Federal Aviation Administration

Part 23 Amendment 23-64

Implementation Procedures Guide

June 15, 2022

Revision History:

Revision 1.0	Dated June 15, 2022	Initial Issue

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FIGURES

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NOTE: This guide is intended to be used on projects for traditional part 23 airplanes. Novel designs that use part 23 amendment 23-64 require evaluation and may require modification of the guide.

1.0 SUMMARY.

This guide provides supplemental guidance to existing orders and advisory circulars on the type certification process using Title 14 of the Code of Federal Regulations (14 CFR) part 23, amendment 23-64, effective August 30, 2017[1] for normal category airplanes.

Figure 1 shows how the activities affected by amendment 23-64 fit into the phases of a typical certification project using the model from Order 8110.4C, Change 6, *Type Certification,* dated March 6, 2017. The affected activities, highlighted in bold text in Figure 1, are:

- 6.2 Certification Project Notification
- 6.3 G-1 Certification Basis IP for New TC Projects
- 6.4 Certification Basis for Changed Products
- 6.5 DDS IP
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- 6.9 Type Certificate Data Sheet (TCDS)
- 6.10 DDS Summary Document
- 6.11 Supplemental Type Certificate Form

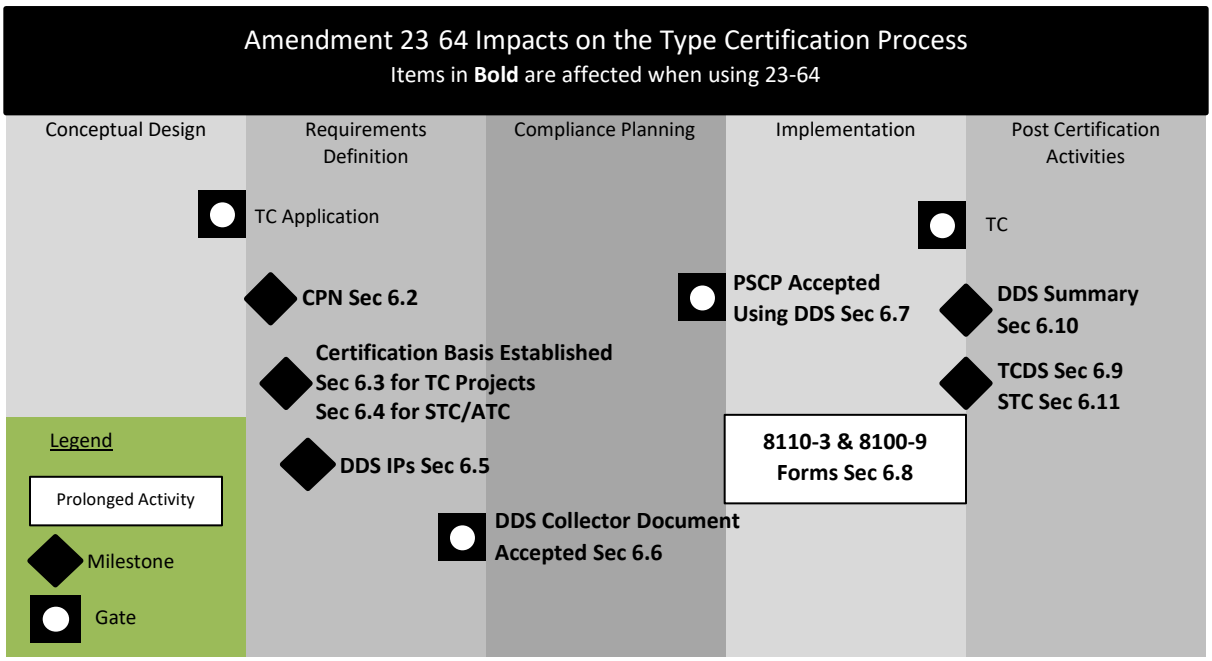

Figure 1—Amendment 23-64 Impacts on the Type Certification Process.

[1] See *Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and Commuter Category Airplanes.* Federal Register 81-251 (December 30, 2016) p. 96572. [81 FR 96572]. Available at: https://www.federalregister.gov/documents/2016/12/30/2016-30246/revision-of-airworthiness-standards-for-normal-utility-acrobatic-and-commuter-category-airplanes

2.0 DEFINITION OF KEY TERMS.

The use herein of the terms “must,” “should,” and “recommend” have specific meanings that are explained in Appendix A.

- **Detailed Design Standard (DDS)** - Prescriptive standards, appropriate for the specific aircraft design which contain the means of compliance used to comply with the safety objectives of the performance-based regulations of 14 CFR part 23, amendment 23-64. The DDS is a set of design requirements used to comply with § 23.2010 and is of the same level of detail as prescriptive regulations. Refer to Section 6.1 for a discussion of DDS and examples.

- **DDS Collector Document** - A document used to coordinate and accept the DDS for a project. Refer to Section 6.6.

- **DDS Summary Document** - The document containing the non-proprietary information from the DDS Collector Document referenced on the Type Certificate Data Sheet (TCDS) or Supplemental Type Certificate (STC) that contains the DDS. Refer to Section 6.10.

- **Performance-Based Regulations (PBRs)** - 14 CFR part 23 regulations rewritten at amendment 23-64 to state a safety objective, rather than a prescriptive requirement.

- **Prescriptive Regulations (PRs)** - 14 CFR part 23 sections (regulations) prior to amendment 23-64. (**Note:** These prescriptive regulations contain sufficiently detailed language to allow compliance directly with each section (regulation) when applied to traditional designs that were prevalent at the time the regulations were written. These legacy prescriptive regulations are not sufficient nor appropriate for some modern designs.

3.0 CURRENT REGULATORY AND ADVISORY MATERIAL.

The guidance in this document supplements the following advisory circulars (AC), orders, and publications:

- AC 21-40A, *Guide for Obtaining a Supplemental Type Certificate,* September 27, 2007.
- AC 21.101-1B, *Establishing the Certification Basis for Changed Aeronautical Products,* March 11, 2016.
- AC 21.303-4, *Application for Parts Manufacturer Approval via Tests and Computation or Identicality,* March 21, 2014.
- AC 23.2010-1, *FAA Accepted Means of Compliance Process for 14 CFR Part 23,* March 27, 2017.
- Order 8100.15B CHG 3, *Organization Designation Authorization Procedures,* June 15, 2018.
- Order 8110.112A, *Standardized Procedures for Usage of Issue Papers and Development of Equivalent Levels of Safety Memorandums,* October 3, 2014.
- Order 8110.115 CHG 1, *Certification Project Initiation and Certification Project Notification,* September 5, 2014.
- Order 8110.37F, *Designated Engineering Representative (DER) Handbook,* August 31, 2017.
- Order 8110.4C CHG 6, *Type Certification,* March 6, 2017.
- Order 8110.42D CHG 1, *Parts Manufacturer Approval Procedures,* September 15, 2017.
- Order 8110.48A, *How to Establish the Certification Basis for Changed Aeronautical Products,* July 21, 2017.
- *The FAA and Industry Guide to Product Certification,* Third Edition, May 2017.

4.0 RELEVANT PAST PRACTICE.

Advisory Circular (AC) 23.2010-1 provides guidance on how to submit a proposed means of compliance (MOC) during the certification process under amendment 23-64. However, as experience with amendment 23-64 is gained, it is evident that additional process clarity is required. ACO Branches working projects with amendment 23-64 coordinated closely with the Policy and Innovation Division to develop and standardize the process details contained in this document.

5.0 BACKGROUND INFORMATION.

In 2011, the FAA established an Aviation Rulemaking Committee (ARC) to examine part 23 airworthiness requirements in response to a joint FAA/Industry study which it completed in 2009. The ARC recommended that part 23 be completely restructured and move from traditional prescriptive regulations to performance-based rules supported by consensus standards as a means of compliance with the regulations. There were several factors supporting this decision.

- Performance-based rules require a safety outcome, rather than a single prescriptive approach to achieving that outcome. The flexibility gained by the performance-based approach gives industry an incentive to innovate and find new, non-traditional ways to achieve the required safety outcome.

- Performance-based rules break the cycle of the prescriptive regulations being out of date as technology advances. In the new millennium, with technology advancing at ever higher rates, the ability of prescriptive regulations to keep pace with technology was becoming less and less likely.

- Non-traditional airplane designs could be certified with a reduced number of special conditions, exemptions and other administrative workarounds. Since the regulations are performance-based, and the detailed design requirements are now defined in the means of compliance, flexibility can be exercised in setting the design requirements without cumbersome rulemaking.

- Use of voluntary consensus standards leverages FAA resources, provides access to worldwide expertise, and fosters a global, collaborative approach to defining an acceptable means of compliance with the performance based rules.

- Passage of *The Small Airplane Revitalization Act of 2013*, Pub. L. 113-53 (2013), provided the political impetus.[2]

The added flexibility to accommodate future designs carries along with it the need to clearly describe some new concepts and to revise some existing processes. Those descriptions follow in this section and in following sections in this document.

A fundamental concept introduced by amendment 23-64 is the relationship between the new, performance-based rules and the underlying means of compliance. Amendment 23-63 is prescriptive and provides detailed design requirements. The traditional means and methods of compliance provide guidance on how to show compliance to those prescriptive requirements. Amendment 23-64 is performance-based, which provides a safety outcome requirement, but not a prescriptive means of achieving that outcome. Amendment 23-64 can be thought of as representing a higher logical requirement. In order to show compliance to the performance-based rules, the applicant must choose an accepted means of compliance, per 14 CFR 23.2010. Those means of compliance serve the role of the prescriptive rules found in 23-63. In other words, the means of complying with the performance-based rules are detailed design standards. Per AC 23.2010-1, and as discussed in Section 6.0, there are multiple sources of accepted MOC to the performance-based rules, including but not limited to, accepted consensus standards, prior part 23 amendment language if applicable, and applicant proposed and FAA accepted detailed design or testing requirements.

Figure 2 describes these relationships.

[2] See https://www.congress.gov/113/plaws/publ53/PLAW-113publ53.pdf.

The content of the box labeled “Prescriptive requirements” is, in the context of amendment 23-64, known as the Detailed Design Standards (DDS), as defined in Section 2.0. It is a set of design requirements used to comply with § 23.2010 and is of the same level of detail as amendment 23-63. For a given project, the accepted DDS could be a combination of the options listed in the prior paragraph, for each of the amendment 23-64 rules in the certification basis.

The flexibility of the applicant selecting, and FAA accepting, a DDS for a given project, without rulemaking or special conditions, incentivizes innovation and certification efficiency for all stakeholders.

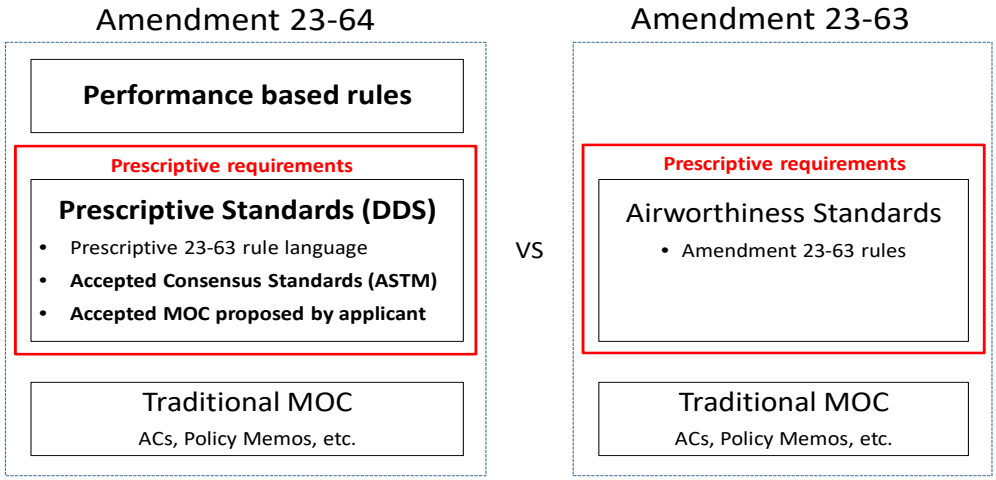

Figure 2—Comparison between Amendment 23-64 and Amendment 23-63

6.0 GUIDANCE.

6.1 Detailed Design Standard (DDS).

This section supplements AC 23.2010-1, *FAA Accepted Means of Compliance Process for 14 CFR Part 23*, March 27, 2017.

6.1.1 Explanation of DDS.

The safety objectives represented in the prescriptive 14 CFR part 23 regulations at amendment 23-63 were used to develop the performance-based regulations in amendment 23-64. The safety objective language (performance-based regulations) contained in amendment 23-64 provides the flexibility to address new technology with fewer special conditions, exemptions, and equivalent safety findings. However, the performance-based regulations do not provide detailed standards that are design specific. Consequently, applicants are required to comply with the performance-based regulations in amendment 23-64 using an MOC appropriate to their design, which meets the safety objectives in 23-64. These MOC may include consensus standards and must be accepted by the Administrator. (See § 23.2010(a)). For the purposes of this document, the MOC required by § 23.2010 are referred to as DDS to distinguish them from the traditional MOC and methods of compliance in advisory circulars, policy memorandums, and other regulatory guidance, and provide a level of detail comparable to the former regulations of amendment 23-63. Acceptance of the DDS is a new step in the certification process that sets the detailed design requirements for the project, similar to establishing the certification basis for previous amendments.

There are several options for DDS discussed in this document, but all DDS must:

- Be accepted by the FAA before use by an applicant.(See § 23.2010(a));
- Be in a form and manner acceptable to the FAA. (See § 23.2010(b));
- Be prescriptive design standards that are appropriate for the applicant's design and provide a level of detail similar to amendment 23-63, previous special conditions, and equivalent level of safety (ELOS) findings;
- Meet the safety objectives of 23-64 to maintain at least the legacy level of safety, at the aircraft level, established by amendment 23-63 with the following exceptions: (See amendment 23-64).
    - New design approaches and technologies are required to improve airplane stall characteristics and pilot situational awareness to prevent Loss of Control (LOC) accidents. (See § 23.2150).

- Airplanes approved for flight into known icing, including Supercooled Large Droplets (SLD) must demonstrate safe operations in SLD conditions. (See § 23.2540).
- Airplanes approved for flight into known icing, but prohibited from flight in SLD, require a means for detecting SLD conditions and showing the airplane can safely avoid or exit such conditions. (See § 23.2540).
- Airplanes limited to Day VFR operations with a maximum of one passenger that were previously approved using CS-VLA as special class airplanes can be approved under amendment 23-64 as normal category airplanes with appropriate limitations. (See amendment 23-64).

Traditional means of compliance and methods of compliance such as advisory circulars, policy memorandums, and design standards (e.g., RTCA/DO-160, DO-178, DO-254, ARP4761, ARP4754) may continue to be used in support of the DDS, but are not intended to be listed in the DDS Collector Document.

Since prescriptive requirements were removed from the amendment 23-64 rule language, compliance must also be tracked to the accepted DDS to show compliance to the regulations. For example, Table 1 illustrates how § 23.2605(c) provides a high-level safety objective, but F3061, paragraph 10.1 provides a much more specific requirement that may be used to meet that safety objective. It should be understood that some innovative designs may have design features that are not addressed by previously accepted DDS, so applicants may have to propose unique DDS that are appropriate for their designs. Refer to paragraph 6.1.3 for custom DDS proposals. Satisfying all of the specific requirements in the DDS, the safety objectives represented by the DDS will also be satisfied.

Table 1—Comparison of Performance-Based Rules and Prescriptive Requirements

Part 23 Amendment 23-64 Rule Language	**Portion of the DDS Language**
Information concerning an unsafe system operating condition must be provided in a timely manner to the crewmember responsible for taking corrective action. (See § 23.2605).	Takeoff Warning System—Unless it can be shown that a lift or longitudinal trim device that affects the takeoff performance of the aircraft would not give an unsafe takeoff configuration when selected out of an approved takeoff position, a takeoff warning system must be installed and meet the requirements of 10.1.1 through 10.1.4. (See ASTM F3061).

6.1.2 Accepted DDS.

The Policy and Innovation Division (AIR-600) has accepted the following DDS, which may be used by applicants if the DDS are applicable for the project design. In the future, this list may be expanded to include other sources.

6.1.2.1 Option 1: ASTM Standards.

The FAA accepts ASTM standards as DDS for amendment 23-64 by publishing a Notification of Availability in the Federal Register. The DDS are then listed on the *Small Airplane Regulations, Policies & Guidance* public website with notes that clarify exceptions on how DDS can be used.[3]

6.1.2.2 Option 2: Language from Previous Part 23 Amendments.

Language from amendment 23-63 is accepted as DDS for amendment 23-64—except for loss of control (§ 23.2150, *Stall characteristics, stall warning, and spins*), flight into known icing (§ 23.2165, *Performance and flight characteristics requirements for flight in icing conditions and § 23.2540 Flight in icing conditions*), and new and novel designs for which the 23-63 language is not adequate. If amendment 23-63 is used as DDS, the language must be updated to address errors described in the Small Airplane Issues List (SAIL).[4]

Language from amendment 23-61 can also be used as DDS with the same exceptions as amendment 23-63 except for high performance and jet airplanes, airplanes with heads up displays (HUD), or airplanes with new/novel technology. The following table shows some of the differences between amendments 23-61, 23-62, and 23-63.

[3] The latest ASTM standards accepted by the FAA are available at: https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/media/part_23_moc.pdf

[4] The Small Airplane Issues List (SAIL) is available at: https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/

Table 2—Difference between Part 23, Amendments 23-61, 23-62, and 23-63

Amendment	Exceptions (What the amendment is not adequate for as DDS)	Note
23-61 (suggested for pistons and turboprops)	Airplanes with turbofan or turbojet engines Airplanes with $M_{MO} \geq 0.6$ Airplanes with Max Alt > 40,000' Head Up Displays Loss of Control (23.2150) Flight into Known Icing (23.2165) New and Novel Technology†	Same as 23-62 except for high performance jet requirements.
23-62*	Head Up Displays Loss of Control (23.2150) Flight into Known Icing (23.2165) New and Novel Technology†	Accepted in 81 FR 96572 preamble to amendment 23-64
23-63* (suggested for jets and high performance)	Loss of Control (23.2150) Flight into Known Icing (23.2165) New and Novel Technology†	Same as 23-62 except for 23.773 requirements for Heads Up Displays

* Affected by errors. Reference the SAIL.

† In this context New and Novel Technology includes all designs that are not adequately addressed by the regulatory language. For example, amendments 23-63 contained requirements that addressed nickel-cadmium batteries, but not lithium batteries. Amendment 23-63 may be used as DDS but would require additional DDS for a lithium battery installation.

6.1.2.3 Option 3: Accepted DDS Listed on the Small Airplane Issues List (SAIL).

The SAIL may list acceptable DDS for certain issues. These DDS may be based on the content of special conditions and equivalent level of safety (ELOS) findings used with previous part 23 amendments. Refer to the current SAIL at the following website for items that can be used as previously accepted DDS: (https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/).

6.1.2.4 Option 4: Reusing DDS Previously Proposed by an Applicant and Accepted.

If an applicant previously proposed a custom DDS that was accepted by the FAA, it may be reused by that applicant on future projects if the FAA determines it is applicable for the new project design. The determination of applicability is required by the Compliance and Airworthiness Division (AIR-700) project office and may be coordinated with AIR-600.

6.1.2.5 Option 5: Language from Certification Specifications—Very Light Aeroplanes (CS-VLA).

Amendment 23-64 preamble explained that certain airplanes previously certified using EASA certification specifications for very light aeroplanes (CS-VLA) could be certified using amendment 23-64. For these airplanes, CS-VLA is an accepted DDS except for Loss of Control (§ 23.2150). Accepted Means of Compliance (AMC) 3 in European Union Aviation Safety Agency (EASA) AMC/ Guidance Material (GM) CS-23 gives an example format for how CS-VLA could be proposed as DDS for amendment 23-64.[5]

6.1.2.6 Option 6: Combinations of Previously Accepted DDS.

It is acceptable for an applicant to use a combination of previously accepted DDS for a project as long as the DDS are appropriate for the design and address all relevant aspects.

6.1.3 Custom DDS not Previously Accepted.

If an applicant proposes a DDS that was not previously accepted, it must be reviewed and accepted by AIR-600. The DDS Collector Document or a DDS Issue Paper (IP) described in sections 6.6 or 6.5 of this document, respectively, may be appropriate. This process should also be used if an applicant proposes using an accepted DDS with deviations.

6.1.4 Title 14 CFR Part 23 Amendment 23-64 Sections that do not Require DDS.

The following sections are prescriptive regulations or administrative regulations that do not require DDS. All other sections require DDS.

- § 23.1457, *Cockpit voice recorders*
- § 23.1459, *Flight data recorders*
- § 23.1529, *Instructions for continued airworthiness*
- § 23.2000, *Applicability and definitions*
- § 23.2005, *Certification of normal category airplanes*
- § 23.2010, *Accepted means of compliance*

6.2 Certification Project Notification.

This section supplements Order 8110.115 CHG 1, *Certification Project Initiation and Certification Project Notification*, September 5, 2014, for projects using amendment 23-64. When creating a Certification Project Notification (CPN) entry for a project using amendment 23-64:

[5]AMC 3 can be found on EASA's website at: https://www.easa.europa.eu/certification-specifications/cs-23-normal-utility-aerobatic-and-commuter-aeroplanes.

6.2.1 Note that the certification basis includes amendment 23-64 in the Project Description with a statement such as “The certification basis for the project includes amendment 23-64.”

6.2.2 If the applicant proposes to use only previously accepted DDS for the project, note this in the Project Description field and briefly describe the DDS with a statement such as “All DDS are ASTM Standards previously accepted in Notice No. 23–20–01–NOA and have been evaluated and found to be appropriate for the design.”

6.2.3 If the applicant proposes to use any DDS that have not been previously accepted, note this in the Project Description field and briefly describe the proposed DDS with a statement such as “ASTM Standard Fxxxx-yy for Hydrogen Fuel Cells is proposed as DDS and requires P&I acceptance.”

6.2.4 For projects that use both previously accepted DDS and non-previously accepted DDS, briefly describe the DDS proposal in the Project Description field. An acceptable example showing all of the information unique to amendment 23-64 follows:

> The certification basis for the project includes amendment 23-64. The applicant proposes to use the language from amendment 23-63 for the majority of the DDS (accepted previously) and ASTM standard Fxxxx-yy for Hydrogen Fuel Cells, which has not been accepted and requires AIR-600 acceptance.

6.3 G-1 Certification Basis IP for New Type Certification (TC) Projects.

This section supplements the following orders for projects using amendment 23-64:

- Order 8110.4C CHG 6, *Type Certification*, March 6, 2017.
- Order 8110.112A, *Standardized Procedure for Usage of Issue Papers and Development of Equivalent Levels of Safety Memorandums*, October 3, 2014.

6.3.1 In the G-1 IP Background section, briefly describe the baseline DDS that will be used for the project. Two acceptable examples are:

Example 1:

> The DDS will be primarily based on ASTM standards accepted in Notice No. 23–20–01–NOA. When the standards make no provisions for electrically powered aircraft, DDS using later versions of these ASTM standards or alternative DDS will be proposed. The complete DDS will be documented in Document Number 12345 DDS Collector Document and coordinated using the G-2 IP.

Example 2:

> The DDS will be primarily based on language from amendment 23-61. Compliance with § 23.2150, amendment 23-64, will use ASTM F3180-XX, and a new DDS will be proposed for automatic flap extension. The complete DDS will be documented in Document Number 12345 DDS Collector Document and coordinated using the G-2 IP.

6.3.2 In the G-1 IP FAA position, identify the airplane performance level and certification level for § 23.2005. For example:

> The Model XXX Certification and Performance Levels for § 23.2005 will be Level 2, Low Speed. This will be listed in the certification basis section of the TCDS.

6.4 Certification Basis for Changed Products.

This section supplements the following orders for projects using amendment 23-64:

- Order 8110.48A, *How to Establish the Certification Basis for Changed Aeronautical Products*, July 21, 2017.
- AC 21.101-1B, *Establishing the Certification Basis for Changed Aeronautical Products,* March 11, 2016.

6.4.1 Avoiding Special Conditions, Equivalent Level of Safety Findings, and Exemptions by Using Amendment 23-64.

The flexibility of amendment 23-64 may make special conditions, ELOS findings or exemptions unnecessary. If any pre-amendment 23-64 regulations are not adequate or appropriate to address a novel design change, and there are amendment 23-64 regulations that are adequate or appropriate to address the novel design, then the applicable amendment 23-64 regulations must be used along with an accepted DDS. New special conditions will not be issued unless it is determined that 23-64 is not adequate. Previously issued special conditions, ELOS findings, or exemptions from the current certification basis can be re-used, if still applicable, after a determination that the associated regulations and their amendment levels can remain at the current level.

6.4.2 Requirements if any amendment 23-64 performance-based regulations are used:

- Include §§ 23.2000, 23.2005 and 23.2010 in the certification basis; and
- Identify the airplane certification level and performance level used for compliance in the certification basis.

6.4.3 Section 21.101(b)(3) Evaluation.

Section 21.101(b)(3) allows applicants to make exceptions to use previous amendments to the certification basis when the later amendment “would not contribute materially to

the level of safety of the product." This assessment may be challenging when comparing amendment 23-64 with previous amendments because the regulations were reorganized as performance-based regulations. Amendment 23-64 maintained the same level of safety as amendment 23-63—except for loss of control and flight into known icing—so amendment 23-63 can be used for this assessment excluding loss of control and flight into known icing.

"Certification Basis Worksheet for Airplane Modifications on Airplanes with an Original Certification Basis prior to 23-64" (Appendix B) can be used to compare the current certification basis of an airplane with the amendment in effect at 23-63 for this assessment.

6.5 DDS IP.

This section supplements the following orders for projects using amendment 23-64:

- Order 8110.4C CHG 6, *Type Certification,* March 6, 2017.
- Order 8110.112A, *Standardized Procedures for Usage of Issue Papers and Development of Equivalent Levels of Safety Memorandums,* October 3, 2014.

If an applicant proposes a new DDS that is complex enough that it merits its own IP, a DDS IP can be used to obtain FAA acceptance. This would generally be appropriate for new/novel technology or new/novel certification approaches. The DDS IP template in Appendix C is a format that the applicant can use to provide the FAA the information needed to evaluate the DDS.

6.6 DDS Collector Document.

This section supplements the following orders for projects using amendment 23-64:

- Order 8110.4C CHG 6, *Type Certification,* March 6, 2017.
- Order 8110.112A, *Standardized Procedures for Usage of Issue Papers and Development of Equivalent Levels of Safety Memorandums,* October 3, 2014.

6.6.1 Overview.

The DDS Collector Document establishes the certification requirements for the project that will be used in the certification plan, compliance checklist, and other certification documents on TC, amended TC and STC projects that use amendment 23-64 extensively. The output of the DDS Collector Document will be used to create the DDS Summary Document, which will be listed in the TCDS and publicly available. The DDS Collector Document will be stored in an FAA database to aid ACO Branch access to the DDS used on amendment 23-64 projects. The example template in Appendix D contains a format, instructions, and examples for creating the DDS Collector Document. The DDS Collector Document is routed using the G-2 template in Appendix E

6.6.2 STC and ATC Projects Using Exclusively Previously Accepted DDS.

One way to document the DDS, instead of the DDS Collector Document, for STC/ATC projects that use previously accepted DDS is by including the DDS collector document table in the certification plan. The same information provided in the DDS Collector Document is required, but only for the regulations at amendment 23-64. Appendix F contains an example using the Project Specific Certification Plan (PSCP) format from *The FAA and Industry Guide to Product Certification*, Third Edition, May 2017.

Note, there are many potentially complex scenarios for STC/ATC projects not addressed by this example. Coordinate with AIR-600 for guidance on addressing unique scenarios.

6.7 Certification Plan & Compliance Checklist.

Supplements the following for projects using amendment 23-64:

- Order 8110.4C CHG 6, *Type Certification*, March 6, 2017.
- AC 21-40A, *Guide for Obtaining a Supplemental Type Certificate*, September 27, 2007.

The FAA accepted project DDS must be used to develop the certification plan, and documented in the compliance checklist (e.g., by adding an additional column).

6.8 Designee Forms and Process 8100-9/8110-3.

This section supplements the following orders for projects using amendment 23-64:

- Order 8110.37F, *Designated Engineering Representative (DER) Handbook*, August 31, 2017.
- Order 8100.15B, CHG 3, *Organization Designation Authorization Procedures*, June 15, 2018.

Order 8110.37F and Memo No. AIR-600-17-6F0-PM01provide instructions for listing the means of compliance (MOC) under § 23.2010 in addition to the regulations on forms 8110-3 and 8100-9 for amendment 23-64. The DDS are the means of compliance that should be listed on these forms, and other means of compliance like advisory circulars do not need to be listed.

6.9 Type Certificate Data Sheet (TCDS).

This section supplements Order 8110.4C CHG 6, *Type Certification*, March 6, 2017, for projects using amendment 23-64.

For projects using amendment 23-64, specify the § 23.2005 certification and performance level in the certification basis. An acceptable statement is:

"§ 23.2005 Certification Level and Performance Level: Level 2, Low Speed"

List the DDS Summary Document in the certification basis. An acceptable statement is:

> "The detailed design standards used as a means of compliance in accordance with § 23.2010 are documented in Airplane Manufacturer Report Number 12345 Revision X."

6.10 DDS Summary Document.

This section supplements Order 8110.4C CHG6, *Type Certification*, March 6, 2017, for projects using amendment 23-64

The DDS Summary Document contains the non-proprietary DDS from the DDS Collector Document and eliminates the Baseline DDS columns and Alternate/Additional DDS column from the first table, and the Rationale column from the second table. Appendix G shows an example DDS Summary Document format. It will be made publicly available in the Dynamic Regulatory System[6] (DRS).

6.11 Supplemental Type Certificate Form.

This section supplements Order 8110.4C CHG 6, *Type Certification*, March 6, 2017.

6.11.1 Changes that affect the § 23.2005 certification level, or performance level

For STCs that affect or change the Airplane Performance Level or Airplane Certification Level, note these levels explicitly in the Limitations and Conditions Section. An acceptable example statement is:

Limitations and Conditions

> "Incorporation of this STC makes the airplane Level 2, Low Speed for 14 CFR § 23.2005, and the number of passengers cannot be increased without addressing all applicable requirements for a higher level."

List the DDS Summary Document in the certification basis. An acceptable example statement is:

> "The detailed design standards used as a means of compliance in accordance with § 23.2010 are documented in Airplane Manufacturer Report Number 12345 Revision X."

6.12 Parts Manufacturer Approval (PMA).

Supplements the following orders for projects using amendment 23-64:

[6]The "Dynamic Regulatory System" (https://drs.faa.gov/) replaced the "Regulatory and Guidance Library" (RGL).

- Order 8110.42 CHG 1, *Parts Manufacturer Approval Procedures*, September 15, 2017.
- AC 21.303-04, *Application for Parts Manufacturer approval Via Tests and Computation or Identicality,* March 21, 2014.

For Test and Computation PMA projects using amendment 23-64, the DDS for each applicable amendment 23-64 regulation should be identified by the applicant and included in the compliance checklist. The DDS Collector Document Template in Appendix D lists previously accepted DDS that could be used by the applicant. The applicant is not required to use the same DDS used for the initial TC, but it may be helpful for the Project ACO Branch to review the DDS used for the TC. This will be documented in the DDS Summary Document.

Appendix A Terms and Definitions

Terms

Table A-1 defines the use of key terms in this guide. The table describes the intended functional impact.

Table A-1—Definition of Key Terms

	Regulatory Requirements	Acceptable Methods of Compliance (MOC)	Recommendations
Language	Must	Should	Recommend
Meaning	Refers to a regulatory requirement that is mandatory for design approval	Refers to instructions for a particular MOC	Refers to a recommended practice that is optional
Functional Impact	No Design Approval if not met	Alternative MOC has to be approved by IP.	None, because it is optional

Appendix B Amendment 23-64 Certification Basis Worksheet Template[1]

Certification Basis Worksheet for Airplane Modifications on Airplanes with an Original Certification Basis prior to 23-64

Company XXXX

Model xxx

Project xxxx

TCDS or STC xxxx

Revision (-)

Date xxxx xx, 20xx

[1] An updated template may be available by contacting the Policy and Innovation Division (AIR-600).

Introduction

This worksheet identifies, coordinates, and documents the certification basis for airplane projects that include certification basis of Title 14 of the Code of Federal Regulations (14 CFR) part 23 that include both amendment 23-64 regulations and amendments prior to 23-64. Completion of this worksheet may be used to coordinate with the FAA for completion of a § 21.101 evaluation against the current amendment of part 23 (amendment 23-64) or to voluntarily incorporate amendment 23-64 regulations into the airplane certification basis.

Title 14 CFR part 23, amendment 23-64, introduced performance-based regulations. Performance-based regulations do not contain the prescriptive language of prior amendments. In addition to replacing all the prescriptive regulation with performance-based regulations, the regulation numbers were extensively changed. That change makes it difficult to compare any pre-amendment 23-64 certification basis with the current performance-based regulations. The regulation language of amendment 23-64 and later contains the safety intent of the rule and requires a prescriptive DDS for each section to find compliance. The baseline level of safety needed for any DDS to be acceptable for showing compliance with amendment 23-64 are the prescriptive requirements contained in the language of part 23, amendment 23-63 with the following exceptions.[1]

- New design approaches and technologies are required to improve airplane stall characteristics and pilot situational awareness to prevent loss of control (LOC) accidents.

- Airplanes approved for flight into known icing, including supercooled large droplets (SLD) must demonstrate safe operations in SLD conditions.

- Airplanes approved for flight into known icing but prohibited from flight in SLD require a means for detecting SLD conditions and showing the airplane can safely avoid or exit such conditions.

- Airplanes limited to Day VFR operations with a maximum of 1 passenger that were previously approved using CS-VLA as special class airplanes, can be approved under amendment 23-64 as normal category airplanes with appropriate limitations.

When proposing changes to products with a certification basis prior to amendment 23-64, 14 CFR § 21.101 may require an evaluation of the certification basis for the areas of change. This worksheet provides a means to compare the baseline safety intent of amendment 23-64, which is the prescriptive language from amendment 23-63 (column 1 provided by the FAA) and the current amendment level of the product proposed for modification (column 2 completed by the applicant). For all areas of significant change where the applicant does not intend to step up to the latest amendment, a justification is needed (column 3 completed by the applicant), if stepping up to the latest amendment, no justification is required. For those regulations where the applicant

[1] See *Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and Commuter Category Airplanes.* Federal Register 81-251 (December 30, 2016) p. 96572. [81 FR 96572]. Available at: https://thefederalregister.org/81-FR/96572.

is applying amendment 23-64, identification of the associated rule number is needed (column 4 provided by the FAA). The worksheet documents the certification basis of the changed product agreed upon between the applicant and FAA (column 5). If the applicant is not using part 23, amendment 23-63 language as a DDS, the corresponding DDS shall be identified and accepted to in the DDS Collector Document (See section 6.6 of this guide).

For airplane modifications not affecting areas associated with stall characteristics, loss of control, flight into known icing or new and novel technologies not adequately covered by amendment 23-63 that would otherwise require special conditions, equivalent level of safety findings or exemptions, may utilize amendment 23-63 instead of 23-64 to satisfy any 21.101 evaluation. If any modification assessed against amendment 23-63 would require special conditions, equivalent level of safety findings or exemptions to be adequately addressed, then those areas of change must step up to amendment 23-64 so the appropriate requirements can be captured as DDS.

Definition of Terms Used in this Worksheet

- **Baseline Level of Safety** – The initial FAA-accepted DDS proposed for compliance with a majority of the applicable part 23, amendment 23-64, based on the prescriptive language contained part 23 amendment 23-63, except for areas involving loss of aerodynamic control and flight into known icing. The baseline level of safety was established in the preamble to the final rule 'Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and Commuter category Airplanes,' also known as part 23 amendment 23-64.[2]

- **Detailed Design Standard (DDS)** – Prescriptive standards, appropriate for the specific aircraft design which contain the means of compliance used to comply with the safety objectives of the performance-based regulations of 14 CFR part 23, amendment 23-64. The DDS is a set of design requirements used to comply with § 23.2010 and is of the same level of detail as prescriptive regulations.

- **DDS Collector Document** - A document used to coordinate and accept the DDS for a project.

- **Performance-Based Regulations (PBRs)** – 14 CFR part 23 regulations rewritten at amendment 23-64 to state a safety objective, rather than a prescriptive requirement.

- **Prescriptive Regulations (PRs)** – 14 CFR part 23 sections (regulations) prior to amendment 23-64. (**Note:** These prescriptive regulations contain sufficiently detailed language to allow compliance directly with each section (regulation) when applied to traditional designs that were prevalent at the time the regulations were written. These legacy prescriptive regulations are not sufficient nor appropriate for some modern designs.

[2] See [81 FR 96572].

Section 1 – General Description of Airplane and Systems

Provide a description of the airplane and all proposed changes to the airplane or its systems for the proposed amended or supplemental type design. The description should include all new or novel design features along with a general description of the airplane, its systems and a basic 3-view.

Section 2 – General Description of Intended Operations and Limitations

Provide a description of the intended operations and limitations for the airplane.

Section 3 – Identification of the Pre-Modification Certification Basis and the Certification Basis for the Proposed Modification

Identify the certification basis of the unmodified airplane along with any proposed changes to the certification basis needed to address the proposed modifications.

Company xxx, Model xxx proposed Certification Basis

(1) Former Regulation Associated with Airplane Baseline Level of Safety for 14 CFR 23 Amendment 23-64	(2) Pre-Modification Amendment Level	(3) Justification for use of a regulation with an amendment level prior to column 1. (If using the amendment level shown in column 1, no justification needed.)	(4) Corresponding 14 CFR 23 Amendment 23-64 Regulation(s)	(5) Final Certification Basis
§23.1457	These prescriptive regulations were not rewritten as performance-based regulations.			§23.1457
§23.1459				§23.1459
§23.1529				§23.1529
Subpart A	**General**			
§23.2000	If any performance-based amendment 23-64 regulations become part of the certification basis, these regulations must also become part of the certification basis.			§23.2000
§23.2005				§23.2005
§23.2010				§23.2010
Subpart B	**Flight**			
§23.21 @ 23-31	§23.21 @ 23-xx		§23.2100	DDS XXXXX
§23.23 @ 23-45	§23.23 @ 23-xx		§23.2100	
§23.25 @ 23-50	§23.25 @ 23-xx		§23.2100	
§23.29 @ 23.21	§23.29 @ 23.xx		§23.2100	
§23.31 @ 23-13	§23.31 @ 23-xx		§23.2100	
§23.33 @ 23-50	§23.3x @ 23-xx		§23.2400	

§23.45 @ 23-50	§23.45 @ 23-xx		§23.2105	
§23.49 @ 23-62	§23.49 @ 23-xx		§23.2110	
§23.51 @ 23.62	§23.51 @ 23.xx		§23.2115	
§23.53 @ 23-62	§23.53 @ 23-xx		§23.2115	
§23.55 @ 23-62	§23.55 @ 23-xx		§23.2115	
§23.57 @ 23-62	§23.57 @ 23-xx		§23.2115	
§23.59 @ 23-62	§23.59 @ 23-xx		§23.2115	
§23.61 @ 23-62	§23.61 @ 23-xx		§23.2115	
§23.63 @ 23-62	§23.63 @ 23-xx		§23.2120	
§23.65@ 23-62	§23.65@ 23-xx		§23.2120	
§23.66 @ 23-62	§23.66 @ 23-xx		§23.2125	
§23.67 @ 23-62	§23.67 @ 23-xx		§23.2120	
§23.69 @ 23-50	§23.67 @ 23-xx		§23.2125	
§23.71 @ 23-50	§23.71 @ 23-xx		§23.2125	
§23.73 @ 23-62	§23.73 @ 23-xx		§23.2130	
§23.75 @ 23-50	§23.75 @ 23-xx		§23.2130	
§23.77 @ 23-62	§23.77 @ 23-xx		§23.2120	
§23.141 @ 23-50	§23.141 @ 23-xx		§23.2135	

§23.143 @ 23-50	§23.143 @ 23-xx		§23.2135	
§23.145 @ 23-50	§23.145 @ 23-xx		§23.2135	
§23.147 @ 23-50	§23.147 @ 23-xx		§23.2135	
§23.149 @ 23-50	§23.149 @ 23-xx		§23.2135	
§23.151 @ 23-0	§23.151 @ 23-0		§23.2135	
§23.153 @ 23-50	§23.153 @ 23-xx		§23.2135	
§23.155 @ 23-50	§23.155 @ 23-xx		§23.2135	
§23.157 @ 23-50	§23.157 @ 23-xx		§23.2135	
§23.161 @ 23-50	§23.161 @ 23-xx		§23.2140	
§23.171 @ 23-0	§23.171 @ 23-0		§23.2145	
§23.173 @ 23-34	§23.173 @ 23-xx		§23.2145	
§23.175 @ 23-50	§23.175 @ 23-xx		§23.2145	
§23.177 @ 23-62	§23.177 @ 23-xx		§23.2145	
§23.179 @ 23-45	§23.179 @ 23-xx		§23.2145	
§23.181 @ 23-62	§23.181 @ 23-xx		§23.2145	
§23.201 @ 23-62	§23.201 @ 23-xx		§23.2150	

§23.203 @ 23-62	§23.203 @ 23-xx		§23.2150	
§23.207 @ 23-50	§23.207 @ 23-xx		§23.2150	
§23.221 @ 23-50	§23.221 @ 23-xx		§23.2150	
§23.231 @ 23-0	§23.231 @ 23-0		§23.2155	
§23.233 @ 23-50	§23.233 @ 23-xx		§23.2155	
§23.235 @ 23-50	§23.235 @ 23-xx		§23.2155	
§23.237 @ 23-50	§23.237 @ 23-xx		§23.2155	
§23.239 @ 23-00	§23.239 @ 23-0		§23.2155	
§23.251 @ 23-62	§23.251 @ 23-xx		§23.2160	
§23.253 @ 23-62	§23.253 @ 23-xx		§23.2160	
§23.255 @ 23-62	§23.255 @ 23-xx		§23.2160, §23.2165	
Subpart C	**Structures**			
§23.301 @ 23-48	§23.301 @ 23-xx		§23.2210, §23.2230	
§23.302 @ 23-42	§23.302 @ 23-xx		§23.2210	
§23.303 @ 23-0	§23.303 @ 23-0		§23.2230	
§23.305 @ 23-45	§23.305 @ 23-xx		§23.2235, §23.2205	
§23.307 @ 23-0	§23.307 @ 23-0		§23.2235	

§23.321 @ 23-45	§23.321 @ 23-xx		§23.2200, §23.2210	
§23.331 @ 23-42	§23.331 @ 23-xx		§23.2210	
§23.333 @ 23-34	§23.333 @ 23-xx		§23.2200, §23.2215	
§23.335 @ 23-48	§23.335 @ 23-xx		§23.2200	
§23.337 @ 23-48	§23.337 @ 23-xx		§23.2200	
§23.341 @ 23-48	§23.341 @ 23-xx		§23.2215	
§23.343 @ 23-48	§23.343 @ 23-xx		§23.2200	
§23.345 @ 23-48	§23.345 @ 23-xx		§23.2225	
§23.347 @ 23-48	§23.347 @ 23-xx		§23.2215	
§23.349 @ 23-48	§23.349 @ 23-xx		§23.2215	
§23.351 @ 23-42	§23.351 @ 23-xx		§23.2215	
§23.361 @ 23-45	§23.361 @ 23-xx		§23.2225	
§23.363 @ 23-00	§23.363 @ 23-xx		§23.2225	
§23.365 @ 23-00	§23.365 @ 23-xx		§23.2225, §23.2240	
§23.367 @ 23-7	§23.367 @ 23-x		§23.2215	
§23.369 @ 23-48	§23.369 @ 23-xx		§23.2210	

§23.371 @ 23-48	§23.371 @ 23-xx		§23.2225	
§23.373 @ 23-7	§23.373 @ 23-x		§23.2225	
§23.391 @ 23-48	§23.391 @ 23-xx		§23.2225	
§23.393 @ 23-48	§23.393 @ 23-xx		§23.2225	
§23.395 @ 23-7	§23.395 @ 23-x		§23.2225	
§23.397 @ 23-45	§23.397 @ 23-xx		§23.2225	
§23.399 @ 23-48	§23.399 @ 23-xx		§23.2225	
§23.405 @ 23-0	§23.405 @ 23-0		§23.2225	
§23.407 @ 23-0	§23.407 @ 23-0		§23.2225	
§23.409 @ 23-0	§23.409 @ 23-0		§23.2225	
§23.415 @ 23-48	§23.415 @ 23-xx		§23.2225	
§23.421 @ 23-42	§23.421 @ 23-xx		§23.2210, §23.2215	
§23.423 @ 23-42	§23.423 @ 23-xx		§23.2225	
§23.425 @ 23-42	§23.425 @ 23-xx		§23.2225	
§23.427 @ 23-42	§23.427 @ 23-xx		§23.2225	
§23.441 @ 23-48	§23.441 @ 23-xx		§23.2225	
§23.443 @ 23-48	§23.443 @ 23-xx		§23.2225	

§23.445 @ 23-42	§23.445 @ 23-xx		§23.2210, §23.2215, §23.2225	
§23.455 @ 23-48	§23.455 @ 23-xx		§23.2225	
§23.459 @ 23-0	§23.459 @ 23-0		§23.2225	
§23.471 @ 23-0	§23.471 @ 23-0		§23.2220	
§23.473 @ 23-48	§23.473 @ 23-xx		§23.2220	
§23.477 @ 23-0	§23.477 @ 23-0		§23.2220	
§23.479 @ 23-45	§23.479 @ 23-xx		§23.2220	
§23.481 @ 23-0	§23.481 @ 23-0		§23.2220	
§23.483 @ 23-0	§23.483 @ 23-0		§23.2220	
§23.485 @ 23-45	§23.485 @ 23-xx		§23.2220	
§23.493 @ 23-0	§23.493 @ 23-0		§23.2220	
§23.497 @ 23-48	§23.497 @ 23-xx		§23.2220	
§23.505 @ 23-7	§23.505 @ 23-x		§23.2220	
§23.507 @ 23-14	§23.507 @ 23-xx		§23.2220	
§23.509 @ 23-14	§23.509 @ 23-xx		§23.2220	
§23.511 @ 23-7	§23.511 @ 23-x		§23.2220	
§23.521 @ 23-48	§23.521 @ 23-xx		§23.2220	

§23.523 @ 23-45	§23.523 @ 23-xx		§23.2220	
§23.525 @ 23-45	§23.525 @ 23-xx		§23.2220	
§23.527 @ 23-45	§23.527 @ 23-xx		§23.2220	
§23.529 @ 23-45	§23.529 @ 23-xx		§23.2220	
§23.531 @ 23-45	§23.531 @ 23-xx		§23.2220	
§23.533 @ 23-45	§23.533 @ 23-xx		§23.2220	
§23.535 @ 23-45	§23.535 @ 23-xx		§23.2220	
§23.537 @ 23-45	§23.537 @ 23-xx		§23.2220	
§23.561 @ 23-62	§23.561 @ 23-xx		§23.2270	
§23.562 @ 23-62	§23.562 @ 23-xx		§23.2270	
§23.571 @ 23-62	§23.571 @ 23-xx		§23.2240	
§23.572 @ 23-48	§23.572 @ 23-xx		§23.2240	
§23.573 @ 23-48	§23.573 @ 23-xx		§23.2240	
§23.574 @ 23-48	§23.574 @ 23-xx		§23.2240	
§23.575 @ 23-48	§23.575 @ 23-xx		§23.2240	
Subpart D	**Design and Construction**			

§23.601 @ 23-0	§23.601 @ 23-0		§23.2250	
§23.603 @ 23-23	§23.603 @ 23-xx		§23.2250, §23.2260	
§23.605 @ 23-23	§23.605 @ 23-xx		§23.2260	
§23.607 @ 23-48	§23.607 @ 23-xx		§23.2250, §23.2255	
§23.609 @ 23-0	§23.609 @ 23-0		§23.2255	
§23.611 @ 23-48	§23.611 @ 23-xx		§23.2255	
§23.613 @ 23-45	§23.613 @ 23-xx		§23.2260	
§23.615 @ 23-45	§23.615 @ 23-xx		§23.2265	
§23.617 @ 23-7	§23.617 @ 23-x		§23.2265	
§23.619 @ 23-7	§23.619 @ 23-x		§23.2265	
§23.621 @ 23-45	§23.621 @ 23-xx		§23.2265	
§23.623 @ 23-7	§23.623 @ 23-xx		§23.2265	
§23.625 @ 23-7	§23.625 @ 23-xx		§23.2265	
§23.627 @ 23-0	§23.627 @ 23-0		§23.2240	
§23.629 @ 23-62	§23.629 @ 23-xx		§23.2245	
§23.641 @ 23-0	§23.641 @ 23-0		§23.2235	
§23.651 @ 23-0	§23.651 @ 23-0		§23.2235	

§23.655 @ 23-45	§23.655 @ 23-xx		§23.2300	
§23.657 @ 23-48	§23.657 @ 23-xx		§23.2265	
§23.659 @ 23-0	§23.659 @ 23-0		§23.2216, §23.2335	
§23.671 @ 23-0	§23.671 @ 23-0		§23.2300, §23.2600, §23.2605	
§23.672 @ 23-45	§23.672 @ 23-xx		§23.2300, §23.2510, §23.2605	
§23.673 @ 23-48	§23.673 @ 23-xx		§23.2300	
§23.675 @ 23-17	§23.675 @ 23-xx		§23.2300	
§23.677 @ 23-49	§23.677 @ 23-xx		§23.2245, §23.2300, §23.2515 §23.2600	
§23.679 @ 23-45	§23.679 @ 23-xx		§23.2300, §23.2605	
§23.681 @ 23-0	§23.681 @ 23-0		§23.2225, §23.2235, §23.2265	
§23.683 @ 23-7	§23.683 @ 23-xx		§23.2250, §23.2300	
§23.685 @ 23-17	§23.685 @ 23-xx		§23.2300	
§23.687 @ 23-0	§23.687 @ 23-0		§23.2245, §23.2250, §23.2300	

§23.689 @ 23-7	§23.689 @ 23-xx		§23.2250, §23.2255	
§23.691 @ 23-49	§23.691 @ 23-xx		§23.2250, §23.2300, §23.2510, §23.2605	
§23.693 @ 23-0	§23.693 @ 23-0		§23.2265	
§23.697 @ 23-49	§23.697 @ 23-xx		§23.2300	
§23.699 @ 23-0	§23.699 @ 23-0		§23.2600	
§23.701 @ 23-49	§23.701 @ 23-xx		§23.2300, §23.2510	
§23.703 @ 23-62	§23.703 @ 23-xx		§23.2605	
§23.721 @ 23-34	§23.721 @ 23-xx		§23.2305, §23.2430	
§23.723 @ 23-49	§23.723 @ 23-xx		§23.2235, §23.2250	
§23.725 @ 23-48	§23.725 @ 23-xx		§23.2235	
§23.726 @ 23-7	§23.726 @ 23-xx		§23.2235	
§23.727 @ 23-7	§23.727 @ 23-xx		§23.2235, §23.2250	
§23.729 @ 23-49	§23.729 @ 23-xx		§23.2235, §23.2305, §23.2505, §23.2600, §23.2605,	
§23.731 @ 23-45	§23.731 @ 23-xx		§23.2220, §23.2250	

§23.733 @ 23-45	§23.733 @ 23-xx		§23.2250, §23.2610	
§23.735 @ 23-62	§23.735 @ 23-xx		§23.2250, §23.2305, §23.2510	
§23.737 @ 23-45	§23.737 @ 23-xx		§23.2235	
§23.745 @ 23-49	§23.745 @ 23-xx		§23.2305, §23.2600	
§23.751 @ 23-45	§23.751 @ 23-xx		§23.2310	
§23.753 @ 23-45	§23.753 @ 23-xx		§23.2220	
§23.755 @ 23-48	§23.755 @ 23-xx		§23.2310	
§23.757 @ 23-0	§23.757 @ 23-0		§23.2310	
§23.771 @ 23-14	§23.771 @ 23-xx		§23.2320, §23.2600	
§23.773 @ 23-63	§23.773 @ 23-xx		§23.2600	
§23.775 @ 23-49	§23.775 @ 23-xx		§23.2250, §23.2320, §23.2510, §23.2540, §23.2600	
§23.777 @ 23-62	§23.777 @ 23-xx		§23.2600, §23.2610	
§23.779 @ 23-51	§23.779 @ 23-xx		§23.2600	
§23.781 @ 23-33	§23.781 @ 23-xx		§23.2600	

§23.783 @ 23-49	§23.783 @ 23-xx		§23.2250, §23.2315, §23.2605	
§23.785 @ 23-49	§23.785 @ 23-xx		§23.2265, §23.2270	
§23.787 @ 23-49	§23.787 @ 23-xx		§23.2270, §23.2315	
§23.791 @ 23-49	§23.791 @ 23-xx		§23.2320,	
§23.803 @ 23-46	§23.803 @ 23-xx		§23.2315	
§23.805 @ 23-46	§23.805 @ 23-xx		§23.2315	
§23.807 @ 23-62	§23.807 @ 23-xx		§23.2351, §23.2250	
§23.811 @ 23-46	§23.811 @ 23-xx		§23.2315	
§23.812 @ 23-46	§23.812 @ 23-xx		§23.2315	
§23.813 @ 23-46	§23.813 @ 23-xx		§23.2315	
§23.815 @ 23-46	§23.815 @ 23-xx		§23.2315	
§23.831 @ 23-62	§23.831 @ 23-xx		§23.2320, §23.2510, §23.2600	
§23.841 @ 23-62	§23.841 @ 23-xx		§23.2320, §23.2505, §23.2510, §23.2605, §23.2610	
§23.843 @ 23-0	§23.843 @ 23-0		§23.2225, §23.2236,	

			§23.2320, §23.2505	
§23.851 @ 23-45	§23.851 @ 23-xx		§23.2325	
§23.853 @ 23-62	§23.853 @ 23-xx		§23.2325	
§23.855 @ 23-49	§23.855 @ 23-xx		§23.2325	
§23.856 @ 23-62	§23.856 @ 23-xx		§23.2325	
§23.859 @ 23-27	§23.859 @ 23-xx		§23.2255, §23.2325	
§23.863 @ 23-34	§23.863 @ 23-xx		§23.2325	
§23.865 @ 23-48	§23.865 @ 23-xx		§23.2330	
§23.867 @ 23-49	§23.867 @ 23-xx		§23.2335	
§23.871 @ 23-27	§23.871 @ 23-xx		§23.2100	
Subpart E	**Powerplant**			
§23.901 @ 23-53	§23.901 @ 23-xx		§23.2400	
§23.903 @ 23-62	§23.903 @ 23-xx		§23.2400, §23.2410, §23.2425	
§23.904 @ 23-43	§23.904 @ 23-xx		§23.2405	
§23.905 @ 23-59	§23.905 @ 23-xx		§23.2400, §23.2425	
§23.907 @ 23-59	§23.907 @ 23-xx		§23.2400	

§23.909 @ 23-43	§23.909 @ 23-xx		§23.2400, §23.2425, §23.2620	
§23.925 @ 23-51	§23.925 @ 23-xx		§23.2400	
§23.929 @ 23-51	§23.929 @ 23-xx		§23.2415	
§23.933 @ 23-51	§23.933 @ 23-xx		§23.2420	
§23.934 @ 23-43	§23.934 @ 23-xx		§23.2420	
§23.937 @ 23-43	§23.937 @ 23-xx		§23.2410	
§23.939 @ 23-42	§23.939 @ 23-xx		§23.2425	
§23.943 @ 23-43	§23.943 @ 23-xx		§23.2425	
§23.951 @ 23-43	§23.951 @ 23-xx		§23.2430	
§23.953 @ 23-43	§23.953 @ 23-xx		§23.2430	
§23.954 @ 23-7	§23.954 @ 23-xx		§23.2430	
§23.955 @ 23-51	§23.955 @ 23-xx		§23.2430	
§23.957 @ 23-43	§23.957 @ 23-xx		§23.2430	
§23.959 @ 23-51	§23.959 @ 23-xx		§23.2430	
§23.961 @ 23-43	§23.961 @ 23-xx		§23.2430	
§23.963 @ 23-51	§23.963 @ 23-xx		§23.2400, §23.2430	

§23.965 @ 23-51	§23.965 @ 23-xx		§23.2430	
§23.967 @ 23-43	§23.967 @ 23-xx		§23.2400, §23.2430	
§23.969 @ 23-0	§23.969 @ 23-0		§23.2430	
§23.971 @ 23-43	§23.971 @ 23-xx		§23.2430	
§23.973 @ 23-51	§23.973 @ 23-xx		§23.2430	
§23.975 @ 23-51	§23.975 @ 23-xx		§23.2415, §23.2430	
§23.977 @ 23-43	§23.977 @ 23-xx		§23.2430	
§23.979 @ 23-51	§23.979 @ 23-xx		§23.2400, §23.2430	
§23.991 @ 23-43	§23.991 @ 23-xx		§23.2430, §23.2605	
§23.993 @ 23-43	§23.993 @ 23-xx		§23.2430	
§23.994 @ 23-29	§23.994 @ 23-xx		§23.2430	
§23.995 @ 23-29	§23.995 @ 23-xx		§23.2430	
§23.997 @ 23-43	§23.997 @ 23-xx		§23.2400, §23.2430	
§23.999 @ 23-43	§23.999 @ 23-xx		§23.2430	
§23.1001 @ 23-51	§23.1001 @ 23-xx		§23.2400, §23.2430, §23.2610	
§23.1011 @ 23-43	§23.1011 @ 23-xx		§23.2400	

§23.1013 @ 23-51	§23.1013 @ 23-xx		§23.2400	
§23.1015 @ 23-15	§23.1015 @ 23-xx		§23.2400	
§23.1017 @ 23-14	§23.1017 @ 23-xx		§23.2400	
§23.1019 @ 23-43	§23.1019 @ 23-xx		§23.2400, §23.2600	
§23.1021 @ 23-43	§23.1021 @ 23 xx		§23.2400	
§23.1023 @ 23-0	§23.1023 @ 23-0		§23.2400	
§23.1027 @ 23-43	§23.1027 @ 23-xx		§23.2400	
§23.1041 @ 23-51	§23.1041 @ 23-xx		§23.2400	
§23.1043 @ 23-51	§23.1043 @ 23-xx		§23.2400	
§23.1045 @ 23-51	§23.1045 @ 23-xx		§23.2400	
§23.1047 @ 23-51	§23.1047 @ 23-xx		§23.2400	
§23.1061 @ 23-43	§23.1061 @ 23-xx		§23.2400	
§23.1063 @ 23-0	§23.1063 @ 23-0		§23.2400	
§23.1091 @ 23-0	§23.1091 @ 23-0		§23.2435	
§23.1093 @ 23-51	§23.1093 @ 23-xx		§23.2415	
§23.1095 @ 23-0	§23.1095 @ 23-0		§23.2415	

§23.1097 @ 23-0	§23.1097 @ 23-0		§23.2415	
§23.1099 @ 23-0	§23.1099 @ 23-0		§23.2415	
§23.1101 @ 23-43	§23.1101 @ 23-xx		§23.2400, §23.2435	
§23.1103 @ 23-43	§23.1103 @ 23-xx		§23.2435	
§23.1105 @ 23-51	§23.1105 @ 23-xx		§23.2435	
§23.1107 @ 23-51	§23.1107 @ 23-xx		§23.2435	
§23.1109 @ 23-42	§23.1109 @ 23-xx		§23.2400	
§23.1111 @ 23-17	§23.1111 @ 23-xx		§23.2400	
§23.1121 @ 23-51	§23.1121 @ 23-xx		§23.2435	
§23.1123 @ 23-43	§23.1123 @ 23-xx		§23.2435	
§23.1125 @ 23-17	§23.1125 @ 23-xx		§23.2400, §23.2435	
§23.1141 @ 23-51	§23.1141 @ 23-xx		§23.2270, §23.2400, §23.2410, §23.2440, §23.2500, §23.2535, §23.2600	
§23.1142 @ 23-43	§23.1142 @ 23-xx		§23.2425, §23.2600, §23.2605, §23.2615	

§23.1143 @ 23-51	§23.1143 @ 23-xx		§23.2410, §23.2600	
§23.1145 @ 23-43	§23.1145 @ 23-xx		§23.2425, §23.2600	
§23.1147 @ 23-43	§23.1147 @ 23-xx		§23.2600	
§23.1149 @ 23-0	§23.1149 @ 23-0		§23.2600	
§23.1153 @ 23-51	§23.1153 @ 23-xx		§23.2600	
§23.1155 @ 23-7	§23.1155 @ 23-x		§23.2600	
§23.1157 @ 23-0	§23.1157 @ 23-0		§23.2600	
§23.1163 @ 23-42	§23.1163 @ 23-xx		§23.2400	
§23.1165 @ 23-62	§23.1165 @ 23-xx		§23.2400, §23.2425, §23.2605	
§23.1181 @ 23-51	§23.1181 @ 23 xx		§23.2440	
§23.1182 @ 23-14	§23.1182 @ 23-xx		§23.2440	
§23.1183 @ 23-51	§23.1183 @ 23-xx		§23.2440	
§23.1189 @ 23-43	§23.1189 @ 23-xx		§23.2440	
§23.1191 @ 23-51	§23.1191 @ 23-xx		§23.2440	
§23.1192 @ 23-14	§23.1192 @ 23-xx		§23.2440	
§23.1193 @ 23-62	§23.1193 @ 23-xx		§23.2440	

§23.1195 @ 23-62	§23.1195 @ 23-xx		§23.2440	
§23.1197 @ 23-62	§23.1197 @ 23-xx		§23.2400, §23.2440	
§23.1199 @ 23-62	§23.1199 @ 23-xx		§23.2400	
§23.1201 @ 23-62	§23.1201 @ 23-xx		§23.2400	
§23.1203 @ 23-62	§23.1203 @ 23-xx		§23.2400, §23.2440, §23.2500, §23.2600	
Subpart F				
§23.1301 @ 23-62	§23.1301 @ 23-xx		§23.2250, §23.2500, §23.2505, §23.2605	
§23.1303 @ 23-62	§23.1303 @ 23-xx		§23.2500, §23.2615, §23.2525	
§23.1305 @ 23-52	§23.1305 @ 23-xx		§23.2500, §23.2605, §23.2615	
§23.1306 @ 23-61	§23.1306 @ 23-xx		§23.2515	
§23.1307 @ 23-49	§23.1307 @ 23-xx		§23.2500, §23.2610	
§23.1308 @ 23-57	§23.1308 @ 23-xx		§23.2520	
§23.1309 @ 23-62	§23.1309 @ 23-xx		§23.2500, §23.2510, §23.2605	

§23.1310 @ 23-62	§23.1310 @ 23-xx		§23.2525	
§23.1311 @ 23-62	§23.1311 @ 23-xx		§23.2500, §23.2615	
§23.1321 @ 23-49	§23.1321 @ 23-xx		§23.2500, §23.2610	
§23.1322 @ 23-43	§23.1322 @ 23-xx		§23.2605	
§23.1323 @ 23-62	§23.1323 @ 23-xx		§23.2250, §23.2500, §23.2505, §23.2510, §23.2615	
§23.1325 @ 23-50	§23.1325 @ 23-xx		§23.2250, §23.2500, §23.2510, §23.2540, §23.2615	
§23.1326 @ 23-49	§23.1326 @ 23-xx		§23.2605	
§23.1327 @ 23-20	§23.1327 @ 23-xx		§23.2500, §23.2505, §23.2615	
§23.1329 @ 23-49	§23.1329 @ 23-xx		§23.2300, §23.2500, §23.2505, §23.2510, §23.2600, §23.2605	
§23.1331 @ 23-62	§23.1331 @ 23-xx		§23.2510, §23.2525, §23.2605	

§23.1335 @ 23-20	§23.1335 @ 23-xx		§23.2500, §23.2505, §23.2510, §23.2600, §23.2605	
§23.1337 @ 23-51	§23.1337 @ 23-xx		§23.2325, §23.2430, §23.2605, §23.2610, §23.2615	
§23.1351 @ 23-49	§23.1351 @ 23-xx		§23.2500, §23.2525, §23.2325, §23.2605	
§23.1353 @ 23-62	§23.1353 @ 23-xx		§23.2525	
§23.1357 @ 23-43	§23.1357 @ 23-xx		§23.2500, §23.2505, §23.2510, §23.2525	
§23.1359 @ 23-49	§23.1359 @ 23-xx		§23.2330, §23.2325, §23.2330,	
§23.1361 @ 23-49	§23.1361 @ 23-xx		§23.2500, §23.2505	
§23.1365 @ 23-49	§23.1365 @ 23-xx		§23.2330, §23.2505	
§23.1367 @ 23-0	§23.1367 @ 23-0		§23.2505, §23.2600	
§23.1381 @ 23-0	§23.1381 @ 23-0		§23.2500, §23.2600	
§23.1383 @ 23-49	§23.1383 @ 23-xx		§23.2325, §23.2530	

§23.1385 @ 23-43	§23.1385 @ 23-xx		§23.2325, §23.2530	
§23.1387 @ 23-43	§23.1387 @ 23-xx		§23.2530	
§23.1389 @ 23-43	§23.1389 @ 23-xx		§23.2530	
§23.1391 @ 23-43	§23.1391 @ 23 xx		§23.2530	
§23.1393 @ 23-43	§23.1393 @ 23-xx		§23.2530	
§23.1395 @ 23-43	§23.1395 @ 23-xx		§23.2530	
§23.1397 @ 23-11	§23.1397 @ 23-xx		§23.2530	
§23.1399 @ 23-0	§23.1399 @ 23-0		§23.2530	
§23.1401 @ 23-49	§23.1401 @ 23-xx		§23.2530	
§23.1411 @ 23-36	§23.1411 @ 23-xx		§23.2270, §23.2530	
§23.1415 @ 23-0	§23.1415 @ 23-0		§23.2535	
§23.1416 @ 23-23	§23.1416 @ 23-xx		§23.2500, §23.2505, §23.2605	
§23.1419 @ 23-43	§23.1419 @ 23-xx		§23.2165, §23.2540, §23.2600	
§23.1431 @ 23-62	§23.1431 @ 23-xx		§23.2510	
§23.1435 @ 23-49	§23.1435 @ 23-xx		§23.2235, §23.2250, §23.2440,	

			§23.2543, §23.2600	
§23.1437 @ 23-0	§23.1437 @ 23-0		§23.2410, §23.2515	
§23.1438 @ 23-20	§23.1438 @ 23-xx		§23.2545	
§23.1441 @ 23-43	§23.1441 @ 23-xx		§23.2320, §23.2605	
§23.1443 @ 23-62	§23.1443 @ 23-xx		§23.2320	
§23.1445 @ 23-62	§23.1445 @ 23-xx		§23.2250, §23.2320	
§23.1447 @ 23-62	§23.1447 @ 23-xx		§23.2320	
§23.1449 @ 23-9	§23.1449 @ 23-x		§23.2320	
§23.1450 @ 23-20	§23.1450 @ 23-xx		§23.2320, §23.2610	
§23.1451 @ 23-49	§23.1451 @ 23-xx		§23.2320	
§23.1453 @ 23-49	§23.1453 @ 23-xx		§23.2320, §23.2545	
§23.1461 @ 23-49	§23.1461 @ 23-xx		§23.2550	
Subpart G	**Flightcrew Interface and Other Info.**			
§23.1501 @ 23-21	§23.1501 @ 23-xx		§23.2610	
§23.1505 @ 23-7	§23.1505 @ 23-x		§23.2610	
§23.1507 @ 23-45	§23.1507 @ 23-xx		§23.2610	

§23.1511 @ 23-50	§23.1511 @ 23-xx		§23.2610	
§23.1513 @ 23-0	§23.1513 @ 23-0		§23.2610	
§23.1519 @ 23-0	§23.1519 @ 23-0		§23.2610	
§23.1521 @ 23-50	§23.1521 @ 23-xx		§23.2610	
§23.1522 @ 23-45	§23.1522 @ 23-xx		§23.2610	
§23.1523 @ 23-34	§23.1523 @ 23-xx		§23.2610	
§23.1524 @ 23-10	§23.1524 @ 23-xx		§23.2610	
§23.1525 @ 23-45	§23.1525 @ 23-xx		§23.2610	
§23.1527 @ 23-45	§23.1527 @ 23-xx		§23.2610	
§23.1541 @ 23-21	§23.1541 @ 23-xx		§23.2610	
§23.1543 @ 23-50	§23.1543 @ 23-xx		§23.2610	
§23.1545 @ 23-62	§23.1545 @ 23-xx		§23.2610	
§23.1547 @ 23-20	§23.1547 @ 23-xx		§23.2610	
§23.1549 @ 23-45	§23.1549 @ 23-xx		§23.2610	
§23.1551 @ 23-0	§23.1551 @ 23-0		§23.2610	
§23.1553 @ 23-50	§23.1553 @ 23-xx		§23.2610	

§23.1555 @ 23-62	§23.1555 @ 23-xx		§23.2610	
§23.1557 @ 23-45	§23.1557 @ 23-xx		§23.2610	
§23.1559 @ 23-62	§23.1559 @ 23-xx		§23.2610	
§23.1561 @ 23-0	§23.1561 @ 23-0		§23.2610	
§23.1563 @ 23-62	§23.1563 @ 23-xx		§23.2610	
§23.1567 @ 23-62	§23.1567 @ 23-xx		§23.2610	
§23.1581 @ 23-50	§23.1581 @ 23-xx		§23.2620	
§23.1583 @ 23-62	§23.1583 @ 23-xx		§23.2620	
§23.1585 @ 23-62	§23.1585 @ 23-xx		§23.2620	
§23.1587 @ 23-62	§23.1587 @ 23-xx		§23.2620	
§23.1589 @ 23-50	§23.1589 @ 23-xx		§23.2620	

Appendix C DDS Issue Paper Template[1]

ISSUE PAPER

PROJECT:	**ITEM:** **STAGE:** 2
REG. REF.: Title 14 CFR Part 23.2010, 23.XXXX [Regulation that DDS will apply to]	**DATE:**
NATIONAL POLICY REF.: **AC 23.2010-1, Policy Statement XXXXX**	**ISSUE STATUS:** OPEN
SUBJECT:	**BRANCH ACTION:**
	COMPLIANCE TARGET: **Pre-Type Certification**

23.2010 Means of Compliance

STATEMENT OF ISSUE:

This issue paper will be used to coordinate acceptance or comments for new Detailed Design Standards proposed by [Applicant] on the [Model].

BACKGROUND:

Airworthiness Standards in Title 14 of the Code of Federal Regulations (14 CFR) Part 23 at amendment 23-64 were restructured such that they are now performance-based. The general language contained in 23-64 provides the flexibility to address new technology without special conditions, exemptions, and equivalent safety findings. However, the requirements are not detailed enough to stand on their own, and § 23.2010(a) requires the applicant to use means of compliance accepted by the Administrator. The means of compliance required by § 23.2010 are called Detailed Design Standards (DDS) to distinguish them from the means of compliance in advisory circulars, policy memorandums, or directives. The preamble to amendment 23-64 explained that the means of compliance must maintain the level of safety established in amendment 23-63 at the aircraft level with certain exceptions.[2]

[1] An updated template may be available by contacting the Policy and Innovation Division (AIR-600).

[2] A higher level of safety than amendment 23-63 must be provided for loss of control and for flight into known icing. The level of safety may be lower than amendment 23-63 for some low speed Level 1 airplanes with limitations, but not lower than CS-VLA. This is discussed in the preamble to the final rule, published in the Federal Register on December 30, 2016. See *Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and*

FAA POSITION (Stage 2 – TBD):

Section 23.2010(b) requires applicants to provide the means of compliance to the FAA in a form and manner acceptable to the Administrator. The outline provided in the Applicant Position can be used to meet this requirement. The following outline is an acceptable format for proposing a DDS for FAA acceptance.

1.0 Sections of part 23 amendment 23-64 that the DDS will be used for.

2.0 Description of the aircraft, design features, operations, or other information pertinent to the DDS.

3.0 Currently accepted DDS relevant to the regulations in Section 1.0 and the description in Section 2.0.[3]

4.0 Reasons that using the currently accepted DDS would be impossible, impractical, or undesirable.

5.0 Proposed DDS.
The level of detail should generally be similar to that provided in amendment 23-63 and special conditions. Information that cannot be made available to the public should not be included in the proposed DDS, similar to information that is shared in Memo's documenting Equivalent Level of Safety Findings.

6.0 Explanation of how DDS maintains the level of safety with part 23 amendment 23-63 at the aircraft level.
The information provided should be sufficient that the FAA can determine that accepting the proposed DDS would maintain the level of safety.[2]

7.0 Currently accepted guidance applicable to the proposed DDS
ACs, policy memos, design standards, and other directives relevant to the DDS

8.0 If the currently accepted guidance is not adequate to implement the proposed DDS, describe how it will be implemented.

This can go into more detail than the DDS, but should be kept separate so that the DDS can be made publicly available. This section can be used to address the kinds of issues documented in Methods of Compliance issue papers described in Order 8110.112.

APPLICANT'S POSITION (Stage 3 – TBD):

Commuter Category Airplanes. Federal Register 81-251 (December 30, 2016) p. 96572. [81 FR 96572]. Available at: https://thefederalregister.org/81-FR/96572.

[3] Refer to the preamble to the final rule; see [81 FR 96572], and ASTM Consensus Standards at: https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/media/part_23_moc.pdf .

CONCLUSION (Stage 4 – TBD):

Policy and Innovation Division **Date**
Aircraft Certification Service

CONTACTS:

TITLE	NAME	PHONE
Project Manager		
Project Officer		

Appendix D DDS Collector Document Template[1]

Black Text is prepopulated information, Blue text will be filled out by the applicant

The **"Baseline DDS Language of Part 23 regulations as of 23-63"** column in the Section 4 table is based on the cross reference table contained in the final rule.

The **"Baseline DDS ASTM F44 Standards"** column is incomplete and subject to change. This cross reference will ultimately be consistent with the cross reference table being added to each F44 standard in the form of an Annex and will reference specific sections of each F44 standard.

The applicant will fill out the **"Applicant Proposed Alternative or Additional DDS"** and **"Applicant Proposed Project DDS"** columns in the Section 4 table.

The applicant will fill out the **"Justification for Applicant Proposed Alternative or Additional DDS"** table in Section 5 if any DDS is proposed which differs from the accepted baseline DDS

NOTE: This template is intended to be used on projects for traditional part 23 airplanes. Novel designs require evaluation and may require modification of the template.

[1] An updated template may be available by contacting the Policy and Innovation Division (AIR-600).

Detailed Design Standard Collector Document

Company xxxx

Model xxxx

Project xxxx

TCDS xxxx

Revision (-)

Date xxxx xx, 20xx

Introduction

This document identifies, coordinates and documents acceptance of the § 23.2010 FAA accepted means of compliance (DDS) for any airplane project that includes Title 14 of the Code of Federal Regulations (14 CFR) part 23, amendment 23-64 in the certification basis.

The accepted ASTM F44 standards, a portion of the baseline DDS referenced in this document, are those standards accepted by Notice No. 23-20-01-NOA, published in the Federal Register on September 22, 2020.[1] Not all ASTM F44 standards accepted by Notice No. 23-20-01-NOA are acceptable as published. Exceptions to the published standards are available on the FAA website.[2]

The language contained in 14 CFR part 23 amendment 23-63, another portion of the baseline DDS referenced in this document, are accepted by the FAA as DDS for amendment 23-64.

Note: Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and Commuter Category Airplanes, Final Rule published in the Federal Register on December 30, 2016,[3] identified the prescriptive requirements in former part 23, amendment 23-62 as an accepted means of compliance except for those sections where the level of safety has increased, specifically for stall characteristics and icing protection. The language in amendment 23-62 established the minimum level of safety required for all means of compliance proposed for compliance with amendment 23-64. The release of amendment 23-63 prior to the effective date of amendment 23-64 added requirements for Enhanced Flight Vision Systems to § 23.773. This change did not affect the level of safety established in amendment 23-62 and only provided requirements for an optional system, therefore reference to amendment 23-63 is considered equivalent to amendment 23-62 as an acceptable as a means of compliance to amendment 23-64 and will be used throughout this document as a baseline DDS.

Definition of terms used in this document

- **Baseline DDS** – The FAA accepted DDS proposed for compliance with a majority of the applicable 14 CFR 23 Amendment 23-64 regulations. Accepted DDS are available at the website listed in the footnote under Industry Standards.[4]

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[1] See *Accepted Means of Compliance; Airworthiness Standards: Normal Category Airplanes.* Federal Register Notice 85-184 September 22, 2020 p. 59400 [85 FR 59400], https://www.govinfo.gov/content/pkg/FR-2020-09-22/pdf/2020-17911.pdf.

[2] Exceptions to published standards are available at: https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/media/part_23_moc.pdf.

[3] See *Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and Commuter Category Airplanes.* Federal Register 81-251 (December 30, 2016) p. 96572. [81 FR 96572]. Available at: https://thefederalregister.org/81-FR/96572.

[4] Find accepted DDS under "Industry Standards" at: https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/.

- **Detailed Design Standard (DDS)** – Prescriptive standards, appropriate for the specific aircraft design which contain the means of compliance used to comply with the safety objectives of the performance-based regulations of 14 CFR part 23, amendment 23-64. The DDS is a set of design requirements used to comply with § 23.2010 and is of the same level of detail as prescriptive regulations.

- **DDS Collector Document** - A document used to coordinate and accept the DDS for a project.

- **Performance-Based Regulations (PBRs)** – 14 CFR part 23 regulations rewritten at amendment 23-64 to state a safety objective, rather than a prescriptive requirement.

- **Prescriptive Regulations (PRs)** – 14 CFR part 23 sections (regulations) prior to amendment 23-64. (**Note:** These prescriptive regulations contain sufficiently detailed language to allow compliance directly with each section (regulation) when applied to traditional designs that were prevalent at the time the regulations were written. These legacy prescriptive regulations are not sufficient nor appropriate for some modern designs.

Section 1 – General description of airplane and systems

Provide a description of the airplane for new type designs or a description of all proposed changes to the airplane or its systems for amended type designs. The description should include all new or novel design features along with a general description of the airplane, its systems and a basic 3-view.

Section 2 – General description of intended operations and limitations

Provide a description of the intended operations and limitations for the airplane or modified airplane.

Section 3 – Identification of Certification Basis and baseline DDS

Identify the certification basis of the airplane or modification along with any proposed changes to the certification basis. Additionally, identify the baseline DDS proposed for showing compliance with a majority of the applicable 23-64 regulations. For modifications to airplanes with an original certification basis prior to amendment 23-64, use the 21.101 Worksheet to identify the 23-64 Performance-based Regulations that must be added to the original certification basis. The applicable amendment 23-64 regulations identified below must be in the certification basis shown on the face of the amended TCDS or STC.

Section 4 – Applicant Proposed DDS for the Airplane or Modifications to Existing Airplanes

Each applicant must identify the complete list of **DDS** applicable to the airplane or airplane modification in the table below.

The **Baseline DDS** columns list the FAA accepted individual DDS necessary to support compliance with each PBR. The DDS for a given project may consist of PR language from amendment 63, accepted ASTM F44 Standards, or a combination.

Note: PR language from amendment 63 will be denoted in the table by its historical rule number (E.g. 23.1301)

The **Applicant Proposed Alternative or Additional DDS** column, identifies the proposed changes or additions to the **Baseline DDS** for each respective PBR.

If the proposed alternative or additional DDS is from a published consensus standard, identify the requirement with the standard number, revision level and proposed paragraphs.

If the proposed DDS is from the FAA Small Airplane Issue List (SAIL), it must be uniquely identified and listed in the table for the PBR which it supports. The unique identifier should use the format "SAIL-", followed by the SAIL item number (i.e., SAIL-3060).

If the proposed alternative or additional DDS is not from a published consensus standard or the FAA Small Airplane Issue List, it must be uniquely identified and listed in the table for the PBR which it supports. The unique identifier, should be a set of letters, followed by a sequential number (E.g. DDS 23.2100-1, DDS-Elec-2, or similar). When proposing multiple additional DDS for the same regulation or system, the following sequential number is incremented (e.g., DDS-Elec-1, DDS-Elec-2).

For each **Applicant Proposed Alternative or Additional DDS,** the applicant must provide a rationale for its use, in Section 5 of this document.

The applicant must also identify all DDS language that addresses NOA exceptions in the **Applicant Proposed Alternative or Additional DDS** column.

Each applicant must include all applicable **Baseline DDS** and **Applicant Proposed Alternative or Additional DDS** in the **Applicant Proposed Project DDS** column for the PBR they support.

Note: The DDS Collector Document does not include 14 CFR Part 23 Amendment 23-64 regulations that do not require a DDS. The following regulations are prescriptive regulations or administrative regulations and do not require DDS. All other regulations require DDS and are included in the table.

- § 23.1457 Cockpit voice recorders.
- § 23.1459 Flight data recorders.

- § 23.1529 Instructions for continued airworthiness.
- § 23.2000 Applicability and definitions.
- § 23.2005 Certification of normal category airplanes.
- § 23.2010 Accepted means of compliance.

Company xxx, Model xxx Proposed DDS (Example)

Note: The third and fourth columns will be filled out by the FAA. The fourth column will be populated using the mapping annexes in the ASTM standards. The applicant will fill out the fifth and sixth columns.

14 CFR 23 Amendment 23-64 Regulation	Title	DDS			
		Baseline DDS		Applicant Proposed Alternative, Additional, or mixing of Baseline DDS	Applicant Proposed Project DDS
		Language of Part 23 regulations as of 23-63 ***23.xx** - Indicates corrected language found in Appendix H	ASTM F44 Standards[1] *Accepted per 'NOA-23-22-01' (See FAA website[2] for exceptions from FAA acceptance)*		
Subpart B	**Flight**				
§23.2100	Weight and center of gravity	23.21, 23.23, 23.25, 23.29, 23.31, 23.871	**F3082/F3082M-17 F3114-21**		
§23.2105	Performance data	***23.45**	**F3179/F3179M-20**		
§23.2110	Stall speed	23.49	**F3179/F3179M-20**		
§23.2115	Takeoff performance	***23.51**, 23.53, 23.55, 23.57, 23.59, 23.61	**F3179/F3179M-20**		
§23.2120	Climb requirements	***23.63**, 23.65, ***23.67**, ***23.77**	**F3179/F3179M-20**		
§23.2125	Climb information	23.66, 23.639, 23.71	**F3179/F3179M-20**		

[1] Refer to the current published NOA for the current FAA accepted ASTM F44 Standards. An updated DDS collector template with the current FAA accepted ASTM F44 Standards corresponding to the current published NOA may be available by contacting the Policy and Innovation Division (AIR-600).
[2] For exceptions, see https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/media/part_23_moc.pdf.

§23.2130	Landing	***23.73**, 23.75	**F3179/F3179M-20**		
§23.2135	Controllability	23.141, 23.143, 23.145, 23.147, 23.149, 23.151, 23.153, 23.155, 23.157	**F3173/F3173M-21**		
§23.2140	Trim	***23.161**	**F3173/F3173M-21**		
§23.2145	Stability	23.171, 23.173, 23.175, 23.177, ***23.181**	**F3173/F3173M-21**		
§23.2150	Stall characteristics, stall warning, and spins	For 23.2150(a) 23.201, 23.203, 23.207, ***23.221**. Compliance with §23.2150 requires additional DDS.	**F3180/F3180M-16** (reflects FAA exception)		
§23.2155	Ground and water handling characteristics	23.231, 23.233, 23.235, 23.237, 23.239	**F3173/F3173M-21**		
§23.2160	Vibration, buffeting, and high-speed characteristics	***23.251**, ***23.253**, 23.255	**F3173/F3173M-21**		
§23.2165	Performance and flight characteristics requirements for flight in icing conditions	23.1419 Compliance with §23.2165 requires additional DDS.	**F3120/F3120M-20**		
Subpart C	**Structures**				
§23.2200	Structural design envelope	23.333, 23.335, 23.337, 23.343,	**F3116/F3116M-18e2** **F3396/F3396M-20**		

		23.345, 23.373, 23.473, 23.523			
§23.2205	Interaction of systems and structures	23.345(b)(3), 23.373(b) Compliance with §23.2205 requires additional DDS	**F3254-19**		
§23.2210	Structural design loads	23.441, 23.443, 23.445, 23.455, 23.471, 23.477, 23.479, 23.483, 23.485, 23.493, 23.497, 23.505, 23.507, 23.509, 23.511, 23.521, 23.523, 23.525, 23.527, 23.529, 23.531, 23.533, 23.535, 23, 301(d), 23.307(a, b), 23.341, 23.347, 23.349, 23.351, 23.361, 23.363, 23.365(a, b, c, d), 23.367, 23.369, 23.371, 23.373(a), 23.391, 23.393, 23.395, 23.397, 23.399, 23.405, 23.407, 23.409, 23.415, 23.421, 23.423, 23.425, 23.427, 23.321(b), 23.345(a, d),	**F3116/F3116M-18e2 F3396/F3396M-20 F3408/F3408M-21**		

		23.301(b, c), 23.302(a, b), 23.321(a, c), 23.331, 23.333(a), 23.347, 23.459, 23.473(f)			
§23.2215	Flight load conditions	23.445, 23.333(c), 23.341, 23.345(a, d), 23.373(a), 23.425, 23.427, 23.347, 23.349, 23.351, 23.421, 23.423, 23.441, 23.455, 23.367, 23.391	**F3116/F3116M-18e2 F3396/F3396M-20**		
§23.2220	Ground and water load conditions	23.473(a-f), 23.477, 23.479, 23.481, 23.483, 23.485, 23.493, 23.497, 23.499, 23.505, 23.507, 23.509, 23.511, 23.521, 23.523, 23.525, 23.527, 23.529, 23.531, 23.533, 23.535, 23.537, 23.753	**F3116/F3116M-18e2 F3331-18**		
§23.2225	Component loading conditions	23.361, 23.363, 23.365, 23.371, 23.393, 23.395, 23.397, 23.399, 23.405, 23.407, 23.409, 23.415 23.423, 23.425, 23.427, 23.441,	**F3061/F3061M-20 F3232/F3232M-20 F3116/F3116M-18e2 F3396/F3396M-20**		

		23.443, 23.445, 23.455,			
§23.2230	Limit and ultimate loads	23.301(a), 23.303, 23.473(g)	**F3114-21** **F3408/F3408M-21**		
§23.2235	Structural strength	23.305(a), 23.307(a), 23.681(a), 23.723, 23.725, 23.726, 23.727, 23.729(a), 23.737, 23.1435(a)(1), 23.305(b), 23.307(b)	**F3114-21** **F3408/F3408M-21**		
§23.2240	Structural durability	23.365(e), ***23.571**, 23.572, 23.573, 23.574, 23.575,	**F3061/F3061M-20** **F3066/F3066M-18** **F3115/F3115M-20** **F3116/F3116M-18e2** **F3380-19**		
§23.2245	Aeroelasticity	23.629, 23.677(c), 23.687	**F3061/F3061M-20** **F3093/F3093M-21**		
§23.2250	Design and construction principles	23.601, 23.603, 23.607, 23.687, 23.689, 23.691(a, b), 23.723(b), 23.733, 23.373, 23.745(b), 23.775(b-d), 23.859(b-i), 23.1435(a)(3), (c), ***23.1445(a, b)**, 23.683, 23.783(c)(1), (e), 23.807(d)(2),	**F3061/F3061M-20** **F3232/F3232M-20** **F3114-21** **F3380-19** **F3408/F3408M-21**		
§23.2255	Protection of structure	23.607, 23.609(a, b), 23.611, 23.689(a)(3)	**F3061/F3061M-20** **F3232/F3232M-20** **F3114-21**		

			F3066/F3066M-18 **F3380-19** **F3408/F3408M-21**		
§23.2260	Materials and processes	23.603(a), 23.605, 23.613(a, b, c, d)	**F3114-21** **F3380-19** **F3408/F3408M-21**		
§23.2265	Special factors of safety	23.619, 23.621, 23.623, 23.625, 23.657, 23.681(b), 23.693, ***23.785(a)**	**F3061/F3061M-20** **F3114-21** **F3380-19**		
§23.2270	Emergency conditions	23.561, 23.562, ***23.785**, 23.787, 23.1141(b)(2)	**F3061/F3061M-20** **F3232/F3232M-20** **F3083/F3083M-20A** **F3408/F3408M-21**		
Subpart D	**Design and Construction**				
§23.2300	Flight control systems	23.655, 23.671(a), 23.672, 23.675, 23.677(a, b, d), 23.679(c), 23.685, 23.691(d-f), 23.697, 23.701, 23.1329(b)	**F3232/F3232M-20** Sections (4-5) **F3061/F3061M-20** **F3066/F3066M-18** **F3117/F3117M-20**		
§23.2305	Landing gear systems	23.721(b, c), 23.729(b, c, g), 23.735(a-c, (e)	**F3061/F3061M-20** Sections 13.6.5, 13.6.6, 13.6.10, 13.9.1, 13.9.2, 13.9.3, 13.9.5		
§23.2310	Buoyancy for seaplanes and amphibians	23.751, 23.755, 23.757	**F3061/F3061M-20**		
§23.2315	Means of egress and emergency exits	23.783(a, b, c2-c6, d-g), 23.787(a2), 23.803, 23.805, 23.807(a-c, d1, d3,	**F3061/F3061M-20** **F3083/F3083M-20A** Sections 5.2.1, 5.2.2, 5.3.1.2, 5.5, 5.6, 5.6.1,		

		d4, e), 23.811, 23.812, 23.813, 23.815	5.6.2, 5.6.3, 5.6.4.1, 5.6.4.3, 5.6.5, 5.7, 5.8.1, 5.10, 5.11		
§23.2320	Occupant physical environment	23.771(b, c), 23.775(a, h1), ***23.831(a-c)**, 23.841(a, b1-b4, b8, c, d1-d3), 23.1441, 23.1443, ***23.1445**, 23.1447, 23.1449, 23.1450, 23.1451, 23.1453	**F3061/F3061M-20** Section 10.2 **F3083/F3083M-20A** **F3114-21** Sections 4.7.1, 4.7.6 **F3117/F3117M-20** Section 4.1.2 **F3227/F3227M-21** Sections 3.2.3, 4.1.1-4.1.6, 5.1.1-5.1.5, 5.1.10-5.1.16, 6		
§23.2325	Fire protection	23.851, 23.853, 23.855, 23.856, 23.859(a), 23.863, 23.1337(a), 23.1351(e), 23.1359(a, c), 23.1385(d)	**F3061/F3061M-20** Sections 10.3, 10.4 **F3066/F3066M-18** Section 7.1 **F3083/F3083M-20A** (6.1, 6.2, 6.3.2, 6.4) **F3231/F3231M-21** Sections 4.2.14, 4.8 **F3234/F3234M-17** Sections 4.1.4, 4.2.4 Compliance with §23.2325 requires additional DDS for airplanes with electric or hybrid electric propulsion systems. **F3408/F3408M-21**		

§23.2330	Fire protection in designated fire zones and adjacent areas	23.865, 23.1359(b)	**F3061/F3061M-20** Section 10.5 **F3066/F3066M-18** **F3114-21** Section 7.4 **F3231/F3231M-21** Section 4.8.2		
§23.2335	Lightning protection	23.867	**F3061/F3061M-20** Section 17.1		
Subpart E	**Powerplant**				
§23.2400	Powerplant installation	23.33, 23.901, 23.903(a), 23.905(a, b, d, f, g, h), 23.907, 23.909(b, c, d), 23.925, 23.963(b, c), 23.967(a-b), 23.979, 23.997(a, c-d), 23.1001(a-f), 23.1011, 23.1013, 23.1015, 23.1017, 23.1019, 23.1021, 23.1023, 23.1027, 23.1041, 23.1043, 23.1045, 23.1047, 23.1061, 23.1063, 23.1101, 23.1109, 23.1111, 23.1125, 23.1141(b-d), 23.1163, 23.1165, ***23.1197**, ***23.1199**, ***23.1201**, 23.1203(b-c)	**F3062/F3062M-20** Sections 3.2.2, 4.1, 4.2, 5.3.4, 6.3, 6.4, 7.1.2, 7.1.3, 7.2-7.4, 8.1-8.6, 9, 11.2-11.3, 12 **F3063/F3063M-20** Sections 5.1.2, 5.2.1, 5.2.3, 5.3.1, 5.8.2.1, 5.8.2.3, 5.8.2.4, 8, 9.1-9.6 **F3064/F3064M-21** Sections 4.1.2-4.1.4, 5.3-5.6 **F3065/F3065M-21a** Sections 4.1.1, 4.1.2, 4.3, 4.4.1-4.4.3, 4.5, 5.1, , 6.1, 7.1 **F3066/F3066M-18** Sections 5.7, 9.2, 9.3, 9.5, 10.2-10.4		

§23.2405	Automatic power or thrust control system	23.904, Appendix H23.1-H23.6	**F3062/F3062M-20** **F3064/F3064M-21** Sections 3.2, 5.9.1-5.9.6 **F3065/F3065M-21a** **F3117/F3117M-20**		
§23.2410	Powerplant installation hazard assessment	23.903(b-c), 23.937, 23.1141(e), 23.1143(g)	**F3061/F3061M-20** **F3062/F3062M-20** **F3063/F3063M-20** **F3064/F3064M-21** Sections 4.1.5, 4.1.7 **F3065/F3065M-21a** Section 7.2 **F3066/F3066M-18** Sections 4.1-4.2 **F3117/F3117M-20**		
§23.2415	Powerplant ice protection	23.929, 23.975, 23.1093, 23.1095, 23.1097, 23.1099	**F3062/F3062M-20** Section 11.5 **F3063/F3063M-20** Section 5.5 **F3066/F3066M-18** Section 5.1-5.4 Compliance with §23.2540 requires additional DDS for certain turbine engine applications.		
§23.2420	Reversing systems	23.933, 23.934	**F3062/F3062M-20** Sections 10.1-10.5 **F3065/F3065M-21a** Section 6.2		

§23.2425	Powerplant operational characteristics	23.903(d-g), 23.905(c), 23.909(a, e), 23.939, 23.943, 23.1142, 23.1145, 23.1165, 23.1337(d)	**F3062/F3062M-20** Sections 7.1.1, 7.1.4-7.1.5 11.3 **F3064/F3064M-21** Sections 4.2, 4.8, 5.1-5.2, 5.3.5, 5.7.1-5.7.5, 6.1.3 **F3065/F3065M-21a** Section 4.2 **F3066/F3066M-18** **F3117/F3117M-20** Section 5.2.11		
§23.2430	Fuel system	23.951(a-c), 23.953, 23.954, 23.955, 23.957(a-b), 23.959, 23.961, 23.963(a, d, e), 23.965, 23.967(a, c, d, e), 23.969, 23.971, 23.973, 23.975, 23.977, 23.979, 23.991, 23.993, 23.994, 23.995, 23.997(b, d, e), 23.999, 23.1001(a-f, h), 23.1337(a, c)	**F3062/F3062M-20** Section 11.1 **F3063/F3063M-20** Sections 4.10, 6.1.2, 6.1.4 **F3064/F3064M-21** Sections 4.1.2-4.1.4, 5.3-5.6 **F3066/F3066M-18** Sections 6.2-6.3, 11.9 **F3114-21**		
§23.2435	Powerplant induction and exhaust systems	23.1091, 23.1101(a), 23.1103(a-f), 23.1105, 23.1107, 23.1121, 23.1123, 23.1125	**F3062/F3062M-20** Sections 5.1-5.3.4, 5.4.1-5.4.6, 5.5-5.6, 6.1-6.4		
§23.2440	Powerplant fire protection	23.1141(f), 23.1181, 23.1182, 23.1183, 23.1189, 23.1191,	**F3061/F3061M-20** **F3062/F3062M-20** Section 11.4		

		23.1192, 23.1193, ***23.1195**, ***23.1197**, 23.1203(a)	**F3063/F3063M-20** **F3064/F3064M-21** **F3066/F3066M-18** Sections 6.1, 7.2, 8, 9.1, 10.1-10.2, 11.3, 11.5-11.8		
Subpart F	**Equipment**				
§23.2500	Airplane level systems requirements	23.1141(b-d), 23.1203(e), 23.1301(a), 23.1303, 23.1305, 23.1307, 23.1309(a), 23.1311, 23.1321, 23.1323, 23.1325, 23.1327, 23.1329, 23.1335, 23.1351(b, e, f, g), 23.1357, 23.1361, 23.1381(c), 23.1416	**F3061/F3061M-20** **F3231/F3231M-21** **F3235-17a** **F3232/F3232M-20** **F3233/F3233M-21** **F3229/F3229M-17** **F3064/F3064M-21** **F3066/F3066M-18** **F3117/F3117M-20** **F3120/F3120M-20** Compliance with §23.2500 requires additional DDS for airplanes with electric or hybrid electric propulsion systems. **F3408/F3408M-21**		
§23.2505	Function and installation	23.729(d), 23.841(d)(5), 23.843(b), 23.1301(a, c), 23.1323, 23.1327, 23.1329, 23.1335, 23.1357, 23.1361, 23.1365, 23.1367(a-b), 23.1461	**F3061/F3061M-20** **F3231/F3231M-21** **F3235-17a** **F3232/F3232M-20** **F3233/F3233M-21** **F3117/F3117M-20** Compliance with §23.2505 requires additional DDS for		

			lithium battery installations. Compliance with §23.2505 requires additional DDS for airplanes with electric or hybrid electric propulsion systems. **F3408/F3408M-21**		
§23.2510	Equipment, systems, and installations	23.677(d), 23.691(g), 23.701, 23.735(d), 23.775(g), ***23.831(d)**, 23.841(c), (d)(2), (d)(3), 23.1309, 23.1323, 23.1325, 23.1329, 23.1331(b-c), 23.1335, 23.1337(b-c), 23.1357, 23.1431	**F3061/F3061M-20 F3230-20a F3232/F3232M-20 F3233/F3233M-21 F3227/F3227M-21 F3309/F3309M-21** Compliance with §23.2510 requires additional DDS for lithium battery installations. **F3408/F3408M-21**		
§23.2515	Electrical and electronic system lightning protection	23.1306, 23.1437	**F3061/F3061M-20 F3367-21**		
§23.2520	High-intensity Radiated Fields (HIRF) protection	23.1308	**F3061/F3061M-20 F3236-17 F3367-21**		
§23.2525	System power generation,	23.1303, 23.1310, 23.1331(b-c),	**F2490-20**, **F3061/F3061M-20 F3231/F3231M-21**		

	storage, and distribution	23.1351(a-c), 23.1353, 23.1357	**3233/F3233M-21** **F3117/F3117M-20** **F3120/F3120M-20** Compliance with §23.2525 requires additional DDS for airplanes with electric or hybrid electric propulsion systems. Compliance with §23.2525 requires additional DDS for lithium battery installations.		
§23.2530	External and cockpit lighting	23.1383(a-c), 23.1385(a-c), 23.1387, 23.1389, 23.1391, 23.1393, 23.1395, 23.1397, 23.1399, 23.1401(a)(1), (b-f)	**F3061/F3061M-20** **F3233/F3233M-21** **F3234/F3234M-17** **F3117/F3117M-20** **F3120/F3120M-20** Compliance with §23.2530 requires additional DDS for airplanes which require cockpit lighting.		
§23.2535	Safety equipment	23.1141(a), (b)(1), 23.1415	Compliance with §23.2535 requires additional DDS such as **F3061/F3061M-20** **F3117/F3117M-20** and/or **F3083/F3083M-20A**.		

§23.2540	Flight in icing conditions	23.775(f), 23.1323(d), 23.1325(b)(3), (g), 23.1419 Compliance with §23.2540 requires additional DDS.	**F3061/F3061M-20 F3233/F3233M-21 F3120/F3120M-20**		
§23.2545	Pressurized systems elements	23.1435(a)(4), (b), 23.1438m 23.1453(a),	**F3061/F3061M-20 F3229/F3229M-17**		
§23.2550	Equipment containing high-energy rotors	23.1461	**F3061/F3061M-20**		
Subpart G	**Flightcrew Interface and Other Info.**				
§23.2600	Flightcrew interface	23.671(a-b), 23.677(a), 23.697, 23.699(a-b), 23.729(e), 23.745(a-b), 23.771(a-b), 23.773(a)(1-3), 23.775(e), (h)(1-2) 23.777(a-h), 23.779(a-b), 23.781, ***23.831(c)**, 23.1019, 23.1141(a, g), 23.1142, 23.1143(a-f), 23.1145(a-c), 23.1147, 23.1149, 23.1153, 23.1155, 23.1157, 23.1203(d),	**F3061/F3061M-20 F3232/F3232M-20 F3062/F3062M-20 F3063/F3063M-20 F3064/F3064M-21 F3114-21 F3117/F3117M-20** Compliance with windshield luminous transmittance aspects of § 23.2600 requires additional DDS. Compliance with the pilot compartment view with formation of fog or frost		

		23.1321(a, b, e), 23.1329(b, d), 23.1335, 23.1357(d-e), 23.1361(a, c), 23.1367(c-d), 23.1419(d), 23.1435(a)(2)	aspects of § 23.2600 requires additional DDS. **F3408/F3408M-21**		
§23.2605	Installation and operation	23.671(b), 23.672(a), 23.679(a-b), 23.691(c), 23.703(a-c), 23.729(f), 23.783(e)(3), 23.841(b)(5,6), (d)(4,5), 23.991(c), 23.1142, 23.1165(d), 23.1301(b), 23.1305, 23.1309(d), 23.1322, 23.1326, 23.1329(a-d, h), 23.1331(a), 23.1335, 23.1337(b, d), 23.1351(c)(4), (d), 23.1381(a, b), 23.1416(c) 23.1441(c), 23.1501(a), 23.1505, 23.1507, 23.1511, 23.1513, 23.1519, 23.1521, 23.1522, 23.1523(a)(1,2,3,5,6, 7)(b-c), 23.1523(a)(4), 23.1524, 23.1525, ***23.1527**, 23.1561	**F3061/F3061M-20 F3227/F3227M-21 F3231/F3231M-21 F3232/F3232M-20 F3233/F3233M-21 F3062/F3062M-20 F3063/F3063M-20 F3064/F3064M-21 F3117/F3117M-20 F3120/F3120M-20 F3408/F3408M-21**		

§23.2610	Instrument markings, control markings, and placard	23.733(b), 23.777(a-h), 23.841(b)(7), 23.1001(g), 23.1307, 23.1337(b, d), 23.1450(c), 23.1501(b), 23.1541, 23.1543, ***23.1545**, 23.1547, 23.1549, 23.1551, 23.1553, 23.1555, 23.1557, 23.1559, 23.1561, 23.1563, 23.1567	**F3061/F3061M-20** **F3063/F3063M-20** **F3117/F3117M-20** **F3120/F3120M-20** **F3408/F3408M-21**		
§23.2615	Flight, navigation, and powerplant instruments	23.1142(g)(2), 23.1142, 23.1305, 23.1311(a)(1-2), 23.1311(a)(3-7), 23.1321(a, b, d, e)	**F3061/F3061M-20** **F3062/F3062M-20** **F3064/F3064M-21** **F3117/F3117M-20** **F3432-20a**		
§23.2620	Airplane flight manual	23.909(e), 23.1581, ***23.1583**, 23.1585, 23.1587, 23.1589	**F3174/F3174M-19** **F3117/F3117M-20** **F3174/F3174M-19** **F3120/F3120M-20** **F3408/F3408M-21**		

Section 5- Justification for Applicant Proposed Alternative or Additional DDS

Note: You must identify and provide a rationale for any language addressing NOA exceptions not previously accepted by the FAA in this table.

Alternative or Additional Item	Detailed Design Standard (DDS)	Rationale
Subpart B - Flight		
Alternative or Additional 23.21xx-1		
Subpart C - Structures		
Alternative or Additional 23.22xx-1		
Subpart D - Design and Construction		
Alternative or Additional 23.23xx-1		

Alternative or Additional Item	Detailed Design Standard (DDS)	Rationale
Subpart E - Powerplant		
Alternative or Additional 23.24xx-1		
Subpart F - Equipment		
Alternative or Additional 23.25xx-1		
Subpart G – Flightcrew Interface and Other Info.		
Alternative or Additional 23.26xx-1		

Appendix E G-2 Determination of Compliance Issue Paper Template[1]

NOTE: If a G-2 IP is being used to address other issues discussed in Order 8110.112A, the contents of this template may be incorporated into the G-2 IP to coordinate the DDS Collector Document.

ISSUE PAPER

PROJECT:	**ITEM:** G-2 **STAGE:** 2
REG. REF.: Title 14 CFR Part 23.2010	**DATE:**
NATIONAL POLICY REF.: 8110.4C, 8110.112A, AC 23.2010-1	**ISSUE STATUS:** OPEN
SUBJECT: Detailed Design Standard (DDS) Collector Document	**BRANCH ACTION:**
	COMPLIANCE TARGET: **Pre-Type Certification**

Determination of Compliance

STATEMENT OF ISSUE:

This issue paper will be used to coordinate acceptance of the Detailed Design Standard (DDS) Collector Document [Document Number] [Revision] by [Applicant] on the [Model].

BACKGROUND:

The safety objectives represented in the prescriptive Title 14 of the Code of Federal Regulations (14 CFR) part 23 regulations at amendment 23-63 were used to develop the performance-based regulations in amendment 23-64. The safety objective language (performance-based regulations) contained in amendment 23-64 provides the flexibility to address new technology with fewer special conditions, exemptions, and equivalent safety findings. However, the performance-based regulations do not provide detailed standards that are design specific. Consequently, applicants are required to comply with the performance-based regulations in amendment 23-64 using a means of compliance (MOC), appropriate to their design, which meets the safety objectives in amendment 23-64.

[1] An updated template may be available by contacting the Policy and Innovation Division (AIR-600).

These MOC may include consensus standards, and must be accepted by the Administrator (See § 23.2010(a)). For the purposes of this issue paper, the MOC required by § 23.2010 are referred to as DDS to distinguish them from the traditional MOC/methods of compliance in advisory circulars, policy memorandums, etc. and provide a level of detail comparable to the former regulations of amendment 23-63. Acceptance of the DDS is a new step in the certification process that sets the detailed design requirements for the project, similar to establishing the certification basis for previous amendments.

There are several options for DDS, but all DDS must:

- Be accepted by the FAA before use by an applicant (See § 23.2010(a));
- Be in a form and manner acceptable to the FAA (See § 23.2010(b));
- Be prescriptive design standards that are appropriate for the applicant's design and provide a level of detail similar to amendment 23-63, previous special conditions, and ELOS findings;
- Meet the safety objectives of 23-64 to maintain at least the legacy level of safety, at the aircraft level, established by amendment 23-63 with the following exceptions: (See amendment 23-64).

    - New design approaches and technologies are required to improve airplane stall characteristics and pilot situational awareness to prevent Loss of Control (LOC) accidents (See § 23.2150).
    - Airplanes approved for flight into known icing, including Supercooled Large Droplets (SLD) must demonstrate safe operations in SLD conditions (See § 23.2540).
    - Airplanes approved for flight into known icing, but prohibited from flight in SLD, require a means for detecting SLD conditions and showing the airplane can safely avoid or exit such conditions (See § 23.2540).
    - Airplanes limited to Day VFR operations with a maximum of one passenger that were previously approved using CS-VLA as special class airplanes can be approved under amendment 23-64 as normal category airplanes with appropriate limitations (See amendment 23-64).

Traditional means of compliance and methods of compliance such as advisory circulars, policy memorandums, design standards (e.g., RTCA/DO-160, DO-178, DO-254, SAE ARP4761A, ARP4754) may continue to be used in support of the DDS, but are not intended to be listed in the DDS Collector Document.

The DDS collector document identifies, coordinates and documents acceptance of the § 23.2010 FAA accepted means of compliance (DDS) for any airplane project that includes 14 CFR 23 amendment 23-64 regulations in the certification basis.

FAA POSITION (Stage 2 – TBD):

Section 23.2010(b) requires applicants to provide the means of compliance to the FAA in a form and manner acceptable to the Administrator. The DDS Collector Document Template is an acceptable form and manner for satisfying this requirement. This issue paper will be used to route the DDS Collector Document for FAA review and acceptance or comments.

APPLICANT'S POSITION (Stage 3 – TBD):

Note: This section is expected to contain a short description of the DDS Collector Document, or could simply refer to the document number and revision of the DDS collector document. The purpose of this issue paper is simply routing the document for FAA review.

CONCLUSION (Stage 4 – TBD):

_____ _____

Manager, TBD, AIR-TBD **Date**
Policy and Innovation Division
Aircraft Certification Service

CONTACTS:

TITLE	NAME	PHONE
Project Manager		
Project Officer		

Appendix F DDS Collector within PSCP for Simple STC/ATC Projects

Using the PSCP format from *The FAA and Industry Guide to Product Certification*, Third Edition, a new section shown in **Bold/Underline** would be needed.

1. PURPOSE
2. SCOPE
3. REFERENCES AND ACRONYMS
4. PROJECT DESCRIPTION
5. OTHER CERTIFICATION RELATED ITEMS
6. PROJECT SCHEDULE
7. CERTIFICATION BASIS
8. ***DDS COLLECTOR***
9. COMPLIANCE PLAN
10. COMMUNICATION AND COORDINATION
11. TESTING PLAN
12. COMPLIANCE DOCUMENTATION
13. PRODUCTION CERTIFICATION
14. POST CERTIFICATION REQUIREMENTS
15. PROJECT ISSUE PLANNING

The format and Baseline DDS for the DDS Collector Document in Appendix D can be used, but only the amendment 23-64 regulations from the certification basis are listed.

Appendix G DDS Summary Document Template

14 CFR 23 Amendment 23-64 Section	Title	DDS New DDS are Noted as 23.XXXX-X
Subpart B	**Flight**	
§23.2100	Weight and center of gravity	
§23.2105	Performance data	
§23.2110	Stall speed	
§23.2115	Takeoff performance	
§23.2120	Climb requirements	
§23.2125	Climb information	
§23.2130	Landing	
§23.2135	Controllability	
§23.2140	Trim	
§23.2145	Stability	
§23.2150	Stall characteristics, stall warning, and spins	
§23.2155	Ground and water handling characteristics	
§23.2160	Vibration, buffeting, and high-speed characteristics	
§23.2165	Performance and flight characteristics requirements for flight in icing conditions	
Subpart C	**Structures**	
§23.2200	Structural design envelope	
§23.2205	Interaction of systems and structures	
§23.2210	Structural design loads	
§23.2215	Flight load conditions	
§23.2220	Ground and water load conditions	
§23.2225	Component loading conditions	
§23.2230	Limit and ultimate loads	
§23.2235	Structural strength	
§23.2240	Structural durability	
§23.2245	Aeroelasticity	

14 CFR 23 Amendment 23-64 Section	Title	DDS New DDS are Noted as 23.XXXX-X
§23.2250	Design and construction principles	
§23.2255	Protection of structure	
§23.2260	Materials and processes	
§23.2265	Special factors of safety	
§23.2270	Emergency conditions	
Subpart D	**Design and Construction**	
§23.2300	Flight control systems	
§23.2305	Landing gear systems	
§23.2310	Buoyancy for seaplanes and amphibians	
§23.2315	Means of egress and emergency exits	
§23.2320	Occupant physical environment	
§23.2325	Fire protection	
§23.2330	Fire protection in designated fire zones and adjacent areas	
§23.2335	Lightning protection	
Subpart E	**Powerplant**	
§23.2400	Powerplant installation	
§23.2405	Automatic power or thrust control system	
§23.2410	Powerplant installation hazard assessment	
§23.2415	Powerplant ice protection	
§23.2420	Reversing systems	
§23.2425	Powerplant operational characteristics	
§23.2430	Fuel system	
§23.2435	Powerplant induction and exhaust systems	
§23.2440	Powerplant fire protection	

14 CFR 23 Amendment 23-64 Section	Title	DDS New DDS are Noted as 23.XXXX-X
Subpart F	**Equipment**	
§23.2500	Airplane level systems requirements	
§23.2505	Function and installation	
§23.2510	Equipment, systems, and installations	
§23.2515	Electrical and electronic system lightning protection	
§23.2520	High-intensity Radiated Fields (HIRF) protection	
§23.2525	System power generation, storage, and distribution	
§23.2530	External and cockpit lighting	
§23.2535	Safety equipment	
§23.2540	Flight in icing conditions	
§23.2545	Pressurized systems elements	
§23.2550	Equipment containing high-energy rotors	
Subpart G	**Flightcrew Interface and Other Info.**	
§23.2600	Flightcrew interface	
§23.2605	Installation and operation	
§23.2610	Instrument markings, control markings, and placard	
§23.2615	Flight, navigation, and powerplant instruments	
§23.2620	Airplane flight manual	

Alternative or Additional Item	Detailed Design Standard (DDS)
Subpart B - Flight	
Alternative or Additional 23.21xx-1	
Subpart C - Structures	
Alternative or Additional 23.22xx-1	
Subpart D - Design and Construction	
Alternative or Additional 23.23xx-1	
Subpart E - Powerplant	
Alternative or Additional 23.24xx-1	
Subpart F - Equipment	
Alternative or Additional 23.25xx-1	
Subpart G – Flightcrew Interface and Other Info.	
Alternative or Additional 23.26xx-1	

Appendix H Correction of Errors in the Language of Amendment 23-62 and 23-63

H-1. Overview of Errors.

Amendment 23-62[1] amended the applicable regulations for part 23 turbofan- and turbojet-powered airplanes. During the first certification projects that incorporated amendment 23-62, the FAA discovered some unintentional errors. Amendment 23-63 did not correct these errors. The following sections of Title 14 of the Code of Federal Regulations (14 CFR) contain these unintentional errors:

- § 23.45, *Flight - General—Performance*
- § 23.51, *Takeoff Speeds*
- § 23.63, *Climb: General*
- § 23.67, *Climb: One Engine Inoperative*
- § 23.73, *Reference Landing Approach Speed*
- § 23.77, *Balked Landing*
- § 23.161, *Trim*
- § 23.181, *Dynamic Stability*
- § 23.221, *Spinning*
- § 23.251, *Vibration and Buffeting*
- § 23.253, *High Speed Characteristics*
- § 23.571, *Metallic pressurized cabin structures*
- § 23.785, *Seats, berths, litters, safety belts, and shoulder harness*
- § 23.831, *Ventilation*
- § 23.1195, *Fire extinguishing systems*
- § 23.1197, *Fire extinguishing agents*
- § 23.1199, *Fire extinguishing containers*
- § 23.1201, *Fire extinguishing materials*
- § 23.1527, *Maximum operating altitude*
- § 23.1445, *Oxygen distribution system*
- § 23.1545, *Airspeed Indicator*
- § 23.1583, *Operating Limitations*

Section H-2 shows the corrections needed to use the language from these regulations as DDS for amendment 23-64 and section H-3 contains the corrected language.

[1] See *Certification of part 23 Turbofan- and Turbojet-Powered Airplanes and Miscellaneous Amendments.* Federal Register 76-232 (December 2, 2011) p. 75736 [76 FR 75736]. Available at: https://www.govinfo.gov/content/pkg/FR-2011-12-02/pdf/2011-30412.pdf#page=2.

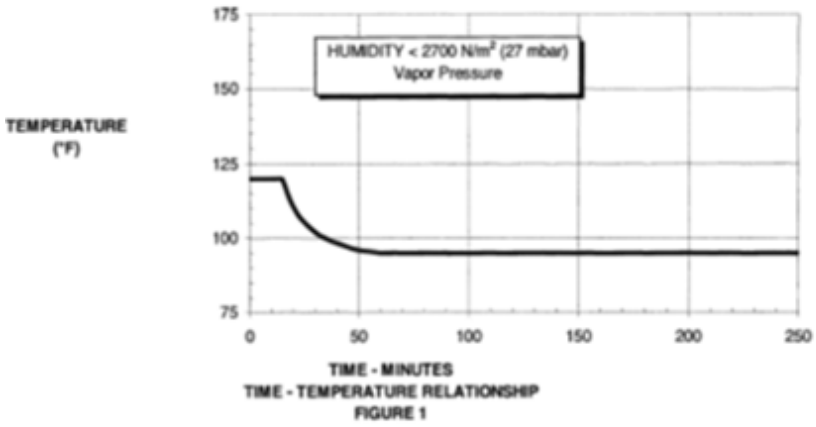
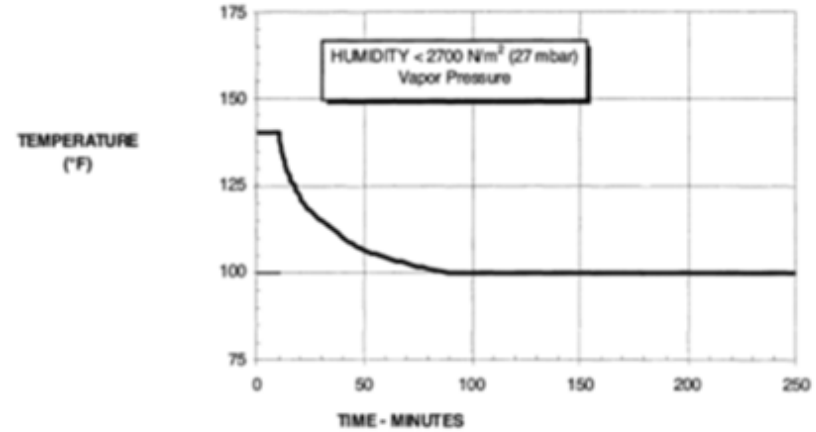
H-2. Required Corrections.

Requirement Containing Errors	**Required Correction**
§ 23.45, General (Performance)	
§ 23.45(h)(4) change:	"§ 23.67(c)(4)" to "§ 23.67(d)(4)"
§ 23.51, Takeoff speeds	
§ 23.51(c)(4) change:	"§ 23.67(c)(1) and (c)(2)" to "§ 23.67(d)(1) and (d)(2)"
§ 23.63, Climb: General	
§ 23.63(c), including (c)(1) and (c)(2), change to read:	(c) For each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, (2) single engine turbines, and (3) multiengine turbine airplanes of 6,000 pounds or less maximum weight, compliance must be shown at weights as a function of airport altitude and ambient temperature within the operational limits established for takeoff and landing, respectively, with: (1) For reciprocating engine-power airplanes of more than 6,000 pounds maximum weight: (i) Sections 23.65(b) and 23.67(b)(1) and (2), where appropriate, for takeoff and (ii) Section 23.67(b)(2), where appropriate, and § 23.77(b), for landing, (2) For single-engine turbines: (i) Section 23.65(b), for takeoff, and (ii) Section 23.77(b) for landing. (3) For multiengine turbine airplanes of 6,000 pounds or less maximum weight: (i) For takeoff, § 23.65(b) and (A) If a turbopropeller-power airplane, § 23.67(b)(1), and (2), where appropriate. (B) If a jet airplane, § 23.67(c)(1), and (2), where appropriate. (ii) For landing, § 23.77(b) and (A) If a turbopropeller-powered airplane, § 23.67(b)(2), where appropriate. (B) If a jet airplane, § 23.67(c)(2), where appropriate.

Requirement Containing Errors	**Required Correction**
§ 23.63(d)(1) change to read:	(d) * * * (1) If a normal, utility, or acrobatic category, turbopropeller-powered airplane: (i) Section 23.67(b)(1), and (2), where appropriate, for takeoff, and (ii) Section 23.67(b)(2), where appropriate, and § 23.77(c), for landing.
§ 23.63(d)(2) change to read:	(d) * * * (2) If a jet or commuter category airplane: (i) Section 23.67(d)(1), (2), and (3), where appropriate, for takeoff, and (ii) Section 23.67(d)(3), and (4), where appropriate, and § 23.77(c) for landing.
§ 23.67, Climb: One engine inoperative	
§ 23.67(a) change:	"reciprocating engine-powered" to "reciprocating multiengine-powered"
§ 23.67(b) change:	"reciprocating engine-powered" to "reciprocating multiengine-powered" and "turbopropeller-powered" to "multiengine turbopropeller-powered
§ 23.67(c) change:	"jets" to "multiengine jets"
§ 23.67(d) change:	"jets" to "multiengine jets"
§ 23.67(d)(1)(i) change:	"propeller" to "propeller, if applicable,"
§ 23.67(d)(2)(i) change:	"propeller" to "propeller, if applicable,"
§ 23.67(d)(3)(i) change:	"propeller" to "propeller, if applicable,"
§ 23.67(d)(4)(i) change:	"propeller" to "propeller, if applicable,"
§ 23.73, Reference landing approach speed	
§ 23.73(b) change to read:	"Each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplane of more than 6,000 pounds maximum weight, (2) turbine powered airplane of 6,000 pounds or less

Requirement Containing Errors	**Required Correction**
	maximum weight, and (3) single engine turbine powered airplane of more than 6,000 pounds maximum weight,"
§ 23.73(c) change:	"jets of more than" to "multiengine turbine powered airplanes over"
§ 23.77, Balked landing	
§ 23.77(b) change to read:	"Each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplane of more than 6,000 pounds maximum weight, (2) turbine powered airplane of 6,000 pounds or less maximum weight, and (3) single engine turbine powered airplane of more than 6,000 pounds maximum weight,
§ 23.161, Trim	
§ 23.161(d) change:	"§ 23.67(a), (b)(2), or (c)(3)," to "§ 23.67(a), (b)(2), (c)(2), or (d)(3),"
§ 23.181, Dynamic stability	
§ 23.181(c) change:	"(b)(2)" to "the fixed position testing of (b)"
§ 23.221, Spinning	
§ 23.221(a)(2)(ii) change:	"§ 23.201(e)" to "§ 23.201(f)"
§ 23.221(b) change:	"§ 23.807(b)(7)" to "§ 23.807(b)(6)"
§ 23.221(c) change:	"§ 23.807(b)(6) to "§ 23.807(b)(5)"
§ 23.251, Vibration and buffeting	
§ 23.251(a) change:	"turbojets" to "jets"
§ 23.253, High speed characteristics	
§ 23.253(b)(2) change:	"turbojets" to "jets"
§23.571, Metallic pressurized cabin structures	

Requirement Containing Errors	**Required Correction**
§ 23.571 change:	"… evaluated under one of the following" to "… evaluated under paragraphs (a), (b), or (c). In addition, the requirements of paragraph (d) must be met when applicable."
§ 23.785, Seats, berths, litters, safety belts, and shoulder harnesses	
§ 23.785(c) add to end of paragraph:	"Commuter category jet airplanes, must also comply with the requirements of § 23.562."
§ 23.831, Ventilation	
§ 23.831(d) add to the end of the paragraph:	"The cabin cooling system must be designed to meet the following conditions during flight above 15,000 feet mean sea level (MSL): (1) After any probable failure, the cabin temperature-time history may not exceed the values shown in Figure 1 of this paragraph. (2) After any improbable failure, the cabin temperature-time history may not exceed the values shown in Figure 2 of this paragraph."

Requirement Containing Errors	**Required Correction**
	 TIME - TEMPERATURE RELATIONSHIP FIGURE 1  TIME - TEMPERATURE RELATIONSHIP FIGURE 2
§ 23.1195, Fire extinguishing systems	
§ 23.1195(a) change:	"For all airplanes . . ." to "For commuter category airplanes, and all airplanes . . ."
§ 23.1197, Fire extinguishing agents	
§ 23.1197 introduction sentence, change:	"For all airplanes . . ." to "For commuter category airplanes, and all airplanes . . ."

Requirement Containing Errors	**Required Correction**
§ 23.1199, Fire extinguishing containers	
§ 23.1199 introduction sentence, change:	"For all airplanes . . ." to "For commuter category airplanes, and all airplanes . . ."
§ 23.1201, Fire extinguishing materials	
§ 23.1201 introduction sentence, change:	"For all airplanes . . ." to "For commuter category airplanes, and all airplanes . . ."
§ 23.1445, Oxygen distribution system	
§ 23.1445(c) change to read:	"(c) If the airplane is to be certified for operation above 41,000 feet and the flightcrew and passengers share a common source of oxygen, a means to separately reserve the minimum supply required by the flightcrew must be provided."
§ 23.1527, Maximum operating altitude	
§ 23.1527(b) change:	"§ 23.775(e)" to "§ 23.775(d)"
§ 23.1545, Airspeed indicator	
§ 23.1545(d) change:	"(b)(4)" to "(b)(3)"
§ 23.1583, Operating limitations	
§ 23.1583(c)(3) change to read:	"For each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, (2) single-engine turbines, and (3) multiengine turbines of 6,000 pounds or less maximum weight . . ."
§ 23.1583(c)(3)(i) change:	"§ 23.63(c)(1)" to "§ 23.63(c)(1)(i), (c)(2)(i), or (c)(3)(i), as appropriate"
§ 23.1583(c)(3)(ii) change:	"§ 23.63(c)(2)" to "§ 23.63(c)(1)(ii), (c)(2)(ii), or (c)(3)(ii), as appropriate"
§ 23.1583(c)(4) change:	"jets" to "turbines"

Requirement Containing Errors	**Required Correction**
§ 23.1583(c)(4)(i) change:	"§ 23.63(d)(1)" to "§ 23.63(d)(1)(i), or (d)(2)(i), as appropriate"
§ 23.1583(c)(5) change:	"jets" to "turbines"
§ 23.1583(c)(5)(i) change:	"§ 23.63(d)(1)" to "§ 23.63(d)(1)(ii) or (d)(2)(ii), as appropriate"

H-3. Corrected Language.

The language below corrects the errors in amendment 23-62 and amendment 23-63. Paragraph change bars appear in the left margin and the underlined text denotes the change.

Section 23.45 General (Performance).

(a) Unless otherwise prescribed, the performance requirements of this part must be met for—

(1) Still air and standard atmosphere; and

(2) Ambient atmospheric conditions, for commuter category airplanes, for reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, and for turbine engine-powered airplanes.

(b) Performance data must be determined over not less than the following ranges of conditions—

(1) Airport altitudes from sea Level to 10,000 feet; and

(2) For reciprocating engine-powered airplanes of 6,000 pounds, or less, maximum weight, temperature from standard to 30° C above standard; or

(3) For reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight and turbine engine-powered airplanes, temperature from standard to 30° C above standard, or the maximum ambient atmospheric temperature at which compliance with the cooling provisions of sections 23.1041 to 23.1047 is shown, if lower.

(c) Performance data must be determined with the cowl flaps or other means for controlling the engine cooling air supply in the position used in the cooling tests required by sections 23.1041 thru 23.1047.

(d) The available propulsive thrust must correspond to engine power, not exceeding the approved power, less—

(1) Installation losses; and

(2) The power absorbed by the accessories and services appropriate to the particular ambient atmospheric conditions and the particular flight condition.

(e) The performance, as affected by engine power or thrust, must be based on a relative humidity—

(1) Of 80 percent at and below standard temperature; and

(2) From 80 percent, at the standard temperature, varying linearly down to 34 percent at the standard temperature plus 50° F.

(f) Unless otherwise prescribed, in determining the takeoff and landing distances, changes in the airplane's configuration, speed, and power must be made in accordance with procedures established by the applicant for operation in service. These procedures must be able to be executed consistently by pilots of average skill in atmospheric conditions reasonably expected to be encountered in service.

(g) The following, as applicable, must be determined on a smooth, dry, hard-surfaced runway—

(1) Takeoff distance of section 23.53(b);

(2) Accelerate-stop distance of section 23.55;

(3) Takeoff distance and takeoff run of section 23.59; and

(4) Landing distance of section 23.75.

NOTE: The effect on these distances of operation on other types of surfaces (for example, grass, gravel) when dry, may be determined or derived and these surfaces listed in the Airplane Flight Manual in accordance with 23.1583(p).

(h) For multiengine jets weighing over 6,000 pounds in the normal, utility, and acrobatic category and commuter category airplanes, the following also apply:

(1) Unless otherwise prescribed, the applicant must select the takeoff, enroute, approach, and landing configurations for the airplane.

(2) The airplane configuration may vary with weight, altitude, and temperature, to the extent they are compatible with the operating procedures required by paragraph (h)(3) of this section.

(3) Unless otherwise prescribed, in determining the critical engine-inoperative takeoff performance, takeoff flight path, and accelerate-stop distance; changes in the airplane's configuration, speed, and power must be made in accordance with procedures established by the applicant for operation in service.

(4) Procedures for the execution of discontinued approaches and balked landings associated with the conditions prescribed in sections 23.67(d)(4) and 23.77(c) must be established.

(5) The procedures established under paragraphs (h)(3) and (h)(4) of this section must—

(i) Be able to be consistently executed by a crew of average skill in atmospheric conditions reasonably expected to be encountered in service;

(ii) Use methods or devices that are safe and reliable; and

(iii) Include allowance for any reasonably expected time delays in the execution of the procedures.

Section 23.51 Takeoff speeds.

(a) For normal, utility, and acrobatic category airplanes, rotation speed, V_R, is the speed at which the pilot makes a control input, with the intention of lifting the airplane out of contact with the runway or water surface.

(1) For multiengine landplanes, V_R, must not be less than the greater of 1.05 V_{MC}; or 1.10 V_{S1};

(2) For single-engine landplanes, V_R, must not be less than V_{S1}; and

(3) For seaplanes and amphibians taking off from water, V_R, may be any speed that is shown to be safe under all reasonably expected conditions, including turbulence and complete failure of the critical engine.

(b) For normal, utility, and acrobatic category airplanes, the speed at 50 feet above the takeoff surface level must not be less than:

(1) For multi-engine airplanes, the highest of—

(i) A speed that is shown to be safe for continued flight (or emergency landing, if applicable) under all reasonable expected conditions, including turbulence and complete failure of the critical engine;

(ii) 1.10 V_{MC}; or

(iii) 1.20 V_{S1}.

(2) For single-engine airplanes, the higher of—

(i) A speed that is shown to be safe under all reasonably expected conditions, including turbulence and complete engine failure; or

(ii) 1.20 V_{S1}.

(c) For normal, utility, and acrobatic category multiengine jets of more than 6,000 pounds maximum weight and commuter category airplanes, the following apply:

(1) V_1 must be established in relation to V_{EF} as follows:

(i) V_{EF} is the calibrated airspeed at which the critical engine is assumed to fail. V_{EF} must be selected by the applicant but must not be less than 1.05 V_{MC} determined under section 23.149(b) or, at the option of the applicant, not less than V_{MCG} determined under section 23.149(f).

(ii) The takeoff decision speed, V_1, is the calibrated airspeed on the ground at which, as a result of engine failure or other reasons, the pilot is assumed to have made a decision to continue or discontinue the takeoff. The takeoff decision speed, V_1, must be selected by the applicant but must not be less than V_{EF} plus the speed gained with the critical engine inoperative during the time interval between the instant at which the critical engine is failed and the instant at which the pilot recognizes and reacts to the engine failure, as indicated by the pilot's application of the first retarding means during the accelerate-stop determination of section 23.55.

(2) The rotation speed, V_R, in terms of calibrated airspeed, must be selected by the applicant and must not be less than the greatest of the following—

(i) V_1;

(ii) 1.05 V_{MC} determined under section 23.149(b);

(iii) 1.10 V_{S1}; or

(iv) The speed that allows attaining the initial climb-out speed, V2, before reaching a height of 35 feet above the takeoff surface in accordance with section 23.57(c)(2).

(3) For any given set of conditions, such as weight, altitude, temperature, and configuration, a single value of V_R must be used to show compliance with both the one engine-inoperative takeoff and all-engines-operating takeoff requirements.

(4) The takeoff safety speed, V_2, in terms of calibrated airspeed, must be selected by the applicant so as to allow the gradient of climb required in 23.67(d)(1) and (g)(2) but must not be less than 1.10 V_{MC} or less than 1.20 V_{S1}.

(5) The one-engine-inoperative takeoff distance, using a normal rotation rate at a speed 5 knots less than V_R, established in accordance with paragraph (c)(2) of this section, must be shown not to exceed the corresponding one-engine-inoperative takeoff distance, determined in accordance with sections 23.57 and 23.59(a)(l), using the established V_R. The takeoff, otherwise performed in accordance with section 23.57, must be continued safely from the point at which the airplane is 35 feet above the takeoff surface and at a speed not less than the established V_2 minus 5 knots.

(6) The applicant must show, with all engines operating, that marked increases in the scheduled takeoff distances, determined in accordance with section 23.59(a)(2), do not result from over-rotation of the airplane or out-of-trim conditions.

Section 23.63 Climb: General.

(a) Compliance with the requirements of sections 23.65, 23.66, 23.67, 23.69, and 23.77 must be shown—

(1) Out of ground effect; and

(2) At speeds that are not less than those at which compliance with the powerplant cooling requirements of sections 23.1041 to 23.1047 has been demonstrated; and

(3) Unless otherwise specified, with one engine inoperative, at a bank angle not exceeding 5 degrees.

(b) For normal, utility, and acrobatic category reciprocating engine-powered airplanes of 6,000 pounds or less maximum weight, compliance must be shown with sections 23.65(a), 23.67(a), where appropriate, and section 23.77(a) at maximum takeoff or landing weight, as appropriate, in a standard atmosphere.

(c) For each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, (2) single-engine turbines, and (3) multiengine turbine airplanes of 6,000 pounds or less maximum weight, compliance must be shown at weights as a function of airport altitude and ambient temperature, within the operational limits established for takeoff and landing, respectively, with—

(1) For reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight—

(i) Sections 23.65(b) and 23.67(b)(l) and (2). where appropriate. for takeoff; and

(ii) Section 23.67(b)(2), where appropriate, and section 23.77(b), for landing.

(2) For single-engine turbines—

(i) Section 23.65(b) for takeoff; and

(ii) Section 23.77(b) for landing.

(3) For multiengine turbine airplanes of 6,000 pounds or less maximum weight:

(i) For takeoff, section 23.65(b) and:

(A) If a turbopropeller-powered airplane, section 23.67(b)(l) and (2), where appropriate.

(B) If a jet airplane, section 23.67(c)(l) and (2), where appropriate.

(ii) For landing. 23.77(b) and:

(A) If a turbopropeller-powered airplane, section 23.67(b)(2), where appropriate.

(B) If a jet airplane, section 23.67(c)(2), where appropriate.

(d) For multiengine turbine airplanes over 6,000 pounds maximum weight in the normal, utility, and acrobatic category and commuter category airplanes, compliance must be shown at weights as a function of airport altitude and ambient temperature within the operational limits established for takeoff and landing, respectively, with—

(1) If a normal. utility, or acrobatic category turbopropeller-powered airplane—

(i) Sections 23.67(b)(1) and (2), where appropriate. for takeoff; and

(ii) Sections 23.67(b)(2), where appropriate, and 23.77(c), for landing.

(2) If a jet or commuter category airplane—

(i) Sections 23.67(d)(l), (2) and (3), where appropriate, for takeoff; and

(ii) Sections 23.67(d)(3) and (4), where appropriate, and 23.77(c) for landing.

Section 23.67 Climb: One engine inoperative.

(a) For normal, utility, and acrobatic category reciprocating multiengine-powered airplanes of 6,000 pounds or less maximum weight, the following apply:

(1) Except for those airplanes that meet the requirements prescribed in section 23 .562(d), each airplane with a V_{SO} of more than 61 knots must be able to maintain a steady climb gradient of at least 1.5 percent at a pressure altitude of 5,000 feet with the—

(i) Critical engine inoperative and its propeller in the minimum drag position;

(ii) Remaining engine(s) at not more than maximum continuous power;

(iii) Landing gear retracted;

(iv) Wing flaps retracted; and

(v) Climb speed not less than 1.2 V_{S1}.

(2) For each airplane that meets the requirements prescribed in section 23.562(d), or that has a V_{SO} of 61 knots or less, the steady gradient of climb or descent at a pressure altitude of 5,000 feet must be determined with the—

(i) Critical engine inoperative and its propeller in the minimum drag position;

(ii) Remaining engine(s) at not more than maximum continuous power;

(iii) Landing gear retracted;

(iv) Wing flaps retracted; and

(v) Climb speed not less than 1.2 V_{S1}.

(b) For normal, utility, and acrobatic category reciprocating multiengine-powered airplanes of more than 6,000 pounds maximum weight, and multiengine turbopropeller-powered airplanes in the normal, utility, and acrobatic category--

(1) The steady gradient of climb at an altitude of 400 feet above the takeoff must be no less than I percent with the--

(i) Critical engine inoperative and its propeller in the minimum drag position;

(ii) Remaining engine(s) at takeoff power;

(iii) Landing gear retracted;

(iv) Wing flaps in the takeoff position(s); and

(v) Climb speed equal to that achieved at 50 feet in the demonstration of section 23.53.

(2) The steady gradient of climb must not be less than 0.75 percent at an altitude of l,500 feet above the takeoff surface, or landing surface, as appropriate, with the—

(i) Critical engine inoperative and its propeller in the minimum drag position;

(ii) Remaining engine(s) at not more than maximum continuous power;

(iii) Landing gear retracted;

(iv) Wing flaps retracted; and

(v) Climb speed not less than 1.2 V_{S1}.

(c) For normal, utility, and acrobatic category multiengine jets of 6,000 pounds or less maximum weight—

(1) The steady gradient of climb at an altitude of 400 feet above the takeoff must be no less than 1.2 percent with the—

(i) Critical engine inoperative;

(ii) Remaining engine(s) at takeoff power;

(iii) Landing gear retracted;

(iv) Wing flaps in the takeoff position(s); and

(v) Climb speed equal to that achieved at 50 feet in the demonstration of section 23.53.

(2) The steady gradient of climb may not be less than 0.75 percent at an altitude of 1,500 feet above the takeoff surface, or landing surface, as appropriate, with the—

(i) Critical engine inoperative;

(ii) Remaining engine(s) at not more than maximum continuous power;

(iii) Landing gear retracted;

(iv) Wing flaps retracted; and

(v) Climb speed not less than 1.2 V_{S1}.

(d) For multiengine jets over 6,000 pounds maximum weight in the normal, utility and acrobatic category and commuter category airplanes, the following apply:

(1) *Takeoff: landing gear extended.* The steady gradient of climb at the altitude of the takeoff surface must be measurably positive for two-engine airplanes, not less than 0.3 percent for three-engine airplanes, or 0.5 percent for four-engine airplanes with—

(i) The critical engine inoperative and its propeller, if applicable, in the position it rapidly and automatically assumes;

(ii) The remaining engine(s) at takeoff power;

(iii) The landing gear extended, and all landing gear doors open;

(iv) The wing flaps in the takeoff position(s);

(v) The wings level; and

(vi) A climb speed equal to V_2.

(2) *Takeoff; landing gear retracted.* The steady gradient of climb at an altitude of 400 feet above the takeoff surface must not be less than 2.0 percent for two-engine airplanes, 2.3 percent for three-engine airplanes, and 2.6 percent for four-engine airplanes with—

(i) The critical engine inoperative and its propeller, if applicable, in the position it rapidly and automatically assumes;

(ii) The remaining engine(s) at takeoff power;

(iii) The landing gear retracted;

(iv) The wing flaps in the takeoff position(s);

(v) A climb speed equal to V2.

(3) *Enroute.* The steady gradient of climb at an altitude of 1,500 feet above the takeoff or landing surface, as appropriate, must be not less than 1.2 percent for two-engine airplanes, 1.5 percent for three-engine airplanes, and 1.7 percent for four-engine airplanes with—

(i) The critical engine inoperative and its propeller, if applicable, in the minimum drag position;

(ii) The remaining engine(s) at not more than maximum continuous power;

(iii) The landing gear retracted;

(iv) The wing flaps retracted; and

(v) A climb speed not less than 1.2 V_{S1}.

(4) *Discontinued approach.* The steady gradient of climb at an altitude of 400 feet above the landing surface must be not less than 2.1 percent for two-engine airplanes, 2.4 percent for three-engine airplanes, and 2.7 percent for four-engine airplanes, with—

(i) The critical engine inoperative and its propeller, if applicable, in the minimum drag position;

(ii) The remaining engine(s) at takeoff power;

(iii) Landing gear retracted;

(iv) Wing flaps in the approach position(s) in which V_{S1} for these position(s) does not exceed 110 percent of the V_{S1} for the related all-engines-operating landing position(s); and

(v) A climb speed established in connection with normal landing procedures but not exceeding 1.5 V_{S1} .

Section 23.73 Reference landing approach speed.

(a) For normal, utility, and acrobatic category reciprocating engine-powered airplanes of 6,000 pounds or less maximum weight, the reference landing approach speed, V_{REF}, may not be less than the greater of V_{MC}, determined in section 23.149(b) with the wing flaps in the most extended takeoff position, and 1.3 V_{S1}.

(b) For each of the following normal. utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplane of more than 6,000 pounds maximum weight, (2) turbine powered airplane of 6,000 pounds or less maximum weight, and (3) single engine turbine powered airplane of more than 6,000 pounds maximum weight, the reference landing approach speed, V_{REF}, may not be less than the greater of V_{MC}, determined in section 23.149(c), and 1.3 V_{Sl}.

(c) For each normal, utility, and acrobatic multiengine turbine-powered airplanes over 6,000 pounds maximum weight and commuter category airplanes, the reference landing approach speed, V_{REF}, may not be less than the greater of 1.05 V_{MC}, determined in section 23.149(c), and 1.3 V_{S1}.

Section 23.77 Balked landing.

(a) Each normal, utility, and acrobatic category reciprocating engine-powered airplane of 6,000 pounds or less maximum weight must be able to maintain a steady gradient of climb at sea level of at least 3.3 percent with—

(1) Takeoff power on each engine;

(2) The landing gear extended;

(3) The wing flaps in the landing position, except that if the flaps may safely be retracted in two seconds or less without loss of altitude and without sudden changes of angle of attack, they may be retracted; and

(4) A climb speed equal to V_{REF}, as defined in section 23.73(a).

(b) Each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplane of more than 6,000 pounds maximum weight. (2) turbine-powered airplane of 6,000 pounds or less maximum weight, and (3) single-engine turbine-powered airplane of more than 6,000 pounds maximum weight, must be able to maintain a steady gradient climb of at least 2.5 percent with—

(1) Not more than the power that is available on each engine eight seconds after initiation of movement of the power controls from the minimum flight idle position;

(2) The landing gear extended;

(3) The wing flaps in the landing position; and

(4) A climb speed equal to V_{REF}, as defined in section 23.73(b).

(c) Each normal, utility, and acrobatic multiengine turbine powered airplane over 6,000 pounds maximum weight and each commuter category airplane must be able to maintain a steady gradient of climb of at least 3.2 percent with—

(l) Not more than the power that is available on each engine eight seconds after initiation of movement of the power controls from minimum flight idle position;

(2) Landing gear extended;

(3) Wing flaps in the landing position; and

(4) A climb speed equal to V_{REF}, as defined in section 23.73(c).

Section 23.161 Trim.

(a) General. Each airplane must meet the trim requirements of this section after being trimmed and without further pressure upon, or movement of, the primary controls or their corresponding trim controls by the pilot or the automatic pilot. In addition, it must be possible, in other conditions of loading, configuration, speed and power to ensure that the pilot will not be unduly fatigued or distracted by the need to apply residual control forces exceeding those for prolonged application of section 23.l43(c). This applies in normal operation of the airplane and, if applicable, to those conditions associated with the failure of one engine for which performance characteristics are established.

(b) Lateral and directional trim. The airplane must maintain lateral and directional trim in level flight with the landing gear and wing flaps retracted as follows:

(1) For normal, utility and acrobatic category airplanes, at a speed of 0.9 V_H, V_C, or V_{MO}/M_{MO}, whichever is lowest; and

(2) For commuter category airplanes, at all speeds from 1.4 V_{S1} to the lesser of V_H or V_{MO}/M_{MO}.

(c) Longitudinal trim. The airplane must maintain longitudinal trim under each of the following conditions:

(1) A climb with—

(i) Takeoff power, landing gear retracted, wing flaps in the takeoff position(s), at the speeds used in determining the climb performance required by section 23.65; and

(ii) Maximum continuous power at the speeds and in the configuration used in determining the climb performance required by section 23.69(a).

(2) Level flight at all speeds from the lesser of V_H and either V_{NO} or V_{MO}/M_{MO} (as appropriate), to 1.4 V_{S1} with the landing gear and flaps retracted.

(3) A descent at V_{NO} or V_{MO}/M_{MO}, whichever is applicable, with power off and with the landing gear and flaps retracted.

(4) Approach with landing gear extended and with—

(i) A 3-degree angle of descent, with flaps retracted and at a speed of 1.4 V_{S1};

(ii) A 3-degree angle of descent, flaps in the landing position(s) at V_{REF}; and

(iii) An approach gradient equal to the steepest used in the landing distance demonstrations of section 23.75, flaps in the landing position(s) at V_{REF}.

(d) In addition, each multiengine airplane must maintain longitudinal and directional trim, and the lateral control force must not exceed 5 pounds at the speed used in complying with section 23.67(a), (b)(2), (c)(2), or (d)(3), as appropriate, with—

(1) The critical engine inoperative, and if applicable, its propeller in the minimum drag position;

(2) The remaining engine(s) at maximum continuous power;

(3) The landing gear retracted;

(4) Wing flaps retracted; and

(5) An angle of bank of not more than 5 degrees.

(e) In addition, each commuter category airplane for which, in the determination of the takeoff path in accordance with section 23.57, the climb in the takeoff configuration at V_2 extends beyond 400 feet above the takeoff surface, it must be possible to reduce the longitudinal and lateral control forces to 10 pounds and 5 pounds, respectively, and the directional control force must not exceed 50 pounds at V_2 with—

(1) The critical engine inoperative and its propeller m the minimum drag position;

(2) The remaining engine(s) at takeoff power;

(3) Landing gear retracted;

(4) Wing flaps in the takeoff position(s); and

(5) An angle of bank not exceeding 5°.

Section 23.181 Dynamic stability.

(a) Any short period oscillation not including combined lateral-directional oscillations occurring between the stalling speed and the maximum allowable speed appropriate to the configuration of the airplane must be heavily damped with primary controls—

(1) Free; and

(2) In a fixed position.

(b) Any combined lateral-directional oscillations (Dutch roll) occurring between the stalling speed and the maximum allowable speed (V_{FE}, V_{LE}, V_{NO}, V_{FC}/ M_{FC}) appropriate to the configuration of the airplane with the primary controls in both free and fixed position, must be damped to 1/l0 amplitude in—

(1) Seven (7) cycles below 18,000 feet; and

(2) Thirteen (13) cycles from 18,000 feet to the certified maximum altitude.

(c) If it is determined that the function of a stability augmentation system, reference section 23.672, is needed to meet the flight characteristic requirements of this part, the primary control requirements of paragraphs (a)(2) and the fixed position testing of (b) of this section are not applicable to the tests needed to verify the acceptability of that system.

(d) During the conditions as specified in section 23.175, when the longitudinal control force required to maintain speeds differing from the trim speed by at least ± 15 percent is suddenly released, the response of the airplane must not exhibit any dangerous characteristics nor be excessive in relation to the magnitude of the control force released. Any long-period oscillation of flight path, phugoid oscillation, that results must not be so unstable as to increase the pilot's workload or otherwise endanger the airplane.

Section 23.221 Spinning.

(a) *Normal category airplanes*. A single-engine, normal category airplane must be able to recover from a one-turn spin or a three-second spin, whichever takes longer, in not more than one additional turn after initiation of the first control action for recovery, or demonstrate compliance with the optional spin resistant requirements of this section.

(1) The following apply to one turn or three-second spins:

(i) For both the flaps-retracted and flaps-extended conditions, the applicable airspeed limit and positive limit maneuvering load factor must not be exceeded;

(ii) No control forces or characteristic encountered during the spin or recovery may adversely affect prompt recovery;

(iii) It must be impossible to obtain unrecoverable spins with any use of the flight or engine power controls either at the entry into or during the spin; and

(iv) For the flaps-extended condition, the flaps may be retracted during the recovery, but not before rotation has ceased.

(2) At the applicant's option, the airplane may be demonstrated to be spin resistant by the following—

(i) During the stall maneuvers contained in section 23.201, the pitch control must be pulled back and held against the stop. Then, using ailerons and rudders in the proper direction, it must be possible to maintain wings-level flight within 15 degrees of bank and to roll the airplane from a 30-degree bank in one direction to a 30-degree bank in the other direction;

(ii) Reduce the airplane speed using pitch control at a rate of approximately 1 knot per second until the pitch control reaches the stop; then, with the pitch control pulled back and held against the stop, apply full rudder control in a manner to promote spin entry for a period of 7 seconds or through a 360 degree heading change, whichever occurs first. If the 360-degree heading change is reached first, it must have taken no fewer than 4 seconds. This maneuver must be performed first with the ailerons in the neutral position, and then with the ailerons deflected opposite the direction of tum in the most adverse manner. Power and airplane configuration must

be set in accordance with section 23.201(e) without change during the maneuver. At the end of 7 seconds or a 360 degree heading change, the airplane must respond immediately and normally to primary flight controls applied to regain coordinated, unstalled flight without reversal of control effect and without exceeding the temporary control forces specified by section 23.143(c); and

(iii) Compliance with sections 23.201 and 23.203 must be demonstrated with the airplane in uncoordinated flight, corresponding to one ball width displacement on a slip-skid indicator, unless one ball width displacement cannot be obtained with full rudder, in which case the demonstration must be with full rudder applied.

(b) *Utility category airplanes*. A utility category airplane must meet the requirements of paragraph (a) of this section. In addition, the requirements of paragraph (c) of this section and section 23 .807(b)(6) must be met if approval for spinning is requested.

(c) *Acrobatic category airplanes*. An acrobatic category airplane must meet the spin requirements of paragraph (a) of this section and section 23.807(b)(5). In addition, the following requirements must be met in each configuration for which approval for spinning is requested:

(1) The airplane must recover from any point in a spin up to and including six tums, or any greater number of turns for which certification is requested, in not more than one and one-half additional turns after initiation of the first control action for recovery. However, beyond 3 tums, the spin may be discontinued if spiral characteristics appear.

(2) The applicable airspeed limits and limit maneuvering load factors must not be exceeded. For flaps-extended configurations for which approval is requested, the f1aps must not be retracted during the recovery.

(3) It must be impossible to obtain unrecoverable spins with any use of the flight or engine power controls either at the entry into or during the spin.

(4) There must be no characteristics during the spin (such as excessive rates of rotation or extreme oscillatory motion) that might prevent a successful recovery due to disorientation or incapacitation of the pilot.

Section 23.251 Vibration and buffeting.

(a) There must be no vibration or buffeting severe enough to result in structural damage, and each part of the airplane must be free from excessive vibration, under any appropriate speed and power conditions up to V_D/M_D, or V_{DF}/M_{DF} for jets. In addition, there must be no buffeting in any normal flight condition, including configuration changes during cruise, severe enough to interfere with the satisfactory control of the airplane or cause excessive fatigue to the flight crew. Stall warning buffeting within these limits is allowable.

(b) There must be no perceptible buffeting condition in the cruise configuration in straight flight at any speed up to V_{MO}/ M_{MO}, except stall buffeting, which is allowable.

(c) For airplanes with MD greater than M 0.6 or a maximum operating altitude greater than 25,000 feet, the positive maneuvering load factors at which the onset of perceptible buffeting

occurs must be determined with the airplane in the cruise configuration for the ranges of airspeed or Mach number, weight, and altitude for which the airplane is to be certificated. The envelopes of load factor, speed, altitude, and weight must provide a sufficient range of speeds and load factors for normal operations. Probable inadvertent excursions beyond the boundaries of the buffet onset envelopes may not result in unsafe conditions.

Section 23.253 High-speed characteristics.

If a maximum operating speed V_{MO}/M_{MO} is established under section 23.1505(c), the following speed increase and recovery characteristics must be met:

(a) Operating conditions and characteristics likely to cause inadvertent speed increases (including upsets in pitch and roll) must be simulated with the airplane trimmed at any likely speed up to V_{MO}/M_{MO}. These conditions and characteristics include gust upsets, inadvertent control movements, low stick force gradients in relation to control friction, passenger movement, leveling off from climb, and descent from Mach to airspeed limit altitude.

(b) Allowing for pilot reaction time after occurrence of the effective inherent or artificial speed warning specified in section 23.1303, it must be shown that the airplane can be recovered to a normal attitude and its speed reduced to V_{MO}/M_{MO}, without—

(1) Exceptional piloting strength or skill;

(2) Exceeding V_D/M_D, or V_{DF}/ M_{DF} for jets, the maximum speed shown under section 23.251, or the structural limitations; and

(3) Buffeting that would impair the pilot's ability to read the instruments or to control the airplane for recovery.

(c) There may be no control reversal about any axis at any speed up to the maximum speed shown under section 23.251. Any reversal of elevator control force or tendency of the airplane to pitch, roll, or yaw must be mild and readily controllable, using normal piloting techniques.

(d) Maximum speed for stability characteristics, V_{FC}/M_{FC}. V_{FC}/M_{FC} may not be less than a speed midway between V_{MO}/M_{MO} and V_{DF}/M_{DF} except that, for altitudes where Mach number is the limiting factor, M_{FC} need not exceed the Mach number at which effective speed warning occurs.

Section 23.571 Metallic pressurized cabin structures.

For normal, utility, and acrobatic category airplanes, the strength, detail design, and fabrication of the metallic structure of the pressure cabin must be evaluated under paragraphs (a), (b), or (c). In addition, the requirements of paragraph (d) must be met when applicable.

(a) A fatigue strength investigation in which the structure is shown by tests, or by analysis supported by test evidence, to be able to withstand the repeated loads of variable magnitude expected in service; or

(b) A fail safe strength investigation, in which it is shown by analysis, tests, or both that catastrophic failure of the structure is not probable after fatigue failure, or obvious partial failure, of a principal structural element, and that the remaining structures are able to withstand a static ultimate load factor of 75 percent of the limit load factor at $V_{C,}$ considering the combined effects of normal operating pressures, expected external aerodynamic pressures, and flight loads. These loads must be multiplied by a factor of 1.15 unless the dynamic effects of failure under static load are otherwise considered.

(c) The damage tolerance evaluation of section 23.573(b).

(d) If certification for operation above 41,000 feet is requested, a damage tolerance evaluation of the fuselage pressure boundary per section 23.573(b) must be conducted.

Section 23.831 Ventilation.

(a) Each passenger and crew compartment must be suitably ventilated. Carbon monoxide concentration may not exceed one part in 20,000 parts of air.

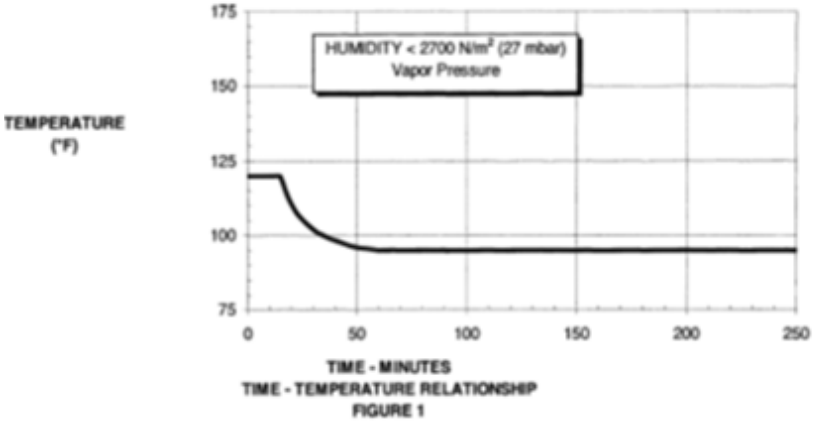
(b) For pressurized airplanes, the ventilating air in the flightcrew and passenger compartments must be free of harmful or hazardous concentrations of gases and vapors in normal operations and in the event of reasonably probable failures or malfunctioning of the ventilating, heating, pressurization, or other systems and equipment. If accumulation of hazardous quantities of smoke in the cockpit area is reasonably probable, smoke evacuation must be readily accomplished starting with full pressurization and without depressurizing beyond safe limits.

(c) For jet pressurized airplanes that operate at altitudes above 41,000 feet, under normal operating conditions and in the event of any probable failure conditions of any system, which would adversely affect the ventilating air, the ventilation system must provide reasonable passenger comfort. The ventilation system must also provide a sufficient amount of uncontaminated air to enable the flightcrew members to perform their duties without undue discomfort or fatigue. For normal operating conditions, the ventilation system must be designed to provide each occupant with at least 0.55 pounds of fresh air per minute. In the event of the loss of one source of fresh air, the supply of fresh airflow may not be less than 0.4 pounds per minute for any period exceeding five minutes.

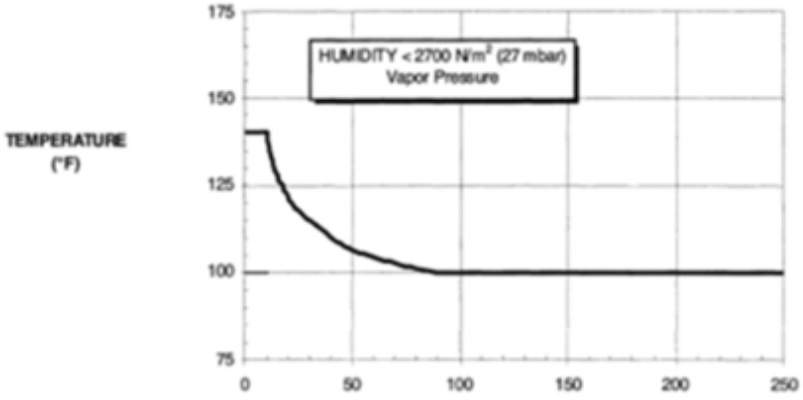
(d) For jet pressurized airplanes that operate at altitudes above 41,000 feet, other probable and improbable Environmental Control System failure conditions that adversely affect the passenger and flight crew compartment environmental conditions may not affect flight crew performance so as to result in a hazardous condition, and no occupant shall sustain permanent physiological harm. <u>The cabin cooling system must be designed to meet the following conditions during flight above 15,000 feet mean sea level (MSL):</u>

<u>(1) After any probable failure, the cabin temperature-time history may not exceed the values shown in Figure 1 of this paragraph.</u>

<u>(2) After any improbable failure, the cabin temperature-time history may not exceed the values shown in Figure 2 of this paragraph.</u>



TIME - TEMPERATURE RELATIONSHIP
FIGURE 1



TIME - TEMPERATURE RELATIONSHIP
FIGURE 2

Section 23.1195 Fire extinguishing systems.

(a) For commuter category airplanes, and all airplanes with engine(s) embedded in the fuselage or in pylons on the aft fuselage, fire-extinguishing systems must be installed and compliance shown with the following:

(1) Except for combustor, turbine, and tailpipe sections of turbine-engine installations that contain lines or components carrying flammable flu ids or gases for which a fire originating in these sections is shown to be controllable, a fire extinguisher system must serve each engine compartment.

(2) The tire extinguishing system, the quantity of the extinguishing agent, the rate of discharge, and the discharge distribution must be adequate to extinguish fires. An individual "one shot" system may be used, except for engine(s) embedded in the fuselage, where a "two shot" system is required.

(3) The fire extinguishing system for a nacelle must be able to simultaneously protect each compartment of the nacelle for which protection is provided.

(b) If an auxiliary power unit is installed in any airplane certificated to this part, that auxiliary power unit compartment must be served by a fire extinguishing system meeting the requirements of paragraph (a)(2) of this section.

Section 23.1197 Fire extinguishing agents.

For commuter category airplanes, and all airplanes with engine(s) embedded in the fuselage or in pylons on the aft fuselage the following applies:

(a) Fire extinguishing agents must—

(1) Be capable of extinguishing flames emanating from any burning fluids or other combustible materials in the area protected by the fire extinguishing system; and

(2) Have thermal stability over the temperature range likely to be experienced in the compartment in which they are stored.

(b) If any toxic extinguishing agent is used, provisions must be made to prevent harmful concentrations of fluid or fluid vapors (from leakage during normal operation of the airplane or as a result of discharging the fire extinguisher on the ground or in flight) from entering any personnel compartment, even though a defect may exist in the extinguishing system. This must be shown by test except for built-in carbon dioxide fuselage compartment fire extinguishing systems for which—

(1) Five pounds or less of carbon dioxide will be discharged, under established fire control procedures, into any fuselage compartment; or

(2) Protective breathing equipment is available for each flight crewmember on flight deck duty.

Section 23.1199 Fire extinguishing containers.

For commuter category airplanes, and all airplanes with engine(s) embedded in the fuselage or in pylons on the aft fuselage the following applies:

(a) Each extinguishing agent container must have a pressure relief to prevent bursting of the container by excessive internal pressures.

(b) The discharge end of each discharge line from a pressure relief connection must be located so that discharge of the fire-extinguishing agent would not damage the airplane. The line must also be located or protected to prevent clogging caused by ice or other foreign matter.

(c) A means must be provided for each fire extinguishing agent container to indicate that the container has discharged or that the charging pressure is below the established minimum necessary for proper functioning.

(d) The temperature of each container must be maintained, under intended operating conditions, to prevent the pressure in the container from—

(1) Falling below that necessary to provide an adequate rate of discharge; or

(2) Rising high enough to cause premature discharge.

(e) If a pyrotechnic capsule is used to discharge the extinguishing agent, each container must be installed so that temperature conditions will not cause hazardous deterioration of the pyrotechnic capsule.

Section 23.1201 Fire extinguishing materials.

For commuter category airplanes, and all airplanes with engine(s) embedded in the fuselage or in pylons on the aft fuselage the following applies:

(a) No material in any fire extinguishing system may react chemically with any extinguishing agent so as to create a hazard.

(b) Each system component in an engine compartment must be fireproof.

Section 23.1445 Oxygen distribution system.

(a) Except for flexible lines from oxygen outlets to the dispensing units, or where shown to be otherwise suitable to the installation, nonmetallic tubing must not be used for any oxygen line that is normally pressurized during flight.

(b) Nonmetallic oxygen distribution lines must not be routed where they may be subjected to elevated temperatures, electrical arcing, and released flammable fluids that might result from any probable failure.

(c) If the airplane is to be certified for operation above 41,000 feet and the flightcrew and passengers share a common source of oxygen, a means to separately reserve the minimum supply required by the flightcrew must be provided.

Section 23.1545 Airspeed indicator.

(a) Each airspeed indicator must be marked as specified in paragraph (b) of this section, with the marks located at the corresponding indicated airspeeds.

(b) The following markings must be made:

(1) For the never-exceed speed V_{NE}, a radial red line.

(2) For the caution range, a yellow arc extending from the red line specified in paragraph (b)(1) of this section to the upper limit of the green arc specified in paragraph (b)(3) of this section.

(3) For the normal operating range, a green arc with the lower limit at V_{S1} with maximum weight and with landing gear and wing flaps retracted, and the upper limit at the maximum structural cruising speed V_{NO} established under section 23.1505(b).

(4) For the flap operating range, a white arc with the lower limit at V_{SO} at the maximum weight, and the upper limit at the flaps-extended speed V_{FE} established under section 23.1511.

(5) For reciprocating multiengine-powered airplanes of 6,000 pounds or less maximum weight, for the speed at which compliance has been shown with section 23.69(b) relating to rate of climb at maximum weight and at sea level, a blue radial line.

(6) For reciprocating multiengine-powered airplanes of 6,000 pounds or less maximum weight, for the maximum value of minimum control speed, V_{MC}, (one-engine inoperative) determined under section 23.149(b), a red radial line.

(c) If V_{NE} or V_{NO} vary with altitude, there must be means to indicate to the pilot the appropriate limitations throughout the operating altitude range.

(d) Paragraphs (b)(1) through (b)(3) and paragraph (c) of this section do not apply to airplanes for which a maximum operating speed V_{MO}/M_{MO} is established under Sec. 23.1505(c). For those airplanes, there must either be a maximum allowable airspeed indication showing the variation of V_{MO}/M_{MO} with altitude or compressibility limitations (as appropriate), or a radial red line marking for V_{MO}/M_{MO} must be made at lowest value of V_{MO}/M_{MO} established for any altitude up to the maximum operating altitude for the airplane.

Section 23.1583 Operating limitations.

The Airplane Flight Manual must contain operating limitations determined under this part 23, including the following—

(a) *Airspeed limitations*. The following information must be furnished:

(1) Information necessary for the marking of the airspeed limits on the indicator as required in section 23.1545, and the significance of each of those limits and of the color coding used on the indicator.

(2) The speeds V_{MC}, V_O, V_{LE}, and V_{LO}, if established, and their significance.

(3) In addition, for turbine powered commuter category airplanes—

(i) The maximum operating limit speed, V_{MO}/M_{MO} and a statement that this speed must not be deliberately exceeded in any regime of flight (climb, cruise, or descent) unless a higher speed is authorized for flight test or pilot training;

(ii) If an airspeed limitation is based upon compressibility effects, a statement to this effect and information as to any symptoms, the probable behavior of the airplane, and the recommended recovery procedures; and

(iii) The airspeed limits must be shown in terms of V_{MO}/M_{MO} instead of V_{NO} and V_{NE}.

(b) *Powerplant limitations*. The following information must be furnished:

(1) Limitations required by section 23.1521.

(2) Explanation of the limitations, when appropriate.

(3) Information necessary for marking the instruments required by sections 23.1549 through 23.1553.

(c) *Weight*. The airplane flight manual must include:

(1) The maximum weight.

(2) The maximum landing weight, if the design landing weight selected by the applicant is less than the maximum weight.

(3) For each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, (2) single-engine turbines, and (3) multiengine turbines 6,000 pounds or less maximum weight, performance operating limitations as follows—

(i) The maximum takeoff weight for each airport altitude and ambient temperature within the range selected by the applicant at which the airplane complies with the climb requirements of section 23.63(c)(1)(i), (c)(2)(i), or (c)(3)(i), as appropriate.

(ii) The maximum landing weight for each airport altitude and ambient temperature within the range selected by the applicant at which the airplane complies with the climb requirements of section 23.63(c)(l)(ii), (c)(2)(ii), or (c)(3)(ii). As appropriate.

(4) For normal, utility, and acrobatic category multiengine turbines over 6,000 pounds and commuter category airplanes, the maximum takeoff weight for each airport altitude and ambient temperature within the range selected by the applicant at which—

(i) The airplane complies with the climb requirements of section 23.63(d)(l)(i) or (d)(2)(i), as appropriate; and

(ii) The accelerate-stop distance determined under section 23.55 is equal to the available runway length plus the length of any stopway, if utilized; and either:

(A) The takeoff distance determined under section 23.59(a) is equal to the available runway length; or

(B) At the option of the applicant, the takeoff distance determined under section 23.59(a) is equal to the available runway length plus the length of any clearway and the takeoff run determined under section 23.59(b) is equal to the available runway length.

(5) For normal, utility, and acrobatic category multiengine turbines over 6,000 pounds and commuter category airplanes, the maximum landing weight for each airport altitude within the range selected by the applicant at which—

(i) The airplane complies with the climb requirements of section 23.63(d)(l)(ii) or (d)(2)(ii), as appropriate for ambient temperatures within the range selected by the applicant; and

(ii) The landing distance determined under section 23.75 for standard temperatures is equal to the available runway length.

(6) The maximum zero wing fuel weight, where relevant, as established in accordance with section 23.343.

(d) *Center of gravity*. The established center of gravity limits.

(e) *Maneuvers*. The following authorized maneuvers, appropriate airspeed limitations, and unauthorized maneuvers, as prescribed in this section.

(1) *Normal category airplanes*. No acrobatic maneuvers, including spins, are authorized.

(2) *Utility category airplanes*. A list of authorized maneuvers demonstrated in the type flight tests, together with recommended entry speeds and any other associated limitations. No other maneuver is authorized.

(3) *Acrobatic category airplanes*. A list of approved flight maneuvers demonstrated in the type flight tests, together with recommended entry speeds and any other associated limitations.

(4) *Acrobatic category airplanes and utility category airplanes approved for spinning*. Spin recovery procedure established to show compliance with section 23.22 1(c).

(5) *Commuter category airplanes*. Maneuvers are limited to any maneuver incident to normal flying, stalls, (except whip stalls) and steep turns in which the angle of bank is not more than 60 degrees.

(f) *Maneuver load factor*. The positive limit load factors in g's, and, in addition, the negative limit load factor for acrobatic category airplanes.

(g) *Minimum flightcrew*. The number and functions of the minimum flight crew determined under section 23.1523.

(h) *Kinds of operation*. A list of the kinds of operation to which the airplane is limited or from which it is prohibited under section 23. 1525, and also a list of installed equipment that affects any operating limitation and identification as to the equipment's required operational status for the kinds of operation for which approval has been given.

(i) *Maximum operating altitude*. The maximum altitude established under section 23.1527.

(j) *Maximum passenger seating configuration*. The maximum passenger-seating configuration.

(k) *Allowable lateral fuel loading*. The maximum allowable lateral fuel loading differential, if less than the maximum possible.

(l) *Baggage and cargo loading*. The following information for each baggage and cargo compartment or zone—

(1) The maximum allowable load; and

(2) The maximum intensity of loading.

(m) *Systems*. Any limitations on the use of airplane systems and equipment.

(n) *Ambient temperatures*. Where appropriate, maximum and minimum ambient air temperatures for operation.

(o) *Smoking*. Any restrictions on smoking in the airplane.

(p) *Types of surface*. A statement of the types of surface on which operations may be conducted. (See sections 23.45(g) and 23.1587(a)(4), (c)(2), and (d)(4)).