MacBook

Environmental Report

Model MC207

Date introduced

October 20, 2009

Environmental Status Report

MacBook is designed with the following features to reduce environmental impact:

- Mercury-free LED backlit display
- Arsenic-free display glass
- Brominated flame retardant-free
- PVC-free[1]
- Highly recyclable polycarbonate enclosure

Meets ENERGY STAR® Version 5.0 requirements.

MacBook achieved a Gold rating from EPEAT.[2]

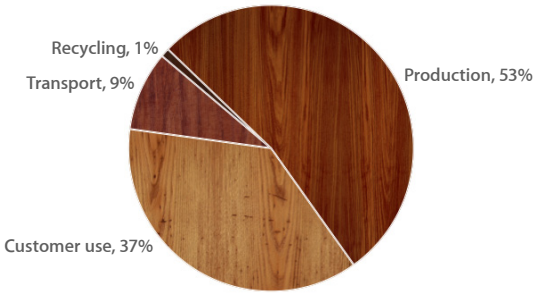
Apple and the Environment

Apple believes that improving the environmental performance of our business starts with our products. The careful environmental management of our products throughout their life cycles includes controlling the quantity and type of materials used in their manufacture, improving their energy efficiency, and designing them for better recyclability. The information below details the environmental performance of the MacBook as it relates to climate change, energy efficiency, restricted substances, and material efficiency.

Climate Change

Greenhouse gas emissions have an impact on the planet's balance of land, ocean, and air temperatures. Most of Apple's corporate greenhouse gas emissions come from the production, transport, use, and recycling of its products. Apple seeks to minimize greenhouse gas emissions by setting stringent design-related goals for material and energy efficiency. The chart below provides the estimated greenhouse gas emissions for the MacBook over its life cycle.

Greenhouse Gas Emissions for MacBook



Total greenhouse gas emissions: 350 kg CO_2e

Energy Efficiency

Because a significant portion of product-related greenhouse gas emissions results from its use, energy efficiency is a key part of each product's design. Apple products use power-efficient components and software that can intelligently power them down during periods of inactivity. The result is that MacBook is energy efficient right out of the box.

MacBook outperforms the stringent requirements of ENERGY STAR Program Requirements for Computers Version 5.0. It consumes 32 percent less power and has a 20 percent smaller carbon footprint than the original MacBook. The following table details the power consumed in different use modes:

Power Consumption for MacBook

Mode	100V	115V	230V
Power adapter, no-load	0.18W	0.19W	0.24W
Off	0.56W	0.56W	0.63W
Sleep with WOL on	1.02W	1.21W	1.12W
Idle–Display off / on	8.3W / 13.1W	8.3W / 13.2W	8.6W / 13.6W
Power adapter efficiency	88.3%	88.2%	87.7%

Battery Chemistry

Lithium-ion polymer, 60 Whr

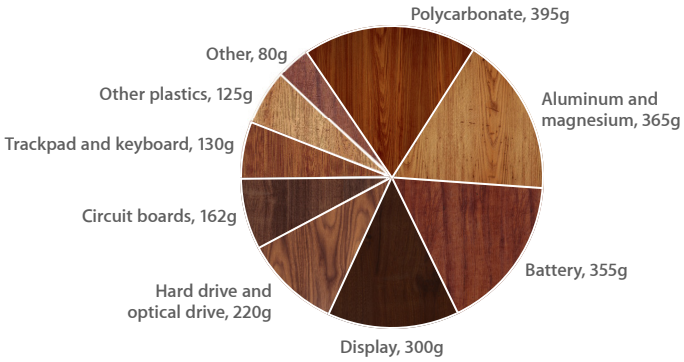
Battery Design

MacBook features a breakthrough battery design that improves its life span-up dramatically—to five years. So it uses just one battery in the same time a typical notebook uses three.

Material Efficiency

Apple's ultracompact product and packaging designs lead the industry in material efficiency. Reducing the material footprint of a product helps maximize shipping efficiency. It also helps reduce energy consumed during production as well as material waste generated at the end of the product's life. The MacBook is made of recyclable materials, such as polycarbonate, aluminum, and magnesium. The chart below details the materials used for MacBook.

Material Use for MacBook



The MacBook retail box consumes up to 53 percent less volume than that of the original MacBook. Because smaller boxes allow us to fit up to 80 percent more boxes into each shipping container, more products fit on each boat and plane. This means that fewer boats and planes are used, resulting in fewer CO_2 emissions.

Packaging

The packaging for MacBook uses corrugate cardboard made from a minimum of 25 percent post-consumer recycled content, and it's free of expanded polystyrene (EPS). In addition, MacBook retail packaging is extremely material efficient, consuming 20 percent less than previous models and up to 53 percent less volume than that of the original MacBook. This allows up to 80 percent more units to fit into each shipping container. The following table details the materials used in MacBook packaging.

Packaging Breakdown for MacBook (U.S. Configurations)

Material	Retail box	Retail and shipping box
Paper (corrugate, molded fiber)	343g	969g
High-impact polystyrene	131g	131g
Other plastics	30g	45g

Restricted Substances

Apple has long taken a leadership role in restricting harmful substances from its products and packaging. As part of this strategy, all Apple products comply with the strict European Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, also known as the RoHS Directive. Examples of materials restricted by RoHS include lead, mercury, cadmium, hexavalent chromium, and PBB and PBDE brominated flame retardants (BFRs). MacBook goes even further than the requirements of the RoHS Directive by incorporating the following more aggressive restrictions:

- Mercury-free LED backlit display
- Arsenic-free display glass
- Brominated flame retardant (BFR)-free
- Internal cables and power adapter DC cable free of polyvinyl chloride (PVC)
- PVC-free AC power cord for U.S., Canada, Mexico, Colombia, El Salvador, Guatemala, Panama, Peru, Puerto Rico, U.S. Virgin Islands, and Venezuela

Recycling

Through ultra-efficient design and the use of highly recyclable materials, Apple has minimized material waste at the product's end of life. In addition, Apple offers and participates in various product take-back and recycling programs in 95 percent of the regions where Apple products are sold. All products are processed in the country or region in which they are collected. For more information on how to take advantage of these programs, visit www.apple.com/environment/recycling/.

Definitions

Electronic Product Environmental Assessment Tool (EPEAT): A program that ranks computers and displays based on environmental attributes in accordance with IEEE 1680. For more information, visit www.epeat.net.

Greenhouse gas emissions: Estimated emissions are calculated in accordance with guidelines and requirements as specified by ISO 14040 and ISO 14044. Calculation includes emissions from the following life cycle phases contributing to Global Warming Potential (GWP 100 years) in CO_2 equivalency factors (CO_2e):

- **Production:** Includes the extraction, production, and transport of raw materials as well as the manufacture of the product and product packaging.
- **Transport:** Includes air and sea transportation of the finished product and its associated packaging from the manufacturing site to continental distribution hubs. Transport of products from distribution hubs to the end customer is not included.
- **Use:** End-user power consumption assumes a four-year period. Consumption patterns are modeled according to European Commission and U.S. Environmental Protection Agency computer eco-design studies. Geographic differences in the power grid mix have been accounted for at a continental level.
- **Recycling:** Includes transportation from collection hubs to recycling centers as well as the energy used in mechanical separation and shredding of parts.

Energy efficiency terms: The energy values in this report are based on the ENERGY STAR Program Requirements for Computers Version 5.0 and/or ENERGY STAR Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies Version 2.0. For more information, visit www.energystar.gov.

- **Off:** Lowest power mode of the system when the battery is fully charged and the system is shut down. Also referred to as Standby.
- **Idle–Display on:** System is on and has completed loading Mac OS X; the display is set to its full brightness.
- **Idle–Display off:** System is on and has completed loading Mac OS X; the display is set to sleep.
- **Sleep:** Low power state that is entered automatically after 10 minutes of inactivity (default) or by selecting Sleep from the Apple menu. Wake-on-LAN is enabled.
- **Power adapter, no-load:** Condition in which the power adapter is connected to AC power, but not connected to the system.
- **Power adapter efficiency:** Average of the power adapter's measured efficiency when tested at 100 percent, 75 percent, 50 percent, and 25 percent of the power adapter's rated current.

Restricted substances: Apple defines a material as BFR-free and PVC-free if it contains less than 900 parts per million (ppm) of bromine and chlorine.

1. PVC-free AC power cord is available in the United States, Canada, Mexico, Colombia, El Salvador, Guatemala, Panama, Peru, Puerto Rico, U.S. Virgin Islands, and Venezuela.
2. MacBook achieved a Gold rating from EPEAT in the United States, Canada, France, Germany, and the UK.