NOTICE

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

Air Traffic Organization Policy

N JO 6950.54

Effective Date: 03/16/2017 Cancellation Date: 03/16/2018

SUBJ: Elimination of FAA-STD-019e Requirement on External Bonding Jumper Conductor for All Flexible Metallic Conduits

1. Purpose of This Notice. This notice provides for the elimination of the requirement in FAA-STD-019e section 4.2.10.3 (c) that requires an external bonding jumper conductor on all flexible metal conduits.

2. Audience. This notice applies to the following Air Traffic Organization service units: Air Traffic Services, Mission Support, and System Operations; and all associated air traffic control facilities.

3. Where Can I Find This Notice. You can find an electronic copy of this notice on the Directives Management System (DMS) website at <u>https://employees.faa.gov/tools_resources/orders_notices/</u>. Or go to the MyFAA Employee website and select 'Tools and Resources' then 'Orders and Notices'.

4. Explanation of Changes. The FAA-STD-019e, section 4.2.10.3 (c) states that "All flexible metal conduits shall be provided with an external bonding jumper in addition to the internal equipment grounding conductor. The bonding jumper shall be a 6 AWG green-insulated stranded copper conductor. The bonding jumper shall terminate on fittings listed for grounding at each end of the flexible metal conduit."

The FAA practice is always to install the equipment grounding conductor with the phase conductors, including for the conductors that are run inside the flexible metal conduits. This practice meets or exceeds the National Electrical Code (NEC) 2014 requirements as quoted below:

a. NEC Article 348.60 Grounding and Bonding requires the installation of an internal equipment grounding conductor if the flexible metal conduit is used for equipment interconnection where flexibility is necessary to minimize the transmission of vibration.

b. NEC Article 348.60 states, "If used to connect equipment where flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor shall be installed."

c. NEC 2014 Article 250.118 Equipment grounding conductor run with or enclosing circuit conductors shall be one or more or the combination of the following:

(5) Listed flexible metal conduit meeting all the following conditions:

- a. The conduit is terminated in listed fittings.
- b. The circuit conductors contained in the conduit are protected by overcurrent devices rated at 20 amperes or less.

- c. The combined length of flexible metal conduit and flexible metallic tubing and liquidtight flexible metal conduit in the same ground-fault current path does not exceed 6 feet.
- d. If used to connect equipment where flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor shall be installed.

Based on the above practice and meeting the NEC requirements, and following general consensus of a Power Services Group Work Group in Washington DC in September 2015 (as recorded on the minutes), it is determined that the FAA-STD-019e section 4.2.10.3 (c) requirement can be eliminated.

FAA-STD-019e is currently under review and will be amended to reflect the changes documented in this notice.

5. Detailed Guidance. The external bonding jumper conductor on flexible metal conduit is no longer required per FAA-STD-019e, section 4.2.10.3 (c), provided that an internal equipment grounding conductor is present per the discussion above.

6. Implementation. Guidance for equipment grounding conductors as directed in FAA-STD-019e (as amended by this notice), shall be included:

- **a.** As part of the initial design package for both facility and/or equipment.
- **b.** As part of the new system.
- c. Whenever existing systems undergo major upgrades.

7. Responsibilities

a. All designs and contract specifications shall incorporate FAA-STD-019e (as amended by this notice). Accomplishment of these requirements will be the joint responsibility of the service area Engineering Services staffs and appropriate program offices.

b. The design shall be performed by qualified engineers who are familiar with this notice and FAA Orders, Standards, and Specifications. All questions regarding implementation of this notice or FAA-STD-019e will be referred to the Power Services Group, System Engineering Program Office.

8. Distribution. This order will be distributed electronically.

9. Background. The existing FAA requirement for an external bonding jumper on flexible metal conduit and liquid-tight flexible metal conduit has been repeatedly challenged because it exceeds the requirements of the National Electrical Code (NFPA 70). These wiring methods are addressed in NEC, Articles 348 and 350, respectively.

The same requirement was also in FAA-STD-019d (paragraph 3.12.3(d), dated August 9, 2002), and FAA-C-1217e (paragraph 4.6.2.6, dated January 25, 1991).

Several Unacceptable Condition Reports have been filed for noncompliant installations against the FAA-STD-019e, section 4.2.10.3 (c), even though the installation practice meets the NEC.

10. Authority to Change this Notice. The Director of Technical Operations, Air Traffic Control Facilities/Engineering Services, issues changes to this notice that do not set policy, delegate authority, or assign responsibility.

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