User Guide

Powermark™ is a battery life benchmark designed for testing Windows based notebooks, tablets and other battery powered devices. Powermark is compatible with Windows 8 and Windows 7. Please do not hesitate to contact us if you have a question about Powermark.

Press	press@futuremark.com
Business	sales@futuremark.com
Support	support@futuremark.com

Thank you for using Futuremark products.

Licensing and Activation

You need to enter your upgrade license key before you can use Powermark Professional Edition for battery life testing. Running Powermark without entering a key will disable all parts of the benchmark other than the ability to load and view result files, however, this can be useful for setting up a PC to collect and store all the results from a testing lab.

A Powermark Professional Edition license includes a set number of Activations. An Activation is a single install of Powermark on a single device. There is no limit to the number of times Powermark can be run on a single activated device. The device must be connected to the Internet during Activation; however, an online connection is not required for testing once a device has been activated. When all the Activations included with your license have been used, you will need to purchase a new licence in order to install and run Powermark on additional devices.

Powermark Enterprise Edition license includes an unlimited number of activations and does not require online activation. Contact us for details.

Using Powermark from the GUI

Standard tab
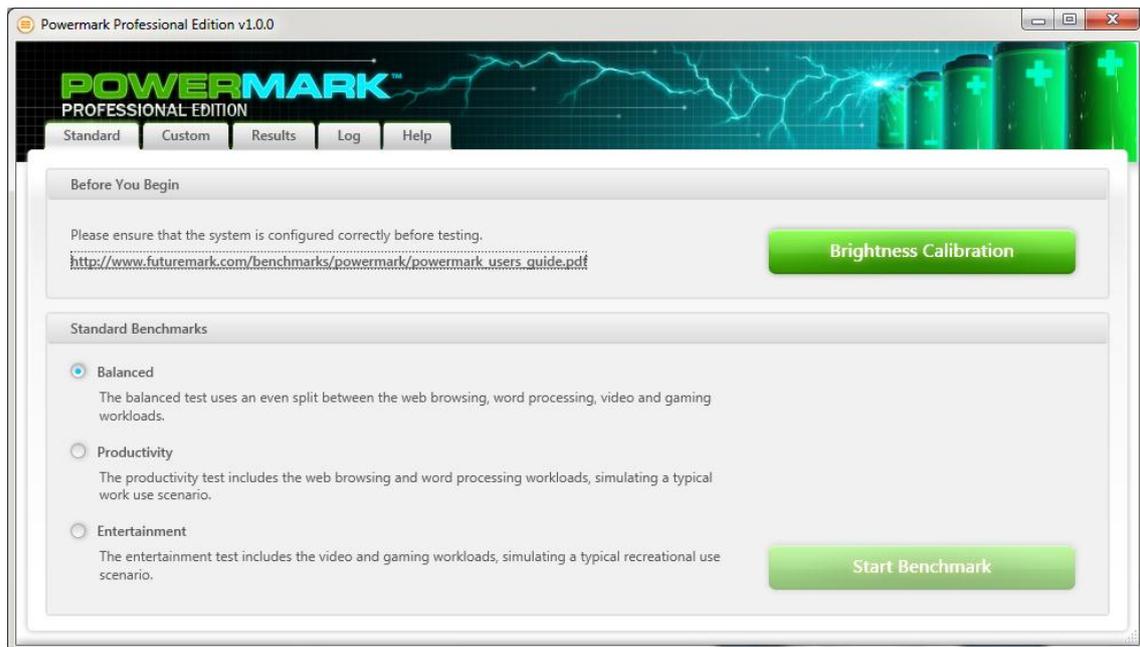
Powermark includes three standard tests suitable for the most common use cases:

- The *balanced* test uses an even split between the web browsing, word processing, video and gaming workloads.

- The *productivity* test includes the web browsing and word processing workloads, simulating a typical work use scenario

- The *entertainment* test includes the video and gaming workloads, simulating a typical recreational use scenario.

Choose the test you wish to run, then click on the START BENCHMARK button.

The Brightness Calibration feature helps you to calibrate the screen brightness before you run the benchmark. Clicking on the "BRIGHTNESS CALIBRATION" button opens a pure white window. Close the calibration screen by clicking the "EXIT" button or by pressing ESC on the keyboard.

Custom tab

The custom tab lets you define your own test scenario by individually setting the per-iteration run times of each of the four workloads, as well as setting the battery charge end condition. See the specification included later in this document for details of each workload.

Results tab
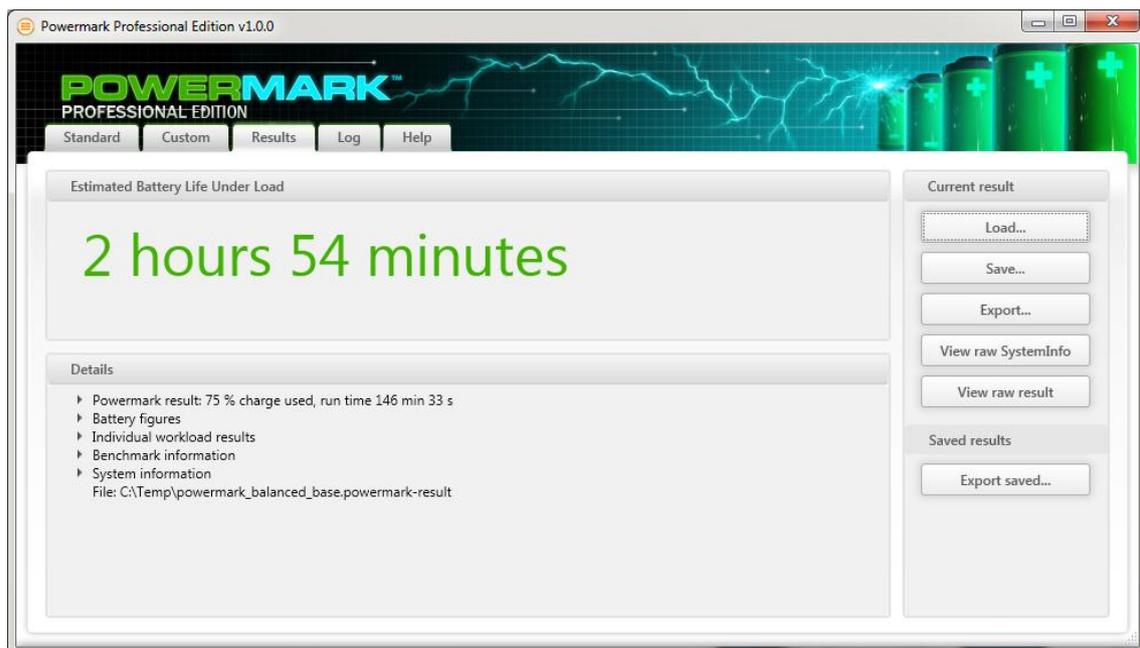
The results tab lets you view, load, save and export results. The benchmark saves and loads results in a proprietary file format while the Export-feature allows you to export the result data as an Excel-compatible .XML file. The Export saved - feature allows you to export one or more saved result files.

Log tab

The log tab contains detailed information collected during the benchmark run. It can be useful for finding out potential causes for problems encountered during the benchmark run.

Help tab

Details

Product Edition - the Powermark version installed on this device.

Your upgrade key - Use this key to activate additional installations of Powermark.

Your activation ID - This is a unique ID for the installation of Powermark on this device.

SystemInfo version - The version of the SystemInfo component installed on this device.

Activations remaining – An activation is a single install of Powermark on a single device. When all the activations included with your license have been used, you will need to purchase an additional license in order to install Powermark on additional devices.

Unregister button - Clicking this button will remove the upgrade key from this installation of Powermark. This can be useful for cleaning a device after benchmarking. Please note, unregistering does not recover used activations.

Troubleshooting options

SystemInfo scan enables Powermark to collect and store device information with the result, (enabled by default).

SystemInfo monitoring enables Powermark to check that the device set up has not changed between benchmark iterations, (disabled by default).

Maximum logging provides additional debugging information should you require support, (disabled by default).

Running from the command line

Powermark can be run from the command line e.g. for easier automation. The test procedure works exactly as it does with the GUI client. The benchmark status and instructions are displayed in the command prompt window. Essential options are explained below.

Powermark can be registered and activated from the command line. An activated copy can also be unregistered if necessary.

```
PowermarkCmd --register="YOUR-LICENSE-KEY"
PowermarkCmd -unregister
```

All the preset benchmarks are available on the command line:

```
PowermarkCmd --preset-entertainment
PowermarkCmd --preset-productivity
PowermarkCmd --preset-balanced
```

A custom benchmark may be constructed by supplying its parameters. Unspecified run times default to zero.

```
PowermarkCmd --cutoff-charge=25 --browsing-seconds=120 --gaming-seconds=0 --video-
seconds=300 --wordprocessing-seconds=120
```

By default the result file will be written into the current user's Documents\Powermark folder with a name generated from the hostname, date and time. A different location and name can be specified instead:

```
PowermarkCmd --preset-balanced --out=C:\result.powermark-result
```

One or more collected results can be exported into a summary XML file:

```
PowermarkCmd --export=summary.xml --in=C:\result_1.powermark-result --
in=C:\result_2.powermark-result
```

For other uses and options, run PowermarkCmd.exe without arguments and see the displayed help.

Best practice testing

You can improve the repeatability, accuracy and relevance of your results by running Powermark under controlled conditions. If you plan on publishing your Powermark results you can help your readers understand the results by including the details of your test set-up and process.

The steps below outline Futuremark's recommended test process for Powermark. The environmental specification and screen brightness requirements match those given in the ECMA-383 standard "[Measuring the Energy Consumption of Personal Computing Products](#)".

Set-up

1. Connect the power cable to your device.

2. Power up or reboot the device.

3. Make sure the device being tested resides in an environment compliant with ECMA-383:

    a. Temperature: 23 +/- 5 degrees Celsius.

    b. Relative humidity: 10 - 80 %.

    c. Ambient light: 250 +/- 50 lux.

4. Set the device's power plan to "Balanced".

    a. Control Panel -> Hardware and Sound -> Power Options.

5. Disable all wireless connections such as WLAN, Bluetooth and 3G/4G

6. Set the screen brightness of the device to a standard setting:

    a. Use a luminance meter and calibrate the brightness to a value of 110 cd/m2. The Brightness Calibration feature available on the Standard-tab provides a pure white screen to help with the process.

    b. Or, if you don't have access to an luminance meter, calibrate the device manually using an alternative reference such as an another monitor, light box or similar.

7. Disconnect all external devices such as auxiliary monitors, mouse, keyboard, speakers, headphones, external disk drives, etc.

8. Run pending idle tasks to prevent them from interfering with the benchmark.

9. For example, by running "Rundll32.exe advapi32.dll,ProcessIdleTasks" from the command prompt and waiting for the tasks to finish.

Starting the benchmark

1. Run Powermark from either the GUI or command line.

2. Choose the test you wish to run, then click on START BENCHMARK.

3. Wait while Powermark collects information about the system.

4. When prompted, disconnect the power cable to begin benchmarking.

   - Ideally, disconnect the power when the battery is charged to 100 percent.

   - Powermark will not start if the charge is less than 85 percent.

Running the benchmark

1. Let the benchmark run until it finishes. Depending on the device you are testing, it may take several hours to finish the test.

2. You can reconnect the power cable when the "Finalizing result" message appears.

Viewing results

1. The projected battery life for the device is displayed when the benchmark is complete.

2. Detailed results are available in the tree view below the main result.

3. You can save or export the results for later use.

4. When running the same test on the same device multiple times the results should be within 5 percent of the median result. If they are not, and there is no reason to believe the hardware is faulty, please contact us.

Technical specification

The purpose of the workloads is to simulate realistic usage scenarios of portable computing devices. Short test scenarios are looped until the per-iteration run time (five minutes by default) is reached or the battery charge end condition is met.

The workloads selected for the benchmark are run in order, each workload once per iteration. Iterations are run until the battery charge has dropped to the desired level or the benchmark is cancelled. Once the battery charge end condition has been met Powermark generates a result based on the time elapsed and battery charge consumed by the workloads. In order to maintain the specified workload weighting the results of the final iteration (during which the battery charge fell to the desired level) is ignored.

Web browsing workload

The web browsing workload opens Internet Explorer and serves content from a local custom made web server. The content is a modified version of Peacekeeper 1.0 Community site test. The computational load is mostly JavaScript based and performs following tasks:

- Encryption
- XML parsing
- Data filtering
- String sorting
- Window scrolling

Word processing workload

The word processing workload is a text editor look-a-like application. It is implemented using RichTextBox control in Windows Presentation Foundation (WPF). Typing in the editor is simulated and throttled to match typing speed of a user. The workload content is based on a Wikipedia article on batteries.

Video workload

The video workload simulates watching movies on a portable device.

Clip details:
Codec: H.264

Duration: 8:43
Resolution: 1280 x 720
Frame rate: 25 frames per second
Bitrate: approx. 5000 kbps.

Gaming workload

The gaming workload renders a DirectX 9 Shader Model 2.0 scene to simulate the graphics workload of a mainstream game. The scene features cascaded shadow maps and high-resolution shadow mapped point lights.

Futuremark

Futuremark creates benchmarks that enable people to measure, understand and manage computer hardware performance. Our talented team creates the industry's most authoritative and widely used performance tests for desktop computers, notebooks, tablets, smart phones and browsers.

We work in cooperation with many of the world's leading technology companies to develop industry standard benchmarks that are relevant, accurate, and impartial. As a result, our benchmarks are widely used by the world's leading press publications and enthusiast review sites when testing the latest processors, graphics cards, notebooks and tablets. Futuremark maintains the world's largest and most comprehensive hardware performance database, using the results submitted by millions of users to drive innovative online solutions designed to help consumers make informed purchasing decisions.

Our headquarters are in Finland just outside the capital Helsinki. We also have a sales office in Silicon Valley and sales representatives in Taiwan.