



INTERMODAL MATERIÉL
AND
NAUTICAL/NUCLEAR ANALYSIS
IMANNA
LABORATORY INC.

CERTIFICATION TEST REPORT

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CERTIFICATION TEST REPORT 16251-1
OF
DNA AFT EIM CIRCUIT BREAKER BOX ASSEMBLY
P/N; 91YY5017-2
TO
IGNITION PROTECTION TEST REQUIREMENTS
FOR
SEA RAY BOATS, INC.

CUSTOMER:

DNA GROUP, Inc.
P.O. BOX 31727
RALEIGH, NC 27622

**MANUFACTURER
OF TEST ARTICLE:** DNA

REPORT NO.: 16251-1
IMANNA JOB NO.: 16251
CUSTOMER P.O. NO.: Verbal
CONTRACT: N/A
PAGES IN REPORT: 50

DATE: AUGUST 29, 2003

STATE OF FLORIDA

ROBERT L. WHITE, being duly sworn, deposes and says: The information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects.

Robert L. White

SUBSCRIBED and sworn to before me this 29th day of August, 2003

David H. Hudgins



David H. Hudgins
Commission # DD 010632
Expires May 3, 2003
Bonded Thru
Atlantic Bonding Co., Inc.

Imanna shall have no liability for damages of any kind to person or property, including special or consequential damages resulting from Imanna's providing the service covered by the report.

IMANNA LABORATORY, Inc.
TEST BY
Alan Bell
PROJ. MANAGER

1. TEST ARTICLE

Ten representative samples of a DNA Aft EIM circuit breaker box assembly was received for test. The assembly (consisting of all components and the enclosure) is normally mounted and located in an area where an explosive mixture of gasoline and air could exist (such as an engine compartment).

2. PART NUMBER

91YY5017-2

3. REQUIREMENTS

The enclosure assembly is to be tested to determine compliance to the USCG/ABYC/SAE /ISO requirements for Ignition Protection.

The tests are to determine compliance of the assembly to the Ignition Protection requirements for electrical components as stated in the Title 33 CFR, Part 183, Subpart I, Section 183.410, SAE J1171, ISO 8846 and the NMMA Certification Handbook.

4. PROCEDURE

The procedures used to accomplish the tests are ISO 8846, the United States Coast Guard Electrical System Standard Test Procedure, dated January 1978, and the SAE J1171, dated Jan86.

All sections of the Ignition Protection Test Procedure which would apply to the assembly or the internal components were applied during the testing.

Upon receipt, the test specimens were inspected for damage and any obvious signs of noncompliance with the requirements of ISO 8846, SAE J1171, and the USCG.

The system components that might produce an internal spark were subjected to the Induced Ignition Test per the USCG, ISO, and SAE requirements. Components which appeared to be sealed devices (including the assembly enclosure) were subjected to the Water Submergence Test. High Temperature Operating Tests were conducted on all of the system components that were heat producers. All system components were subjected to an Explosive Atmosphere Exposure Test.

5. RESULTS

The results of the tests performed indicate that the system meets the Ignition Protection Test requirements of ISO 8846, the USCG, stated in Title 33 CFR 183.410 and the SAE J1171 Standard at the component level.

The system box enclosures that were received were subjected to a Water Submergence Test for a sealed enclosure. Some of the enclosures leaked water; however, some of the enclosures were totally sealed. An examination of the sealing technique was conducted and found that there was a difference in the amount and consistency of application of the sealant between the enclosure box and lid. It appeared that some of the boxes were immediately assembled after the application of the sealant, while others were mated later. Those that appeared to have been mated later were the ones that leaked during the water test.

An induced explosion test indicated that the enclosure failed to be a barrier that meets the Induced Ignition Test requirements; therefore, the applicable system components were tested to the ignition protection requirements of the National Marine Manufacturer's Association (NMMA) Certification Handbook, the USCG Ignition Protection Regulation 33 CFR 183.410, ISO 8846, and SAE J1171.

Using a test harness to activate all the system circuits, all of the system components were operated while in an explosive atmosphere without igniting the surrounding explosive atmosphere. None of the system components that generate heat had a surface temperature in excess of the limits of the standard when subjected to the High Temperature Operating Test. All sparking components within the system were subjected to an Induced Ignition test and contained the 50 Induced ignitions without igniting the surrounding explosive atmosphere. Specific component results are contained in the data sheets appended.

6. OBSERVATIONS AND COMMENTS

The results of the tests performed indicate that the enclosure cannot be accepted as the ignition protection barrier in all assemblies tested. Based upon the additional tests conducted, the ignition protection conformance of the assembly is verified at the component level. Each of the circuit breakers, relays and other electrical components meet the ignition protection requirements and do not require an external barrier to serve as the flame front arrestor. Based on the field service probability, it is not required that the lid of the enclosure be sealed with a full hardening sealant, but can be sealed with a gasket to allow field service with removal and replacement of the enclosure lid since absolute water-tightness of the enclosure is not required for ignition protection conformance.

A previously tested enclosure was used to verify the inadequacy of the enclosure to hold the energy of an internal ignition when the enclosure was filled with an explosive mixture of vapors, instead of using the production (customer delivered) pieces received from Sea Ray.

The results presented herein apply only to the test specimen as prepared and as tested. All equipment used in the performance of these tests was calibrated to standards traceable to the N.I.S.T.

INSTRUMENTATION EQUIPMENT SHEET

Date: August 13, 2003 **Job No.:** 16251 **Customer:** Sea Ray/DNA
Technician: Kallis **Test Area:** Explosion Test Cell

Test Item Description: Electric Interface Module MRP#1759175

INSTRUMENT	MFG	MODEL	RANGE	ACCURACY	CAL DATE	CAL DUE
Hydrocarbon Analyzer	Summit Industries	703D2	0 to 10% Propane In Air	±0.1%	Each Use	Each Use
Data Acquisition System	IO Tech	Daqbook 100	Multi	Mfg.	Self-Cal Each operation	Self-Cal Each operation
400 MHz Computer	John Key Corp.	AMD-K6	Multi	Mfg.	Not Required	Not Required
Temperature Indicator / Controller	Omega Eng'ring	DP-41-TC	Multi	±0.03%	7-14-03	1-14-04
Digital Multimeter	Fluke	12	Multi	±0.2%	6-25-03	6-25-04

Instrumentation Information Verified by:

R White

APPENDIX
SUPPORTING DATA



Figure 1 Top view of assembly tested.



Figure 2 Side view of assembly tested.



Figure 3 View of set-up with dummy loads attached.



Figure 4 View of bubbles rising from the submerged assembly.



Figure 5 View of typical circuit breaker tested.



Figure 6 View of typical relay tested.

DATA FORM NO. 1

TEST PROCEDURE USCG and ISO and SAE

RECEIVING INSPECTION(Page 2 of 3)

12. Name of Component and/or System:

No. 1 : EIM circuit breaker box assembly

No. 2 : _____

No. 3 : _____

No. 4 : _____

No. 5 : _____

13. Explanations of Additional Data:

NONE

14. Receiving Inspection Results:

APPEAR SOUND AND READY TO TEST.

15. Nonconformance Items Noted But Not Tested by this Procedure:

NONE

DATA FORM NO.1
TEST PROCEDURE USCG and ISO and SAE
RECEIVING INSPECTION(Page 3 of 3)

Component or System : 91YY5017-2 Rev 3 EIM circuit breaker box assembly

12(a). Manufacturer: DNA

12(b). Date of Manufacture: Unknown

12(c). Part No.: 91YY5017-2 Rev 3

12(d). Serial No.: N/A

12(e). Capacity or Rating: 12 VDC

12(f). Shipping or Transport damage: NONE

12(g). Quality of Workmanship: GOOD

12(h). Conformity to Manufacturer's Documentation: Unknown

12(i). Dents, Cracks, or Abrasions: NONE

12(j). Loose or Missing Screws, Clamps, Nuts, etc.: NONE

12(k). Other Defects: NONE

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 1)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications:

Voltage: 12 VDC
Amperage: up to 15 amps per circuit breaker
RPM: DNA
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 78°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? 14"
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? 50°C
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? YES
15. If component was disassembled after submergence, was water found inside component? YES
16. Is the component acceptable according to PART II? NO

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 1)
18. Percent of Propane in air: 4.8%
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? YES
20. Is component acceptable according to PART III? NO
21. Remarks:
The lid and retaining fasteners are not strong enough to take the internal pressure developed by an internal ignition of vapors.

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 1)

23. Component Specifications:

Voltage: 12 VDC
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 2
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications:

Voltage: 12VDC
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 80°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? 14"
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? 50°C
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? YES
15. If component was disassembled after submergence, was water found inside component? YES
16. Is the component acceptable according to PART II? NO

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: This test was not conducted on this part
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 2)

23. Component Specifications:

Voltage: 12 vVDC
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 3)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 78°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What Is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TESTS WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: N/A
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:
THIS TESTS WAS NOT CONDUCTED ON THIS ITEM

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 3)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 4)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 79.6°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TESTS WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: N/A
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:
THIS TESTS WAS NOT CONDUCTED ON THIS ITEM
-

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 4)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 5)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 79°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TESTS WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: N/A
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:
THIS TESTS WAS NOT CONDUCTED ON THIS ITEM
-

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 5)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 6)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 81°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: N/A
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:
THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 6)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 7)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 78°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

- 8. Are all readings within acceptable limits? YES
- 9. Did the explosive atmosphere ignite during component operation? NO
- 10. Was the mixture verified to be explosive? YES
- 11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

- 12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
- 13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
- 14. Are bubbles observed coming from component? N/A
- 15. If component was disassembled after submergence, was water found inside component? N/A
- 16. Is the component acceptable according to PART II? THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

- 17. Test specimen I.D. No.: N/A
- 18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
- 19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
- 20. Is component acceptable according to PART III? N/A
- 21. Remarks:
THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 7)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 8)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 79°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: N/A
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:
THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 8)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 9)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 77°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: N/A
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:
THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 9)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 10)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 79°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 10)
18. Percent of Propane in air: N/A
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? N/A
20. Is component acceptable according to PART III? N/A
21. Remarks:
THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 91YY5017-2 Rev 3 EIM circuit breaker box assembly (No. 10)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: up to 15 amps per circuit breaker
RPM: N/A
Duty Factor: Continuous operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A control harness was attached to the unit to activate each branch circuit in the assembly while surrounded with an explosive mixture. The test was conducted with the lid in place and with the lid removed from the enclosure without ignition of the vapors occurring during the operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 16251-11 (CIRCUIT BREAKER)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 240VAC /28VDC
Amperage: 6AMPS
RPM: N/A
Duty Factor: Continuous Activation voltage/Intermittent operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 79°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS TEST WAS NOT CONDUCTED ON THIS ITEM

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: 16251-11 (CIRCUIT BREAKER)
18. Percent of Propane in air: 4.8%
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? NO
20. Is component acceptable according to PART III? YES
21. Remarks:
This item was selected based on a larger amount of free space internal to the circuit breaker due to smaller capacity.
-

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 16251-11 (CIRCUIT BREAKER)

23. Component Specifications:

Voltage: 240VAC /28VDC
Amperage: 6AMPS
RPM: N/A
Duty Factor: Continuous Activation voltage/Intermittent operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A dummy load was attached to the circuit breaker to load the unit until it opened through its normal operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 16251-12 (CIRCUIT BREAKER)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 240VAC /28VDC
Amperage: 15 AMPS
RPM: N/A
Duty Factor: Continuous Activation voltage/Intermittent operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 81°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? N/A

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: 16251-12 (CIRCUIT BREAKER)
18. Percent of Propane in air: 4.8%
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? NO
20. Is component acceptable according to PART III? YES
21. Remarks:
This item was selected based on a larger amp rating than other breakers in the assembly

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: 16251-12 (CIRCUIT BREAKER)

23. Component Specifications:

Voltage: 12 VDC nominal system voltage
Amperage: 15 AMPS
RPM: N/A
Duty Factor: Continuous Activation voltage/Intermittent operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? NO

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? YES

28. Is the component acceptable according to the requirements of Part IV? YES

29. Remarks: A dummy load was attached to the circuit breaker to load the unit until it opened through its normal operation.

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

PART A

1. Test Article I.D. No.: 16251-13 (Relay)
2. Is Component certified as ignition proof by an independent testing laboratory? NO

Requirement: A component certified by an approved testing lab as having passed an accepted industry test may be considered as having met the requirements of this procedure.

3. Is component obviously unacceptable? NO

Requirement: Components obviously unacceptable shall be rejected with no test.

PART I - HIGH TEMPERATURE OPERATING TEST

4. Component Specifications: Buss Fuse

Voltage: 12 VDC nominal system voltage
Amperage: Not Identified
RPM: N/A
Duty Factor: Continuous Activation voltage/Intermittent operation
Other: 12 VDC nominal system voltage

Requirement: Component shall be operated for this test at its normal rated condition.

5. Ambient Temperature during test: 60°C

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

6. Highest temperature indicated on any surface: 68°C

Requirement: If the highest component surface temperature exceeds 200°C, the component shall be required to undergo additional testing.

7. Percentage of Propane in Air surrounding component: 4.8%

Requirement: 4.75% +/- 0.5%

DATA FORM NO. 3
TEST PROCEDURE USCG and ISO and SAE
TEST DATA

8. Are all readings within acceptable limits? YES
9. Did the explosive atmosphere ignite during component operation? NO
10. Was the mixture verified to be explosive? YES
11. Is the component acceptable according to the requirements of PART I? YES

PART II - WATER SUBMERGENCE TEST

12. What is the depth of the component beneath the surface of the water? N/A
Requirement: 14" minimum
13. What is the temperature of the water at the start of the test period? N/A
Requirement: 50°C +/- 2°C
14. Are bubbles observed coming from component? N/A
15. If component was disassembled after submergence, was water found inside component? N/A
16. Is the component acceptable according to PART II? THIS ITEM WAS NOT TESTED BY THIS EFFORT

PART III - INDUCED IGNITION TEST

17. Test specimen I.D. No.: 16251-13 (Relay)
18. Percent of Propane in air: 4.8%
Requirement: 4.75% +/- 0.5%
19. Did explosive atmosphere surrounding component ignite during any of the internal atmosphere explosions? NO
20. Is component acceptable according to PART III? YES
21. Remarks:
A dummy load was attached to the relay to load the unit while it was opened through its normal operation.
-

PART IV - EXPLOSIVE ATMOSPHERE EXPOSURE TEST

22. Test Specimen ID Number: _____ 16251-13 (Relay) _____

23. Component Specifications:

Voltage: _____ 12 VDC nominal system voltage _____
Amperage: _____ Not Identified _____
RPM: _____ N/A _____
Duty Factor: _____ Continuous Activation voltage/Intermittent operation _____
Other: _____ 12 VDC nominal system voltage _____

Requirement: Component shall be operated for this test at its normal rated conditions and duty cycle.

24. Ambient Temperature during test: _____ 60°C _____

Requirement: Ambient temperature surrounding the test specimen shall be 60°C throughout the test period.

25. Percentage of Propane in Air surrounding component: _____ 4.8% _____

Requirement: 4.75% +/- 0.5%

26. Did the Explosive atmosphere ignite during 50 component cycles of operation? _____ NO _____

Requirement: The explosive atmosphere surrounding the component shall not ignite when the component is cycled 50 times.

27. Was the atmosphere verified to be explosive? _____ YES _____

28. Is the component acceptable according to the requirements of Part IV? _____ YES _____

29. Remarks: A dummy load was attached to the relay to load the unit while it was opened through its normal operation.

