CHANGE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

8200.32A CHG 1

3/20/01

SUBJ: **Flight Inspection Criteria for Aspen, Colorado, Localizer-Type Directional Aid (LDA)**

1. PURPOSE. This change transmits revisions to FAA Order 8200.32A, Flight Inspection Criteria for Aspen, Colorado, Localizer-Type Direction Aid (LDA).

2. DISTRIBUTION. This change is distributed to the branch level in the Flight Inspection Operations Division of Aviation System Standards and to the Northwest Mountain Region Flight Standards and Airway Facilities Divisions.

3. EXPLANATION OF CHANGES. Paragraph 7 contains changes in references to FAA Form numbers and field numbers for forms in FAA Order 8240.36, Instructions for Flight Inspection Reporting (latest revision).

4. DISPOSAL OF TRANSMITTAL. After filing the revised pages, the change transmittal should be retained.

PAGE CONTROL CHART

Remove Pages	Dated	Insert Pages	Dated
5	8/24/98	5	8/24/98
6	8/24/98	6	3/20/01

/s/

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Program Director of Aviation
System Standards

Distribution: **A-W(VN-200)-3; ANM-200 (6 copies); ANM-400 (6 copies)**

Initiated By: **AVN-230**

ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

8200.32A

8/24/98

SUBJ: Flight Inspection Criteria for Aspen, Colorado, Localizer-Type Directional Aid (LDA)

1. PURPOSE. This order establishes special flight inspection criteria and tolerances for Aspen LDA, which supports only missed approach and instrument departure procedures.

2. DISTRIBUTION. This order is distributed to the branch level in the Flight Inspection Operations Division of Aviation System Standards; to the Northwest Mountain Region Flight Standards Division and Airway Facilities Division; and to the Flight Inspection and Procedures Branch in the FAA Academy at the Mike Monroney Aeronautical Center.

3. CANCELLATION. FAA Order 8200.32, Flight Inspection Criteria for Aspen, Colorado Localizer Type Directional Aid (LDA), dated March 21, 1989, is canceled. GENOT 8200.68, dated 5/7/98, Change in Order 8200.32, is canceled.

4. BACKGROUND. The rationale for special criteria and tolerances is as follows:

a. Existing localizer criteria and tolerances were designed to support a specific type of operation, an instrument approach to a runway. The tolerances were tailored to meet terminal obstructions requirements throughout the various ILS zones and points predicated about a runway threshold.

b. In contrast, due to special site geography, Aspen LDA is being used in place of a conventional non-precision navigational aid to support the missed approach and instrument departure procedures. Since the intended operational use of this facility is related to the performance accuracy requirements of a non-precision navigation aid, all tolerances are established in degrees. The facility is inspected using ILS flight inspection techniques, requiring conversion of degrees to microamperes (μA) in the analysis and reporting of structure and alignment.

5. Flight Inspection Procedures

a. Checklist. The following procedures pertain to Aspen LDA. The facility is a dual frequency localizer, configured to provide back course missed approach guidance.

Check	Ref Para	Inspection			Transmitter Configuration		Measurements Required					
		C	PM	P	Course	Clearance	MOD	WIDTH	SYM	CLR	ALIGN	STRUC
Mod Lvl	5b	X			Norm	OFF	X					
		X			OFF	Norm	X					
		X	X	X	Norm	Norm	X					
Mod Equal (2)	5c	(1)			Carrier Only	OFF	X					
		(1)			OFF	Carrier Only	X					
Power Ratio	5d	X			RF Alarm	Norm						

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Check	Ref Para	Inspection			Transmitter	Configuration	Measurements Required					
		C	PM	P	Course	Clearance	MOD	WIDTH	SYM	CLR	ALIGN	STRUC
Phasing (3)	5e	(1)			Quad	OFF		Set to Value of Modulation Equality				
		(1)			OFF	Quad		Set to Value of Modulation Equality				
Width & Clearance	5f 5g	(1)			OFF	Norm		X	X	X		
		X	X	X	Norm	Norm		X	X	X		
Align & Structure	5h 5i	X	X	X	Norm	Norm	X				X	X
Polarization	5j	X	X	X	Norm	Norm						X
Transition	5k		X	X	Norm	Norm				X		X
		X			RF Alarm	RF Alarm				X		X
Monitors:		X			Narrow	Narrow		X		X		
Width	5l	(1)			Wide Alarm	Norm		X				
		X			Narrow Alarm	Wide Alarm		X		X		
		X	X		Wide Alarm	Wide Alarm		X		X		
Align	5l	X		(1)	Align Alarms	Norm					X	X
RF Power	5m	X			RF Alarm	RF Alarm				X		X
Identification	5n	X	X	X								X

NOTE:
(1) Facilities Maintenance Request
(2) Adjustment to carrier modulation balance will require a subsequent check of course alignment.
(3) Measure width and clearances prior to the phasing check. If, as a result of the quadrature phasing check, the width either remains the same or narrows, and/or clearances increase, then the phasing has been improved.

b. Modulation Level. Measure the modulation of the radiated signal while flying the missed approach, departure course outbound, at the minimum climb rate of 152 feet per nautical mile and between 5 and 15 miles from the LDA antenna. Flag current may fluctuate due to signal reflections; therefore, record the modulation level and construct a graphical average for tolerance application. The modulation level may also be established during the modulation equality check.

c. Modulation Equality. Conduct this check to obtain a crosspointer value which will be used as a reference for phasing. Position the aircraft on course, inbound or outbound, between 5 and 15 miles, at 17,000 feet. Adjustments to modulation equality will require a subsequent check of course alignment.

d. Power Ratio. The purpose of this check is to measure the ratio of power (using the spectrum analyzer) between the course and clearance transmitters. Position the aircraft inbound or outbound, between 5 and 15 miles at 17,000 feet, and, using the spectrum analyzer, compare the relative signal strength of the course and clearance transmitters with the course transmitter in RF power alarm and the clearance transmitter in normal.

e. Phasing

(1) This check may be conducted to determine that the phase relationship between sideband and carrier energy is optimum. Since the facility is normally phased using ground procedures, airborne phasing is only conducted at the request of maintenance personnel.

(2) Position the aircraft on the appropriate azimuth (obtained from facility maintenance personnel), inbound or outbound at 17,000 feet, between 5 and 15 miles. Transmit the crosspointer values to the ground technician for use in adjusting the phasing. The optimum quadrature phase condition occurs when the microampere deflection is equal to that obtained during the modulation equality check. The quadrature phasing microampere deflection will have frequent fluctuations, and adjustments should be based on long-term averaging.

f. Course Sector Width and Symmetry

(1) The purpose of this check is to establish and maintain a backcourse sector width and ratio between half-course sectors, that will provide the desired displacement sensitivity required at the procedural missed approach point (MAP). For ease of flyability and to remain within the procedurally protected area, a course width of 10 degrees has been selected as the most desirable to meet both of these objectives at Aspen.

(2) During the commissioning inspection, measure the course sector width and symmetry on a 10-mile arc from the LDA, at 17,000 feet and for comparability at 20,000 feet, in the normal configuration. If the results at the higher altitude are in tolerance and within $\pm$ 0.2 degrees of the lower altitude, any altitude between 17,000 and 20,000 feet inclusive may be used on subsequent inspections. Document the results of the comparability check on the facility data sheet.

g. Clearance

(1) Measure clearances in Sector 1 to ensure that the facility provides adequate off-course indications throughout the service volume. During commissioning, conduct the check on a 10-mile arc from the LDA antenna at both 17,000 feet and, for comparability, at 20,000 feet. Perform the comparability check IAW the procedure in Order 8200.1A, Chapter 217. Document the results of the comparability check on the facility data sheet.

(2) During the commissioning inspection, check clearances in both normal and the monitor reference configurations, designated in paragraph 5a. On subsequent periodic with monitor inspections, check clearances in the normal configuration only if the clearances found during the monitor alarm configuration are less than the tolerances for normal.

h. Course Alignment. Measure course alignment (either inbound or outbound) on the procedural azimuth using GPS. FMS, AFIS, theodolite, or well-defined checkpoint in the segment between 6 and 7 NM from the antenna at 12,550' MSL. The preferred method is to fly the published missed approach, intercepting the LDA guidance at approximately 5 NM from the antenna at 12,550 feet MSL, and flying a GPS or GPS-updated FMS ground track outbound from that point. The coordinates of mileage points on the course are contained in the facility data sheet. If other than the preferred method is used, document the method and altitude used on the flight inspection report. Document the location and description of any visual checkpoint used on the facility data sheet.

i. Course Structure. Measure structure while flying outbound, on the procedural azimuth, from 5 to 21.1 miles (inclusive), maintaining 12,550 feet MSL.

j. Polarization Effect. This check may be accomplished concurrently with the course structure check. Bank the aircraft 20 degrees left and right. Activate the event mark at the maximum banked attitudes.

k. Transition. Because the missed approach routing is a transition from the missed approach point to the operational service volume of the LDA facility, and the transition termination point is not identified with a facility other than the LDA course, check clearances along the missed approach routing.

(1) Commissioning. With the facility in RF alarm, start at the MAP, 100 feet below the minimum descent altitude (MDA), fly the missed approach procedure at an approximate climb rate of 152 feet per mile, until intercepting the LDA. Repeat the maneuver, except climb expeditiously to and maintain 14,000 feet to intercept.

(2) Periodic. Fly a normal published missed approach procedure from the MAP, starting at 100 feet below the MDA, until intercepting the LDA on course.

l. Monitors – Width and Alignment. Check monitors when prescribed by the checklist, when applicable on special inspections, and at the request of maintenance personnel. If the facility is found operating out-of-tolerance, check the monitor which should have sensed the out-of-tolerance condition.

(1) Width Monitor. Use the procedures and methods described in paragraph f. At the conclusion of the inspection, return the facility to normal and check and report the resulting course sector width and symmetry.

(2) Alignment Monitor. Position the aircraft on the designed procedural azimuth, between 5 and 15 miles, at an altitude where the signal is free of reflections. Request the course be misaligned to the monitor reference limits each side (90 Hz/150Hz) of the established course. Use both the recording device and meter values to verify course alignment shifts. Measure the alignment shifts by recording the instantaneous course displacements while maintaining a constant track; this may be accomplished on one run during which both alarm points and a return to normal are recorded. This check may also be accomplished by using the “equality of modulation method” as found in Order 8200.1, Section 217.

m. RF Power Monitor. This inspection is conducted to determine that the LDA meets specified tolerances throughout its operational service volume while operating at RF power alarm. Check for interference, signal strength, clearance, flag alarm current, identification, and structure as follows:

(1) Start 5 miles from the LDA at 11,000 feet. Climb outbound on course at an approximate rate of 152 feet per mile. Cross LINDZ at 12,550 feet and 26.1 miles at 12,900 feet.

(2) Fly an arc across the LDA course at 26.1 miles from the antenna at 12,900 feet throughout Sector 1.

(3) Repeat Step 2, except fly the arc at 20,000 feet.

(4) Fly an arc across the LDA course at 10 miles from the antenna at 20,000 feet throughout Sector 1.

(5) Repeat Step 4, except fly the arc at 12,900 feet.

n. Identification. Record the identification during all checks. Restrict the facility if identification cannot be received in all areas of required coverage.

o. Standby Power. The facility is powered by in-line “floating” batteries--a standby power check is not required.

p. Service Volume. Frequency protection for this facility has been approved to 20,000 feet MSL and 26.1 miles. The operational service volume for flight inspection purposes is as follows:

(1) Longitudinally from 5 to 21.1 miles

(2) Laterally 10 degrees each side of course.

(3) Vertically ascending to 12,550 feet MSL at 21.1 miles for the lower limit and 20,000 feet for the upper limit.

q. Analysis

(1) There is no requirement for inspecting the LDA inside 5 miles.

(2) Clearance deviations in Sector 1 to less than tolerance are not acceptable. Momentary deviations in Sector 2 to a minimum of 100 μA are acceptable, provided that the aggregate area does not exceed 3 degrees of arc.

r. Tolerances. Course structure, width, and alignment tolerances, similar to what applies to a non-precision air navigation facility (NAVAID), have been used for this facility based on the additional airspace protected by non-precision terminal instrument procedures (TERPS) criteria. Any modification or change to less restrictive procedural, protected areas will invalidate these tolerances. Actual tolerances are in degrees; the μA values shown in parenthesis, based upon a 10-degree course.

(30 μA = 1.0^0), are provided for reporting purposes.

CODES:

C – Tolerances applied to site, commissioning, or reconfiguration inspections

P – Tolerances applied to any inspection subsequent to the inspection outlined in Code C.

Parameter	Ref Para	Inspection		Tolerance/Limit
		C	P	
(1) Mod Lvl	5b	X	X	40% ± 4%
(2) Power Ratio	5d	X		Course transmitter power level output at least 10 dB greater than the clearance transmitter
(3) Phasing	5e	As required		No tolerance
(4) Width	5f	X		$10^0 \pm 0.5^0$
			X	$10^0 \pm 17\%$
(5) Symmetry	5f	X	X	Facility normal: 40 – 60%
(6) Alignment	5h	X	X	Designed procedural azimuth $\pm 2.5^0$ (+75 μA)
(7) Structure	5i	X	X	$\pm 3.0^0$ (± 90 μA) from the average course signal
(8) Polarization	5j	X	X	Maximum effect: ± 60 μA
(9) Monitors Align	5l(2)	X	X	$\pm 1.0^0$ (± 30 μA) from established alignment, not to exceed 75 μA from designed procedural azimuth
Width	5l(1)	X	X	$10^0 \pm 17\%$
RF Power	5m	X		Maintained at or above: Signal strength – 5 μV Flag alarm current – 240 μA Clearance and structure – in tolerance

Parameter	Ref Para	Inspection		Tolerance/Limit
		C	P	
(10) Transition	5k	X	X	At or greater than: Signal strength – 5 μV Flag alarm current – 240 μA Clearance and structure – in tolerance Interference – shall not cause an out-of-tolerance condition
(11) Clearance Normal	5g	X	X	Measured from designed procedural azimuth: Sector — Minimum Clearance 1 — Linear increase to 175 μA, then maintain 175 μA to 10^0 2 — 150 μA (see NOTE)
Facility in any alarm configuration		X	X	Clearances are reduced 15 μA from those required in normal.
	5q(2)	X	X	NOTE: Exceptions are authorized in Sector 2.
(12) Identification	5n	X	X	Clear, correct; identification shall have no effect on the course.

6. Periodicity. Inspect Aspen LDA in accordance with the periodicity requirements in Order 8200.1, United States Standard Flight Inspection Manual, Section 105.

7. Reporting. Report the results of Aspen, Colorado, LDA inspections on FAA Forms 8240-8, Flight Inspection Report – Instrument Landing System, and 8240-10, Flight Inspection Report – Azimuth Clearance Plot (as appropriate) in accordance with Order 8240.36, Instructions for Flight Inspection Reporting (latest revision) except for the following fields of FAA Form 8240-8:

a. Field 3, Runway No: enter "RWY 00."

b. Field 7, Facility Inspected: Place an "X" in the LDA box and write in after LDA, "\Depart,"

c. Field 8: Leave the "Category" box blank.

d. Report all results as a back course; report all course structure in the box for Zone 1 with distance relative to the LDA antenna position.

e. Field 12, Remarks: Include the comment, "Aspen, CO, LDA inspected using criteria and tolerances contained in the current edition of FAA Order 8200.32."

/s/

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