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AUSTRALIAN NAVAL CLASSIFICATION AUTHORITY MANUAL (VOLUME 2)

DIVISION 3: SHIP RULES

CHAPTER 10: DANGEROUS GOODS

PART 1: ANC RULES

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

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

4 http://drnet/AssociateSecretary/security/policy/Pages/dspf.aspx

AUSTRALIAN NAVAL CLASSIFICATION RULES

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Division 3: Ship Rules
Part 1: ANC Rules

Chapter 10: Dangerous Goods

Contents

Australian Naval Classification Rules

Rule 0. Goal

Note: This Chapter primarily regulates the carriage and use of Class 1 articles and substances. Class 1 Dangerous goods shall be referred to as Explosive Ordnance (EO). The Chapter Scope (Rule 1 *General*) also details how Class 2-9 articles and substances shall be addressed.

0.1 The ship arrangements for the carriage and use (including stowage and handling) of dangerous goods shall:

0.1.1 Minimise the risk of an incident associated with the carriage of dangerous goods;

0.1.2 Manage the risk to the people, property and the environment including Essential Safety and Mission Critical Functions arising from incidents associated with the carriage and use of dangerous goods So Far As Reasonably Practicable (SFARP); and

0.1.3 Enable the safe movement, maintenance and preparation for use of dangerous goods.

Note: This Chapter seeks to control the risk of an incident arising from the carriage and use of dangerous goods and could be considered a component of an environmental protection policy.

Rule 1. General

Functional Objective

1.1 The purpose of this Rule is to outline the principles and framework of Chapter 10 *Dangerous Goods* that must be met if the role of the ship requires the carriage or use of EO.

Scope

1.2 Chapter 10 *Dangerous Goods* is written in a goal based format which specifies high level objectives to achieve a minimum level of safety for the stowage and handling of EO onboard Naval Vessels.

1.3 Division 2 Chapter 01 *General Requirements* and Chapter 01 *Integrated Platform Survivability* applies to all chapters of the ANC Rules, as applicable to the design, and therefore in order to meet the Chapter 10 *Dangerous Goods* goal, the requirements of both this chapter, Chapter 01 and Division 2 Chapter 01 *General Requirements* shall be met.

1.4 Ship arrangements associated with all dangerous goods shall be in accordance with the requirements of Safety of Life at Sea (SOLAS) and International Maritime Dangerous Goods (IMDG) Code.

1.5 For Class 1 EO items where compliance with paragraph 1.4, in whole or part, is not compatible with the Operating and Support Intent (OSI), the Naval Vessel Operator (NVO) shall comply with this Chapter by the implementation of:

1.5.1 Equivalent arrangements for aspects within the scope of SOLAS or IMDG Code; and/or

1.5.2 Additional arrangements for aspects outside the scope of SOLAS or IMDG Code.

1.6 For Class 2-9 items where compliance with paragraph 1.4, in whole or part, is not compatible with the OSI, the NVO shall address the issues of stowage, personal protection and emergency

procedures when dangerous goods are in use, and the subsequent stowage of opened dangerous goods, through a risk assessment.

1.7 The requirements of this Chapter apply directly to all spaces and systems in which dangerous goods are stowed (either permanent or temporary), maintained, handled, or used and to those adjacent spaces containing items that might be a causal factor to increasing the risk of incident.

1.8 Chapter 04 *Engineering Systems* contains the overarching requirements for Engineering Systems which apply to the carriage and use of Dangerous Goods (Class 1-9). Chapter 10 *Dangerous Goods* supplements Chapter 04 *Engineering Systems* by providing additional requirements applicable to EO.

1.9 Chapter 06 *Fire Safety* contains the overarching requirements for Fire Safety which apply to the carriage and use of Dangerous Goods (Class 1-9). Chapter 10 *Dangerous Goods* supplements Chapter 06 *Fire Safety* by providing additional requirements applicable to EO.

1.10 Chapter 10 *Dangerous Goods* does not apply to dangerous goods which are a permanent component of a ship's system except for EO stored within their launching mechanisms.

1.11 Once equipment containing dangerous goods is removed from its host system it is subject to the Rules of this Chapter.

1.12 Where a ship loads and unloads dangerous goods to vehicles (small craft, vehicles and aircraft) the ship arrangements shall manage the safety of the dangerous goods until the loaded vehicle no longer places the ship at risk.

1.13 The ANC Rules excludes training requirements. This Chapter assumes all embarked persons have an appropriate level of competence for the operation of the installed systems.

Application

1.14 This Chapter shall apply from the point at which dangerous goods directly contact or place at risk the receiving vessel (e.g. on the deck or attached to ship's lifting equipment) to the point at which they no longer put the vessel at risk (e.g. after consumption or transfer to another vessel or shore).

1.15 This Chapter applies to the carriage and use of dangerous goods during Foreseeable Operating Conditions. For extreme threat conditions, the NVO shall define the requirements in the OSI and set the performance requirements for the safety of dangerous goods.

Note: Foreseeable Operating Conditions and extreme threat conditions are defined in Division 1 Annex A *Definitions and Abbreviations*.

1.16 Where the ship arrangements do not meet the requirements of the other chapters the implications for dangerous goods shall be identified and ship arrangements provided specific to the risk management of the dangerous goods.

General Performance Requirements

1.17 Division 2 Chapter 01 Rule 2 *Safety Management System* contains the overarching requirements for the ship's Safety Management System which shall include a section specific to dangerous goods, whose scope at a minimum addresses all the elements of this Chapter and shall be independently assured. Design standards, acceptance criteria and verification of effective ship arrangements throughout the ship's life shall be derived from the Safety Management System.

1.18 Ship arrangements supporting the safe carriage and use of dangerous goods shall be clearly identified, operated and maintained commensurate with the importance of the risk they manage.

1.19 Dangerous Goods (Class 1-9) shall be designated in accordance with the UN Recommendations on the Transport of Dangerous Goods – Model Regulations. In addition, all EO shall be designated in accordance with the UN NATO Hazard Classification for the Stowage of Military Ammunition and Explosives.

1.20 Dangerous goods shall not be embarked without appropriate documentation that identifies the dangerous goods' inherent safety and associated safety parameters.

1.21 Where, for extraordinary immediate operational reasons requirements are unable to be met, acceptance of an equivalent solution shall be based on engineering analysis performed in accordance with General Requirements and is subject to the approval of the ANC Authority and as recommended by the NVO.

1.22 Not used.

1.23 EO Stowage and Designated Danger Area (DDA) design shall be considered as supporting the ship's weapon system and affecting overall survivability; and aim to minimise risks to:

1.23.1 Platform survivability;

1.23.2 Operational capability;

1.23.3 Safety (of crew and public);

1.23.4 Physical security;

1.23.5 Societal risk; and

1.23.6 Environment.

1.24 Dangerous Goods shall be safe and serviceable for the range of environmental conditions expected for the platform as started in the OSI.

1.25 Naval ships carrying EO shall ensure they meet the relevant requirements of Chapter 13 *Combat Systems* and that EO for integration on board has been tested in accordance with Rule 12 and classified for the ship conditions accordingly.

1.26 As well as compliance with Chapter 10, all EO Stowages and DDAs shall comply with Division 2 Chapter 01 Rule 3 *System Safety* requirements for the ship's system safety.

Rule 2. Layout and Services

Functional Objective

2.1 Ship arrangements for the location within the ship, layout of spaces and the provision of supporting services shall maintain the inherent safety of the dangerous goods and manage incidents.

Performance Requirements

2.2 The size, shape and location of the dangerous goods stowage areas (either permanent or temporary), maintenance facilities, embarkation and disembarkation routes and emergency procedures shall be designed taking into account the OSI, the use of the dangerous goods and the risks associated with the dangerous goods as derived from the Safety Management System.

2.3 Spaces adjacent to dangerous goods stores and ship equipment (for both normal and fault conditions) shall be designed to manage the hazards they present to the dangerous goods.

2.4 Ship arrangements for temporary holding areas for dangerous goods shall manage the risk from and to the dangerous goods commensurate with the time at risk.

2.5 The ergonomics of the spaces in which dangerous goods are stored, prepared, maintained or used shall provide for the safe carriage and use, maintenance and inspection of dangerous goods and the dangerous goods stowage areas.

2.6 Ship arrangements shall control the risk of a reaction occurring between dangerous goods.

2.7 Systems or equipment passing through or resident in spaces in which dangerous goods are stored or used shall not be a causal factor to increasing the risk to the dangerous goods or vice versa during normal operation or fault conditions.

2.8 Dangerous goods stowage areas shall be designed to collect any leakage of hazardous liquids, as well as detect and vent gases or vapours, which might emanate from dangerous goods or other items.

2.9 Ship arrangements shall be such that an incident associated with dangerous goods does not degrade essential escape, evacuation and rescue systems due to an incident related to dangerous goods.

2.10 Incident control systems such as pressure relief systems and containment control shall not endanger the crew or third parties when operated.

2.11 Dangerous goods stowage areas shall provide emergency escape and evacuation arrangements for personnel. The scope of such arrangements shall be commensurate with the size of the vessel and the type of hazard presented by the dangerous goods.

2.12 The ship arrangements shall control the environment as required by the dangerous goods embarked.

2.13 Ship arrangements shall be demonstrated at build and through life to control the environment in accordance with the dangerous goods embarked.

Note: For treatment of personnel in the event of injury from incidents involving EO, see Chapter 15 *Health Facilities*.

Rule 3. Structural Protection

Functional Objective

3.1 Ship arrangements shall provide appropriate structural integrity to support dangerous goods and their associated safety systems.

Performance Requirements

3.2 Structure which is a component of the ship's safety management system shall be designed, constructed and maintained to protect the ship from incidents occurring with dangerous goods.

Note: For foreseeable damage conditions structural requirements relating to fire incidents are in Chapter 06 *Fire Safety* Rule 2 *Structural Integrity* in case of fire and structural requirements relating to damage are in Chapter 02 *Structures:* Rule 3 *Structural Design.*

3.3 Ship structure shall withstand or be protected from loads (e.g. blast, heat, and shock) arising from the use of dangerous goods.

3.4 Ship structure shall support safety and consequence management systems.

3.5 Safety factors of structure associated with handling and operating equipment shall be appropriate for the hazard classification of the dangerous goods being used and the operation under consideration.

3.6 Temporary or portable ship structure, or fittings associated with the carriage and use of dangerous goods shall be designed, built, assembled and tested commensurate with the risk associated with the dangerous goods.

3.7 Structural fixing of items within dangerous goods stowage areas shall ensure items remain fixed in all foreseeable operating conditions and extreme conditions.

Rule 4. Fire Protection

Functional Objective

4.1 Ship arrangements shall minimise the risk of fire incidents initiated by dangerous goods or that threaten dangerous goods SFARP.

Note: This Rule applies whenever and wherever dangerous goods are present and are additional to the requirements of Chapter 06 *Fire Safety* – which should be read in conjunction with this Chapter

Performance Requirements

4.2 The fire management policy for dangerous goods for the vessel, including prevention, detection, containment, control and extinguishing of fires, shall be defined in the OSI.

Note: This will include a definition of the number and severity of fire incidents the ship shall be expected to manage and verified for operation in the extreme threat conditions.

4.3 The fire detection, alarm and response system (e.g. fully automated or require manual activation) shall be appropriate to the ship's OSI.

4.4 Materials shall be selected to minimise the fire risk they present.

4.5 Drainage, flooding and fixed fire-fighting systems for dangerous goods stowage areas shall be controllable from outside the space.

4.6 To prevent fire escalation, the fire protection system design, coverage, reaction times and rates of deployment shall be commensurate with the type of hazard presented by the dangerous goods.

4.7 Systems passing through dangerous goods stores shall be avoided where a failure of the system presents a fire risk to the goods stored. Where this is not possible appropriate controls such as shielding or enhanced fire protection systems shall be provided.

Note: Systems refers to pipes, cables, vents etc.

4.8 Integrity and operational efficiency of fire protection systems for dangerous goods stores shall not be compromised by failure or maintenance of the ship systems or equipment that support the fire protection system.

4.9 Ventilation control shall ensure the effectiveness of the fire protection system provided for the protection of dangerous goods.

4.10 The operation of the fire protection system should be monitored at all times whilst dangerous goods are embarked and reported to the ship's staff when activated.

4.11 Reporting of the fire protection system of the dangerous goods stowage shall be to a continually manned space.

4.12 Arrangements for dangerous goods stowage areas shall limit transfer of heat from fires, machinery systems or other equipment or systems outside of the stowage areas to within safe levels.

4.13 Ship arrangements shall provide the rapid and direct distribution of appropriate fire suppressant or cooling media.

4.14 Dangerous goods shall not be embarked until the fire protection system is operable and verified.

4.15 Control points for fire-fighting systems shall be provided and separated to reduce the probability of loss of system control.

4.16 Positions where dangerous goods are temporarily stowed, prepared or maintained shall be provided with fire detection, prevention and suppressant systems commensurate with the time at risk and the magnitude of the risk presented by the dangerous goods.

4.17 Dangerous goods stored on exposed decks shall be provided with fire protection systems suitable for the fire risk.

4.18 Ship arrangements shall facilitate the testing of fire systems to ensure their availability and reliability are maintained whilst the dangerous goods are present.

4.19 Ship arrangements for fire protection of dangerous goods shall consider failure modes and provide suitable control measures.

Rule 5. Electrical Fittings

Functional Objective

5.1 The ship arrangements shall protect dangerous goods from electrical conditions that could lead to an incident.

Performance Requirements

5.2 Electrical items shall be approved and certified safe for operation in dangerous good stowage areas or in the vicinity of dangerous goods or their associated safety systems.

5.3 The design of electrical items under normal, overload and fault conditions shall maintain the safety arrangements associated with the protection of dangerous goods.

5.4 Ship arrangements shall maintain the electromagnetic conditions within safe limits wherever and whenever dangerous goods are present.

Note: Authorised electrical items are recognised by the ANC Authority or a Competent Organisation to be safe for operation through meeting or exceeding applicable standards associated with the dangerous goods embarked.

5.5 All electrical fittings, or equipment containing electrical components, that are used in a EO Stowage (either permanently fixed or portable) shall be essential to the function of the EO Stowage; and shall meet the requirements of this chapter and Chapter 04 *Engineering Systems*.

5.6 Electrical fittings and equipment shall be watertight and suitable for service in the marine environment and constructed from materials that are consistent with the proposed operating environment and survivability studies.

5.7 Where an explosive or flammable atmosphere may be present, only electrical fittings or equipment containing electrical components that will not provide an ignition source shall be used.

5.8 All electrical fittings and equipment, not associated with the EO Stowage, shall not be mounted on the common boundary with the EO Stowage unless it is impractical to mount it elsewhere.

5.9 Electrical fittings within EO stowages and WPAs shall be designed and positioned so that they do not:

5.9.1 Cause an obstruction or hazard to personnel during EO handling or storage operations; or

5.9.2 Interfere with the efficient operation of blast pressure venting arrangements, lighting, ventilation equipment and fire detection and suppression equipment; or

5.9.3 Cause a hazard to EO stored therein during routine maintenance activities.

5.10 Cables in adjacent compartments shall be routed to minimise any additional risks to EO.

Rule 6. Stowage and Handling

Functional Objective

6.1 Ship arrangements shall provide safe and secure stowage, handling, movement, re-location and transfer of dangerous goods and the required quantities of EOs as specified in the OSI.

Performance Requirements

6.2 Ship arrangements shall have secure restraint systems that maintain the integrity and safety of the dangerous goods.

6.3 All other items stored within dangerous goods stowage areas shall be assessed for compatibility with the dangerous goods and restrained such that they do not endanger the dangerous goods.

6.4 Where bulk or versatile stowage of dangerous goods is used, ship arrangements shall provide segregation, restraint and partitioning to prevent movement caused by ship manoeuvres, sea conditions, vibration or underwater shock.

6.5 Dangerous goods stores on exposed decks shall be provided with adequate protection from environmental conditions and sited to control the risk from ship operations.

6.6 Stowage layouts shall be commensurate with the protection systems (e.g. adequate clearance to bulkheads and decks for boundary cooling from fire-fighting systems).

6.7 The temperature of surfaces in the vicinity of dangerous goods shall be maintained at safe levels during normal and fault conditions.

6.8 Where dangerous goods safety is at risk from exposure to sea water, flood alarms shall be fitted and reported in a continually manned space, at sea and in harbour.

6.9 Ship arrangements shall incorporate embarked vehicles in which dangerous goods are stored for transfer.

6.10 The interface between safety arrangements for the ship and any system delivering dangerous goods to and from the ship shall be carefully managed and controlled commensurate with the risk posed.

6.11 Restraint systems and layout shall allow access to and removal of dangerous goods without detriment to the safety of other dangerous goods.

6.12 Movement, re-location or transfer shall be undertaken in accordance with a procedure to efficiently, with the minimum of delay or pausing in the process to limit the exposure of the ship to increased safety risk.

6.13 All dangerous goods transfer routes shall be defined and approved.

6.14 All lifting and handling equipment is to comply with approved standards and regulations for the areas in which they are to be used commensurate with the risks appropriate to the movement and handling of dangerous goods.

Rule 7. Security

Functional Objective

7.1 Ship arrangements shall prevent malicious or unintended interference with the dangerous goods or their safety management system.

Performance Requirements

7.2 The permission of the Commanding Officer or a delegated responsible representative is required for the embarkation of any dangerous goods.

7.3 Ship arrangements shall prevent access to dangerous goods or associated safety management systems by unauthorised persons and be approved.

Note: Authorised persons are those approved by the NVO to have access to dangerous goods and have been assessed as competent or are appropriately supervised.

Note: Access includes physical presence, control of procedures, or freedom to affect the safe carriage and use of dangerous goods. This may apply when dangerous goods are not present.

7.4 A system shall be in place to ensure the location, condition and quantity of all dangerous goods is known, logged, monitored, and reported at all times.

Rule 8. Incident Reporting

Functional Objective

8.1 A system shall be in place to ensure all incidents involving dangerous goods or associated systems is reported, investigated and, where appropriate, ship arrangements amended to maintain or improve safety levels.

Note: The requirements of Division 2 Chapter 01*General Requirements* Rule 02 *Safety Management System,* which relate to Reporting Procedures, for accidents and non-conformities.

Performance Requirements

8.2 A management system shall exist to ensure that dangerous goods incidents are recognised and reported.

8.3 The NVO shall make adequate and proportional arrangements for the investigation or review of each dangerous goods incident.

8.4 Appropriate measures shall be taken such that the intended safety levels are maintained or improved following a dangerous goods incident.

Rule 9. Not Used

Rule 10. Use of Dangerous Goods

Functional Objective

10.1 Ship Arrangements shall control the safety risk associated with use of dangerous goods.

Note: For maritime armament systems safe use requirements see Chapter 13 *Combat Systems*.

Performance Requirements

10.2 All planned activities involving the use of dangerous goods shall be identified with a safe system of work defined for each activity.

10.3 The ship arrangements shall provide for the safe disassembly and assembly of packaging.

10.4 Ship arrangements shall manage the safe preparation of dangerous goods.

10.5 Ship arrangements shall manage the safe activation of dangerous goods.

10.6 Ship Arrangements shall manage the risk due to the carriage of dangerous goods by off-board systems operating to and from the ship.

10.7 Ship Arrangements shall manage the risk due to carriage and use of dangerous goods by embarked persons.

10.8 Ship Arrangements shall manage the safety of tests, trials and experiments involving dangerous goods.

Rule 11. Emergency Procedures

Functional Objective

11.1 Ship Arrangements shall control the consequences associated with dangerous goods, arising from foreseeable emergency situations.

Performance Requirements

11.2 A system shall be in place to ensure emergency planning is conducted to identify and prioritise all foreseeable emergency situations.

11.3 Arrangements to control the consequences of emergency situations shall be put in place.

11.4 Emergency arrangements shall be implemented effectively.

11.5 Appropriate measures shall be taken to return all dangerous goods to a safe condition following an emergency.

Rule 12. Generic Maritime Environment (GME) for Armament Systems

Functional Objective

12.1 The maritime environment a ships armament systems will be exposed to whilst embarked in ADF Platforms, shall be defined in the Generic Maritime Environment (GME). GME provides a

common environmental datum for use as the reference basis for assessment of both EO and Naval Vessels.

12.2 The risks associated with the effects of the Generic Maritime Environment (GME) shall be managed and controlled. This includes risks to material components within armament systems (launcher, WPAs, EO Stowage, etc.) as well as EO.

Performance Requirements

12.3 A common environmental datum shall be used as the reference basis for assessment of both EO and ship. When conducting the EO integration activity, assessment/performance data for both the EO and the ship shall have a common basis.

12.4 For each item of EO to be embarked, designers and installers shall compare platform and compliance data to GME to achieve satisfactory integration in accordance with the OSI.

12.5 Where either the EO or the ship (or both) are not compliant to achieve successful integration, to ensure compliance is achieved, such as:

12.5.1 Mitigation, improvements to the EO intrinsic performance; or

12.5.2 Removing the requirement for the EO to be embarked.

Rule 13. Special Requirements

Functional Objective

13.1 Ship arrangements shall control the risks associated with dangerous goods associated with Special Requirements.

Performance Requirements

13.2 For each item of EO subject to Special Requirements, comparison between the EO and platform compliance data shall be made to identify areas requiring further risk management to minimise risk.

13.3 Special Requirements shall apply to the following EO Stowage areas designed specifically for the permanent or temporary storage of approved EO, including:

13.3.1 Magazines

13.3.2 Small Magazines

13.3.3 Specific Magazines include:

13.3.3.1 Detonator Ready Use (RU) Magazines;

13.3.3.2 RU Magazines;

13.3.4 Guided Weapon Magazines, including:

13.3.4.1 Integrated Missile Magazines;

13.3.4.2 Non-Integrated Guided Weapon (GW) Magazines;

13.3.5 Loaded Launchers, including:

13.3.5.1 Canisterised Harpoon;

13.3.5.2 NULKA Launchers;

13.3.5.3 Surface Vessel Torpedo Tube (SVTT);

13.3.6 Cargo EO, including non-RAN EO (e.g. Embarked Forces EO);

13.3.7 Vehicle Deck EO; and

13.3.8 Weapons Preparation Areas (WPA).

13.4 Special Requirements for Magazines, Small Magazines, and Specific Magazines shall be applied to:

13.4.1 Location;

13.4.2 Construction Material;

13.4.3 Installation Location and Method;

13.4.4 Surface Finishes and Markings;

13.4.5 Stowage and Fittings;

13.4.6 Electrical Requirements;

13.4.7 Flooding / Fire Suppression;

13.4.8 Pressure Venting;

13.4.9 Efflux Protection;

13.4.10 EO Handling Equipment; and

13.4.11 EO Stowage Markings.

13.5 Where either the EO or the ship (or both) are not compliant to achieve successful integration, fundamental action shall be taken, such as:

13.5.1 Mitigation, improvements to the EO intrinsic performance; or

13.5.2 Removing the requirement for the EO to be embarked.