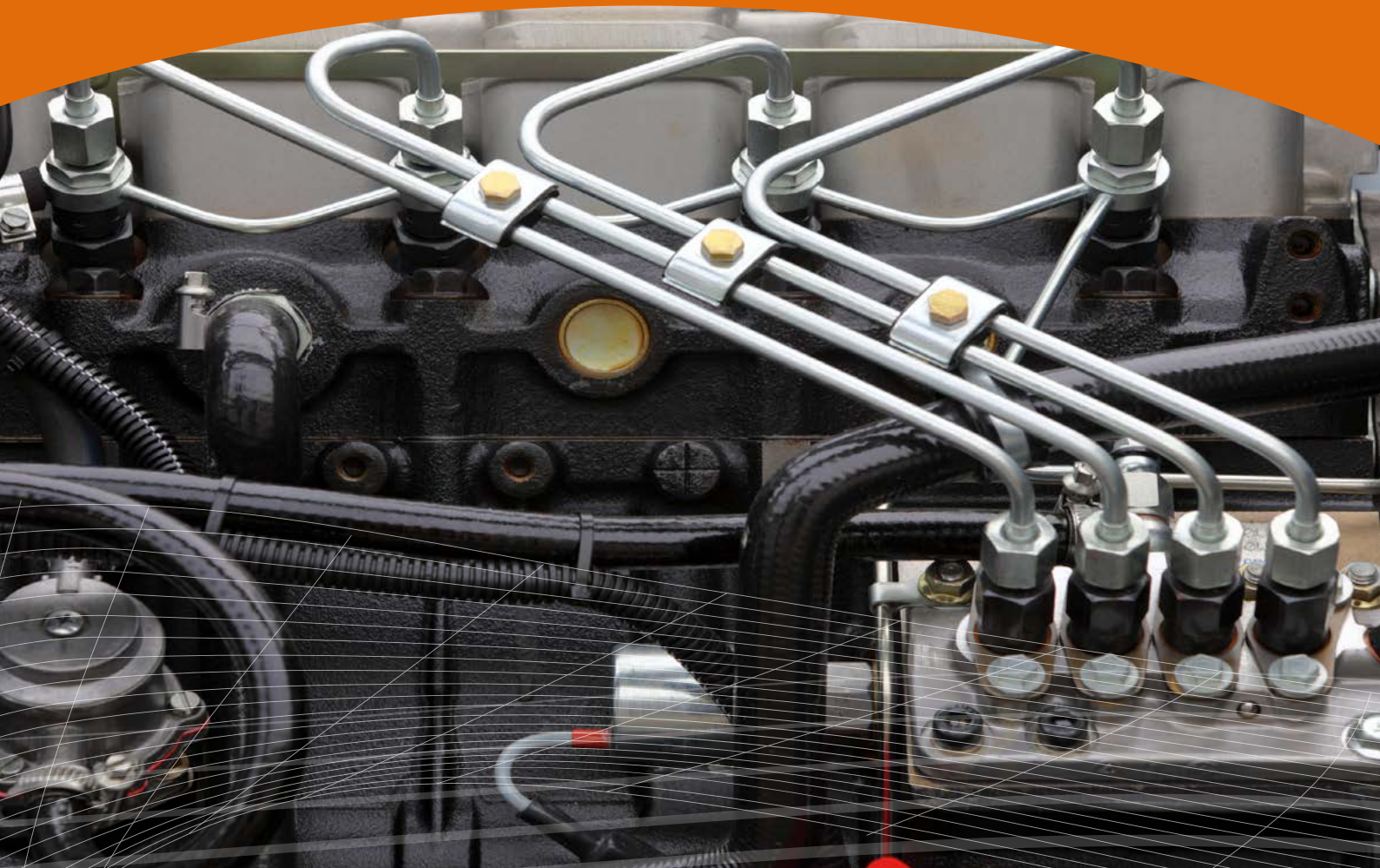
Australian Government
Australian Maritime Safety Authority

Marine Engine Driver Grade 3 Near Coastal

Skills and Knowledge Required for Marine Order 505 (Certificates of competency — national law) 2022



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The tables in this document are taken directly from AMSA 730 Skills and Knowledge Required for Marine Order 505 (Certificates of competency — national law) 2022. Only those tables specific to this certificate of competency are included in this document.

TABLE 2 – ELEMENTS OF SHIPBOARD SAFETY

Outcome	Content	Standards for evaluating competence
Elements of Shipboard Safety Safety and emergencies including survival craft	**Meet operational and emergency safety requirements** • Apply basic survival skills in the event of vessel abandonment • Follow procedures to minimise and fight fire on a vessel • Meet workplace health and safety requirements • Survive at sea using survival craft	• Practice survival techniques • Operate lifesaving and survival equipment • Undertake and understand risk management processes including Safety Management System (SMS) operational practices • Follow workplace health and safety procedures and take action • Understand and follow fire minimisation procedures • Respond to and fight fires with portable and other firefighting appliances including correct use of vessel closure and shutdown systems • Identify and respond to risks associated with confined spaces • Practice survival techniques using survival craft

TABLE 3 – FOLLOW SOUND ENVIRONMENTAL WORK PRACTICES

Outcome	Content	Standards for evaluating competence
Environment Follow environmental work practices	**Environmental Responsibilities** • Implement and follow environmental workplace practices and procedures • Contribute to improved environmental work practices • Maintain environmental records • Precautions to prevent pollution • Sensitive sea and restricted sea areas • MARPOL • Oil spill equipment and its limitations	• Identify safe and environmentally acceptable practices for: - Refuelling - Cleaning up fuel or oil spills - Understanding garbage, sewage, noise, anchoring or marine life and other environmental type maritime responsibilities - Antipollution procedures and equipment

TABLE 11 – MARINE ENGINE DRIVING

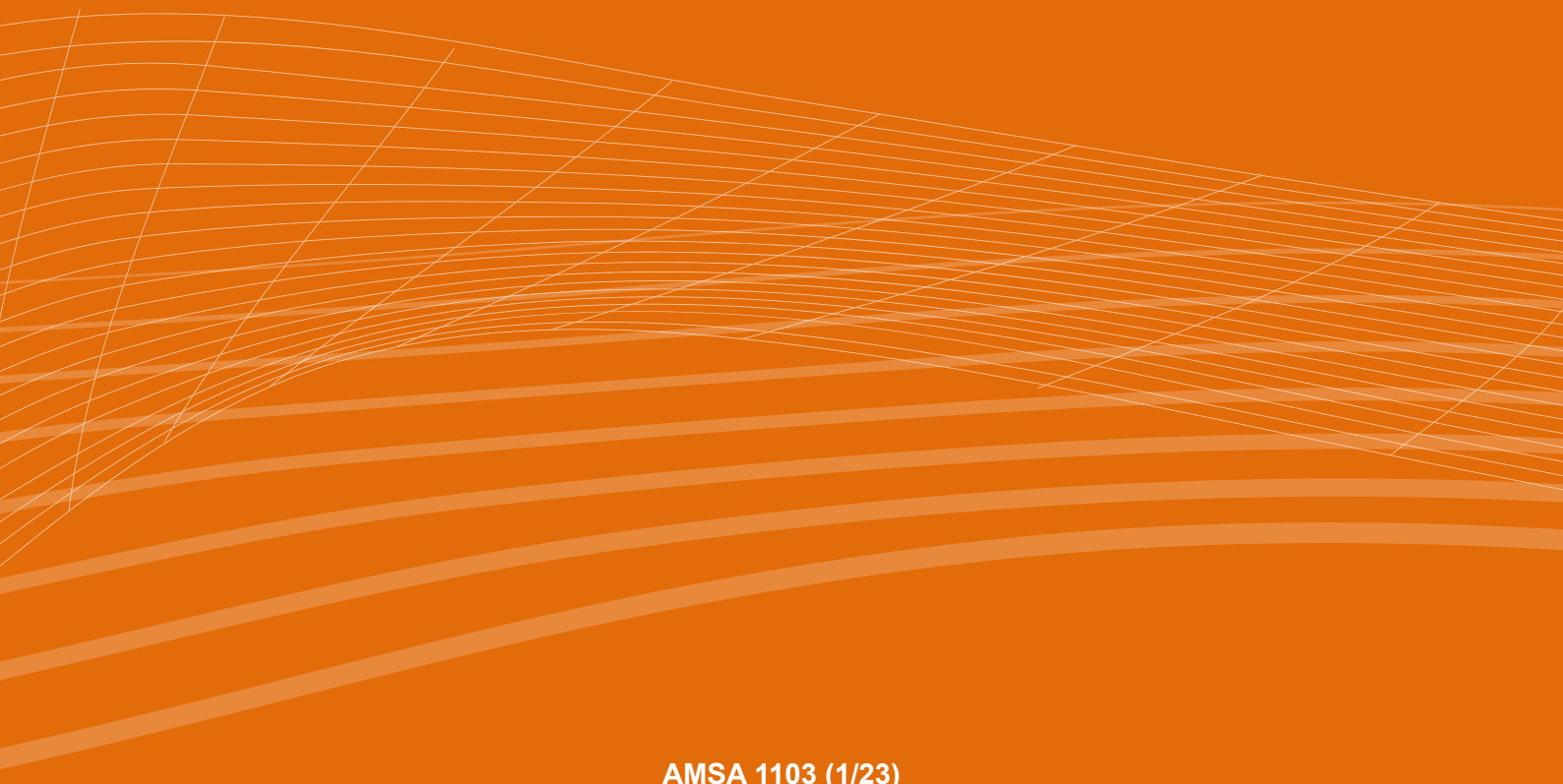
Outcome	Content	Standards for evaluating competence
Outcome 11.1 Demonstrate knowledge of the construction, operation and service of marine internal combustion engines	**Basic Cycles of Operation and Component Identification of:** • Marine 2- and 4-stroke diesel engines • Marine 2- and 4-stroke petrol engines • Basic timing diagrams • Fuel systems including: - Petrol/diesel - Carburettors/fuel injectors - Fuel storage and management - Injection pumps - Basic governor operation - Fuel system maintenance - Fuel system fault finding and possible emergency operation • Basic combustion process • Air filters • Turbo / supercharging	• Major parts of marine internal combustion engines are identified • Main differences between 2- and 4-stroke cycles of operation are identified • Fuel systems are managed safely in accordance with regulations, manufacturer's instructions and vessel procedures to prevent pollution of the marine environment are applied • Marine internal combustion engines are operated within the technical specifications • Operation and surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions • Basic operational faults are recognized and repair or maintenance assistance is organised
	Cooling Systems, including: • Keel cooling/heat exchangers • Circulating pumps • Ship's side valves • Coolant circulation and thermostats • Corrosion • Maintenance • Instrumentation • Emergency Procedures	• Cooling systems are operated in accordance with established procedures and prevent pollution of the marine environment
	Lubricating Systems, including: • Lube oil circulating systems • Lube oil system components • General lubrication and cooling effects • Lubrication system problems • Lube oil contamination • Lube oil system management and maintenance • Lube oil system instrumentation • Refuelling operations (environment, safety and regulators)	• Lubricating systems are operated in accordance with established procedures and prevent pollution of the marine environment

Outcome	Content	Standards for evaluating competence
Outcome 11.2 • Demonstrate knowledge of the workings of marine propulsion systems • Recognise and take steps to rectify basic operational faults	**Power Transmission, including:** • Basic reverse/reduction gearbox operation • Types of gear trains • Lubrication and cooling of gearboxes including filters and strainers • Fault identification • Emergency operation • Propeller and intermediate shafting alignment • Bearing types, materials, installation, lubrication • Shaft seals and glands, packing • Coupling types, fitting, keys and keyways • Propeller types, fitting, keys and keyways, securing nuts, locking • Controllable pitch propellers • Stem drive and water jet drive units • Maintenance and inspection • Causes of vibration and undue wear	• Marine propulsion systems components are identified and functions explained in simple terms • Describe the operation and servicing of propulsion system within the technical specifications • Basic operational faults are recognised and repair or maintenance assistance is organised
Outcome 11.3 Prepare a vessel's machinery for sea	**Engine Watchkeeping** • Inspection and checks of main auxiliary machinery and associated spaces • Start-up procedures • Instrumentation • Running checks • Keeping of running and maintenance logs • Shut down procedures	• Methods of preparing for start-up and of making available fuel, lubricants, cooling water and air comply with vessel operating procedures and manufacturer's recommendations • Checks of pressures, temperatures and revolutions during the start-up and warm-up periods are in accordance with the technical specifications • Methods of preparing the shut-down and supervising the cooling down of the engine are in accordance with vessel operating procedures and manufacturer's recommendations

Outcome	Content	Standards for evaluating competence
Outcome 11.4 Identify and operate components of auxiliary systems	**Steering Systems, including:** • Rudder construction and rudder types • Rudder and stock support bearings • Glands, packing, seals • Tiller arm attachment • Steering operation of hydraulic, cable, rod and gear • Testing of steering and hydraulic systems • Emergency steering checks	• Steering arrangements are operated in accordance with manufacturer's instructions, operational procedures and regulations • Maintenance is arranged in accordance with the technical specifications
	Pumping Systems, including: • Fire/bilge/tank circulating systems • Fault identification, maintenance, prevention of corrosion • Valve types – construction and routine servicing • Back-flooding prevention • Strainers, mud boxes, foot valves • Dual duty systems/cross connection. • Use of flexible materials, hoses, etc. • Drive systems, belts, clutches, motors, etc. • Environmental responsibilities • Regulations and legislative requirements	• Pumping systems are operated in accordance with manufacturer's instructions, operational procedures and regulations to ensure safety of operation and prevention of pollution of the marine environment • Maintenance is arranged in accordance with the technical specifications
	Refrigeration systems, including: • Hazards of refrigerant gases • Identification of components • Environmental responsibilities	• Refrigeration system is operated and maintained in accordance with manufacturer's recommendations, regulations and vessel operating procedures to ensure safety of operation and prevention of pollution of the environment **WARNING:** *Relevant Commonwealth, local and State/Territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.*

Outcome	Content	Standards for evaluating competence
Outcome 11.5 Operate electrical systems	**Direct Current Systems** (DC) (not exceeding 32 V DC) including: • Batteries – types, care and maintenance, hazards • Basic care of electrical systems in general – fault recognition • Charging systems – regulators, alarms/indicators • Uses of fuses and circuit breakers – selection of correct capacity • Connecting batteries • Starter motors, alternators and associated equipment – operation maintenance	• DC systems are operated and operator preventative maintenance in accordance with manufacturer's recommendations, regulations and vessel operating procedures to ensure safe operation. **WARNING:** *Relevant State/Territory electrical licensing requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 V AC or above, OR 120 V DC or above, on a vessel.*
	Electric Systems (above 32 V DC and up to 415 V AC) including: • Protective devices on switchboards • Personal safety • Shore power connection • Fault identification, location, and safety implications	• Electrical systems are operated in accordance with manufacturer's recommendations, regulations and vessel operating procedures to ensure safe operation • Electrical system faults are recognised and where necessary steps are taken to make them immediately safe **WARNING:** *Relevant State/Territory electrical licensing requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 V AC or above, OR 120 V DC or above, on a vessel.*
Outcome 11.6 Use deck machinery	**Use of Deck Machinery** • Lifting equipment • Winches, capstans • Safe working procedures • Basic hydraulic systems, their operation and user-maintenance • Legislation affecting lifting equipment	• Lifting equipment and deck machinery are operated and user-maintenance is carried out in accordance with manufacturer's recommendations, regulations and vessel operating procedures
Outcome 11.7 Demonstrate knowledge of the basic techniques of hull maintenance	**Hull Maintenance** • Basic hull inspection and maintenance • Use of sacrificial anodes	• Maintenance procedures and techniques for hulls are in accordance with regulations and vessel operating procedures

Outcome	Content	Standards for evaluating competence
Outcome 11.8 • Demonstrate the actions to be taken in the event of fire or explosion • Describe actions for the operation and maintenance of fire-fighting equipment in the engine space	• Firefighting systems • Fire/explosion, corrosion • Fire triangle • Minimisation of hazards • Identification and maintenance of fire- fighting equipment • Use of fire-fighting equipment • Management/control of fires • Personnel safety • Emergency shut-offs and closures • Fire alarm systems – heat/smoke detectors • Alarm panels • Fixed fire-fighting installations • Control of passengers/crew • Communications, instructions, etc.	• Fire control is implemented in accordance with maritime safety and vessel operating procedures whilst maintaining crew safety, vessel stability and operational capability • Actions taken to control fires are based on full and accurate assessment of the incident, using all available sources of information • Priority, timing and sequence of actions are appropriate to the overall requirements of the incident and to minimise damage and potential damage to the vessel, injuries to personnel and impairment of the operational effectiveness of the vessel • Maintenance of fire-fighting appliances is in accordance with manufacturer's specifications • Alarms are actioned, recorded and reported according to vessel procedures and marine safety requirements
Outcome 11.9 Demonstrate knowledge of the principles of the stowage and management of explosive and flammable materials	• Stowage and management of flammable/explosive liquids, gases, solids and other materials normally carried onboard (spare fuel, lubricants, LPG cooking gas, flares) • Dangers inherent with the above materials	• Stowage of flammable/explosive materials and their management, is in accordance with established rules and procedures
Outcome 11.10 Maintain running log including fuel calculations and written reports	• Writing of simple reports • Keeping of running and maintenance logs • Working out simple calculations for fuel capacity, consumption and voyage duration	• Running and maintenance logs are completed according to vessel and maritime procedures including regular reports • Calculations for fuel capacity, consumption and voyage duration
Outcome 11.11 Work effectively with others	• Work in a group environment promoting team commitment and cooperation, supporting team members and dealing effectively with issues, problems and conflict	• Work effectively as part of a crew



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