

**METRIC**

**DOD-STD-1399(NAVY)**

**SECTION 071**

**12 November 1981**

**MILITARY STANDARD**

**INTERFACE STANDARD FOR  
SHIPBOARD SYSTEMS**

**SECTION 071**

**MASS/SIZE/SHAPE, SHIPBOARD UNITS**

**(METRIC)**



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SECTION 071  
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DEPARTMENT OF THE NAVY  
WASHINGTON, DC 20362

Interface Standard for Shipboard Systems,  
Mass/Size/Shape, Shipboard Units

DOD-STD-1399(NAVY)  
SECTION 071

1. This Military Standard is approved for use by all interested Commands of the Department of the Navy in the technical development plans, design, and specifications for new ship acquisitions, ship modernizations or conversions, and equipment for installation therein and into active fleet ships where applicable, and is available for use by all Departments and Agencies of the Department of Defense.

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 3112, Department of the Navy, Washington, DC 20362, 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

Purpose. This section defines the standard interface requirements for, and the constraints on, the physical design with respect to mass/size/shape of units of equipment destined for interior shipboard installation.

Nature of the interface. Units of shipboard equipment must be brought on board, transported through the ship, and installed in the proper area. Factors which must be considered concern the physical size, the shape of the units, and the deadweight loads which can be handled. The ship layout establishes the handling and installation environment, and the interface is between this environment and the units which must be transported within the ship.

Structure. The technical content first delineates the characteristics in terms of ship access geometry which bear on the transporting of units inside the ship. The constraints on individual unit design necessary to achieve shipboard compatibility with these characteristics are then established.

Numerical quantities. Numerical quantities are expressed in metric (SI) units followed by U.S. customary units in parentheses. The SI equivalents of the U.S. customary units are approximated to a practical number of significant figures. The SI equivalents are numerically equal to or slightly less than the actual U.S. customary units since physical dimensions are established by the latter. Values stated in U.S. customary units are to be regarded as the current specified magnitude.

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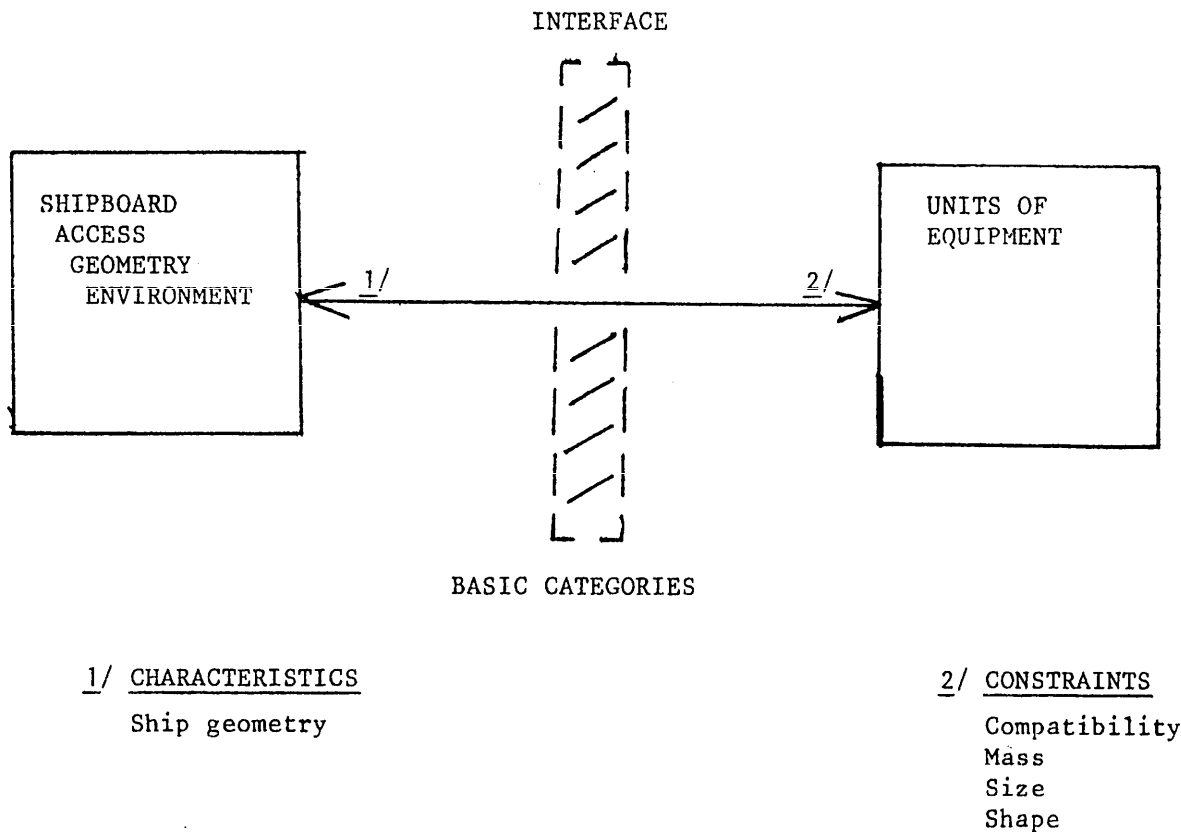
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1. GENERAL, SCOPE, INTERFACE, AND APPLICABILITY

1.1 General. Policies and procedures established by DOD-STD-1399 are mandatory. This section and the basic standard are to be viewed as an integral single document.

1.2 Scope. This section establishes interface requirements for units of shipboard equipment with regard to mass/size/shape to ensure compatibility between such units and the shipboard access geometry environment.

1.3 Interface. Basic characteristic and constraint categories concerned with this interface are shown symbolically on figure 1 (see section 3 "Definitions" of DOD-STD-1399):



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FIGURE 1. Interface.

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

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1.4 Applicability. This section applies to units of shipboard equipment to be installed within the ship during or after it is constructed, or may be transported in or out of the ship, or relocated inside the ship during its life cycle. This section does not apply to large permanent machinery units (such as main propulsion machinery, steering gear, electric generators) which are installed during construction while the ship is being built around them, and there is no intention that such units will be physically disturbed or relocated during the ship life cycle. Also, it does not apply to weapons handling, for which other pertinent sections of DOD-STD-1399 apply.

## 2. REFERENCED DOCUMENTS

2.1 This section is not applicable to this standard.

## 3. DEFINITIONS

3.1 Equipment. Equipment is a hardware entity installed on board Navy ships whose overall design is constrained by the characteristics of the shipboard installation interface. Within the context of its use, the term can encompass an integral grouping of associated and related units and components, or may only relate to a single "black box".

3.1.1 Unit (of an equipment). A unit, for the purpose of this section, is a discrete, physically separable entity of equipment which may be introduced, removed, installed, or relocated on board ship.

## 4. REQUIREMENTS

4.1 Requirements. The specific interface requirements and constraints established herein are mandatory and shall be adhered to by SYSCOMs, Project managers, contractors, and all others engaged in any aspect of shipboard design and layout to which these requirements and constraints apply including systems/equipment design, production, and installation (see section 4 "Requirements" of DOD-STD-1399).

## 5. INTERFACE CHARACTERISTICS AND CONSTRAINTS

5.1 General considerations. The interface area concerns the physical characteristics of such units which must be brought on board, transported through the ship, and installed in place. The ship access geometry will have an impact on the efficient performance of this operation. Units shall be sized so they will pass through access openings such as doors and hatches and be configured so that they can be maneuvered around corners or bends. Deadweight loads imposed by such units shall not exceed the capacity of conventional handling gear. Where it is not technically feasible for units to be designed to be completely compatible with the ship geometry, the situation needs to be considered on a case basis (see 5.3.4). Due consideration shall be accorded to this subject during the shipbuilding process to eliminate potentially costly installation problems.

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5.2 Interface characteristics. The interface characteristics of the shipboard geometry are described in 5.2.1 through 5.2.5. These characteristics describe the environment as it concerns and restricts the design of units to facilitate orderly and efficient handling.

5.2.1 Access to interior (surface ships). Normal access to, and passage within, the interior of surface ships will be limited by the standard dimensions of doorways and hatches through which uncrated units must pass. These standard dimensions are:

- (a) Doorways - 66 centimeters (cm) (26 inches (in)) wide  
- 167 cm (66 in) high  
(reduced further by round corners on a 20 cm (8 in) radius)
- (b) Hatches - 152 cm (60 in) long  
- 76 cm (30 in) wide  
(reduced further by round corners on a 19 cm (7.5 in) radius)

5.2.2 Access to interior (submarines). Normal access to, and passage within, the interior of submarines will be limited by the standard dimensions of entrance hatches and doorways through which uncrated units must pass. These standard dimensions are:

- (a) Pre SSN 688 class:
  - (1) Entrance hatch - circular tube 63 cm (25 in) diameter
  - (2) Doorways - 50 cm (20 in) wide  
- 96 cm (38 in) high  
(reduced further by round corners on a 25 cm (10 in) radius)
- (b) SSN 688 class and later SSN's:
  - (1) Entrance hatch - circular tube 76 cm (30 in) diameter
  - (2) Doorways - 50 cm (20 in) wide  
- 96 cm (38 in) high  
(reduced further by round corners on a 25 cm (10 in) radius)
- (c) TRIDENT:
  - (1) Entrance hatch - circular tube 182 cm (72 in) diameter
  - (2) Doorways - 91 cm (36 in) diameter

5.2.3 Restrictions on movement. In addition to the direct limitations imposed by normal access dimensions specified in 5.2.1 and 5.2.2, there are other restrictions due to internal structural configurations. Some of these result from stanchions and structural members, reach around corners in passageways or entrances into or out of spaces, or to interference by installed equipment, piping, wireways or fixtures. These restrictions will exist on individual ships depending on variations in ship construction and layout, and must be examined on a case basis.

5.2.4 Physical handling. Units must be physically moved around the ship from place to place. This is accomplished by various types of mass handling facilities such as cranes, booms, hoists, dollies, block and tackles, chain falls, or in many instances by ordinary manhandling where mechanical devices are not available. In all such operations the mass of the unit is a controlling factor.

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5.2.5 Special accesses and arrangements. The ship design may incorporate, based on past experience or on known requirements, oversize accesses (doorways or hatches), removable bolted or welded plates, and other removable interior structural members. The shipbuilder will develop and maintain an access control program identifying all such oversize accesses and establishing access routes for units which will not pass through the normal accesses specified herein.

5.3 Interface constraints. The interface characteristics of the ship geometry environment impose certain constraints on the design of units of equipment which are destined for installation within the ship. These constraints are specified in 5.3.1 through 5.3.4.

5.3.1 Compatibility. The design of units of equipment which are destined for shipboard installation and will be affected by the ship geometry shall be compatible with the interface characteristics given in 5.2.

5.3.2 Maximum mass. The maximum mass of units for which mechanical handling devices, such as davits and chain hoists, are provided shall not exceed the established design capacity of such handling devices. If no handling devices are programmed and it is presumed the unit must be handled, its mass shall not exceed 90 kilograms (kg) (200 pounds (lb)).

5.3.3 Shape of units. Units shall be as compact as possible. Ungainly and awkwardly shaped configurations shall be avoided. Consideration shall be given to the necessity for movement through standard accesses in the ship, particularly around sharp corners and past obstructions, structural members, stanchions, installed equipment, and other interferences.

5.3.4 Overall size. The overall size of any unit destined for interior installation shall permit the transportation of the unit into the designated compartment without dismantling of structure. Units, however, may be designed to be dismantled to meet access limitations. The access limitations specified in 5.2.1 and 5.2.2 are "worst case" limiting. Units meeting these requirements may be satisfactorily introduced into any ship or submarine. Where technical design factors for particular units preclude meeting these limiting requirements, the installation situation must be examined by the shipbuilder on a case basis to determine if the ship design provides for:

- (a) Alternate access routes not constricted by the "worst case".
- (b) Removable bolted or welded plates for oversize access.
- (c) Removable (portable) interferences.
- (d) An access control program which will permit the introduction of the unit during construction, and it will be cost-effective to accept the risk of having to open up the ship in case of later need for removal of the unit.

In any such cases the prior approval of the Principal Development Activity (PDA) shall be obtained. In cases where such approval by the PDA is not forthcoming, the provisions of section 6 "Deviations" of DOD-STD-1399 must be complied with (see 6.1).

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## 6. DEVIATIONS

6.1 Conditions. In achieving the purpose of this section, it is recognized that there must be some flexibility of application. During the early ship design stage and design of units for systems and equipment destined for installation within the ship, it may become apparent that significant advantages in the overall design and operation of such units can be achieved by deviating from the standard characteristics specified herein. In such instance, the provisions of section 6 "Deviations" of DOD-STD-1399 must be complied with.

6.1.1 Deviation procedure. Requests for deviations shall be submitted to the Naval Sea Systems Command with copies to:

- (a) Program/Project manager.
- (b) NAVSEA Ship Arrangements Design Branch.

Review activity:  
Navy - EC  
User activity:  
Navy - YD

Preparing activity:  
Navy - SH  
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