



ADMINISTRATIVE  
COMMUNICATIONS SYSTEM  
U.S. DEPARTMENT OF EDUCATION

**DEPARTMENTAL DIRECTIVE**

**OCIO: 3-105**

**Page 1 of 13 (05/01/2006)**

Distribution:  
All Department of Education employees

Approved by: \_\_\_\_\_/s/  
Michell C. Clark  
Assistant Secretary for Management

**Procuring Electronic and Information Technology (E&IT)  
in Conformance with Section 508 of the Rehabilitation Act of 1973 as Amended**

*Table of Contents*

I.	Purpose.....	2
II.	Policy .....	2
III.	Authority .....	2
IV.	Applicability .....	2
V.	Definitions.....	3
VI.	Responsibilities .....	4
VII.	The Acquisition Process .....	4
VIII.	Exception Determination .....	8
IX.	References.....	9

For technical information regarding this ACS document, contact Don Barrett at [don.barrett@ed.gov](mailto:don.barrett@ed.gov) or 202-453-7301.

Supersedes OCIO: 3-105 Procuring Electronic and Information Technology in Conformance with Section 508 of the Rehabilitation Act of 1973, as Amended dated 09/21/2004.

## I. Purpose

The purpose of this directive is to establish documentation requirements necessary to demonstrate compliance with the requirements of Section 508 of the Rehabilitation Act of 1973, as amended (hereafter "Section 508"). The resulting documentation is to be used to demonstrate the availability, or lack thereof, of products and services that meet the applicable technical, business, and accessibility requirements of a procurement action.

## II. Policy

It is the policy of the Department to develop, procure, maintain, and use Electronic and Information Technology (E&IT) in accordance with the Accessibility Standards set forth by Section 508 of the Rehabilitation Act of 1973, as amended.

## III. Authority

- A. 48 C.F.R. 1.301 – Federal Acquisition Regulations.
- B. Section 508 of the Rehabilitation Act of 1973, as Amended: Federal Register Volume 65, p. 80500, December 21, 2000; Federal Register Volume 66, p. 20894, April 25, 2001.
- C. Electronic and Information Technology Accessibility Standards (Accessibility Standards); Final Rule: 36 C.F.R. Part 1194; <http://www.access-board.gov/sec508/508standards.pdf>.

## IV. Applicability

This directive applies to all employees when procuring E&IT products or services made on or after June 25, 2001.

Section 508 requires Federal agencies to ensure that all E&IT procured be accessible by individuals with disabilities. Notwithstanding this requirement, the implementing regulations provide certain exceptions.

In general, Section 508 does not apply to:

- A. Any E&IT procured before June 25, 2001;
- B. Within scope modifications to existing E&IT systems procured before June 25, 2001 (legacy systems);
- C. Procurements where Section 508 compliant E&IT is unavailable, and;
- D. Procurements where the cost of acquiring Section 508 compliant E&IT would constitute an "undue burden" to the U.S. Department of Education (Department).

**V. Definitions**

- A. *Contracting Officer (CO)* – FAR, Subpart 2.101 – A person with the authority to enter into, administer, or terminate contracts and make related determinations and findings.
- B. *Electronic and Information Technology (E&IT)* – Has the same meaning as “information technology” except E&IT also includes any equipment or interconnected system or subsystem of equipment that is used in the creation, conversion, or duplication of data or information. The term E&IT, includes, but is not limited to, telecommunication products (such as telephones), information kiosks and transaction machines, worldwide websites, multimedia, and office equipment (such as copiers and fax machines).
- C. *Equivalent Facilitation* – The use of designs or technologies as alternatives to those explicitly prescribed by Accessibility Standards provided that they result in substantially equivalent or greater access to, and use of, a product for individuals with disabilities.

Compliance with the following functional performance criteria is the test for equivalent facilitation:

1. At least one mode of operation and information retrieval that does not require user vision shall be provided, or support for assistive technology used by people who are blind or visually impaired shall be provided.
  2. At least one mode of operation and information retrieval that does not require visual acuity greater than 20/70 shall be provided in audio and enlarged print output working together or independently, or support for assistive technology used by people who are visually impaired shall be provided.
  3. At least one mode of operation and information retrieval that does not require user hearing shall be provided, or support for assistive technology used by people who are deaf or hard of hearing shall be provided.
  4. Where audio information is important for the use of a product, at least one mode of operation and information retrieval shall be provided in an enhanced auditory fashion, or support for assistive hearing devices shall be provided.
  5. At least one mode of operation and information retrieval that does not require user speech shall be provided, or support for assistive technology used by people with disabilities shall be provided.
  6. At least one mode of operation and information retrieval that does not require fine motor control or simultaneous actions and that is operable with limited reach and strength shall be provided.
- D. *Information Technology* – Any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or

reception of data or information. The term information technology includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.

- E. *Market Research* – Means collecting and analyzing information about capabilities within the market to satisfy agency needs.
- F. *Requiring Official* – Individual in the Principal Office having responsibility for the procurement in question. The Principal Office and program management will make assignment as need dictates.
- G. *Undue Burden* – A significant difficulty or expense, as defined by disability case law.

## VI. Responsibilities

- A. The Requiring Official is responsible for ensuring that market research is performed and the findings are documented, including information on the accessibility of the E&IT products or services being considered for procurement. The documentation should address the findings relative to the conformance or nonconformance of the E&IT products or services with the Access Board's Federal E&IT Accessibility Standards. This documentation is required by the FAR and is important for recording the degree of conformance, the validation of exceptions or the existence of an equivalent facilitation solution to the Federal E&IT Accessibility Standards. Research documentation must be submitted to the Contracting Officer for inclusion in the contract file and will be required as part of the documentation packages for the various review activities in the acquisition and implementation life cycle.
- B. The Contracting Officer will ensure the Requiring Official provides market research and supporting documentation for inclusion in the contract file. Contracting Officers that award indefinite-quantity contracts must indicate to requiring officials which supplies and services the contractor indicates as compliant, and show where full details of compliance can be found (*e.g.*, vendor's or other exact website location).
- C. The OCIO Assistive Technology Team is readily available throughout the procurement process and will, upon request, provide the Requiring Official consultation regarding E&IT accessibility and assistive technology accommodation.

## VII. The Acquisition Process

The OCIO Assistive Technology Team is available to provide validation of vendor claims and documentation, pre and post-acquisition accessibility testing, and other Section 508 related assistance throughout this process.

- A. First, the Requiring Official reads and becomes familiar with the Section 508 Accessibility Standards and the Federal Acquisition Regulation and determines

which technical standards apply. The Section 508 E&IT Accessibility Standards defines six categories for the technical requirements and are shown below.

1. 1194.21 Software applications and operating systems.
2. 1194.22 Web-based intranet and Internet information and applications.
3. 1194.23 Telecommunications products.
4. 1194.24 Video and multimedia products.
5. 1194.25 Self contained, closed products.
6. 1194.26 Desktop and portable computers.

The Section 508 Technical Standards are included in this document in References, IX (E).

- B. Second, the Requiring Official performs market research to determine the availability of products and services that meet the applicable technical standards. The General Services Administration (GSA) has developed an on-line tool (the Buy Accessible Wizard) to help users determine and document Section 508 requirements that apply to a particular E&IT acquisition:  
<http://www.buyaccessible.gov>.

In determining availability, the Requiring Official should consider, among other things, information on vendor websites and GSA's Section 508 website <http://www.section508.gov>. The Section 508 website contains links to those vendor sites that have registered and have accessibility information available on their respective sites. Most often a completed Voluntary Product Accessibility Template (VPAT) is available for printing or downloading. The VPAT is a standard format developed by the [Information Technology Industry Council \(ITI\)](#) in cooperation with GSA and the Section 508 Steering committee for vendors to document how they respond to the federal accessibility standard. In the absence of a VPAT, the Requiring Official should request what other documentation the vendor has available to assist with the accessibility determination. The Requiring Official may also consider vendor plans or commitments to modify its product to be compliant and whether the vendor is likely to have a compliant product in time to meet Principal Office's delivery requirements.

- C. Third, the Requiring Official identifies the technical standards, if any, which do not apply due to an exception, such as non-availability or undue burden.
- D. Fourth, the Requiring Official develops technical specifications and minimum requirements considering the results of market research and agency needs. It is most important that the requirement (the real need and *not* brand name) is stated, versus picking items out of the catalogue, because one will need to address how the accessibility need can be met in some alternative fashion. This can only be done when the actual quantified performance requirement is stated.

The following three steps summarize this phase of the acquisition process:

1. Determine Business Functional Requirements.
2. Determine Technical Requirements.
3. Determine Accessibility Requirements:

Please reference Department of Education Requirements for Accessible Electronic and Information Technology Design: <http://www.ed.gov/fund/contract/apply/clibrary/software.html>; or, the Section 508 Accessibility Standards: <http://www.access-board.gov/sec508/standards.htm>. (Also listed in References, IX (E) in this document.)

The Requiring Official is responsible for written justification for an exception under Section 508 (see Section VIII, below). Such written justification is submitted to the Contracting Officer for inclusion in the procurement or contract file.

- E. Finally, determine as soon as possible whether a custom solution will be developed or if a commercial off-the-shelf (COTS) solution will be utilized.
1. Custom Development Process:
    - a. Develop a Statement of Work or include the following in the in-house development and design documents.
      - i. Business functional requirements and accessibility requirements as the basic development requirements.
      - ii. Accessibility testing, network certification, and network integration requirements. The OCIO Assistive Technology Team will provide design consulting and accessibility testing assistance.
      - iii. Requirement that the respondent identify how they will meet the accessibility requirement.
      - iv. Requirement that the respondent provide all documentation in an accessible electronic format.
      - v. Requirement that any software acquired by the respondent as part of the system solution meets the applicable Section 508 requirements. The applicable technical requirement(s) must be identified in the response. (1194.21 Software applications and operating systems; 1194.22 Web-based intranet and Internet information and applications; 1194.23 Telecommunications products; 1194.24 Video and multimedia products; 1194.25 Self contained, closed products; or 1194.26 Desktop and portable computers.)
    - b. Skip to Section VII. F. 3, *For Both Options*.
  2. Commercial Off-The-Shelf (COTS) process:
    - a. Identify potential sources to meet the business need. (Document)
    - b. Narrow selection to 2 – 3 best before addressing how to meet Section 508 compliance. (The agency must comply, not the vendor.)

For each potential product:

- i. Obtain a copy of the completed [Voluntary Product Accessibility Template \(VPAT\)](#) from the developer of the COTS product. Include the VPAT in the market research and contract/procurement file.
  - ii. Obtain an evaluation copy or ask the developer to bring a copy of the E&IT to the OCIO Assistive Technology Team for pre-acquisition accessibility and usability testing. This provides research documentation and can smooth network certification and integration process. Always invite the sponsoring PO and developer to attend the test session.
  - iii. Obtain Assistive Technology Team Accessibility Review (AR) report. Include in the market research and contract/procurement file.
- c. Next step is VII. F. 3, *For Both Options*.

3. For Both Options:

- a. Prepare a product comparison addressing all the requirements and select the most accessible product that meets the business needs. Include in the market research and contract/procurement file. A requirements or product matrix works well. Determine from the product comparison if one of the allowable exceptions apply. Note the determination in the market research and contract/procurement file documentation.
- b. Review all the research and documentation with Contracting Officer.
- c. If of significant size to require Department Investment Review Board (IRB) approval, then present to IRB, else present to OCIO Technical Review Board (TRB).
- d. Continue the life cycle process.
- e. Submit this information along with the purchase request, including any exception documentation as appropriate, to the Contracting Officer. These requirements should be included along with the functional requirements necessary to meet the procurement objective. These requirements would be included in the Statement of Work (SoW) for task orders and contracts.
- f. Finally, the Contracting Officer drafts and issues a solicitation to receive offers from interested sources or consider placing an order under a delivery order or task order contract. Proposal evaluation may yield additional information that could require reconsideration of the need for an exception (either retracting or invoking an exception, such as non-availability).
- g. Market research, accessibility (Section 508 conformance), exception determination (see section VIII, below), and selection documentation

collected during this process will be the justification for meeting the Section 508 compliance obligations for the purchase. This documentation will form the basis of the Department's rationale should the acquisition be challenged by an internal grievance or a civil court action. A suggested set of market research and selection justification documentation includes:

- i. The applicable Accessibility Standards;
- ii. The completed [Voluntary Product Accessibility Template \(VPAT\)](#), if available;
- iii. Reports or research findings resulting from the use of the GSA Buy Accessible Wizard: <http://app.buyaccessible.gov/baw/>;
- iv. The OCIO Assistive Technology Team pre-procurement Accessibility Review report(s);
- v. Exception justification, if applicable;
- vi. Selection and evaluation documentation, such as a requirements comparison matrix; and
- vii. Any other vendor/developer supplied documents pertaining to the accessibility of their product(s).

### VIII. Exception Determination

- A. Where an "undue burden" exception is claimed, the request must contain specific financial information to justify the procurement. Essentially, the test for undue burden requires the claimant to demonstrate that there is a "significant difficulty or expense" associated with making the Section 508 Accessibility Standards. In making this determination, *all agency resources* must be considered (36 C.F.R. 1194.4 and 48 C.F.R. 39.204). The FAR regulations set forth the procedures that must be followed in order to support a determination of undue burden. Additionally, the FAR regulations require that the requiring official for each E&IT system considered where the "undue burden" exception is claimed perform a separate undue burden determination.
- B. If an exception is requested based upon the non-availability of compliant E&IT, the Requiring Official is responsible for providing a written explanation detailing his or her efforts to acquire compliant E&IT (48 C.F.R. 39.203 (c) (2)). The written documentation for proving non-availability should provide sufficient detail showing that adequate market research has been conducted, as stated in the FAR, prior to determining that compliant E&IT is not available. In addition to describing the market research performed, the applicable technical provisions that cannot be met with products or services available from the marketplace must be specifically identified (48 C.F.R. 39.203(c)). An exception based upon non-availability may be justified if the Requiring Official is unable to find a commercial item that meets both the Section 508 Accessibility Standards and



cannot be furnished in time to satisfy the delivery requirements of the Principal Office (48 CFR 39.203, 204).

- C. If products are available that meet some, but not all, applicable standards, a Requiring Official cannot consider the product as a whole to be “non-available”. Agency acquisitions must comply with applicable technical provisions that can be met with supplies or services available in the commercial marketplace in time to meet the delivery requirements of the Principal Office.
- D. Unless an exception applies, the Contracting Officer may only make an award to an offeror that meets or will meet all the accessibility standards stated in the solicitation in time to meet the delivery requirements of the Principal Office. If none of the offerors meets or will meet all the accessibility standards stated in the solicitation in time to meet the delivery requirements of the Principal Office, the requiring official must determine if an exception applies. If no exception applies, the contracting offer may not make an award. The Contracting Officer may reopen negotiations, modify the solicitation, or cancel the solicitation and re-compete.
- E. Documentation of any exception, equivalent facilitation, or non-availability must be acceptable to the Contracting Officer, and become part of the contract file.
- F. Exceptions are identified at 48 C.F.R. 204.

## IX. References

- A. Section 508 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794 (d): <http://www.access-board.gov/sec508/guide/act.htm>
- B. The Federal Acquisition Regulations: <http://www.Section508.gov/docs/final99607A.doc>
- C. GSA Buy Accessible Wizard: <http://www.buyaccessible.gov> or <http://app.buyaccessible.gov/baw/>
- D. The Voluntary Product Accessibility Template (VPAT) developed by the Information Technology Industry Council (ITI): <http://www.itic.org/policy/vpat.html> or [http://www.itic.org/archives/articles/20040506/voluntary\\_product\\_accessibility\\_template.php](http://www.itic.org/archives/articles/20040506/voluntary_product_accessibility_template.php)
- E. The Electronic and Information Technology Accessibility Standards (Section 508): <http://www.access-board.gov/sec508/standards.htm> (reprinted below).

### Section 508 1194 Subpart B — Technical Standards

- 1194.21 Software applications and operating systems;
- 1194.22 Web-based intranet and Internet information and applications;
- 1194.23 Telecommunications products;
- 1194.24 Video and multimedia products;

- 1194.25 Self contained, closed products;
- 1194.26 Desktop and portable computers.

#### **1194.21 Software applications and operating systems.**

- (a) When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.
- (b) Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.
- (c) A well defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes.
- (d) Sufficient information about a user interface element including the identity, operation and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.
- (e) When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.
- (f) Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.
- (g) Applications shall not override user selected contrast and color selections and other individual display attributes.
- (h) When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.
- (i) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.
- (j) When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.
- (k) Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.
- (l) When electronic forms are used, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

#### **§ 1194.22 Web-based intranet and Internet information and applications.**

- (a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).
- (b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.
- (c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.
- (d) Documents shall be organized so they are readable without requiring an associated style sheet.
- (e) Redundant text links shall be provided for each active region of a server-side image map.
- (f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
- (g) Row and column headers shall be identified for data tables.
- (h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.
- (i) Frames shall be titled with text that facilitates frame identification and navigation.
- (j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

- (k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.
- (l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.
- (m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with § 1194.21(a) through (l).
- (n) When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.
- (o) A method shall be provided that permits users to skip repetitive navigation links.
- (p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

**§ 1194.23 Telecommunications products.**

- (a) Telecommunications products or systems which provide a function allowing voice communication and which do not themselves provide a TTY functionality shall provide a standard non-acoustic connection point for TTYs. Microphones shall be capable of being turned on and off to allow the user to intermix speech with TTY use.
- (b) Telecommunications products which include voice communication functionality shall support all commonly used cross-manufacturer non-proprietary standard TTY signal protocols.
- (c) Voice mail, auto-attendant, and interactive voice response telecommunications systems shall be usable by TTY users with their TTYs.
- (d) Voice mail, messaging, auto-attendant, and interactive voice response telecommunications systems that require a response from a user within a time interval, shall give an alert when the time interval is about to run out, and shall provide sufficient time for the user to indicate more time is required.
- (e) Where provided, caller identification and similar telecommunications functions shall also be available for users of TTYs, and for users who cannot see displays.
- (f) For transmitted voice signals, telecommunications products shall provide a gain adjustable up to a minimum of 20 dB. For incremental volume control, at least one intermediate step of 12 dB of gain shall be provided.
- (g) If the telecommunications product allows a user to adjust the receive volume, a function shall be provided to automatically reset the volume to the default level after every use.
- (h) Where a telecommunications product delivers output by an audio transducer which is normally held up to the ear, a means for effective magnetic wireless coupling to hearing technologies shall be provided.
- (i) Interference to hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) shall be reduced to the lowest possible level that allows a user of hearing technologies to utilize the telecommunications product.
- (j) Products that transmit or conduct information or communication, shall pass through cross-manufacturer, non-proprietary, industry-standard codes, translation protocols, formats or other information necessary to provide the information or communication in a usable format. Technologies which use encoding, signal compression, format transformation, or similar techniques shall not remove information needed for access or shall restore it upon delivery.
- (k) Products which have mechanically operated controls or keys, shall comply with the following:
  - (1) Controls and keys shall be tactilely discernible without activating the controls or keys.
  - (2) Controls and keys shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls and keys shall be 5 lbs. (22.2 N) maximum.
  - (3) If key repeat is supported, the delay before repeat shall be adjustable to at least 2 seconds. Key repeat rate shall be adjustable to 2 seconds per character.

- (4) The status of all locking or toggle controls or keys shall be visually discernible, and discernible either through touch or sound.

**§ 1194.24 Video and multimedia products.**

- (a) All analog television displays 13 inches and larger, and computer equipment that includes analog television receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals. As soon as practicable, but not later than July 1, 2002, widescreen digital television (DTV) displays measuring at least 7.8 inches vertically, DTV sets with conventional displays measuring at least 13 inches vertically, and stand-alone DTV tuners, whether or not they are marketed with display screens, and computer equipment that includes DTV receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals.
- (b) Television tuners, including tuner cards for use in computers, shall be equipped with secondary audio program playback circuitry.
- (c) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain speech or other audio information necessary for the comprehension of the content, shall be open or closed captioned.
- (d) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain visual information necessary for the comprehension of the content, shall be audio described.
- (e) Display or presentation of alternate text presentation or audio descriptions shall be user-selectable unless permanent.

**§ 1194.25 Self contained, closed products.**

- (a) Self contained products shall be usable by people with disabilities without requiring an end-user to attach assistive technology to the product. Personal headsets for private listening are not assistive technology.
- (b) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.
- (c) Where a product utilizes touchscreens or contact-sensitive controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).
- (d) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.
- (e) When products provide auditory output, the audio signal shall be provided at a standard signal level through an industry standard connector that will allow for private listening. The product must provide the ability to interrupt, pause, and restart the audio at anytime.
- (f) When products deliver voice output in a public area, incremental volume control shall be provided with output amplification up to a level of at least 65 dB. Where the ambient noise level of the environment is above 45 dB, a volume gain of at least 20 dB above the ambient level shall be user selectable. A function shall be provided to automatically reset the volume to the default level after every use.
- (g) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.
- (h) When a product permits a user to adjust color and contrast settings, a range of color selections capable of producing a variety of contrast levels shall be provided.
- (i) Products shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

- (j) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following:
- (1) The position of any operable control shall be determined with respect to a vertical plane, which is 48 inches in length, centered on the operable control, and at the maximum protrusion of the product within the 48 inch length (see Figure 1 of this part).

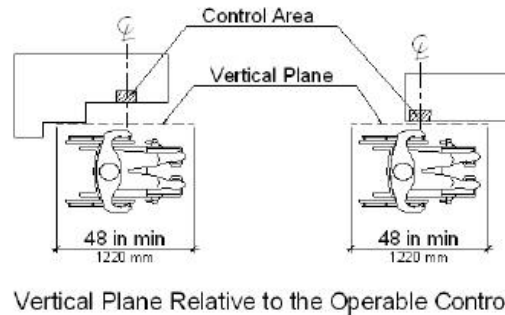


Figure 1

- (2) Where any operable control is 10 inches or less behind the reference plane, the height shall be 54 inches maximum and 15 inches minimum above the floor.
- (3) Where any operable control is more than 10 inches and not more than 24 inches behind the reference plane, the height shall be 46 inches maximum and 15 inches minimum above the floor.
- (4) Operable controls shall not be more than 24 inches behind the reference plane (see Figure 2 of this part).

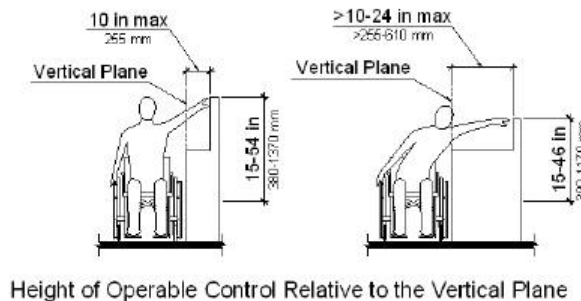


Figure 2

#### § 1194.26 Desktop and portable computers.

- (a) All mechanically operated controls and keys shall comply with §1194.23 (k) (1) through (4).
- (b) If a product utilizes touchscreens or touch-operated controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).
- (c) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.
- (d) Where provided, at least one of each type of expansion slots, ports and connectors shall comply with publicly available industry standards.