Test And
Quality Manager | Puffco



WANT IN?

Supercharge your failure analysis with Instrumental.

Reach out to discuss your use cases and schedule a tailored demo of the Instrumental platform.

sales@instrumental.com