

AMMO 50: COMPLIANCE REQUIREMENTS FOR ACCEPTANCE OF PROJECTS ON FACILITIES WITH LIGHTNING PROTECTION SYSTEMS

A DoD Three Day Advanced Senior Inspector Course

Course Objective: *To understand lightning behavior, how damage can occur, to address common construction issues, to comprehend defensive measures and to apply inspection and testing procedures. This course is designed for engineers or experienced inspectors who may be responsible for determining compliance of LPSs after any construction project, even if the LPS was compliant before the construction project.*

Application: *This course is intended for Base inspectors who will be appointed by the Base CE (BCE) to determine acceptance or rejection of various construction projects performed on facilities with LPSs.*

Prerequisites: *1) Military: a) Attendance and completion of AMMO 47 or AMMO 48, b) AFSC of 3EOX1, 5-level with training commensurate to that level of expertise and experience, c) Proficiency with test equipment required to obtain measurements for bi-annual inspections. 2) Civilian: a) Attendance and completion of AMMO 47 or AMMO 48, b) Six years experience in maintenance and inspection of LPSs in a field equivalent to AFSC 3EOX1, 5-level, c) Proficiency with test equipment required to obtain measurements for bi-annual inspections. 3) MAJCOM Electrical Engineers responsible for LPSs for the Command.*

- 1. Introduction to NLSI and to the Course Objectives. Description of Course Materials and Selected Codes & Standards.**
- 2. Review of Fundamental Concepts of Lightning Protection including: Lightning Behavior, Physics & Theory; Lightning Damage Characteristics; The Lightning Defense Template.**
- 3. Review of Exterior Lightning Protection for a DoD Facility: Accepted Designs – Franklin/Masts/Overhead/Faraday-Like Shield; Unconventional Devices – ESE/DAS; Geometric and Rolling Ball Design Review; Appropriate Selection of Air Terminal Options & Down Conductors. Compliance with NFPA-780 & DoD Codes & Standards. How/What/Where to Inspect.**
- 4. Understanding the Bonding & Grounding Imperatives. Why Bond? Bonding Options. Grounding Design Options & Effectiveness. Solutions to Difficult Situations. Compliance with NFPA-780 & DoD Codes & Standards. Understanding NEC 250 – Grounding & 25 Ohms. Exam.**

5. **Advanced Inspection Principles. Integrating LPS on a building addition into the original building LPS. Ways a LPS can be compromised: Paint; HVAC additions; Fall protection; Antennas; Re-roofing; Other projects.**
6. **Interior Lightning Protection for the Electrical & Electronic Systems of a DoD Facility. Introduction to Surge Protection Devices (SPDs) including Functions, Technologies, Performance, Specification, and Installation per Codes & Standards Requirements. Suggested Remedies for Outdated DoD SPD Codes. Exam.**
7. **Lightning Protection for Specific DoD Structures. Essential vs Non-Essential Criteria. Airfield & Communications Towers. Energetic Materials Storage, including ECMs and Other Buildings. Includes Site Inspection of LPSs as available.**
8. **Understanding Codes & Standards. NFPA-780. AFI 32-1065; AFMAN 91-201; ETL 12-9; DA PAM 385-64; NEC 250; UFC 3-520-01; UFC 3-575-01; Compare NFPA-780 to AFI 32-1065/PAM 386-64. Exam.**
9. **LPS Grounding and Bonding Testing. Requirements per DoD Test Records. Going Beyond the Codes. Commonly Observed LPS Deficiencies. Continuity Testing. Ground Resistivity Measuring with 3-Point Fall of Potential and Clamp-On Test Meters. In-the-field and in-the-ground testing procedures (weather permitting). Exam.**
10. **Lightning Safety for Outdoors Activities. Safe/Not Safe Zones. Lightning detection methods.**
11. **Student Critique: NLSI photographic presentation of LPS strengths and weaknesses at major USAF installations. Verbal exam with class participation.**
12. **Conclusion. References & Resources. Glossary of Terms. Final Exam. Instructor Critique.**

-

This course exceeds information contained in NFPA-780, UL 96a, NASA KSC-STD-E0012F, USAF AFI 32-1065, AFMAN 91-20; ETL 12-9; DA PAM 385-64; Navy OP SEA 5, FAA-STD-019e, DDESB 6055.9, and DDESP TP22.