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Standard Guide for Aircraft Certification Education Standards for Engineers and Professionals in Aerospace Industry¹

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1. Scope

1.1 The purpose of this guide is to address the fundamental subject and content knowledge requirements and outcomes of aircraft certification educational training courses for engineers and professionals in the aerospace industry. The content may be more broadly applicable. The standards envisioned within this guide are intended to be usable globally.

1.2 *Background*—The standards envisioned within this guide are intended to be usable globally. There are certification requirements specific to each country’s respective civil aviation authority (CAA) (for example, published guidance from applicable CAA) concerning the acceptable use and application thereof. For example, some engineering approval processes vary from country to country. Regardless of an engineering process’s name or description, to the maximum extent possible, the standards to be developed from this guide should account for engineering approvals that support aircraft certification globally.

1.2.1 Through education standards that are created and accepted by CAAs and industry, engineers and professionals in the aerospace industry will have the knowledge and skills necessary to successfully carry out aircraft design certification projects using these standards for professional training and curriculum accreditation. Compliance data will be developed by engineers who have gained foundational knowledge in aircraft certification through training developed according to globally recognized consensus standards.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the*

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Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

F3060 Terminology for Aircraft

F3264 Specification for Normal Category Aeroplanes Certification

F3376 Guide for Core Competencies for Aviation Maintenance Personnel

2.2 *Federal Aviation Administration (FAA) Documents:*³

Order 8110.4C Type Certification

Advisory Circular (AC) 21-40A Guide for Obtaining a Supplemental Type Certificate

The FAA and Industry Guide to Product Certification

2.3 *Other Standards:*⁴

ATA iSpec 2200 Information Standards for Aviation Maintenance

3. Terminology

3.1 See terminology in accordance with Terminology F3060 (current version is F3060-20).

3.2 See Table 1 for task performance and knowledge definitions.

3.3 *Explanations for Task Knowledge and Task Performance Levels:*

3.3.1 A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task.

3.3.2 Task performance level is determined by performance in a certification project or a mock certification project conducted by an educational institution.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

³ Available from Federal Aviation Administration (FAA), 800 Independence Ave., SW, Washington, DC 20591, http://www.faa.gov.

⁴ Available from Airlines for America, 275 Pennsylvania Avenue, NW Suite 1300 Washington, DC 20004, https://publications.airlines.org/.

TABLE 1 Task Performance and Knowledge Levels

Scale Value	Definition: The Individual
Task Performance Levels (P)	3 Expert - Can advise others in parts of certification projects. Recognized expert in certification or engineering fields, or both.
	2 Advanced - Capable of project managing and completing a certification project. May need direction from a Level 3 in certification or engineering fields, or both.
	1 Professional - Can contribute to parts of certification project or address some engineering fields, or both, while working with Level 2 or Level 3, or both.
Task Knowledge Levels (K)	3 Expert - A detailed knowledge of the theoretical and practical aspects of the subject. To know, understand, and apply facts, principles, theories, and concepts. A capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner. Objectives: <ul style="list-style-type: none"> The individual should know the theory of the subject and interrelationships with other subjects. The individual should be able to give a detailed description of the subject using theoretical fundamentals and specific examples. The individual should understand and be able to use mathematical formulae related to the subject as appropriate for certification. The individual should be able to read, understand, and prepare sketches, complex drawings, and schematics describing the subject. The individual should be able to apply their knowledge in a practical manner using manufacturer's instructions or other acceptable data. The individual should be able to interpret results from various sources and measurements and apply corrective action where appropriate. The individual should be able to perform all certification tasks as necessary for an appropriate finding of airworthiness. The applicant should be able to develop airworthiness certification plans in accordance with acceptable or approved aerospace standards or FAA policies.
	2 Advanced - A general knowledge of the theoretical and practical aspects of the subject and an ability to apply that knowledge in a practical manner. Objectives: <ul style="list-style-type: none"> The individual should be able to understand the theoretical fundamentals of the subject. The individual should be able to find and interpret aircraft engineering and maintenance data and information, as appropriate, for certification. The individual should be able to give a general description of the subject using, as appropriate, typical examples. The individual should be able to use mathematical formulae in conjunction with physical laws describing the subject, as appropriate, for certification. The individual should be able to read and understand sketches, drawings, and schematics describing the subject.
	1 Professional - A familiarization with the principal elements of the subject. Objectives: <ul style="list-style-type: none"> The individual should be familiar with the basic elements of the subject. The individual should be able to give a simple description of the whole subject, using common words and examples. The individual should be able to locate methods, procedures, instructions, and reference material. The individual should be able to use typical terms.

3.4 Definitions of Terms Specific to This Standard:

3.4.1 *applicant, n*—person or entity seeking type certification (TC) or its equivalent from CAA.

3.4.2 *design certification, n*—design certification encompasses various types of FAA approvals associated with a variety of aircraft certification activities including, but not limited to:

(1) Issuance of a type certificate (TC), supplemental type certificate (STC), and amended TCs and STCs;

(2) Approval of elements of a manufacturing or inspection process needed to produce parts that conform with the approved design;

(3) Approval of type design changes, including airworthiness limitations;

(4) Approval to manufacture aircraft parts, such as parts manufacturer approval (PMA);

(5) Authorization to manufacture material, parts, or appliances to a minimum performance standard, such as technical standard order authorization (TSOA); and

(6) Approval of data in support of repairs and alterations.

3.5 Acronyms and Abbreviations:

3.5.1 *14 CFR*—Title 14 of the Code of Federal Regulations

3.5.2 *A4A*—Airlines for America

3.5.3 *AC*—advisory circular

3.5.4 *ACO*—aircraft certification office

3.5.5 *ACOS*—aircraft certification office subsystem

3.5.6 *ACRP*—aircraft certification regulatory program

3.5.7 *AD*—airworthiness directive

3.5.8 *AEE*—FAA's Office of Environment and Energy

3.5.9 *AEG*—aircraft evaluation group

3.5.10 *AFM*—aircraft flight manual

3.5.11 *AIR*—aircraft certification directorate system

3.5.12 *ALS*—airworthiness limitation section

3.5.13 *AML*—approved model list

3.5.14 *AMOC*—alternative methods of compliance

3.5.15 *ARC*—aviation rulemaking committee

3.5.16 *ATA*—Air Transportation Association of America

3.5.17 *BASA*—bilateral aviation safety agreements

- 3.5.18 *CAA*—civil aviation authority
- 3.5.19 *CAM*—civil aeronautics manual
- 3.5.20 *CAR*—civil air regulations
- 3.5.21 *CMACO*—certificate management aircraft certification office
- 3.5.22 *CMO*—certificate management office
- 3.5.23 *CMR*—certification maintenance requirements
- 3.5.24 *COS*—continued operational safety
- 3.5.25 *CPI*—certification process improvement
- 3.5.26 *CPN*—certification project notification
- 3.5.27 *CPP*—certification project plan
- 3.5.28 *CS*—certification specifications
- 3.5.29 *CSR*—certification summary report
- 3.5.30 *CSTA*—chief scientist and technical advisors
- 3.5.31 *DAR*—designated airworthiness representative
- 3.5.32 *DAS*—designated alteration station
- 3.5.33 *DER*—designated engineering representative
- 3.5.34 *DMIR*—designated manufacturing inspection representative
- 3.5.35 *EASA*—European Aviation Safety Agency
- 3.5.36 *ELOS*—equivalent level of safety
- 3.5.37 *eVTOL*—electric vertical take-off and landing
- 3.5.38 *FAA*—Federal Aviation Administration
- 3.5.39 *FHA*—failure hazards analysis
- 3.5.40 *FMEA*—failure modes and effects analysis
- 3.5.41 *FOEB*—Flight Operations Evaluation Board
- 3.5.42 *FRACA*—failure reporting, analysis and corrective action system
- 3.5.43 *FSB*—Flight Standardization Board
- 3.5.44 *FSDO*—flight standards district office
- 3.5.45 *IA*—inspection authorization
- 3.5.46 *ICA*—instructions for continued airworthiness
- 3.5.47 *ICAO*—International Civil Aviation Organization
- 3.5.48 *IFO*—international field office
- 3.5.49 *IPA*—implementation procedures for airworthiness
- 3.5.50 *JAA*—Joint Aviation Authorities of Europe
- 3.5.51 *JAR*—joint aviation requirements
- 3.5.52 *LSA*—light sport aircraft
- 3.5.53 *MDR*—malfunction difficulty reports
- 3.5.54 *MIDO*—manufacturing inspection district offices
- 3.5.55 *MISO*—manufacturing inspection satellite office
- 3.5.56 *MOA*—memorandum of agreement
- 3.5.57 *MoC*—means of compliance
- 3.5.58 *MRB*—Maintenance Review Board
- 3.5.59 *N/A*—not applicable
- 3.5.60 *NASA*—National Aeronautics and Space Administration
- 3.5.61 *NPRM*—notice of proposed rulemaking
- 3.5.62 *NTSB*—National Transportation Safety Board
- 3.5.63 *ODA*—organization designation authorization
- 3.5.64 *ODAR*—organizational designated airworthiness representative
- 3.5.65 *OEM*—original equipment manufacturer
- 3.5.66 *PACO*—project aircraft certification office
- 3.5.67 *PAH*—production approval holder
- 3.5.68 *PC*—production certificates
- 3.5.69 *PMA*—parts manufacturer approval
- 3.5.70 *PSCP*—project-specific certification plan
- 3.5.71 *PSP*—partnership for safety plan
- 3.5.72 *RGL*—regulatory and guidance library
- 3.5.73 *RTCA*—radio technical commission for aeronautics
- 3.5.74 *SAE*—Society of Automotive Engineering
- 3.5.75 *SAIB*—special airworthiness information bulletin
- 3.5.76 *SCR*—special certification review
- 3.5.77 *SDR*—service difficulty reports
- 3.5.78 *SFAR*—special federal aviation regulation
- 3.5.79 *SSA*—system safety analysis
- 3.5.80 *STC*—supplemental type certification
- 3.5.81 *STIR*—supplemental type inspection report
- 3.5.82 *TC*—type certification
- 3.5.83 *TCB*—Type Certification Board
- 3.5.84 *TCBM*—Type Certification Board meeting
- 3.5.85 *TCDS*—type certificate data sheet
- 3.5.86 *TIA*—type inspection authorization
- 3.5.87 *TIR*—type inspection report
- 3.5.88 *TSO*—technical standard orders
- 3.5.89 *TSOA*—technical standard order authorization
- 3.5.90 *UAM*—urban air mobility
- 3.5.91 *UAS*—unmanned aircraft systems
- 3.5.92 *USC*—United States Code
- 3.5.93 *UM*—unit member

4. Significance and Use

4.1 This guide is intended to be used to assess competencies of qualified individuals who wish to become (a) certified in basic aircraft certification knowledge and (b) those who wish to earn advanced degrees as an aerospace engineering certification specialist through an accredited collegiate program.

4.2 This guide is intended to be used in concert with a certification provider's structure and materials for management, exam delivery, and candidate preparation.

4.3 This can also be an educational steppingstone to becoming an individual designee or an organizational delegation authority unit member (UM), or both.

5. Test Knowledge Requirements

5.1 The following subject, performance, and task knowledge areas shall be assessed by levels (referenced in **Table 1**) of competency in the exam items.

5.2 *Aircraft Certification Overview:*

5.2.1 Overview of aircraft designs and the aviation system.

NOTE 1—Guide **F3376** is equivalent to **5.2.1.1** thru **5.2.1.3**.

5.2.1.1 *Variation in Aircraft Designs – (Levels P1 and K1)*—Knows and can identify the relationship of basic facts and state general principles in regard to aircraft designs, from early aviation pioneering designs (that is, the Wright Brothers Wright Flyer) to today’s modern jets and contemporary aerospace vehicle designs.

5.2.1.2 *Variation in Engine Designs – (Levels P1 and K1)*—Knows and can identify the relationship of basic facts and state general principles in regard to aircraft engine designs, from reciprocating engines to jet engines. Electric engines are an advanced technology.

5.2.1.3 *Variation in Aircraft Configurations – (Levels P1 and K1)*—Knows and can identify the relationship of basic facts and state general principles in regard to aircraft configurations, from single engine general aviation aircraft to multiengine transport aircraft, including rotorcraft and balloons (reference 14 CFR Parts 21, 23, 25, 27, 29, and 31 in **Table 2**). Understands how aircraft are organized by categories, classes, and types, such as experimental, military, and supersonic aircraft.

5.2.1.4 *Variation in New and Novel Aircraft – (Levels P1 and K1)*—Knows and understands the relationship of basic facts in regard to new and novel aircraft, from eVTOL (electric vertical take-off and landing), UAS (unmanned aircraft systems), UAM (urban air mobility), and spacecraft. This guide addresses traditional aircraft certification and, at this time, does not address the additional topics required for unmanned aircraft systems as a whole.

5.2.1.5 *Variation in Engineering Philosophies – (Levels P1 and K1)*—Knows and can identify the relationship of basic facts and state general principles in regard to engineering philosophies between aircraft designs, including differences in performance versus certification safety goals; also, overview of the life of an aircraft, from design, to manufacturing, to in-service deployment, to maintenance, and finally to retirement.

5.2.1.6 *The National Airspace System – (Levels P1 and K1)*—Knows and understands the relationship of basic facts in regard to the national aviation system, from air traffic control, airspaces class A to G, and various aircraft operations (private, charter, commercial, and freight).

5.3 *History and Evolution of Certification:*

5.3.1 *Legal Basis for Certification – (Levels P2 and K2)*—Knows and can identify the relationship of basic facts and state general principles in regard to certification laws created by Congress. The following is a minimum list of laws associated with this subject and noteworthy historical events:

5.3.1.1 *1926*—Air Commerce Act and Aeronautics Bulletin 7.

5.3.1.2 *1934*—Civil air regulations (CAR) started to be issued.

5.3.1.3 *1935*—The accident that led Congress to create the CAA.

5.3.1.4 *1938*—The CAA is created by Congress.

5.3.1.5 *1958*—The Federal Aviation Act is passed, which authorizes the Federal Aviation Authority (and replaces the CAA).

5.3.1.6 *1982*—In February 1982, the FAA’s aircraft certification directorate system (AIR) was created by means of Order 8000.51. This was a result of the post-accident recommendations from the American Airlines accident at O’Hare Airport in Chicago (May 25, 1979). Reference **Table 3** for website information.

5.3.1.7 *1994*—In July 1994, the Act of 1958 was recodified as Subtitle VII of Title 49 of the United States Code (USC), which currently provides the FAA’s regulatory authority. Airworthiness standards are separately codified in Chapter I of Title 14 of the Code of Federal Regulations. Title 49 of the USC is defined by federal legislation and can only be changed by new legislation. Title 14 of the Code of Federal Regulations is defined by regulations issued by federal agencies, such as the FAA, in accordance with relevant sections of the USC.

5.3.2 *FAA’s Legal Authorization – (Levels P2 and K2)*—Knows and can identify the relationship of basic facts and state general principles in regard to the FAA’s legal authorization, as granted by Congress, from rulemaking powers to regulate air transport, therein codified by means of 14 CFR Parts; knows and can identify the different types of certificates issued by the FAA, such as TC, production certificate (PC), standard airworthiness certificate, and special airworthiness certificate (experimental).

5.3.3 *FAA Documents – (Levels P2 and K2)*—Knows and can identify the relationship of basic facts and state general principles in regard to FAA documents from regulations to procedures; legal priority of orders, advisory circulars, and other various policies; and can identify mandatory actions versus recommendations. This will include a look back at earlier policies found in Bulletin 7 through the Civil Aeronautics Manual (CAM).

5.3.4 *FAA Safety Organizations – (Levels P2 and K2)*—Knows and can identify the relationship of basic facts and state general principles in regard to the FAA safety organizations, from aircraft certification’s engineering and manufacturing organizations to flight standards’ maintenance and operations organizations. The following is a minimum list of organizational subjects to be reviewed:

5.3.4.1 Historical review of FAA organization, including organizational charts and geographical jurisdictions;

5.3.4.2 Review of current FAA safety organizations, including roles and responsibilities and rulemaking and documents, including relationships with National Transportation Safety Board (NTSB), foreign authorities, U.S. military, National Aeronautics and Space Administration (NASA), and safety and standards associations;

5.3.4.3 Review of any new changes to FAA’s safety organizations, including roles and responsibilities.

TABLE 2 List of Applicable Federal Aviation Regulations that Focus on Various Certification Methodologies

National Archives	Prioritization: A is Mandatory, while B and C are Recommendations
CFR TITLE 14	A
List of Subjects revised as of October 1, 2018	
14 CFR Part 1 Definitions and abbreviations	A
Air transportation	
14 CFR Part 3 General requirements	A
Aviation safety	
14 CFR Part 5 Safety management systems	B
Air carriers	
Aircraft	
Airmen	
Aviation safety	
Reporting and recordkeeping requirements	
Safety	
Transportation	
14 CFR Part 11 General rulemaking procedures	A
Administrative practice and procedure	
Reporting and recordkeeping requirements	
14 CFR Part 13 Investigative and enforcement procedures	A
Administrative practice and procedure	
Air transportation	
Aviation safety	
Hazardous materials transportation	
Investigations	
Law enforcement	
Penalties	
14 CFR Part 21 Certification procedures for products and articles	A
Aircraft	
Aviation safety	
Exports	
Imports	
Reporting and recordkeeping requirements	
14 CFR Part 23 Airworthiness standards: Normal category airplanes	A
Aircraft	
Aviation safety	
Signs and symbols	
14 CFR Part 25 Airworthiness standards: Transport category airplanes	A
Aircraft	
Aviation safety	
Reporting and recordkeeping requirements	
14 CFR Part 26 Continued airworthiness and safety improvements for transport category airplanes	A
Aircraft	
Aviation safety	
14 CFR Part 27 Airworthiness standards: Normal category rotorcraft	A
Aircraft	
Aviation safety	
14 CFR Part 29 Airworthiness standards: Transport category rotorcraft	A
Aircraft	
Aviation safety	
14 CFR Part 31 Airworthiness standards: Manned Free Balloons	A
14 CFR Part 33 Airworthiness standards: Aircraft engines	A
Aircraft	
Aviation safety	
14 CFR Part 34 Fuel venting and exhaust emission requirements for turbine engine powered airplanes	A
Air pollution control	
Aircraft	
14 CFR Part 35 Airworthiness standards: Propellers	A
Aircraft	
Aviation safety	
14 CFR Part 36 Noise standards: Aircraft type and airworthiness certification	A
Agriculture	
Aircraft	
Noise control	

TABLE 2 Continued

National Archives	Prioritization: A is Mandatory, while B and C are Recommendations
14 CFR Part 39 Airworthiness Directives (ADs)	A
Aircraft	
Aviation safety	
Reporting and recordkeeping requirements	
14 CFR Part 43 Maintenance, preventive maintenance, rebuilding, and alteration	A
Aircraft	
Aviation safety	
Reporting and recordkeeping requirements	
14 CFR Part 45 Identification and registration marking	A
Aircraft	
Exports	
Signs and symbols	
14 CFR Part 47 Aircraft registration	A
Aircraft	
Reporting and recordkeeping requirements	
14 CFR Part 61 Certification: Pilots, flight instructors, and ground instructors	A
Aircraft	
Airmen	
Alcohol abuse	
Aviation safety	
Drug abuse	
Recreation and recreation areas	
Reporting and recordkeeping requirements	
Security measures	
Teachers	
Reporting and recordkeeping requirements	
Security measures	
14 CFR Part 65 Certification of airmen other than flight crewmembers	A
Subpart D: Mechanics. This subpart also contains information regarding inspection authorizations (IAs) and their authority. (Major repairs, major alterations, Form 337s, etc.)	
14 CFR Part 71 Designation of Class A, B, C, D, and E airspace areas; air traffic service routes; and reporting points	B
Airspace	
Navigation (air)	
14 CFR Part 73 Special use airspace	B
Airspace	
Navigation (air)	
Security measures	
Aircraft	
Aviation safety	
Recreation and recreation areas	
Reporting and recordkeeping requirements	
Aviation safety	
Reporting and recordkeeping requirements	
Security measures	
Smoking	
14 Part 91 General operating and flight rules	A
14 CFR Part 101 Moored balloons, kites, amateur rockets, unmanned free balloons, and certain model aircraft	A
14 CFR Part 103 Ultralight vehicles	A
14 CFR Part 105 Parachute operations (Note: this is for a person, not an aircraft)	B
14 CFR Part 121 Air carrier certification	A
14 CFR Part 125 Certification and operations: Airplanes having a seating capacity of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more; and Rules governing persons on board such aircraft	C
14 CFR 129 Operations: Foreign air carriers and foreign operators of U.S.-registered aircraft engaged in common carriage	C
14 CFR Part 133 Rotorcraft external-load operations	B
Aircraft	
Aviation safety	
Reporting and recordkeeping requirements	

TABLE 2 *Continued*

National Archives	Prioritization: A is Mandatory, while B and C are Recommendations
14 CFR Part 135 Operating requirements: Commuter and on demand operations and rules governing persons on board such aircraft	C
14 CFR Part 136, Subpart A National Air Tour Safety Standards	C
14 CFR Part 137 Agricultural aircraft operations	C
14 CFR 145 Repair stations	A
14 CFR 183 Representatives of the Administrator	A
PART 185 Testimony by employees and production of records in legal proceedings, and service of legal process and pleadings	C
PART 187 FAA fees	C

5.4 Overview of Aviation Regulations and Significant Accidents:

5.4.1 *Review of Certification-focused Regulations – (Levels P2 and K2)*—Knows and can identify the relationship of basic facts and state general principles in regard to certification regulations in the fields of engineering, manufacturing, and flight standards’ maintenance and operations organizations. Reference [Table 2](#) for list of regulations.

5.4.2 *Review of Engineering Certification Regulations, Philosophies, and Significant Accidents – (Levels P2 and K2)*—Knows and can identify the relationship of basic and advanced facts and state general and advanced principles in regard to the FAA’s aircraft certification engineering regulations, philosophies, and changes due to significant accidents, including review of NTSB reports. Reference [Table 3](#) for website information. The following is a minimum list of organizational subjects to be reviewed:

5.4.2.1 Understanding the legal construct of the engineering safety certification model.

5.4.2.2 Understanding the legal and engineering philosophical meanings of showing compliance and of finding compliance.

5.5 Overview of Engineering and Design Approval Processes for TC:

5.5.1 *Review of Engineering Certification Regulations, Policies and Related Documents – (Levels P2 and K2)*—Knows and can identify the relationship of basic and advanced facts and state general and advanced principles in regard to safety philosophies and certification regulations, policies, and related documents in the field of engineering. The following is a minimum list of organizational subjects to be reviewed:

5.5.1.1 Aircraft systems and certification paths.

5.5.1.2 Review of TC process by means of FAA Authorization Act (law), 14 CFR Part 21 (regulations) (see [Table 2](#)), and FAA Order 8110.4 (review history of CAMs to current version of order). Focus on aircraft TC regulations, orders, and policies.

5.5.1.3 Engineering R&D (research and design); FAA applications, such as the FAA Form 8110-12 TC application; data, analysis, and test plans; experimental and production drawings; test set-ups, testing, parts and test set-up

conformities, and witnessing; professional way to deal with problems during testing and conformities; and analyzing and documenting test results and developing test reports, including identification of life limits and mandatory inspections. Review of various ground versus flight tests. Review of new 14 CFR Part 23 (see [Table 2](#)), Amendment 64, requirement for means of compliance (MoC), in addition to the needs for methods of compliance. Review of an FAA accepted MoC, Specification [F3264](#), and review of the Federal Register Notice No. 23–18–01–NOA “FAA 14 CFR Part 23 Accepted Means of Compliance; Airworthiness Standards: Normal Category Airplanes; Action: Notification of Availability; Request for Comments” (released May 11, 2018).

5.5.1.4 Showing and finding of compliance, compliance matrix, project-specific certification plans (PSCPs), overall development of certification plans and timelines, and maintaining open and positive communication between the ACO, manufacturing inspection district offices (MIDO), the applicant, and the designees.

5.5.1.5 Three principal types of TCs: aircraft, engine, and propellers. Review of other aircraft airworthiness certificates for balloons, light sport aircraft (LSA), experimental, etc. Review of various regulations, orders, and policies.

5.5.1.6 Engine and propeller TC regulations, orders, and policies.

5.5.1.7 Flight test regulations, orders, and policies and development of flight test plans (including type inspection authorization (TIA)) and conformities.

5.5.1.8 Post flight test inspections and reports, including type inspection report (TIR).

5.5.1.9 Review of Noise (part 36) and Engine Emissions (part 34) regulations (see [Table 2](#)), orders, and policies. Review relationship between engineering certification regulations in support of parts 61, 91, 107, 121, 125, 127, 129, and 135 (see [Table 2](#)).

5.5.2 *Review of Special Conditions and Equivalent Levels of Safety – (Levels P2 and K2)*—Knows and can identify the relationship of basic and advanced facts and state general and advanced principles in regard to special conditions and equivalent levels of safety in the field of aircraft certification engineering.

5.5.3 *Review of Issue Papers and Exemptions – (Levels P2 and K2)*—Knows and can identify the relationship of basic and advanced facts and state general and advanced principles in regard to issue papers and exemptions in the field of aircraft certification engineering.

5.5.4 *Review of System Level Testing and Hardware Testing – (Levels P2 and K2)*—Knows and can identify the relationship of basic and advanced facts and state general and advanced principles in regard to system level testing and hardware testing, as well as related regulations and policies, in the field of aircraft certification engineering. This includes compliance with FHA (failure hazards analysis), FMEA (failure modes and effects analysis), and SSA (system safety analysis) requirements. Reference [Table 3](#) for website information.

TABLE 3 List of Websites to Provide Further Supplemental Information

The following websites are provided to locate further and amplifying information to individual subject areas. As of the time of publication of this guide, the provided links were verified to be live links. If a link is no longer functioning, please contact ASTM and report the issue so that it may be resolved. The following websites are recommended sources, but not the only sources for information.

General Information: FAA's Aircraft Certification

Order 8100.5C	https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1031526
Homepage	https://www.faa.gov/licenses_certificates/aircraft_certification/

The following recommended websites are listed by the subject matter areas where they appear:

The National Airspace System

FAA 101 Overview	https://www.youtube.com/watch?v=9KguBoIH4I
1982: The FAA's Aircraft Certification Service Directorate System is created (in accordance with Order 8000.51)	https://www.faa.gov/documentLibrary/media/Order/ND/8000-51.pdf
American Airlines Flight 191 Accident	https://lessonslearned.faa.gov/ll_main.cfm?TabID=1&LLID=14

Review of Engineering Certification Regulations, Philosophies, and Significant Accidents

Lessons learned from civil aviation accidents	https://lessonslearned.faa.gov/
NTSB website and accident reports	https://www.ntsb.gov/Pages/default.aspx
European Aviation Safety Agency (EASA) websites	https://www.easa.europa.eu/easa-and-you/safety-management/accident-and-incident-investigation-support https://www.easa.europa.eu/easa-and-you/safety-management/aviation-safety-reporting
Flight Safety Foundation websites	https://aviation-safety.net/database/ https://aviation-safety.net/ https://www.flightsafety.org

Review of System Safety Analysis

FAA AC 23-1309-1E System Safety Analysis and Assessment for Part 23 Airplanes	https://www.faa.gov/regulatory_policies/advisories/2023/0719e41e1d26099108625795d005d5302/\$FILE/AC%2023.1309-1E.pdf
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Review of Military Certification

FAA Order 8110.101A Type Certification Procedures For Military Commercial Derivative Aircraft	https://www.faa.gov/documentLibrary/media/Order/ND/8110.101.pdf
FAA AC 20-169 Guidance for Certification of Military Special Mission Modifications and Equipment for Commercial Derivative Aircraft (CDA)	https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_20-169.pdf
FAA's Military Program Office	https://www.faa.gov/air_traffic/flight_info/avn/military/
FAA's Military Certification Office	https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/air/directorates_field/small_airplanes/mco/

Review of Foreign Civil Aviation Authorities' Requirements for Applicants

EASA's Rules for Normal-Category Aeroplanes (CS-23)	https://www.easa.europa.eu/document-library/easy-access-rules/easy-access-rules-normal-category-aeroplanes-cs-23
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Review of Individual Delegations

FAA Order 8110.37F Designated Engineering Representative (DER) Handbook	https://www.faa.gov/documentLibrary/media/Order/FAA_Order_8110.37F.pdf
Individual Delegations	https://www.faa.gov/other_visit/aviation_industry/designees_delegations/individual_designees/

Review of Organizational Delegations

FAA Order 8100.15B with Chg 3 Organization Designation Authorization Procedures	https://www.faa.gov/documentLibrary/media/Order/Order_8100.15B_with_Chg_3.pdf
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