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INCH-POUND

MIL-DTL-16377/86A(SH)

DRAFT

SUPERSEDING

MIL-DTL-0016377/86(SH)

30 June 2014

## DETAIL SPECIFICATION SHEET

### FIXTURES, LIGHTING; LAMP, SOLID STATE, FOR USE AS REPLACEMENT FOR COMMERCIAL FLUORESCENT LAMP

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-DTL-16377.

All dimensions are in inches. For tolerances other than those specified herein, see 3.5.2 of MIL-DTL-16377.

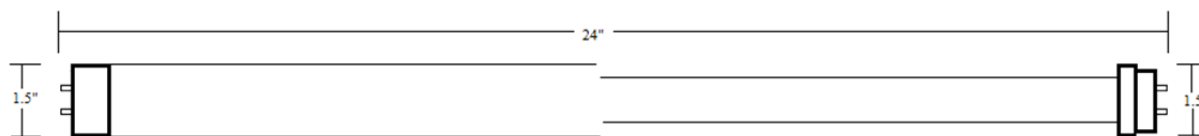


FIGURE 1. M16377/86-001 lamp dimensions (inches).

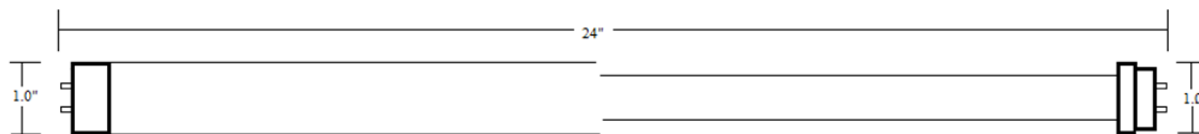


FIGURE 2. M16377/86-002 lamp dimensions (inches).

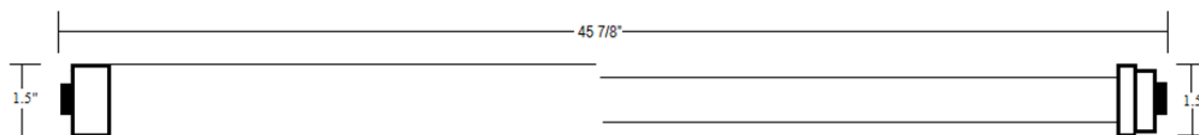


FIGURE 3. M16377/86-003 lamp dimensions (inches).

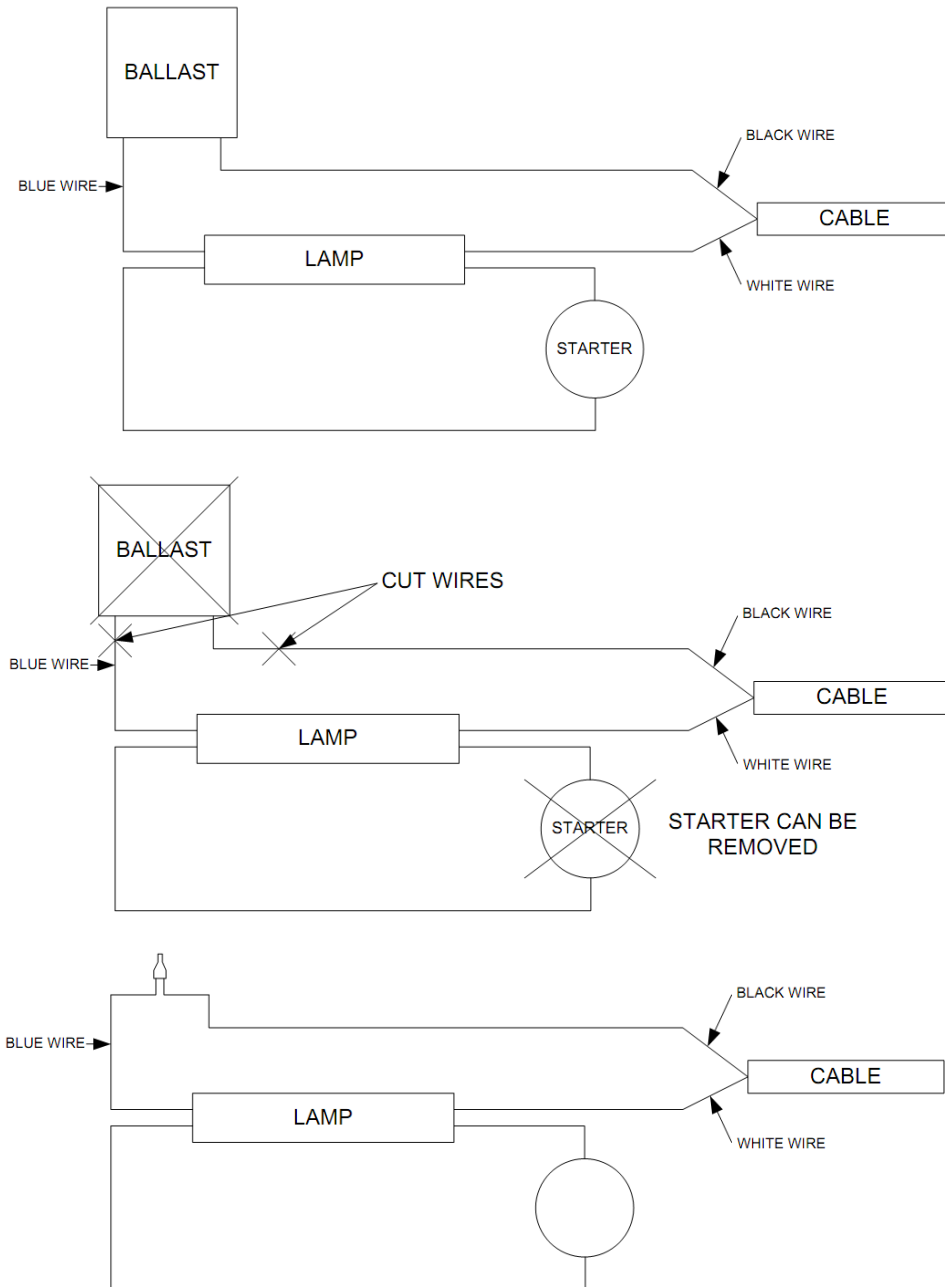


FIGURE 4. Ballast and starter removal for fixtures utilizing M16377/44, 2-wire ballast for 115-volts alternating current (VAC) operation of solid state lamp.

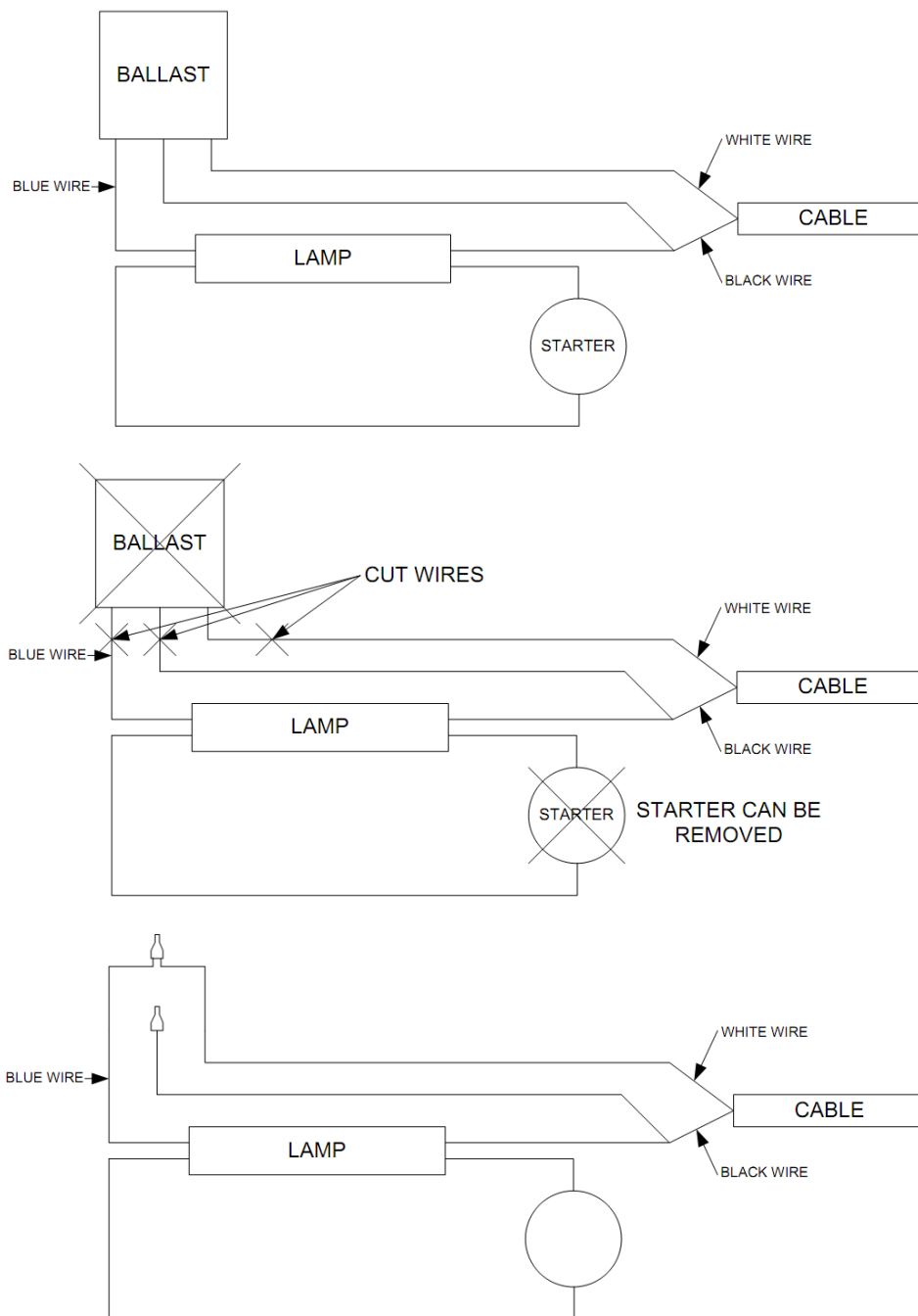


FIGURE 5. Ballast and starter removal for fixtures utilizing M16377/72, 3-wire ballast and M16377/81-002 ballast for 115-VAC operation of solid state lamp.

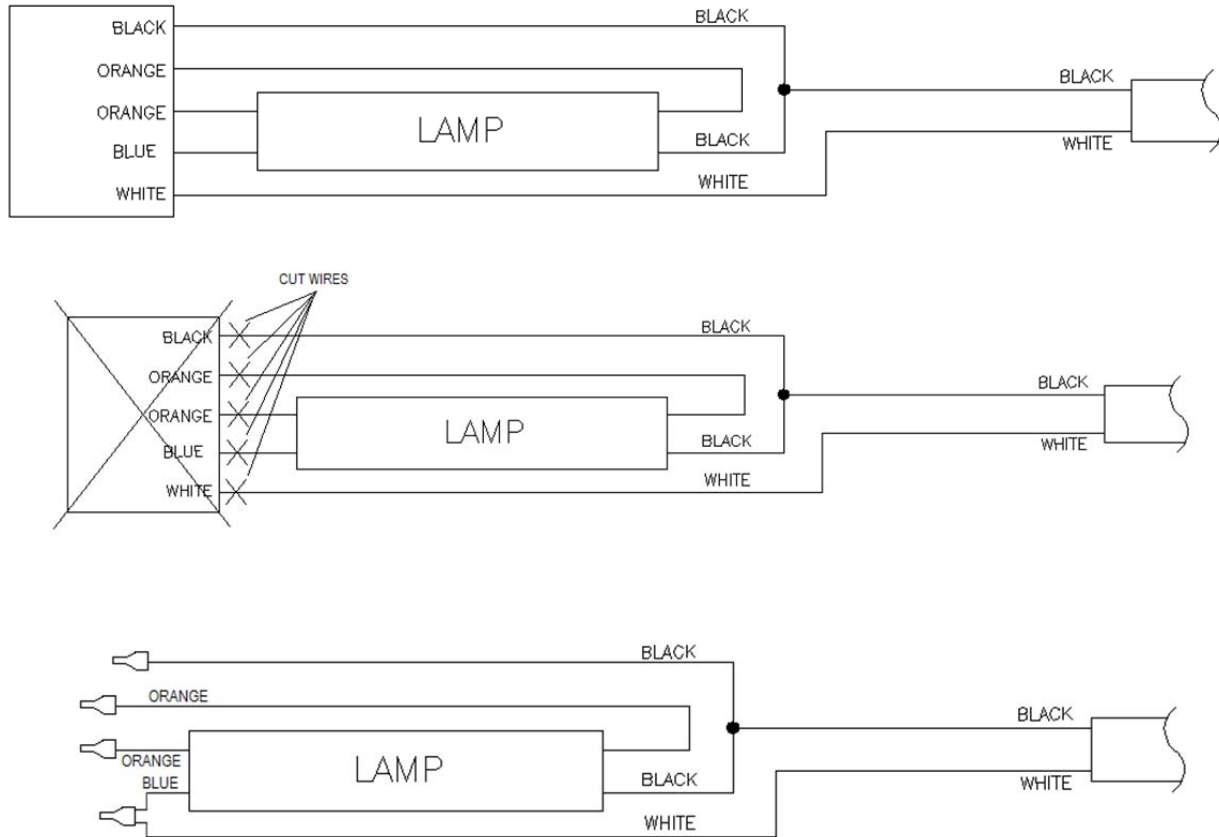


FIGURE 6. Ballast removal for fixtures utilizing M16377/81-001, 5-wire ballast for 115-VAC operation of solid state lamp.

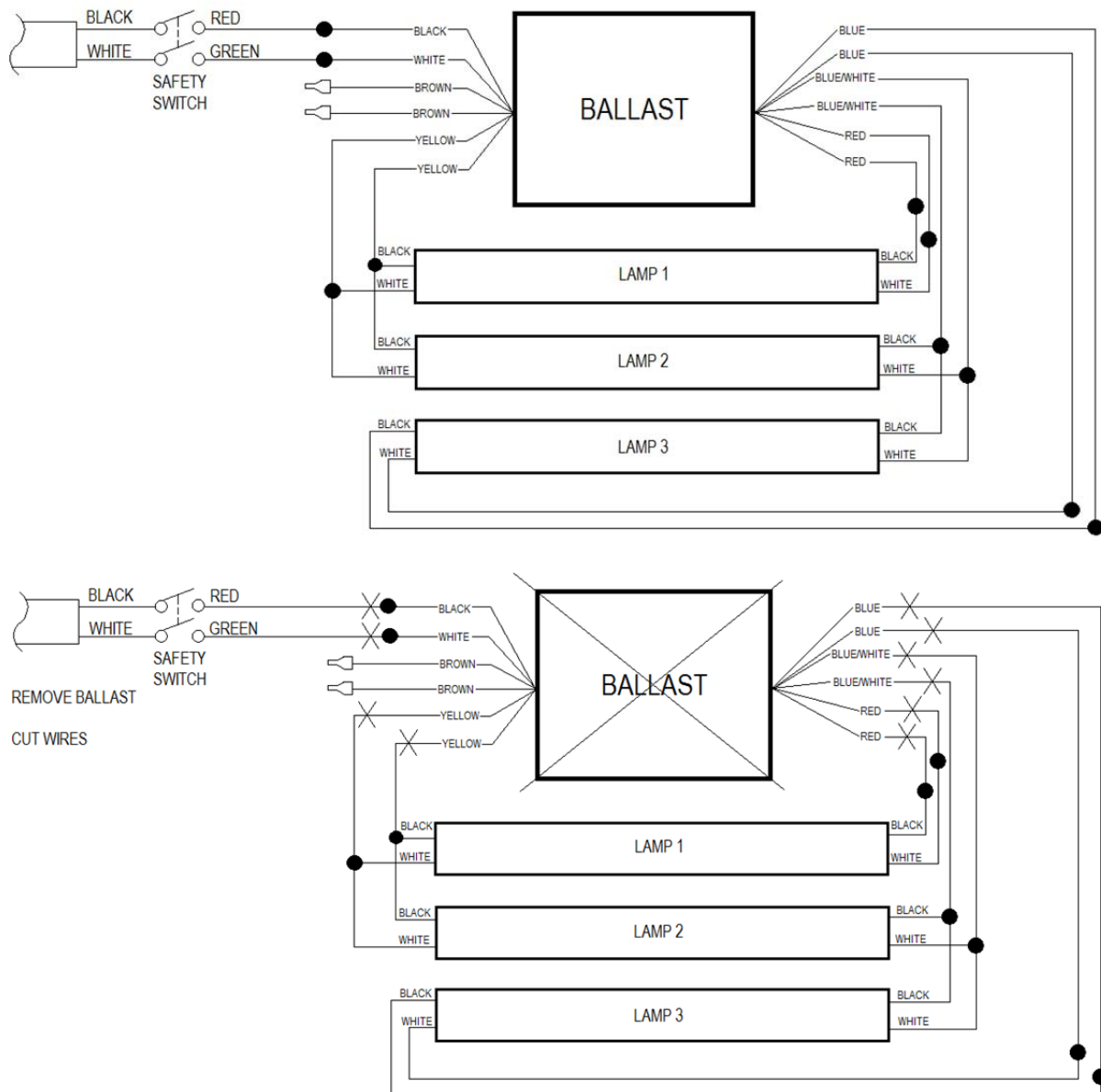


FIGURE 7. Ballast removal for M16377/13 fixtures for operation of solid state lamp.

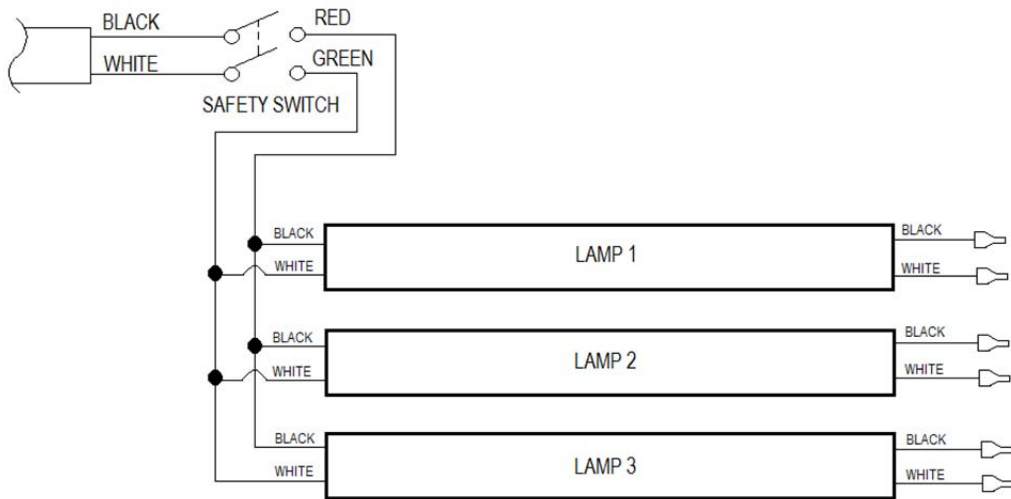


FIGURE 7. Ballast removal for M16377/13 fixtures for operation of solid state lamp – Continued.

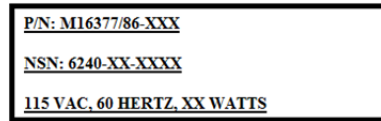


FIGURE 8. Label for lamp, dimensions at manufacturer's discretion.

REQUIREMENTS:

CLASSIFICATION:

Type: III  
Class: 2

DESIGN:

Electrical rating:

M16377/86-001, -002: 12 watts, maximum.  
M16377/86-003: 35 watts, maximum.

Dimensions: See [figures 1, 2, and 3](#).

Nominal end-cap diameter:

M16377/86-001, -003: 1.5 inches.  
M16377/86-002: 1.0 inch.

Nominal overall length:

M16377/86-001, -002: 24 inches.  
M16377/86-003: 45<sup>7</sup>/<sub>8</sub> inches.

Operation:

M16377/86-001: The solid state lamp shall utilize light emitting diodes (LEDs) and is intended as a replacement of the F20T12 and F17T12 fluorescent lamps used in the following MIL-DTL-16377 fixtures:

M16377/8  
M16377/11  
M16377/12  
M16377/57  
M16377/73  
M16377/74  
M16377/75

M16377/86-002: The solid state lamp shall utilize LEDs and is intended as a replacement of the F17T8 fluorescent lamps used in the following MIL-DTL-16377 fixtures:

M16377/78  
M16377/79  
M16377/80  
M16377/82  
M16377/83  
M16377/84

M16377/86-003: The solid state lamp shall utilize LEDs and is intended as a replacement of the F48T12HO fluorescent lamps used in the following MIL-DTL-16377 fixtures:

M16377/13

Electrical operation:

M16377/86-001: The lamp shall be compatible with M16377 fixtures utilizing F20T12 or F17T12 fluorescent lamps and the following ballasts, with the starter removed:

M16377/44

M16377/72

The lamp shall also function in M16377 fixtures utilizing F20T12 or F17T12 fluorescent lamps when the starter has been removed, the ballast has been removed in accordance with [figure 4](#) or [5](#), and ungrounded 115 VAC is applied to the lamp holders.

The lamp shall function in New Emergency Automatic Lighting Systems (NEALS) fixtures on battery power for a minimum of 5 hours utilizing a battery back-up ballast that meets the requirements of MIL-DTL-16377/77.

M16377/86-002: The lamp shall be compatible with M16377 fixtures utilizing the M16377/81-001 ballast with no fixture modification. The lamp shall be compatible with M16377 fixtures utilizing the M16377/81-002 ballast with the starter removed.

The lamp shall also function in M16377 fixtures when the fixture has been modified as on [figure 5](#) or [6](#).

The lamp shall function in NEALS fixtures on battery power for a minimum of 5 hours utilizing a battery back-up ballast that meets the requirements of MIL-DTL-16377/77.

M16377/86-003: Lamps shall function in M16377/13 fixtures with the ballast removed in accordance with [figure 7](#).

White light output:

M16377/86-001: The candlepower distribution curve of a modified Symbol 333.1 fixture with the LED lamps installed shall meet the requirements of 3.7.1 of MIL-DTL-16377 when compared to the candlepower distribution curve shown on figure 10 of MIL-DTL-16377/12.

M16377/86-002: The candlepower distribution curve of a modified Symbol 333.1T8 fixture with the LED lamps installed shall meet the requirements of 3.7.1 of MIL-DTL-16377 when compared to the candlepower distribution curve shown on figure 13 of MIL-DTL-16377/80.

M16377/86-003: The candlepower distribution curve of a modified Symbol 74 fixture with the LED lamps installed shall meet the requirements of 3.7.1 of MIL-DTL-16377 when compared to the candlepower distribution curve shown on figure 10 of MIL-DTL-16377/13.

Non-white light:

Non-white light can be accomplished by using existing filters or by developing color LED tubes. No white light leakage shall be evident when existing filter tubes are used with M16377/86-001 or -002. The red, amber, blue, and cyan LED tubes shall have their light fall within the relevant boundaries as described in 3.7.4 of MIL-DTL-16377.

Total candlepower of colored LED tubes shall be 20 percent of white light output. Gray light shall be equal to 2.5 percent or 1 percent of the full output of the M16377/86-001 and -002, as appropriate.

Base configuration:

M16377/86-001, -002: Compatible with medium bipin base (G13/G13M) of the naval-use lampholders section of UL 496.

M16377/86-003: Compatible with recessed double-contact base (R17d) of the naval-use lampholders section of UL 496.

Weight:

M16377/86-001, -002: 0.95 pound, maximum.



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M16377/86-003:	2 pounds, maximum.
Color rendering index (CRI):	$\geq 75$ .
Color temperature:	4100 K. See 3.7.4.1.1 of MIL-DTL-16377.
Designed life:	$L_{70} \geq 50,000$ hours.
Minimum lumens at 0 hours on battery back-up for M16377/86-001, -002:	240.
Minimum lumens at 5 hours on battery back-up for M16377/86-001, -002:	144.
Circuit design:	The lamp assembly shall incorporate integrated driver circuitry so that no external driver components are required.
Designation and marking:	One label as shown on <a href="#">figure 8</a> .

EXAMINATION AND TESTS:

First article inspection:	See <a href="#">table I</a> .
Conformance:	
Conformance inspection:	See MIL-DTL-16377.
Comparison inspection:	Same as the first article inspection.

GENERAL INFORMATION:

Assignment of military part numbers and general information is shown in [table II](#).

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TABLE I. First article and comparison inspection for complete T12 LED tube.<sup>1/</sup>

Tests	Requirement	Test Method	Remarks
Examination	3.13	4.5	<sup>2/</sup>
Operation	3.13	4.8.1	<sup>2/</sup>
Dielectric withstanding voltage	3.6.15	4.8.2	<sup>2/</sup> , <sup>3/</sup>
Insulation resistance	3.6.16	4.8.3	<sup>2/</sup> , <sup>3/</sup>
Shock	3.5.12	4.8.7	<sup>2/</sup> , <sup>3/</sup>
Vibration	3.5.13	4.8.8	<sup>2/</sup> , <sup>3/</sup>
Dielectric withstanding voltage	3.6.15	4.8.2	<sup>2/</sup> , <sup>3/</sup>
Insulation resistance	3.6.16	4.8.3	<sup>2/</sup> , <sup>3/</sup>
Noise	3.5.14	4.8.9	<sup>2/</sup> , <sup>3/</sup>
Continuity of grounding	3.6.13.4	4.8.12	<sup>2/</sup>
Magnetic permeability	3.4.8	4.8.18	<sup>2/</sup>
Photometrics	3.7.1	4.8.6.1	<sup>2/</sup>
Brightness	3.7.5	4.8.6.4	<sup>2/</sup>
Chromaticity	3.7.4	4.8.6.5	<sup>2/</sup>
Correlated color temperature (CCT)	3.7.4.1.1	4.8.6.6	<sup>2/</sup>
Lumen maintenance	3.7.11	4.8.20	<sup>2/</sup>
Fail-safe circuit	3.6.17	4.8.24	
Plastics flammability and smoke	3.4.2.1	--	
Optical uniformity	3.7.7.1	4.8.4	
Electromagnetic interference	3.6.14	4.8.16	<sup>2/</sup> , <sup>4/</sup>
Power interface	3.6.18	4.8.21	<sup>2/</sup>
Power quality	3.6.18.1	4.8.22	<sup>2/</sup>
Voltage transient spike	3.6.18.2	4.8.23	<sup>2/</sup> , <sup>5/</sup>
Emergency light output	3.7.1.1	4.8.6.8	<sup>6/</sup>
Battery discharge test	3.6.19.3	4.8.26	<sup>6/</sup>

NOTES:

- <sup>1/</sup> Requirement and test method paragraph numbers refer to MIL-DTL-16377.
- <sup>2/</sup> Testing shall be accomplished with three LED lamps installed in M16377/12 Symbol 333.1 fixture, NSN 6210-00-548-0222 for M16377/86-001, with three LED lamps installed in M16377/80 Symbol 333.1T8, NSN 6210-01-592-2397, or with three LED lamps installed in M16377/13 Symbol 74, NSN 6210-00-474-5653, as appropriate. The legacy fixture shall be modified as shown on [figure 5](#), [6](#), or [7](#), as appropriate.
- <sup>3/</sup> Testing shall be completed in above order.
- <sup>4/</sup> Required tests are RE 101, RE 102, CE 101, and CE 102 only.
- <sup>5/</sup> Number of spikes shall be as specified in MIL-STD-1399-300.
- <sup>6/</sup> Testing shall be accomplished with two LED lamps installed in M16377/74 Symbol 77.4EM fixture, NSN 6210-01-477-4615, or two LED lamps installed in M16377/83 Symbol 77.4T8EM, NSN 6210-01-595-4136, as appropriate. The legacy fixture shall be modified as shown on [figure 5](#) or [6](#), as appropriate.

TABLE II. Military part numbers.

<b>Military Part Number M16377/86-</b>	<b>Item Name</b>	<b>National Stock Number (NSN)</b>
001	2-foot T12 LED lamp, white	6240-01-610-2124
002	2-foot T8 LED lamp, white	
003	4-foot T12 LED lamp, white	
004	2-foot T12 LED lamp, red	
005	2-foot T12 LED lamp, amber	
006	2-foot T12 LED lamp, blue	
007	2-foot T12 LED lamp, cyan	
008	2-foot T12 LED lamp, gray 1%	
009	2-foot T12 LED lamp, gray 2.5%	
010	2-foot T8 LED lamp, red	
011	2-foot T8 LED lamp, amber	
012	2-foot T8 LED lamp, blue	
013	2-foot T8 LED lamp, cyan	
014	2-foot T8 LED lamp, gray 1%	
015	2-foot T8 LED lamp, gray 2.5%	
016	4-foot T12 LED lamp, red	
017	4-foot T12 LED lamp, amber	
018	4-foot T12 LED lamp, cyan	

CHANGES FROM PREVIOUS ISSUE: Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Preparing activity:  
Navy – SH  
(Project 6210-2014-019)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.