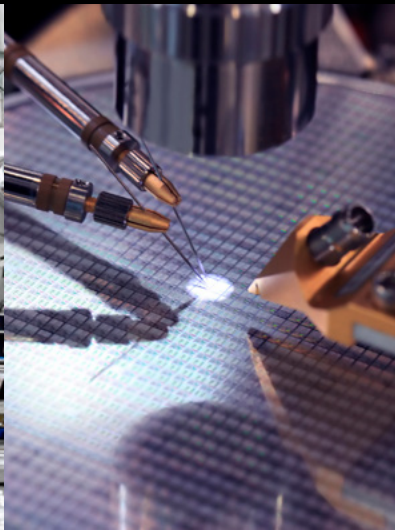


# Mitutoyo



General Manufacturing | Automotive | Electronics and Semiconductor | Medical and Pharmaceuticals | Aerospace | Energy | Intelligent Manufacturing | Gage Control

## MeasurLink<sup>®</sup> by Industry



## MeasurLink®

An Integrated Solution for Quality Data Management



MeasurLink® is Mitutoyo's Data Collection and Real-Time Statistical Process Control Software. MeasurLink® can be used in any industry to manage inspection data collection and improve manufacturing processes.

- Reduce costs associated with inspection, rework and scrap
- Ensure part quality and consistency
- Increase data visibility and accessibility
- Increase ease of use for inspectors from both Quality Control and Manufacturing Environments
- Reduce manufacturing defects through the use of real-time SPC

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Manufacturing companies across every industry want to improve the quality of their products while keeping their operating costs low. Mitutoyo's MeasurLink® is the ideal software to assist companies with achieving these goals. As a Data Collection and Statistical Process Control Software, manufacturers have used MeasurLink® to improve product quality, prevent non-conformities and reduce inspection time and costs for over twenty years.

### Real-Time Statistical Process Control



MeasurLink® is an integral part of Six Sigma activities. Unlike other software, MeasurLink® calculates and monitors statistical metrics as each part is measured. This Real-Time monitoring allows users to control the quality of the product during production and prevent costly defects.

- Live statistical data testing
- Email alerts and alarms for out-of-control processes
- Real time Cp, Cpk, Pp and Ppk calculations
- Immediate pre-control, XBAR and IMR charting
- Assignable cause and corrective action data entry

MeasurLink® allows companies to control the quality of their processes by identifying and reducing process variation.

### Analysis of Measurement Data



Measurement data is only useful if it can be found when it is needed. Manufacturers need instant access to data regardless of when or where it was measured. MeasurLink® Process Analyzer meets the analytical and reporting needs of manufacturers.

- Filter data by traceability items
- Merge data from other Lots or processes
- Generate reports on current or historical data
- Summary reports allow complex review of large amounts of data
- Multivariate charting allows analysis of correlation

Access data from any workstation in system, across the room or anywhere on your network.



The automotive industry is one of the greatest users of statistical process control. Whether an OEM, Tier1, Tier2 or other supplier of automotive components, manufacturers are constantly striving for consistent product quality and improved profitability. Reducing process variation, monitoring critical characteristics, realizing continuous improvement and reducing administrative workloads are just a few of the techniques used to meet these goals.

## Reduce Process Variation



Reducing process variation and increasing process stability is essential to improving product quality. Stable processes produce less scrap and require less inspection which saves time and money. MeasurLink® is the perfect tool for these ongoing activities.

- Monitor real time capability indices
- Use pre-control charting to reveal variation and mean shifts in data
- Compare multiple operations performing the same processes to increase overall quality
- Use historical data to predict tool life to reduce defects due to breakage

## Monitoring Critical Characteristics



Automotive manufacturers constantly monitor critical characteristics to ensure the quality their customers demand and reduce the risk of product recalls. Recalls are not only costly but can permanently damage the reputation of a company and their OEM customers.

MeasurLink® can be used to:

- Provide visibility to these characteristics
- Monitor capability indices in real-time
- Perform data tests as each subgroup is measured
- Alert operators and engineers the instant a defective part is measured through email alerts

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Process improvement is very important in automotive manufacturing. Mass production allows manufacturers to refine their process to be more cost effective while reducing the risk of non-conformities. Going paperless is also a large initiative taken by many facilities. MeasurLink® is a great tool for both of these activities. Electronic Data collection and database retention allows for reduced record keeping and instant access to data.

### Continuous Improvement



Continuous Improvement activity is nonstop in automotive facilities locally and globally. Constantly improving your process will not only improve the quality of your products, it will also save you money. By having more efficient processes, customer satisfaction will also improve.

Use MeasurLink® to:

- Reduce scrap
- Prevent non-conformities
- Reduce cycle time
- Improve tool life accuracy

### Reduce the Workload



Reduce the workload associated with managing inspection data. MeasurLink® Real-Time eliminates the need for paper based data collection. Electronic data collection not only enables faster, more accurate data collection, but it also makes reporting, data mining and audit preparation a simpler task.

- Faster inspection times
- More accurate data collection
- Reduced dependency on spreadsheets
- Gather data from electronic gages, RS232 devices, PC based metrology equipment, PLC's and more



Aerospace quality control keeps manufacturing processes operating at the highest efficiency. Specialty raw materials and aerospace subcomponents can be expensive. Finding defects late in production increases scrap and rework along with shipment delays. Quality managers need to proactively prevent defects by monitoring processes closely at the earliest production stages.

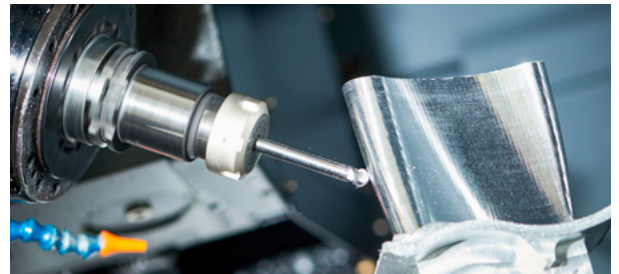
## Data Visibility



Our customers gain the biggest improvements and cost savings by evaluating statistical data from a higher level—comparing performance across plants, processes, shifts, parts, and lots to find the next biggest opportunities for reducing costs and minimizing waste. All quality data collected by MeasurLink® is stored in a single networked database, allowing users to:

- More closely monitor and analyze processes
- Prioritize quality improvement efforts
- Deliver continuous process improvements
- Generate reports and analytics
- Compare production line capability
- Ensure product consistency

## AS9100 Conformance



AS9100 requires a great focus on establishing and complying with design requirements. MeasurLink® uses a Part, Routine and Characteristic structure that allows users to build and maintain a system to ensure the customer's design requirements are being inspected and held to conformance.

AS9102 describes the details for first article inspection while AS9103 defines the expectations for statistical process control. Multiple Routines, or the use of Variable Inspection Frequency along with Real-Time SPC, allows the user to ensure these inspection requirements are met.



Medical Device and Pharmaceutical manufacturers produce products that improve and save lives every day. Products must be of the highest quality to meet customer demands for safety and efficacy. In addition, Medical Device and Pharmaceutical manufacturers must meet stringent government regulations and oversight while managing an increasingly global supply chain.

### FDA Compliance

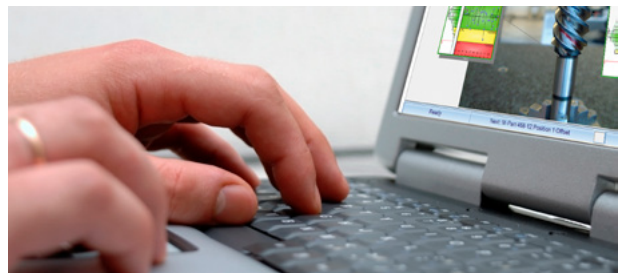


Part 11 applies to drug makers, medical device manufacturers, biotech and other FDA-regulated industries. It requires manufacturers implement controls including audits, system validations, audit trails, electronic signatures, and documentation for software and systems involved in processing the electronic data.

Some of the tools used in Part 11 Compliance are:

- Electronic signatures
- Audit trails
- Unique users and login credentials
- Software validation

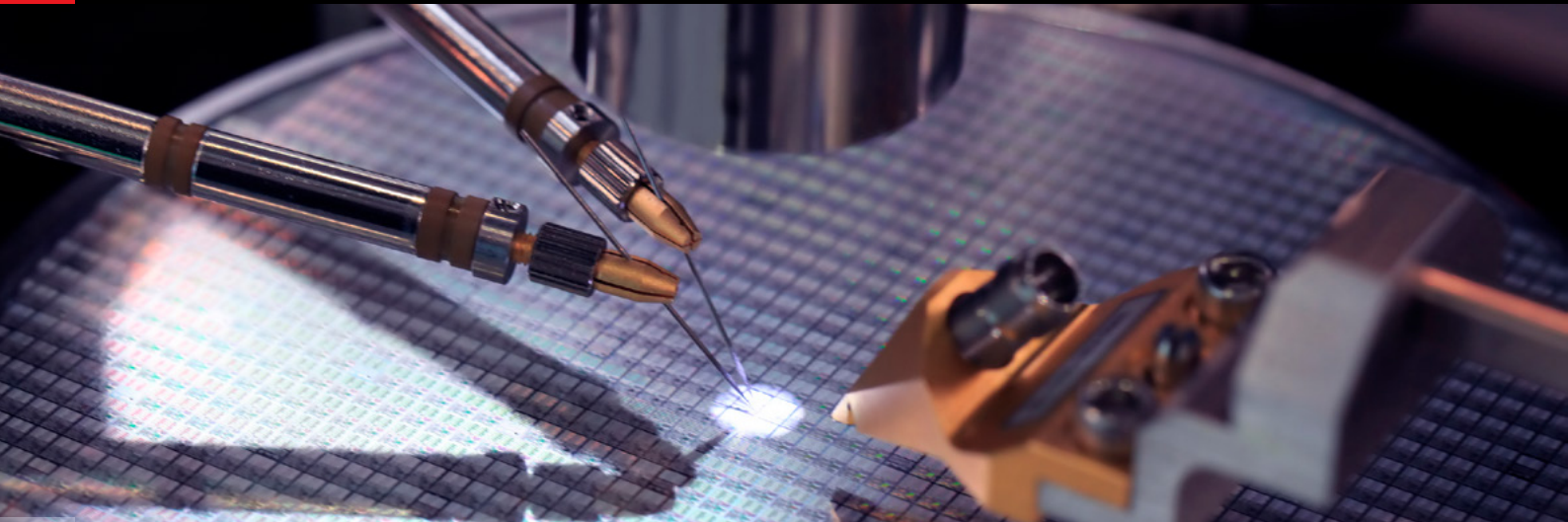
### Software Validation



The Medical Industry, like many others, is required to prove that the software they use performs as advertised. Software validation is a principal means of avoiding defects and resultant recalls related to software defects.

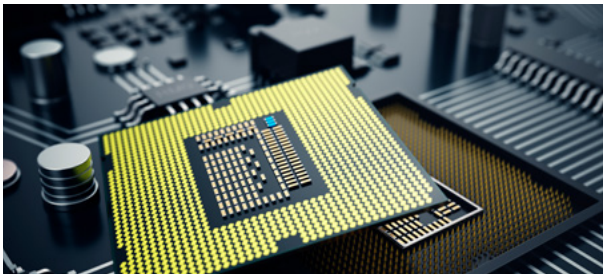
MeasurLink® validation is quick and easy using the existing scripts provided by our developers. These scripts are used by the end user to ensure the software meets their requirements.

MeasurLink® works on virtually all electronic Metrology equipment. By utilizing one data collection and SPC platform, the need to validate multiple software is eliminated.



Almost all of today's electronic technology involves the use of semiconductors. Semiconductor and electronic manufacturing is also integral to every other industry as more products have electronics embedded into them. Manufacturers of these components use sophisticated techniques and processes that are unique to this industry and must be able to quantify and react to abnormal conditions.

## Lot Acceptance



Lot inspection and acceptance allows manufacturers to assess the quality of the batches of components received and predict the quality of similar batches. This approach allows users to reduce the amount of sample that needs to be inspected. MeasurLink® supports this activity by providing real-time statistics such as Cpk and Ppk.

This approach allows:

- Reduced cost of receiving inspection
- Increased confidence in supplier quality
- Faster reaction to supplier quality issues
- Less risk of supplier defects impacting other processes

## Multi-Operation Manufacturing



Products produced in the semiconductor industry involve many unique operations. Measurements are taken during all steps of manufacturing: Wafer processing, Die processes, IC packaging and testing. All of this data needs to be tied back to the end product.

Serial numbers and other traceability can be used to filter data down to the subset needed by users and then reported to the customer on demand. This data can be analyzed at the operation site or remotely by users with access to the database from anywhere in the world.





Modern society consumes large amounts of fuel, and the energy industry is a crucial part of the infrastructure and maintenance of society in almost all countries. Like other industries, energy manufacturers must produce quality components at an affordable cost. Reducing scrap and rework while ensuring conformance of product is key to reaching these goals.

### Traceability



Traceability is information about a part that is important, but not a measurement. This information can be collected and used as criteria for filtering the data.

- Serial Number, Lot Number, Customer, Invoice, Order
- Fixture, Machine Line, Material type, etc

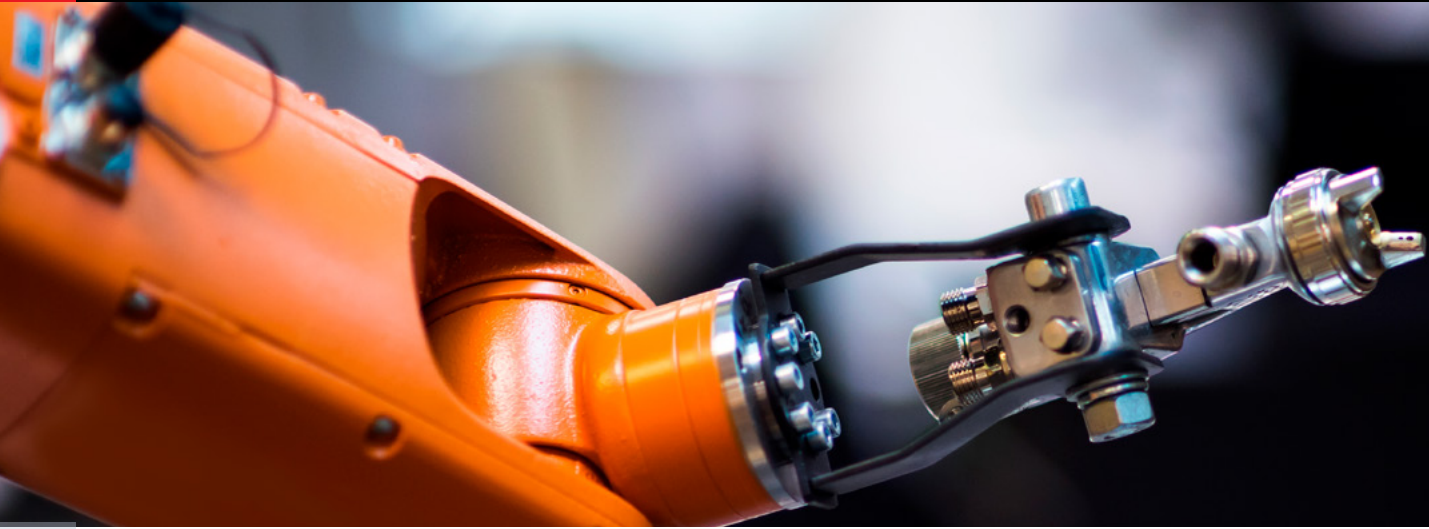
This information is just as important as the actual measurement data. Many energy components have a long life in use and retention and access to not only measurements, but traceability data that is necessary to ensure the component is up to the job. MeasurLink® data is easily retained and accessible to meet this need.

### Electronic Data Collection



Electronic data collection allows the user of the gage to send the measurement displayed on the gage directly to a computer by simply pushing a data send button. An incredible variety of Data Management is available. From USB cables and multiplexer systems to wireless systems, MeasurLink® can support them all.

- Reduce the time required to measure and record data
- Reduce errors in data such as transposing numbers and illegible handwriting
- Increase ease of use by not having to put the gage down to pick up a pen and paper to record the data



We are at a very exciting time in manufacturing. The next revolution in industrial technology has already begun. More and more machine tools are supplying process data, while monitoring programs are displaying and improving machine uptime and usage. Metrology equipment and software are being adapted to work with this same infrastructure so that data can be collected quickly and easily.

## XML and ASCII Based Import and Export



MeasurLink® is a core software when implementing intelligent manufacturing. The Real-Time module can collect or import data from many sources including:

- Quality Information Format(QIF)
- Text, ASCII and CSV
- XML Data Sources
- Serial Devices(RS232)
- Other Mitutoyo software using DDE
- USB and Virtual COM Ports

Can also be exported in many formats including:

- Quality Information Format(QIF)
- Text, ASCII and CSV
- XML Data Sources
- AQDEF

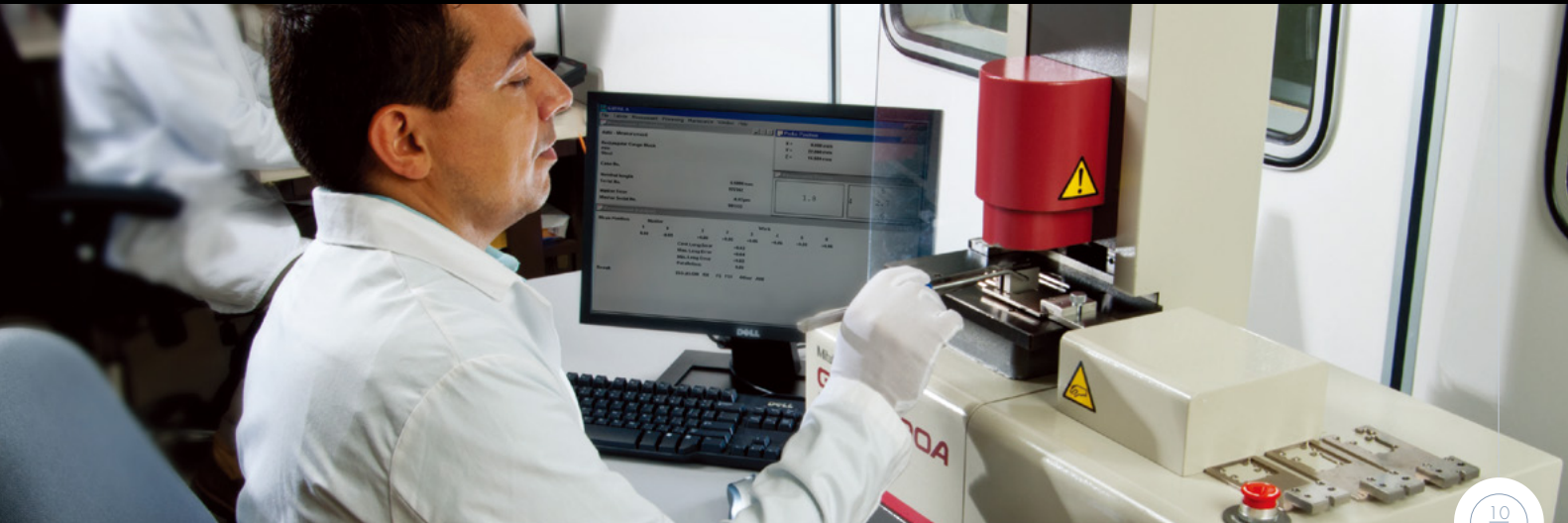
## Process Feedback Automation



Modern in-process gaging not only uses more sophisticated measurement equipment, it also reduces operator influence by using software to control the adjustment frequency and amount. Modern, in-line metrology equipment and software must have features and functions to facilitate this. MeasurLink® can be used to collect data and pass it along to other compensation software.

MeasurLink® can:

- Collect data from virtually any digital source
- Compare this data to part specifications
- React to out-of-spec conditions, or failed data tests
- Automatically generate and send XML-based reports upon completed part inspection



Regardless of industry, manufacturers need to ensure their metrology equipment is the right tool for the job. Gage repeatability and reproducibility testing is the best way to ensure the gage has the required accuracy and resolution for the task at hand. Managing the calibration methods and cycles of this equipment is just as important. Gage management is a large undertaking usually involving on-site and off-site calibration, repair and maintenance.

### Gage R&R



MeasurLink® Gage R&R uses calculation methods based on AIAG's Measurement Systems Analysis (MSA4).

The following Gage R&R study types are supported:

- Bias
- Linearity
- Type I
- Variable Range Method
- Crossed ANOVA
- Crossed Average & Range
- Nested ANOVA
- Nested Average & Range
- Stability

### Gage Management



Manufacturers use and maintain hundreds or thousands of gages. The procedures and record keeping of this work can be a time consuming and daunting task. MeasurLink® Gage Management allows users to perform these functions with confidence and efficiency.

- Gage inventory management
- Calibration history
- Calibration procedures
- Assessment and reporting
- Gage vendor management
- Gage location management
- Gage R&R history



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