

NAVSEA 05Z3

Electrical Systems Technical Update

Presented at the National Shipbuilding Research Program
Electrical Technologies Panel Meeting

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Electrical Systems Ships – SEA 05Z33

NAVAL SEA SYSTEMS COMMAND

- Status
- Approvals
- Summary of Selected Current Projects
- Circuit Protection Technical Advisory Board (CPTAB)
- Related NSRP Electrical Technologies Panel Projects

Status

NAVSEAINST 9304.1E “SHIPBOARD CABLE AND CABLEWAY INSPECTION AND REPORTING PROCEDURES” *Published July 26, 2018*

Instruction describes requirements for planning and performing shipboard cableway inspections and correcting identified cable and cableway hazards. Covers all cable types used in the Fleet.

The new instruction is now consistent with the Joint Fleet Maintenance Manual (JFMM) and current cableway inspection practices.

Approvals L.C. Doane 300-LED series fixtures with the P-601-350 LED drivers

L.C. Doane Part No.	Military Part Number	Specification Sheet
301-LED	M-16377/8-331.1SSL	MIL-DTL-16377/8
301-LED-F	M-16377/8-331.2SSL	MIL-DTL-16377/8
301-LED-P	M-16377/8-347.2SSL	MIL-DTL-16377/8
301-LED-PF	M-16377/8-347.3SSL	MIL-DTL-16377/8
300-LED	M-16377/11-77.4SSL	MIL-DTL-16377/11
300-LED-F	M-16377/11-77.5SSL	MIL-DTL-16377/11
300-LED-P	M-16377/11-344.2SSL	MIL-DTL-16377/11
300-LED-PF	M-16377/11-344.3SSL	MIL-DTL-16377/11
303-LED	M-16377/12-333.1SSL	MIL-DTL-16377/12
303-LED-F	M-16377/12-333.2SSL	MIL-DTL-16377/12
311-LED	M-16377/12-341.1SSL	MIL-DTL-16377/12
311-LED-F	M-16377/12-341.2SSL	MIL-DTL-16377/12
303-LED-P	M-16377/12-342.2SSL	MIL-DTL-16377/12
303-LED-PF	M-16377/12-342.3SSL	MIL-DTL-16377/12
301-LED-E	M-16377/73-331.1EMSSL	MIL-DTL-16377/73A
301-LED-F-E	M-16377/73-331.2EMSSL	MIL-DTL-16377/73A
301-LED-P-E	M-16377/73-347.2EMSSL	MIL-DTL-16377/73A
301-LED-PF-E	M-16377/73-347.3EMSSL	MIL-DTL-16377/73A
300-LED-E	M-16377/74-77.4EMSSL	MIL-DTL-16377/74A
300-LED-F-E	M-16377/74-77.5EMSSL	MIL-DTL-16377/74A
300-LED-P-E	M-16377/74-344.2EMSSL	MIL-DTL-16377/74A
300-LED-PF-E	M-16377/74-344.3EMSSL	MIL-DTL-16377/74A
303-LED-E	M-16377/75-333.1EMSSL	MIL-DTL-16377/75A
303-LED-F-E	M-16377/75-333.2EMSSL	MIL-DTL-16377/75A
311-LED-E	M-16377/75-341.1EMSSL	MIL-DTL-16377/75A
311-LED-F-E	M-16377/75-341.2EMSSL	MIL-DTL-16377/75A
303-LED-P-E	M-16377/75-342.2EMSSL	MIL-DTL-16377/75A
303-LED-PF-E	M-16377/75-342.3EMSSL	MIL-DTL-16377/75A

Approvals

LED Smart LED 4-foot T12 lamp

P/N FLZ-T12-R-48-115-0-G-20-41-M f

Military part number M16377/86-003 MIL-DTL-16377/86A

Approved for use as a replacement for the F48T12HO fluorescent lamps used in the MIL-DTL-16377/13 family of high bay fixtures.

Approvals

LED Lighting Solutions Global LLC's LED light fixtures to the requirements of the MIL-DTL-16377 specification for Type III, Class 2 light fixtures in both emergency and non-emergency variants.

LED Lighting Solutions Part Number	Description
LLS360-MILX3-8-40-SD	Standard Mount, Diffuse Window, Non-emergency
LLS360-MILX2-8-40-SD	
LLS360-MILX1-8-40-SD	
LLS360-MILX3-8-40-FD	Flush Mount, Diffuse Window, Non-Emergency
LLS360-MILX2-8-40-FD	
LLS360-MILX1-8-40-FD	
LLS360-MILX3-8-40-SD-EM	Standard Mount, Diffuse Window, Emergency
LLS360-MILX2-8-40-SD-EM	
LLS360-MILX1-8-40-SD-EM	
LLS360-MILX3-8-40-FD-EM	Flush Mount, Diffuse Window, Emergency
LLS360-MILX2-8-40-FD-EM	
LLS360-MILX1-8-40-FD-EM	

Current Projects

- Naval Combatant Design Standards – Electrical Section Updates
- MIL-STD-2003 Rev B - Electric Plant Installation Standard Methods for Surface Ships and Submarines
- Specs, Standards and Drawings Updates

NCDS UPDATES (proposed)

SECTION	TITLE	Data Call Notes
307 - New	Electric Plant Control System	Develop new design specification based on problems and lessons learned from surface casualties and failure review boards
300	1399-LVDC	This task proposes to identify modifications to MIL-STD-1399 to incorporate Interfaces for LVDC.
235	Electric Propulsion	Create a Propulsion Motor Drive Specification (CPES requirement from 5/18/2016 for MVDC Propulsion Motor Module and for MVDC ground reference device) FUNDED
313	Batteries and Facilities	Revise NCDS Section 313 and associated battery CID's referenced in table 1. The revision will include referencing PD-133 Fork Lift battery spec, non-chargeable and chargeable lantern battery information, and lithium battery information as required. This task is recommended in FY18, but after NSTM 313 Rev 3 is published.
332	Lighting Fixtures	Revise current design specifications to reflect advancing technologies that will ensure future ship classes are well equipped to support Fleet Mission Requirements. Revisions will also consider and incorporate lessons learned and commonality.
310	Electric Power Generation	Revise MIL-G-21296B and MIL-G-22077C Generator Specification to cover Medium Voltage.
314	Power Conversion Equipment UPS, Static Frequency Changers, Rectifiers, Power Supplies, Variable Frequency Drives	Revise Specifications: 1) PCM 1A and PCM 1B, 2) Update MIL-PRF-32272 3) MVDC ground reference specification for MVDC power converters
422	Electrical Navigation Aids (incl. Navigation Lights)	Revise current design specifications to reflect advancing technologies that will ensure future ship classes are well equipped to support Fleet Mission Requirements. Revisions will also consider and incorporate lessons learned and commonality.
310	Electric Power Generation	Revise current design specifications to reflect advancing technologies that will ensure future ship classes are well equipped to support Fleet Mission Requirements. Revisions will also consider and incorporate lessons learned and commonality.

MIL-STD-2003 Electric Plant Installations

- Latest NAVSEA approved methods from shipyard standard electrical installation methods drawings from shipyards.
- Major effort to update guidance on:
 - Incorporates the latest shipyard and industry practices
 - cable lugs, cable marking, end preparation and repair
 - Medium Voltage cables
 - Lithium Ion Battery management
 - Multi-Cable Penetrations - MCP Insert Blocks extensively updated
 - Fastener requirements iaw SAE, ASTM, NAS and NSTM 075
 - multi-cable connectors, connector fabrication and lead preparation
 - New- guidance for weight limits of enclosures when using washers as shims
- Production of Final Copy for Review and Approval is Complete
- Delivering to SEA 08 for Review
- Publication mid-2019 (estimated)

MIL-DTL-32483A Switchgear, Power, Hard-Mounted, Medium Voltage, Naval Shipboard

- SRB and comment adjudication completed May 2018.
- Final Revision In Review

MIL-DTL-xx653 *New* Switchgear, Power, Shock-Mounted, Low Voltage, Naval Shipboard

- Created to establish standard construction, testing, and safety requirements for shock-mounted low voltage switchgear that will result in consistent vendor pricing from program to program.
- SRB and comment adjudication completed May 2018.
- Final Revision In Review

MIL-DTL-24643 Cables, Low Smoke (Base spec + all slant sheets)

- SRB review complete
- Compiling received comments into a spreadsheet to be available mid-December.
- Review and adjudication of comments. January 2019
- Base spec + all associated slant sheets finalized. February 2019
- NAVSEA signature and publication. March 2019 (estimated)

MIL-DTL-24640 Cables, Lightweight, Low Smoke (Base spec + all slant sheets)

- Open PDS.
- Will start work on revisions upon completion of MIL-DTL-24643.

MIL-PRF-XX654 Arc Fault Detection System Performance Specification

- In revision
- Market Survey Complete
- Technical Issues being addressed
- Circulating for comments

NAVSEA 803-2145532C Indicator/Indicating System Liquid Level Application/Selection Guide

- PDS Open
- Incorporate latest guidance and revisions to installation drawings
- Revisions to be distributed for comment early 2019.

MIL-T-17221 Transformers, Power, Distribution, Single Phase, 400 Hertz 01-JUN-1973

- **NEW** PDS
- Routine updates to ensure currency of specifications

MIL-T-15108 Transformers, Power, Step Down, Single-Phase, 60 Hertz, 1-KVA 03-JUL-1985

- **NEW** PDS
- Routine updates to ensure currency of specifications

New Projects FY19-FY20

Initiate routine review and update of

MIL-STD-2037 Procedure to Obtain Certification for Electric Motor Sealed Insulation Systems
23-Oct-1991

MIL-R-2729 Regulator-Exciter Systems, Voltage, A.C. Generator, Naval Shipboard Use
28-Jan-1992

MIL-I-3190 Insulation Sleeving, Electrical, Flexible, Coated, General Specification 28-Aug-1993

MIL-I-003190/1 Insulation Sleeving Class 130, Type A, Category A

MIL-I-3190/2A Insulating Sleeving Class 130, Type B, Category B

MIL-I-3190/3A Insulation Sleeving, Class 155, Type A, Category A

MIL-I-003190/4 Insulation Sleeving, Class 155, Type A, Category C

MIL-I-3190/5B Insulation Sleeving Class 200, Type C, Category C

MIL-I-3190/6A Insulation Sleeving Class 200, Type D, Category C

MIL-I-3190/7A Insulation Sleeving Class 220 Degrees C, Type E, Category C

MIL-I-3190/8A Insulation Sleeving, Silicone Coated, Class 220 Deg. C, Type D, Category C

MIL-I-3190/9(1) Insulation Sleeving, Silicone Coated Class 240 Deg C, Type D, Category C

Overview

- Policy and responsibilities apply to all nuclear and non-nuclear circuit protection, circuit breakers, protective relays and switchboards.
- Address known circuit protection and switchboard design, installation and operational issues/ problems.
- Technology developments reviewed and evaluated.

Goals

- Maintain communication / share best practices and common problems.
- Coordinate procurement, design, development, and support efforts among users to maximize commonality.
- Optimize the use of Navy resources to establish and maintain a sustainable supplier base for reliable and economical circuit protection equipment.
- Maintain standardized COTS & military specs – Low Voltage and Medium Voltage
- Ensure Navy circuit protection available for next 5 years.
- Ensure COTS or new technology devices under development for applications where need is identified.

Status

Executive committee met November 29, 2018

- LCM Update and addressing hi-visibility issues
- ACB 17587 qualification and support issues
- AQB 17361 obsolescence issues
- Safety Devices for tag out and circuit isolation
- Medium Voltage Switchboard issues
- Digital replacement of Analog circuit protection
- Next in person meeting planned for May/June in Philadelphia.

- Distributed Temperature Sensing for Inspection Electrical Panels on Navy Ships – NSRP effort completed. Follow on efforts will be discussed.
- Evaluation of Efficacy of Self-Sealing Cable Transit Devices for Aluminum Bulkheads and Decks in Non-Watertight Boundaries
- Low Voltage Shipboard Lighting Feasibility Study
- High Temperature Insulated Bus Pipe (HTIBP)
- New Projects (TBD)

Questions?