STYLUS PROFILOMETRY

Dektak Pro

Proven Technology, Enhanced Performance

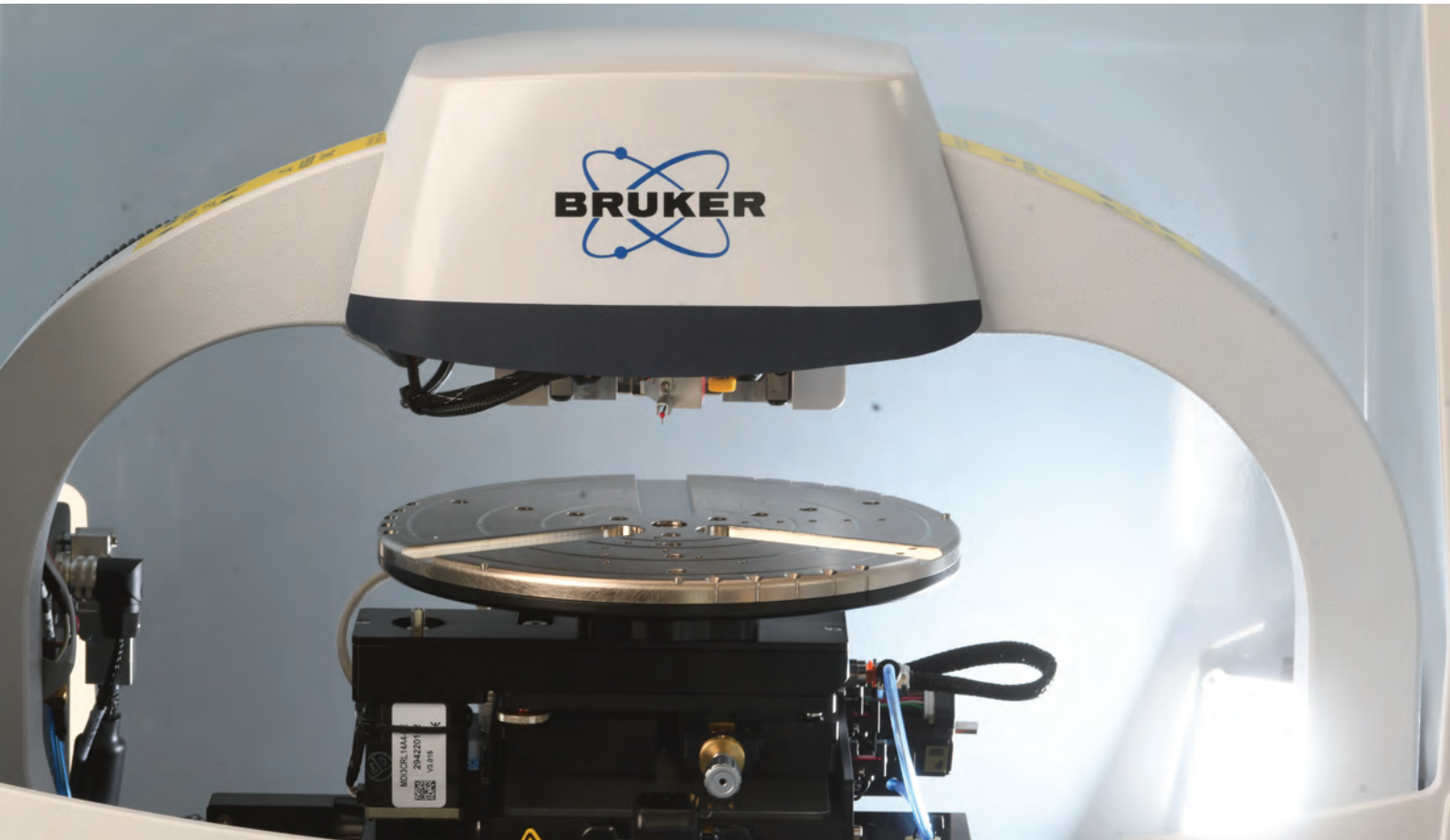
Dektak Pro

World's Most Advanced Stylus Profiler

Dektak Pro™ boasts state-of-the-art ease-of-use functionality and unparalleled accuracy for film thickness, step height, stress, surface roughness, and wafer bow measurements. This 11th-generation Dektak® system delivers exceptional 4 Å repeatability and offers a 200 mm stage option, providing ultimate versatility for surface topography analysis in both research and industrial applications. Dektak Pro sets a new benchmark in surface metrology performance for cutting-edge microelectronics, thick film coatings, and life sciences applications.

Only Dektak Pro delivers:

- Industry-leading measurement and analysis features that ensure accurate, precise data every time
- Unmatched versatility and ease of use with streamlined software and simplified tip exchange
- Accelerated time to results through direct-drive scan stage and software advances



Unparalleled Accuracy and Value

In stylus profilometry, a radiused probe tip is traced over a surface to capture height information at every point along the trace, enabling high-resolution surface topography analyses. Stylus profiling is well known for being highly accurate and cost effective, and recent advancements are additionally enhancing speed and versatility to meet the evolving demands of cutting-edge engineering applications.

Dektak Pro addresses R&D, process development, and QA/QC present and future needs across a host of industrial and research applications, including:

Microelectronics

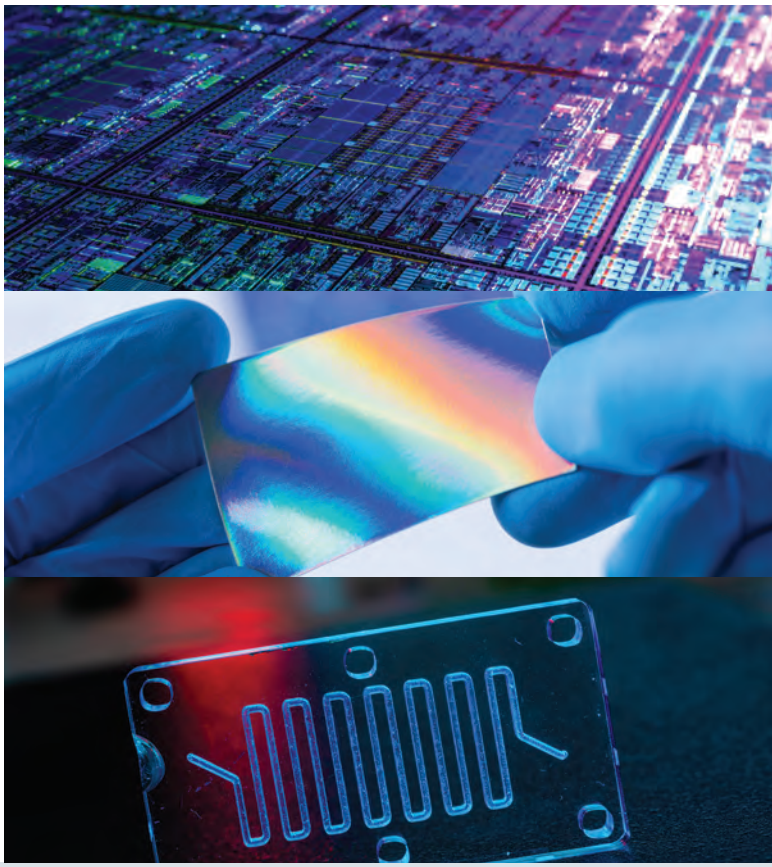
- Monitoring deposition and etching processes
- Measuring device and sensor heights
- Evaluating trench depths

Thick Film Coatings

- Verifying UV/hardness coatings on eyeglasses
- Optimizing decorative coatings on faucets/fixtures
- Analyzing paint or ink coating thickness

Life Sciences

- Determining bio-material thicknesses
- Evaluating bio-sensor topography
- Characterizing microfluidic channels



Dektak's History of Innovation

Bruker has driven stylus profiling innovation over the last five decades, improving resolution, stability, speed, and versatility. This has firmly established Dektak as the gold standard of stylus profilers, leading to hundreds of Dektak systems being installed around the world every year. Now, Dektak Pro provides even more enhanced operability, reliability, and measurement accuracy. When an accurate, trustworthy stylus profiler is needed, Dektak Pro is the unquestioned solution.

Unrivaled Performance and Repeatability

Dektak Pro's superior resolution, stability, robustness, and longevity guarantee reliable, quality results for years or even decades to come. The system builds on industry-leading Dektak fundamentals to deliver highest resolution, lowest noise floor, and easiest tip exchange—elements essential to maximizing the system's unbeatable repeatability and accuracy. In the right environments, Dektak Pro can even measure single-nanometer step heights and achieve better than 4 Å repeatability on a 1 µm step height standard.

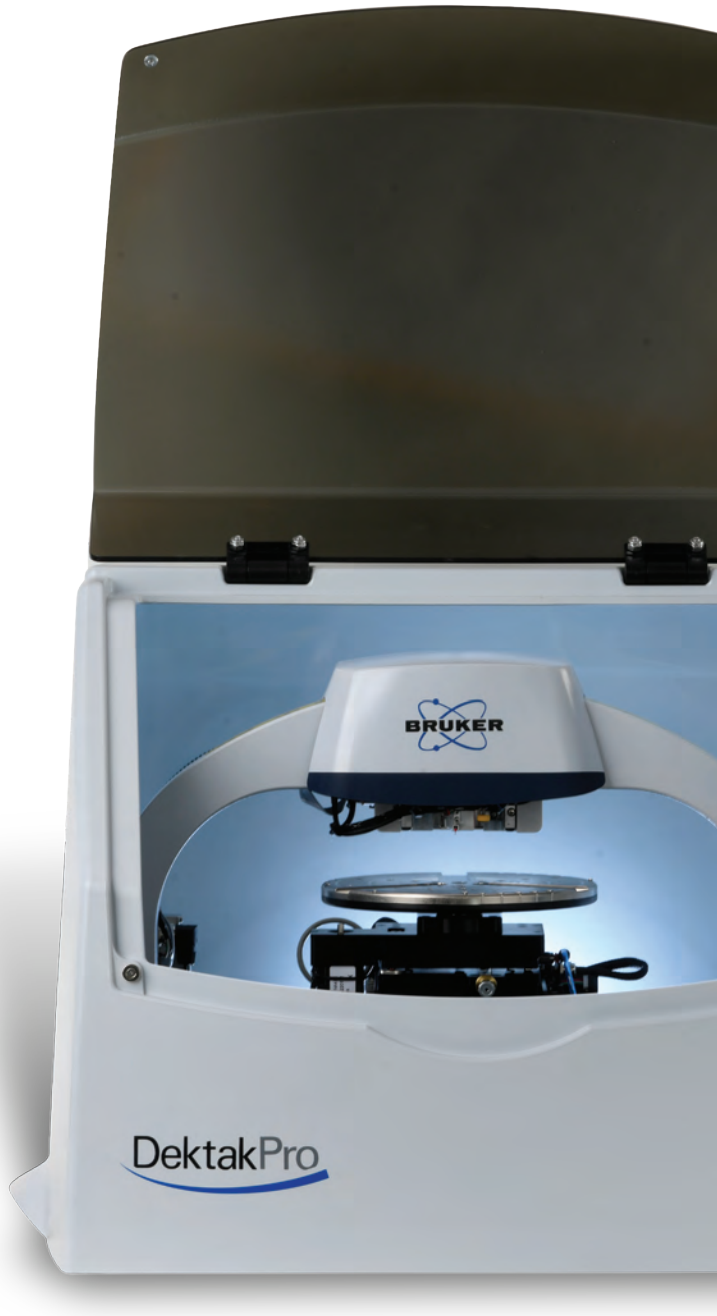
Superior Performance is in the Details

Single-arch design mitigates sensitivity to adverse environmental conditions, such as acoustic and seismic noise, while accommodating large substrates.

Smart electronics minimize temperature variations and electronic noise, reducing errors and uncertainty in high-precision measurements.

Low-inertia sensor (LIS 3) enables rapid adaptation to sudden changes in surface morphology, maintaining accuracy and responsiveness in dynamic measurement scenarios.

Stylus exchange technology eliminates misalignment and the need for system recalibration by using a self-aligning stylus fixture for effortless exchange that takes less than a minute.



Productivity-Enhancing Speed and Ease of Use

Dektak Pro stands at the forefront of stylus profilometry, prioritizing time to results while maintaining data quality. The system is indispensable for researchers and engineers seeking rapid acquisition of precise measurements, as well as for multi-user facilities and laboratories with diverse measurement needs.

Fastest Time to Results

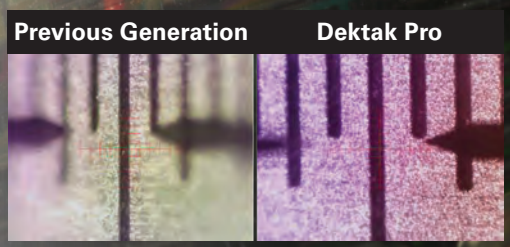
Direct-drive scan stage technology is foundational to the accelerated measurements enabled by Dektak Pro. This advanced stage reduces time between scans without compromising resolution and noise floor, speeding up time to results for large 3D maps or long profile scans while maintaining industry-leading data quality and repeatability.

64-bit parallel processing employed by the Vision64® software provides fast data processing even for large datasets. Additionally, automated multi-scan analysis operations streamline repetitive tasks, enhancing speed and ease of use.

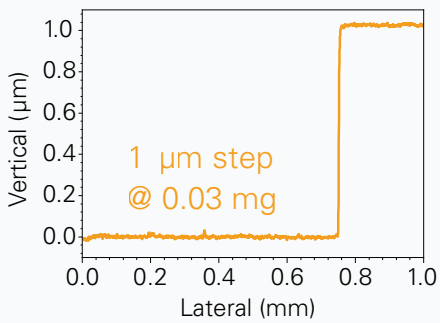
Easiest Operation

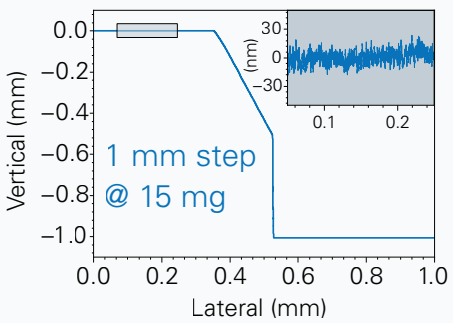
Data collection is performed in Bruker's Vision64 software, featuring a streamlined graphical user interface that combines intelligent architecture with an intuitive visual workflow and extensive user-defined automation capabilities. Dektak Pro further improves the data collection experience with:

- Minimal optical distortion, resulting in the entire field of view being in focus
- A single measurement head to cover 5 nm–1 mm step heights and 1–15 mg loads (down to 0.03 mg with N-Lite+) without recalibration
- Simple operator GUI for automating measurement setup and streamlining operation



A new algorithm brings the field of view into finer focus, making it easier than ever to locate features of interest.





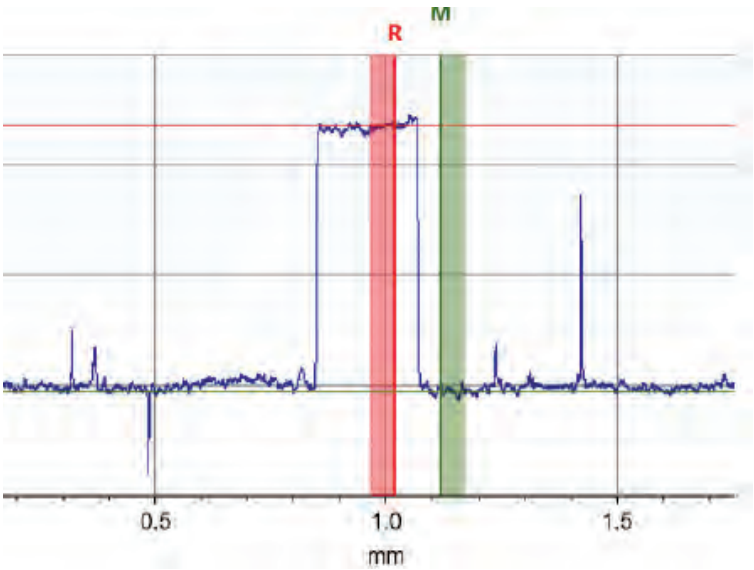
Dektak Pro measures nanometer to millimeter step heights using a single LIS 3 sensor capable of a software-controlled force range of 0.03 mg to 15 mg (with N-Lite+ low load option). Examples shown are of a 1 µm step (left) and 1 mm step (right), both measured with a single sensor.

Expand Your Analysis Capabilities

The Data Analyzer in Vision64 makes analysis robust and simple with data filters, automated leveling, auto step detection, and recipe capabilities.

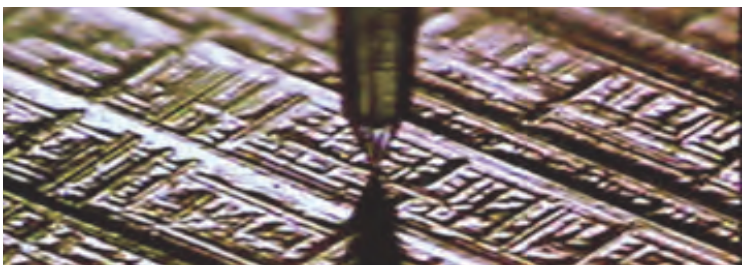
Step Height

Dektak Pro's powerful new step height algorithms deliver reliable and comprehensive results for an extensive array of complex surface profiles. Its automated analysis routines also minimize user influence in step height calculations, promoting consistency and objectivity in data interpretation.



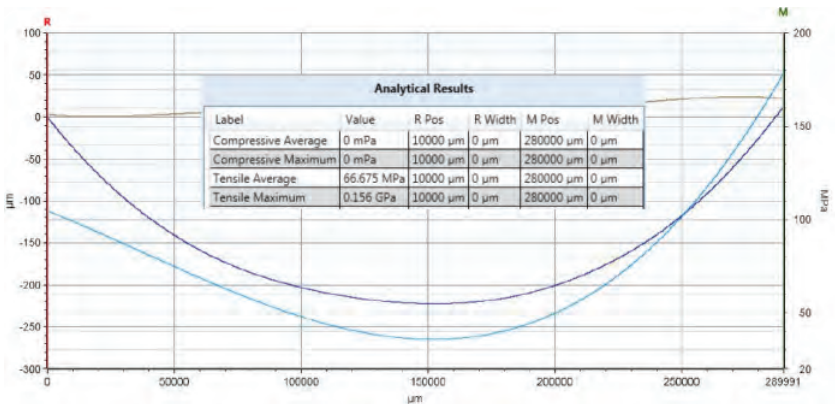
Surface Roughness and Waviness

Dektak Pro provides a cost-effective and user-friendly solution for quantifying surface roughness, texture, and waviness with high precision. The combination of a wide variety of stylus geometries, user-definable stylus force of 1–15 mg (down to 0.03 mg with N-Lite+), and a large vertical range enables measurements on a vast range of surfaces.



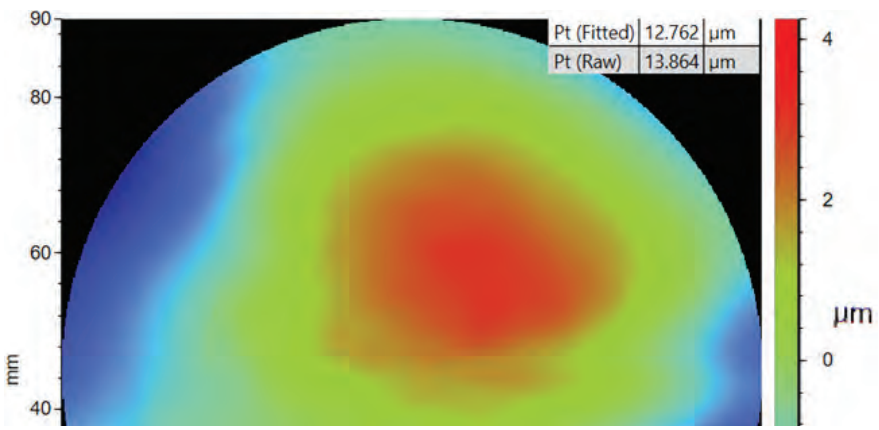
2D Stress Measurements

With Dektak Pro, users have more control than ever over 2D stress analyses. More repeatable, higher-accuracy stress measurements are possible with user-defined outlier removal and fitting boundaries.



Wafer Warpage Mapping and 3D Stress Measurements

Accurate assessment of the deformation caused by film stress is critical for developing controllable processes and producing high-quality devices. Dektak Pro accurately measures film stresses that can lead to deformation, cracking, and delamination.



Choose the Best Dektak Pro for Your Application

Dektak Pro-E or -S

Manual 100 mm XY stage with optional manual theta

Dektak Pro-A

Automated 150 mm XY stage with automated 360° theta

Dektak Pro-A200

Automated encoded 200 mm XY stage with fine encoded automated 360° theta

Configuration Options

Vacuum Isolation Pads	Provides integrated vibration isolation with 4 pads connected to central air (requires ~50 psi).
Vibration Isolation Table	Vibration isolation table 30" x 30". Full-sized table requires 40–60 psi air (not included).
Wafer Vacuum Chucks	Interchangeable 2–3", 4–6", and 8" chucks are available. Chucks have vacuum (on/off manual switch) and include mounting for stress measurements. Black anodized 4–6" and 8" chucks available for transparent samples.
2" Ceramic Vacuum Chuck	Microporous 2" diameter vacuum chuck to firmly hold small samples or coupons.
Photovoltaic Chuck	6" square vacuum chuck designed to hold solar cells firmly in place during measurement. Easily interchangeable with standard wafer vacuum chuck using provided adapter kit.
3–8″ Universal Chuck	Holds 3–8" wafers with vacuum/mounts for stress metrology (Dektak Pro-A200 only).

Stylus Tip Options

Radius	Common Applications
12.5 µm, 25 µm	Bow, stress, and shape for soft samples.
5 µm, 2.5 µm, 2 µm	Step height and roughness measurements for a wide variety of applications. Both 5 µm and 2 µm radii conform to ISO 3274.
0.2 µm, 0.7 µm	High-resolution roughness and trench measurements (N-Lite+ low force recommended).
50 nm	Fine roughness and shallow trench measurements (N-Lite+ low force required).

Ensuring Performance and Reliability

Bruker has a long tradition of partnering with our customers to enable high-quality data acquisition for efficient materials and process development. After developing next-generation technologies with industry leaders and assisting customers in selecting the right system and accessories, this partnership continues through training and extended service long after the tools are sold. Our highly trained team of support engineers, application scientists, and subject-matter experts are wholly dedicated to maximizing your productivity with system service and upgrades, as well as application support and training across a very wide range of disciplines.

Dektak Pro Specifications

Measurement Technique	Stylus profilometry (contact measurement)
Measurement Capability	Two-dimensional surface profile measurements; Optional three-dimensional measurement/analyses
Sample Viewing	Digital magnification, 0.275 to 2.2 mm vertical FOV
Stylus Sensor	Low Inertia Sensor (LIS 3)
Stylus Force	1 to 15 mg with LIS 3 sensor
Low Force Option	N-Lite+ Low Force with 0.03 to 15 mg (optional)
Stylus Options	Stylus radius options from 50 nm to 25 µm; High Aspect Ratio (HAR) tips 200 µm x 20 µm; Custom tips available upon request
Sample Stage XY	Manual 100 mm (4"), manual leveling; Motorized 150 mm (6"), manual leveling; Motorized encoded 200 mm (8"), manual leveling
Sample R-Theta Stage	Manual or motorized with continuous 360°
Vibration Isolation	Vibration isolation solutions available
Scan Length Range	55 mm (2"); 200 mm (8") with scan stitching capability
Data Points Per Scan	120,000 maximum
Maximum Sample Thickness	50 mm (1.95") using standard wafer vacuum chucks
Maximum Wafer Size	200 mm (8")
Step Height Repeatability	4 Å, 1 sigma on steps ≤1 µm (30 scans using a 12.5 µm stylus)
Vetical Range	1 mm (0.039")
Vertical Resolution	1 Å (@ 6.55 µm range)
Input Power	100 to 240 VAC, 50 to 60 Hz
Temperature Range	Operating Range, 20 to 25°C (68 to 77°F)
Humidity Range	≤80%, non-condensing
System Dimensions and Weight	455 mm W x 550 mm D x 370 mm H; (17.9" W x 22.6" D x 14.5" H); 34 kg (75 lb); Enclosure: 550 mm L x 585 mm W x 445 mm H (21.6" L x 23" W x 17.5" H); 5.0 kg (11 lb)

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