Brighton Science



Surface Analyst 5001

Fast. Easy. Accurate. Non-Destructive.

PREDICTIVE ANALYTICS FOR SURFACE QUALITY CONTROL

The Surface Analyst 5001 is Brighton Science's handheld surface inspection device that allows manufacturers to quantify the quality of material surfaces for bonding, coating, sealing, painting, printing, or cleaning applications.

This fast, easy, accurate and non-destructive device provides the analytics businesses need to reliably predict whether adhesion and cleaning will be successful. The Surface Analyst technology allows manufacturers to eliminate scrap, rework, production delays and the risk of recalls related to adhesion and cleaning issues.

Whether you are performing a Failure Mode and Effects Analysis (FMEA) for a new product, validating incoming material quality from your supplier, developing a Process Capability Index (Cpk) to validate plasma and cleaning equipment or measuring the effect of product handling and storage, controlling these critical points in your adhesion process enables zero defect manufacturing.



A Truly Near-to-Action Inspection

The quantitative inspections of the Surface Analyst are the first step to understanding your adhesion and cleaning processes. The portability and ease-of-use of the Surface Analyst 5001 device allows users to walk their production line to inspect material surfaces and map **Critical Control Points**—areas within production where surface condition has the opportunity to change and impact adhesion and cleaning outcomes.

The first step in achieving a holistic process control solution to surface quality, adhesion and cleaning is adoption of the all-new and state-of-the-art Surface Analyst 5001. Combining flexible and portable measurement devices like the 5001 with touchless, automated inspection points, using the **Surface Analyst XA** system, your whole production line will be seamlessly integrated for 100%-part validation.

FAST.

Through the push of a button—easily accessible directly on the body of the 5001 or using the extended controls on the Universal Inspection Head—users retrieve accurate and quantitative surface quality data in less than 2-seconds.

EASY.

Designed specifically for the manufacturing floor, **the 5001 allows for inspections on any material, in any direction and on parts with complex geometries.** A single button operation, powerful software and flexible tethered Universal Inspection Head break down barriers to the information manufacturers need to control manufacturing processes related to adhesion, cleaning and new product development. The 5001 is a self-contained system that does not require it to be fixed to a computer or tablet.

The 5001 includes extended controls: buttons, status lights and audible “pass-fail” feedback directly in the Universal Inspection Head for an even easier, single-handed inspection experience—removing the need to view the device’s screen during a test.

ACCURATE.

Archer, the world’s most powerful software that powers the device streamlines surface adhesion inspection processes by providing precise and quantitative inspections, free from subjectivity. **The robust Archer software is designed to supply precise inspections on variable material surfaces and in unpredictable manufacturing environments, providing perfect surface quality results in imperfect situations.**

The 5001 features intelligent **Dynamic Detection**—a combination of advanced vision tool-sets capable of exceeding the accuracy of any other goniometer contact angle measurements.

NON-DESTRUCTIVE.

Eliminate scrap resulting from destructive testing. The 5001 takes inspections using tiny droplets of highly purified HPLC-grade water, eliminating the potential for material contamination and makes inspections completely harmless to users.

Hardware Features

AUTOMATIC PRESSURE COMPENSATION
This feature includes a dedicated sensor that monitors system performance and hydraulic pressure. This advanced control allows the device to take precise measurements in any angle or direction--vertical, up-side-down and in small spaces.

DATA TRANSFER PORTS
Transfer ports allow for the easy transfer of inspection data and images critical for predictive analytics. Users can also upgrade device software and features using USB, and other communication protocols.

LCD TOUCHSCREEN
The 5001 features a resistive touchscreen that allows for the use of any and all glove types. An intuitive and easy-to-use interface puts data visualization at the user's fingertips.

LIVE VIDEOSCOPE
The only handheld tool to have a live feed coming from the inspection head. The Surface Analyst 5001 displays a real-time view of the surface before the drop is deposited, allowing for precise inspection placement.

SINGLE-BUTTON OPERATION
Inspection measurements are performed in less than 2-seconds with a simple click of a button located on either the body of the device or through extended controls on the Universal Inspection Head. The 5001 has been designed to include two sets of buttons on the body of the device for both left and right-handed operators in mind.



FLUID CARTRIDGE
Individually hand-assembled and inspected cartridges use non-destructive, certified HPLC water (or endotoxin-free for medical device) to ensure zero contamination during inspection.



FLEXIBLE TETHER
The 5001 features a standard 2' tether to allow measurements on complex surfaces: horizontal, vertical, inverted, blind, contoured and textured. An additional option for an extended tether--up to 6 meters—is provided for even more flexibility for testing hard-to-reach and challenging surfaces.

UNIVERSAL INSPECTION HEAD
The rugged Universal Inspection Head's innovative design provides ultimate measurement accuracy through an innovative top-down surface quality inspection. This innovative design provides the manufacturing floor with precision that exceeds laboratory equipment. The Universal Inspection Head has been designed to meet the needs of every unique application--whether you're inspecting into deep and confined channels, on narrow edges, on small parts, and much more. The Universal Inspection head features rugged and durable components, capable of withstanding rough production environments.

EXTENDED CONTROLS
Built-in control buttons, colored status lights and audible feedback indicates a pass/fail inspection to the user.

SINGLE-HAND INSPECTION
Extended controls like buttons, status lights and audible feedback are integrated into the Universal Inspection Head and indicate a passed or failed test.

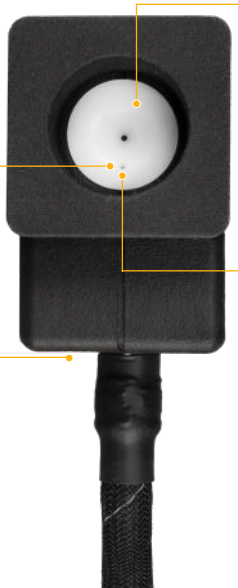
Extended controls remove the need to look at the device's screen during a test. Using Brighton Science's wearable accessories, users can holster the device to their body and easily conduct surface inspections, all while having an additional free hand. Single-hand inspection and device wear-ability provide an even more convenient and user-friendly experience.

INTERCHANGEABLE INSPECTION FEET
Take surface quality inspection to the next level with our interchangeable custom inspection feet. Interchangeable inspection feet accommodate unique applications, users who need to test a variety of products with different shapes and sizes or materials/products that have complex geometries.

ENHANCED BALLISTIC DEPOSITION
Ballistic Deposition is Brighton Science's patented approach to depositing a drop of fluid to **measure real-world surfaces** that vary in roughness, chemical variation and complex geometries (vertical, upside down, small, narrow).

Enhanced Ballistic Deposition features a new built-in microcontroller that automatically executes precise adjustments to further increase the accuracy of drop deposition to inspect a wider array of rough surfaces or materials with complex finishes.

TEMPERATURE CONTROL SYSTEM
Allows the device to maintain a steady temperature for consistent viscosity of the fluid for accurate contact angle measurements.



LUCENT
Lucent is a unique lighting configuration that controls illumination of the inspected surface. Lucent's advanced design can easily manage challenging surfaces with varying finishes by removing reflectivity and increasing contrast.

By controlling lighting environment, the 5001 captures high-quality images for the most precise measurement of contact angle on a large variety of complex material surfaces.

GEM DROP
GEM Drop is a jeweled valve dispense system that meticulously builds the perfect fluid drop on material surfaces for a reliable and accurate contact angle measurement.

GEM Drop takes sensitive surface chemistry measurements out of the laboratory and puts them directly on the production line and allows for precise inspections in crevices and tiny drops on very complex materials.

Powered by Archer Software

DYNAMIC DETECTION

This innovative approach to powerful image analysis provides the most precise top-down measurement of contact angle. Dynamic Detection's superior drop shape detection enables the device to measure a contact angle that more accurately represents the droplet's interaction with the surface, therefore, exceeding the accuracy of any other goniometer contact angle measurements. Dynamic Detection's combination of image analysis toolsets are so intelligent, it **provides perfect contact angle results in imperfect situations.**

SMARTDROP

This smart software feature streamlines the inspection process by intelligently accepting inspections that meet measurement standards. This feature removes all human decision making from the process for a truly non-subjective inspection.

USER MANAGEMENT

Management can add individual user profiles and if necessary, limit capabilities to eliminate changes to device settings. Each inspection record automatically logs the username conducting the inspection for easy tracking and auditing purposes. It also logs time of inspection, part inspected and results.

SURFACE PROFILES

Using the Surface Profiles feature, Admins can create unique profiles with customized inspection parameters to increase accuracy when measuring dissimilar materials. Surface Profiles ensure precise measurements on materials with varying finishes, textures, conditions, or surface preparations.

2-LEVEL PERFORMANCE MONITORING

Actively monitor and analyzes system functionality down to each micro droplet being deposited. This feature monitors any changes in functionality between Performance Checks and will signal if an additional check is required, guaranteeing accurate readings 100% of the time.

1. **Performance Check**
   A Performance Check is an automated test sequence and tool realignment process that is used to verify and maintain proper measurement results to ensure the Surface Analyst is operating at maximum performance.

2. **Performance Alert**
   This automated intelligence provides thorough feedback by alerting the user to conduct a Performance Check. This ensures the device is working at peak performance 100% of the time.

DATA COLLECTION & TREND ANALYSIS

All inspection data is automatically logged and displayed in a convenient chart for easy trend analysis, directly on the device. The data can be easily retrieved from the device so it can be conveniently shared within the organization for further analysis.

PASS/FAIL MODE

Using this feature, admins can input customizable pass/fail tolerance ranges that read out to the operator simply as, Pass or Fail. This feedback provides the result in a simple way that eliminates the need for the operator to understand inspection tolerances or what the number means. The Universal Inspection head provides audible feedback based on the inspection result and the built-in status lights will turn red when an inspection fails and green when an inspection indicates a pass.

NEAR-FAILURE NOTIFICATIONS

This feature is designed to warn users when their process is near, or reaching the defined pass/fail limit, but is still passing. This predictive analytics feature helps users understand if their process is slowly drifting toward the failure limit. When a test is near-failure, the on-screen Pass/Fail message will turn yellow as well as the built-in status lights located on the Universal Inspection Head.

DROP NOTES

Drop Notes facilitate logging custom information, meta-data or comments alongside Surface Analyst 5001 inspection results. Drop Notes ensure that data extracted from the Surface Analyst is properly matched to the appropriate materials or surface treatment steps and allows users to quickly tell the source of exported data during analysis.

ON-DEVICE TRAINING VIDEOS

Allows new and existing users the ability to view training videos directly on the device. This can be done on the factory floor prior to using the Surface Analyst device.



Additional Options

QUICK-START TEST PLAN+

The Quick-Start Test Plan+ incorporates Brighton Science's experience and expertise to help you develop a plan to successfully gather meaningful data using the 5001. The Quick Start Test Plan + includes the Test Plan *plus* customized Process Analytics software *and* Auto Profile Selection using QR Code Reading.

Once the necessary data has been gathered, Brighton Science will help you understand what the data means and how to make data-based manufacturing process decisions.

The 4-step process includes:

1. Partner with Brighton Science to build the Test Plan
2. Produce meaningful analytics (using Brighton Science's Process Analytics & Auto Profile Selection software)
3. Brighton Science will help you understand what the data means
4. Make effective manufacturing decisions based on meaningful data

PROCESS ANALYTICS

This intelligent software feature allows manufacturers to scale material surface measurements that provide statistical process control to the factory floor. With little operator input, manufacturers can pass/fail products based on lot or batch.

Process Analytics is a data collection workflow that enhances the Surface Analyst's use in manufacturing by providing:

- Meaningful data
- A new level of test result traceability
- Custom data aggregation
- Magnified surface quality trends
- Testing to measure uniformity of surface quality

PRINT ANALYTICS

This feature is used with Process Analytics software to print results in hard copy format for durable storage of certification or regulatory quality check documentation.

QR CODE READING

The Universal Head includes QR Code Reading that allows users to easily load 5001 material profiles, process workflows and customized metadata alongside surface inspection results. QR Code Reading reduces human error by eliminating the need for users to manually enter this information into the device while on the busy manufacturing floor.

GRAPHICAL FEEDBACK

Data produced by Process Analytics are tabulated into a legible and information-rich data sheet to show manufacturers a clear image of how consistent and effective their cleaning and adhesion process is at any given time.

WETTING ANALYTICS

Wetting Analytics is a feature that analyzes dynamic drop wet-out and alerts the user to the presence of a water-soluble chemical on the material surface. This information is vitally important for processes that include cleaning and washing steps where improper rinsing has left surfactants, detergents, or other hydrophilic agents on the surface. Failure to remove these substances is a cause of sealant and adhesive failure.

Conversely, water-soluble agents may be a desirable component of a process. Wetting Analytics software will quantify the amount and uniformity of these substances, ensuring downstream product performance.

CONNECTIVITY

The Surface Analyst 5001 provides real-time output of surface inspection data into MES via RS232 output or ethernet API. Statistical process control allows you to monitor in real-time what changes are occurring on the surface due to treatment degradation or unseen factors that lead to adhesion failure.

uCONNECT UNIVERSAL MOUNT

uConnect provides a means to position the Universal Inspection Head precisely and consistently over the surface being inspected for the perfect point of view. uConnect allows users to easily connect the Universal Inspection Head to a Surface Quality Check Station for a fixed inspection.

SURFACE QUALITY CHECK STATION

Partner with Brighton Science to design a custom Surface Quality Check Station or choose from standard product nests and fixture options to ensure proper alignment of both the Surface Analyst 5001 and your product. Surface Check Stations remove variability in inspection placement and ensure meticulous measurements across complex-shaped products. Check Stations can communicate and connect to MES through RS232 and ethernet API.

DYNE MODE

This software mode displays results in dyne/cm, allowing manufacturers to transition away from harmful dyne solutions. Dyne Mode allows users to measure to an existing dyne specification, but without the subjective and destructive ink.

COMPLETE SURFACE LAB SERVICES

Brighton Science provides full laboratory services to help manufacturers:

- Establish surface quality specifications & cleaning procedures
- Get to the root cause of adhesion and cleaning failure
- Eliminate adhesion performance risks in new product development

Technical Specifications

ITEM	SPECIFICATION
Weight (Instrument only)	1 lb (.5kg)
Weight (With Case & Accessories)	10 lbs (4.5 kg)
Dimensions (Instrument Only)	4.4 in x 2.4 in x 9.2 in (11.2 cm x 6.1 cm x 23.4 cm)
Case Dimensions	14 in x 17 in x 7 in (36 cm x 43 cm 18 cm)
Power	Battery Lithium Ion 7.4 VDC, 2600 mAh, 19.24 Wh
	Power Supply (Input) 100-240 VAC, 50-60 Hz, 1.2A
	Power Supply (Output) 12 VDC, 2.5A
Battery Charging Station (If Included)	Input DC 12V, 2.5A
	Charges 1 Brighton Science battery
	Charge Time 2 hours
Noise Emission	Less than 70 db(A)
Cartridge Liquid	HPLC-grade water
Cartridge Capacity	1000 measurements
Inspection Time	2 seconds
Image Storage Capacity	40,000

APPLICATIONS	MATERIALS	INDUSTRIES
Bonding	Composite	Film & Flexible Packaging
Coating	Polymer	Aerospace
Sealing	Metal	Automotive
Painting	Glass	Medical Devices
Printing	Certain Textiles	Consumer Goods
Cleaning	Ceramics	Electronics

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