Computing Savings in California

Requirements for Desktop Computers, Thin Clients, Mobile Gaming Systems, Portable All-in-Ones and Notebook Computers

On July 1, 2021, desktop computers, thin clients and mobile gaming systems will be required to comply with the Tier-II performance, testing, marking and certification requirements listed in Sections 1601-1608 of California's Appliance Efficiency Regulations (Title 20). Portable all-in-ones and notebook computers must continue to meet the Tier 1 requirements that became effective on January 1, 2019.

On December 9, 2021, computers with high-speed networking capability, multi-screen notebooks, notebooks with cyclical behavior, and monitors with high refresh rates will also be required to meet the performance, testing, marking and certification requirements listed in Sections 1601(v) - 1608 of Title 20.

The regulations for these computer types are in addition to those that went into effect on January 1, 2018 for small-scale servers, high expandability computers, mobile workstations and workstations.

Why?

According to the 2016 Energy Commission Staff Report, computers and monitors account for approximately 3% of residential and 7% of commercial energy use, qualifying them as large electricity consumers. Much of the time, these products are turned on and consuming electricity but are not actively being used. The Energy Commission recognizes four different non-active operational modes: short-idle, long-idle, sleep and off-modes. Some computers consume 50 watts of electricity in these idle modes.

The Title 20 standards are cost-effective, technically feasible and limit the amount of electricity computers and monitors are allowed to consume when not in active mode. The standards are designed to reduce energy consumption in active mode without interfering with performance. The standards set targets for energy consumed in the four non-active modes based on a computer's "expandibility score" (ES). The ES considers the number and type of interfaces offered. There are also allowances for additional energy use if the computer offers additional functionality, including:

- Add-in Cards
- Additional Hard Disks
- Graphics Cards
- High Bandwidth System Memory
- High-speed Ethernet Capability
- Integrated Display
- Refresh Rates Above 300 Hz (monitors)
- System Memory
- Video Surveillance Cards
- Wired Ethernet or Fiber Cards

The base total energy consumption targets are determined by a product's ES, which is contingent on the type of interfaces present in the system as sold or offered for sale.

Relevant Code Sections
California Appliance Efficiency Regulations, Title 20 • 1602(a) and 1602(v) – Definitions • 1604(v)(4) – Test Methods for Computers • 1605.3(v)(5) – State Standards for Computers • 1606 – Filing by Manufacturers; Listing of Appliances in Database • 1607(b) – Marking of Appliances (Name, Model Number, and Date)

Monitor Requirements

In addition to the Title 20 computer requirements, monitors manufactured on or after July 1, 2019, are required to comply with the performance, testing, certification and marking requirements listed in applicable Title 20 Sections. Computer monitor product types are defined in Section 1602(v).

On January 1, 2021, new energy consumption allowances associated with additional features for monitors such as touch screen, "enhanced performance display," gaming, OLED, curved and others became effective. For example, OLED monitors manufactured before January 1, 2021 have a 30% energy adder on top of the maximum power allowance, while OLED monitors manufactured on or after January 1, 2021 receive only a 20% energy adder.

Base standards and applicable allowances are listed in Section 1605.3(v)(4) Tables V-4 and V-5, respectively. On December 9, 2021, new power allowances will become effective.

Specified monitors are not required to meet any performance requirements, but are still required to comply with the testing, certification and marking requirements listed in applicable Title 20 Sections. These are:

- Keyboard, video and mouse (KVM) or keyboard, mouse and monitor (KMM) computer monitors that can operate with a KVM switch and are designed to be used in a server rack for use solely in a data center
- Certain larger high-performance monitors

Medical computer monitors are required to follow the Title 20 marking and certification requirements. However, they are not required to comply with the energy efficiency requirements.

What's Covered

Desktop Computer	A computer in which the main unit is designed to be in a fixed location, often on a desk or floor. A desktop computer includes an integrated desktop computer.
Integrated Desktop Computer	A desktop computer in which the computing hardware and display are integrated into a single housing, and which is connected to AC power through a single cable. Integrated desktop computers come in two forms: • A system in which the display and computer are physically combined into a single unit • A system packaged as a single system for which the display is separate but is connected to the main chassis by a DC power cord, and both the computer and display are powered from a single power supply
Thin Client	An independently powered computer that relies on a connection to remote computing resources (e.g., a computer server or a remote workstation) to obtain primary functionality. Main computing functions (e.g., program execution, data storage and interaction with other internet resources) are provided by remote computing resources. A thin client does not have integral rotational storage media and is designed for use in a fixed location during operation.
Mobile Gaming System	A computer primarily used for gaming and designed specifically for portability and to be operated for extended periods both with and without a direct connection to an AC mains power source. A mobile gaming system is sold with an integrated display and a physical keyboard, and has ALL of the following: • First discrete GPU with frame buffer bandwidth ≥ 128 gigabytes/second • System memory ≥16 gigabytes • External power supply with a nameplate output power ≥150 W • Total battery capacity ≥ 75 Wh
Portable All-in-One	A computer designed for limited portability and meeting ALL of these criteria: • Includes an integrated display with a diagonal size ≥ 17.4" • Does not have a keyboard integrated into the physical housing of the product in its as-shipped configuration • Includes and primarily relies on touch-screen input, with optional keyboard • Includes the capacity to connect to a wireless network • Includes an internal battery that can power the computer's primary functions
Notebook Computer 	A computer designed specifically for portability and to be operated for extended periods both with and without a direct connection to an AC mains power source. It is sold with an integrated display and a physical keyboard. The term "notebook computer" includes two-in-one notebooks, mobile thin clients, multi-screen notebooks and notebook computer models with touch-sensitive screens. Mobile workstations and mobile gaming systems are not considered notebook computers.
Two-in-One Notebook	A notebook computer which has a clam shell form factor, but has a detachable keyboard. The keyboard and display portions of the product must be shipped as an integrated unit.
Mobile Thin Client 	A notebook computer that relies on a connection to remote computing resources to obtain primary functionality and does not have integral rotational storage media.

Requirements

Title 20, Section 1605.3(v)(5) requires desktop computers, thin clients, mobile gaming systems, portable all-in-ones, and notebook computers manufactured on or after January 1, 2019, to meet all of the following four criteria:

1. Comply with the energy consumption standards in Table V-7 (see table below)
2. Be shipped with power management settings that do both of the following:
   a. Transition the computer into either the computer sleep mode or computer off mode measured in Section 1604(v)(4) within 30 minutes of user inactivity. If the transition is to a computer sleep mode, that sleep mode must either:
      i. Be a computer sleep mode as described in Advanced Configuration and Power Interface (ACPI) as S3 or
      ii. Consume power ≤ the values shown in Table V-6
   b. Transfer connected displays into sleep mode within 15 minutes of user inactivity
3. If the model is shipped at the purchaser's request with either a limited capability operating system or without an operating system, or if the model is not capable of having an operating system, the model is not required to comply with the power management requirements of Section 1605.3(v)(5)(B).
4. Desktop computers and thin clients assembled before July 1, 2021, entirely from parts manufactured before September 1, 2018, are not required to comply with Table V-7 (shown below).

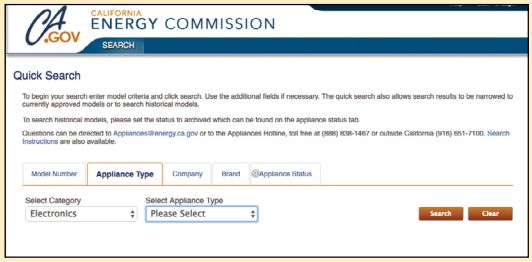
In addition to the new Tier-II energy consumption requirements, new power allowances for high-speed networking capability, multi-screen notebooks, notebooks with cyclical behavior, and monitors with high refresh rates become effective on December 9, 2021 (see Table V-8).

Table V-7

Title 20, Section 1605.3(v)(5)		
Computer Type	For models manufactured on or after January 1, 2019, and before July 1, 2021, the measured annual energy consumption shall be less than or equal to the values below.	For models manufactured on or after July 1, 2021, the measured annual energy consumption shall be less than or equal to the values below.
Desktop Computers, mobile gaming systems, and thin clients with an ES of 250 or less	50 kWh/yr + applicable adders in Table V-8	50 kWh/yr + applicable adders in Table V-8
Desktop Computers, mobile gaming systems, and thin clients with an ES more than 250 but no more than 425	80 kWh/yr + applicable adders in Table V-8	60 kWh/yr + applicable adders in Table V-8
Desktop Computers, mobile gaming systems, and thin clients with an ES more than 425 but no more than 690	100 kWh/yr + applicable adders in Table V-8	75 kWh/yr + applicable adders in Table V-8
Notebook Computers and portable all-in-ones	30 kWh/yr + applicable adders in Table V-8	30 kWh/yr + applicable adders in Table V-8
Minimum power factor of a computer power supply that is not a federally-regulated external power supply	0.9 measured at full load	0.9 measured at full load

How to Comply with Title 20

- Meet the applicable design or performance standards (efficiency standards)
- Test regulated products using the required test method performed by a lab approved by the California Energy Commission and maintaining all test reports on file to be produced for verification upon the Energy Commission's request
- Mark the regulated product in accordance with Title 20, Section 1607 **and**
- Certify the product to the California Energy Commission's MAEDbS



Even if a computer meets all performance, testing and marking requirements outlined in Title 20, it is illegal to sell or offer for sale a regulated product in California if the model is not certified to the Energy Commission and accurately listed in the MAEDbS.

Manufacturers, distributors, retailers, contractors and importers - all members of the supply chain - are responsible for ensuring that regulated products are accurately listed in the MAEDbS and updated as necessary. To learn more about the MAEDbS and how to use it, view the Energy Code Ace Title 20 On-Demand Video Trainings.

Standard Effective Dates

January 1, 2018	***January 1, 2019***	***July 1, 2021***	***December 9, 2021***
Standards for workstations, mobile workstations, rack-mounted workstations, small-scale servers and high expandability computers. For more information see the Energy Code Ace fact sheet on 2018 requirements.	Tier-I standards for desktop computers, thin clients, mobile gaming systems, portable all-in-ones and notebook computers.	Tier-II standards for desktop computers, thin clients and mobile gaming systems.	Standards for high-speed networking capability, multi-screen notebooks, notebooks with cyclical behavior, and monitors with high refresh rates.

Frequently Asked Questions

Q: *Are there any marks required for product certification or registration?*

A: Section 1607, Marking Requirements, requires products to be permanently, legibly and conspicuously marked with manufacturer name, brand name or trademark, model number and date of manufacture, including the year and month.

Q: *If a notebook computer is certified and registered with MAEDbS for having a small battery charger system, does it need to be certified again as a notebook computer?*

A: Yes, computer models that are certified as meeting the battery charger standards will also need to be certified as meeting the computer standards. See Title 20, Section 1606(a)(1)(D).

Q: *When can manufacturers start to certify computers to the Energy Commission's database?*

A: The database is now ready for certification of the computer types subject to the Tier 2 requirements effective July 1, 2021. Models that met the Tier 1 requirements will be archived on the MAEDbS but can continue to be offered for sale in California if manufactured before July 1, 2021.

Manufacturers who wish to comply early with the regulations effective December 9, 2021, can now voluntarily certify computers and computer monitors to the MAEDbS using the new additional fields.

Q: *If a manufacturer produces only a limited quantity of units, must these units be in compliance with Title 20?*

A: If the manufacturer meets the criteria for a "small volume manufacturer," then the products may not need to be tested, certified, marked or meet the performance or design standards in Title 20. However, these products must still meet the applicable power management requirements in Title 20, Sections 1605.3(v)(5)(B)2 and 1605.3(v)(6)(C).

The definition of a small volume manufacturer can be found in Title 20, Section 1602(v). Small volume manufacturers must certify as such to the Energy Commission as required in Section 1606(j). If a small volume manufacturer produces more than 50 units of a basic model of a desktop or workstation, then those desktops or workstations must meet all of the requirements in Title 20, including testing, certification, marking, and performance or design standards.

Q: *Does the computer regulation apply to computers that ship into a California port, but are then not sold into California? If the product just passes through a California international shipping port does it have to be registered or comply?*

A: No, regulations only apply to computers that are sold or offered for sale in California (including internet sales). It does not apply to products that transit through California for sale in another state.

For More Information

Title 20 Primary Documents

- Title 20 Appliance Efficiency Regulations:
  tinyurl.com/Title20

California Energy Commission Information & Services

- Appliance Compliance Assistance Call Center
  (888) 838-1467 or outside California (916) 651-7100
- Questions may also be emailed to Appliances@energy.ca.gov
- California Appliance Efficiency Regulations Site:
  energy.ca.gov/appliances
- Modernized Appliance Efficiency Database (MAEDbS):
  https://cacertappliances.energy.ca.gov/Login.aspx
- 2016 Appliance Efficiency Rulemaking, Staff Report: Final Analysis of Computers, Computer Monitors, and Signage Displays
  efiling.energy.ca.gov/GetDocument.aspx?tn=213548&DocumentContentId=23311
- Frequently Asked Questions: Computers. Monitors, and Signage Displays
  www.energy.ca.gov/appliances/documents/computers_and_displays_regulation_FAQ.html

Additional Resources

- Energy Code Ace:
  EnergyCodeAce.com
  - An online "one-stop-shop" providing no-cost tools, traing and resources to help appliance and building industry professionals decode and comply with Title 20 and Title 24, Part 6. The site is administered by California's investor-owned utilities.

    Of special interest:
    - Fact Sheets:
      energycodeace.com/content/resources-fact-sheets/
      - Title 20 Certification Overview, Process and FAQs
      - Computing Savings in California – 2018 California Appliance Efficiency Regulations for Computers
    - Title 20 On-Demand Video Training:
      energycodeace.com/content/title-20-training/
    - Reference Ace:
      energycodeace.com/content/tools-ace/tool=reference-ace
      - Helps you navigate the Standards using key word searches, hyperlinked tables and related searches

    Please register with the site and select a Title 20 industry role for your profile in order to receive messages about additions to our Title 20 offerings!

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