

## HP ZBook G10 mobile workstations: Get the performance you need to take projects and action plans to the next level

With today's hybrid work environments taking center stage, investing in a great mobile workstation can empower users of all kinds. However, the mobile workstation that's right for one person may not be such a good fit for someone else.

On March 29, 2023, HP announced the release of four HP ZBook G10 mobile workstations: the HP ZBook Firefly G10, the HP ZBook Power G10, the HP ZBook Studio G10, and the HP ZBook Fury G10.<sup>1</sup> In this report, we compare processing performance on three of the four G10 models. The first in our lineup is a 14-inch HP ZBook Firefly G10 with an Intel® Core™ i7-1370P processor, which could be a good fit for a user who's ready to explore something more powerful than a typical business laptop.

The second is a 15.6-inch HP ZBook Power G10 with an Intel Core i9-13900H processor, which is a better fit for creative and technical professionals who want more oomph in their daily routine. And the heaviest hitter in our comparison is the 16-inch HP ZBook Fury G10 with an Intel Core i9-13950HX processor, which could be the right option for data scientists, analysts, and those seeking high-end mobile workstation power.

While we didn't include the HP ZBook Studio G10 in this evaluation, we did compare the HP ZBook Studio G10 against its G9 predecessor in a comparison you can see here: <https://facts.pt/CX6eqAK>.



### HP ZBook Firefly G10

Strong performance on multiple benchmarks



### HP ZBook Power G10

Boost performance by up to 4.4x on the Geekbench 6 Pro GPU Compute OpenGL benchmark\*

Increase samples per minute by up to 23.1x on the Blender 3.6 Classroom workload\*



### HP ZBook Fury G10

Amplify performance an additional 89% on the Geekbench 6 Pro GPU Compute OpenGL benchmark\*\*

Raise samples per minute an additional 82% on the Blender 3.6 Classroom workload\*\*

\*when comparing the HP ZBook Power G10 to the Firefly G10 | \*\*when comparing the HP ZBook Fury G10 to the Power G10

## What we tested

To determine the performance benefits of investing in different HP ZBook G10 mobile workstations powered by 13<sup>th</sup> Gen Intel Core processors, we compared the processing performance metrics of three of these systems—all configured with the same amount of RAM and the same storage capacity:

HP ZBook Firefly G10	HP ZBook Power G10	HP ZBook Fury G10
HP designed the Firefly G10 for professional users, architects, engineers, Microsoft 365 power users, and construction managers who need more power than a traditional notebook provides. <sup>2</sup> We tested the 14-inch model with an Intel Core i7-1370P processor, Intel Iris <sup>®</sup> Xe graphics, 32 GB of 5200 DDR5 memory, and 1TB of NVMe™ storage.	HP targeted this mobile workstation at helping professionals power through creative and technical workflows. It comes with a 15.6-inch display and certifications from Independent Software Vendors (ISV) for critical computer-aided design (CAD), 3D modeling, and rendering applications. <sup>3</sup> We tested this model with an Intel Core i9-13900H processor, NVIDIA <sup>®</sup> RTX™ 2000 (Ada Gen) discrete graphics, 32 GB of 5200 DDR5 memory, and 1TB of NVMe storage.	HP created this desktop-class mobile workstation for media and entertainment pros, data scientists, engineers, and product designers. <sup>4</sup> We tested this model with an Intel Core i9-13950HX processor, NVIDIA RTX 4000 (Ada Gen) discrete graphics, 32 GB of 5600 DDR5 memory, and 1TB of NVMe storage.

### Additional benefits of HP ZBook workstations

While we focused on the processing performance of three HP ZBook G10 workstation models, HP built all the ZBook mobile workstations for durability and security.

**Durability:** HP ZBook mobile workstations and their components have survived the HP System Validation Test Protocol, which pushes every aspect of the system to their limits. This includes tests you might expect, such as yanking out cables, subjecting screens to abrasion tests, and opening and closing the clamshell tens of thousands of times. What you might not expect is that they also subject the mobile workstations to military-grade durability tests (i.e., drop, vibration, explosive atmosphere, dust, and humidity). In all, the current HP ZBook mobile workstation platform has gone through over 120,000 hours of testing and validation.<sup>5</sup>

**Security:** All HP ZBook workstations include “self-healing software solutions that detect intrusions and automatically recover the most recent, healthy version of the BIOS.” Organizations and individuals can also help strengthen security with HP Sure Click, optional built-in privacy screens, and password-, fingerprint-, or facial-scan-based user authentication.<sup>6</sup>

For more information on HP workstations, read this complete summary:  
<https://www.hp.com/us-en/shop/tech-takes/hp-workstations-review>.



We compared processing performance with an array of resource-intensive benchmark tests:

- **3DMark** benchmarks measure 3D rendering performance.
- **Basemark®** and **Geekbench** benchmarks measure 2D and 3D graphics development and rendering capabilities.
- **Blender 3.6** benchmarks measure the estimated number of 3D samples a system can handle per minute.
- The **Procyon® Video Editing Benchmark** measures how long it takes a system to export video project files to popular formats.
- **PugetBench for Creators** benchmarks measure visual content production performance.
- The **WebXPRT 4** benchmark measures web-browsing capabilities.

Next, we tackled compute-intensive content creation workflows, recording the time it took each mobile workstation to finish these tasks:

- **Rendering a scene from an Autodesk Maya® 2024 video into an image** using the Arnold for Maya rendering tool
- **Upscaling image resolution 4x** using the Topaz Labs Gigapixel AI image editor
- **Exporting a 5K video to 1080p** using the DaVinci Resolve 18 post-production tool
- **Encoding video formats** using the HandBrake video encoding tool
- **Creating a panoramic 45MP image** using the Photomerge element in Adobe®Photoshop®

## Taking on complex projects with Intel firepower

While we used gaming and content creation benchmarks to stress the three mobile workstations we tested, these results are applicable to any person or team who relies on compute-intensive workflows and applications to get the results they need as quickly as possible.

**3DMark**, **Basemark**, and **Geekbench** benchmarks measure 2D and 3D graphics development and rendering capabilities using OpenGL, Vulkan, and DirectX graphics application programming interfaces (APIs). Investing in mobile workstations that deliver higher benchmark scores can better help videographers, developers, and technical professionals bring realistic visual effects to life. The 3DMark CPU and Graphics sub-scores reflect the system's CPU workload processing and 3D graphic rendering proficiency.

**3DMark Time Spy** has a "pure DirectX 12 engine, which supports features like asynchronous compute, explicit multi-adapter, and multithreading."<sup>7</sup> The better a system can handle DirectX 12 technology, the more realistic lighting effects, such as reflections and shadows, appear to the user. Faster frame rates help this ultra-realistic effect.<sup>8</sup>

For reference, a 3DMark Time Spy overall score of 6,000 translates to an average of 70 frames per second (FPS) and an overall score of 12,000 translates to 140 FPS.<sup>9</sup> The industry standard for videos on the web, TV, and film is 24 FPS, bumping up to 30 FPS for live events such as news programs, sporting events, and concerts—places where viewers want a smoother video experience.<sup>10</sup> This means that even the lowest-scoring device in our comparison, the ZBook Firefly G10 with an Intel i7-1370P processor, is no slouch in the FPS department—its overall score of 2,069 would translate to approximately the 24 FPS necessary for industry-standard video.

### 3DMark Time Spy (overall)

Overall score | Higher is better

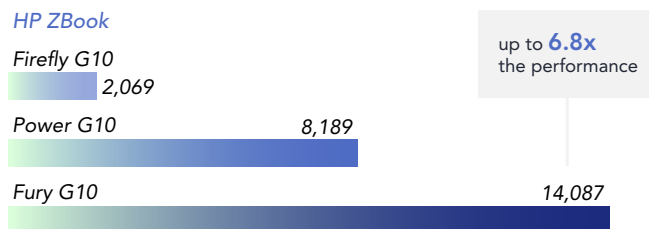


Figure 1: 3DMark Time Spy overall scores. Higher scores are better. Source: Principled Technologies.

### 3DMark Time Spy (graphics)

Graphics score | Higher is better

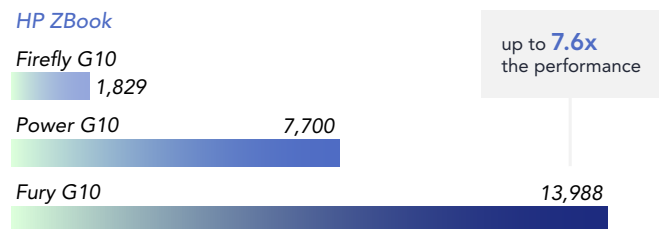


Figure 2: 3DMark Time Spy graphics scores. Higher scores are better. Source: Principled Technologies.

### 3DMark Time Spy (CPU)

CPU score | Higher is better

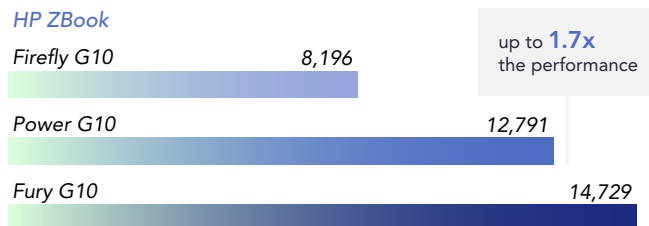


Figure 3: 3DMark Time Spy CPU scores. Higher scores are better. Source: Principled Technologies.



The **Basemark GPU** benchmark “runs through an advanced game-like scene with up to ten of thousands of individual draw calls per frame.”<sup>11</sup>

### Basemark GPU: Vulkan

Score | Higher is better

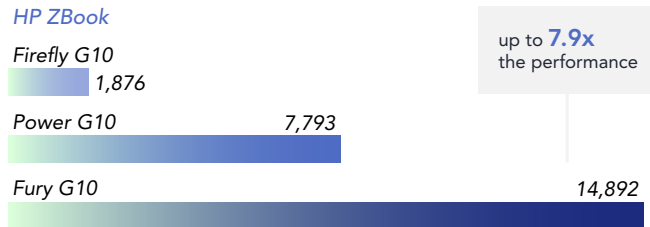


Figure 4: Basemark GPU Vulkan benchmark scores. Higher scores are better. Source: Principled Technologies.

### Basemark GPU: DirectX 12

Score | Higher is better

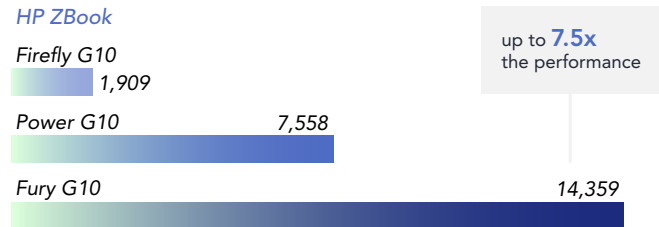


Figure 5: Basemark GPU DirectX 12 benchmark scores. Higher scores are better. Source: Principled Technologies.



### The Geekbench 6 Pro GPU Compute OpenGL

benchmark runs popular applications using realistic data sets to measure performance in augmented reality and machine learning scenarios. Geekbench 6 Pro GPU Compute OpenGL scores are, according to Geekbench, “calibrated against a baseline score of 2,500 (which is the score of a Dell Precision 3460 with a [Intel] Core i7-12700 processor).”<sup>12</sup> Higher Geekbench 6 Pro GPU Compute OpenGL scores highlight how much better the HP ZBook Power G10 and Fury G10 mobile workstations we tested could handle compute-intensive simulation workloads, image synthesis, and machine learning workflows such as facial recognition and background blur.<sup>13</sup>

### Geekbench 6 Pro GPU Compute OpenGL

Score | Higher is better

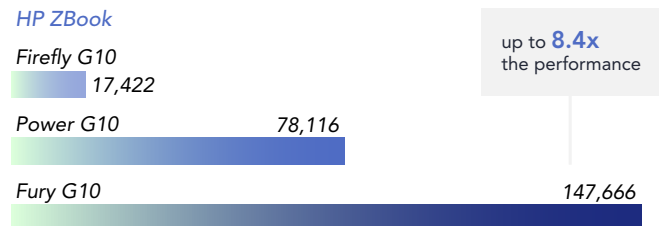


Figure 6: Geekbench 6 Pro GPU Compute OpenGL scores. Higher scores are better. Source: Principled Technologies.

The **Blender 3.6** results reflect how quickly the Cycles render engine can render each sample project on the three models we tested. The more samples per minute a mobile workstation can handle, the smoother and more realistic a video can appear.

### Blender 3.6: Monster workload

Samples per minute | Higher is better

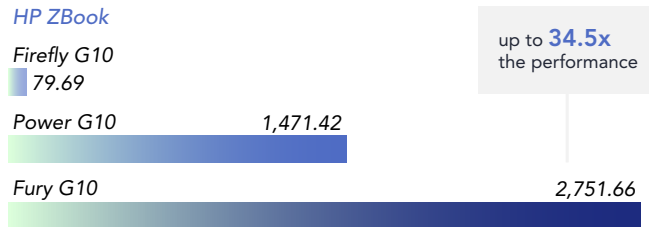


Figure 7: Blender 3.6 Monster workload samples per minute. More samples are better. Source: Principled Technologies.

### Blender 3.6: Junkshop workload

Samples per minute | Higher is better

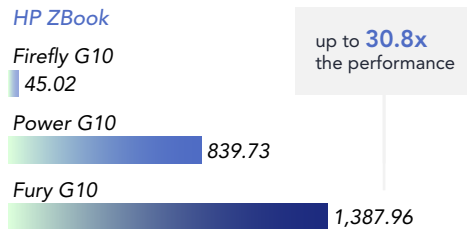


Figure 8: Blender 3.6 Junkshop workload samples per minute. More samples are better. Source: Principled Technologies.

### Blender 3.6: Classroom workload

Samples per minute | Higher is better

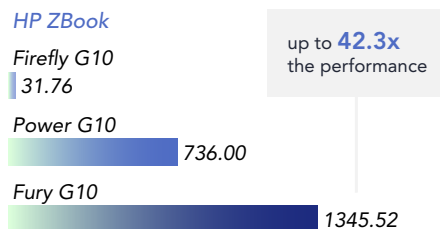
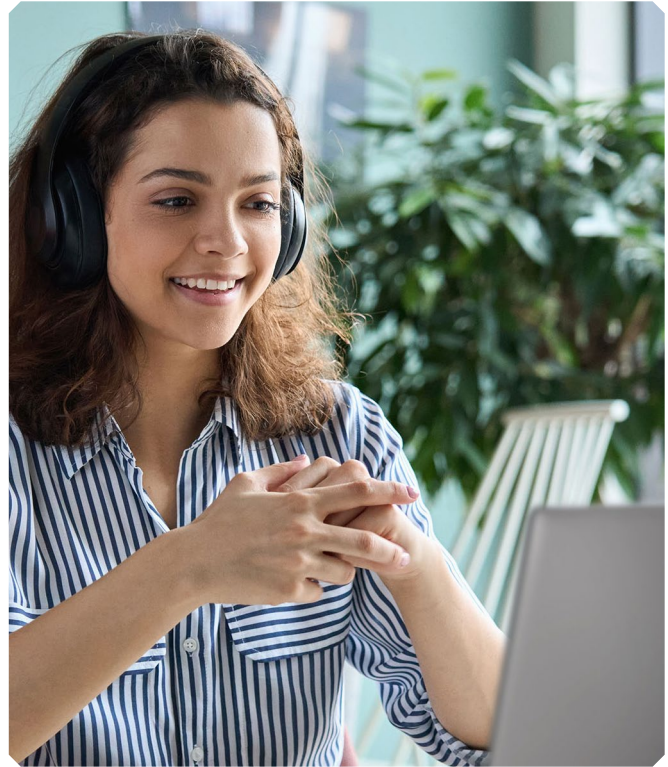


Figure 9: Blender 3.6 Classroom workload samples per minute. More samples are better. Source: Principled Technologies.



The UL **Procyon Video Editing Benchmark** uses Adobe® Premiere® Pro to reflect real-world performance through a typical video editing workflow. The UL website states, "Exporting video files from Premiere Pro is dead time to a creator. Even short videos can take several minutes to export. Longer sequences with layers, color grading and complex effects may take an hour or longer. A faster creator PC takes less time to export video files, giving more time back to the creator."<sup>14</sup>

### Procyon Video Editing Benchmark

Score | Higher is better

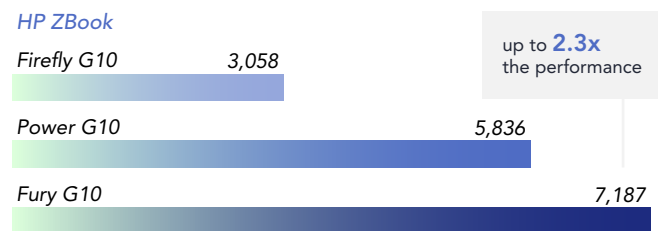


Figure 10: Procyon Video Editing Benchmark overall scores. Higher scores are better. Source: Principled Technologies.

The **PugetBench for Creators** benchmarks run directly on Adobe Creative Cloud® applications and use real-world visual content production workloads to gauge performance.

### PugetBench for Premiere Pro

Score | Higher is better

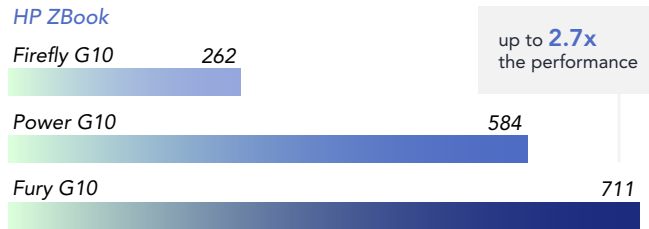


Figure 11: PugetBench for Adobe Premiere Pro overall scores. Higher scores are better. Source: Principled Technologies.

### PugetBench for After Effects

Score | Higher is better

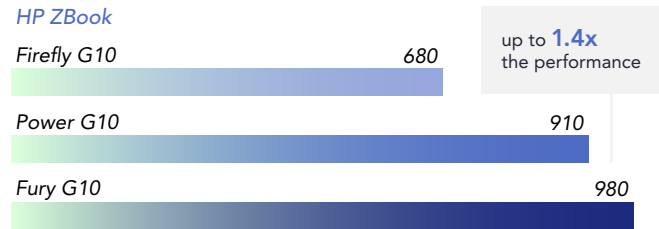


Figure 12: PugetBench for Adobe After Effects® overall scores. Higher scores are better. Source: Principled Technologies.

## Completing high-priority workflows with Intel firepower

The faster creative and technical professionals can finish high-priority workflows, the more time teams and clients have to iterate, the less time each project is in production, and the faster you can invoice a completed project.

For this image-rendering workflow comparison, we rendered a single scene from an **Autodesk Maya 2024** animation. Then, we timed how long it took each mobile workstation to render that scene into an image using the Arnold for Maya rendering tool. Saving 30 seconds every time you tackle a resource-intensive project is a big deal—especially if you’re jumping in and out of that application or project multiple times a day.

### Rendering a scene from an Autodesk Maya® 2024 video into an image

Time (seconds) | Lower is better

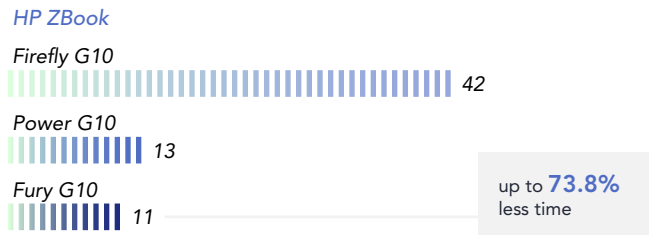


Figure 13: Time to render a scene in Maya 2024 with the Arnold for Maya rendering tool. Less time is better. Source: Principled Technologies.

For this AI image upscaling workflow comparison, we began with an image at 4,284 x 2,844 resolution. We then used the **Topaz Labs Gigapixel AI** app to enlarge and enhance that image by a factor of four, resulting in an enhanced image at a 17,136 x 11,376 resolution.

### Upscale image resolution 4x using Gigapixel AI

Time (seconds) | Lower is better

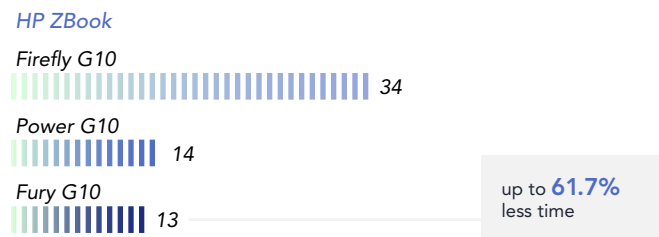


Figure 14: Time to upscale image resolution 4x using Gigapixel AI. Less time is better. Source: Principled Technologies.

For this video post-production workflow comparison, we used the quick export option in the **DaVinci Resolve 18** post-production tool to export a 5K video to 1080p. Remember that exporting video files is dead time for creators. So, going from a quick export that takes 4 minutes and 33 seconds to 1 minute and 16 seconds could translate to less waiting, more concentrated focus, and a boost in productivity.

### Export 5K video to 1080p using Davinci Resolve 18

Time (minutes:seconds) | Lower is better

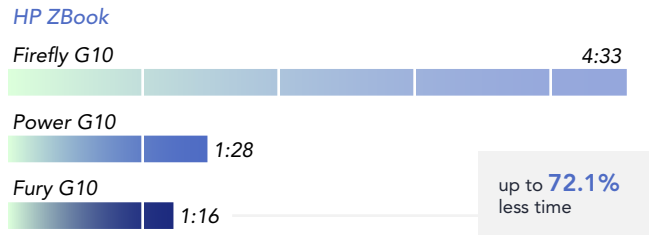


Figure 15: Time to export a 5K video to 1080p using DaVinci Resolve 18. Less time is better. Source: Principled Technologies.

For this video post-production workflow comparison, we used **HandBrake** (Fast 1080p30 preset and H.264 video encoder) to convert a 4K video to a 1080p video.

### Handbrake hardware 4K video render with Fast 1080p30 preset

Time (minutes:seconds) | Lower is better

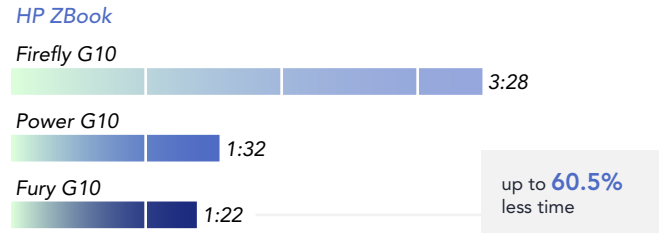


Figure 16: Handbrake hardware 4K video render with Fast 1080p30 preset. Less time is better. Source: Principled Technologies.

For this image post-production workflow comparison, we taxed all three processors by using the Photomerge element in **Adobe Photoshop** to merge two photos into a single composition.

### Create a panoramic 45MP image using Photomerge

Time (seconds) | Lower is better

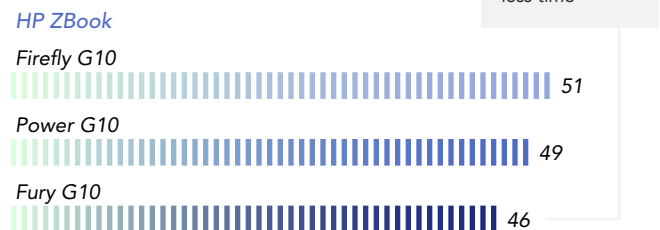


Figure 17: Time to create a panoramic 45MP image using the Photomerge element in Photoshop. Less time is better. Source: Principled Technologies.





## Handle web-browsing activities with increasing firepower

The **WebXPRT 4** browser benchmark replicates everyday web-browsing activities to show how web-enabled devices handle online tasks. WebXPRT 4 uses real-world programming-language-based scenarios to quantify web-browsing capabilities.<sup>15</sup> Higher scores indicate a faster browsing experience as well as better performance while loading and displaying web pages. The HP ZBook Firefly 14 G10 we tested received a 270 overall score in this evaluation, while the other two workstations we tested scored even higher. 270 indicates strong web browsing performance: On November 29, 2023, a WebXPRT 4 overall score of 270 was in the 83<sup>rd</sup>–84<sup>th</sup> percentile of all laptops/desktops listed in the results table.<sup>16</sup>

### WebXPRT 4

Overall score | Higher is better

#### HP ZBook



Figure 18: WebXPRT 4 overall scores. Higher scores are better. Source: Principled Technologies.



## Conclusion

We found that HP ZBook G10 Firefly, Power, and Fury mobile workstations powered by 13<sup>th</sup> Gen Intel Core processors offer strong processing performance for all kinds of users. For example, the 14-inch HP ZBook Firefly G10 with an Intel Core i7-1370P processor we tested might be a solid choice for a user who's ready to explore something more powerful than a typical business laptop. The HP ZBook Power G10 with an Intel Core i9-13900H processor, on the other hand, is a better fit for creative and technical professionals who want a little more zip in their daily routine. And, the 16-inch HP ZBook Fury G10 with an Intel Core i9-13950HX processor we tested could be just what data scientists, analysts, and creative professionals need to speed through their resource-intensive workloads. Investing in the right HP ZBook mobile workstation could result in less waiting, more concentrated focus, and a boost in productivity for everybody.

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