





Work unplugged for nearly 8 hours in Windows Best Performance mode\*



Up to 2.08x the Cinebench rating for sustained productivity\*\*



Over 24°F cooler with better sustained performance\*\*\*



## Experience longer battery life, increased responsiveness, and cooler surface temperatures with the HP EliteBook 645 G9 Notebook PC

vs. the Dell Latitude 5430 and Dell Latitude 5420 laptops

When purchasing laptops, you want the device best suited to your employees' needs. After all, whether interruptions result from slow response times, searching for an outlet, or the discomfort of hot surface temperatures, any device issues can affect productivity and workflows.

We put three business laptops to the test: a current-gen HP EliteBook 645 G9 Notebook PC powered by an AMD Ryzen™ 7 PRO 5875U processor, a current-gen Dell™ Latitude™ 5430 laptop powered by an Intel® Core® i7-1265U processor, and a previous-gen Dell Latitude 5420 laptop powered by an Intel Core i7-1185G7 processor. We compared models from the HP EliteBook 605 series and the Dell Latitude 5000 series because both vendors target corporate enterprise users who need portability and power for those devices. We compared models from current generations and chose a previous-generation Dell unit to measure gen-to-gen improvements.

First, we tested the devices' batteries, and the HP EliteBook 645 G9 provided longer battery life than the current-gen Dell Latitude 5430. Then we used industry-standard benchmark tools, such as Cinebench R23, and found that the HP EliteBook 645 G9 achieved comparable or better system responsiveness than the Dell Latitude 5430 and 5420 laptops we tested. Finally, when we ran a sustained workload in Cinebench R23, the HP EliteBook 645 G9 ran cooler than the current-gen Dell Latitude 5420 and delivered a higher multi-core performance score. The performance of the HP EliteBook 645 G9 from our benchmark tools indicate that the notebook could help business users work longer, wait less for applications to perform tasks, and stay cooler with the device on their laps.

\*Based on a MobileMark® 2018 battery life scores; scores may differ from other published scores due to differences in system settings

\*\*Based on Cinebench R23 multi-core score during a sustained workload vs. the Dell Latitude 5420 laptop

\*\*\*Based on surface temperatures while running a sustained Cinebench R23 workload

# Putting three laptops to the test

We tested the following business laptops:



## **Current-gen HP EliteBook 645 G9**

AMD Ryzen™ 7 PRO 5875U processor  
8 cores  
32GB RAM  
1TB PCIe® NVMe® SSD  
42WHr battery

## **Current-gen Dell Latitude 5430**

Intel Core i7-1265U processor  
10 cores  
32GB RAM  
1TB PCIe NVMe SSD  
41WHr battery

## **Previous-gen Dell Latitude 5420**

Intel Core i7-1185G7 processor  
4 cores  
32GB RAM  
1TB PCIe NVMe SSD  
63WHr battery

In this report, we visually present data for all three systems together, but where necessary, we include key takeaways that break down the comparisons: current-gen HP EliteBook 645 G9 Notebook PC vs. current-gen Dell Latitude 5430 device and current-gen HP EliteBook 645 G9 Notebook PC vs. previous-gen Dell Latitude 5420 device.

We ran the following benchmark tests:

- MobileMark 2018
- Cinebench R23
- PCMark 10
- PassMark PerformanceTest 10

To test battery life, we ran MobileMark 2018. Cinebench R23, PCMark 10, and PassMark all measured performance and produced scores for each system under test while the systems were plugged in. For our surface temperature tests, we put the devices under a sustained Cinebench R23 workload and took temperatures on the keyboard deck (top of laptop) and underside of chassis (bottom).

We ran each test three times and report the median result. For more information on our configurations and a step-by-step guide to testing, see the [science behind the report](#).

## Battery testing

Hybrid work means it's not always possible to have a nearby outlet for charging a laptop, and that can complicate a user's workday. An extra hour of battery life that doesn't negatively impact system responsiveness could be a productivity lifesaver. In our test, the HP EliteBook 645 G9 Notebook PC delivered nearly eight hours of strong, unplugged performance running in Best Performance mode (see Figure 1).

The HP EliteBook 645 G9 Notebook PC had a similarly sized battery as the Dell Latitude 5430 device and a smaller battery than the Dell Latitude 5420 laptop, but as Figure 2 shows, the EliteBook offered better normalized system efficiency scores than either of the Dell devices. These data suggest better system efficiency from the HP EliteBook Notebook PC.

### Key takeaways

*Current gen vs. current gen: The HP EliteBook 645 G9 Notebook PC had a comparably sized battery to the Dell Latitude 5430 device (42 and 41 WHr, respectively), and ran 1 hour and 44 minutes longer. Calculating the WHr per minute, the system was 24.7 percent more efficient.*

*Current gen vs. previous gen: The HP EliteBook 645 G9 Notebook PC had a smaller battery capacity, by 21 WHr, than the Dell Latitude 5420 device, but ran just 48 minutes less (or 9.6 percent less run time) than the Dell Latitude 5420. Calculating the WHr per minute, the HP EliteBook 645 G9 Notebook PC was 36.7 percent more efficient than the Latitude 5420 device.*

### MobileMark 2018 overall battery life in Windows Best Performance mode

hours:min | Median | Higher is better

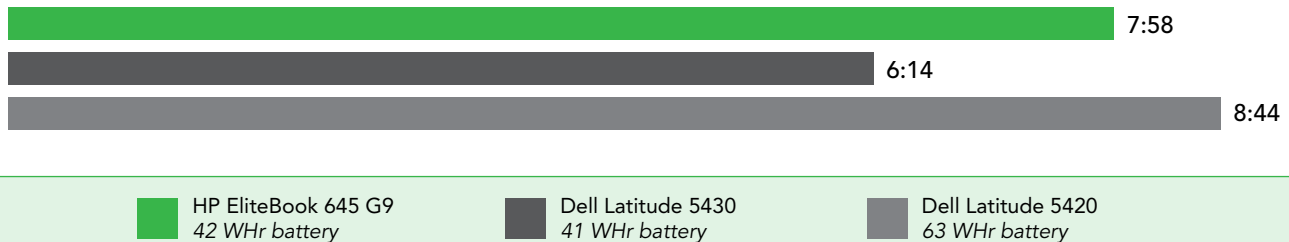


Figure 1: Overall battery life of the three systems we tested as reported by MobileMark 2018. Higher is better. Source: Principled Technologies.

### System efficiency

Minutes per WHr | Median | Normalized | Higher is better

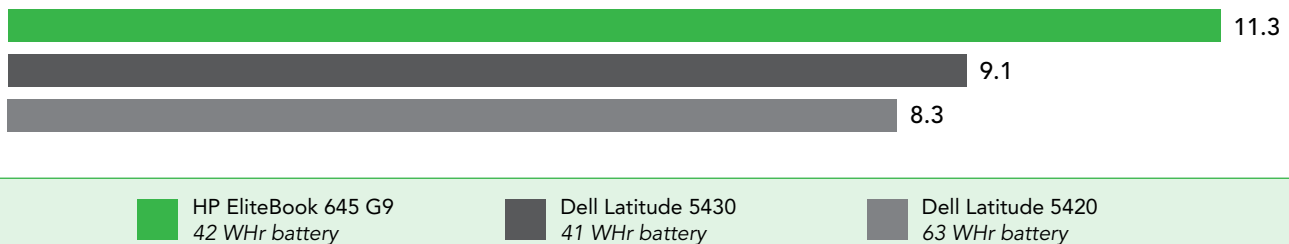


Figure 2: System efficiency of each of the three devices we tested, in minutes of battery life (as measured by the MobileMark 2018 benchmark) per WHr. Higher is better. Source: Principled Technologies.



## About the AMD Ryzen™ 7 PRO 5875U processor

The AMD Ryzen 7 PRO 5875U processor is part of the AMD Ryzen PRO 5000 Series processors product line, which AMD states “offer up to 8 high-performance cores for blazing fast performance that accelerate the latest productivity, collaboration, and office applications that are essential to the hybrid workforce.”<sup>1</sup> The AMD Ryzen 7 PRO 5875U processor has 16 threads, a 2.0GHz base clock, and up to a 4.5GHz maximum boost clock.<sup>2</sup> In our testing, the AMD Ryzen 7 PRO 5875U processor powered the HP EliteBook 645 G9.

Learn more at <https://www.amd.com/en/products/apu/amd-ryzen-7-pro-5875u>.

## About the HP EliteBook 645 G9 Notebook PC

The HP EliteBook 645 G9 Notebook PC is powered by an AMD Ryzen 7 PRO 5875U processor. At 14 inches, the model we tested also came equipped with integrated AMD Radeon™ Graphics, 2 SODIMM memory slots, a 1TB PCIe NVMe SSD, and a 720p HD privacy camera. The device we tested also had 32 GB of memory.

To learn more, visit <https://www.hp.com/us-en/shop/pdp/hp-elitebook-645-14-inch-g9-notebook-pc-p-669y7ut-aba-1>.

## Productivity benchmark testing

The faster a system can perform an everyday task, the more time users have to focus on work. Because users often run a variety of productivity applications, we used a range of industry-standard benchmark tools that measure different aspects of system performance. While a single benchmark can help determine system performance, running multiple tests can provide a fuller idea of what users can expect from their devices. The four benchmarks we used in our testing can help paint a picture of the responsiveness that the HP EliteBook 645 G9 Notebook PC and the Dell Latitude 5420 and 5430 laptops could deliver.

*Note: Unless we specify otherwise, we show each benchmark's overall test results below. For a detailed breakdown of each benchmark's sub-scores, see the [science behind this report](#).*

## Cinebench R23

### Key takeaways

*Current gen vs. current gen: The HP EliteBook 645 G9 Notebook PC had a multi-core score comparable to the Dell Latitude 5430 device and a 29.3 percent higher multi-core sustained load score than that same Dell Latitude system.*

*Current gen vs previous gen: The HP EliteBook 645 G9 Notebook PC had an 88.3 percent higher multi-core score than the Dell Latitude 5420 device and more than double the multi-core sustained load score of that competitor.*

The Cinebench R23 benchmark evaluates devices' multi-core and single-core performance. Both tests offer valuable insight into system responsiveness, but the multi-core test could be a better indicator for hybrid workers who may utilize more of their systems' CPU as they work across multiple projects, workloads, and applications. As Figure 3 shows, the AMD Ryzen 7 PRO processor-powered HP EliteBook 645 G9 Notebook PC achieved a higher Cinebench R23 multi-core score than the other devices we tested.

### Cinebench R23 multi-core performance score

Median | Higher is better

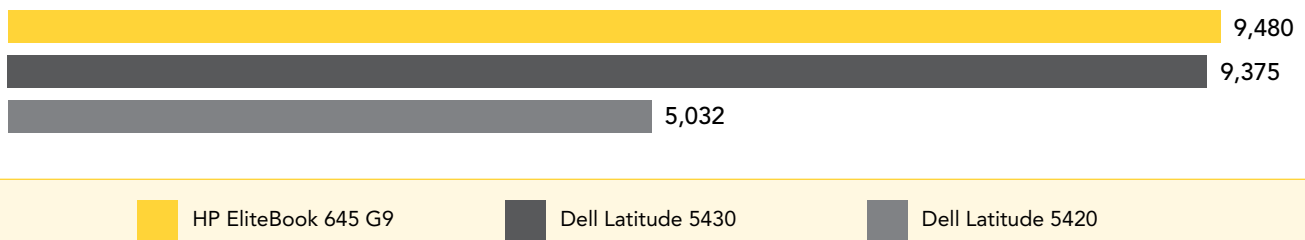


Figure 3: CPU multi-core scores as reported by Cinebench R23 for the three systems we tested. Higher is better.  
Source: Principled Technologies.

The HP EliteBook 645 G9 Notebook PC had a comparable single-core score to the previous-gen Dell Latitude 5420 laptop and had a lower single-core score than the current-gen Dell Latitude 5430 laptop. For our full set of results, including the single-core scores, see the [science behind this report](#).

We performed a sustained Cinebench R23 CPU multi-core test by performing 30 back-to-back runs, which took roughly an hour to complete. Figure 4 shows the Cinebench R23 CPU multi-core sustained load scores of the three systems we tested. We present the thermal outputs in the [Surface temperature](#) section of this report.

### Cinebench R23 multi-core sustained performance score

Median | Higher is better

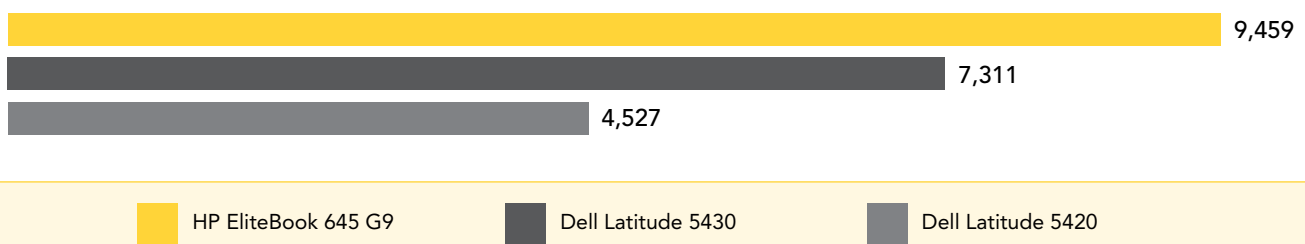


Figure 4: CPU multi-core scores under a sustained load as reported by Cinebench R23 for the three systems we tested. Higher is better.  
Source: Principled Technologies.

## PCMark 10

### Key takeaways

*Current gen vs. current gen: The HP EliteBook 645 G9 Notebook PC had a comparable overall rating to the Dell Latitude 5430 and a 24.6 percent higher productivity rating.*

*Current gen vs. previous gen: The HP EliteBook 645 G9 Notebook PC had a slightly higher (6.4 percent) overall rating and a 30.3 percent higher productivity rating than the Dell Latitude 5420.*

PCMark 10 includes “a comprehensive set of tests that cover the wide variety of tasks performed in the modern workplace.”<sup>3</sup> The benchmark tool produces an overall rating that covers those tasks, and a productivity rating for writing- and spreadsheet-based workloads. Figures 5 and 6 show the overall and productivity ratings, respectively, for the three systems we tested.

### PCMark 10 overall rating

Median | Higher is better

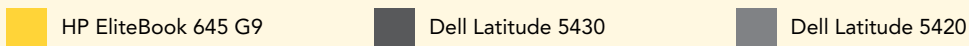


Figure 5: Overall ratings as reported by PCMark 10 for the three systems we tested. Higher is better. Source: Principled Technologies.

### PCMark 10 productivity rating

Median | Higher is better



Figure 6: Productivity ratings as reported by PCMark 10 for the three systems we tested. Higher is better. Source: Principled Technologies.

## PassMark PerformanceTest 10

### Key takeaways

*Current gen vs. current gen: The HP EliteBook 645 G9 Notebook PC had an 11.7 percent higher overall score and a 69.6 percent higher 2D graphics score than the Dell Latitude 5430 laptop. The CPU mark scores of the two systems were comparable.*

*Current gen vs previous gen: The HP EliteBook 645 G9 Notebook PC had a 22.2 percent higher overall score, a 47.7 percent higher CPU mark score, and an 80.7 percent higher 2D graphics score than the Dell Latitude 5420 laptop.*

PassMark PerformanceTest 10 measures performance in many areas, including CPU, 2D and 3D graphics, disk, and memory. Figure 7 shows the PassMark PerformanceTest 10 overall scores for the three systems we tested.

### PassMark PerformanceTest 10 overall rating

Median | Higher is better

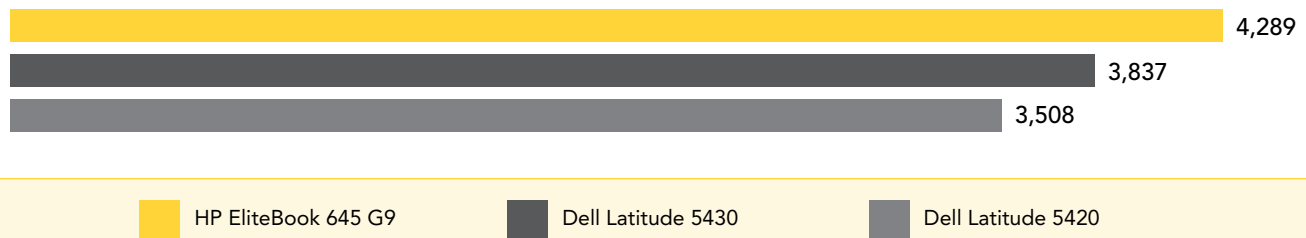


Figure 7: Overall scores as reported by PassMark PerformanceTest 10 for the three systems we tested. Higher is better. Source: Principled Technologies.

The HP EliteBook 645 G9 Notebook PC delivered an overall rating up to 22.2 percent better than the two Dell Latitude competitors. In the CPU and 2D mark tests, the HP EliteBook 645 G9 Notebook PC scored up to 47.7 and 80.7 percent higher, respectively, than the two competitors. The two Dell Latitude systems outperformed the HP EliteBook 645 G9 Notebook PC in 3D graphics, memory, and disk mark tests.





## Surface temperature

### Key takeaways

*Current gen vs. current gen: While achieving a higher performance score, the HP EliteBook 645 G9 Notebook PC ran cooler on the top and bottom under load than the Dell Latitude 5430 device.*

*Current gen vs. previous gen: The HP EliteBook 645 G9 Notebook PC achieved twice the performance score of the Dell Latitude 5420 device while running at the same top temp.*

Choosing a high-performing processor could mean dealing with more heat coming from the device. That could be a problem for users who rest their laptops on their laps to do tasks such as send emails or browse the internet from a waiting area at an airport. To measure the thermal output of the systems we tested, we ran the resource-intensive Cinebench R23 benchmark tool repeatedly for over 60 minutes.

Figure 8 shows temperature readings in Celsius and Fahrenheit for two locations on our test devices while they were under CPU load running the multi-core workload in Cinebench R23. Despite its greater performance on this benchmark, both hot spots of the AMD Ryzen 7 PRO 5875U processor-powered HP EliteBook 645 G9 ran cooler than the same hot spots on the current-gen Intel Core i7-1265U processor-powered Dell Latitude 5430.

The higher Cinebench R23 scores and lower temperatures of the HP EliteBook Notebook PC indicate that it could stay cooler while delivering better performance on resource-intensive tasks, making it an appealing option for workers in non-traditional settings.

### Thermal performance during a sustained Cinebench R23 workload

Average | Lower is better

#### Keyboard deck



#### Underside of chassis

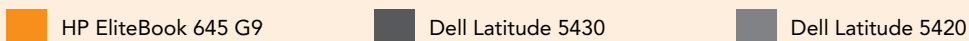


Figure 8: Average temperatures, in degrees Celsius and Fahrenheit, for two hot spots on the devices under load. Lower is better. Source: Principled Technologies.





## Conclusion

Choosing laptops for a hybrid workforce requires the consideration of many factors. Users with the AMD Ryzen 7 PRO 5875U processor-based HP EliteBook 645 G9 Notebook PC could experience longer battery life, increased responsiveness, and cooler surface temperatures.

In our hands-on testing with MobileMark 2018, the HP EliteBook 645 G9 Notebook PC ran more than 90 minutes longer on battery power than the current-gen Dell Latitude 5430 system. When we used other industry-standard benchmark tools, the HP EliteBook 645 G9 Notebook PC achieved comparable or better system responsiveness than the current-gen Dell Latitude 5430 and previous-gen Dell Latitude 5420 laptops we tested. Users might not get as hot with the HP EliteBook 645 G9 Notebook PC on their laps too: Temperatures for the bottom of the laptop averaged 24 degrees cooler than the current-gen Dell Latitude 5430 system.

1. AMD, "AMD Ryzen™ Processors vs. the Competition," accessed October 13, 2022, <https://www.amd.com/en/partner/amd-vs-the-competition>.
2. According to AMD, "Max boost for AMD Ryzen processors is the maximum frequency achievable by a single core on the processor running a bursty single-threaded workload. Max boost will vary based on several factors, including, but not limited to: thermal paste; system cooling; motherboard design and BIOS; the latest AMD chipset driver; and the latest OS updates." Source: "AMD Processor Specifications," accessed October 13, 2022, <https://www.amd.com/en/partner/processor-specifications>.
3. "PCMark 10," accessed October 13, 2022, <https://benchmarks.ul.com/pcmark10>.

Read the science behind this report at <https://facts.pt/eCU21Qi> ►



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