



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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**Subject:** USE OF CD-ROM SYSTEMS

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**Change:**

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1. PURPOSE. This advisory circular (AC) provides guidance on the use of CD-ROM (compact disk read-only memory) systems for the preservation and retention of the maintenance portion of a certificate holder's manual. The AC also provides guidance on the use of CD-ROM systems for the retrieval of the technical data contained in a certificate holder's manual.

2. FOCUS. This AC applies to certificate holders conducting operations under Title 14 of the Code of Federal Regulations (14 CFR) parts 121, 129, and 135. Operators under 14 CFR part 91 or 125 and repair stations certificated under 14 CFR part 145 also may use the guidance contained in this AC to the extent that it is applicable to the conduct of their operations.

3. RELATED MATERIAL.

a. 14 CFR §§ 43.13, 121.133, 121.135, 121.137, 121.139, 121.141, 121.369, 125.71, 125.73, 125.75, 125.249, 129.14, 135.21, 135.23, and 135.427.

b. AC 21-33, Quality Assurance of Software Used in Aircraft or Related Products; AC 21-35, Computer Generated/Stored Records. Copies of these documents may be obtained from the U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Ave., Landover, MD 20785.

c. Federal Aviation Administration (FAA) Order 8300.10, Airworthiness Inspector's Handbook; FAA Order 8400.10, Air Transportation Operations Inspector's Handbook; FAA Order 8700.1, General Aviation Inspector's Handbook. Copies of these documents may be purchased from: New Orders, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

#### 4. BACKGROUND.

a. The Federal Aviation Regulations permit the preparation, use, and retention of the maintenance portion of a certificate holder's manual in electronic format if that format is acceptable to the Administrator. The FAA has determined that electronic storage and retrieval of the information contained in those manuals that are in a CD-ROM format offers improved data accessibility, quality control, and speed of distribution over paper- or microfilm-based information storage systems. These improvements result in enhanced safety and a reduced economic burden on industry and government by providing users with more rapid access to information at a reduced cost. These improvements also provide industry with a means to enhance the manner in which it presents the technical data contained in a certificate holder's manual by facilitating the use of media formats (e.g., visual displays, video, graphic files, audio, animation, and computer files) that are incompatible with the use of paper- or microfilm-based manuals.

b. Any acceptable CD-ROM system must deliver to the user the information contained in the system with at least the same degree of accuracy and integrity afforded by the use of a system based on a paper or microfilm format. The use of a CD-ROM system for the storage and retrieval of technical data does not relieve a certificate holder or operator from compliance with other regulatory requirements pertaining to the currency, completeness, use, or availability of technical data.

#### 5. CD-ROM SYSTEMS.

a. Considerations that an Acceptable CD-ROM System Should Address. Prior to the implementation of a CD-ROM system, the certificate holder or operator should ensure that the following subjects are addressed:

(1) Specification and Installation of Computing Platform Hardware, Software, and Retrieval Tools. The computing platform hardware, software, and retrieval tools should be able to store and retrieve the technical data contained in the manuals under conditions of normal operation and use. The system should not permit unauthorized modification of the technical data it contains.

(2) On-going Maintenance and Support of the Computing Platform(s), Including Provisions for Outages and Necessary Alternative Retrieval Services. Although maintenance and support for the system may be provided by a source independent of the certificate holder or operator, responsibility for compliance with all regulatory requirements cannot be delegated.

(3) Distribution of Technical Data to Authorized Users. Certificate holders and operators should ensure that required personnel are provided with copies of manuals contained on a CD-ROM system or that the manuals are made available to the personnel, as appropriate. The procedures for the distribution of these manuals and their included technical data need not differ substantially from the procedures used for the distribution of information contained in paper or microfilm manuals. Certificate holders and operators may use their current manual distribution system for the distribution of manuals in a CD-ROM format.

(4) Creation and Distribution of any Incremental or Temporary Revisions Required Between Scheduled Revisions. The certificate holder or operator should establish procedures to verify that revisions to the technical data contained in the maintenance portion of its manual are current and complete and have been authorized by the appropriate authority before distribution.

(5) Accessibility by the FAA or National Transportation Safety Board (NTSB). The CD-ROM system must permit any authorized representative of the Administrator or the NTSB to retrieve, print, or view the information contained in any manual that is in CD-ROM format, upon request. If a certificate holder or operator is required to provide information to the FAA or NTSB, the certificate holder or operator must be able to provide the data in a format that is usable by the requesting agency.

(6) User Instructions. A certificate holder or operator should provide the user with information describing the operation and use of the CD-ROM system, to include: information and instructions for using publications, reference information, and system administration information. These instructions need not be in paper form. They may consist of electronic, context-sensitive help; on-line or system responses to specific operator queries; telephonic or electronic access to a designated assistance line; or other information included in the CD-ROM system.

(7) Training. The certificate holder or operator should establish a training program for employees who use a CD-ROM system. The subject matter and objectives of the training provided should vary depending on the employee's job responsibilities and functional level within the organization. Training should include security awareness and the policy and procedures for system operation. Acceptable methods of providing this training may include, but are not limited to, classroom instruction, on-line or system tutorials, user guides, and simulated problemsolving exercises. Any training program should

define minimum competency criteria and the method for demonstration of user competence.

(8) Enhancements. Additional features such as text searching, hypertext links, or other enhancements that facilitate access to the information are generally not required for a system to be considered acceptable.

b. Functional Considerations.

(1) A CD-ROM system should provide the user with the ability to retrieve the technical data contained within any manual stored in the system. Any CD-ROM system should have the ability to access, navigate, and retrieve applicable technical data at a computer workstation. The user accesses these data via the specific methods provided by the system. Electronic retrieval of information stored in a CD-ROM system may occur in either a stand-alone environment or a shared environment.

(2) The content of a manual contained in a CD-ROM system must be available and able to be viewed by the user. When the requested information is presented by the CD-ROM system, the result should be capable of being displayed on a computer screen or comparable device. If connected to a paper printer, the CD-ROM system should have the ability to output in paper form any information contained in a manual stored within the system. The format of any printed output from the system should clearly identify the information presented and be easily correlated to corresponding information contained in a printed version of the manual.

c. Revision Control Procedures.

(1) Validation of Revision Control Process. Certificate holders and operators should establish revision control procedures to audit the revision process and ensure that the contents of a CD-ROM system are current and complete. The revision control procedures for CD-ROM data may be similar to the revision control procedures used for any other medium that stores data.

(2) Revision Transmittal Letter/Release Notes. Many certificate holders and operators frequently use internal distribution documentation that specifies the current revision number and date for each revision. This documentation is sometimes provided separately, in which case it conveys revision numbers and dates, with applicable instructions to the users. A user can inspect and review this documentation to determine data currency.

(3) Data Currency Audit. Certificate holders and operators should establish procedures to ensure the currency of the technical data (regardless of storage media) that they use. Certificate holders and operators must ensure that all CD-ROM storage media contain the current revisions and associated revision dates. With CD-ROM media, page level insertion audits of manuals by the user may no longer be necessary to ensure information currency.

(4) User Responsibilities. Users of information obtained from CD-ROM systems, especially the data output in printed form, should ensure that the output was obtained from the most current CD-ROM data available to the certificate holder or operator.

d. Special Considerations in Displaying Output.

(1) Data Content and Output Form.

(a) The capabilities and advantages of electronic retrieval systems may cause information retrieved from a manual stored in a CD-ROM system to be displayed in a different format than it appears on paper or microfilm pages. The information should be identical in content regardless of output form.

(b) Any displayed output should be readily traceable to its original source. From the displayed output, the user should be able to obtain: the manual title; applicable aircraft, airframe, engine, propeller, appliance, component, or part make and model; effectivity of the data; and the revision number/date of the data. This information need not be concurrently displayed with the output display of the technical data (e.g., on the computer screen); however, this information must be readily accessible to the user.

(2) Page Numbers and Revision Data.

(a) The design of the display screen on many video monitors does not allow for the complete display of a traditional letter size (8 1/2" X 11") paper page. Frequently, the video monitor will display only one-third to one-half of a paper page, and the user must scroll the on-screen display to see the complete page. Conversely, some systems will print an entire page even though the video monitor is displaying a partial page. This situation may result in the page numbers assigned by an electronic system and displayed or printed not to be in agreement with the page numbers on the approved copy of the manual. Therefore, certificate holders and operators must ensure that the information that is displayed or printed can be traced to the correct revision level of the manual.

(b) The contents of a chapter, section, or subject in a maintenance manual may be displayed as a continuous flow of information without the actual page numbers of the approved manual. The user may elect to output only a portion of a page of a manual containing the relevant information. If this occurs, the organizational format of the manual should be retained, and a means of referencing the section or page of the manual from which the data was obtained should be provided.

(3) References to specific chapters, sections, or paragraphs of the manual may be used to ensure information traceability to corresponding sections of a printed version of the manual. This permits the technical data to be easily referenced by the user and ensures traceability of the information to its source.

(4) The most common method of updating a manual in CD-ROM format is to issue a new compact disk (CD). The CD-ROM system usually displays the date of the issuance of the most recent CD as the date of the entire manual. Although, only the affected portions of the manuals are updated and marked with the most current revision date, the date contained on the entire manual may not correspond to the revision date contained on each page. When this method of updating the manual through the issuance of a replacement CD is used, a date for the CD issuance may be considered the date of last revision of the manual. The FAA recommends that certificate holders and operators prepare a table of revisions and include that table on the CD to show when each page of the manual was revised.

e. Data Archives. Maintenance recordkeeping requirements frequently require retention of and access to previously used technical data to substantiate a method of repair or maintenance. To facilitate compliance with those traceability requirements, a certificate holder or operator may decide to archive earlier versions of manuals in the event of a future need to duplicate, regenerate, or reconstruct maintenance instructions. This archived data may be retained by the certificate holder or operator, or could be obtained from the original source of the data. Regardless of the source, the certificate holder or operator is responsible for ensuring the availability of any required record.

(1) Preservation of Stored Data. Procedures should be established by the certificate holder or operator to ensure the integrity of the stored technical data (regardless of the medium of the storage). These procedures should include:

(a) Ensuring that no unauthorized changes can be made.

(b) Selecting a storage medium that minimizes regeneration errors or deterioration.

(c) Exercising, refreshing, or duplicating archived technical data at a frequency compatible with the storage life of the medium (i.e., before deterioration of the storage medium).

(d) Storing duplicate copies in physically separate archives to minimize the risk of data loss in the event of a disaster.

(2) Technology Advances. Certificate holders and operators should ensure that all CD-ROM system components are maintained so that archived manuals can be retrieved. Future technological advancements in data storage media may result in the replacement of current system hardware or the use of another storage medium. Future systems must be able to retrieve the archived technical data or the certificate holder or operator will have to maintain the old CD-ROM system to ensure data availability.

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