

# **PUBLICATION NW4000-20**

Issue 1.0

## **ANNUAL PERFORMANCE TEST AND CERTIFICATION**



### **VOYAGE DATA RECORDER**

**NW4000-series**

**VDR & (S)VDR  
COMMON DOCUMENT**

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# **Important Notices**

## **HEALTH AND SAFETY**

All personnel are required to study these notices and familiarise themselves with all applicable safety precautions and bring them to the attention of others in the vicinity.

## **HIGH VOLTAGE WARNING**

### **LETHAL HIGH VOLTAGES ARE PRESENT IN THE VOYAGE DATA RECORDER**

A current of 100 mA passing through the human body for one second can kill. This can occur at voltages as low as 35V AC or 50V DC. Some equipment in the system uses electrical power that can be lethal. Whenever practical, before carrying out installation, maintenance or repair, personnel involved must:

- (1) Isolate the equipment from the electrical supply.
- (2) Make tests to verify that the isolation is complete.
- (3) Ensure that power cannot be accidentally reconnected.

### **DO NOT OPEN ANY OF THE UNITS WHEN THE VOYAGE DATA RECORDER IS OPERATIONAL UNLESS FULLY QUALIFIED TO DO SO.**

If it is essential to work on the equipment with power connected, work must only be undertaken by qualified personnel who are fully aware of the danger involved and who have taken adequate safety precautions to avoid contact with dangerous voltages.

## **HEALTH HAZARD**

- This equipment contains materials which produce toxic fumes when ignited.
- The inhalation of dust and fumes or any contact with lubricants when cleaning the equipment may be temporarily harmful to health, depending on individual allergic reactions. Components which are broken or overheated may release toxic fumes or dust and must be treated with caution. Do not inhale the fumes and ensure that the dust and debris do not enter open cuts or abrasions. It is prudent to regard all damaged components as being potentially toxic, requiring careful handling and appropriate disposal.

## **PERSONAL PROTECTION**

Personal protection must be used whenever the possibility of an uncontrolled hazard exists. For example, a suitable face visor, gloves and a body apron should be worn when handling cathode ray tubes, as a precaution against injury in the event of breakage.

## **OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES**

### **CAUTION : Handling of Electrostatic-Sensitive Semiconductor Devices**

Certain semiconductor devices used in the equipment are liable to damage due to static voltage. Observe the following precautions when handling these devices in their unterminated state, or sub-units containing these devices:

- Persons removing sub-units from any equipment using these devices must be earthed by a wrist strap and a resistor at the point provided on the equipment.
- Soldering irons used during the repair operations must be low voltage types with earthed tips and isolated from the mains voltage by a double insulated transformer.
- Outer clothing worn must be unable to generate static charges.
- Printed Circuit Boards (PCBs) fitted with these devices must be stored and transported in anti-static bags.

## List Of Specifications

IEC 61996:1999 Shipborne Voyage Data Recorder - Performance requirements – methods of testing and required test results.

IEC PAS 61996-2 Part 2: (2005-07) Simplified voyage data recorder (S-VDR) – Performance requirements – Methods of testing and required test results

IMO A.658(16): Use and fitting of retro-reflective materials on life-saving appliances

IMO A.662(16): Performance standards for float-free release and activation arrangements for emergency radio equipment

IMO A.694(17): General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids

IMO A.810(19): Performance standards for float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz

IMO A.830(19):1995, Code on alarms and indicators

IMO A.861(20): Performance standards for shipborne voyage data recorders (VDRs)

IMO MSC.81(70): Testing of life-saving appliances

IMO MSC.163(78): Performance standards for shipborne simplified voyage data recorders(S-VDR).

Eurocae: ED56A – Minimum operational performance specification (MOPS) for cockpit voice recorder system

VESA:1996, Video electronics standards association – Discrete monitor timings standard 1.0, Revision 0.7 (DMTS)

SAE AS8045:1988, Engineering society for advancing mobility land, sea, air, and space – Minimum performance standard for underwater locating devices – Acoustic-self-powered

IEC 60068-2-27:1987, Environmental testing – Part 2: Tests – Test Ea and guidance: Shock

IEC 60268:1998, Sound system equipment – Part 16: Objective rating of speech intelligibility by speech transmission index

IEC 60936-1:1999, Maritime navigation and radiocommunication equipment and systems – Radar – Part 1: Shipborne radar – Performance requirements – Methods of testing and required test results

IEC 60936-3: Maritime navigation and radiocommunication equipment and systems – Radar – Part 3: Shipborne radar with chart facilities – Methods of testing and required test results

IEC 60945:2002, Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results

IEC 61097-2: 2002, Global maritime distress and safety system (GMDSS) – Part 2: COSPAS SARSAT EPIRB – Satellite emergency position-indicating radio beacon operating on 406 MHz – Operational and performance requirements, methods of testing and required test results

IEC 61097-7:1996, Global maritime distress and safety system (GMDSS) – Part 7: Shipborne VHF radiotelephone transmitter and receiver – Operational and performance requirements, methods of testing and required test results

IEC 61162 (all parts), Maritime navigation and radiocommunication equipment and systems – Digital interfaces

IEC 61260:Electroacoustics – Octave-band and fractional-octave-band filters

IEC 61672 (all parts), Electroacoustics – Sound level meters

IEC 61993-2, Maritime navigation and radiocommunication equipment and systems – Automatic identification systems (AIS) – Part 2: Class A shipborne equipment of the universal automatic identification systems (AIS) – Operational and performance requirements, methods of test and required test results

VESA: 1996 Video electronics standards association - Discrete monitor timings standard 1.0, Revision 0.7 (DMTS)

## **1. General**

The NW-4000 VDR requires an Annual Performance Test (APT) in order to maintain IMO compliance.

This annual test will verify that the NW-4000 (S)VDR and VDR including the Final Recording Medium (FRM) are fully operational and operating within the specifications of the IMO requirements. It will also guarantee that the VDR is recording all required data parameters as initially installed, and the data recorded is both secure and correctly stored to the FRM (HSS Capsule).

SOLAS V #18.8 MSC.99(73) states: "The voyage data recorder (VDR) system, including all sensors, shall be subjected to an annual performance test. The test shall be conducted by an approved testing or servicing facility to verify the accuracy, duration and recoverability of the recorded data. In addition, tests and inspections shall be conducted to determine the serviceability of all protective enclosures and devices fitted to aid location. A copy of a the certificate of compliance issued by the testing facility, stating the date of compliance and the applicable performance standards, shall be retained on board the ship."

This document incorporates the NetWave Systems' Annual Recertification checklist for Voyage Data Recorders. This document must be completed and returned to NetWave by the annual recertification agent.

### **1.1 Preparation**

Prior to the annual survey, arrangements must be made to review documentation pertaining to any equipment changes which have occurred since initial installation and may affect recording. This documentation should be reviewed thoroughly to gain familiarity with any changes which may have taken place.

A date and time must be agreed upon for the survey to ensure vessel availability and access to the necessary equipment. In the case of a survey of a (full) VDR a specific time-period, used to check any discrete digital or analog control signals (from sources such as the bow thrusters, rudder, and engine), must also be arranged.

### **1.2 Time Required**

The annual survey will require approximately four (4) hours for S-VDR to complete, whereas for a full VDR, it will normally take eight (8) hours to complete. These time-indications do not include any repairs, however do include the exchange of batteries and other scheduled maintenance activities.

### **1.3 Equipment required**

The following is a list of equipment necessary for the APT procedures:

- Service PC/Laptop with a 100/10-baseT LAN port interface
- Internet browser-software (Internet Explorer or similar)
- Ethernet Crossover Cable (2x RJ45 Connectors);

- NW4000-10 / NW-4000 Ship's And Operators Instruction Manual
- NW4000-18 / NW-4000 Annual Performance Test (this document)

The following items are required to test the Capsule mounted Underwater locator beacon

- Dukane 42A12D Beacon Test Set
- Benthos ELP362 test set

## 2.0 Ship's details

Provide all details in the spaces provided below.

<b><i>Vessel Name</i></b>	
<i>IMO No</i>	
<i>Shipyard &amp; Hull No</i>	
<i>Flag</i>	
<i>Date Keel Laid</i>	
<i>GRT</i>	
<b><i>Voyage Data Recorder</i></b>	
<i>Date of Survey</i>	
<i>Model</i>	
<i>Serial No</i>	
<i>Date of Commissioning</i>	
<i>HSS capsule serial number</i>	
<i>Recertification Agent Information</i>	
<i>Name</i>	
<i>Address</i>	

## 3.0 Reference Documents

- IMO Res. A.861 (20): Recommendation on Performance Standards for Shipborne Voyage Data Recorders
- IEC 61996: Shipborne Voyage Data Recorder (VDR) Performance Requirements – Methods of testing and required test results

## 4.0 Physical Condition of Equipment

### 4.1 Final Recording Medium (HSS capsule)

The capsule-assembly needs to be visually inspected for signs of corrosion or water ingress, for proper colour and for the adhesives (text) to be in proper order.

1. Check if the colourisation (bright orange) and adhesives on the capsule are clearly visible and in proper order. If not, use spare-kit NW4111 to re-colour the capsule and exchange the adhesives.
2. Remove the capsule from the deckmount by unleashing the release mechanism (by hand) without the use of tools.
3. Check for water-ingress on top of the CPU unit and remove the connector from the top of the CPU assembly. An alarm will be generated on the BCU (Storage unavailable), which may be acknowledged.
  - a. If any water-ingress is detected, replace the seals with spare-kit NW4112, making use of the accompanying instructions.
4. Remove the CPU unit from the deckmount by removing the 6 screws and lifting the unit up.
  - a. If any water-ingress into the deckmount is detected, replace the seals with spare-kit NW4112, making use of the accompanying instructions.
5. External cabling: check if all deck-laid cabling is in proper order and does not show any signs of degradation.

Colourisation	Checked / Remarks
Adhesives / stickers	Checked / Remarks
Release mechanism	Checked / Remarks
CPU water ingress (top)	Checked / Remarks
Deckmount water ingress	Checked / Remarks
Exterior Cabling to HSS Capsule	Checked / Remarks
Alarm at removal of capsule	Checked / Remarks

6. Replace the CPU unit on the deckmount and fix the release mechanism. (re-connect the SUB-D connector)

## 4.2 Underwater Locator (acoustic beacon (HSS))

The beacon must be inspected for corrosion and battery fitness and/or expiration date.

1. For the maintenance and survey of the beacon, refer to the manual for the specific beacon, which is one of three models;
  - a. DUKANE DK480 or DK485
  - b. BENTHOS ELP-362 D

Acoustic Beacon Expiry Date	Checked / Remarks
Battery Expiry Date	Checked / Remarks
Acoustic Beacon	Checked / Remarks
Acoustic Beacon Serial No	Checked / Remarks
Serial No of the Acoustic Beacon	Checked / Remarks
Acoustic Beacon Test	Checked / Remarks



#### 4.4 System network and communications check

Connect to the VDR with a PC/laptop (refer to section 9.1 of the NW4000-10 Manual) and perform the following checks as also described in the NW4000-10 Manual.

##### 4.4.1. System Network check

Refer to Section 9.5 (NW4000-10) and perform the observation / test as described

##### 4.4.2. System Device Identification check

Refer to Section 9.6

##### 4.4.3. System Interface Check

Refer to Section 9.7

##### 4.4.4 Power Supply & Data Switch Check

Refer to Section 9.8

##### 4.4.5. Bridge Control Unit Check

Refer to Section 9.9

Refer to 17.5.0 Test Menu - BCU Test and perform the tests as described

##### 4.4.6 Hardened Storage Server (capsule) Check

Refer to Section 9.10 and perform the observation / test as described

<b>4.4.1. System Network</b>	Checked / Remarks
<b>4.4.2. System Device Identification</b>	Checked / Remarks
<b>4.4.3. System Interface</b>	Checked / Remarks
<b>4.4.4 Power Supply &amp; Data Switch</b>	Checked / Remarks
<b>4.4.5. Bridge Control Unit</b> Section 9.9	Checked / Remarks
<b>4.4.5. Bridge Control Unit</b> Section 17.5.0 Test Menu - BCU Test	Checked / Remarks
<b>4.4.6 Hardened Storage Server</b>	Checked / Remarks

#### **4.5 Ship's Equipment current condition**

##### **Change or Repair to Ship's Equipment**

- Confirm that no equipment, that may affect VDR recording, has been changed or repaired since the last survey.
- Record details of any changes or repairs below:
- Confirm that service reports covering changes or repairs are available

## 5.0 Pre-Existing Alarms

Confirm that no Alarms or Warnings are present at the start of inspection  
If applicable, list all errors below (and repair system before continuing recertification):

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## 6.0 Power Supply

### 6.1 Battery Condition and Power failure test

1. Remove both covers from the PSU
2. Disconnect the VDR from any primary power source (220VAC and/or 24 DC. Wait for the Power failure alarm and acknowledge this by pressing the ACK button on the BCU.
3. Wait 5 minutes
4. Measure (by making use of a DC volt-meter) the voltage over the + and – poles of the (set of) batteries not to be lower than 23,5 Volts. If the voltage reads lower, replace with new batteries (Spare kit NW4023).
5. To replace the batteries, ensure the mains power input to the PSU is switched off or disconnected by other means

Battery Condition Test	Checked / Remarks
Power Fail Alarm Check Remove source of <u>external</u> power. Confirm that the alarm indicating power failure is activated on the Bridge Control Unit.	Time (hh:mm)
Reserve Power Recording Period Check Confirm the VDR records for the required two (2) hour period after removal of external power, with no additional alarms	Time (hh:mm)
Reserve Power Recording Shut Down Confirm that the VDR has terminated recording after two (2) hours	Time (hh:mm)

## 7.0 Recorded Data Checks

Via the Web-administrator Status>Channels Page, verify all designated channels are actively recording (green)

Via the Web-administrator

After having noted all channels to be recording, by replaying the date, to confirm verification on all channels indicated.

<b><i>Recording Channel</i></b>	<b><i>Channel number (Status)</i></b>	<b><i>Verified (see</i></b>
1) Date and time		
2) Ship's position		
3) Speed		
4) Heading		
5) Bridge audio		
6) Communications audio		
7) Radar data		
8) Echo sounder		
9) AIS		
10) Main alarms		
11) Rudder order & response		
12) Engine order & response		
13) Bow & stern thrusters		
14) Hull openings (doors)		
15) Watertight & fire door		
16) Wind speed & direction		

Items 10~16 are only applicable to S-VDR systems where the data is available as NMEA serial information. (acc. To IEC61996 and IEC 61162-1)

## 7.1 Final Recording Medium Download & Verification

Perform a data-download (refer to Section 16 of the NW4000-10 Manual) and replay the data by making use of the Replay software. Confirm the data set contained in the FRM covers the required 12 hour period.

Data downloaded to (PC directory)	Time (hh:mm)
Recorded channels verified for correct representation. Place checkmark in Section 5.	Completed and correct
Remarks:	Sign Off:

## 8. VDR Time Synchronization

Confirm that the time on the VDR is synchronized with the external time source being utilized by the VDR (e.g., GPS) by verifying the Configuration>Vessel Data to contain the correct time source and the time displayed on the Bridge Control Unit is in synchronisation with that time source.

Time source (channel)	
Synchronisation	Checked / Result

## 9. Final Observations

Observations or additional notes:

## 10. Statements

The fields below require the written signature of the (re)certifying technician and vessel's representative, as well as all associated dates.

NetWave Certified Representative name: \_\_\_\_\_

NetWave Certified Representative signature: \_\_\_\_\_

Date: \_\_\_\_\_

Vessel's Representative name: \_\_\_\_\_

Vessel's Representative signature: \_\_\_\_\_

Date: \_\_\_\_\_

Date and Location of Test:

\_\_\_\_\_

*NOTICE! This document IS NOT a certificate. For the annual recertification of this VDR to be valid, an official NetWave Systems Certificate of Compliance for Voyage Data Recorder must be provided by the recertifying technical agent. To obtain this certificate please contact the NetWave Support Department via phone (+31 10 2045665) or e-mail (support@netwavesystems.com).*