



**BUREAU
VERITAS**

Methyl/ethyl alcohol Fuelled Ships

July 2021

**Rule Note
NR 670 DT R00 E**

Marine & Offshore
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Documents

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1. INDEPENDENCE OF THE SOCIETY AND APPLICABLE TERMS

- 1.1** The Society shall remain at all times an independent contractor and neither the Society nor any of its officers, employees, servants, agents or subcontractors shall be or act as an employee, servant or agent of any other party hereto in the performance of the Services.
- 1.2** The operations of the Society in providing its Services are exclusively conducted by way of random inspections and do not, in any circumstances, involve monitoring or exhaustive verification.
- 1.3** The Society acts as a services provider. This cannot be construed as an obligation bearing on the Society to obtain a result or as a warranty. The Society is not and may not be considered as an underwriter, broker in Unit's sale or chartering, expert in Unit's valuation, consulting engineer, controller, naval architect, designer, manufacturer, shipbuilder, repair or conversion yard, charterer or shipowner; none of the above listed being relieved from any of their expressed or implied obligations as a result of the interventions of the Society.
- 1.4** Only the Society is qualified to apply and interpret its Rules.
- 1.5** The Client acknowledges the latest versions of the Conditions and of the applicable Rules applying to the Services' performance.
- 1.6** Unless an express written agreement is made between the Parties on the applicable Rules, the applicable Rules shall be the Rules applicable at the time of entering into the relevant contract for the performance of the Services.
- 1.7** The Services' performance is solely based on the Conditions. No other terms shall apply whether express or implied.

2. DEFINITIONS

- 2.1** "Certificate(s)" means classification or statutory certificates, attestations and reports following the Society's intervention.
- 2.2** "Certification" means the activity of certification in application of national and international regulations or standards ("Applicable Referential"), in particular by delegation from different governments that can result in the issuance of a Certificate.
- 2.3** "Classification" means the classification of a Unit that can result or not in the issuance of a classification Certificate with reference to the Rules. Classification (or Certification as defined in clause 2.2) is an appraisalment given by the Society to the Client, at a certain date, following surveys by its surveyors on the level of compliance of the Unit to the Society's Rules and/or to Applicable Referential for the Services provided. They cannot be construed as an implied or express warranty of safety, fitness for the purpose, seaworthiness of the Unit or of its value for sale, insurance or chartering.
- 2.4** "Client" means the Party and/or its representative requesting the Services.
- 2.5** "Conditions" means the terms and conditions set out in the present document.
- 2.6** "Industry Practice" means international maritime and/or offshore industry practices.
- 2.7** "Intellectual Property" means all patents, rights to inventions, utility models, copyright and related rights, trade marks, logos, service marks, trade dress, business and domain names, rights in trade dress or get-up, rights in goodwill or to sue for passing off, unfair competition rights, rights in designs, rights in computer software, database rights, topography rights, moral rights, rights in confidential information (including know-how and trade secrets), methods and protocols for Services, and any other intellectual property rights, in each case whether capable of registration, registered or unregistered and including all applications for and renewals, reversions or extensions of such rights, and all similar or equivalent rights or forms of protection in any part of the world.
- 2.8** "Parties" means the Society and Client together.
- 2.9** "Party" means the Society or the Client.
- 2.10** "Register" means the public electronic register of ships updated regularly by the Society.
- 2.11** "Rules" means the Society's classification rules (available online on veristar.com), guidance notes and other documents. The Society's Rules take into account at the date of their preparation the state of currently available and proven technical minimum requirements but are not a standard or a code of construction neither a guide for maintenance, a safety handbook or a guide of professional practices, all of which are assumed to be known in detail and carefully followed at all times by the Client.
- 2.12** "Services" means the services set out in clauses 2.2 and 2.3 but also other services related to Classification and Certification such as, but not limited to: ship and company safety management certification, ship and port security certification, maritime labour certification, training activities, all activities and duties incidental thereto such as documentation on any supporting means, software, instrumentation, measurements, tests and trials on board. The Services are carried out by the Society according to the Rules and/or the Applicable Referential and to the Bureau Veritas' Code of Ethics. The Society shall perform the Services according to the applicable national and international standards and Industry Practice and always on the assumption that the Client is aware of such standards and Industry Practice.
- 2.13** "Society" means the classification society 'Bureau Veritas Marine & Offshore SAS', a company organized and existing under the laws of France, registered in Nanterre under number 821 131 844, or any other legal entity of Bureau Veritas Group as may be specified in the relevant contract, and whose main activities are Classification and Certification of ships or offshore units.
- 2.14** "Unit" means any ship or vessel or offshore unit or structure of any type or part of it or system whether linked to shore, river bed or sea bed or not, whether operated or located at sea or in inland waters or partly on land, including submarines, hovercrafts, drilling rigs, offshore installations of any type and of any purpose, their related and ancillary equipment, subsea or not, such as well head and pipelines, mooring legs and mooring points or otherwise as decided by the Society.

3. SCOPE AND PERFORMANCE

- 3.1** Subject to the Services requested and always by reference to the Rules, and/or to the Applicable Referential, the Society shall:
- review the construction arrangements of the Unit as shown on the documents provided by the Client;
 - conduct the Unit surveys at the place of the Unit construction;
 - class the Unit and enter the Unit's class in the Society's Register;
 - survey the Unit periodically in service to note whether the requirements for the maintenance of class are met.
- The Client shall inform the Society without delay of any circumstances which may cause any changes on the conducted surveys or Services.
- 3.2** The Society will not:
- declare the acceptance or commissioning of a Unit, nor its construction in conformity with its design, such activities remaining under the exclusive responsibility of the Unit's owner or builder;
 - engage in any work relating to the design, construction, production or repair checks, neither in the operation of the Unit or the Unit's trade, neither in any advisory services, and cannot be held liable on those accounts.

4. RESERVATION CLAUSE

- 4.1** The Client shall always: (i) maintain the Unit in good safety condition after surveys; (ii) present the Unit for surveys; and (iii) inform the Society in due time of any circumstances that may affect the given appraisalment of the Unit or cause to modify the scope of the Services.
- 4.2** Certificates are only valid if issued by the Society.
- 4.3** The Society has entire control over the Certificates issued and may at any time withdraw a Certificate at its entire discretion including, but not limited to, in the following situations: where the Client fails to comply in due time with instructions of the Society or where the Client fails to pay in accordance with clause 6.2 hereunder.
- 4.4** The Society may at times and at its sole discretion give an opinion on a design or any technical element that would 'in principle' be acceptable to the Society. This opinion shall not presume on the final issuance of any Certificate nor on its content in the event of the actual issuance of a Certificate. This opinion shall only be an appraisalment made by the Society which shall not be held liable for it.

5. ACCESS AND SAFETY

- 5.1** The Client shall give to the Society all access and information necessary for the efficient performance of the requested Services. The Client shall be the sole responsible for the conditions of presentation of the Unit for tests, trials and surveys and the conditions under which tests and trials are carried out. Any information, drawing, etc. required for the performance of the Services must be made available in due time.
- 5.2** The Client shall notify the Society of any relevant safety issue and shall take all necessary safety-related measures to ensure a safe work environment for the Society or any of its officers, employees, servants, agents or subcontractors and shall comply with all applicable safety regulations.

6. PAYMENT OF INVOICES

- 6.1** The provision of the Services by the Society, whether complete or not, involves, for the part carried out, the payment of fees thirty (30) days upon issuance of the invoice.
- 6.2** Without prejudice to any other rights hereunder, in case of Client's payment default, the Society shall be entitled to charge, in addition to the amount not properly paid, interest equal to twelve (12) months LIBOR plus two (2)

per-cent as of due date calculated on the number of days such payment is delinquent. The Society shall also have the right to withhold Certificates and other documents and/or to suspend or revoke the validity of Certificates.

- 6.3** In case of dispute on the invoice amount, the undisputed portion of the invoice shall be paid and an explanation on the dispute shall accompany payment so that action can be taken to resolve the dispute.

7. LIABILITY

- 7.1** The Society bears no liability for consequential loss. For the purpose of this clause consequential loss shall include, without limitation:
- Indirect or consequential loss;
 - Any loss and/or deferral of production, loss of product, loss of use, loss of bargain, loss of revenue, loss of profit or anticipated profit, loss of business and business interruption, in each case whether direct or indirect.
- The Client shall defend, release, save, indemnify, defend and hold harmless the Society from the Client's own consequential loss regardless of cause.
- 7.2** Except in case of wilful misconduct of the Society, death or bodily injury caused by the Society's negligence and any other liability that could not be, by law, limited, the Society's maximum liability towards the Client is limited to one hundred and fifty per-cent (150%) of the price paid by the Client to the Society for the Services having caused the damage. This limit applies to any liability of whatsoever nature and howsoever arising, including fault by the Society, breach of contract, breach of warranty, tort, strict liability, breach of statute.
- 7.3** All claims shall be presented to the Society in writing within three (3) months of the completion of Services' performance or (if later) the date when the events which are relied on were first discovered by the Client. Any claim not so presented as defined above shall be deemed waived and absolutely time barred.

8. INDEMNITY CLAUSE

- 8.1** The Client shall defend, release, save, indemnify and hold harmless the Society from and against any and all claims, demands, lawsuits or actions for damages, including legal fees, for harm or loss to persons and/or property tangible, intangible or otherwise which may be brought against the Society, incidental to, arising out of or in connection with the performance of the Services (including for damages arising out of or in connection with opinions delivered according to clause 4.4 above) except for those claims caused solely and completely by the gross negligence of the Society, its officers, employees, servants, agents or subcontractors.

9. TERMINATION

- 9.1** The Parties shall have the right to terminate the Services (and the relevant contract) for convenience after giving the other Party thirty (30) days' written notice, and without prejudice to clause 6 above.
- 9.2** The Services shall be automatically and immediately terminated in the event the Client can no longer establish any form of interest in the Unit (e.g. sale, scrapping).
- 9.3** The Classification granted to the concerned Unit and the previously issued Certificates shall remain valid until the date of effect of the termination notice issued, or immediately in the event of termination under clause 9.2, subject to compliance with clause 4.1 and 6 above.
- 9.4** In the event where, in the reasonable opinion of the Society, the Client is in breach, or is suspected to be in breach of clause 16 of the Conditions, the Society shall have the right to terminate the Services (and the relevant contracts associated) with immediate effect.

10. FORCE MAJEURE

- 10.1** Neither Party shall be responsible or liable for any failure to fulfil any term or provision of the Conditions if and to the extent that fulfilment has been delayed or temporarily prevented by a force majeure occurrence without the fault or negligence of the Party affected and which, by the exercise of reasonable diligence, the said Party is unable to provide against.
- 10.2** For the purpose of this clause, force majeure shall mean any circumstance not being within a Party's reasonable control including, but not limited to: acts of God, natural disasters, epidemics or pandemics, wars, terrorist attacks, riots, sabotages, impositions of sanctions, embargoes, nuclear, chemical or biological contaminations, laws or action taken by a government or public authority, quotas or prohibition, expropriations, destructions of the worksite, explosions, fires, accidents, any labour or trade disputes, strikes or lockouts.

11. CONFIDENTIALITY

- 11.1** The documents and data provided to or prepared by the Society in performing the Services, and the information made available to the Society, will be treated as confidential except where the information:
- is properly and lawfully in the possession of the Society;
 - is already in possession of the public or has entered the public domain, other than through a breach of this obligation;
 - is acquired or received independently from a third party that has the right to disseminate such information;
 - is required to be disclosed under applicable law or by a governmental order, decree, regulation or rule or by a stock exchange authority (provided that the receiving Party shall make all reasonable efforts to give prompt written notice to the disclosing Party prior to such disclosure).
- 11.2** The Parties shall use the confidential information exclusively within the framework of their activity underlying these Conditions.
- 11.3** Confidential information shall only be provided to third parties with the prior written consent of the other Party. However, such prior consent shall not be required when the Society provides the confidential information to a subsidiary.
- 11.4** Without prejudice to sub-clause 11.1, the Society shall have the right to disclose the confidential information if required to do so under regulations of the International Association of Classifications Societies (IACS) or any statutory obligations.

12. INTELLECTUAL PROPERTY

- 12.1** Each Party exclusively owns all rights to its Intellectual Property created before or after the commencement date of the Conditions and whether or not associated with any contract between the Parties.
- 12.2** The Intellectual Property developed by the Society for the performance of the Services including, but not limited to drawings, calculations, and reports shall remain the exclusive property of the Society.

13. ASSIGNMENT

- 13.1** The contract resulting from to these Conditions cannot be assigned or transferred by any means by a Party to any third party without the prior written consent of the other Party.
- 13.2** The Society shall however have the right to assign or transfer by any means the said contract to a subsidiary of the Bureau Veritas Group.

14. SEVERABILITY

- 14.1** Invalidity of one or more provisions does not affect the remaining provisions.
- 14.2** Definitions herein take precedence over other definitions which may appear in other documents issued by the Society.
- 14.3** In case of doubt as to the interpretation of the Conditions, the English text shall prevail.

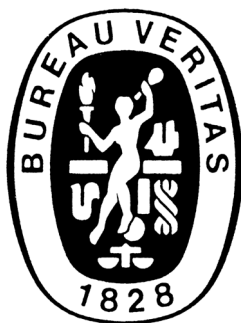
15. GOVERNING LAW AND DISPUTE RESOLUTION

- 15.1** These Conditions shall be construed in accordance with and governed by the laws of England and Wales.
- 15.2** Any dispute shall be finally settled under the Rules of Arbitration of the Maritime Arbitration Chamber of Paris ("CAMP"), which rules are deemed to be incorporated by reference into this clause. The number of arbitrators shall be three (3). The place of arbitration shall be Paris (France). The Parties agree to keep the arbitration proceedings confidential.
- 15.3** Notwithstanding clause 15.2, disputes relating to the payment of the Society's invoices may be submitted by the Society to the *Tribunal de Commerce de Nanterre*, France, or to any other competent local Court, at the Society's entire discretion.

16. PROFESSIONAL ETHICS

- 16.1** Each Party shall conduct all activities in compliance with all laws, statutes, rules, economic and trade sanctions (including but not limited to US sanctions and EU sanctions) and regulations applicable to such Party including but not limited to: child labour, forced labour, collective bargaining, discrimination, abuse, working hours and minimum wages, anti-bribery, anti-corruption, copyright and trademark protection, personal data protection (<https://personaldataprotection.bureauveritas.com/privacypolicy>).
- Each of the Parties warrants that neither it, nor its affiliates, has made or will make, with respect to the matters provided for hereunder, any offer, payment, gift or authorization of the payment of any money directly or indirectly, to or for the use or benefit of any official or employee of the government, political party, official, or candidate.
- 16.2** In addition, the Client shall act consistently with the Bureau Veritas' Code of Ethics and, when applicable, Business Partner Code of Conduct both available at <https://group.bureauveritas.com/group/corporate-social-responsibility/operational-excellence>.





RULE NOTE NR 670

NR 670 Methyl/ethyl alcohol Fuelled Ships

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SECTION 1

GENERAL

1 General

1.1 Application

1.1.1 This Rule Note provides requirements for the arrangement, installation, control and monitoring of machinery, equipment and systems using methyl/ethyl alcohol as fuel to minimize the risk to the ship, its crew and the environment, having regard to the nature of the fuels involved.

1.1.2 This Rule Note incorporates requirements from IMO MSC.1/Circ.1621, which are applicable for Classification purposes.

1.1.3 Ships using methyl/ethyl alcohol as fuel and falling within the scope of SOLAS Convention are to comply with the requirements of IMO IGF Code and Flag Administration rules as applicable.

1.1.4 In accordance with the requirements of NR467, Pt A, Ch 1, Sec 2, ships complying with the requirements of this Rule Note will be eligible for assignment of a classification notation defined in [1.2].

Note 1: NR467 Rules for the Classification of Steel Ships.

Unless otherwise specified, the requirements of Sec 1 to Sec 12 are applicable to all ships.

In addition to the requirements of Sec 1 to Sec 12, ships assigned with the service notation **chemical tanker**, and designed to use methyl/ethyl alcohol cargo as fuel, are to comply with the requirements of Sec 13.

1.2 Classification notations

1.2.1 Ships complying with the requirements of this Rule Note will be eligible for assignment of the additional service feature **methanolfuel** or **LFPfuel** for other alcohols as defined in NR467, Pt A, Ch 1, Sec 2, [4.13].

The additional service feature **methanolfuel** or **LFPfuel** is completed by:

- the notation **singlefuel** when the engine uses only methyl/ethyl alcohol as fuel
- the notation **dualfuel** when the engine uses methyl/ethyl alcohol fuel and oil fuel.

The additional service feature e.g. **methanolfuel dualfuel** or **methanolfuel singlefuel** may be completed by:

- the notation **-prop** when methyl/ethyl alcohol fuel is only used for propulsion systems
- the notation **-aux** when methyl/ethyl alcohol fuel is only used for auxiliary systems.

1.3 Documentation to be submitted

1.3.1 With reference to [1.2], for ships to be assigned the additional service feature **methanolfuel** or **LFPfuel** for other alcohols, the documents listed in Tab 1 are to be submitted for approval or information.

1.4 Definitions

1.4.1 For the purpose of this Rule Note, the terms used have the meanings defined in the following paragraphs. Terms not defined are to have the same meaning as in NR467 Rules for Steel Ships, NR566 Hull arrangement, stability and systems for ships less than 500 GT and NR529 Gas Fuelled Ships.

1.4.2 Bunkering

Bunkering means the transfer of fuel from land-based or floating facilities into ships' permanent tanks or connection of portable tanks to the fuel supply system.

1.4.3 Fuel

Fuel means methyl/ethyl alcohol fuels, containing allowable additives or impurities. Physical and chemical properties considered for the application of the present Rule Note are those of the products identified under CAS 67-56-1, UN 1230 or EC 00-659-6 for methyl alcohol and CAS 64-17-5, UN 1170, or EC 200-578-6 for ethyl alcohol.

1.4.4 Fuel tank

Fuel tank is any integral, independent or portable tank used for storage of fuel. The spaces around the fuel tank are defined as follows:

- fuel storage hold space is the space enclosed by the ship's structure in which an independent fuel tank is located. If tank connections are located in the fuel storage hold space, a fuel storage hold space also is to be considered as tank connection space. Integral fuel tanks do not have a fuel storage hold space
- cofferdam is a structural space surrounding a fuel tank which provides an added layer of gas and liquid tightness protection against external fire and toxic and flammable vapours between the fuel tank and other areas of the ship
- tank connection space is a space surrounding all tank connections and tank valves that is required for tanks with such connections in enclosed spaces.

1.4.5 Fuel preparation space

Fuel preparation space means any space containing equipment for fuel preparation purposes, such as fuel pumps, fuel valve train, heat exchangers and filters.

1.4.6 Purging

Purging means the introduction of inert gas into a tank which is already in an inert condition with the object of further reducing the oxygen content; and/or reducing the existing fuel or other flammable vapours content to a level below which combustion cannot be supported if air is subsequently introduced into the tank.

1.4.7 Gas freeing

Gas freeing is the process carried out to achieve a safe tank atmosphere. It includes two distinct operations:

- purging the hazardous tank atmosphere with an inert gas or other suitable medium (e.g. water) to dilute the hazardous vapour to a level where air can be safely introduced
- replacing the diluted inert atmosphere with air.

1.4.8 Independent fuel tank

Independent tanks are self-supporting, do not form part of the ship's hull and are not essential to the hull strength.

1.4.9 Integral fuel tank

Integral tank means a fuel-containment envelope tank which forms part of the ship's hull and which may be stressed in the same manner and by the same loads which stress the contiguous hull structure and which is normally essential to the structural strength of the ship's hull.

1.4.10 Portable fuel tank

Portable tank means an independent tank being able to be:

- easily connected and disconnected from ship systems and
- easily removed from ship and installed on board ship.

1.4.11 Working pressure

- Low pressure means a maximum working pressure lower than or equal to 1,0 MPa.
- High pressure means a maximum working pressure greater than 1,0 MPa but lower than or equal to 2,0 MPa.
- Very high pressure means a maximum working pressure greater than 2,0 MPa.

1.4.12 Single failure

Single failure is where loss of intended function occurs through one fault or action.

1.4.13 Single fuel installation

Single fuel engine means an engine capable of operating on a fuel as defined in [1.4.3].

1.4.14 High fire risk spaces

It includes as a minimum, but is not to be restricted to:

- a) cargo spaces except cargo tanks for liquids with flashpoint above 60°C and except cargo spaces exempted in accordance with SOLAS regulations II-2/10.7.1.2 or II-2/10.7.1.4
- b) vehicle, ro-ro and special category spaces
- c) service spaces (high risk): galleys, pantries containing cooking appliances, saunas, paint lockers and store-rooms having areas of 4 m² or more, spaces for the storage of flammable liquids and workshops other than those forming part of the machinery space, as provided in SOLAS regulations II-2/9.2.2.4, II-2/9.2.3.3 and II-2/9.2.4, and
- d) accommodation spaces of greater fire risk: saunas, sale shops, barber shops, beauty parlors and public spaces containing furniture and furnishing of other than restricted fire risk and having deck area of 50 m² or more, as provided in SOLAS regulation II-2/9.2.2.3.

Table 1 : Documentation to be submitted

No.	I/A (1)	Documents
1	A	General arrangement of the ship showing the location of the bunkering stations, fuel tanks, TCS, fuel preparation rooms, vent masts, etc.
2	A	General arrangement of the machinery spaces containing the fuel utilization units (engines, turbines, boilers or gas combustion units)
3	I	Design statement that provides information about the intended service of the ship, including and the functionality of the main propulsion and auxiliary systems that use methyl/ethyl alcohol as fuel.
4	I	Operating manuals documents, to be kept on board, that indicate the installation particulars, including at least operating and maintenance instructions of fuel tanks, supply system and methyl/ethyl fuelled engines.
5	I	Bunkering operational procedures and maintenance instruction manuals.
6	I	Testing and trial procedure (including sea trials). The testing procedures are to include testing of safety shutdowns in accordance with the cause and effect diagram.
7	I	Arrangement of fuel tanks and/or fuel containment systems
8	I	Arrangement of fuel preparation spaces
9	I	Arrangement of fuel bunkering systems, including the bunkering connections
10	A	Arrangement of doors and openings within hazardous areas
11	A	Arrangement of entrances and air inlets leading of accommodation spaces, service spaces and control station spaces
12	A	Location and structure of air locks
13	A	Pipe, cable and duct penetrations in bulkheads and decks

No.	I/A (1)	Documents
14	A	Calculation of the hull temperature and associated distribution of quality and steel grades
15	A	Scantlings, material and arrangement of the fuel containment system, including the secondary barrier, if any
16	A	Sloshing calculation where relevant
17	A	Details of tank domes and deck sealings
18	A	Fuel containment system testing and inspection procedures
19	A	Vent mast detailed drawing
20	A	Description of coamings, drip trays and other protective measures
21	A	Hazardous area classification
22	I	Risk analysis report
23	A	Risk analysis recommendation follow-up
24	A	Details or instruction of fuel piping, including pressure relief valves and vent pipes for each fuel utilization unit
25	A	Technical documents for branches, return pipes, elbows, expansion joints, bellows and similar devices;
26	A	Drawing and instruction of flanges vent lines for pressure/ vacuum relief valves or similar piping and ducts for fuel pipes
27	A	Technical documents for the material, welding, post-weld heat treatment and non-destructive testing of fuel pipes;
28	I	Functional test guidelines for all piping, including valves, fittings and equipment relating to fuel (liquid or vapour) operation
29	A	Technical documents for electrical ground system of fuel pipes
30	I	Technical documents for the measures to remove the fuel from the fuel bunkering pipes before shutoff the bunkering connections
31	A	Fuel heating or cooling system
32	A	Diagram of the inert gas piping system
33	I	Fuel containment system gas freeing procedure, including emptying, inerting and aerating
34	A	Arrangement of bilge and drainage systems for fuel pump rooms and fuel tank connection spaces
35	I	Calculation for the discharge volume of pressure relief valves of pipes
36	A	Exhaust gas system, including arrangement of explosion relief
37	A	Interbarrier space drainage, inerting and pressurisation systems if fitted
38	A	Diagram of the fuel oil system including pilot fuel supply
39	A	Stress analysis of the high pressure piping systems
40	A	Arrangement and instruction of mechanical ventilation systems in hazardous areas and adjacent zones, including the capacity and arrangement of fans and their motors
41	A	Arrangement of the double piping or duct system
42	I	Fire Safety operational documentation including methyl/ethyl alcohol safety / emergency procedures
43	A	Arrangement and instruction (capacity calculation, etc.) of water spray systems, including pipes, valves, nozzles and fittings
44	A	Fire protection arrangement of fuel tanks and/or fuel storage hold spaces and their vent pipes, bunkering stations
45	A	Structural fire protection plan
46	A	External surface protection water spraying system
47	A	Bunkering station fire extinguishing system
48	A	Single line diagram of intrinsically safe circuits
49	A	List of certified explosion-proof equipment
50	A	Arrangement of electrical installation in hazardous areas, including lighting system
51	I	Safety certificates for electrical equipment located in hazardous spaces or zones, where applicable
52	A	Arrangement and instruction of fuel vapour detection and alarm systems, including probes, alarm arrangements and alarm set points
53	A	Arrangement and instruction of fuel tanks monitoring and control systems, including sensors and alarm set points
54	A	Arrangement and instruction of fuel pumps monitoring and control systems
55	A	Arrangement and instruction of methyl/ethyl alcohol fuelled engines monitoring and control systems
56	A	Arrangement and instruction of fire detection and alarm system
57	I	Type testing of the engine with electronic controls or a proposed test plan with the electronic controls operational
58	A	Arrangement and instruction of liquid leakage detection and alarm system

No.	I/A (1)	Documents
59	A	Emergency shutdown system
60	I	Dock and sea trials procedure relating to methyl/ethyl alcohol fuel, e.g. functional tests for all fuel piping and their valves, fittings and relevant equipment.
61	A	Tank hatches, pipes and any openings to tanks
62	A	Details of tanks coating
63	A	Detailed drawings of fuel tanks, materials, including internal structure, heat insulation (if any), piping, valves and connections
64	A	Detailed drawings of fuel tanks supporting
65	A	Pressure analysis of fuel tanks
66	I	Specification and type-approval reference of the fuel utilization units
67	A	Fabrication details of fuel tanks including building tolerances, NDT plan and welding procedures (WPS)
68	I	Procedure for maintenance of the fuel utilization units and other fuel-related equipment, including the steps to be taken prior to servicing the units
69	A	Diagram of the engine lubricating oil system
70	A	Diagram of the engine cooling system
71	A	Diagram of the engine crankcase venting systems
72	A	Drawings of the boilers, including burners
73	A	Fuel injection valves and drive and sealing system
74	A	Explosive protection and introduction of crankcase
75	A	Explosive protection and calculation of exhaust system
76	A	Schematic diagram of engine control system related to methyl/ethyl alcohol fuel (including monitoring, alarm and safety protection devices)
77	A	Schedule of testing at engine builders and commissioning prior to sea trials, including any testing required to verify the safeguards determined in the risk-assessment
78	A	HAZOP study if very high pressure fuel installations and report of the follow-up recommendations
79	A	FMECA analysis if very high pressure fuel equipment
80	A	FMEA analysis for the systems intended to maintain the fuel tank pressure and temperature
(1) I: for information A: for approval		

SECTION 2

RISK-BASED STUDIES

1 Risk assessment

1.1 Scope of the risk assessment

1.1.1 A risk assessment is to be conducted to ensure that risks arising from the use of methyl / ethyl alcohol fuels affecting persons on board, the environment, the structural strength or the integrity of the ship are addressed. Consideration is to be given to the hazards associated with physical layout, operation and maintenance, following any reasonably foreseeable failure.

1.1.2 In addition to the requirements of this Section, Risk based studies for ships granted with the service notation **chemical tanker**, and designed to use methyl/ethyl alcohol cargo as fuel, are to comply with the provisions of Sec 13, [1.2].

1.2 Methodology

1.2.1 The risks are to be analysed using acceptable and recognized risk analysis techniques. Loss of function, component damage, fire, explosion, toxicity and electric shock are to, be considered, as a minimum. The analysis is to ensure that risks are eliminated wherever possible. Risks which cannot be eliminated are to be mitigated as necessary.

1.2.2 The assessment is to be carried out in accordance with acceptable and recognized techniques described in the current version of, for example, ISO 31010 (Risk management - Risk assessment techniques), ISO 17776 (Petroleum and natural gas industries - Major accident hazard management during the design of new installations), ISO 16901 (Guidance on performing risk assessment in the design of onshore LNG installations including the ship/shore interface), NORSOK Z-013 (Risk and emergency preparedness assessment standard) or CPR 12E. (Methods for determining and processing probabilities).

1.2.3 An HAZID study is to be carried out for each methyl/ethyl alcohol fuelled ship. It should cover at least the following spaces, zones and systems:

- tank connection space (TCS)
- enclosed and semi-enclosed fuel preparation rooms
- enclosed and semi-enclosed bunkering stations
- spaces containing very high pressure gas or liquid fuel piping
- ESD-protected machinery spaces
- spaces where fuel enclosure units are installed

- zones where vent lines and safety valve discharge lines are led, except where ventilation inlets to accommodation and machinery spaces are provided with gas detection arrangements (see Sec 12, [2.5.1]).

The risks identified by the HAZID study may be mitigated by operational procedures (e.g. stopping ship spaces ventilation during bunkering operations to prevent gas from entering those spaces through openings).

Where the requirements of this Rule Note for the arrangement of vents outlets cannot be satisfied due to size limits, gas dispersion analysis will be required to assess the risk associated with gas venting or pressure relief

1.2.4 A FMECA analysis is to be carried out for the very high pressure equipment, including:

- pumps
- compressors
- diesel engines
- electrical generation and distribution systems as settled in IEC 60812.

1.2.5 An HAZOP study is to be carried out for the very high pressure fuel installation. Type approved equipment need not be considered in the study.

1.2.6 For any risk assessment carried out in the scope of the present Rule Note, a detailed follow-up report of actions and mitigation measures taken in response to any analysis findings is to be submitted to the Society.

2 Limitation of explosion consequences

2.1 Principle

2.1.1 An explosion in any space containing any potential sources of release and potential ignition sources is not to:

- a) cause damage to or disrupt the proper functioning of equipment/systems located in any space other than that in which the incident occurs
- b) damage the ship in such a way that flooding of water below the main deck or any progressive flooding occur;
- c) damage work areas or accommodation in such a way that persons who stay in such areas under normal operating conditions are injured
- d) disrupt the proper functioning of control stations and switchboard rooms necessary for power distribution;
- e) damage life-saving equipment or associated launching arrangements

- f) disrupt the proper functioning of fire-fighting equipment located outside the explosion-damaged space
- g) affect other areas of the vessel in such a way that chain reactions involving, inter alia, cargo, gas and bunker oil may arise
- h) prevent persons' access to life-saving appliances (LSA) or impede escape routes.

Note 1: Double wall fuel pipes are not considered as potential sources of release.

2.2 Additional requirements for explosion analysis

2.2.1 An explosion analysis is required for gas hazardous spaces, as a result of the risk assessment.

2.2.2 Explosion analyses are to demonstrate that, for the worst case scenario, the maximum pressure built-up in case of explosion does not exceed the design pressure of the space, taking into account the venting arrangement and the explosion pressure relief devices, where provided.

2.2.3 The worst case scenario is to assume a complete rupture of a fuel pipe and to take into account the following parameters:

- maximum expected time between the pipe rupture and the leakage detection
- time between the leakage detection and the gas supply shutoff
- ventilation flow rate.

2.2.4 Where necessary, explosion pressure relief devices are to be provided.