

Subject: Engineering Drawing and Document Requirements**Responsible Office: Office of the Director – Chief Engineer****DOCUMENT HISTORY LOG**

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**Langley
Procedural
Requirements**

LPR 7320.1 K

Effective Date: 09/30/2022

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PREFACE

P.1 Purpose

- a. The engineering drawing and document practices and procedures set forth in this directive are based on established Government-industry standards, supplemented where necessary by a minimum of requirements particular to the NASA Langley Research Center (LaRC).
- b. The purpose of this directive is to provide a uniform but flexible system of engineering drawing and document preparation, use, and interpretation. A standard drawing and document numbering system, Configuration Control Center (CCC), and Facility Configuration Management System (FCMS) server-based software are included (<https://fcms.ndc.nasa.gov/otcs/cs.exe/app>). The FCMS contains the previous Engineering Drawing File (EDF) repository of drawings in electronic format.
- c. Unless otherwise noted herein, in the event of a conflict between the text of this document and the references cited, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

P.2 Applicability

- a. This directive is applicable to all engineering drawings generated by LaRC personnel and support service contractors. At LaRC there are two broad categories of drawings and documents that will have distinct procedures for configuration management and storage within either FCMS or in another system that meets equivalent Configuration Management and archival requirements. These categories are:
 - i. Facility drawings and documents: Related to the design, construction, operations, maintenance, repair, upgrade, and demolition of LaRC facilities designated with a building number or other real property designator.
 - ii. Non-Facility drawings and documents: Related to LaRC non-Facility projects such as flight hardware/software, wind tunnel models, test articles. If not stored within FCMS, these drawings will be stored in accordance with a project- or organization-documented configuration management and archival process in a repository that prevents inadvertent modification and allows for future searches/recovery of the information.
- b. This directive is applicable to engineering documents prepared in accordance with governing documents of the owning organizations.
- c. In this document, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice, and is recommended but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material.

P.3 Authority

NPD 7120.4, NASA Engineering and Program/Project Management Policy

P.4 Applicable Documents and Forms

- a. DoD 5220.22-M, National Industrial Security Program Operating Manual
- b. NPR 1600.2A, NASA Classified National Security Information (CNSI)
- c. NPR 2810.7, Controlled Unclassified Information (CUI)
- d. NPR 2190.1, NASA Export Control Program
- e. NRRS 1441.1, NASA Records Retention Schedules
- f. LAPD 1150.2, Councils, Boards, Panels, Committees, Teams, and Groups
- g. LPR 1740.4, Facility System Safety Analysis
- h. LPR 5300.1, Product Assurance Plan
- i. LPR 7123.2 Facility Configuration Management
- j. LMS-CP-4710 Facility Change Request Process
- k. LF 181, Configuration Change Request (CCR)
- l. LF 219, Flight Projects Change Request Form
- m. LF 605, Facility Change Request

The standards listed below are requirements for generating engineering drawings for the applicable domains. Unless identified by date, the edition in effect at the start of the design applies, including addenda and code cases.

- n. National CAD Standard (facility projects except machine design)
- o. ASME Y14.100, Engineering Drawing Practices (machine design)
- p. ASME Y14.1, Decimal Inch Drawing Sheet Size and Format (machine design)
- q. ASME Y14.35, Revision of Engineering Drawings and Associated Documents
- r. ASME Y14.5M, Dimensioning and Tolerancing
- s. MIL-STD-403, Preparation for and Installation of Rivets and Screws, Rocket, Missile, and Airframe Structures
- t. ANSI B4.1-1967, Preferred Limits and Fits for Cylindrical Parts
- u. NAS 523, Fastener Code
- v. AWS A1.1-2001, Metric Practice Guide for the Welding Industry
- w. AWS A2.4-2012, Standard Symbols for Welding, Brazing, and Nondestructive Examination
- x. ANSI/ISA-5.1 Instrumentation Symbols and Identification
- y. COD Facility Engineering Standards ([Center Operations Directorate – LaRC Engineering Standards \(nasa.gov\)](#)):
 1. LaRC-FES-MACH, COD Facility Engineering Standard for Machine Design, Appendix 2 Requirements for Mechanical System Drawings

2. LaRC-FES-FAS, COD Facility Engineering Standard for Facility Automation Systems, Appendix A FAS Drafting Standard
3. LaRC-FES-PVS, COD Facility Engineering Standard for Piping Systems and Pressure Vessels, Appendix 2 Requirements for Pressure Vessel and Piping System Drawings, Appendix 3 Guidelines for Process, and Instrumentation Diagrams (P&ID)
4. LaRC-FES-ELEC, COD Facility Engineering Standard for Electrical Systems, Section 4.2 Drawings.

P.5 Measurement/Verification

None

P.6 Cancellation

This LPR cancels LPR 7320.1 J, dated October 25, 2016.

/s/ David Young 09/30/2022
Center Deputy Director *Date*

Distribution:

Approved for public release via the Langley Management System; distribution is unlimited.

CHAPTER 1 – GENERAL ADMINISTRATIVE PROCEDURES

1.1 Scope

- 1.1.1 The Engineering Drawing and Document Langley Procedural Requirements (LPR) establishes the procedural requirements and practices to be followed in the preparation, maintenance, control, storage, and utilization of engineering drawings and related documents. It includes all engineering drawings generated by LaRC personnel and their supporting services contractors. An engineering drawing is defined as a document that discloses, by means of pictorial and/or textual presentations, the form and function of an item, is assigned a LaRC drawing number, and contains proper approvals. This procedural requirement excludes any sketches, diagrams, informal schematics, or other instructions.
- 1.1.2 This procedural requirement is authorized for use in establishing engineering drawing format and procedures for all research, design, development, fabrication, and installation activities.

1.2 Maintenance of Engineering Drawing Procedural Requirements

- 1.2.1 The Engineering Drawing System Committee (EDSC) is responsible for making revisions or adding supplements to this procedural requirement. See LAPD 1150.2, “Councils, Boards, Panels, Committees, Teams, and Groups” for EDSC member organizations.
- 1.2.2 Requests for revisions or supplements to the procedural requirement shall be addressed to the committee chairperson. Supplements and revisions will be posted on the NASA Langley Management System (LMS) Web site.

1.3 Engineering Drawing and Document Files

The Configuration Control Center (CCC) office is responsible for assigning drawing and document numbers and filing these for drawings to be stored in the FCMS.

CCC contact: LaRC-COD-CCC@mail.nasa.gov or 864-3333.

- 1.3.1 Drawing and Document Numbering System
 - 1.3.1.1 Drawing numbers may be obtained by telephone or email to the CCC.
 - 1.3.1.2 The CCC repository administrator shall enter all available information into the FCMS for requested drawing numbers. This information may include the project name, type of drawing, revision letter, title, size, requestor organization code, name of requester, and date assigned, and notify the requester of the assigned drawing number(s). A block of numbers may be issued to a requestor as needed.
 - 1.3.1.3 Facility organizations granted access may create new drawing numbers associated with a Facility Change Request (FCR) directly using the FCMS Automatic Drawing Numbering (ADN) system.
 - 1.3.1.4 Non-Facility organizations will request new drawing numbers from the CCC.
 - 1.3.1.5 Document numbers shall be defined by the owning organization.

1.3.2 Drawing and Document Metadata

Metadata, or attributes of the electronic file, are useful for searching and organizing these files. NOTE: If FCMS is used for storing drawings, it provides a search capability for all readable text within the repository files so that the metadata is not the only method for searching the electronic files.

1.3.2.1 Upon completion of the new or revised drawing (or document), the originator, project CM, or CCC shall update the file metadata in the FCMS, or the storage system used by the project either individually file by file or using a bulk loading spreadsheet. File metadata is defined in Appendix B for facility drawings and can serve as a guideline for non-facility drawings and documents. The metadata associated with project drawings will adhere to the minimum repository metadata requirements. Additional metadata will be at the discretion of the project management team.

1.3.3 Submittal of Drawings or Documents into the FCMS Repository

See Chapter 2 for administrative procedures specific to Non-Facility drawings and documents or Chapter 3 for Facility drawings and documents.

1.3.4 Retention of Engineering Drawings and Documents

The retention of Engineering Drawings and Documents, whether stored within the FCMS or another system selected by the project in accordance with this document, shall be conducted per NRRS 1441.1,

<https://sp.ndc.nasa.gov/sites/Records/default.aspx>

1.4 Drawing and Document Changes

See Chapter 2 for Non-Facility drawing, and document change administrative procedures and Chapter 3 for Facility drawing and document change administrative procedures.

1.5 Security Classification

1.5.1 DD Form 254, "DOD Contract Security Classification Specification," prepared in accordance with DOD 5220.22M, "Industrial Security Manual for Safeguarding Classified Information," shall be used by LaRC to provide specific security classification guidance to contractors who originate classified drawings.

1.5.2 Specific classification and marking guidance shall be provided by the LaRC Protective Services Office for drawings originated by LaRC. The classification of the drawings shall be determined by an appropriate security classification guide or other source document and marked in accordance with NPR 1600.2.

1.5.3 The Facility Configuration Management System (FCMS) shall **not** be used to store Classified information.

1.5.4 The FCMS may be used to store Controlled Unclassified Information (CUI) and Export-Controlled drawings and documents.

1.5.4.1 The drawing owner shall select the CUI file metadata attribute and designate FCMS users authorized for access.

1.5.4.2 File folder creation and provisioning for authorized access for CUI files shall be through the system administrator. Contact the Systems Administrator Enterprise Applications Service Technologies 2 (EAST2) help desk at 864-FMSS or <https://fmsshelpp.ndc.nasa.gov/helpdesk/WebObjects/Helpdesk.woa>) for

assistance.

- 1.5.4.3 CUI drawings and documents shall be categorized, marked, and protected in accordance with NPR 2810.7, "Controlled Unclassified Information".
- 1.5.4.4 The drawing/document owner shall select the Export-Controlled metadata file attribute if applicable in accordance with NPR 2190.1. NOTE: It is the responsibility of the drawing owner to seek review and approval by the Export Control Officer if required.

CHAPTER 2 – NON-FACILITY ADMINISTRATIVE PROCEDURES

2.1 Scope

This chapter applies to non-facility engineering drawings and documents such as for engineering directorate, flight project, test article, wind tunnel models, and other non-facility drawings and documents.

2.2 Engineering Drawing and Document Files

2.2.1 Each non-facility Directorate that generates drawings may select to have an FCMS folder and subfolders that authorized users can modify or delete. Contact the Systems Administrator (EAST2 help desk at 864-FMSS or <https://fmsshelpp.ndc.nasa.gov/helpdesk/WebObjects/Helpdesk.woa>) for assistance. Direct update of non-facility FCMS project folders may be made by authorized personnel.

2.2.2 Drawing and Document Changes

2.2.2.1 Changes to engineering drawings and documents shall be made by one of three methods:

- a. Drawing revision
- b. LF 181, "Configuration Change Request (CCR)" – All changes made after the formal release of drawings must be authorized in the same manner and processed through FCMS, if the drawing is stored in this system, or through the project's documented configuration management process for recording and electronic storage. At the NASA Project Manager's discretion, a copy of the CCR shall be forwarded to Configuration and Data Management for recording and electronic storage.
- c. Redline changes

2.2.2.2 Drawing Revisions

The procedures described in ASME Y14.35 apply to LaRC-generated drawings. The same functional set of signatures required for the initial release of the drawing shall be required for drawing revisions. At the NASA Project Manager's discretion, this requirement can be waived through the Project Implementation Plan. The waiver will explicitly define the alternative for ensuring appropriate review and approval of changes.

2.2.2.3 Configuration Change Request (CCR)

A CCR (LF-181) is an interim method of changing the information contained on an engineering drawing or associated document. Such changes are to be incorporated into the drawing by formal revision unless otherwise specified on the CCR. CCRs shall remain active until incorporated by revision and so noted in the revision block. The incorporated CCR shall then be retired to the historical files. No more than three CCRs may be outstanding against an individual drawing at any one time. CCRs are not applicable to facility drawings. Changes to facility drawings require an FCR.

2.2.2.4 Drawing Redline Changes for Hardware Fabricated in LaRC Facilities

- a. Only under critical schedule conditions where the delivery milestone will be missed, the design activity may temporarily modify drawings in the fabrication process, using redlines to reflect changes that must be enacted immediately. Redline changes are not required to be immediately submitted for review and approval of the drawing approvers. Therefore, the personnel implementing the redline changes must be aware that the changes may be disapproved, resulting in scrap or rework, and ultimately cost and/or schedule impact. Only the design engineer or Project-approved designee may implement a redline change. Project management shall provide the fabrication organization with a list of approved designees. This notification shall be provided at the start of the fabrication process via memo or email.
- b. The redline requestor shall inform the original drawing approvers and NASA Project Manager not more than three business days after initiation of the redline change. To implement redline changes for hardware built in LaRC facilities, the design engineer, or a Project-approved designee shall do the following:
 1. Redline the production control copy of the affected drawing that shall be the stand-alone master copy of the change until a CCR is submitted or the drawing is revised.
 2. Cross through text one or two lines at a time or cross out text by a series of diagonal parallel lines at uniform spacing through a selection of text.
 3. Print the new text in a legible format in close proximity to the text being changed.
 4. Draw a "cloud" around the change.
 5. Print LaRC Employee X500 User ID (for example, "LA1232AB"), initial, and date close to the cloud.
 6. Make a copy of the redlined drawing for the redline requestor to take back to engineering personnel for incorporation into a revised drawing per paragraph 2.2.2.2 or a CCR per paragraph 2.2.2.3.
 7. Notify by email all project personnel who approved the original drawing, and the Project Manager, of the redline change.
 8. In situations where the design engineer or Project-approved designee cannot be present to mark the redline change on the drawing and manufacturing must continue, the design engineer or Project-approved designee may authorize the change by email. The email must specify the change to the requirements to authorize the continuation of the manufacturing process. The change shall not be implemented without the email authorization. The email authorization shall be placed into the fabrication

documentation by the fabrication technician. The design engineer or Project-approved designee shall properly mark the drawing with the redline change within three business days.

9. The fabrication organization is responsible for reproducing the master redline copy for fabrication uses.
10. The project shall incorporate the redline changes into an approved revised drawing per paragraph 2.2.2.2 or a CCR per paragraph 2.2.2.3, prior to the quality assurance inspection of the hardware. The quality inspection shall be executed using the latest "approved" drawings.

NOTE:

The project has the responsibility to maintain configuration control of all hardware affected by the redline process.

2.2.2.5 Drawing and Document Obsolete/Cancellation Procedure

All drawing status revision changes to "superseded", "canceled", or "obsolete" shall be executed by the owning organization in accordance with ASME Y14.35.

CHAPTER 3 –FACILITY ADMINISTRATIVE PROCEDURES

3.1 Scope

This chapter applies to facility engineering drawings and documents that shall be created and controlled in accordance with LPR 7123.2 Facility Configuration Management.

3.2 Engineering Drawing and Document Files

3.2.1 Facility drawing and document file naming convention shall be per Appendix A.

3.2.2 Facility drawing and document metadata shall be per Appendix B.

3.2.3 Changes to facility drawings and documents shall be the responsibility of the LaRC FCM Owner Team (FCM Owner, Facility Coordinator, and Facility Safety Head) and if applicable, the NASA Project Manager to ensure that changes and revisions are made with a Facility Change Request (FCR) per LMS-CP-4710.

3.2.4 Facility drawings or documents may be marked obsolete with the processing of an FCR per LMS-CP-4710. The obsolete status shall be applied when the system or entire facility has been demolished or permanently transferred.

3.2.5 Verification of Drawings and Documents (Files)

The CCC repository administrator shall check the files for the following:

- a. Alignment between file and file metadata such as drawing number, title, revision, discipline, building, record sensitivity, export-controlled, and drawing file name. These checks will ensure the drawing can be stored and located in FCMS with appropriate search terms as well as provide general error checking. See Appendix B for complete metadata.
- b. LaRC administrative standards – Drawings shall meet LaRC requirements (see Chapter 4) per this LPR including drawing border, drawing title box, and legibility.
- c. Once the file is verified, the CCC repository administrator shall publish the drawing to the FCMS repository.

CHAPTER 4 - ENGINEERING DRAWING REQUIREMENTS

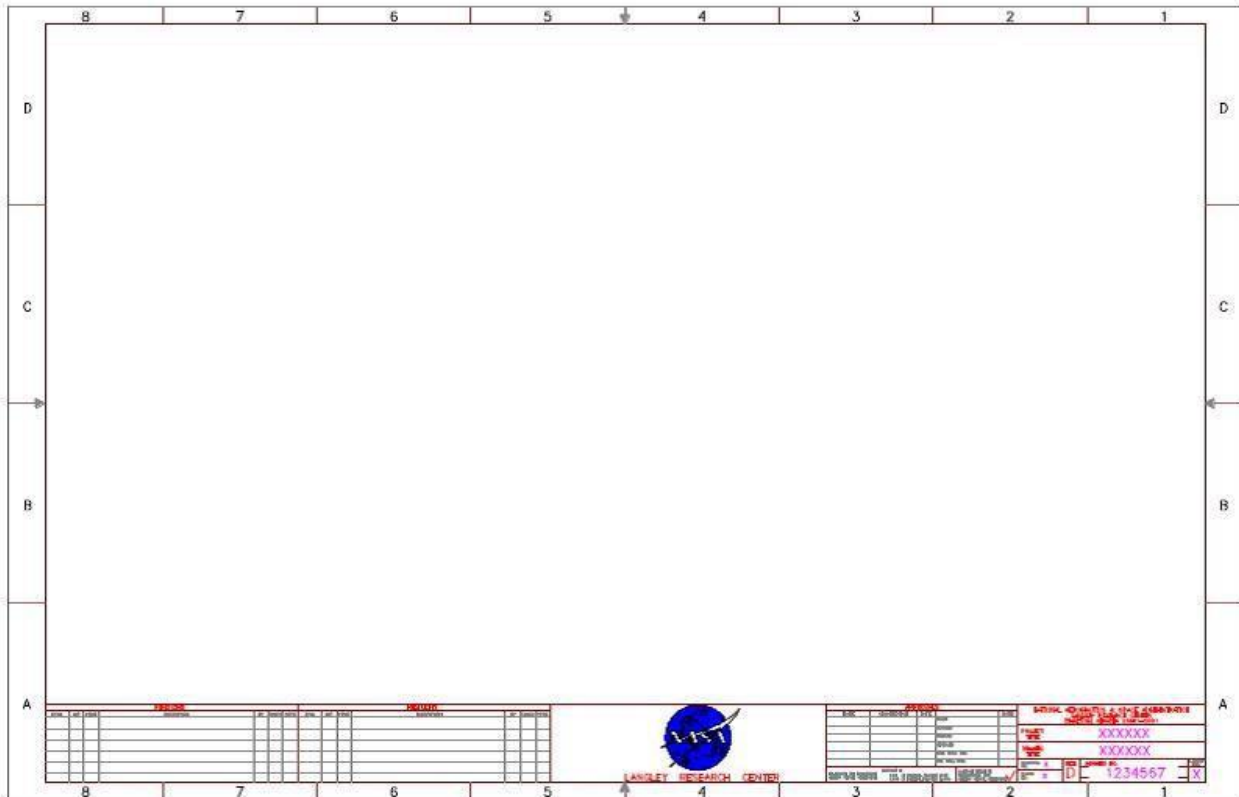
4.1 Size and Format

4.1.1 Drawing Sizes

Finished sheet format sizes and the size-designated letter are those listed in ASME Y14.100. Multiple-sheet drawings are permissible.

4.1.2 Basic Sheet Format

The general format and arrangement of data on drawings shall be in accordance with ASME Y14.100. An alternate basic sheet is authorized for facility drawings as shown in the following illustration.



4.1.3 Title Block

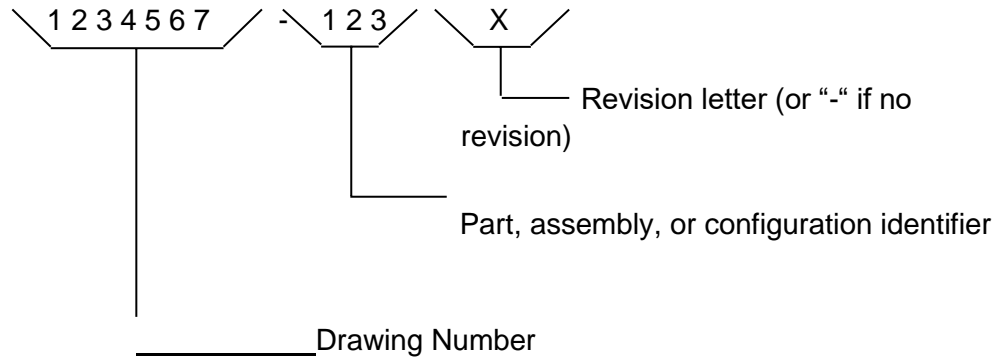
The basic drawing title block in the lower right-hand corner of each drawing shall be in accordance with ASME Y14.100. An alternate title block is authorized for use with facility drawings.

4.1.4 Drawing Titles

Drawing titles shall conform to the procedures for creating title block nomenclature entries for drawings and for parts detailed thereon as specified in ASME Y14.100.

4.1.5 Numbering of Drawings and Parts

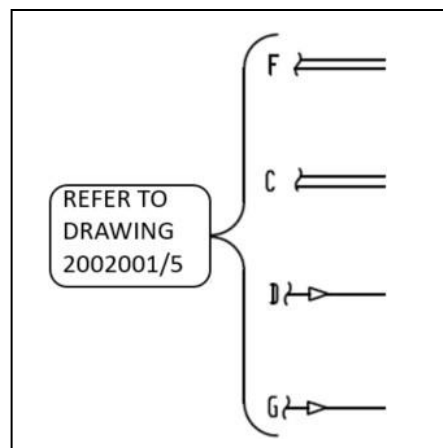
The LaRC standard numbering system provides for a seven-digit (maximum) drawing number centrally controlled and issued by the Configuration Control Center (CCC) or direct from the FCMS Automatic Document Numbering (ADN) system.



The desired method of marking and identification of parts shall be specified on the drawing and shall conform to LPR 5300.1.

4.1.6 Sheet Numbering for Facility Drawings

- a. Alphanumeric sheet numbering format may be used for Supporting Facility Drawings (SFD) with the understanding that the metadata in FCMS for the drawing file will not reflect drawing title block sheet number but will be “1” for single-sheet drawings or numerically sequenced for multi-sheet drawings (drawing sheets with the same drawing number.) NOTE: SFDs are facility drawings that will not be configuration controlled after the construction “as-built” revision. These are typically detailed architectural, mechanical, structural, piping, and electrical construction drawings.
- b. Drawing sheet numbers for Configuration Controlled Item (CCI) designated drawings per LPR 7123.2 shall be sequential numbers only. “1” for sheet 1, “2” for sheet 2, etc. Alphanumeric sheet numbers shall not be used for CCI drawing sheets. NOTE: Typically, this will only apply to 1-line power distribution schematics, Piping & Instrumentation Diagrams (P&IDs), and control wiring diagrams representing 3-15% of drawing packages.
- c. External references between CCI drawings will use the 7-digit drawing number and sheet number for multi-sheet drawings instead of the sheet number. For example, if Piping & Instrumentation Diagram drawing 2002001 Sheet 1 of 5 refers to drawing 2002001 Sheet 5 shall look like:



- d. Configuration Control Center drafters are authorized to change external references on CCI designated drawings from sheet numbers to drawing numbers prior to completing the new revision.
- 4.1.7 Additional Data Blocks
Additional data blocks are authorized as set forth in ASME Y14.100.
- 4.1.8 Drawing Notes
Drawing notes shall be in accordance with ASME Y14.100.
- 4.1.9 CAGE CODE
The official CAGE CODE Number for NASA LaRC is 25305. This number may be reflected in the Drawing Title Block under the CAGE CODE entry block if applicable.
- 4.1.10 Facility Drawing Revisions
- a. The designer/drafter shall follow the procedures described in ASME Y14.35 for LaRC facility drawings and documents.
 - b. Under the description, the FCR number shall be provided by the drafter/designer.
 - c. The date of the revision and the date of the approval shall be provided along with the name of the drafter, checker, and approver. NOTE: The approver shall be as follows:”
 - 1. NASA Project Manager for project implemented changes.
 - 2. Member of the FCM Owner team for facility implemented changes.
 - 3. Pressure Systems Manager (PSM) for Pressure Systems Configuration Management (PSCM) documents.
 - d. The revision block shall be filled in by the CCC based upon the FCR approvals for the as-built drawing or final submittal of the newly revised document.

4.2 Basic Requirements

- 4.1.2 Purpose of Drawings
The purpose of drawings is to convey sufficient engineering requirements, characteristics, and information to manufacture or procure an item, to procure materials or services, or to enable technical understanding. Drawings shall be complete for the purpose intended. Good drafting technique is essential; however, drawings have no artistic value and drafting technique is not an end. A good drawing is one that can be easily and completely understood by craftsmen, production planners, buyers, and others who must use the drawing.
- 4.1.3 Legibility
- a. All line-work shall be sharply defined and of uniform density.
 - b. Lettering shall be clear and adequately spaced.
 - c. All line-work and lettering shall be sufficiently opaque to be legible in full-size copies prepared by any generally accepted method of reproduction.

4.1.4 General Drawing Practice

General drawing practice shall be in accordance with ASME Y14.100.

4.1.5 Dimensions and Tolerances

ASME Y14.5 shall be used to establish uniform practices for stating and interpreting requirements shown on drawings.

CHAPTER 5 – NON-FACILITY DRAWING AND DOCUMENTATION CONTROL

5.1 Definition

Drawing and documentation control as used herein provides assurance that all released drawings reflect the current design status of all hardware.

5.2 Applicability

The procedures outlined in this section shall be applied to all drawings and/or electronic files produced at LaRC for non-facility fabrication, construction, and maintenance of component hardware.

NOTE: The existing LaRC Facilities Configuration Management program, as defined by LPR 7123.2 and the existing Geographical Information System (GIS) subsurface utility drawings program are not applicable.

5.3 Drawing Document Media

5.3.1 All drawings and documents entered the FCMS are in electronic format with the native format file preferred. Portable Document Format (PDF) data files are also accepted.

5.3.2 Released engineering and supporting documents stored in an Agency approved application platform for document/configuration management – whether FCMS or project-selected system – will be in electronic format with the native format file preferred. All non-facility project drawings must comply with reproducibility, traceability and preservation requirements found in NPR 7123.1, NPR 7120.5, NPR 1441.1E and NRRS 1441.1 08/101. To achieve this compliance, a Portable Document Format (PDF) representation of the drawing of released engineering will be maintained with the native format files in the document/configuration management system. All platforms for document/configuration management must prevent inadvertent modification, preserve versioning, allow for future searches, and provide recovery of information while also protecting the access.

Note: The FCMS includes a CAD and document viewer software module that will permit the viewing and printing of most drawings and documents in their native format without having the native program on the user computer. This applies to most commonly used CAD and document software packages. Please contact the CCC to ensure compatibility.

Note: Project drawings are considered fundamental units of a [flight] project development. These vary in complexity and at times contain a hierarchy of other fundamental units. As an integral part of the project's configuration these units are captured as project configuration items and are maintained per the [flight] project configuration management processes. This requires that the process captures the systematic control of changes to the configuration of these drawings while maintaining the integrity and traceability of the unit throughout its life cycle. Uniquely identifiable baselines at each major milestone (i.e., SRR, PDR, CDR..) provide the reproducibility and traceability essential to requirement compliance. Preserving as part of the project case file, drawings in their native formats is the best practice; however, not all application platforms are suitable for such storage. Therefore, project configuration management process captures drawings in Portable Document Format (PDF) in the project's case file on an Agency's identified application platform for document/configuration

management determined by the project. The capture of native format allows for single “source of truth” (SoT) reproducibility. The rationale is that the pdf format captured in the case file complies with records management requirements and allows project team member who may not have access to a viewer to view the drawing. The native file capture is the best practice for reproducibility.

As projects evolve from document/drawing centric process to data-centric moving beyond the common use of office applications, process transformation must occur. Those configuration management processes are not intended to be captured in this document.

5.4 Release Approval

The Organizational Head or designee(s) of each organizational unit responsible for the generation of drawings, either in-house or on contract, is authorized to approve drawings for release. It is the responsibility of these individuals to ensure conformance with the provisions contained within this procedural requirement. The “release approval” of drawings in no way relieves the individual engineer, designer, drafter, COR, and others who generated the design from the responsibility of ensuring the structural integrity and/or mission suitability.

The NASA Project Manager has the authority to designate the set of signatures required for the release of his/her project drawings.

5.5 Approval Process

It is the responsibility of the design activity (i.e., NASA Project Manager, cognizant engineer, designer, drafter, COR, and others) to ensure that no drawings are released without proper approvals. Note: **Cognizant Engineer** is defined as the individual who is responsible for sponsoring, executing, or developing the design. In this context, the word “engineer” is used to mean an individual with a degree in engineering or engineering technology.

5.5.1 Drawings and Documents Approval and Upload

- a. Upon completion of a new or revised drawing/document, the designated approvers within the cognizant organization shall review and sign the original, which should be done electronically listing name, and date. It is the responsibility of the NASA Project Manager or cognizant engineer to ensure that the drawing revision is approved by all original parties or designee(s).
- b. Upon the release of a revised drawing, a native file or PDF version of the signed drawing revision shall be transmitted to the FCMS repository directly by those authorized to update the applicable directorate or project folder.
- c. If a CCR (LF181) or a Flight Project Change Request Form (LF219) is used to make a change, the Organizational Head or designee(s) shall sign in the added approval block in the drawing data file. It is the responsibility of the Organizational Head or designee(s) to ensure that the drawing revision is approved and properly signed by all original parties or designee(s).
- d. It is the responsibility of the design activity to ensure that all recipient organizations of the original drawings receive copies of the revision or

notification that a revision is available in the applicable configuration management system system.

Appendix A: Facility Configuration Management Drawing and Document File Naming Convention

DRAWING FILE NAMING CONVENTION

The Facility Configuration Management System (FCMS) mandates the use of distinct filenames. The following convention is proposed for drawings:

Field #	Field	Example 1	Example 2	Example 3
1	Building or NASA RP Classification	1244	1265	812-30
2	System Type	GEN	MECH	ELEC
3	Drawing Type	DWG	WLD	DWG
4	Drawing Number	1005859	75236	1005858
5	Sheet ID Name 1 -	1	1	1

The fields are underscore-delimited, so the above examples would be rendered as:

1244_GEN_DWG_1005859_1

1265_MECH_WLD_75236_1

812-30_ELEC_DWG_1005858_1

Fields:

1 - Building or NASA real property classification (e.g., 812-30 Electrical Distribution System): Building would be the Building # (Property # as defined in the real property system).

2 - System Type:

- MECH = MECHANICAL
- ELEC = ELECTRICAL
- PIPE = PIPING (or PLUMBING)
- CTRL = CONTROLS
- INSTR = INSTRUMENTATION
- STRUC = STRUCTURAL
- CIVIL = CIVIL
- GEN= GENERAL (LEGENDS, SYMBOLS, DRAWING INDEX, SITE PLAN)
- FIRE = FIRE PROTECTION
- COMM = TELECOMMUNICATIONS/NETWORKS
- NA = Not Applicable

3 - Drawing type

DWG	Drawing (DEFAULT)
FA	Fire Alarm/Sprinkler
IID	In-service Inspection Drawing
IP	Inspection Plan
MSC	Miscellaneous Document
WLD	Weld Location Drawing
SWD	Switching Diagram
UNK	Unknown
BIM	Building Information Model

4 - Drawing Number: Numerical for most drawings.

5 - Sheet ID Name (3 char): 1-999

DOCUMENT FILE NAMING CONVENTION

The Facility Configuration Management System (FCMS) mandates the use of distinct filenames. The following convention is proposed for documents:

Field #	Field	Example 1	Example 2	Example 3
1	Building or NASA RP Classification	1236	1265	1247E
2	Document Type	CL	MOP	PSD
3	Document Number	12-2	S01E-01	6000AB1

The fields are underscore-delimited, so the above examples would be rendered as:

1236_CL_12-2 1265_MOP_S01E-01 1247E_PSD_6000AB1-PSCM

Fields:

1 - Building or NASA real property classification (e.g., 812-30 Electrical Distribution System): Building would be the Building # (Property # as defined in the real property system).

2 – Document Type:

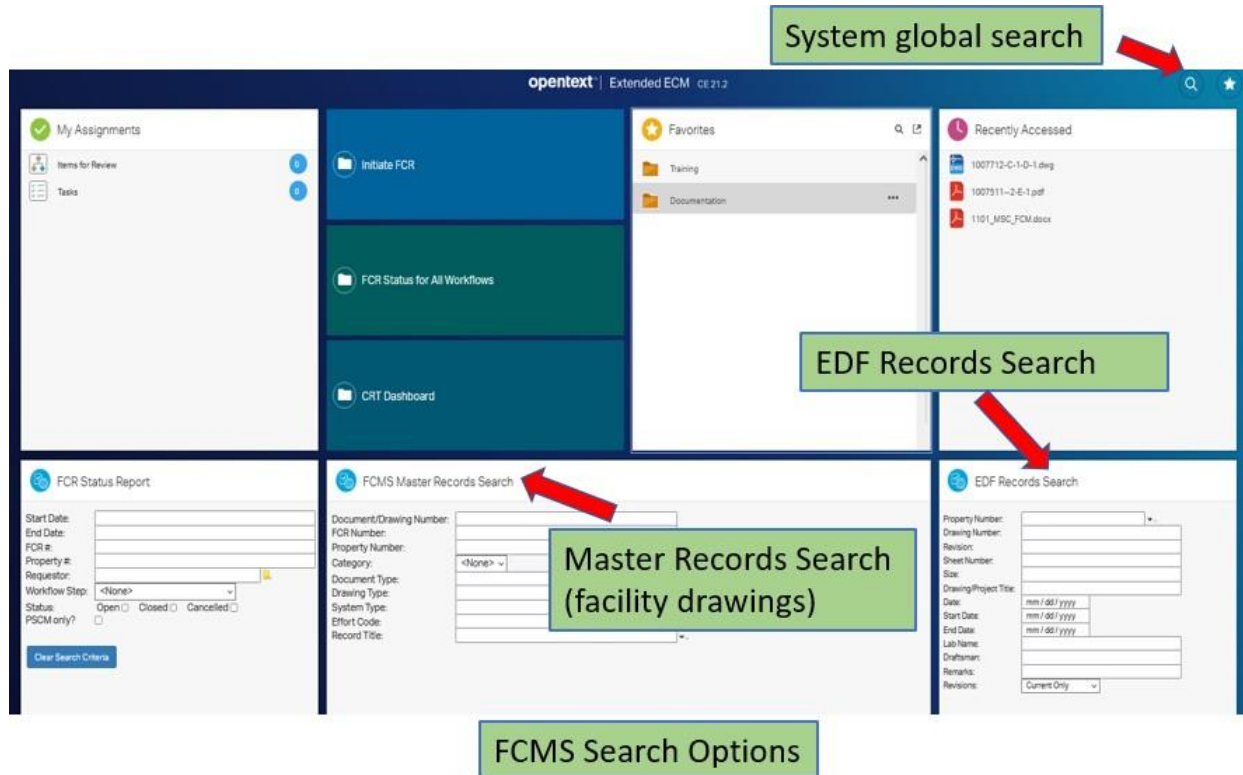
AIP	Administrative Instructional Procedure	OP	Operational Procedure
CL	Check List	PMP	Preventative Maintenance Procedure
D2	Device List	PO	Post-Operational Procedure
D6	Controlled Interlock List	PR	Pre-Operational Procedure
ECP	Emergency Cutoff Procedure	PSD	Pressure System Doc.
ESP	Emergency & Safety Procedure	SACR	Software Assurance Classification Report
FMP	Facility Management Plan	SAR	Safety Analysis Report
FRT	Facility Risk Tier	SCMP	Software Config. Management Plan
HA	Hazard Analysis	SEP	Safety & Emergency Procedure
IDSP	Instrumentation and Data System Procedure	SOP	Standard Operating Procedure
IOP	Integrated Operating Procedure	TAIP	Test Article Integration Procedure
MIP	Maintenance Inspection Procedure	TP	Training Plan
MOP	Maintenance Operating Procedure		

3 – Document Number – set by facility

Appendix B: Facility Drawing/Document Metadata

Master records (CCIs) in FCMS make use of metadata categories for drawings and files. These fields are used to locate drawings when doing Master Records searches or a search in the Controlled Revision Tracking (CRT) Dashboard.

Engineering Drawing File (EDF) records search uses “EDF-DR” metadata category. That category is used finding drawings originally stored in EDF, the legacy drawing archive. Note that this makes use of the old drawing card metadata.



LaRC Drawing and File Metadata categories:

Field Name	Notes
Category	CCI, SFD, or Other
LaRC Drawing Number	Used only for drawings
Contractor's Drawing Number	
Drawing Type	BIM, DWG, FA, FSS, IID, IP, MSC, SWD, or UNK
Record Title	
Sheet Number	
System Type	ELEC, MECH, STRUC, CTRL, etc.
Date Entered	
Date of Revision	
Document Number	Used only for documents
Document Type	D2, D6, ECP, ESP, FMP, FRT, HA, IDSP, IOP, MCSL, MIP, MOP, MSC, OP, PMP, PO, PR, PSD, SACR, SAR, SCMP, SEP, SOP, TAIP, or TP
Record Sensitivity	CUI, Non-CUI; Refer to NPR 2810.7 for CUI categories
Export-Controlled	YES/NO; Refer to NPR 2190.1
Effort Code	Legacy from CMOL
Field Verified	Yes or No
Frame	Default of 1. Other numbers used for rare, multi-page drawings
Keywords	
LARCID	Facility systems component locator number
Project Manager	
Project Title	
Property Name	
Property Number	Building number or real property number if applicable
Remarks	
Revision Letter	
Size	
Status	ACT or OBS

EDF-DR Information:

Field Name	Notes
Category	CCI, CUI, Other (such as "flight" or "test article")
Classification Code	Legacy from EDF. N – Unclassified; C – Confidential; O – Other (note that EDF was not authorized to store classified drawings); See "Document Sensitivity" for new drawing metadata.
Contractor's Drawing Number	
Date Entered	
Date of Revision	
Document Number	Used only for documents
Document Sensitivity	CUI, Non-CUI; Refer to NPR 2810.7 for CUI categories
Document Type	
*Draftsman	
Drawing Number	Used only for drawings
Effort Code	Legacy from CMOL
Field Verified	Yes or No
Frame	Default of 1. Other numbers used for rare, multi-page drawings
Keywords	
LARCID	System locator number
*Organization	
*Project Manager	
*Project Title	
*Property Name	
*Property Number	Building number or real property number if applicable
Remarks	
*Revision Letter	
Sheet Number	
*Size	
Status	ACT or OBS (active or obsolete)
System Type	ELEC, MECH, STRUC, CTRL, etc.
*Title	

* - Mandatory