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United States Coast Guard Office of Engineering

801213

**FIELD TESTING AND
DEVELOPMENT CENTER**
REPORT NO. 448

PROJECT 3981/01/23

HARVELL-KILGORE CORPORATION MODEL K-5A
ORANGE SMOKE DISTRESS SIGNALS, APPROVAL NO. 160.022/8/0,
LOT NO. 74, DATED MAY 1966

25 OCTOBER 1966

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Washington, D.C.

20226

**FLOATING ORANGE
SMOKE DISTRESS SIGNAL
MODEL K-5A**

DIRECTIONS

1. USE ONLY WHEN AIRCRAFT
OR VESSEL IS SIGHTED.
2. REMOVE COVER.
3. HOLD AWAY FROM FACE
AND PULL WIRE SHARPLY.
4. THROW OVERBOARD TO
LEEWARD IMMEDIATELY.

HARVELL-KILGORE CORP.

TOONE, TENNESSEE

U.S. COAST GUARD APPROVAL NO. 160.92228

LOT NO.

74

LOADED

MAY 5

UNITED STATES COAST GUARD
FIELD TESTING AND DEVELOPMENT CENTER
TEST REPORT

PROJECT 3981/01/23

HARVELL-KILGORE CORPORATION MODEL K-5A
ORANGE SMOKE DISTRESS SIGNALS, APPROVAL NO. 160.022/8/0,
LOT NO. 74, DATED MAY 1966

By

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ABSTRACT

This report covers the testing of proprietary floating orange smoke distress signals for compliance with Coast Guard Specifications, 46 CFR Subpart 160.022. Signals were manufactured under Coast Guard Approval No. 160.022/8/0 by the Harvell-Kilgore Corporation, Toone, Tennessee and were taken from Lot No. 74 dated May 1966.

The samples tested met the requirements of the appropriate Coast Guard specification for operational tests, but failed to meet all the requirements of the technical tests. In addition, the sample lot failed to meet all of the requirements of subparagraph 160.022-3(c) of the specification.

1. INTRODUCTION:

The purpose of these tests was to determine the compliance of Signals, Distress, Floating Orange Smoke, with Coast Guard Specifications. A complete description of the signals tested is included in Appendix A.

2. MATERIAL UNDER TEST:

The material under test consisted of a sample lot of Model K-5A floating orange smoke distress signals, encased in cylindrical metal containers painted gray. Directions for use was plainly marked in black lettering of the required size. Manufacture was intended to comply with Coast Guard Specifications, Subpart 160.022, dated 31 October 1947, 5th amendment dated 11 September 1962.

3. TESTS CONDUCTED:

Twelve (12) floating orange smoke samples were tested in accordance with U. S. Coast Guard Specifications for Signals, Distress, Floating Orange Smoke for Merchant Vessels, Subpart 160.022, Subparagraph -4(c)4. The following tests were conducted:

<u>Test</u>	<u>Applicable Paragraph of Specification</u>
<u>OPERATIONAL TESTS:</u>	
Ignition and Smoke Emitting and Smoke Emitting Time	160.022-4(e) and (f)
Underwater Smoke Emission	160.022-4(g)
<u>TECHNICAL TESTS:</u>	
Elevated Temperature, Humidity and Storage	160.022-4(h)
Spontaneous Ignition	160.022-4(i)
Susceptibility to Explosion	160.022-4(j)
Corrosion, Color, and Volume & Density	160.022-4(k), (l) and (m)
Color and Volume and Density	160.022-4(l) and (m)

4. TEST RESULTS:

The results of all tests are detailed in Appendix A. These test results are listed and described using the corresponding paragraph destination and description contained in the applicable Coast Guard Specification. A detailed description of the test procedure in each case is contained in the specification. Specimens were numbered 1 through 12 for identification purposes.

5. DISCUSSION OF RESULTS:

Of the twelve signals tested, six were subjected to operational tests and six to technical tests. In the operational tests, the requirements of the specification were met or exceeded by every specimen; however, in the technical tests one specimen failed to meet the requirements.

Following elevated temperature, humidity and storage conditioning, Specimen No. 8 failed to ignite. Upon examination it was found that the ignition mechanism failed to ignite the fuse. It was also noted that moisture had penetrated the cap during the conditioning causing the smoke-making composition to shrink and harden. See Figures 1 and 2.

Since no deviations from the requirements of the specification are permitted for technical tests, the sample lot is considered to have failed these tests.

Subparagraph -3(c) of the specification states that the watertight cover protecting the igniter mechanism shall be easily and quickly removable by hand without the use of tools. A tool was required to open six specimens of this sample lot. The metal tab gripped with the fingers to remove the locking device around cap, tore into two parts leaving jagged metal edges. See Figure 3. Three of the remaining specimens were opened by hand using a great amount of effort and the other three opened normally.

6. CONCLUSIONS:

Model K-5A floating orange smoke distress signals for Merchant vessels, Lot No. 74, dated May 1966, manufactured by the Harvell-Kilgore Corporation under Coast Guard Approval No. 160.022/8/0 failed to meet the requirements of the specifications in technical tests. Since no deviation from the requirements are allowed for these tests the sample lot is considered to be unsatisfactory.

In addition, the sample lot failed to meet all of the requirements of Subparagraph 160.022-3(c) of the specification.

APPENDIX A
Test Data Sheet

TEST DATA SHEET

1. MATERIAL TESTED:

The material tested was Model K-5A, Floating Orange Smoke Distress Signals, manufactured under U. S. Coast Guard Approval No. 160.022/8/0 by the Harvell-Kilgore Corporation, Toone, Tennessee. Specimens tested were from Lot No. 74 dated May 1966.

2. TESTS CONDUCTED AND RESULTS:

a. 160.022-4(b)(1) - Operational Tests:

(1) Ignition and smoke emitting and smoke emitting time.

<u>Specimen Number</u>	<u>Burning Time</u>		<u>Ignition and Smoke Emitting Characteristics</u>	<u>Kind of Defect</u>	<u>Percent of Failure</u>
	<u>M</u>	<u>S</u>			
1.	4	10	Good	None	-
2	4	40	Good	None	-
3	5	20	Good	None	-
4	5	20	Good	None	-

(2) Underwater Smoke Emission:

5	4	15	Good	None	-
6	3	40	Good	None	-

b. 160.022-4(b)(2) - Technical Tests:

(1) Elevated Temperature, Humidity and Storage (operation after Conditioning)

7	4	10	Good	None	-
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8	Failed to ignite following elevated temperature, humidity and storage conditioning.				
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(2) Spontaneous Ignition:

Specimen No. 9 - Satisfactory

(3) Susceptibility to Explosion:

Specimen No. 10 - Satisfactory

(4) Corrosion, Color, and Volume & Density:

Specimen No. 11 - Satisfactory

(5) Color and Volume & Density:

Specimen No. 12 - Satisfactory

APPENDIX B
Photographs



FIGURE 1

SPECIMEN NO. 8 - Igniter mechanism failed to ignite fuse.



FIGURE 2

SPECIMEN NO. 8 - Smoke making composition shrunk and hardened during elevated temperature, humidity and storage conditioning.



FIGURE 3

Sample failure of cap locking device.