



## AI-Powered Defect Detection for Glass Manufacturers

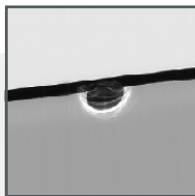
# Like you've never seen it before.

Spyglass Visual Inspection (SVI) by Mariner significantly outperforms existing glass inspection systems, catching more actual defects while at the same time virtually eliminating false defect detection – by more than 20X at one of our glass manufacturing customers. Here's how it all went down.

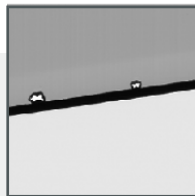
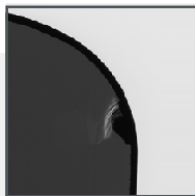
Our customer's existing machine vision system captured high-quality images but struggled to differentiate water, dust, and dirt from true defects. At first, they tuned their system to eliminate defects, but were also incorrectly identifying water and dust as defects – the “false defect” or “false positive” problem – which in turn forced costly reinspection. However, tuning their system to eliminate false defects led to the opposite problem: Far too many missed defects.

Either way, this was an incredibly costly problem. And that's where **Spyglass Visual Inspection** entered the picture. (Yep, pun intended!)

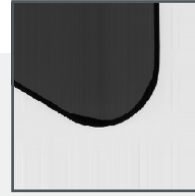
During our free **Proof of Value** program, we built our customer a Deep Learning model that dramatically improved defect detection AND dramatically reduced false defect detection – and it even learned a defect class about which their existing machine vision system knew nothing.



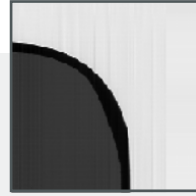
Edge Defects



Water Droplets



Rolled Edges



MARINER

www.mariner-usa.com  
(704) 540-9500 // sales@mariner-usa.com



# PROOF OF VALUE RESULTS

## Current Vision System

		PREDICTED		
		Defect	Good	Water
ACTUAL	Defect	45	0	0
	Good	0	50	0
	Water	28	0	0

**X** Accuracy = 77%  
False Positive Rate = 23%

VS

## Spyglass Vision Inspection

		PREDICTED			
		Rolled Edge	Defect	Good	Water
ACTUAL	Rolled Edge	16	0	3	0
	Defect	0	25	0	1
	Good	1	0	49	0
	Water	0	0	0	28

**✓** Accuracy = 96%  
False Positive Rate = 0.8%

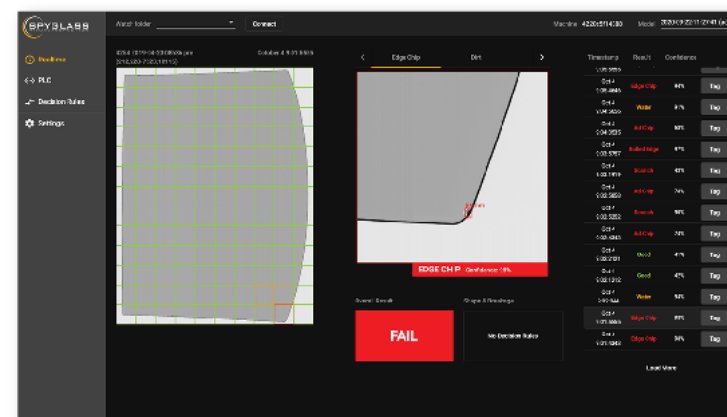
We then installed Spyglass Visual Inspection on one factory line to further prove value, and demonstrated with human inspector validation that of 811 pieces on the production line, their existing machine vision system incorrectly decided 17 pieces – while SVI missed only 2.

	Existing	SVI
False Negative	16	2
False Positive	1	0
Correct	794	809
Accuracy	97.9%	99.8%
Wrong	2.1%	0.2%
FN	2.0%	0.2%
FP	0.1%	0.0%

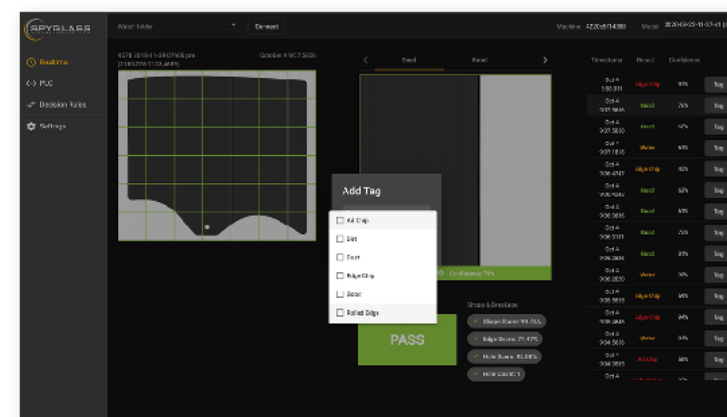
**KEY TAKEAWAY:** Spyglass Visual Inspection dramatically reduces glass manufacturers' cost of quality by reducing defects, reducing false positives, and allowing valuable QA personnel to be redeployed to other high-value assets.

## Spyglass Visual Inspection: THE HUMAN MACHINE INTERFACE

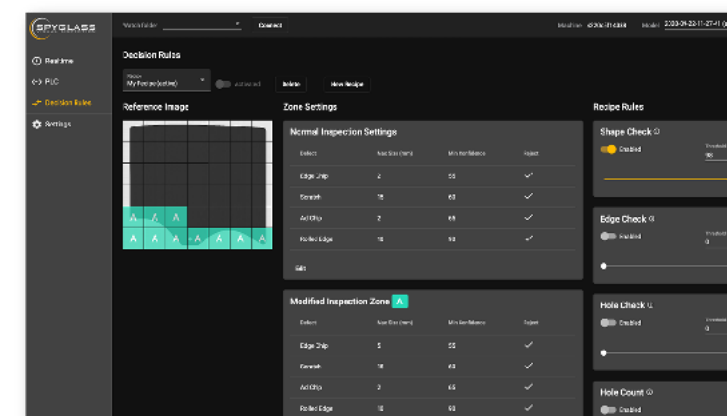
**IMPORTANT NOTE:** SVI CAN (AND DOES) RUN WITHOUT HUMAN INTERVENTION. That said, there are great features and functionality in the Human-Machine Interface (HMI) that we'd like to tell you about. Here's a look at some typical HMI screens.



The realtime view, showing the defect detected, SVI's confidence in its decision, and other recent glass pieces.



If SVI has decided a piece incorrectly, you can correct it with a new or amended tag – information which SVI will use to get smarter over time.



We know that not all glass pieces at your sites have the same rules for what should be considered a defect – so SVI also allows custom business rules (and sets of rules) to be applied to its decision-making.




## It all adds up to Spyglass Visual Inspection having a dramatic impact on reducing glass manufacturers' Total Cost of Quality.


### Some key takeaways:


- Leverages **Deep Learning** to significantly outperform existing glass inspection systems
- Catches more defects, while dramatically **reducing false rejects** from +20% to < 1%
- Integrates with existing glass line scanners – **NO RIP AND REPLACE** REQUIRED
- Delivers **real-time pass/fail results** and 40+ other quality analytics metrics to PLC
- In-factory application allows users to tag images to **improve Deep Learning model performance** over time
- Decision rules feature allows for **precise control** of Deep Learning decisioning criteria

### Did we mention that our 30-Day Proof of Value is FREE?

For more information on our Proof of Value or Spyglass Visual Inspection generally, please contact Mariner at:

 [sales@mariner-usa.com](mailto:sales@mariner-usa.com)

 (704) 540-9500

 [www.mariner-usa.com](http://www.mariner-usa.com)

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