

Title	Demonstrate knowledge of air conditioning plants and systems, and their major components and operation on board ships		
Level	4	Credits	5

Purpose	<p>This unit standard has been developed for personnel responsible for the servicing and maintenance of air conditioning plants and systems installed on board ships.</p> <p>People credited with this unit standard are able to demonstrate knowledge of: climate control terminology and the need for heating, ventilating, and air conditioning systems; basic system layout of an air conditioning system on board ships; other systems associated with/that support air conditioning systems on board ships; and components of air conditioning systems on board ships.</p>
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Classification	Mechanical Engineering > Maintenance and Diagnostics in Mechanical Engineering
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Available grade	Achieved
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Explanatory notes

Definitions

Industry practice – safe and sound practices generally accepted by competent trade persons within the maritime industry.

Ships regulations refers to the written instructions/manuals on board a ship and may relate to – personnel safety, precautions, processes and procedures, operation of plants and systems, disaster management, rules and regulations, operating instructions, maintenance procedures, record keeping, reporting, standards, handling and disposal of toxic and hazardous substances, prevention of pollution.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of climate control terminology and the need for heating, ventilating, and air conditioning systems.

Evidence requirements

- 1.1 Terminology associated with climate control is explained in accordance with industry practice.

Range includes but is not limited to – specific volume, saturated, relative humidity, humidity, dew point temperature, sensible heat, specific heat, latent heat, change of state, superheat, condenser, expansion valve, refrigerant, thermostat, radiation, convection, evaporation, chiller, pressure vessel, heat exchangers.

- 1.2 Differences between air conditioning in buildings and on ships, and the difficulty associated with air conditioning on board ships are explained.
- 1.3 An explanation of wind chill and how it affects people are given.
- 1.4 The requirements for ventilation systems on board ships and the five properties it is meant to control are explained in accordance with industry practice.

Outcome 2

Demonstrate knowledge of basic system layout of an air conditioning system on board ships.

Evidence requirements

- 2.1 The four phases of a vapour compression cycle are explained.
- 2.2 The need for chilled water systems on board ships is described.
- 2.3 The operation of a water chiller is described by identifying all major components.
- 2.4 By describing what a PLC is and what it does, reasons for its use in air conditioning systems is given.
- 2.5 The need for air conditioning systems on ships is described in accordance with industry practice.
- 2.6 The basic vapour compression cycle described.
- 2.7 Explain relationship between pressure and temperature.
- 2.8 The operation of the air conditioners is explained by describing all major components in accordance with industry practice.
- 2.9 The purpose for crash stop ventilation is explained in accordance with the ships regulations and industry practice.
- 2.10 Safety devices fitted to air conditioning units are listed and reasons for their use given in accordance with industry practice.

Outcome 3

Demonstrate knowledge of other systems associated with/that support air conditioning systems on board ships.

Evidence requirements

- 3.1 Other systems that support/complement or are associated with air conditioning systems on board ships are listed, and their purpose and operation explained in accordance with the ships regulations and industry practice.

 Range air intake (supply), recirculation systems, exhaust systems, heating systems, waste heat system, ventilation flaps, closed loop chilled water system.
- 3.2 Other services supplied by ventilation systems on ships are listed in accordance with the ships regulations and industry practice.

Outcome 4

Demonstrate knowledge of components of air conditioning systems on board ships.

Evidence requirements

- 4.1 The function of the components of an air conditioning system on board ships is described in accordance with the ships regulations and industry practice.

 Range ventilation flaps and modules, air treatment units, pumps, closed loop chilled water system, centrifugal and axial flow fans, chillers, chilled water pressure vessel, hot water circulation pump, hot water boilers or heat exchangers, hot water pressure vessel.
- 4.2 The different types of air supply terminals used on ships are explained in accordance with the ships regulations and industry practice.

 Range punkah, Type “H” distributor, slotted trunking, bell mouths, adjustable vane terminals.
- 4.3 Two methods of obtaining hot water for the air conditioning systems are explained in accordance with the ships regulations and industry practice.
- 4.4 The purpose and operation of ventilation flaps fitted throughout ships are explained in accordance with the ships regulations and industry practice.
- 4.5 The purpose and operation of self-contained air conditioning units on board ships are explained in accordance with the ships regulations and industry practice.

Planned review date	31 December 2017
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	14 December 2012	N/A

Consent and Moderation Requirements (CMR) reference	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.