



LIGHTING PRODUCTS DIVISION  
UNITED STATES RADIIUM CORPORATION  
1259 ROUTE 46 / PARSIPPANY, NEW JERSEY 07054 / (201) 335-9636

April 22, 1970

Director, Division of  
Materials Licensing  
Attn: Mr. James Malaro  
United States Atomic Energy Commission  
Washington, D. C. 20545

Re: License 29-13537-02G

Dear Mr. Malaro:

We hereby request an amendment to License 29-13537-02G  
Condition 10B to include sources 604 and 616.

Both are new models in which tritium containment is accomplished by construction that is very similar to that of Model 758 which has been subjected to prototype testing and which has proven satisfactory during several years of service in aircraft.

Prototypes of the 604 Model were subjected to extensive environmental tests similar to the tests specified by 10CRF 32.101. All units successfully passed the tests except that minor blemishes occurred on surface paint during the humidity test.

The tests for the 604 Sign only and test schedule were designed by Boeing Company (60B50196) Model 747 Project Engineering Staff to assure that the units would perform satisfactorily in passenger aircraft. Details of the tests are given in Appendix A.

Drawings showing containment features are attached.

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The Model 604 Units passed all tests except the humidity test. The results of humidity resistance were not perfect because small points of deterioration occurred in the painted exterior surfaces. This problem has been corrected, and in-house tests re-run show no other negative effects from humidity.

Details of the environmental tests are given in Appendix A. The test schedule was chosen to satisfy Boeing Company engineering requirements for evidence that the signs would perform satisfactory when installed in aircraft.

The 616 Light Source is similar to the 604 in that the containment is achieved by the same method, namely sealed glass light sources potted into a metal container with a resilient silicone potting gels. The test results for the 604 Units are considered applicable to the 616 Units because the tritium containment is accomplished by similar construction.

#### Notes on Appendix A

USRC Type 604 Placards were tested in accordance with Boeing Quality Assurance specifications for Model 747 Aircraft.

This test schedule included:

1. High temperature test, in accordance with MIL-E-5272, Paragraph 4.1.2 procedure 11.
2. Low temperature test, in accordance with MIL-E-5272, paragraph 4.2.1 procedure 1.
3. Temperature-Altitude test in accordance with MIL-E-5272, paragraph 4.14.1 procedure 1 except where modified by Boeing to be more practical for these units.
4. Humidity test, in accordance with MIL-E-5272, paragraph 4.4.1, procedure 1.

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5. Vibration test in accordance with Boeing Specification No. DG-13014, Model 747 Equipment vibration test requirements.

6. Fungus test, in accordance with MIL-E-5272, paragraph 4.8.1 procedure 1.

7. Flame resistance test, was waived by Boeing as all materials of construction are already authorized for use on the Model 747. The plastic materials are flame retardant acrylics: Nos. SE-3 and 5009 manufactured by Rhom and Haas.

8. Acceleration test, in accordance with MIL-E-5272, paragraph 4.16.3 procedure III.

Tests performed are very similar to those specified in 10CFR-32.101. The only basic variation is that the Boeing tests did not include vibration of the units at reduced and elevated temperatures. These tests were carried out for a longer period and for a broader range of frequencies.

Notes:

The following list calls out the variations in the Boeing (60B50196) tests for USRC 604 Sign versus 10CFR-32.101.

1. The temperature altitude test as per 32.101 is very similar to the total specified in high temp, low temp and temperature altitude by Boeing. Boeing does not require as great a vacuum as does 32.101 83 Torr versus approx 240 Torr.

2. Vibration - Boeing did not require vibration at reduced and elevated temperatures, but they did require a dwell time on each resonant frequency of 1 million cycles or 8 hrs whichever came first. The cycling vibration test was for the same period. The frequency range by Boeing was 5 to 1000 cps by 10CFR - it is 5 to 500 cps.

3. Boeing did not require accelerated weathering (this is not problem for our units)

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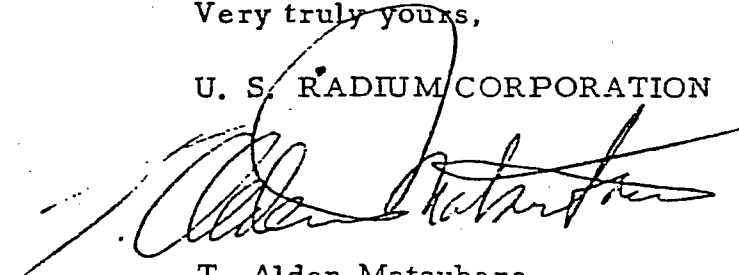
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4. Boeing does not require Hemetric Seal and Waterproof Test.
5. Boeing does not require the Shock Test (Drop Test)

Your prompt attention in review of this application will be greatly appreciated not only by U. S. Radium Corporation, but by the Boeing Company and their airline customers. Please do not hesitate to call me at any time to answer any questions or provide additional information.

Very truly yours,

U. S. RADIUM CORPORATION

A handwritten signature in dark ink, appearing to read 'T. Alden Matsubara', is written over the typed name and title. The signature is fluid and cursive.

T. Alden Matsubara  
Nuclear Products Specialist

TAM:cf

Enc: Appendix A Lockheed Electronic Corp. Test Report  
Two (2) sets of three (3) drawings

Test Report No. 2508-3517

# REPORT OF TEST on

UNITED STATES RADIUM CORPORATION  
EXIT SIGNS  
USRC 604 TYPE

Report Writer: R. F. Soltis

R. F. Soltis

Test Engineer: F. W. Bach

F. W. Bach

**LOCKHEED ELECTRONICS COMPANY**  
PLAINFIELD, NEW JERSEY

Date: April 8, 1970

Approved by: Nat Johnson

N. Johnson, Supervisor  
Environmental Laboratory



S/XB

850516015 XA



Test Report No. 2508-3517

PURPOSE OF TEST: To subject the test specimens to the Environmental Tests referenced in United States Radium Corporation Purchase Order No. 86505 dated 3/4/70.

MANUFACTURER: United States Radium Corporation  
4150 Old Berwick Road  
Bloomsburg, Pa. 17815

SPECIMENS TESTED: Exit Signs, USRC 604 Type

APPLICABLE DOCUMENTS: The Boeing Company Document No. 60850196  
MIL-E-5272

CASE NUMBER: 34-8031-1517

QUANTITY OF SPECIMENS TESTED: Three (3)

SECURITY CLASSIFICATION OF SPECIMENS TESTED: Unclassified

DATE TEST COMPLETED: 3/24/70

TEST CONDUCTED BY: LOCKHEED ELECTRONICS COMPANY  
ENVIRONMENTAL LABORATORY

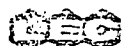
DISPOSITION OF SPECIMENS TESTED: Returned to United States Radium Corporation per Lockheed Electronics Company Packing Slip Nos. 56286 and 58936 dated 3/11/70 and 3/25/70 respectively.

ABSTRACT: The test specimens were subjected to their respective environmental tests referenced in United States Radium Corporation Purchase Order No. 86505 dated 3/4/70.

These tests were completed with the following observations noted at completion of the Humidity portion of testing:

There was slight discoloration of the face of the test specimen and some blistering and corrosion around the screws noted.

TEST APPARATUS: Vibration System, Unholtz-Dickie Model S1A, E.L. No. 027



TEST APPARATUS:  
(Cont'd)

Three (3) Accelerometers, Endevco Model 2221D, S/N LD-39 and HE-07, and Model 2221C, S/N FC-25

Centrifuge, Rucker Co. Model RCT-2, E.L. No. 025

Temperature-Humidity-Altitude Chamber (6'x6'x6'), Guardite Corporation Model STW-VTAH-216-B

Temperature-Humidity Chamber, Thermotron Model F11-CHM-3-3, S/N 4313

TEST PROCEDURE:

Two (2) of the test specimens were secured to vibration and acceleration machines, as shown in Figures 1 thru 6, and subjected to the vibration and acceleration tests in accordance with paragraphs 4.2.5.6 and 4.1.5.9 of The Boeing Company Document No. 60850196.

A third test specimen was placed in the test chamber and subjected to the High-Temperature, Low-Temperature, Temperature-Altitude and Humidity Tests in accordance with paragraphs 4.2.5.2, thru 4.2.5.5 of The Boeing Company Document No. 60850196.

Visual inspections for evidence of any external damage were performed at completion of each test.

TEST RESULTS:

The vibration and acceleration tests performed on two (2) of the test specimens were completed with no visible evidence of any external damage noted to either test specimen.

A resonance of both test specimens was noted during the vibration test at 195 Hz in the Z axis of vibration.

The High-Temperature, Low-Temperature and Temperature-Altitude Tests were each completed with no visible evidence of any external damage noted.

The following observations were noted at completion of the Humidity portion of testing:

- a) Slight discoloration was noted on the test specimen face.



Test Report No. 2508-3517

TEST RESULTS:  
[Cont'd]

b) Some blistering and corrosion  
was noted around the screws.

RECOMMENDATIONS:

None. Data merely submitted.

Test Engineer:

F. W. Bach  
F. W. Bach



FIGURE 1  
VIBRATION SETUP  
X AXIS

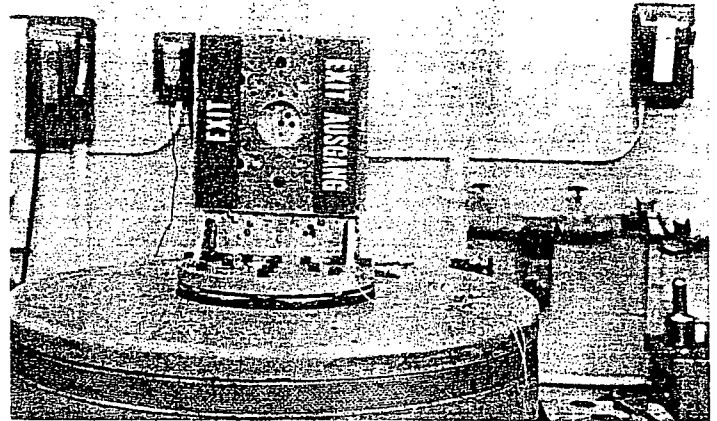


FIGURE 2  
VIBRATION SETUP  
Y AXIS

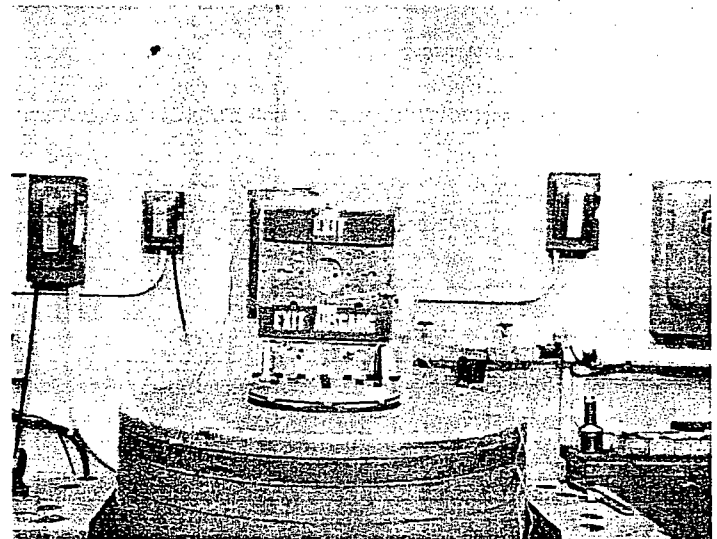


FIGURE 3  
VIBRATION SETUP  
Z AXIS

