

IEEE-650 REVIEW, WORKING GROUP - 2.13

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Report to SC-2 from Working Group

The following changes and corrections to IEEE-650, 1990 are recommended by the working group.

Abstract - Add, "These methods may also be used to qualify similar electronic equipment for use in mild environment applications outside containment, where specific standards for such equipment are not available." This is the new second sentence in the abstract, coming just before "The qualification methods set ".

Foreword -

- 1) Requires revision as to membership of working Group on Battery Chargers and inverters.

Scope and Purpose -

- 1) ANSI / NEMA PE 5-1985 is still valid for battery chargers. It is now IEEE 944 for inverters.
- 2) Section 1.2, second paragraph, first sentence - Add ", and its associated ancillary equipment" after "charger and inverter".

References -

- 1) Add NEMA AB-1 as reference # 20.
- 2) These shall be added to the references as follows:
 - 21) EPRI Preventive Maintenance Basis Volume 22: Inverters, EPRI TR-106857V22, December, 1997
 - 22) EPRI Preventive Maintenance Basis Volume 23: Battery Chargers, EPRI TR-106857-V23, December, 1997
 - 23) NMAC UPS Maintenance and Application Guide, EPRI TR-100491, September, 1994.
- 3) Add a reference to the ANSI Standard on Surge Withstand Capability (see 4.2.1 (3)).

Definitions - Under definition of components, replace "transistors" with "semiconductors" and replace "springs" with "electromechanical devices".

Section 4.3.1 -

- 1) Revise 4.3.1 (1) to read "Minimum and maximum temperature, and profiles if available".
- 2) Revise 4.3.1 (4) to read "Altitude (static air pressure)".

Section 5.1 -

- 1) Figure 1, page 11 - Delete block in flow chart labeled "Stress Test (5.3.1.8)".
- 2) 5.1.2.2.1, first paragraph, last sentence - add ", and within the typical mild environment radiation dose of $1E 10^3$ Rads" after "equipment" at end of sentence.
- 3) 5.1.2.2.1, (1) Electronic Components - add note (asterisk) that "Radiation tolerance levels must be verified by the manufacturer / qualifier."

Section 5.2 -

- 1) 5.2.2.2.1 - Delete "plus 20% for margin" from last paragraph.
- 2) 5.2.2.2.2 - Delete "plus 20% for margin" from last paragraph.
- 3) 5.2.2.2.4 - Change "aged" to "tested" in last sentence.
- 4) 5.2.2.2.7 - Add "transzorbis, MOV's, etc"
 - 1) Delete "plus 20% for margin" from this section.
- 5) 5.2.2.2.10 - Replace "0.5 eV" with "0.8 eV" It was noted that 0.5 eV is too low, leading to longer aging times than necessary, and that this value should be changed to 0.8 eV
- 6) Add a section 5.2.2.2.11 for "Motors, Pumps, and/or Other Materials" which now are covered only under 5.2.2.2.10, "Organic Materials" (due to winding insulation).

Section 5.3 -

- 1) No other equipment has both pre and post stress tests. This would lead to the removal of step 5.3.1.8 on Figure 1, page 11, as previously identified
- 2) First paragraph, fourth and fifth sentences - Change to read "The type test sequence in this section is conservative in that the components are subjected to additional stresses after aging. With the inclusion of the seismic test, this conservatism is sufficient".
- 3) 5.3.1.2, last sentence - Add "When applicable," to the beginning of the sentence.
- 4) 5.3.1.3 - Change "typically less than 1.0×10^4 " to "typically 1.0×10^3 ,".
- 5) 5.3.1.5 - Change third sentence from end to read "[see 4.2.1 (1 and 2)(a, b, and d)]".
- 6) 5.3.1.6 (1)-Revise second sentence to ".....[see 4.2.1 (1 and 2)(a, b, and d)] at maximum, nominal, and minimum input voltages, and maximum and minimum loads, shall be documented".
- 7) Figure 2 - Change label at trough to "MAXIMUM OBTAINABLE HUMIDITY".
- 8) 5.3.1.6 (2) - Change "50% minimum" to "=> 50% if achievable". Revise the next

- sentence to read " [see 4.2.1 (1 and 2)(a, b, and d)] at maximum, nominal, and minimum input voltages, and maximum and minimum loads, shall be documented".
- 9) 5.3.1.6.(3) - Change next to last sentence to read " [see 4.2.1 (1 and 2)(a, b, and d)] at maximum, nominal, and minimum input voltages, and maximum and minimum loads, shall be documented".
- 10) 5.3.1.6, last sentence on page 16 - Change "impact on aging" to ""impact on stressing the equipment".
- 11) 5.3.1.7 - Change "+ 10% for margin" to "+ 10% for margin on the SSE test". 12) 5.3.1.8 -Delete this step.
- 13) 5.3.2 - Change 1st sentence in 2nd paragraph to read any failure occurring " during the testing and qualification process shall be analyzed to "determine if it is of random or common cause origin.
- 14) 5.3.2, last sentence in next to last paragraph - delete "(e.g., the beginning of a specific DBE)".

Section 6 -

- 6.3 (4) (g) - delete "in 5.3.1.2 and 5.3.1.5 - 5.3.1.9".

