

Spotfire® for high-tech manufacturing

Root cause analysis for quality and performance improvement

Industry pain points

Semiconductor manufacturers face some of the toughest production challenges in the industrial world. Each wafer moves through hundreds of process steps during fabrication, which involve sensitive materials, tightly controlled environments, and complex equipment. With thousands of potential variables at play, even minor fluctuations can result in costly defects, reduced yields, and delayed product deliveries.

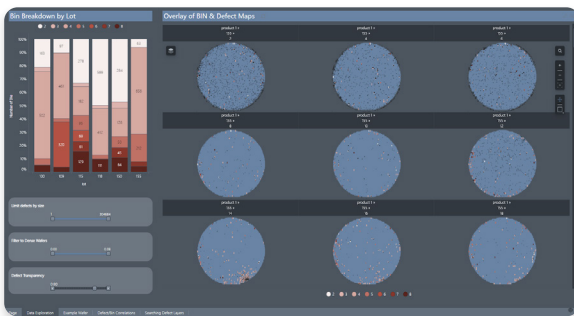
Adding to the complexity, production systems often generate enormous amounts of raw data from factory systems, metrology measurements, process

monitors, wafer-level test structures, and process equipment. All this data is collected and uploaded continuously to data repositories, either on-premise or in the cloud, at a rate of many gigabytes per day. These large disparate datasets present a challenge to engineering teams to connect, extract, and analyze data to determine insights that help pinpoint the root cause of non-conformal excursions, which impact yield and quality of finished products. Excursions that persist or are uncontained have direct effects on both profitability and customer confidence.

Business challenges

The fundamental challenge in semiconductor manufacturing is understanding why yield loss happens, and acting quickly to contain and correct the problem. Traditional approaches to problem-solving rely heavily on manual analysis, limited data integration, or intuition-driven troubleshooting. This slows down response times, and subtle multi-factorial causes of defects can be missed.

For high-tech manufacturers, the inability to rapidly identify root causes translates into significant business risks, including wasted wafers,



Uncover yield insights with interactive wafer analysis in Spotfire



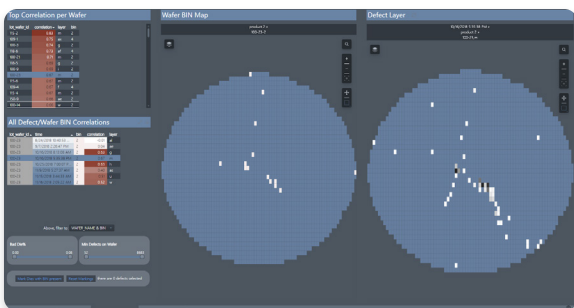
Visualize productivity and optimize performance with Spotfire®

lower throughput, increased production costs, lost revenue, and missed market windows. The industry demands faster, more precise insights that cut across process, quality, and engineering teams, transforming data from a passive byproduct into an active driver of yield and performance improvement.

Spotfire® Industry Pro: Root cause analysis in action

Spotfire Industry Pro brings advanced analytics and visual data science to semiconductor operations, enabling engineers to connect the dots between failures and upstream causes. By integrating tools such as wafer maps, process histories, wafer sort data, defect inspection results, and equipment logs, Spotfire enables engineering teams to create a unified analytical environment to uncover subtle correlations that would otherwise remain hidden.

With Spotfire, engineers no longer need to compile reports or rely on partial datasets manually. Instead, they can explore comprehensive views of production data, detect anomalies, and identify the contributing



Turn complex wafer data into actionable yield insights with Spotfire

factors behind yield excursions. By empowering quality, process, and engineering teams to collaborate around a shared data foundation, Spotfire enables organizations to accelerate problem resolution, reduce scrap, and support continuous performance improvement.

Use case: Root cause analysis for yield loss detection

Consider an engineer faced with an unexplained drop in wafer yield. Using Spotfire Industry Pro, they can combine chemical deposition logs, temperature readings, and defect inspection data into a single analysis. The platform reveals a correlation: a minor fluctuation in chemical composition during deposition is linked to the defect patterns observed downstream. With this insight, the engineer adjusts the process parameters, resulting in a measurable reduction in defects and a yield recovery.

This is the power of root cause analysis with Spotfire. By relating disparate datasets and transforming them into actionable insights, engineering teams can quickly identify and resolve complex issues, prevent repeat excursions, and enhance overall process stability.

Key capabilities for semiconductor manufacturing operations

Spotfire Industry Pro offers a flexible environment for advanced root cause analysis, featuring:

- Integration of diverse data sources: Combines wafer maps, inspection reports, and more for comprehensive investigations.
- Interactive visualizations: Highlights spatial and temporal patterns.
- Advanced analytics: Uncovers correlations that drive yield and quality improvements.

- AI-powered recommendations: Leverage advanced analytics algorithms to suggest the most insightful visualizations, enabling users to uncover hidden patterns in data.
- Time-series analysis, anomaly detection, and statistical modeling: Extends engineers' ability to diagnose problems and optimize processes.

Business value delivered

With Spotfire, semiconductor manufacturers can achieve significant improvements in both yield and efficiency, which directly translates to substantial returns on investment and increased operating margins. Faster root cause identification reduces the time and cost associated with prolonged excursions. Integrated analytics enable data-driven decision-making across teams, ensuring that corrective actions are targeted and effective. By minimizing scrap and process variability, organizations can strengthen their profitability while delivering higher-quality products to market more quickly, with increased yields.

Take the next step toward smarter manufacturing analytics.

Learn more at

spotfire.com/solutions/semiconductors

Ready to explore the power of Spotfire Industry Pro? [Start your free trial now](#). The Spotfire Industry Pro trial gives you the freedom to explore your data and gain faster insights for complex problem-solving. Unlock smarter insights, simplify deployments, and maximize your data's impact with the power of Spotfire Industry Pro.

Unlock smarter manufacturing operations with Spotfire

Spotfire transforms the way semiconductor manufacturers approach problem-solving. By empowering teams to connect data, uncover root causes, and act decisively, it accelerates the path to yield improvement and operational excellence.



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Spotfire® is a visual data science platform that makes smart people smarter by combining interactive visualizations and advanced analytics to solve complex, industry-specific business problems.

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