



Product Service

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TEST HOUSE CERTIFICATE

CLIENT:	Vartech Systems Inc. 11529 Sun Belt Court Baton Rouge Louisiana 70809 USA	CERTIFICATE NUMBER	SX888975/015/003 Issue 01
		PROJECT NUMBER	OS614501
		CLIENT'S ORDER NUMBER	Q46742

INCOMING RELEASE NOTE Declaration of Build Status: 614501

DATE OF RECEIPT 28th June 2005

TEST ITEM 21.3" Flat Panel Marine Monitor

NUMBER OF ITEMS TESTED One

SERIAL NUMBER Not Serialised

PART NUMBER VarTech VT213WP

BUILD STATUS Mod 0 + Mod 1

TEST SPECIFICATION AND ISSUE EN 60945; 2002
Lloyds Registry Test Specification No 1: 2002

DATE OF TEST 5th August 2005 to 13th October 2005

TESTS APPLIED See Table Below

SPECIFICATION	TEST
EN 60945 Section 8.7	Vibration
EN 60945 Section 8.2	Dry Heat
LR Type Approval System Test Specification No 1 Section 14	Humidity Test 1 – Cyclic
EN 60945 Section 8.4.2	Low Temperature
EN 60945 Section 11.1	Acoustic Noise

See further details on Page 3.

RESULT OF TESTS The Equipment Under Test (EUT) met the specification requirements for the applied tests. See Page 2.

APPROVED BY

D H Grace
Authorised Signatory



DATE: 26th April 2006



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RESULT OF TESTS (continued)

EN 60945: 2002 – Section 8.7 – Vibration

Modification State 0

The unit showed no sign of damage or deterioration on completion of the test. All functional tests carried out by TÜV Product Service showed the unit to be operating correctly.

EN 60945: 2002 – Section 8.2 – Dry Heat

Modification State 0

The unit showed no sign of damage or deterioration on completion of the test. All functional tests carried out by TÜV Product Service showed the unit to be operating correctly.

Lloyds Register: LR Type Approval System: Test Specification No 1: Section 14 – Damp Heat, Cyclic

Modification State 1

The unit showed no sign of damage or deterioration on completion of the test. All functional tests carried out by TÜV Product Service showed the unit to be operating correctly.

EN 60945: 2002 – Section 8.4.2 – Low Temperature

Modification State 2

The unit showed no sign of damage or deterioration on completion of the test. All functional tests carried out by TÜV Product Service showed the unit to be operating correctly.

EN 60945: 2002 – Section 11.1 – Acoustic Noise

Modification State 2

The Monitor met the requirements of EN 60945: Clause 11.1 for Acoustic Noise and Signals.

The sound pressure level from the powered Monitor showed no increase above the ambient noise level of 33.5dB(A) (The limit is 60dB(A)).



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TESTS APPLIED

EN 60945: 2002 – Section 8.7 – Vibration

The unit was fixed to a vibration fixture via its front fixings and then bolted to the vibrator table.

The unit was then subjected to a sinusoidal resonance search test in each of three mutually perpendicular axes. The vibration levels were :

3 Hz to 13.2 Hz at 1 mm peak displacement,
13.2 Hz to 100 Hz at 0.7g peak acceleration
Sweep rate 0.5 octaves/minute

EN 60945: 2002 – Section 8.2 – Dry Heat

The powered unit was installed in a climatic chamber at ambient conditions. The unit was then subjected to the following temperature cycle.

1. +25°C to +55°C at 1°C per minute
2. +55°C for 16 hours, after 15 hours the unit was functioned i.a.w. Clause 8.2.2.2.
3. +55°C to +25°C at 1°C per minute
4. +25°C for a minimum of 1 hour

Lloyds Register: LR Type Approval System: Test Specification No 1: Section 14 – Damp Heat Cyclic

The powered Monitor was installed in a climatic chamber at ambient conditions. The unit was then subjected to two of the following temperature/humidity cycles:

Temperature raised from 20°C to 55°C over a period of 2 hours.

1. +55°C/93% relative humidity (rh) for a period of 12 hours.
2. +55°C to 20°C over a period of 2 hours.
3. 20°C/93%rh for a period of 6 hours

EN 60945: 2002 – Section 8.4.2 – Low Temperature

The unpowered unit was installed in a climatic chamber at ambient conditions. The unit was then subjected to the following temperature cycle.

1. +25°C to -15°C at 1°C per minute
2. -15°C for 16 hours, after 14 hours at -15°C the unit was powered and functioned for the remaining 2 hours at -15°C
3. -15°C to +25°C at 1°C per minute
4. +25°C for a minimum of 1 hour

EN 60945: 2002 – Section 11.1 – Acoustic Noise

The measurements were taken using a B&K Sound Level Meter at 1m from the equipment under test in accordance with the specification.



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EUT MODIFICATION CHRONOLOGY

Modification State 0 As supplied by Manufacturer.

Modification State 1 – It was found that condensation was forming on a microcontroller oscillator crystal. This was going underneath the crystal by capillary action. The effect was that the oscillator stopped and caused there to be no picture. This was fixed by coating the crystal with sealant.

Modification State 2 – The LCD module electronics could not operate at -15°C. The monitor uses heat from the LCD Module backlights to warm the electronics sufficiently before they operate. Thus, below about -10°C, there is a delay between applying power and seeing a picture. It was found that the backlight inverter had a parasitic oscillation which occurred intermittently at low temperature and prevented the backlights from being properly lit and heating the LCD Module. Series resistors were added to the two transistors on the inverter to cure this.