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MIL-STD-1399(NAVY)
SECTION 302A
29 February 1988
SUPERSEDING
DOD-STD-1399(NAVY)
SECTION 302
20 March 1972
(See 6.3)

MILITARY STANDARD

INTERFACE STANDARD FOR SHIPBOARD SYSTEMS

SECTION 302

WEATHER ENVIRONMENT



MIL-STD-1399(NAVY)
SECTION 302A
29 February 1988

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND

Washington, DC 20362-5101

Interface Standard for Shipboard Systems, Weather Environment

1. This Military Standard is approved for use by Commands of the Navy in the technical development plans, design, and acquisition specifications for new ship acquisitions, ship modernizations or conversions, and systems/equipment for installation therein and into active fleet ships.
2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter,

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FOREWORD

The purpose of this section is to define the standard interface requirements for and the constraints on the design of ships/systems/equipment which are exposed to or affected by the weather environmental conditions.

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1. GENERAL, SCOPE, INTERFACE AND APPLICABILITY

1.1 General. This section is an integral part of MIL-STD-1399. When the interface between the weather environment and ship/systems/equipment is under consideration this section and the standard must be viewed as a single document. The procedures established by MIL-STD-1399 are mandatory.

1.2 Scope. This section establishes interface requirements for shipboard systems/equipment which are exposed to or affected by the weather to ensure compatibility between such systems/equipment and the weather environment.

1.3 Interface. The interface Which is the concern of this section and the basic characteristic and constraint categories involved at this interface are shown symbolically on figure 1 (see "Definitions" of MIL-STD-1399):

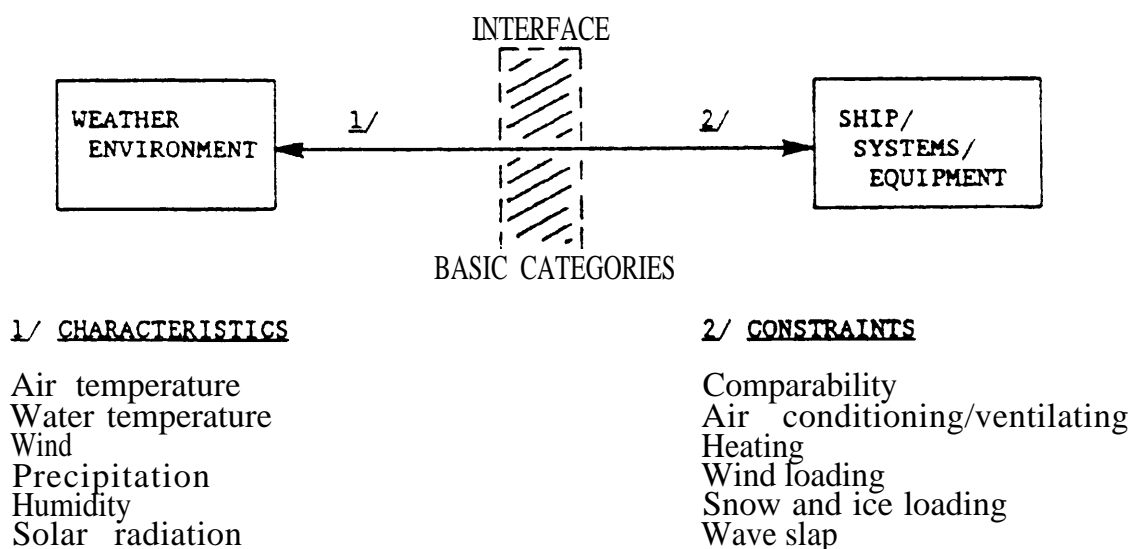


FIGURE 1. Interface

The particular interface characteristics and constraints pertinent to this section are described in 5.2 and 5.3.

1.4 Applicability. This section applies to the weather environment (see 3.1) as it relates to the design of ships/systems/equipment. It does not apply to the concomitant effects of ship motion and attitude or to wave impact and boarding seas,

2. REFERENCED DOCUMENTS

2.1 Issue of documents. The following document of the issue in effect on date of invitation for bids or request for proposal form a part of this standard to the extent specified herein.

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MILITARY

STANDARD

MIL-STD-210 - Climatic Extremes for Military Equipment.

(Copies of standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Order of precedence In the event of a conflict between the text of this standard and the reference cited herein, the text of this standard shall take precedence.

3. DEFINITIONS

3.1 Weather environment. The Weather environment, used in this section, consists of air and water temperature, humidity, wind and precipitation in the immediate vicinity of the ship.

4. GENERAL REQUIREMENTS

4.1 The specific interface requirements and constraints established herein are mandatory and shall be adhered to by SYSCOMS, PMs, contractors and all others engaged in installation (see "Requirements" of MIL-STD-1399).

5. DETAILED REQUIREMENTS

5.1 Interface characteristics constraints

5.1.1 General considerations Naval ships are designed to operate as required on any navigable ocean in the world and to perform their assigned mission under a wide range of weather conditions. These conditions vary with the time of the year and area of operation. MIL-STD-210 indicates the probable extreme climatic conditions of the natural environment to which Military equipment may be exposed, and establishes uniform limits of normal design requirements not to be exceeded for Military equipment. The values presented therein do not necessarily represent the extremes recorded but are scientific judgement values of climatic extremes which will not be exceeded more than 10 percent of the time during the most extreme month. To assist with the logical design and building of ships which will be capable of reliable, effective operations under anticipated weather environmental conditions, it has been found necessary to establish certain empirical limits with regard to weather factors. This section of MIL-STD-1399 identifies those weather factors which are significant at the shipboard weather environment interface and establishes empirical limits for those factors which may be of concern in ship/systems/equipment design.

5.1.2 Special circumstances. The majority of Naval ships, systems and effected equipment are designed to operate when exposed to the weather environmental limits delineated herein. Certain ships may be designed to meet extremes

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of heat or cold when so specified. Specific systems/equipment whose performance will be significantly degraded by occasional excursions beyond these limits may also be designed to tolerate such circumstances.

5.2 Interface characteristics, The interface characteristics of the weather environment are given in table I. Values given are empirical limits for design purposes.

TABLE I. Weather environment.

Weather factor	Limits (Note 1)	
	Maximum	Minimum
Air temperature	100°F (37.8°C) (Note 2)	-20°F (-28.9°C) (with concurrent wind velocity of 40 knots)
Relative humidity	100 percent	10 percent
Wind	75 knots steady; gusts to 100 knots	Not applicable
Precipitation	1 inch per hour rainfall (concurrent wind velocity 35 knots)	Not applicable
Sea temperature	85°F (29.4°C)	28°F (-2.2°C)

Note 1. Propulsion plant components taking air from the weather, such as gas turbine engines, shall be capable of starting and operating satisfactorily in any weather air ambient temperature between minus 40 degrees Fahrenheit (°F)(minus 40 degrees Celsius (°C)) and 125°F (51.7°C) with relative humidity of zero to 100 percent.

Note 2. With respect to maximum air temperature, the heating process of solar radiation and of radiation, conduction and convection in conjunction with own ship generated heat and possible ancillary effects of a mooring/berthing arrangement in port may increase air temperatures at some locations above that of the free air.

5.3 Interface constraints. The interface characteristics of the weather environment impose certain constraints on the design of ships/systems/equipment which are exposed to or affected by this environment. These constraints are described in 5.3.1 through 5.3.7.

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5.3.1 Compatibility. The design of ship structure and systems/equipment which are exposed to or affected by the weather environment shall be compatible with the interface characteristics given in 5.2. It shall be assumed that any reasonable combination of these characteristics can occur simultaneously.

5.3.2 Air conditioning and ventilation. Air conditioning and ventilation systems shall be designed to produce the required compartment ambient conditions with a weather air temperature of 90°F (32.2°C) (dry bulb) and 81°F (27.2°C) (wet bulb).

5.3.3 Heating Heating systems shall be designed to produce the required compartment temperature conditions with a weather air temperature of 10°F (minus 12.2°C).

5.3.4 Wing Loading Ship structure and exposed systems/equipment shall be designed to withstand a wind loading of 30 pounds per square foot (lb/ft²). For ship structure this applies to the projected area with no reduction for vertical members because of heel.

5.3.5 Snow and ice loading Ship structure shall be designed for snow and ice loading of 7.5 lb/ft². Exposed systems/equipment shall be designed to start and operate properly when covered with an ice load of 4.5 lb/ft².

5.3.6 Wave slap. Ship supporting structure and foundations shall be designed for a load transmitted as a result of a wave slap of 500 pounds per square inch acting on the projected area of that portion of equipment and machinery, mounted on the weather deck that is located beneath a line establishing for the hydrostatic head specified for weather deck design.

5.3.7 Special ship configurations. When ships are specified to be designed for cold weather operations (ice-strengthened ships) or for Arctic operations, the additional design criteria specified in 5.3.7.1 and 5.3.7.2 shall apply.

5.3.7.1 Cold weather operations.

- (a) Heating systems shall be designed to produce the required compartment air temperature conditions on the basis of a weather air temperature of minus 20°F (minus 28.9°C).
- (b) Systems/equipment installed in exposed locations shall be designed to operate satisfactorily at a minimum air temperature of minus 40°F (minus 40°C) with a concurrent wind velocity of 70 knots.

5.3.7.2 Arctic operation.

- (a) Heating systems shall be designed to produce the required compartment air temperature conditions on the basis of a weather air temperature of minus 50°F (minus 45.6°C).
- (b) Systems/equipment installed in exposed locations shall be designed to operate satisfactorily at a minimum air temperature of minus 65°F (minus 53.9°C) with a concurrent wind velocity of 100 knots.

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(c) Topside installations shall be designed to withstand the following fluctuating conditions:

- (1) Wind - 100 knots which may reverse direction in a few minutes; change from 0 to 70 knots or 70 to 0 knots in 4 minutes.
- (2) Temperature - Change of 50°F (27.7°C) in 1 hour.
- (3) Relative humidity - Change of 50 percent in 4 hours or 80 percent in 7 hours,

5.3.8 Tropicalal consideration. Certain systems/equipment may be intolerant of even occasional excursions of temperature above the limits prescribed in table I (also see 5.1.1) which could be encountered under some tropical operating situations. In such circumstance the design criteria applied to the particular system/equipment shall be modified accordingly.

6. NOTES

6.1 Deviations.

6.1.1 Conditions. In achieving the purpose of this section it is recognized that circumstances may arise where there must be some flexibility in the mandatory application of environmental design constraints. During the early stage of shipboard systems, equipment, or structure which are exposed to or affected by the weather environment it may become apparent that significant advantages in the overall design/operation can be achieved by deviating from the standard characteristics specified herein. In such instance, the provisions of the "Deviations" of MIL-STD-1399 should be followed.

6.1.2 Deviation procedure. When invoking deviations to this section, correspondence and similar information should be submitted by the contracting activity to the Naval Sea Systems Command (NAVSEA 552) program manager.

6.2 Subject term (keyword) listing.

Air temperature
Precipitation
Relative humidity
Sea temperature
Snow and ice loading
Wave slap
Weather factor
Wind loading

6.3 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiv mess of the changes.

Review activities:
AS, OS, EC, YD

Preparing activity:
Navy - SH
(Project 1990-N069)

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1. DOCUMENT NUMBER MIL-STD-1399 (NAVY) SECTION 302A		2. DOCUMENT TITLE INTERFACE STANDARD FOR SHIPBOARD SYSTEMS WEATHER ENVIRONMENT	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify) _____	
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7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
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