



DEFENCE EVALUATION and RESEARCH AGENCY
FRASER
Fort Cumberland Road
Portsmouth
PO4 9LJ

Report on Type Testing to RTCM SC110-STD
of

Float Free Enclosure for
McMurdo Ltd EPIRB Type E3

DERA/SS/CI//RTCMFF/TT7/98-1.0

Cover + vi + 7 pages + Annex A to B

Issue 1.0 - Date: April 1999

Commissioned by;

McMurdo Ltd.
Rodney Road,
Portsmouth,
Hants, UK
PO4 8SG



TESTING
No. 1217

Issued by

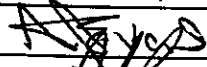
Maritime Navigation Systems
DERA Fraser
Fort Cumberland Road
Portsmouth
England
PO4 9LJ

Copyright and reproduction.

This document is the property of Her Majesty's Government and Crown Copyright is reserved. It may be reproduced only in its entirety and without change, for the purposes of submission to other national bodies for type approval of the equipment mentioned. Requests to disclose its contents outside official circles should be addressed to the issuing authority.

© Crown Copyright (1999)

Authorisation

Position Held	Name	Signature	Date
Test Engineer	W T Harmer	W T Harmer.	15/4/99
Quality Manager	A. Evans		16/4/99
Head of Test	D. Parr		19-4-99

Record Of Changes

This is a controlled document.

Additional copies should be obtained through the issuing authority.

In the extreme event of copying locally, each document shall be marked "Uncontrolled Copy".

Issue	Date	Details of Change
1.0	April 1999	First issue

Table of Contents

Section	Title	Page
1.	Introduction	1
2.	Equipment under Test	1
3.	Test Location	1
4.	Configuration of the EPIRB	1
5.	Tests	2
6.	Conclusions and Recommendations	2
7.	Summary of tests on float free enclosure	3
8.	Automatic release test on float free enclosure with Hammar HRUs fitted	4
9.	Automatic release test on float free enclosure with Pains-Wessex HRUs fitted	5
10.	References	6
	Distribution List	7
Annex A	Photographs of Float Free Enclosure	
Annex B	Manufacturers Statement on Materials	

This page intentionally left blank

1 Introduction

- 1.1 This supplementary report covers testing of the float free enclosure for use with the McMurdo "E3" 406 MHz EPIRB. The assembly was tested in accordance with the RTCM Recommended Standards for 406 MHz Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Version 2.0 February 5, 1997 (RTCM PAPER 4-97/SC110-STD).
- 1.2 The McMurdo "E3" 406 MHz EPIRB with its manual release bracket was previously tested as a Class 1 Category 2 beacon. See report [1]
- 1.3 Two alternative hydrostatic release units (HRU) can be fitted to the float free enclosure. Both underwent the relevant tests.
- 1.4 The test laboratories at DERA Fraser have been accredited by UKAS under their NAMAS scheme and is a UKAS accredited Testing Laboratory No. 1217.
- 1.5 Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

2 Equipment under test

- 2.1 For the duration of type testing McMurdo Ltd. supplied the following items.

ITEM	Type
2 EPIRBs	E3
2 Float Free enclosures	-
10 Pains-Wessex HRUs	breaktHRU
10 Hammar HRUs	H20

- 2.2 Photographs of the float free enclosures can be seen in Annex A.

3 Test Location

- 3.1 The tests were executed at DERA Fraser, Fort Cumberland Road, Portsmouth, Hants.

4 Configuration of the EPIRB

- 4.1 The EPIRB type used in the testing of the release mechanism was a standard E3 type except that the RF section had been inhibited. The strobe light was used as the indication that the activation had occurred.

5 Tests

5.1 The following tests were performed on the float free enclosure.

- | | |
|----------------------------------|-----------------|
| Vibration test | (clause A5.0). |
| Bump test | (clause A6.0). |
| Inadvertent activation test | (clause A16.0). |
| Automatic release mechanism test | (clause A14.0). |

The HRUs do not operate below -30°C and therefore the release mechanism test was performed at the class 2 storage temperature extremes of -30°C and 70°C . This is in spite of the fact that the McMurdo "E3" 406 MHz EPIRB itself is a class 1 beacon.

5.2 The salt fog test was not performed as the manufacturer made a declaration on the materials used. See annex B.

6 Conclusions and Recommendation

6.1 The McMurdo "E3" 406 MHz EPIRB float free enclosure was tested and found to meet the requirements of the RTCM Recommended Standards for 406 MHz Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Version 2.0 in all aspects as detailed in this report.

6.2 Two alternative HRUs were used in the tests and both met the requirements. They are the Hammar H20 and the Pains-Wessex breaktHRU.

6.3 Taking into account the results previously reported in [1] with those presented here the McMurdo "E3" 406 MHz EPIRB float free enclosure is recommended for type approval for use in the temperature range -30°C to 70°C .

Section 7 Summary of Tests on Float Free Enclosure

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min.} (-30°C)	T _{amb.} (+10°C)	T _{max.} (+70°C)	
4. VIBRATION TEST (A5.0) Exterior Mechanical Inspection Activation	No damage	✓		✓		The aliveness test was not carried out. (See note 1) However activation of the strobe light was checked.
	No activation during test	✓		✓		
5. BUMP TEST (A6.0) Exterior Mechanical Inspection Activation	No Damage	✓		✓		The aliveness test was not carried out. (See note 1) However activation of the strobe light was checked.
	No activation during test	✓		✓		
17. INADVERTENT ACTIVATION TEST (A16.0) • Activation release	EUT should not release from bracket or automatically activate	✓		✓		

Notes

1. The RF section of the EPIRB used for testing the float free enclosure had been inhibited so the signal parameters could not be measured. However, the aliveness test parameters of the EPIRB for this test with the manual release bracket had been measured and reported previously.[1]

Section 8 Automatic Release Test on Float Free Enclosure with Hammar HRUs fitted

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min} (-30°C)	T _{amb} (+10°C)	T _{max} (+70°C)	
15. AUTOMATIC RELEASE MECHANISM TEST (A14.0)						
• Normal mounted orientation	Release and float free before 4 meters; automatic activation	✓	✓	✓	✓	
• Rolling 90° starboard		✓		✓		
• Rolling 90° port		✓		✓		
• Rolling 90° bow down		✓		✓		
• Rolling 90° stern down		✓		✓		
• Upside down		✓		✓		

Section 9 Automatic Release Test on Float Free Enclosure with Pains-Wessex HRUs fitted

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min.} (-30°C)	T _{amb.} (+10°C)	T _{max.} (+70°C)	
15. AUTOMATIC RELEASE MECHANISM TEST (A14.0)						
• Normal mounted orientation	Release and float free before 4 meters; automatic activation	✓	✓	✓	✓	
• Rolling 90° starboard		✓		✓		
• Rolling 90° port		✓		✓		
• Rolling 90° bow down		✓		✓		
• Rolling 90° stern down		✓		✓		
• Upside down		✓		✓		

8. References

- 1 *Report on Type Testing to RTCM SC110-STD of McMurdo Ltd 406 MHz EPIRB Type E3.* DERA/SS/W1/RTCM/R-TT7/98-1.0, February 1999.

Distribution List

Copy No	Recipient	Location
1/2	Mr Bob Markle	US Coastguard Survival Systems Branch, (G-MVI-3) 2100 Second St S.W. WASHINGTON, DC 20593-0001, USA
3/4	John Norrish	McMurdo Ltd Rodney Road, Portsmouth, PO4 8SG
Master	File TT 7/98	DERA Fraser, Portsmouth.

Annex A

Photographs of McMurdo E3 Float Free Enclosure

Description	Figure
McMurdo E3 Float Free Enclosure	A1
Float Free Enclosure with cover removed	A2
Float Free Enclosure with EPIRB removed	A3
Float Free Enclosure with HRU and retaining rod removed	A4

Annex B

Manufacturers Statement on Materials

McMurdo

McMurdo Ltd, Rodney Road, Portsmouth, Hampshire, United Kingdom

E3 MATERIALS DECLARATION

A list of materials used on the E3 is attached to this declaration. These materials are in contact with the marine environment and would normally, during type approval, be tested for immunity to...

Salt fog	(RTCM SC110 part A7.0)
Corrosion	(ETS 300-066 part 6.5)
Solar radiation	(ETS 300-066 part 6.11)
Oil resistance	(ETS 300-066 part 6.12)

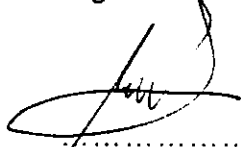
McMurdo believe this testing is unnecessary for one or more of the following reasons...

- 1) The materials have a proven history of service in a marine environment. Either from use in McMurdo's existing approved marine equipment range, or by implication from a long established history of exposure without effect (e.g. stainless steel).
- 2) The material manufacturer has conducted equivalent testing and has declared the product as being immune to these effects in the relevant material data sheet.
- 3) McMurdo in-house testing has proven the materials to be immune to the cause of degradation (eg Oil resistance).

DECLARATION

McMurdo Ltd hereby declares that the materials used on the E3 are not affected by the degrading agents listed above.

Signed on behalf of McMurdo Ltd



John Norrish BSc (Eng)
Product Manager - Electronics

Date... 11/11/98

E3 MATERIALS LIST

The materials listed below are in contact with the marine environment.

EPIRB	Material
Body section	
Moulding	Cycloy C1200 UV stabilised. Polycarbonate / ABS blend
Identity label	Polyester UV stabilised. Printed to rear. Adhesive 3M type 467
Front label	Polyester. Litho printed then laminated. Adhesive 3M type 467
Switch	
Button overlay	Polyester UV stabilised. Printed to rear. Adhesive 3M type 467
Slider & rim	Pulse A35/110 UV stabilised. Polycarbonate / ABS blend
Label	Polyester. Litho printed then laminated. Adhesive 3M type 467
Main seal	
Gasket	Sarlink. Polypropylene / ABS blended thermo-elastomer
Screws	Stainless steel
O-rings on screws	Nitrile rubber
Lens dome	
Moulding	Polycarbonate UV stabilised
Reflective tape	3M Solas approved retro-reflective tape
Expiry label	Fascal 940 all weather PVC vinyl
Antenna	
Conductor	Stainless steel wire rope
Fixing stud	Black Zinc plating over Nickel plated brass
O-ring seal	EPDM
Sleeving	Polyolefin heat shrink tube
Top cap	PVC fixed with cyano-acrylate adhesive
Lanyard	
Former	Pulse A35/110 UV stabilised. Polycarbonate / ABS blend
Cord	Woven polypropylene

BRACKET	Material
Moulding	Pulse A35/110 UV stabilised. Polycarbonate / ABS blend.
Clamping pad	Sarlink. Polypropylene / ABS blended thermo-elastomer
Spring	Stainless steel
Magnet potting	Flexible epoxy resin. 3M type DP105
Mounting screws	Stainless steel
Label instruction	Fascal 940 all weather PVC vinyl

ENCLOSURE	Material
Base & cover	Acrylic capped ASA (Acrylate Styrene Arylonitrile)
Test window	Silicone rubber sheet. Primed and glued with specialist Bostik Adhesive
Spring	Stainless steel
Metalwork	All stainless steel
Circular weight	Nickel plated brass
Fixings	All stainless steel
Breakable rod	Acetal Copolymer
Magnet holder	Acetal Copolymer
Magnet potting	Flexible epoxy resin. 3M type DP105
Foam pads	High density Polyethylene foam
Labels	Fascal 940 all weather PVC vinyl