

GUIDELINES

COMPETENCE REQUIREMENTS FOR THE OPERATION OF CRAFT USING **METHANOL** AS FUEL

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TABLE OF CONTENTS

PART I INTRODUCTION	3
1. Objectives and addressees	3
2. Methodology.....	3
PART II COMPETENCE TABLE FOR THE OPERATION OF CRAFT USING METHANOL AS FUEL	4

PART I

INTRODUCTION

1. Objectives and addressees

The CESNI Working group on professional qualifications drew up guidelines for competences for the operation of craft using methanol as a fuel. The guidelines are intended to address first the training institutes and schools that train students in new technologies. They can also address craft owners and insurance companies, which may also have requirements for crew members.

The guidelines provide a list of minimum competence requirements for specialised persons (on board and/or on shore) who will have to

- 1) be familiar with the specific risks associated with the new technology they will be handling;
- 2) familiarise other persons involved (on land or on board), in an instructive function;
- 3) detect situations likely to result in an accident;
- 4) detect when an incident has occurred and assess the risks for the vessel and the crew;
- 5) take immediate protective measures in the event of an incident.

2. Methodology

CESNI experts identified the following main risks linked to the operation of craft using methanol as a fuel:

- **Toxicity:** methanol may cause injuries to crew members. Measures must be taken to avoid leaks in closed areas and to evacuate vapours as soon as possible. In case of a methanol spill, there is also the risk of toxic vapours. While methanol vapours below harmful level cannot be smelled, the effects can be felt which serves as a warning. Moreover, exposure to skin is a hazard.
- **Environmental damages:** there is a risk of leakage during the bunkering or in case of collision. Unlike gas-oil, methanol dilutes with water, which makes it much less harmful for the environment.
- **Higher flammable potential:** The flash point is at 11° C whereas gas-oil is at 52-96°C, as a result there are risks of fire in the engine or fuel cell space.

Other elements have been considered during the elaboration of the guidelines:

- **Methanol used in fuel cells:** the chosen approach is to add to the competence table a knowledge requirement on the characteristics of the energy converter (fuel cell or combustion engine) in which methanol is used.
- **Testing and training of the foreseen abilities:** the use of simulators could be the safe way to train and take examinations for methanol.

PART II

COMPETENCE TABLE FOR THE OPERATION OF CRAFT USING METHANOL AS FUEL

1. The specialised person shall be able to ensure compliance with legislation and standards applicable to craft that use methanol as a fuel, as well as with other relevant health and safety regulations.

The specialised person shall be able to:

COLUMN 1 COMPETENCE	COLUMN 2 KNOWLEDGE AND SKILLS
<p>1. ensure compliance with relevant legislation and standards applicable to craft using methanol as a fuel;</p>	<ol style="list-style-type: none"> 1. Knowledge of regulations relating to craft using methanol for propulsion and auxiliary systems such as relevant police regulations and ES-TRIN. 2. Ability to instruct and monitor crew member operations in order to ensure compliance with legislation and standards applicable to craft using methanol as a fuel on board the craft and in particular with the bunkering procedure.
<p>2. ensure compliance with safety standards when handling methanol;</p>	<ol style="list-style-type: none"> 1. Knowledge of standards relating to the functioning, operation and safety.. 2. Knowledge of required safety equipment and the ability to use it (i.e. eye protection and protective clothing). 3. Knowledge of possible malfunction and alarms and how to react on them, especially the use of emergency stop e.g. the master fuel valve. 4. Knowledge of the avoidance and remediation of spills when handling methanol. 5. Knowledge of maintenance and monitoring of the fuel system. 6. Ability to perform daily control and maintenance on the fuel system. 7. Ability to use the correct bunker connections. 8. Ability to deal with spills with a view to the toxicity and flammability of methanol, especially in case of leakage below deck. 9. Ability to ensure that all crew members act in a way that safety standards applicable on craft using methanol as a fuel are respected.
<p>3. ensure compliance with other relevant health and safety regulations when sailing and moored.</p>	<ol style="list-style-type: none"> 1. Knowledge of relevant health and safety regulations including relevant local requirements and authorisations in particular in port areas. 2. Ability to instruct and monitor crew members' activities in order to ensure compliance with other relevant health and safety regulations.

2. The specialised person shall be able to be aware of specific points of attention related to methanol, recognise risks and manage them.

The specialised person shall be able to:

COLUMN 1 COMPETENCE	COLUMN 2 KNOWLEDGE AND SKILLS
1. recognise specific points of attention related to the specific characteristics of methanol;	<ol style="list-style-type: none"> 1. Knowledge of definition, composition and quality attributes of methanol, Safety Data Sheet (SDS): physical properties and characteristics of the product including environmental characteristics. 2. Ability to recognise health symptoms caused by inadequate exposure to methanol. 3. Knowledge of flashpoint related hazards.
2. recognise risks and manage them.	<ol style="list-style-type: none"> 1. Knowledge of safety plans, hazards and risk, including knowledge of muster list and its related safety tasks. 2. Ability to conduct risk management, to document on-board safety (including safety plan and safety instructions), to assess and control dangerous areas, fire safety and to use personal protective equipment. 3. Ability to identify inappropriate exposure to methanol requiring urgent control and potential maintenance on the fuel system.

3. The specialised person shall be able to operate the systems specific to methanol in a safe way.

The specialised person shall be able to:

COLUMN 1 COMPETENCE	COLUMN 2 KNOWLEDGE AND SKILLS
<p>1. operate the systems specific to methanol on-board and connected to on board systems in a safe way.</p>	<ol style="list-style-type: none"> 1. Knowledge of technical and operational aspects for a methanol storage system and engine room: <ul style="list-style-type: none"> • General configuration and operating manual, • Bunkering system, • Spill control equipment, • Fire-fighting equipment • Methanol containment system, • Methanol preparation systems, • Methanol pipe systems, • Methanol tank venting system • Inerting systems • Space safety concept(s) • Ventilation systems (of potentially hazardous spaces), • Control, surveillance and safety systems, alarms, gas detection and leakage detection. 2. Knowledge of the characteristics of the energy converter (fuel cell or combustion engine) in which methanol is used. 3. Ability to respect bunkering check list. 4. Ability to prevent leakage. 5. Ability to understand and react to malfunctions and to instruct and monitor crew members' activities during general operation of the fuel system, especially during bunkering procedures in order to ensure a safe operation, taking into account the correct use of personal safety equipment and the strict adherence to safety procedures, including reporting procedures for (near) incidents, spills and failures during bunkering operations.
