



Guidance Notes: EWIS

Electrical Wiring Interconnection Systems

New and revised certification specifications were introduced through CS-25 “Certification Specifications for Large Aeroplane” amendment 5 with a new Subpart H – Electrical Wiring Interconnection Systems – EWIS. The new amendment has been published as part of the ED Decision No. 2008/006/R on the 29th August 2008 and entered into force on September 5th, 2008. The FAA have released a similar requirement under FAR Part 26.

The addition requires existing TC Holders to develop EWIS Instructions for Continued Airworthiness (ICA) derived from the Enhanced Zonal Analysis Procedure (EZAP) is imposed through the provisions of Part 21A.3B©1 for existing TCs, 21A.21©(3) for applicants for TC and 21A.103(a)(2)(iii) for applicants for changes to TC. All TC holders should have been notified of the applicability of those provisions through a dedicated letter in October 2008

For STC Applications received after 1st January 2009, the Agency is mandating the EZAP related aspects dealing with Instructions for Continued Airworthiness of these requirements through a generic Certification Review Item with a Special Condition based on Part 21A.16B(a)3 that will be therefore part of the Certification Basis for that STC.

For TC Holders for the affected aeroplanes, EWIS ICA requirements are applicable to any changes to TC.

The affected aircraft types are large aeroplanes with a type certificate issued after 1st January 1958, that, as a result of original type certification or later increase in capacity, have:

1. A Maximum type-certificated passenger capacity of 30 or more;

Or

2. A Maximum payload capacity of 3402kg (7500lbs) or more

An Electrical Wiring Interconnection System means any wire, wiring device, or combination of these, including termination devices, installed in any area of the aeroplane for the purpose of transmitting electrical energy, including data and signals between two or more intended termination points.

Requirements:

I.

The applicant must conduct analyses if the STC requires a revision of the Instructions for Continued Airworthiness (ICA) applicable to Electrical Wiring Interconnection System (EWIS) as defined below that include the following:

Maintenance and inspection requirements for the EWIS developed with the use of an Enhanced Zonal Analysis Procedure (EZAP) that includes:

- a. Identification of each zone of the aeroplane.
- b. Identification of each zone that contains EWIS.
- c. Identification of each zone containing EWIS that also contains combustible materials.
- d. Identification of each zone in which EWIS is in close proximity to both primary and back-up hydraulic, mechanical, or electrical flight controls and lines.
- e. Identification of:

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- Tasks, and the intervals for performing those tasks, that will reduce the likelihood of ignition sources and accumulation of combustible material, and
 - Procedures, and the intervals for performing those procedures, that will effectively clean the EWIS components of combustible material if there is not an effective task to reduce the likelihood of combustible material accumulation.
- f. Instructions for protections and caution information that will minimize contamination and accidental damage to EWIS, as applicable, during the performance of maintenance, alteration, or repairs. The ICA must be in the form of a document appropriate for the information to be provided, and they must be easily recognizable as EWIS ICA.

II.

For the purpose of this SC, the following EWIS definition applies:

(a) Electrical wiring interconnection system (EWIS) means any wire, wiring device, or combination of these, including termination devices, installed in any area of the aeroplane for the purpose of transmitting electrical energy, including data and signals between two or more intended termination points. Except as provided for in subparagraph (c) of this paragraph, this includes:

- (1) Wires and cables.
- (2) Bus bars.
- (3) The termination point on electrical devices, including those on relays, interrupters, switches, contactors, terminal blocks, and circuit breakers and other circuit protection devices.
- (4) Connectors, including feed-through connectors.
- (5) Connector accessories.
- (6) Electrical grounding and bonding devices and their associated connections.
- (7) Electrical splices.
- (8) Materials used to provide additional protection for wires, including wire insulation, wire sleeving, and conduits that have electrical termination for the purpose of bonding.
- (9) Shields or braids.
- (10) Clamps and other devices used to route and support the wire bundle.
- (11) Cable tie devices.
- (12) Labels or other means of identification.
- (13) Pressure seals.

(b) The definition in subparagraph (a) of this paragraph covers EWIS components inside shelves, panels, racks, junction boxes, distribution panels, and back-planes of equipment racks, including, but not limited to, circuit board back-planes, wire integration units and external wiring of equipment.

(c) Except for the equipment indicated in subparagraph (b) of this paragraph, EWIS components inside the following equipment, and the external connectors that are part of that equipment, are excluded from the definition in subparagraph (a) of this paragraph:

- (1) Electrical equipment or avionics that is qualified to environmental conditions and testing procedures when those conditions and procedures are :
 - (i) Appropriate for the intended function and operating environment, and
 - (ii) Acceptable to the Agency.
- (2) Portable electrical devices that are not part of the type design of the aeroplane. This includes personal entertainment devices and laptop computers.
- (3) Fibre optics.

III.

The following can be used as a guide to assess the impact of the STC on the EWIS ICA EZAP and re-application of EZAP to STC affected zone:

Step 1: Does the STC:

- Affect or modify wiring or its environment,

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- Install or result in wiring being located within 5 cm (2 inches) of both primary and back-up hydraulic, mechanical, or electrical flight controls,
- Change the density of the zone or
- Change the potential effects of fire in the zone?

Step 2: If answer to step 1 is "NO", no further action required

Step 3: If answer to step 1 is "YES", perform EZAP analysis

Step 4: Determine if there is an existing (MRBR) EZAP task(s) that is applicable and effective

Step 5: If answer to step 4 is "YES", no further action required because the existing EZAP derived maintenance task(s) are adequate

Step 6: If answer to step 4 is "NO", develop appropriate task(s) and incorporate them into existing maintenance program.

In case the initial assessment shows that no revision is necessary for the EWIS ICA in accordance with AMC 20-21, this shall be substantiated as part of the certification package for the approval of the STC.

In case the initial assessment shows that a revision to the EWIS ICA may be necessary, the applicant for the STC of the affected aeroplane types identified above must perform an EZAP analysis and must accordingly, if necessary, submit final EWIS ICA to the Agency by 7 June 2010 or the date of issuance of the certificate whichever occurs later.

Enhanced Zonal Analysis Procedures

Zonal Inspection is a collective term comprising selected Visual Inspections and Visual Checks that are applied to each zone, defined by access and area, to check system and power plant installations and structure for security and general condition.

Levels of inspection applicable to EWIS.

Detailed Inspection (DET).

An intensive examination of a specific item, installation or assembly to detect damage, failure or irregularity. Available lighting is normally supplemented with a direct source of good lighting at an intensity deemed appropriate. Inspection aids such as mirrors, magnifying lenses or other means may be necessary. Surface cleaning and elaborate access procedures may be required.

General Visual Inspection (GVI).

A visual examination of an interior or exterior area, installation or assembly to detect obvious damage, failure or irregularity. This level of inspection is made from within touching distance unless otherwise specified. A mirror may be necessary to enhance visual access to all exposed surfaces in the inspection area. This level of inspection is made under normally available lighting conditions such as daylight, hangar lighting, flashlight or droplight and may require removal or opening of access panels or doors. Stands, ladders or platforms may be required to gain proximity to the area being checked.

As an auditor you need to ensure that clients have made the relevant provisions in place to meet the above where required.