15-inch MacBook Pro
Environmental Report

Model MB470, MB471

Date introduced
October 14, 2008

Environmental Status Report

MacBook Pro (15-inch) is designed with the following features to reduce environmental impact:

- Mercury-free LCD display
- Arsenic-free display glass
- Brominated flame retardant-free notebook
- PVC-free internal cables
- Highly recyclable aluminum and glass enclosure

Meets ENERGY STAR® requirements.

MacBook Pro (15-inch) achieved a Gold rating from EPEAT.

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 manufacturing, improving their energy efficiency, and designing for better recyclability. The information below details the life cycle environmental performance of the 15-inch MacBook Pro 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 temperature. 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 life-cycle greenhouse gas emissions for the 15-inch MacBook Pro.

Greenhouse Gas Emissions for 15-inch MacBook Pro

- Recycling, <1%
- Transport, 10%
- Production, 51%
- Customer use, 38%
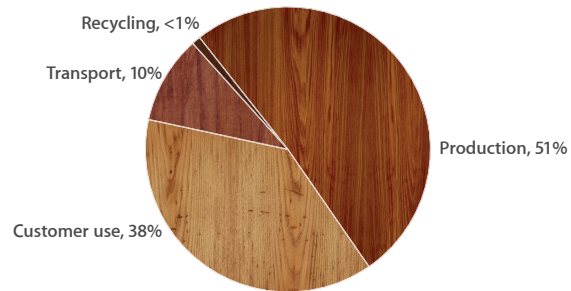
Total greenhouse gas emissions: 560 kg CO_2e

Energy Efficiency

Because the largest portion of product related greenhouse gas emissions result from its use, energy efficiency is a key part of each product's design. Apple products use power efficient components and software that intelligently powers them down during periods of inactivity. The result is that the 15-inch MacBook Pro is energy efficient right out of the box.

The 15-inch MacBook Pro outperforms the stringent requirements of the ENERGY STAR® program. The following table details the power consumed in different use modes.

Power Consumption for 15-inch MacBook Pro

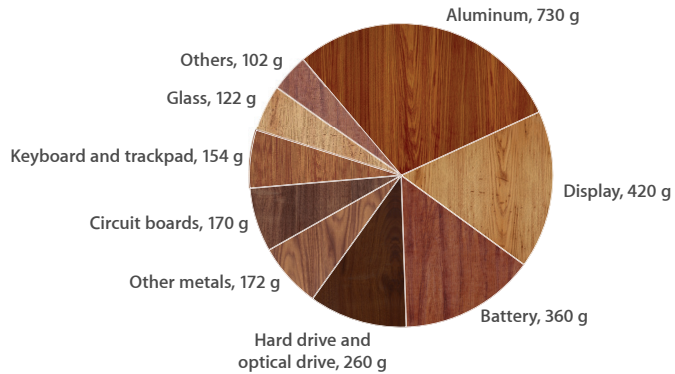| Mode	100V	115V	230V
Power adapter, no-load	0.15 W	0.15 W	0.23 W
Off	0.77 W	0.76 W	0.81 W
Sleep	1.63 W	1.61 W	1.66 W
Idle—Display off / on	11.1 W / 16.6 W	11.1 W / 16.5 W	11.5W / 17.9 W
Power adapter efficiency	87.9%	87.9%	85.6%

Material Efficiency

Apple's ultra-compact 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 and material waste generated at end of life. The 15-inch MacBook Pro enclosure is made of aluminum and glass, materials highly desired by recyclers. The chart below details the materials used in the 15-inch MacBook Pro.

Material Use for 15-inch MacBook Pro

- Aluminum, 730 g
- Others, 102 g
- Glass, 122 g
- Keyboard and trackpad, 154 g
- Circuit boards, 170 g
- Other metals, 172 g
- Hard drive and optical drive, 260 g
- Battery, 360 g
- Display, 420 g

The new 15-inch MacBook Pro retail packaging uses recyclable, high impact polystyrene in place of expanded polystyrene that's more difficult to recycle. In addition, the retail and shipping box consumes 25% less volume than the previous-generation MacBook Pro.

Packaging

The 15-inch MacBook Pro has a new packaging design using corrugate cardboard made from a minimum of 25% post-consumer recycled content, and is free of expanded polystyrene (EPS). In addition, the 15-inch MacBook Pro packaging is extremely material efficient. The following table details the materials used in 15-inch MacBook Pro packaging.

Packaging breakdown for 15-inch MacBook Pro (U.S. configurations)

Material	Retail box	Retail and shipping box
Paper (corrugate, paperboard)	582 g	1076 g
Expanded polypropylene	-	28 g
High impact polystyrene	332 g	332 g
Other plastics	51 g	70 g

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). The 15-inch MacBook Pro goes even further than the RoHS Directive by incorporating the following more aggressive restrictions:

- Mercury-free display
- Arsenic-free display glass
- Notebook is free of brominated flame retardants (BFRs); power adapter's printed circuit board is BFR-free
- All internal cables are free of polyvinyl chloride (PVC)

Recycling

Through ultra-efficient design and use of highly recyclable materials, Apple has minimized material waste at product end of life. In addition, Apple offers and participates in various product take-back and recycling programs in 95% 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

EPEAT, Electronic Product Environmental Assessment Tool: EPEAT is a program which 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; and the manufacture of the product as well as 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 4 year period. Consumption patterns are modeled according to European Commission and US Environmental Protection 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, and 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 4.0 and/or ENERGY STAR® Program Requirements for Single Voltage External AC-DC and AC-AC Power Supplies. 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 set to its full brightness.

- **Idle—Display off:** System is on and has completed loading Mac OS X; the display 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%, 75%, 50%, and 25% of the power adapter's rated current.

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