



Federal Aviation Administration

Memorandum

Date: June 2, 2016

To: Manager, Seattle Aircraft Certification Office, ANM-100S

From: Manager, Small Airplane Directorate, ACE-100

Prepared by: Raymond Johnston, Project Support Office, ACE-112

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Cub Crafters, Model CC19-180, 14 CFR part 23, Amendment 23-62: Project TC10279SE-A

ELOS Memo#: TC10279SE-A-G-9

Regulatory Ref: 14 CFR 23.45, 23.51, 23.63, 23.67, 23.73, 23.77, 23.161, 23.181, 23.221, 23.251, 23.253, 23.571, 23.785, 23.831, 23.1195, 23.1197, 23.1199, 23.1201, 23.1527, 23.1545, and 23.1583

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Accountable Directorate on the establishment of an equivalent level of safety finding for the Cub Crafters model CC19-180.

Background:

Airplane Certification Basis:

The Cub Crafters CC19-180 airplane type certification basis includes part 23, amendment 23-62, and also includes 14 CFR part 36 as amended by amendment 36-1 through amendment 36-30 and 14 CFR part 34, as amended through amendment 34-5A.

Airplane Description:

The CC19-180 is a tandem seat, two passenger, high-wing, reciprocating single-engine powered airplane of conventional design. The CC19-180 has a maximum take-off weight of 2,300 pounds (lbs.). These airplanes will be approved for day and night visual flight rules.

Amendment 23-62 ([76 FR 75736](#), December 2, 2011) amended the applicable regulations for part 23 turbofan- and turbojet-powered airplanes to reflect the current needs of industry, accommodate future trends, address emerging technologies, and provide for future airplane operations.

Recently, while working several new certification projects that incorporated amendment 23-62, some unintentional errors were discovered by the FAA. The Small Airplane Directorate reviewed amendment 23-62, identified the errors, and drafted a corrected version of regulations. The Small Airplane Directorate is drafting a technical amendment to correct amendment 23-62. In the meantime, to avoid project delays for applicants certifying new airplanes under amendment 23-62, the FAA created Issue Paper G-9 to provide an ELOS to the intent of amendment 23-62.

Applicable regulations:

§§ 23.45, 23.51, 23.63, 23.67, 23.73, 23.77, 23.161, 23.181, 23.221, 23.251; 23.253, 23.571, 23.785, 23.831, 23.1195, 23.1197, 23.1199, 23.1201; 23.1527, 23.1545, and 23.1583.

Regulations requiring an ELOS finding:

§§ 23.45, 23.51, 23.63, 23.67, 23.73, 23.77, 23.161, 23.181, 23.221, 23.251; 23.253, 23.571, 23.785, 23.831, 23.1195, 23.1197, 23.1199, 23.1201; 23.1527, 23.1545, and 23.1583.

Description of compensating design features or alternative Methods of Compliance (MoC) which allow the granting of the ELOS (including changes, limitations, or equipment needed for equivalency)

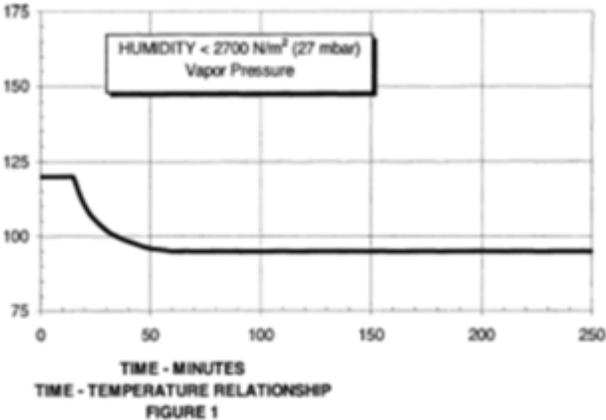
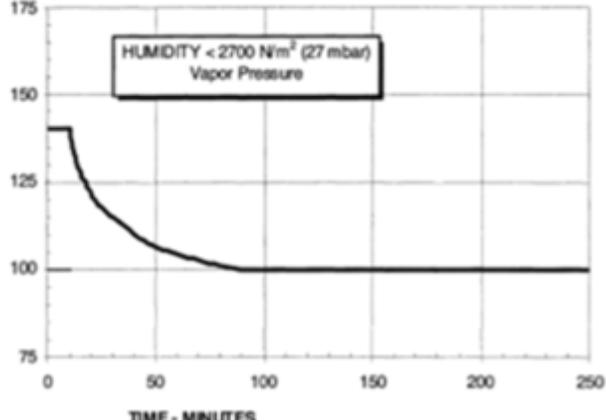
The FAA has determined that an ELOS finding is the appropriate means for showing that the CC19-180 meets the intent of amendment 23-62. The following table documents the ELOS to amendment 23-62 for the CC19-180.

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
<i>§ 23.45, General (Performance)</i>	
§ 23.45(h)(4) change:	“§ 23.67(c)(4)” to “§ 23.67(d)(4)”
<i>§ 23.51, Takeoff speeds</i>	
§ 23.51(c)(4) change:	“§ 23.67(c)(1) and (c)(2)” to “§ 23.67(d)(1) and (d)(2)”
<i>§ 23.63, Climb: General</i>	
§ 23.63(c), including (c)(1) and (c)(2), change to read:	<p>(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:</p> <p>(1) For reciprocating engine-power airplanes of more than 6,000 pounds maximum weight:</p> <p style="padding-left: 40px;">(i) Sections 23.65(b) and 23.67(b)(1) and (2), where appropriate, for takeoff and</p> <p style="padding-left: 40px;">(ii) Section 23.67(b)(2), where appropriate, and § 23.77(b), for landing,</p> <p>(2) For single-engine turbines:</p> <p style="padding-left: 40px;">(i) Section 23.65(b), for takeoff, and</p> <p style="padding-left: 40px;">(ii) Section 23.77(b) for landing.</p> <p>(3) For multiengine turbine airplanes of 6,000 pounds or less maximum</p>

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
	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.
§ 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.
<i>§ 23.67, Climb: One engine inoperative</i>	
§ 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,”

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
<i>§ 23.73, Reference landing approach speed</i>	
§ 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 6,00 pounds or less 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”
<i>§ 23.77, Balked landing</i>	
§ 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,
<i>§ 23.161, Trim</i>	
§ 23.161(d) change:	“§ 23.67(a), (b)(2), or (c)(3),” to “§ 23.67(a), (b)(2), (c)(2), or (d)(3),”
<i>§ 23.181, Dynamic stability</i>	
§ 23.181(c) change:	“(b)(2)” to “the fixed position testing of (b)”
<i>§ 23.221, Spinning</i>	
§ 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)”
<i>§ 23.251, Vibration and buffeting</i>	
§ 23.251(a) change:	“turbojets” to “jets”
<i>§ 23.253, High speed characteristics</i>	
§ 23.253(b)(2)	“turbojets” to “jets”

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
change:	
<i>§23.571, Metallic pressurized cabin structures</i>	
§ 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.”
<i>§ 23.785, Seats, berths, litters, safety belts, and shoulder harnesses</i>	
§ 23.785(c) add to end of paragraph:	“Commuter category jet airplanes, must also comply with the requirements of § 23.562.”
<i>§ 23.831, Ventilation</i>	
§ 23.831(d) add to the end of the paragraph:	<p>“The cabin cooling system must be designed to meet the following conditions during flight above 15,000 feet mean sea level (MSL):</p> <p>(1) After any probable failure, the cabin temperature-time history may not exceed the values shown in Figure 1 of this paragraph.</p> <p>(2) After any improbable failure, the cabin temperature-time history may not exceed the values shown in Figure 2 of this paragraph.”</p>

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
	 <p>TEMPERATURE (°F)</p> <p>HUMIDITY < 2700 N/m² (27 mbar) Vapor Pressure</p> <p>TIME - MINUTES</p> <p>TIME - TEMPERATURE RELATIONSHIP</p> <p>FIGURE 1</p>  <p>TEMPERATURE (°F)</p> <p>HUMIDITY < 2700 N/m² (27 mbar) Vapor Pressure</p> <p>TIME - MINUTES</p> <p>TIME - TEMPERATURE RELATIONSHIP</p> <p>FIGURE 2</p>
<i>§ 23.1195, Fire extinguishing systems</i>	
§ 23.1195(a) change:	“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”
<i>§ 23.1197, Fire extinguishing agents</i>	
§ 23.1197 introduction sentence, change:	“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”
<i>§ 23.1199, Fire extinguishing containers</i>	
§ 23.1199 introduction	“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
sentence, change:	
<i>§ 23.1201, Fire extinguishing materials</i>	
§ 23.1201 introduction sentence, change:	“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”
<i>§ 23.1527, Maximum operating altitude</i>	
§ 23.1527(b) change:	“§ 23.775(e)” to “§ 23.775(d)”
<i>§ 23.1545, Airspeed indicator</i>	
§ 23.1545(d) change:	“(b)(4)” to “(b)(3)”
<i>§ 23.1583, Operating limitations</i>	
§ 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”
§ 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”

Explanation of how design features or alternative Methods of Compliance (MoC) provide an equivalent level of safety intended by the regulation:

The FAA has determined an ELOS finding is the appropriate means for showing the CC19-180 meets the intent of amendment 23-62. The following table documents the ELOS to amendment 23-62 for the CC19-180.

FAA approval and documentation of the ELOS finding:

The FAA has approved the aforementioned ELOS finding in project issue paper G-9. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Accountable Directorate has assigned a unique ELOS memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS memorandum number must be listed in the Type Certificate Data Sheet under the Certification Basis section (TCs & ATCs) or in the Limitations and Conditions section of the STC.

Equivalent Level of Safety findings has been made for the following regulation(s):

- 23.45 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 harnesses
- 23.831 Ventilation
- 23.1195 Fire extinguishing systems
- 23.1197 Fire extinguishing agents
- 23.1199 Fire extinguishing characteristics
- 23.1201 Fire extinguishing materials
- 23.1527 Maximum Operating Altitude
- 23.1545 Airspeed indicator
- 23.1583 Operating limitations

(Documented in ELOS Memo TC10279SE-A-G-9)

Pat Mullen

6/2/2016

for Mel Johnson, Acting Manager, Small Airplane Directorate,
Aircraft Certification Service

Date

ELOS Originated by: Project Support Office: Raymond Johnston	Manager, Project Support Office: Jacqueline Jambor	Routing Symbol: ACE-112
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