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AUSTRALIAN NAVAL CLASSIFICATION RULES

DIVISION 4: SMALL CRAFT RULES

CHAPTER 04: ENGINEERING SYSTEMS

PART 1: ANC RULES



This document is issued for use by Defence and Defence Industry personnel and is effective forthwith.

A handwritten signature in black ink, appearing to read 'CN Dagg'.

CN Dagg, CSC
Assistant Secretary
Australian Naval Classification Authority
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CANBERRA ACT 2600
May 2024 Edition

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ANC RULES (DSwP PUB 201)

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¹ <https://www.legislation.gov.au/Series/C1968A00063>

² <https://www.legislation.gov.au/Series/C2004A04868>

³ <https://www.legislation.gov.au/Series/C2004A03712>

⁴ <https://dpeintranet-seg.defence.gov.au/guidance-compliance/security-management/policy-advice/defencesecurity-principles-framework>

AUSTRALIAN NAVAL CLASSIFICATION RULES

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AMENDMENTS

Proposals for amendments to the ANC Rules may be sent to:

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Division 4: Small Craft
Part 1: ANC Rules

Chapter 04: Engineering Systems

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Australian Naval Classification Rules**Rule 0. Goal**

- 0.1 The Small Craft shall be designed, constructed, operated and maintained with engineering systems that:
 - 0.1.1 enable their operation in all Foreseeable Operating Conditions
 - 0.1.2 minimise danger to embarked persons in all Foreseeable Operating Conditions
 - 0.1.3 operate in a predictable manner with a level of integrity commensurate with operational requirements
 - 0.1.4 ensure the watertight and weathertight integrity of the hull meets the requirements of Chapter 03 *Buoyancy and Stability*
 - 0.1.5 enable the restarting of equipment necessary to provide safety functions ("dead ship" starting) without external aid in all Foreseeable Operating Conditions
 - 0.1.6 minimise the risk of fire, explosion or contamination of the environment
 - 0.1.7 provide support to the embarked persons and provide safety functions in the event of all foreseeable damage at least until the persons have reached a place of safety or the threat has receded
 - 0.1.8 enable the maintenance and repair defined in the Small Craft's maintenance plan.
- 0.2 Additional systems or equipment not directly covered by this Chapter shall not impact on the Small Craft's Engineering or Safety Systems.

Rule 1. General**Functional Objective**

- 1.1 The purpose of this Rule is to outline the principles and framework of Chapter 04 *Engineering Systems* and its application.

Scope

- 1.2 Chapter 01 *General Requirements* applies to all chapters of this Division, as applicable to the vessel design, and therefore in order to meet the Chapter 04 *Engineering Systems* goal, the requirements of both this chapter and Chapter 01 *General Requirements* shall be met.
- 1.3 This chapter covers the requirements for engineering systems.
- 1.4 The ANC Rules exclude training requirements. Chapter 04 *Engineering Systems* assumes all embarked persons have an appropriate level of competence for the operation of the Small Craft.

Application

- 1.5 The applicability of each rule of this Chapter shall be determined from the Naval Vessel's Operating and Support Intent (OSI).

- 1.6 Where engineering systems are installed on the Small Craft and are not covered by this Chapter, they shall meet the applicable requirements of Division 3 Chapter 04 *Engineering Systems*.

Rule 2. Propulsion and Manoeuvring

Functional Objective

- 2.1 The propulsion machinery and manoeuvring equipment shall enable the Small Craft to manoeuvre and maintain control, as required by the operator in all Foreseeable Operating Conditions.

Performance Requirements

- 2.2 All machinery and systems shall either be designed and manufactured specifically for marine use, or shall be adapted for that purpose.
- 2.3 The propulsion and manoeuvring machinery shall be arranged to minimise the danger to Embarked Persons in all Foreseeable Operating Conditions.
- 2.4 Where the Small Craft is fitted with propulsion machinery, it shall be provided with a means of starting under all Foreseeable Operating Conditions.

Note: See Chapter 09 *Navigation and Controllability* Rule 3 *Controllability* for the requirements relating to controllability.

Note: See Rule 4 *Control and Alerts* for the requirements relating to the control systems.

- 2.5 The primary starting arrangements shall maintain reserve capacity, ensuring independence from external assistance from the Small Craft.
- 2.6 Where required, an alternative starting arrangement shall be provided.
- 2.7 The starting arrangements shall provide capability to perform multiple consecutive starts for each engine.
- 2.8 For Small Craft with the Special Function of Self-Righting, the propulsion machinery shall have the means to be brought into operation from a post capsized recovery condition without external aid.
- 2.9 The propulsion machinery shall have the means to be brought into operation from the dead ship condition without external aid, as required by the OSI.
- 2.10 The manoeuvring equipment shall have redundancy against single point of failures without the loss of manoeuvring capability.
- 2.11 For Small Craft with the Special Function of Propulsion Redundancy, the Small Craft shall be fitted with a minimum of two propulsion systems, each capable of independent operation without reliance on the other.
- 2.12 The Small Craft shall automatically cut propulsion power in the event the operator has been forcibly removed due to the vessel motion.
- 2.13 Engines shall have means of remote stopping, physically separated or from outside the engine space.

Rule 3. Tanks and Piping Systems**Functional Objective**

- 3.1 Tanks, associated piping systems and fittings shall be of a design and construction that safely contain the intended media, taking account of anticipated pressure and temperature profiles, service for which they are intended and location.

Performance Requirements

- 3.2 The Tanks and piping systems and fittings shall be designed and constructed to safely contain the intended media, considering:
- 3.2.1 anticipated pressure and temperature profiles
 - 3.2.2 the service for which they are intended
 - 3.2.3 their location and operating environment
 - 3.2.4 static and transient conditions.
- 3.3 Fuel systems shall be arranged to prevent contamination and ensure reliable delivery of fuel.

Note: See Chapter 01 *General Requirements* Rule 13 *Range and Endurance* for the requirements of fuel tank capacity.

- 3.4 The tank system shall provide means to safely determine and monitor the fluid level within the tank.
- 3.5 The tank system shall provide means to prevent both overpressure and under pressure conditions during all Foreseeable Operating Conditions.
- 3.6 The tank system shall provide means to prevent the ignition of vapours within the tank.
- 3.7 Surface temperatures of pipes shall not pose a danger to embarked persons or become a source of ignition in case of flammable or combustible fluid leaks.
- 3.8 The piping systems shall prevent injury to embarked persons due to contact with hot surfaces.

Note: See Chapter 06 *Fire Safety* Rule 2 *Prevention* for the requirements of prevention of ignition sources and contact hazards.

- 3.9 The piping system shall prevent the occurrence of flooding due to ingress of water from any other equipment by isolation of affected equipment.
- 3.10 The oily bilge water transfer system shall be designed to maintain the integrity of watertight boundaries and prevent progressive flooding.
- 3.11 The piping system shall locate or protect vent pipes for all tanks to minimise the risk of damage and ingress of seawater or rainwater.

Note: See Chapter 03 *Buoyancy and Stability* Rule 2 *Watertight Integrity* for the requirements of watertight and weathertight boundaries.

- 3.12 Where fitted, potable water systems shall provide potable water to the quality required for human consumption.

- 3.13 Where fitted, potable water systems shall deliver potable water in all Foreseeable Operating Conditions.
- 3.14 Potable water sampling points shall be located at the storage tanks and other locations throughout the water generation and distribution system in order to monitor water quality and locate any source of contamination.
- 3.15 Potable water tanks shall be kept secure from tampering.
- 3.16 Materials used in potable water systems and associated components shall not adversely affect the quality of water conveyed through the system.
- 3.17 The piping systems shall have pressure relief arrangements that vent to a safe location depending on the media type.
- 3.18 For Small Craft with the Special Function of Low Flash Point Fuel, the fuel storage system shall be located in a designated location and provide means to prevent, detect, and mitigate the accumulation and ignition of fuel vapour.
- 3.19 For Small Craft with the Special Function of Air Drop, the fuel tank system shall be constructed in accordance with an applicable and specified standard.
- 3.20 For Small Craft with the Special Function of Low Flash Point Fuel, fuel stored in portable containers shall minimise stored quantity, provide safe stowage, and enable rapid jettisoning overboard when required.
- 3.21 For Small Craft with the Special Function of Cargo Fuel Carriage, storage and transfer arrangements shall be provided.

Rule 4. Electrical Power and Systems

Functional Objective

- 4.1 Electrical power shall be available for all Foreseeable Operating Conditions as defined in the OSI.

Performance Requirements

- 4.2 The main electrical power system shall supply all operational services and habitability loads during all Foreseeable Operating Conditions without reliance on the emergency electrical power system.
- 4.3 The emergency electrical power system shall supply all emergency services and emergency habitability loads automatically, following loss of the main electrical power system.
- 4.4 The emergency power supply shall have power integrity and availability.
- 4.5 The emergency power supply shall be protected against environmental conditions.
- 4.6 Where no interruption of the electrical supply between normal and emergency or backup supplies is permitted, transitional power supplies shall be provided.
- 4.7 The electrical power system shall eliminate, or minimise SFARP, the risk to embarked persons arising from electrical hazards during all defined operating, maintenance and credible fault conditions.
- 4.8 The electrical power and system shall maintain power quality and protect all electrical equipment from damage in all Foreseeable Operating Conditions.

- 4.9 The electrical power and system shall provide facilities to charge and monitor power storage devices.
- 4.10 The electrical power and system shall provide facilities for connection to shore-side electrical power as defined in the OSI.
- 4.11 The electrical power and system shall have the means to restore emergency electrical power from dead ship condition, to enable operation of safety functions as required by the OSI.
- 4.12 An electrical distribution system for Australian portable electrical equipment shall be provided that meets the Australian Standard for interface compatibility.

Rule 5. Control and Alerts

Functional Objective

- 5.1 Engineering systems shall enable the monitoring, operation and control of system functions during all Foreseeable Operating Conditions.

Note: See Division 2 Chapter 01 General Requirements Rule 10 Control Stations for the requirements relating to control stations.

Performance Requirements

- 5.2 Where a control system is installed, the control system shall:
- 5.2.1 operate machinery and systems in a safe, controlled and stable manner throughout the machinery and systems defined operational limits
 - 5.2.2 recover automatically to a safe state after a loss of power supply
 - 5.2.3 ensure that each item of machinery is controlled from only one control location at any given time
 - 5.2.4 provide indication and feedback to confirm that the system has responded to operator demands
 - 5.2.5 indicate the status of automatic control systems.
- 5.3 The control system for Essential Safety Functions shall be provided with a continuous electrical supply.
- 5.4 In the event of a failure, control systems shall:
- 5.4.1 transition to a defined safe state
 - 5.4.2 not inhibit the manual or reversionary modes of operation.
- 5.5 Where an alert system is provided, it shall alert operators to deviations from the defined normal operating state of machinery and systems.
- 5.6 For Small Craft with the Special Function of Mission Ready State, means to safely silence and restore alert sounds shall be provided.
- 5.7 For Small Craft with Special Function of High-Speed Operation or Launch and Recovery, the control system shall have trim alert as required by the OSI.

Rule 6. Lighting**Functional Objective**

- 6.1 Lighting shall be provided to facilitate the safe operation and movement of embarked persons around the Small Craft.

Performance Requirements

- 6.2 Lighting shall be provided at locations where illumination is necessary for the safe operation of the Small Craft and the safe movement of embarked persons.
- 6.3 Lighting systems shall be provided with an emergency lighting capability independent of the primary lighting power supply.
- 6.4 Lighting required for Essential Safety Functions and essential operations shall remain available during all Foreseeable Operating Conditions, including loss of the primary lighting supply.
- 6.5 The emergency lighting capability shall provide illumination to enable embarked persons to move safely from occupied spaces to weather decks, escape routes and embarkation locations.
- 6.6 Where survival craft embarkation or launching arrangements are fitted, the emergency lighting capability shall illuminate the associated embarkation and launching positions.

Note: See Chapter 07 Escape, Evacuation and Rescue Rule 6 Lighting During Escape, Evacuation and Rescue Emergencies for additional requirements relating to emergency lighting.

- 6.7 Where man-overboard recovery equipment or designated recovery areas are fitted, the emergency lighting capability shall illuminate the equipment and recovery areas necessary to conduct recovery operations.
- 6.8 The emergency lighting capability shall provide illumination necessary for the operation, monitoring and emergency maintenance of essential machinery, equipment and systems.
- 6.9 Where Night Vision Devices (NVDs) are utilised, externally visible lighting and reflective surfaces on the Small Craft shall not interfere with the effective use of those devices during intended operations.
- 6.10 For Small Craft with the Special Function of Mission Ready State shall operate light with low signature and restore to normal state as required by the OSI.
- 6.11 Low-signature lighting arrangements shall provide illumination necessary to safely conduct essential operational activities and emergency actions.

Rule 7. Auxiliary Systems**Functional Objective**

- 7.1 Auxiliary systems shall support the safe and reliable operation of the Small Craft to control risks associated with operation.

Performance Requirements

- 7.2 The auxiliary systems shall withstand the maximum design pressure without loss of containment.

- 7.3 The auxiliary systems shall provide overpressure protection to prevent pressures exceeding the maximum allowable working pressure.
- 7.4 Auxiliary systems shall be designed, constructed and maintained to eliminate or minimise SFARP, the risk to embarked persons arising from the toxicity of gases.
- 7.5 Auxiliary systems shall be designed, constructed and maintained to eliminate or minimise SFARP, the risk to the environment.

Note: See Chapter 12 *Environmental Protection* for the requirements relating to environmental risks.

- 7.6 Auxiliary systems shall be designed, constructed and maintained to eliminate or minimise SFARP, the risk to embarked persons being exposed to extremes of temperature associated with an auxiliary system.