



STANDARD FOR CERTIFICATION

No. 2.9

Type Approval Programme 849.61

SUN SCREEN SYSTEMS

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FOREWORD

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A list of Standards for Certification is found in the latest edition of Pt.0 Ch.1 of the "Rules for Classification of Ships" and the "Rules for Classification of High Speed, Light Craft and Naval Surface Craft".

The list of Standards for Certification is also included in the current "Classification Services – Publications" issued by the Society, which is available on request. All publications may be ordered from the Society's Web site <http://webshop.dnv.com/global/>.

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1. Scope

The type approval programme is for certifying that the equipment under test conforms to the predetermined set of standards.

The requirements are based on relevant IMO performance standards and IEC test standards as well as DNV functional requirements in relation to NAUT Notations.

The procedure for assessment of conformity of manufactured products (production) is part of the scope for the type approval programme.

2. Conformity assessment of design of product type

2.1 Procedure

Type approval procedure consists of the following elements:

- application for type examination of the product
- design assessment
- type testing
- initial survey
- certificate retention survey.

2.2 Documents to be submitted for Sun Screen systems

The following documentation is to be submitted (email or CD) using a common electronic format and protocol (e.g. Acrobat (pdf) or MS Word format (doc) or AutoCad) as relevant. For systems not including electronics or electrical parts, only item 2), 8), 9), 10), 11), 13), 15), 16) and 17) apply:

- 1) Block diagram showing the inter-relationship between all parts of the equipment (e.g. processing unit(s), antennae, receiver(s), I/O-circuitry, amplifiers, relays, storage device(s), keyboard(s), display(s), power supply(ies) and any others as relevant.
- 2) Drawings, schematics and functional description necessary to describe all parts of the equipment.
- 3) Drawings & specification of physical/electrical and logical interfaces including signal format, converters, I/O-cards, protective circuitry, data protocol, cabling, required configuration of sensors.
- 4) Information on data handling and protocol data security and other monitoring measures.
- 5) List of software modules installed comprising function, name, version number and HW residence.
- 6) Drawings and/or pictures showing the user interface of visual display units and user input devices.
- 7) Description of power supply, including details on transformers, rectifiers, monitoring, capacity, consumption, battery, etc.
- 8) Environmental test program and Performance test program and specification of test site(s).

Note:

The Manufacturer is to submit the draft test programmes to DNV for verification prior to any environmental & performance type testing commence. A certificate of accreditation for the selected laboratory(ies) is generally a demand (ref. #2.5.3).

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- 9) Environmental- and Performance type test reports.
- 10) Special operational limitations if any.

- 11) Operation and installation manuals including commissioning specification.
- 12) Alarm list and description of failure modes.
- 13) Proposed or required maintenance procedures.
- 14) Description of failure detection facilities built-in-to the equipment.
- 15) Documentation about the Production quality assurance system.
- 16) Product marking.
- 17) Specification of the glare reduction (%), total solar energy rejection (%), UV light transmission (%) and Visible light transmission (%).

All the documentation submitted shall be marked in accordance with the manufacturer's QA-system and is to be prepared for easy reference of the various elements asked for.

2.3 Design requirements for Sun Screen systems

The equipment is to comply with relevant requirements of the following publications as amended:

- *IMO Resolution A.694(17) (1991)*: General requirements for shipborne radio equipment forming part of the GMDSS and for electronic navigational aids.
- *IEC Standard 60945 (2002)*: Maritime navigation and radio communication equipment and systems - General requirements - Methods of testing and required test results.
- *DNV Rules for Ships Pt.6 Ch.8 and Pt.6 Ch.20*.

Publications may be obtained at:

- www.imo.org, IMO Publications
- www.iec.ch, IEC Publications.

2.4 Requirements for identification of product with certificate

The manufacturer is to specify type, type number, model, etc., which completely identifies the equipment and its components according to drawings/equipment specification.

All optional features are to be listed and those for which type approval is requested are to be marked, either by separate type numbers or by suffixes to the equipment's basic type number.

All drawings and descriptions are to be marked with drawing reference number, item name, issue date, etc., which identify the documentation completely.

In addition all main software modules installed per hardware unit shall be specified with names and version numbers.

The final product shall be provided with visible marking, giving at least the following information:

- identification of manufacturer
- equipment type number or model identification
- serial number
- safe distance to magnetic compass
- power consumption and/or supply voltage.

2.5 Elements of type approval

2.5.1 Application for type approval

The initial stage includes filling in a DNV application form requesting DNV type examination of the product(s). The application form is to be forwarded to the local DNV station together with product documentation and proposed test programs.

2.5.2 Design assessment

The second stage involves DNV assessment of the documenta-

tion requested in sub-section 2.2 and is to verify that the design of the product is in conformance with the regulations and standards described in sub-section 2.3.

2.5.3 Type testing (TT)

When design assessment has been completed by the DNV, including approval of test programmes, the type testing may commence.

The type testing comprises:

- visual inspection
- performance type testing
- environmental type testing.

The type testing is either to be done in the presence of a DNV surveyor or to be conducted by a recognized laboratory holding a valid accreditation for the relevant tests. Alternatively, the presence of an independent expert from a recognised Authority may be accepted subsequent to approval by DNV Responsible Approval Centre.

The type testing shall be reported in accordance with EN 45001 (ISO 17025).

It is the *manufacturer's responsibility* to make sure that the type testing is performed in accordance with approved test programs so being acceptable to DNV.

2.5.3.1 Performance type testing

Tests are to be carried out to verify that the performance of the test sample conforms to the applicable requirements. The performance type tests shall as a minimum include those specified in the relevant test standards as amended listed in table of type tests.

2.5.3.2 Environmental type testing

Tests are to be carried out to verify that the test sample is “fit-for-purpose” in the marine environment as required by IMO performance standards.

The environmental type testing shall be done in accordance with the requirements of IEC 60945. Performance testing is to be conducted during relevant environmental tests. Tests are to be specified in the test program and sent to DNV for approval.

It is the manufacturer's responsibility to ensure that the environmental type testing is performed at an accredited laboratory accepted by DNV. A laboratory accepted by DNV with the presence of a qualified DNV surveyor might be used.

2.5.4 Routine tests (RT)

The routine tests, including commissioning tests on board,

constitute the final production control and the manufacturers standard RT are to be described in the submitted documentation. These tests are normally to be carried out by the manufacturer or his representative unless otherwise is stated in the type approval certificate

2.5.5 Initial Type Approval Survey

An initial TA survey may have to be carried out to confirm that the manufacturer has a production line and quality control for consistent production of the equipment for which TA is requested.

2.5.6 Type approval certificate

When the design assessment and type testing are successfully completed a type approval certificate may be issued to the manufacturer verifying the conformity of the design of the product.

2.5.7 Certification retention survey

Periodical certificate retention surveys at least every second year are required to maintain the validity of the certificate. The objective is to verify that a consistent production quality control system is implemented and that the product has not been altered with respect to design and functions covered by the type approval.

2.5.8 Renewal of type approval certificate

At least three months before the period of validity expires, the certificate holder has to apply for renewal of the certificate.

Upon receipt of the request for renewal, DNV will perform a certificate retention survey as stated above.

The periodical certificate retention survey report will constitute the basis for renewal of the type approval and the issuance of a new certificate.

3. Table of tests for Sun Screen Systems

The manufacture shall submit a procedure of how to carry out the test described in this table of tests.

Tests are to be carried out at recognised laboratories or alternatively test sites approved by DNV (described in 2.5.3).

The manufacturer shall, unless otherwise agreed, set up the equipment and ensure that it is operating normally before type testing commences.

Tests to be carried out.

Some test may only be applicable to certain designs:

| Table 3-1 E. Environmental tests (only applicable to Sun Screen Systems which include electronic or electrical parts) | | | | |
|---|--|-----------------------|--------|---|
| No | TEST | Specification of test | Status | Comments |
| E.1 | Dry heat test, incl. extreme power supply | IEC 60945, 8.2 & 7.1 | | Performance test to be done |
| E.2 | Damp heat test | IEC 60945, 8.3 | | |
| E.3 | Low temperature test (Cold test), incl. extreme power supply | IEC 60945, 8.4 & 7.1 | | Performance test to be done |
| E.4 | Thermal Shock | IEC 60945, 8.5 | | Portable equipment only |
| E.5 | Drop | IEC 60945, 8.6 | | Portable equipment only |
| E.6 | Vibration test | IEC 60945, 8.7 | | |
| E.7 | Rain Test | IEC 60945, 8.8 | | Exposed equipment only |
| E.8 | Immersion test | IEC 60945, 8.9 | | Submerged or Portable equipment only |
| E.9 | Solar radiation | IEC 60945, 8.10 | | Portable equipment only. Alternatively see test P.8 |
| E.10 | Oil resistance | IEC 60945, 8.11 | | Portable equipment only. Waiver possible |
| E.11 | Salt mist test | IEC 60945, 8.12 | | Waiver possible |
| E.12 | Extreme power supply variation test | IEC 60945, 7.1 | | Normal temperature |

| Table 3-1 E. Environmental tests (Continued) (only applicable to Sun Screen Systems which include electronic or electrical parts) | | | | |
|---|---|------------------------------|---------------|---|
| <i>No</i> | <i>TEST</i> | <i>Specification of test</i> | <i>Status</i> | <i>Comments</i> |
| E.13 | Excessive power supply conditions | IEC 60945, 7.2 | | |
| E.14 | Conducted emissions | IEC 60945, 9.2 | | |
| E.15 | Radiated emissions | IEC 60945, 9.3 | | |
| E.16 | Immunity to conducted radio frequency interference. | IEC 60945, 10.3 | | |
| E.17 | Immunity to radiated radio frequency interference. | IEC 60945, 10.4 | | Not for submerged equipment |
| E.18 | Immunity to fast transients on A.C. power, signal and control lines | IEC 60945, 10.5 | | Not for portable equipment |
| E.19 | Immunity to surges A.C. power lines | IEC 60945, 10.6 | | Not for portable equipment |
| E.20 | Immunity to power supply short-term variation | IEC 60945, 10.7 | | Not for portable equipment |
| E.21 | Immunity to power supply failure | IEC 60945, 10.8 | | Not for portable equipment |
| E.22 | Immunity to electrostatic discharge | IEC 60945, 10.9 | | Not for submerged equipment |
| E.23 | Acoustic noise and signals test | IEC 60945, 11.1 | | All bridge mounted equipment |
| E.24 | Compass safe distance | IEC 60945, 11.2 | | Not for submerged equipment |
| E.25 | Protection against accidental access to dangerous voltages | IEC 60945, 12.1 | | Enclosure min IP20 |
| E.26 | Emissions from visual display unit | IEC 60945, 12.3 | | |
| E.27 | Ergonomics and HMI check | IEC 60945, 6.1 | | May be performed during functional test |
| E.28 | Hardware check | IEC 60945, 6.2 | | May be performed during functional test |
| E.29 | Software check | IEC 60945, 6.3 | | May be performed during functional test |
| E.30 | Inter-unit connection | IEC 60945, 6.3 | | May be performed during functional test |

| Table 3-2 P. Performance tests (applicable to all Sun Screen Systems) | | | | |
|---|---|---|---------------|-----------------|
| <i>No</i> | <i>TEST</i> | <i>Specification of test</i> | <i>Status</i> | <i>Comments</i> |
| P.1 | Instantly retractable | Check that the sun screens are instantly retractable. If electrical lowering/ rising mechanism: check that the sun screens are instantly retractable after failure in the electrical mechanism. | | |
| P.2 | Colour rendition | Check, at least by using red, green, yellow and white coloured light, the true colour rendition. | | |
| P.3 | Glare reduction | Test that glare is reduced by at least 80%. | | |
| P.4 | Energy rejection | Test that the total solar energy is rejected by at least 60% | | |
| P.5 | UV light transmission | Test that the UV light transmission is less than 5% | | |
| P.6 | Visible light transmission | Test that the visible light transmission is between 5 and 15% | | |
| P.7 | Endurance test – lowering/ rising | By internal testing or track records, it should be checked that the system is in good working order after 4000 cycles of lowering and rising the sun screens (relates to 5 years of operation - $2 \times 365 \times 5 = 3650$). | | |
| P.8 | Solar radiation (Not applicable if test E.9 above has been performed). | Check track records that there is no signs of harmful deterioration of the sun screens after 5 years of operation. | | |