

NAVSEA 05Z3

Electrical Systems Technical Update

National Shipbuilding Research Program
Electrical Technologies Panel Meeting
Manchester, NH

13 August 2025

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Electrical Systems, Protection, Safety, Distribution, Lighting and Instrumentation – Ships

SEA 05Z33

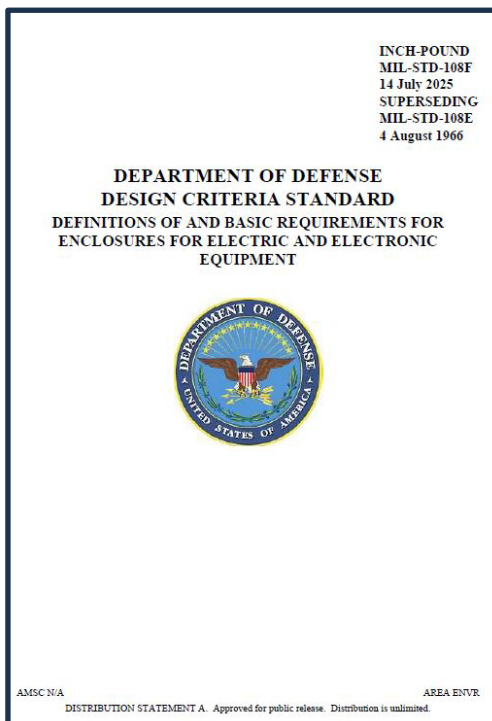
NAVAL SEA SYSTEMS COMMAND

NAVSEA 05Z Update to NSRP

- Status of Standards and Specifications Projects of Interest
 - Recently Published
 - High priority
 - Cable Sealants and Transits
- SEA 05Z3 Supported Electrical Technologies Panel Projects
 - Current, Recent and Past Projects

Recently Completed Specification Revisions

MIL-STD-108F
DESIGN CRITERIA STANDARD
DEFINITIONS OF AND BASIC REQUIREMENTS FOR
ENCLOSURES FOR ELECTRIC AND ELECTRONIC EQUIPMENT
Publication date 14 July 2025



Updated all reference documents

Included Allowance for Composite Enclosures
NAVSEA 803-6983506 - Electrical Enclosure, Composite Installation and
Details

Added levels to the Submersible Enclosure Categories

- Submersible (15 feet)
- Submersible (50 feet)
- Submersible (150 feet)
- Submersible (300 feet)
- Submersible (1,600 feet)

Added new table for guidance
TABLE V. NEMA and IEC rating comparisons

NAVSEA 05Z Update to NSRP

Recently Completed Specification Revisions

MIL-DTL-3064

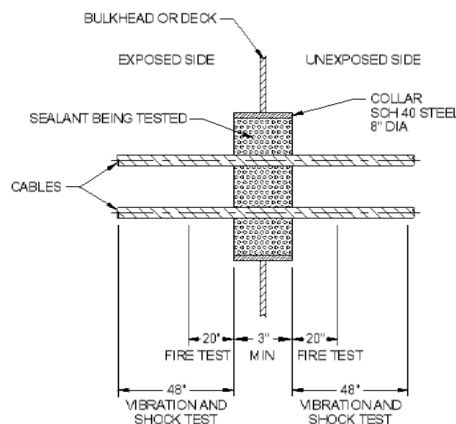
INSULATION, ELECTRICAL, PLASTIC-SEALER COMPOUND

Publication date 14 July 2025

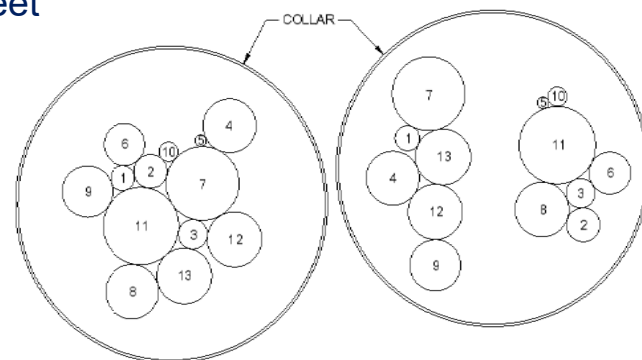
- Updated all reference documents and requirements test methods
- Updated to meet (tailored) requirements of MIL-STD-3020 **Fire Resistance of U.S. Naval Surface Ships**
- Order of testing on deck and bulkhead sections assemblies 4 x 6 feet with 8" collar with cables (HF Sealant Only):

Soap and blow
Vibration
Soap and blow
Shock
Soap and blow
Fire resistance
Hose stream

Publication will allow Cable Sealant Manufacturers to develop test plans to meet the requirements of 3064 in order to qualify their products.



NOT TO SCALE



NO.	TYPE	DIAMETER (INCHES MAXIMUM)	NO.	TYPE	DIAMETER (INCHES MAXIMUM)
1	RG189-00001	0.405	8	LSTTRS-6	0.880
2	LSMSCS-7	0.544	9	LS2SWAL-10	0.830
3	RG189-00002	0.475	10	MIL-PRF-85045/25	0.315
4	RG193-00001	0.870	11	LS3SUS-10	1.250
5	MIL-PRF-85045/17	0.087	12	LSFSGU-23	0.890
6	LSTTRS-2	0.680	13	LSPI-7	0.900
7	LSTTRS-16	1.190			

High Priority Projects

NSTM 300 (S9086-KC-STM-010-300) Naval Ship's Technical Manual Chap 300 Electric Plant

- ✓ Separated into 2 volumes
- ✓ SRB review and comment period complete
- Adjudicating comments
- Volume 1 Electric Plant - General
 - Section 1 Sources of Information
 - Section 2 Electrical Insulation
 - Section 3 Maintenance of Electrical Equipment
 - Section 4 Reconditioning Electrical Equipment after Contamination
 - Appendix A Electrical Insulating Material
 - Appendix B Sealed Insulation Systems for Alternating Current Motors
 - Appendix C Certification Proc for Refurb of Submarine Ship Service/400 Hz Motor Gens
 - Appendix D Banding Armatures with Resin-Treated Fibrous-Glass Banding Tape
 - Appendix E Trickle Method of Shipboard Motor Repair
 - Appendix F QA Inspection Proc for Application of Insulating Varnishes
 - Appendix G Electrical/Electronic Workbenches
 - Appendix H References
- Volume 2 Shipboard Electrical Safety
 - Section 5 Electrical Safety Precautions
 - Appendix A Safety Supplement
 - Appendix B PPE, Safety Equipment
 - Appendix C References

High Priority Projects (continued)

NSTM 320 (S9086-KY-STM-010/320 Rev 8) Electric Power Distribution Systems

- In Progress
- Publication in 2025

MIL-STD-1399-300-3 Low Voltage DC Interface

- ✓ SRB review completed
- Final review in progress

MIL-DTL-24640 Cables Lightweight Low Smoke

- Review in progress

MIL-DTL-24643/70 1 kV Cable New

MIL-DTL-24643/87 15kV Cable New

MIL-HDBK-299 Electrical Cable Comparison Handbook

Cable Data Pertaining to Electric Shipboard Cable

- ✓ Complete
- NAVSEA 08 review
- Publication in 2025

MIL-STD-1399-300-3 Low Voltage DC Interface

- Publication in 2025

High Priority Projects (continued)

MIL-DTL-24705 B (and 3 Slant Sheets -1, 3, 4) Penetrators, Multiple Cable, for Electric Cables, General Specification

- Update of Qualification Test Requirements in progress
- Incorporating tailored requirements from MIL-STD-3020 FIRE RESISTANCE OF US NAVAL SURFACE SHIPS
- Publication expected 2026

S9320-AM-PRO-020/MLDG, Rev 3

Underwater Cable Assembly and Encapsulated Components, Fabrication, Repair, and Installation Manual, Volume II: Molding and Inspection Procedures

✓ Complete

NAVSEAINST 9304.1E

Shipboard Cable and Cableway Inspection and Reporting Procedure

✓ Complete

MIL-DTL-917

Detail Specification Electric Power Equipment, Basic Requirements For

- In progress
- Review of References complete
- Reviewing Derating requirements

Circuit Breakers

MIL-DTL-17587D and /3A, 5A, and 6A –

Circuit Breakers, ACB, Low Voltage, Electric Power, Air, Removable Construction, General Specification for

MIL-DTL-17588F

Breakers (Automatic - ALB-1) and Switch, Toggle (Circuit Breaker, Non-Automatic - NLB-1) Air, Insulated Housing, 125 Volts and Below AC and DC (Naval Shipboard Use)

MIL-DTL-32485 Amendment

MIL-DTL-32485/1 - MSVCB-4.76KV-1200 and MSVCB-4.76KV-1600 **NEW**

UL 2831, Rev. 1

US Naval COTS 3-Pole, Rated Vmax 4.76, 8.25, & 15kV, AC, VCBs, Drawout Type, Without Internal OC Protection, & Accessories/Components for Use on Non-Nuclear Naval Combatant Ships

MIL-DTL-17361H - Circuit Breaker Types AQB/NQB, Air, Electric, Low Voltage, Insulated Housing (Shipboard Use), General Specification for

Motors

MIL-DTL-17059 Motor, 60 Cycle, Alternating Current, Fractional H.P.

- Update in Progress

MIL-DTL- 17060 Motors, Alternating Current, Integral-Horsepower

- Update in Progress

Generators

MIL-DTL-3124 Generator, Alternating Current, 60-Hertz

- Expected to start March 2025

Regulators

MIL-R-2729 Regulator-Exciter Systems, Voltage, A.C. General

- SEA 08 Review

MIL-PRF-XXX733 Multi-layer, Multi-Conductor Laminated Electrical Bus, AC / DC

- SEA 08 Review

Bus Transfer

MIL-PRF-17773 Switch, Bus Transfer, Electric Power, Automatic

Transformers

MIL-DTL-15108 Transformers, Power Step Down, Single Phase, 60 Hz, 1 KVA, Dry Type

MIL-R-23098 Regulator, Line Voltage, Single Phase, 400 Hz AC

MIL-T-17221 Transformers, Power, Distribution, Single Phase, 400 HZ, 220 Deg. C, Dry (Air Cool)

New Start

Switchgear

MIL-DTL-16036N –

Part 1 (Amendment); Part 2 (Revision) Switchgear, Power, LV, Naval Shipboard

MIL-DTL-XX663 - Switchgear, Power, Shock-Mounted, Low Voltage, Naval Shipboard

Insulation, Varnishes and Tape

MIL-I-24092 Insulating Varnishes & Solventless Resins For Application By Dip Process

11 Slant Sheets

- Cancellation

MIL-I-24718 & Slant Sheets - Insulating Resins, Solventless, Vacuum-pressure-impregnating

- *New Start*

MIL-DTL-19166 Insulation Tape, Electrical, High-Temperature, Glass Fiber, Pressure-Sensitive

- Update of Qualification Flammability Test Requirements in progress

MIL-I-24391 Insulation tape, electrical, plastic pressure sensitive

- Update of Qualification Flammability Test Requirements in progress

MIL-I-3505 Insulation Sheet and Tape, Electrical, Coil and Slot, High Temperature

- Update of Qualification Flammability Test Requirements in progress

Lighting Projects

- **16377/27D** 50W Watertight SYM 92.2, 93.2, 93.4, 93.5, 92.2SSL, 93.2SSL, 93.4SSL, 93.5SSL
Action needed to reinstate plastic housing for non-topside installations (DLA request)
- **16377/60B** Incandescent Floodlights 150W Sym 316 & 317 **25-Jan-2022**
Developing detailed requirements for dimmable SSL floodlights compatible with existing ship lighting distribution architecture.
Address topside nighttime security minimum lumen requirements.
- **16377/61A** Incandescent & LED Floodlights 300W Sym 303.2 303.3 303.4 303.2SSL 303.3SSL 303.4SSL **02-Nov-21**
Action needed to add electrical ground check test for Type III (SSL) fixture.
- **16377/86B** Lamp SSL for use as Replacement for Commercial Fluorescent Lamp **02-Nov-21**
Action needed to address electrical safety tests for LED tubes.
- **DOD-HDBK-289 (will become MIL-STD-x743)**
 - Rewrite in progress
 - Publication late 2026
- **MIL-L-24282 SYM 106.1** Light Signal Multi-Purpose
 - At SRB Review and Comment
- **MIL-P-24174 (will become MIL-DTL-24174) and /2 and /5**
Control, Navigation Lights, General Specification for
 - At SRB Review and Comment
- **MIL-P-24175 (will become MIL-DTL-24175) 5 slant sheets**
Panels Power Supply and Control for Navigation Lighting
 - At SRB Review and Comment

Instrumentation

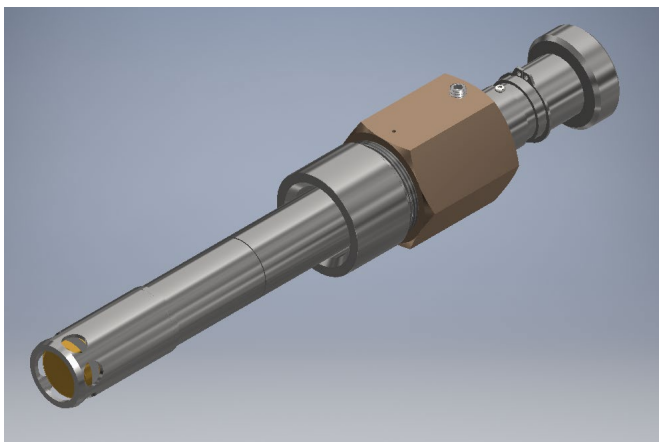
- **MIL-DTL-16034 - and /1-18** Meters, Electrical Indicating (Switchboard and Portable Types)
 - Cancel all portable meter and 6" Switchboard Meters Spec Slant Sheets
 - Incorporate requirements for and then cancel:
 - **MIL-V-23151** - Voltmeter, Expanded Scale Switchboard Type
 - **MIL-M-19261** - Meter, Power Factor 4-1/2 Inch, Switchboard Type
 - **MIL-W-19088** - Wattmeter, Switchboard Type, 4-1/2 inch
 - **MIL-M-23167** - Frequency Meter, Expanded Scale Switchboard Type
- **MIL-S-16104** - Synchroscope –
 - ✓ Update in progress
 - ✓ Updated all references and reviewed and updated test methods
 - SRB Industry and Gov't Review for Comment
- **MIL-I-16103** - Phase Sequence, Indicator, Switchboard and Panel
Update planned
- **MIL-M-16125** - Frequency Meters, Electrical (Portable)
Obsolete and will be cancelled



Instrumentation

MIL-DTL-15103 Salinity Indicating Equipment

- ✓ Updated all references
- ✓ Updated all Test Methods and Procedures (extensive)
SRB Comments being adjudicated
Publication expected 2025
- ✓ **Stainless Steel Cells and Valve Assembly qualified on QPL-15103**
- ✓ **Brass Cells and Bronze Valve Assembly completed Qualification testing**
- ✓ **QPL-15103 listing pending shock approval**



Instrumentation (continued)

- **Review of all TEMPERATURE and PRESSURE Specifications**
 - **2026**
- **NSTM 504 Pressure, Temperature and Other Electromechanical Measuring Instruments**
 - **2026**

- **DOD-HDK-289 Shipboard Lighting**

Report delivered to SEA 05Z3 and NSWC PD c/447

Information collected by the project will be used in the development of the new MIL-STD-X743 Standard Lighting for Ships and Submarine that will replace the Lighting Handbook.

- **Distributed Temperature Sensor for Electrical Switchboards**

SEA 05Z3 and NSWC PD working on project to demonstrate a prototype on LBES.

- **MIL-DTL-24643/ 87 15KV cable design and specification development**

Needed for new combatant designs

- **Shore Power Cable Conector Test Set**

- **Low Voltage Lighting**

- **Solid State and Remote Source Navigation Lighting**

- **Thermal Imaging Windows Evaluation for MV Switchboards**