

## Frequently Asked Questions

### Operationalizing New Federal Requirements for Digitization of Permanent Records

#### 1. What are the key NARA regulations governing digitization of records?

In May 2023, the National Archives and Records Administration (NARA) and Office of Management and Budget (OMB) released new regulations on digitization standards for permanent records.

During the period in which the regulations were being promulgated, many agencies grew confused about what was changing with the new regulations—and what was staying the same. The following areas were NOT changed because of the new regulations:

- Definition of a Permanent Record
- Regulations for formatting Permanent Digital Records
- Regulations for Transferring Permanent Digital Records
- Regulations for Digitizing Temporary Records
- Regulations governing Presidential Records and Congressional Records

The regulations governing digitization standards for *temporary* records (adopted in April 2019) are a useful jumping off point for understanding the new regulations governing *permanent* records.

#### 2. What are the differences in how *temporary* and *permanent* records are digitized?

*Permanent records are approved by the Archivist of the United States as having sufficient historical or other value that warrants continuing to preserve them beyond the time agencies need the records for administrative, legal, or fiscal purposes. Agencies retain permanent records for administrative, legal, or fiscal purposes for a specific period of time. At the end of the scheduled retention period, they then transfer permanent records to the legal custody of the National Archives. (NARA)*

**Permanent** records constitute a small portion of the overall volume of records managed by federal agencies; most records are defined as **temporary** records. NARA previously amended 36 CFR part 1236 (in April 2019) to add standards for the digitization of temporary records, which constitute *the majority of* Federal records.

##### 36 CFR Subpart D — Digitizing Temporary Federal Records

- § 1236.30 — Requirements for digitizing temporary records.
- § 1236.32 — Digitization standards.
- § 1236.34 — Validating digitization.
- § 1236.36 — Disposing of original source records.

The new regulations governing *permanent* records (adopted May 2023 and effective June 2023) add a new subpart that establishes standards for the digitization of permanent paper and photographic print records, including paper and photographs contained in mixed-media records.

##### 36 CFR Subpart E — Digitizing Permanent Federal Records

- § 1236.40 — Scope of this subpart
- § 1236.41 — Definitions for this subpart
- § 1236.42 — Records management requirements
- § 1236.44 — Documenting digitization projects
- § 1236.46 — Quality management requirements
- § 1236.48 — File format requirements
- § 1236.50 — Digitization requirements for permanent paper and photographic prints
- § 1236.52 — Digitization requirements for permanent mixed-media files
- § 1236.54 — Metadata requirements
- § 1236.56 — Validating digitized records and disposition authorities

A key factor in the discussion of digitizing permanent records in the federal government space is the mandate that the original records will no longer be saved—after digitizing (according to NARA's regulations) the originals will be destroyed. The stakes and cost of digitizing to replace, instead of augmenting, the records are much higher. If the originals could be kept, this topic would not garner much attention.

### 3. What are the new *records management* requirements for digitizing permanent records (§ 1236.42)?

- Establish intellectual control.
- Survey source records for preservation problems and select equipment that safely digitizes originals.
- Records must be prepared, indexed, maintained in their original order.
- Identify the age, media types, dimensions, required level of detail, and condition of source records prior to digitization.

### 4. What are new *documentation* requirements for digitizing permanent records (§ 1236.44)?

Agencies must implement a program that digitizes records to the parameters in the regulation. Agencies must also create the following documents when digitizing permanent records and retain them in association with the digitized records:

- A defined project plan
- Quality management plans describing quality assurance (QA) objectives that achieve the requirements
- Quality control (QC) procedures
- Documentation is retained by agencies, not transferred to NARA

### 5. What are the new *quality management* requirements for digitizing permanent records (§ 1236.46)?

- Monitor and quantify scanner performance
- Identify and correct errors due to:
  - Malfunctioning or improperly configured digitization equipment
  - Improper software application settings
  - Incorrect metadata capture
  - Human error
- Regularly execute QC inspections of files for compliance with all parameters

### 6. What are the new *file format* requirements for digitizing permanent records (§ 1236.48)?

Digital files for textual and photographic print records must be encoded in the following formats:

- TIFF
- JPEG 2000
- PNG
- PDF/A (any version as long as the attachments feature is not used)

Image data must be uncompressed or use one of the following visually lossless compression methods:

- Uncompressed
- Deflate (Zip)
- JPEG 2000 part 1 core coding system lossless compression. (Agencies may use up to 20:1 visually lossless compression)

### 7. What are the new *metadata* requirements for digitizing permanent records (§ 1236.54)?

- Capture administrative metadata, including the source record's disposition and item number
- Capture descriptive metadata from source records at the record level
- Capture descriptive rights and restrictions metadata from source records at the record level, to document any that relate to the records
- Generate and capture technical metadata
- Generate checksums when digitization is complete
- Capture technical metadata describing the digitization process and resulting electronic records

### 8. How have the requirements governing image and process quality changed in the new regulations (§ 1236.50/52)?

The areas receiving the most attention in the new regulation have been: 1) a specific quantitative definition of image quality; and 2) specific requirements for insuring the quality and integrity of the imaging process itself.

The regulations for digitizing temporary records required that agencies meet the following standards:

- Capture all information contained in the original source records;
- Include all the pages or parts from the original source records;
- Ensure the agency can use the digitized versions for all the purposes the original source records serve, including the ability to attest to transactions and activities;
- Protect against unauthorized deletions, additions, or alterations to the digitized versions; and
- Ensure the agency can locate, retrieve, access, and use the digitized versions for the records' entire retention period.

The new regulations establish *quantitative standards for image and process quality*. The new regulations are drawn from principles within the *Federal Agencies Digital Guidelines Initiatives (FADGI) Technical Guidelines for Digitizing Cultural Heritage Materials (2023)*, and from International Organization for Standardization (ISO) Technical Specifications (TS) and Technical Reports (TR), specifically ISO/TR 13028:2010, Information and documentation—Implementation guidelines for digitizing records.

## 9. What is FADGI?

FADGI is a collaborative effort started in 2007 by federal agencies to articulate common sustainable practices and guidelines for digitized and born-digital historical, archival and cultural content. Two working groups study issues specific to two major areas: (1) Still Image; and (2) Audio-Visual.

The FADGI digitization program consists of three elements. These three elements, when implemented together, form a FADGI-compliant digitization environment.

- Technical Guidelines and Parameters
- Best Practices
- Digital Imaging Conformance Evaluation (DICE)

The participating agencies share the belief that common guidelines will enhance the exchange of research results and developments, encourage collaborative practices and projects for digital material among federal agencies and institutions while providing the public with a product of uniform quality. They also will serve to set common benchmarks for service providers and manufacturers.

For many years, the human eye was the default for measuring an image's quality. While experienced imaging professionals could detect errors and faults in an image, that measurement was inherently subjective. As a result, the FADGI Still Image Working Group and US federal agencies have worked to develop a process where results can be standardized and quantified.

## 10. What are the specific new image scanning requirements outlined in the regulation?

The regulation outlines a set of image scanning performance parameters that agencies must meet for permanent records and notes, these parameters equate to FADGI three-star aimpoints and tolerance ranges (although it's a bit more complicated than that). The regulation has two major imaging specifications: 1) Prints and Photographs; and 2) Permanent Paper.

- **Prints and Photographs:** For paper records such as manuscripts, illustrations, graphics, and documents with poor legibility or diffuse characters (such as carbon copies or Thermofax) that have visible content with  $L^*$  values darker than 20, agencies must evaluate neutral reference patches on the evaluation test target with  $L^*$  greater than 20. (These values equate to **FADGI three-star** for "Documents (Unbound): General Collections").
- **Permanent Paper:** Modern textual paper records are modern textual documents with a well-defined printed type (such as typeset, typed, laser-printed), and with moderate to high contrast between the ink of the text and the paper background. Performance metric values in table 1 for modern textual paper records conform to the FADGI "Documents (Unbound): **Modern Textual Records**" category.

The FADGI three-star Documents (Unbound): General Collections criteria are largely identical to the Documents (Unbound): Modern Textual Records criteria other than ignoring the measurement results for target patches darker than  $L^*20$ , with three subtle exceptions:

- The Modern Textual Records criteria allows grayscale, but General Collections 3\* criteria do not.
- The Modern Textual Records criteria lists acceptable lossless compression Codecs, but the General Collections 3\* criteria do not mention information about compression. There are general comments about compression that say lossless is appropriate in all cases but leaves room for lossless "when appropriate" (such as Newspaper 3\* recommends JPEG2000 lossy).
- The Modern Textual Records criteria allows PNG, but the General Collections 3\* criteria do not.

The differentiation between the categories is not as complicated as it might seem at first glance. FADGI three-star documents must be scanned at a minimum 400 DPI while Modern Textual Records must be scanned at a minimum 300 DPI. Both categories share the following file format requirements and Modern Textual Records can also utilize PDF/A (without the attachments feature).

Format name and version	Acceptable compression codecs
TIFF 6.0	Uncompressed, Deflate (ZIP).
JPEG2000 part 1 (ISO/IEC 15444-1:2019)	JPEG 2000 part 1 core coding system lossless compression. Agencies may use up to 20:1 visually lossless compression.
Portable network graphics 1.2 (PNG)	Deflate (ZIP).

In terms of image quality parameters, both categories share the requirements in the following table, with these the exception that the Sampling Frequency and Tone Response parameters are less rigorous for Modern Textual Records.

Digital file specifications	Attributes
Color mode	color or grayscale.
Bit depth	8 or 16.
Color space	Gray gamma 2.2, AdobeRGB1998, ProPhoto RGB, ECIRGBv2, ECIRGBv2.
Resolution (Sampling Frequency) (Units are Pixels Per Inch/ppi minus Reproduction Scale Accuracy).	≥392 ppi (400 ppi—2%).
Measurement parameters	Performance metric values
Tone Response (CECF) $L^*$ (Units Colorimetric $\Delta L_{2000}^*$ ) for any given gray patch	± 4.
White Balance (Units Colorimetric $\Delta E(a^*b^*)$ ) for any given gray patch	≤ 4.
Lightness Uniformity (Units Colorimetric $\Delta L_{2000}^*$ Standard Deviation Divided by Mean)	<3%.
Average Color Accuracy (Units Colorimetric—Mean $\Delta E_{2000}$ —average deviation of all patches).	<3.5.
Color Accuracy 90th Percentile (Units Colorimetric—2.5 times average deviation of all patches).	<8.75.
Color Channel Misregistration (Units Pixels)	<0.5 pixel.
SFR10 (Sampling Efficiency) (Measurement is a Ratio %)	80%.
SFR50 (50% SFR) (Units Percentage of Half Sampling Frequency) [Lower, Upper]	Percentage of half sampling frequency: (>40%, <75%).
Reproduction Scale Accuracy (Units % Difference from Header PPI)	< 2%.
Sharpening (Units Max Modulation)	<1.1.
Noise (Upper Limit) (Units Std Dev of $L^*$ )	<2.
Noise (Lower Limit) (Units Std Dev of $L^*$ )—A warning should be raised if the image doesn't meet this criteria.	≥25.

The finalization of the regulations for digitizing permanent records was complicated by the fact that the image quality and process standards were linked to the *FADGI Technical Guidelines for Digitizing Cultural Heritage Materials, which were being updated at the same time as the regulation was being finalized*. As a result, there are two specific image parameters in the final regulation that are less rigorous than the final FADGI Technical Guidelines, but for simplicity agencies and solution providers should optimize against the FADGI parameters.

## 11. Is FADGI-three star a hardware standard?

In the end analysis, the FADGI standard is NOT a hardware standard. It is an image and scanning *process* standard. As Lisa Haralampus, Director of Records Management Policy and Outreach at NARA, noted during NARA's August 2022 Bimonthly Records and Information Discussion Group (BRIDG) meeting, "It is how the standards are *applied* and *validated* and how *process quality* is determined that gives the technical standards merit. Otherwise, you can issue technical standards all day long, but you need to have confidence that they've been applied well."

FADGI is not just about the capture hardware, and FADGI is a guideline and not a standard. The imaging performance aspects of FADGI have been used along with Metamorfoze to create ISO19264 which is a standard, but NARA chose to base its regulation on FADGI rather than the ISO standard.

Anticipating final passage of the permanent records regulation, many manufacturers and federal agency end users have begun to speculate on the practical implications of what meeting "FADGI three-star aimpoints and tolerance ranges" means in an operational environment. This has led to a confusing array of "FADGI-compliant" and "FADGI-capable" claims by solution providers, a confusion that will get much worse once the regulation becomes final, and FADGI THREE-STAR requirements begin to be included in RFPs. Hardware certification alone is not sufficient to guarantee compliance. Equipment must be tested—and re-tested—within the specific content of a business process.

To determine whether equipment meets the image quality requirements, agencies must scan a reference target with the device and measure the results with analytical software to determine how well the digital imaging equipment's optical resolution, sensor size and signal processing perform against the performance evaluation technical parameters in the regulations. Results that fall within the performance metric value's tolerance range confirm that the equipment meets the requirements. Equipment specifications, such as scanner plan position indicator (PPI) settings or camera sensor megapixels, are theoretical resolution claims and do not ensure digital image quality.

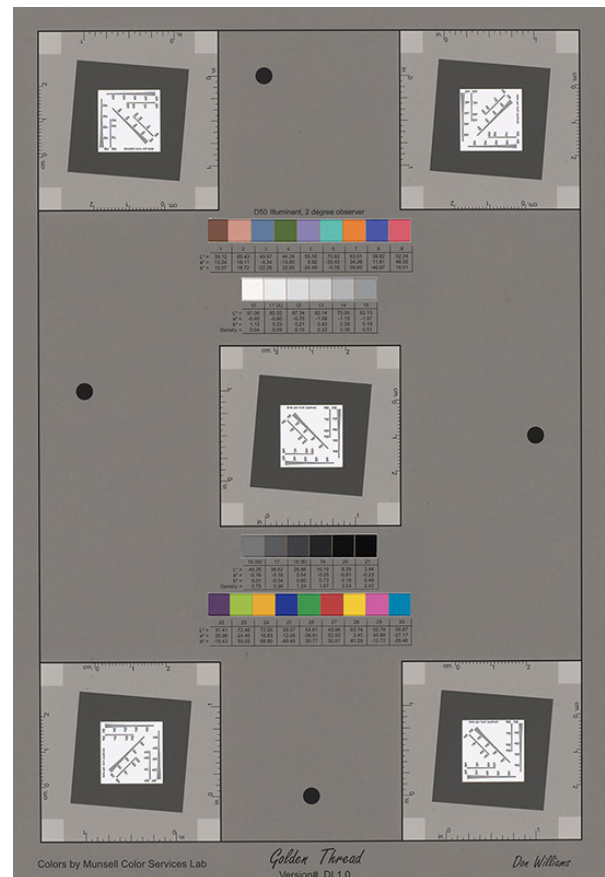
There is no guarantee that existing equipment will be able to meet FADGI THREE-STAR quality levels. In some cases, software and/or firmware updates may be able to bring existing equipment into compliance with FADGI THREE-STAR quality levels. But again, hardware certification alone is not sufficient to guarantee compliance. Equipment must be tested—and re-tested—within the specific content of a business process.

To ensure image quality of digital files created during a project, agencies must also monitor the digitization workflow by digitizing reference targets and analyzing the results against the technical parameters in § 1236.50(c). When all the measurements fall within the technical parameters' performance metric value tolerance range, the digital files meet the image quality objectives.

Agencies must have an image quality testing and analysis process that ensures the resulting digitized records conform to the requirements in § 1236.50, including:

### DICE/Golden Thread™ Software

Agencies can adopt methods consistent with the FADGI Digital Image Conformance Evaluation (DICE/Golden Thread) program to ensure they meet digitization image quality parameters, but they do not have to use DICE to do so. DICE works in tandem with a series of predetermined test "targets" to help imaging professionals see where their images fit on the FADGI quality scale. Golden Thread is a software program and associated test targets developed by Image Science Associates (ISA).



### OpenDICE Software

Any method that ensures you meet the image quality parameters in § 1236.50, though, is acceptable, including OpenDICE. OpenDICE is a FADGI-conformance measurement and analysis tool which has been developed as an alternative to the DICE/Golden Thread system. OpenDICE is a fully functional program for the Windows operating system, created in MatLab. The analysis methodology and results obtained have been confirmed by ISA as consistent with the results obtained with DICE/Golden Thread.

The results obtained with either DICE/Golden Thread or OpenDICE, however, are only as valid as the input measurements from the targets used.

## 12. What key technical specification questions should we be asking?

- Do we understand that image quality standards from the temporary document world (like “300dpi color PDF”) no longer suffice?
- Do we understand that the new regs outline very specific image quality requirements (FADGI THREE-STAR star Unbound Document and FADGI Modern Textual Document)
- Are our existing scanners capable of producing FADGI THREE-STAR images even when doing large batches?
- What pre-scanning process will we use to determine whether the records we are scanning are permanent or temporary? Will we apply the new image quality standards to ALL records or just the permanent ones?
- What business rule will we apply to scanning records with mixed quality requirements (i.e., photos within a Modern Textual Document)—default everything to FADGI THREE-STAR?

## 13. What are the key quality assurance questions we should be asking?

- What image process analytic tool and which device-level reference targets will we use (Golden Thread and OpenDICE are examples) to verify that digitization devices conform to the required imaging parameters?
- How often will we test our imaging process for compliance—At the beginning of every shift? When we update software?
- Have we budgeted to replace reference test targets as they fade—or accumulate dirt, scratches and other surface marks that reduce their usability?
- What kind of operator training is needed to make sure they understand the new requirements?
- What are we going to do with existing scanned permanent records that were not scanned consistent with the new requirements?



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