



Apple Watch Series 4 (GPS + Cellular) Environmental Report



Date introduced
September 12, 2018

Environmental Status Report

Apple Watch Series 4 (GPS + Cellular) is designed with the following features to reduce environmental impact:

- Arsenic-free glass
- Mercury-free
- Brominated flame retardant-free
- PVC-free
- Beryllium-free
- Low-carbon aluminum case¹
- Complies with European REACH regulation on nickel
- 100 percent of packaging fibers are sourced from responsibly managed forests, bamboo, waste sugarcane, or recycled paper.

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 types of materials used in their manufacture, improving their energy efficiency, and designing them for better recyclability. The information below details the environmental performance of Apple Watch Series 4 (GPS + Cellular) as it relates to climate change, energy efficiency, material efficiency, and restricted substances.¹

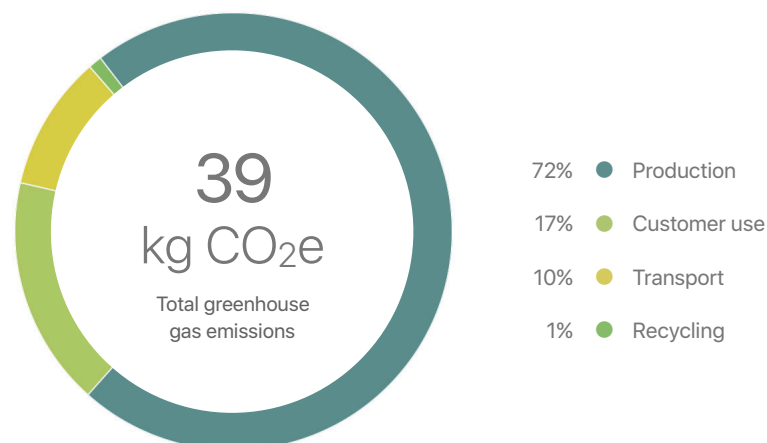
Climate Change

Greenhouse gas emissions have an impact on the planet's balance of land, ocean, and air temperatures. Most of Apple's greenhouse gas emissions come from the production, transport, use, and recycling of our products. Apple seeks to minimize product-related greenhouse gas emissions by setting stringent design-related goals for material and energy efficiency, and by increasing use of renewable energy in our supply chain. For example, since we launched the first Apple Watch in 2015, Apple has minimized its carbon and materials footprints by sourcing aluminum that was smelted using hydroelectricity rather than fossil fuels, and reengineered the manufacturing process to reincorporate scrap aluminum.

In addition, Apple's Supplier Clean Energy program has enabled direct watch suppliers to develop their own renewable energy projects to further reduce greenhouse gas emissions. These projects resulted in a 12 percent decrease in the greenhouse gas emissions from watch production, compared to what they would have been without renewable energy. The chart below provides the estimated greenhouse gas emissions for Apple Watch Series 4 (GPS + Cellular) over its life cycle.²

Greenhouse Gas Emissions for Apple Watch Series 4 (GPS + Cellular)

44mm Aluminum Case with Sport Band





Battery chemistry

- Lithium-ion polymer
- Free of lead, cadmium, and mercury

Energy Efficiency

Apple Watch Series 4 (GPS + Cellular) uses power-efficient components and software that intelligently manages power consumption. The following table details the energy efficiency of the Apple USB Power Adapter.

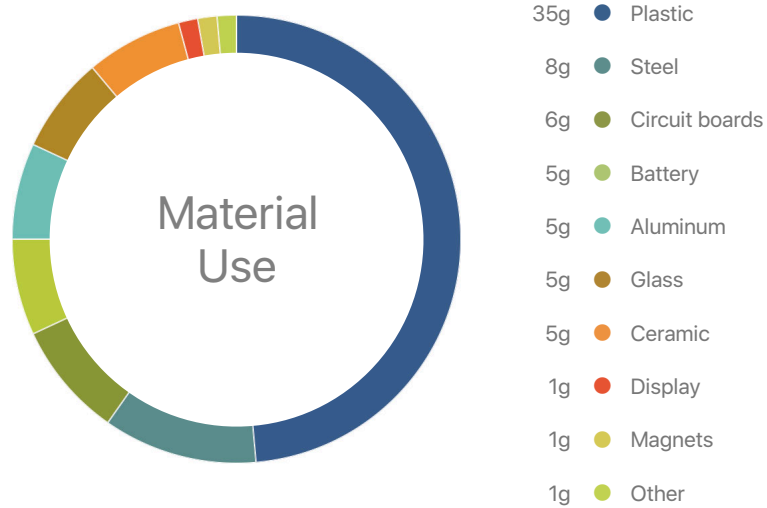
Power Consumption for Apple USB Power Adapter

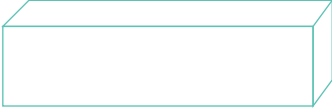
Mode	100V	115V	230V
Power adapter, no-load	0.105W	0.108W	0.100W
Power adapter efficiency	74.3%	74.3%	73.1%

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 and material waste generated at the end of the product’s life. Apple Watch cases are available in stainless steel and aluminum—materials highly desired by recyclers. The chart below details the materials used in Apple Watch Series 4 (GPS + Cellular).³

Material Use for Apple Watch Series 4 (GPS + Cellular) 44mm Aluminum Case with Sport Band





The retail packaging of Apple Watch Series 4 (GPS + Cellular) contains 66 percent less plastic than the previous-generation Apple Watch packaging and contains at least 36 percent recycled content.

Packaging

The retail packaging for Apple Watch Series 4 (GPS + Cellular) is highly recyclable, and 100 percent of the fiber in its retail box is from recycled content, bamboo, waste sugarcane, or responsibly managed forests. The following table details the complete set of materials used in the Apple Watch Series 4 (GPS + Cellular) packaging.

Packaging Breakdown for Apple Watch Series 4 (GPS + Cellular)

Material	Retail box	Retail and shipping box
Fiber (corrugate, paperboard)	339g	475g
Plastic film	0.3g	7g
Microfiber	1.2g	–

Restricted Substances

Apple has long taken a leadership role in restricting harmful substances from our 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, and the European Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals, also known as the REACH regulation. Apple Watch Series 4 (GPS + Cellular) goes further by incorporating more aggressive restrictions on mercury, brominated flame retardants (BFRs), PVC, and beryllium.

In addition, we paid special attention to the materials that will be in prolonged skin contact and applied rigorous controls for them. We developed a list of restricted substances based on existing Apple policies, leading standards, international laws and directives, and recommendations from toxicologists and dermatologists.

Apple then tested and evaluated materials for the concentration of restricted substances, using both Apple and independent laboratories. Toxicologists reviewed the test results to evaluate safety. Finally, we took the added step of having toxicologists review the chemical formation of each material that may have prolonged contact with the skin.

Only materials that passed these reviews were acceptable for use in Apple Watch Series 4 (GPS + Cellular).

Recycling

Through efficient design and the use of highly recyclable materials, Apple has minimized material waste at the product's end of life. Through Apple GiveBack, customers can trade in eligible devices for an Apple Store Gift Card. If it's not eligible for credit, we'll recycle it for free. In addition, Apple offers and participates in various product take-back and recycling programs in 99 percent of the countries where Apple sells products, including at every Apple Store. For more information on how to recycle your products at end of life, visit www.apple.com/giveback.



Definitions

Greenhouse gas emissions: Estimated emissions are calculated in accordance with guidelines and requirements as specified by ISO 14040 and ISO 14044. Calculation includes emissions for the following life-cycle phases contributing to Global Warming Potential (GWP 100 years) in CO₂e equivalency factors (CO₂e):

- **Production:** Includes the extraction, production, and transportation of raw materials, as well as the manufacture, transport, and assembly of all parts and product packaging.
- **Transport:** Includes air and sea transportation of the finished product and its associated packaging from the manufacturing site to regional distribution hubs. Transport of products from distribution hubs to end customer is modeled using average distances based on regional geography.
- **Customer use:** Apple conservatively assumes a three-year period for power use by first owners. Product use scenarios are modeled on data that reflects intensive daily use of the product. Geographic differences in the power grid mix have been accounted for at a regional 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 efficiency values for the Apple USB Power Adapter are based on the following conditions.

- **Power adapter, no-load:** Condition in which the Apple USB Power Adapter with the Apple Watch Magnetic Charging Cable (1m) is connected to AC power, but not connected to Apple Watch Series 4 (GPS + Cellular).
- **Power adapter efficiency:** Average of the Apple USB Power Adapter with the Apple Watch Magnetic Charging Cable (1m) measured efficiency when tested at 100 percent, 75 percent, 50 percent, and 25 percent of the power adapter’s rated output 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 of chlorine. Apple defines a material as beryllium-free if it contains less than 1000 parts per million (ppm) of beryllium. Apple defines a material as RoHS compliant if it conforms to European Union Directive 2011/65/EU and its amendments, including exemptions for the use of lead. Apple is working to phase out the use of these exempted substances where technically possible. A complete list of Apple’s restrictions on hazardous substances is included in Apple’s Regulated Substances Specification at www.apple.com/environment/reports.

1. Product evaluations based on U.S. configurations of 44mm Aluminum Case with Sport Band. Values and claims will vary by configuration.

2. Greenhouse gas emissions vary according to the configuration of Apple Watch. The following table details the estimated greenhouse gas emissions for U.S. configurations of Apple Watch Series 4 (GPS + Cellular) over its life cycle.

Configuration	Greenhouse Gas Emissions
Apple Watch Series 4 (GPS + Cellular) 44mm Aluminum Case with Sport Loop Band	36 kg CO ₂ e
Apple Watch Series 4 (GPS + Cellular) 44mm Aluminum Case with Sport Band	39 kg CO ₂ e
Apple Watch Series 4 (GPS + Cellular) 44mm Stainless Steel Case with Sport Band	41 kg CO ₂ e
Apple Watch Series 4 (GPS + Cellular) 44mm Stainless Steel Case with Milanese Loop Band	39 kg CO ₂ e

3. Excludes Apple Watch Magnetic Charging Cable and Apple USB Power Adapter. Mass will vary by configuration.