



Tailored Evaluation Guides

These evaluation guides cannot hope to, nor are they intended to be all inclusive of explosives safety regulations. They are intended to help activities navigate the many regulations that mitigate the risk of a mishap while handling explosives. Managers and handlers alike should be thoroughly familiar with all references and regulations that impact explosives operations.



Marine Corps Systems Command

Environmental and Explosives Safety Evaluation Guide

Lightning Protection Systems



EVG-LPS-002 Sep 22

Program 6: LPS/Grounding/Emissions Control

Element 02 - Grounding System Test Plan

<u>ID#</u>	<u>Evaluation Question</u>	<u>Reference(s)</u>	<u>Chpt</u>	<u>Paragraph</u>	
60201	Has a grounding system test plan been established for visual inspection and electrical testing of the primary and secondary grounding system and grounded components?	NAVSEA OP 5 Vol 1		5-8.1, 6-9.1	[]Yes []No []N/A
60202	Does the overall grounding system test plan identify the responsibilities for maintaining and updating specific test procedures, conducting the tests, recording the test results, reviewing the test results and scheduling corrective actions?	NAVSEA OP 5 Vol 1	5	5-8.1.1	[]Yes []No []N/A
60203	Is a sketch of each facility to be tested included in the test plan and does the sketch include all test points that require testing?	NAVSEA OP 5 Vol 1	5	5-8.1.7	[]Yes []No []N/A
60204	Are the proper procedures used for testing lightning/grounding systems? Is equipment calibration current?	NAVSEA OP 5 Vol 1	5	5-8.2, 5-8.2.2	[]Yes []No []N/A
60205	Are personnel that perform various lightning protection system functions (testing and inspection) trained and qualified ?	NAVSEA OP 5 Vol 1		5-8.1.2, Appendix D	[]Yes []No []N/A
60206	Are ground systems tested, inspected and records maintained as required?	NAVSEA OP 5 Vol 1		5-8.2, 5-8.2.7, 5-8.3, 6-9	[]Yes []No []N/A
60207	Are test records maintained for six inspection cycles?	NAVSEA OP 5 Vol 1	5	5-5, 5-8.2.7	[]Yes []No []N/A
60208	Is the primary or secondary ground girdle tested for electrical resistance and continuity, upon installation (monthly during first year) and at least every 24 months thereafter?	NAVSEA OP 5 Vol 1	5	5-8.2.2	[]Yes []No []N/A
60209	Is the interconnection between the secondary grounding girdle and other grounds (power/ instrumentation/ static/ ordnance/ structural) tested upon installation and every 24 months thereafter?	NAVSEA OP 5 Vol 1		5-5, 5-8.1.4, 6-9.2	[]Yes []No []N/A
60210	Are ordnance ground systems visually inspected at least every six months and tested at least every 24 months?	NAVSEA OP 5 Vol 1	5	5-5.4.5.1, 5-5.4.5.2	[]Yes []No []N/A
60211	Are portable/installed ground cables visually inspected and tested for electrical resistance?	NAVSEA OP 5 Vol 1	5	5-9 thru 5-9.7.7	[]Yes []No []N/A



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60214 Is test equipment used to measure the earth resistance specifically designed for earth ground system testing? NAVSEA OP 5 Vol 1 5 5-8.2.4 []Yes []No []N/A

Element 03 - Lightning Protection and Grounding Maintenance

ID#	Evaluation Question	Reference(s)	Chpt	Paragraph	
60301	Is all metallic equipment properly bonded/grounded?	NAVSEA OP 5 Vol 1	6	6-6	[]Yes []No []N/A
60302	Are repairs made as necessary to obtain proper resistance within the system?	NAVSEA OP 5 Vol 1		5-4.1, 6-9	[]Yes []No []N/A
60303	Has the Commanding Officer or designated representative identified all hazardous locations (Class I, II & III locations) within the activity and are these locations documented in a permanent record?	NAVSEA OP 5 Vol 1	5	5-2	[]Yes []No []N/A
60311	Are all metal masses to ordnance handling, operating and storage facilities considered for side flash, and are they properly grounded/bonded when required?	NAVSEA OP 5 Vol 1	6	6-6.3	[]Yes []No []N/A
60312	Are ground rods a minimum of 3/4-inch in diameter, copper or copper-clad steel, a minimum of 8ft in length, a minimum of 10 ft in the ground and a minimum of 2ft below grade unless in a test well (if in a test well the rod shall be a minimum of 10ft)?	NAVSEA OP 5 Vol 1	5	5-4.1.1.a thru 5-4.1.1.e	[]Yes []No []N/A
60313	Are ordnance handling, operating and storage facilities/areas provided with lightning protection as required?	NAVSEA OP 5 Vol 1	6	6-3.a thru 6-3.f	[]Yes []No []N/A
60314	If lightning protection is omitted/not installed on a facility, are the reasons for not protecting the facility documented and kept with the related site approval documentation?	NAVSEA OP 5 Vol 1	6	6-3.1	[]Yes []No []N/A
60315	Do all Class II and III storage facilities have lightning protection and secondary ground system as required?	NAVSEA OP 5 Vol 1	6	6-8.2.2, 6-8.2.3	[]Yes []No []N/A
60316	Are commercially built, pre-engineered "portable" magazines/magazine groups properly grounded to provide 25 ohms or less ground resistance?	NAVSEA OP 5 Vol 1	6	6-8.2.2.1, 6-8.2.2.2	[]Yes []No []N/A
60317	Are all metal parts of magazines that pose a side-flash hazard properly bonded?	NAVSEA OP 5 Vol 1	6	6-6.3	[]Yes []No []N/A
60318	Are conductors supported, at a distance of 3 feet or less?	NFPA 780	4	4.9.6.1	[]Yes []No []N/A



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60319	Do conductor bends have a radius of not less than 8 inches and an angle not less than 90 degrees?	NFPA 780	4	4.9.5	[]Yes []No []N/A
60320	Are air terminal tips at least 10 inches higher than the object or area they are to protect?	NFPA 780	4	4.6.2.1	[]Yes []No []N/A
60321	Are air terminals secured against overturning or displacement? Are air terminals greater than 24 inches supported at a point no less than one half their height?	NFPA 780	4	4.6.2.2	[]Yes []No []N/A
60322	Are metal ventilators bonded to secondary ground system?	NAVSEA OP 5 Vol 1		6-8.2.1, 8-2.3.5	[]Yes []No []N/A
60323	Are railroad tracks grounded at points prior to entering a zone of lightning protection?	NAVSEA OP 5 Vol 1	6	6-6.3.1	[]Yes []No []N/A
60324	Are lightning protection systems installed on piers/wharves as required?	NAVSEA OP 5 Vol 1	6	6-8.2.3.1	[]Yes []No []N/A
60325	Do all air terminals have a two-way path to ground? Are down conductors from air terminals on a mast system placed symmetrically (on opposite sides) about the mast?	NAVSEA OP 5 Vol 1	6	6-4.1.2, 6-4.2	[]Yes []No []N/A
60326	Are shade structures used for ordnance operations protected by a mast or catenary lightning protection system?	NAVSEA OP 5 Vol 1	8	5-5.3.1.A	[]Yes []No []N/A
60327	Is a lightning warning system required and if so is it installed correctly?	NAVSEA OP 5 Vol 1	6	6-2	[]Yes []No []N/A
60328	Has criteria been established for terminating A&E operations when required at the approach of a thunderstorm, and do the procedures allow for the termination of operations prior to a storm approaching within ten miles if required?	NAVSEA OP 5 Vol 1	6	6-10	[]Yes []No []N/A
60329	Are cables used to connect Ready Service Lockers to ground rods made of AWG No. 1/0 uninsulated copper with strands not less than AWG No. 17?	NAVSEA OP 5 Vol 1	5	5-4	[]Yes []No []N/A
60330	Are single portable magazines larger than 25 square feet grounded using a minimum of two separate ground rods, each placed in a different corner?	NAVSEA OP 5 Vol 1	6	6-8.2.2.1	[]Yes []No []N/A
60331	Are down conductors subject to physical damage or displacement protected for a minimum of 6ft above grade level?	NAVSEA OP 5 Vol 1	4	4-9.11	[]Yes []No []N/A
60332	Are connector fittings attached so as to withstand a pull test of 200 pounds? Are the fittings of the bolted, welded, high-compression, or crimp type?	NAVSEA OP 5 Vol 1	4	4.12	[]Yes []No []N/A



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60333	Are all bonding connections and conductor splices unpainted?	NAVSEA OP 5 Vol 1	8	8.5.4.4	[]Yes []No []N/A
60334	Are strike termination devices (air terminals) placed at the appropriate intervals according to roof type?	NFPA 780	4	4.7.2	[]Yes []No []N/A