

Title	Demonstrate knowledge of reverse osmosis 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 desalination plants and systems installed on board ships.</p> <p>People credited with this unit standard are able to demonstrate knowledge of: the theory of osmosis and reverse osmosis processes; the reverse osmosis plants on board ships; and maintenance procedures applied to reverse osmosis plants on 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

1 References

International Convention for the Prevention of Pollution from Ships (MARPOL)
Adoption: 1973 (Convention), 1978 (1978 Protocol), 1997 (Protocol - Annex VI);
Entry into force: 2 October 1983 (Annexes I and II). Available from International Maritime Organization (IMO) on:

[http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx](http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx)

Safe Working in a Confined Space. Available at:

<http://www.osh.dol.govt.nz/order/catalogue/pdf/confined.pdf>

AS/NZS 2865:2001 *Safe working in a confined space*.

2 Definitions

Industry standards and recommended practices are those set in place by the Maritime industry.

Reverse osmosis refers to the modern process technology to purify water for a wide range of applications. For the purpose of this unit standard reverse osmosis is limited to desalination: converting seawater to fresh/drinking water.

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 the theory of osmosis and reverse osmosis processes.

Evidence requirements

- 1.1 The osmosis process and the reasons for its use are explained.
- 1.2 The reverse osmosis process and the reasons its use are explained.
- 1.3 Reasons for the use of the reverse osmosis plants on board ships are explained.

Outcome 2

Demonstrate knowledge of the reverse osmosis plants on board ships.

Evidence requirements

- 2.1 A typical block diagram showing the functional arrangement of all major components of a typical reverse osmosis plant on board ships is sketched.
- 2.2 The operation and functions of the major components of a typical reverse osmosis plant on board ships are explained.

Range filter booster pump, pre filters, high pressure pump, disc tube modules, chlorine injection unit, de-acidification filter, flow meter, pressure gauges.

Outcome 3

Demonstrate knowledge of maintenance procedures applied to reverse osmosis plants on ships.

Evidence requirements

- 3.1 The minimum standards of protection required by membranes to preserve their de-salting capabilities are explained in accordance with the ships regulations and industry standards.

Range dosing, flushing, cleaning, preservation.

- 3.2 The processes involved with the maintenance procedures associated with reverse osmosis plants on board ships are described in accordance with the ships regulations and industry standards.

Range pre-start preparations, start up, valve operation and positions, stop rinse, circuit cleaning, sand filter backwash, disinfection cycle.

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.