

# Basic Oil & Chemical Tanker Workbook

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## 1. Information

Please read the following notes carefully before carrying out the assignments.  
The assignments have been written on the assumption that you have experience on this type of tanker and/or working on this type of tanker with the appropriate Safety Management System (SMS) in place.

You may find that some questions do not apply directly to the ship type or size that you are familiar with, however you must attempt to answer these. Use the learning from all course modules, recommended industry publications, the Company SMS and advice from fellow officers onboard to present your answers. All questions must be attempted as incomplete portfolios will be returned unassessed.

### Health, Safety and Protocol

Much of the work will require you to research information from your current or most recent ship. Always comply in full with all Health and Safety protocols and seek permission from the Master and/or relevant officers where your work takes you away from your ordinary routine. Take care not to interfere with shipboard operations and time your work to fit in with the work of others.

## 2. Assessment Guidelines

### Learning Outcomes of the Course

On successful completion of the course you will:

1. know the properties of oil and chemicals and the hazards associated with them
2. be able to apply health, safety and environmental precautions and measures in working on oil and chemical tankers
3. be able to carry out safe oil and chemical tanker cargo operations

There are eight modules in this course mapped to the learning objectives, as follows:

MODULE	LEARNING OUTCOMES ADDRESSED
<b>Module 1</b> OIL AND CHEMICAL TANKER CARGOES	1
<b>Module 2</b> PHYSICS AND CHEMISTRY OF OIL AND CHEMICAL CARGOES	1
<b>Module 3</b> HAZARDS AND THEIR MANAGEMENT	1 & 2
<b>Module 4</b> SHIP DESIGN AND EQUIPMENT	1 & 3
<b>Module 5</b> OIL AND CHEMICAL TANKER OPERATIONS	2 & 3
<b>Module 6</b> INERT GAS SYSTEMS	3
<b>Module 7</b> SAFETY AND POLLUTION PREVENTION	2 & 3
<b>Module 8</b> EMERGENCY PROCEDURES	3

### Assessment

On this course, you are assessed in two ways:

Assessment	Delivery	Learning Outcomes Assessed	Minimum Pass mark
1. Final Test	Closed questions - onscreen	1-3	75%
2. Module Assignments	Open questions – completed offline	1-3	Grade A

- You must achieve at least 75% in the final test and Grade A or higher in all module assignments. If you do not achieve this result in any one element, you will be required to review the course material and re-attempt that element. Note that a re-assessment fee may be payable.
- All onscreen tests are automatically marked and the result displayed onscreen. You will be required to print your final test result immediately after you complete it. The course documentation checklist refers.
- Criteria marking is used to mark all module assignments. The marking scheme used is provided in **Annex A**.
- A grading sheet will be completed by the course assessor when your module assignments are marked. This will be sent to you. Where necessary the course assessor will provide feedback or notes for your attention.

**Completing Module Assignments**

The following word count is suggested for each of the module assignments of the course.

Module	Question(s)	Suggested Word Count
1	1	30-40
	2	50-60 + sketch
	3	30-40
	4	10-20
2	1	30-40
	2	40-50
	3	30-40
	4	40-50
3	1	50-100
	2	15-20 + sketch
	3	90-100
	4	100-150
	5	List 5
4	1	100-150
	2	40-50
	3	60-70 + sketches
	4	40-60
	5	40-60 + sketches
	6	30-50
5	1	70-80
	2	70-80
	3	50-70
	4	120-150
	5	120-150
6	1	40-50
	2	80-100 + sketch
	3	30-50
7	1	40-50
	2	40-50
	3	40-50
	4	List 7 + 7

	5	120-150
	6	List 16
8	1	List 6
	2	10-20
	3	20-30
	4	30-40

Module assignments should be completed electronically (font size 12) or by hand in clear handwriting. Where required or as appropriate, you may provide diagrams or sketches to illustrate your answers. SMS procedures and documents are accepted as scans/attachments. The course assessor reserves the right to reject work that is not presented clearly and legibly.

You are reminded that the final test and module assignments **must** be completed under ‘exam conditions’. This means under the direct supervision of an authenticating person who will attest that your assessments have been completed unaided and solely by you. You are strongly advised to keep a back-up of all your work before sending it to us for Assessment. Anything you quote or paraphrase from a publication or other source must be referenced in your work, by giving the following information:

- Author’s name
- Title of Publication
- Year (and day/month if a newspaper article or magazine) published
- Page reference
- Name of Publisher
- Place of Publication

### Method of acknowledging other’s work

- a) Use “quotation marks” round the actual words you have copied and insert a brief reference in brackets ( ) at the end. The brief reference should contain author’s name and publication year only.
- b) Supply the full reference in a list at the end of your answer.
  - i. Example  
 “Crude Oil is any oil occurring naturally in the earth whether or not treated to render it suitable for transportation and includes:...” (SOLAS 1997 p148)

*and then, at the end of the answer, supply the full reference thus:*

SOLAS, Consolidated Edition 1997, Ch II-2 Para 28, International Maritime Organization, London.

## ANNEX A - GRADE CRITERIA FOR MODULE ASSIGNMENTS

### Notes

- Percentage marks shown under each grade are for guidance only. The assessor will only issue a grade for each module assignment.
- All module assignments must achieve a pass grade for a course certificate to be issued.

MARKING CRITERIA:	GRADE CRITERIA				
	Grade D Refer (0-24%)	Grade C Refer (25-49%)	Grade B Refer (50-74%)	Grade A Pass (75-85%)	Grade A+ Pass (86-100%)
<b>Submitted answer fully addresses the assignment question</b>	Poor, significant missing or inaccurate information	Unsatisfactory, mostly inaccurate or missing information	Satisfactory, planning and structure but key elements missing or inaccurate	Good, any errors or omissions are within acceptable limits	Excellent, all key criteria included with no factual errors
<b>Comprehensive knowledge of relevant taught material has been demonstrated</b>	Poor, core modules information missing or superficial coverage	Unsatisfactory, superficial, inaccurate or weak description of taught content	Mainly satisfactory, but some elements of relevant content missing	Good description of relevant content appropriate to question. Some use of additional information sources used	Excellent description of relevant content appropriate to question. Additional information sources used to good effect
<b>Knowledge of industry best practice, Codes and/or Regulations has been demonstrated where applicable</b>	Token attempt. Poor, missing or inaccurate information	Incorrect or limited application of Codes or regulations used. Little use of best practice applied to question	Answer is satisfactory with some limited use of Codes, regulations or best practice in answering the question	Good knowledge of relevant industry best practice, Codes and/or Regulations demonstrated	Thorough knowledge of relevant industry best practice, Codes and/or Regulations fully demonstrated
<b>Work shows evidence of further reading beyond the taught content</b>	Poor, little or none is evident	Some evidence shown	Satisfactory in some respects, but limited in scope	Good use of further reading shown in answer	Excellent, consistent evidence of further reading has been used
<b>Word count for each question has been complied with</b>	Little attempt made to meet word count limits	Word count limits not met for majority of modules	Word count limits have been met for majority of modules	Word count limits met	Word count limits met

### 3. Basic Oil & Chemical Tanker Assignments

#### Module 1: Oil and chemical tanker cargoes

1. a) List six trading classes of oil tankers, and  
b) For each class give the approximate tonnage range.
2. a) Using a simple sketch or diagram, briefly explain your understanding of a “double hull tanker”,  
b) and List the design characteristics of the double hull construction.
3. List the four groups of chemical cargoes and give a brief description of each.
4. Tankers may be “dual class”, what MARPOL cargoes can these ships carry?

#### Module 2: The Physics and chemistry of oil and chemical cargoes

1. a) List the three physical states of matter.
2. b) Define the following terms:
  - I. Melting point
  - II. Boiling point
  - III. Volatility
3. Briefly explain the relationship between “volatility” and “vapour pressure”.
4. a) Briefly explain your understanding of a “self-reacting” chemical.  
b) How is self-reaction prevented?

#### Module 3: Hazards and their management

1. Describe the Safety Management System (SMS).
2. a) Provide a sketch or diagram of a “fire triangle” and name the parts.  
b) List five sources of ignition that must be controlled on a tanker?  
c) What are the types of fire extinguishing systems that can be found on oil and chemical tankers?
3. a) State the three main health hazards of chemical cargoes, and  
b) Briefly explain each of the health hazards.
4. In what conditions can static charges accumulate in a cargo tank and what are the precautions taken to prevent incendive electrostatic discharges?
5. List the different types of gas detection instruments that are carried on board oil and chemical tankers.

## Module 4: Ship design and equipment

1. List the main construction requirements of an oil tanker as required by SOLAS and MARPOL.
2. Briefly explain the difference between “independent” and “integral” tanks on a chemical tanker.
3. Using simple sketches or diagrams, describe the three pipeline systems that can be found on an oil tanker.
4. Describe how cargo segregation is achieved on a chemical tanker.
5. Using simple sketches or diagrams, describe the four types of valves commonly used in the cargo systems of oil and chemical tankers.
6. List the three criteria that must be provided for in the design of a tanker’s cargo tank venting system.

## Module 5: Oil and chemical tanker operations

1. Describe the procedures that are followed to keep the accommodation free from flammable vapours during cargo operations.
2. Briefly describe the checks to be carried out before commencement of any loading or discharge operations.
3. a) What is the purpose of Crude Oil Washing (COW)?  
b) Which MARPOL Annex addresses the requirements for COW?  
c) What information is contained within the COW Operations and Equipment Manual?
4. In preparation for dry docking, describe a tank cleaning operation on an oil tanker. Your answer should consider the safety precautions taken, the method of washing, the gas freeing and the disposal of slops.
5. a) When tank cleaning on a chemical tanker, what is the mandatory manual that must be consulted for all MARPOL Annex II cargoes?  
b) List the hazards that have to be considered when carrying out a tank cleaning operation on a chemical tanker.

## Module 6: Inert gas systems

1. a) What are the three functions of an inert gas (IG) system?  
b) What are the two main methods of producing IG on an oil tanker?  
c) Explain why a chemical tanker uses nitrogen as an inert gas.
2. Provide a “flammable range” diagram and explain the objective of using inert gas.
3. An oil tanker is required to maintain the inert gas within the cargo tanks at all times, what is the requirement for a chemical tanker?



## Module 7: Safety and pollution prevention

1. a) For an oil tanker, explain the term: "Load on Top".  
b) For Annex II cargoes, explain the categories: "X", "Y" and "Z"
2. Explain the purpose of:
  - I. Oil Record Book (Part I)
  - II. Oil Record Book (Part II)
  - III. Cargo Record Book
3. In the event of a cargo spill in port, list the immediate actions to be taken.
4. List the "routine" and the "emergency" Personal Protective Equipment (PPE) to be found on a tanker.
5. a) List the six characteristics of an enclosed space.  
b) List the checks that will be contained on an Enclosed Space Entry Permit.
6. List the information contained within a Material Safety Data Sheet (MSDS).

## Module 8: Emergency procedures

1. List six of the emergency scenarios that will be used for drills and exercises, as detailed in the SMS.
2. List the four key components of emergency organisation on board.
3. a) What do the letters "SMPEP" stand for?  
b) What information is contained within the SMPEP?
4. What are the general procedures to be adopted when responding to an emergency?

If you need assistance or clarification on the contents of this workbook, do not hesitate to contact us at [courses@oceantg.com](mailto:courses@oceantg.com)

## 4. Document status

Issue no.	Date	Author
V1	17 Nov 2020	IG
V2	9 June 2021	SG

## 5. Changes in the document

Issue no.	Paragraph no.	Description
V2	1	Minor amends to wording
V2	2	New Assessment Guidelines with Annex A inserted incorporating some existing information on referencing. Subsequent paragraphs renumbered.