

Guide for Installation on Deck of Equipment for Well Stimulation and CO₂ Sequestration Activities

Effective from 1 November 2021

GENERAL CONDITIONS

Definitions:

“Administration” means the Government of the State whose flag the Ship is entitled to fly or under whose authority the Ship is authorised to operate in the specific case.

“IACS” means the International Association of Classification Societies.

“Interested Party” means the party, other than the Society, having an interest in or responsibility for the Ship, product, plant or system subject to classification or certification (such as the owner of the Ship and his representatives, the ship builder, the engine builder or the supplier of parts to be tested) who requests the Services or on whose behalf the Services are requested.

“Owner” means the registered owner, the ship owner, the manager or any other party with the responsibility, legally or contractually, to keep the ship seaworthy or in service, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Rules for the Classification of Ships or in the corresponding rules indicated in the specific Rules.

“Rules” in these General Conditions means the documents below issued by the Society:

- (i) Rules for the Classification of Ships or other special units;
- (ii) Complementary Rules containing the requirements for product, plant, system and other certification or containing the requirements for the assignment of additional class notations;
- (iii) Rules for the application of statutory rules, containing the rules to perform the duties delegated by Administrations;
- (iv) Guides to carry out particular activities connected with Services;
- (v) Any other technical document, as for example rule variations or interpretations.

“Services” means the activities described in Article 1 below, rendered by the Society upon request made by or on behalf of the Interested Party.

“Ship” means ships, boats, craft and other special units, as for example offshore structures, floating units and underwater craft.

“Society” or “TASNEEF” means Tasneef and/or all the companies in the Tasneef Group which provide the Services.

“Surveyor” means technical staff acting on behalf of the Society in performing the Services.

Article 1

1.1. The purpose of the Society is, among others, the classification and certification of ships and the certification of their parts and components. In particular, the Society:

- (i) sets forth and develops Rules;
- (ii) publishes the Register of Ships;
- (iii) issues certificates, statements and reports based on its survey activities.

1.2. The Society also takes part in the implementation of national and international rules and standards as delegated by various Governments.

1.3. The Society carries out technical assistance activities on request and provides special services outside the scope of classification, which are regulated by these general conditions, unless expressly excluded in the particular contract.

Article 2

2.1. The Rules developed by the Society reflect the level of its technical knowledge at the time they are published. Therefore, the Society, although committed also through its research and development services to continuous updating of the Rules, does not guarantee the Rules meet state-of-the-art science and technology at the time of publication or that they meet the Society's or others' subsequent technical developments.

2.2. The Interested Party is required to know the Rules on the basis of which the Services are provided. With particular reference to Classification Services, special attention is to be given to the Rules concerning class suspension, withdrawal and reinstatement. In case of doubt or inaccuracy, the Interested Party is to promptly contact the Society for clarification.

The Rules for Classification of Ships are published on the Society's website: www.tasneef.ae.

2.3. The Society exercises due care and skill:

- (i) in the selection of its Surveyors
- (ii) in the performance of its Services, taking into account the level of its technical knowledge at the time the Services are performed.

2.4. Surveys conducted by the Society include, but are not limited to, visual inspection and non-destructive testing. Unless otherwise required, surveys are conducted through sampling techniques and do not consist of comprehensive verification or monitoring of the Ship or of the items subject to certification. The surveys and checks made by the Society on board ship do not necessarily require the constant and continuous presence of the Surveyor. The Society may also commission laboratory testing, underwater inspection and other checks carried out by and under the responsibility of qualified service suppliers. Survey practices and procedures are selected by the Society based on its experience and knowledge and according to generally accepted technical standards in the sector.

Article 3

3.1. The class assigned to a Ship, like the reports, statements, certificates or any other document or information issued by the Society, reflects the opinion of the Society concerning compliance, at the time the Service is provided, of the Ship or product subject to certification, with the applicable Rules (given the intended use and within the relevant time frame).

The Society is under no obligation to make statements or provide information about elements or facts which are not part of the specific scope of the Service requested by the Interested Party or on its behalf.

3.2. No report, statement, notation on a plan, review, Certificate of Classification, document or information issued or given as part of the Services provided by the Society shall have any legal effect or implication other than a representation that, on the basis of the checks made by the Society, the Ship, structure, materials, equipment, machinery or any other item covered by such document or information meet the Rules. Any such document is issued solely for the use of the Society, its committees and clients or other duly authorised bodies and for no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties on the basis of the statements or information given by the Society. The validity, application, meaning and interpretation of a Certificate of Classification, or any other document or information issued by the Society in connection with its Services, is governed by the Rules of the Society, which is the sole subject entitled to make such interpretation. Any disagreement on technical matters between the Interested Party and the Surveyor in the carrying out of his functions shall be raised in writing as soon as possible with the Society, which will settle any divergence of opinion or dispute.

3.3. The classification of a Ship, or the issuance of a certificate or other document connected with classification or certification and in general with the performance of Services by the Society shall have the validity conferred upon it by the Rules of the Society at the time of the assignment of class or issuance of the certificate; in no case shall it amount to a statement or warranty of seaworthiness,

structural integrity, quality or fitness for a particular purpose or service of any Ship, structure, material, equipment or machinery inspected or tested by the Society.

3.4. Any document issued by the Society in relation to its activities reflects the condition of the Ship or the subject of certification or other activity at the time of the check.

3.5. The Rules, surveys and activities performed by the Society, reports, certificates and other documents issued by the Society are in no way intended to replace the duties and responsibilities of other parties such as Governments, designers, ship builders, manufacturers, repairers, suppliers, contractors or sub-contractors, Owners, operators, charterers, underwriters, sellers or intended buyers of a Ship or other product or system surveyed.

These documents and activities do not relieve such parties from any fulfilment, warranty, responsibility, duty or obligation (also of a contractual nature) expressed or implied or in any case incumbent on them, nor do they confer on such parties any right, claim or cause of action against the Society. With particular regard to the duties of the ship Owner, the Services undertaken by the Society do not relieve the Owner of his duty to ensure proper maintenance of the Ship and ensure seaworthiness at all times. Likewise, the Rules, surveys performed, reports, certificates and other documents issued by the Society are intended neither to guarantee the buyers of the Ship, its components or any other surveyed or certified item, nor to relieve the seller of the duties arising out of the law or the contract, regarding the quality, commercial value or characteristics of the item which is the subject of transaction.

In no case, therefore, shall the Society assume the obligations incumbent upon the above-mentioned parties, even when it is consulted in connection with matters not covered by its Rules or other documents.

In consideration of the above, the Interested Party undertakes to relieve and hold harmless the Society from any third party claim, as well as from any liability in relation to the latter concerning the Services rendered.

Insofar as they are not expressly provided for in these General Conditions, the duties and responsibilities of the Owner and Interested Parties with respect to the services rendered by the Society are described in the Rules applicable to the specific Service rendered.

Article 4

4.1. Any request for the Society's Services shall be submitted in writing and signed by or on behalf of the Interested Party. Such a request will be considered irrevocable as soon as received by the Society and shall entail acceptance by the applicant of all relevant requirements of the Rules, including these General Conditions. Upon acceptance of the written request by the Society, a contract between the Society and the Interested Party is entered into, which is regulated by the present General Conditions.

4.2. In consideration of the Services rendered by the Society, the Interested Party and the person requesting the service shall be jointly liable for the payment of the relevant fees, even if the service is not concluded for any cause not pertaining to the Society. In the latter case, the Society shall not be held liable for non-fulfilment or partial fulfilment of the Services requested. In the event of late payment, interest at the legal current rate increased by 1.5% may be demanded.

4.3. The contract for the classification of a Ship or for other Services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30 days' notice to be given in writing. Failure to pay, even in part, the fees due for Services carried out by the Society will entitle the Society to immediately terminate the contract and suspend the Services.

For every termination of the contract, the fees for the activities performed until the time of the termination shall be owed to the Society as well as the expenses incurred in view of activities already programmed; this is without prejudice to the right to compensation due to the Society as a consequence of the termination.

With particular reference to Ship classification and certification, unless decided otherwise by the Society, termination of the contract implies that the assignment of class to a Ship is withheld or, if already assigned, that it is suspended or withdrawn; any statutory certificates issued by the Society will be withdrawn in those cases where provided for by agreements between the Society and the flag State.

Article 5

5.1. In providing the Services, as well as other correlated information or advice, the Society, its Surveyors, servants or agents operate with due diligence for the proper execution of the activity. However, considering the nature of the activities performed (see art. 2.4), it is not possible to guarantee absolute accuracy, correctness and completeness of any information or advice supplied. Express and implied warranties are specifically disclaimed.

Therefore, except as provided for in paragraph 5.2 below, and also in the case of activities carried out by delegation of Governments, neither the Society nor any of its Surveyors will be liable for any loss, damage or expense of whatever nature sustained by any person, in tort or in contract, derived from carrying out the Services.

5.2. Notwithstanding the provisions in paragraph 5.1 above, should any user of the Society's Services prove that he has suffered a loss or damage due to any negligent act or omission of the Society, its Surveyors, servants or agents, then the Society will pay compensation to such person for his proved loss, up to, but not exceeding, five times the amount of the fees charged for the specific services, information or opinions from which the loss or damage derives or, if no fee has been charged, a maximum of AED5,000 (Arab Emirates Dirhams Five Thousand only). Where the fees charged are related to a number of Services, the amount of the fees will be apportioned for the purpose of the calculation of the maximum compensation, by reference to the estimated time involved in the performance of the Service from which the damage or loss derives. Any liability for indirect or consequential loss, damage or expense is specifically excluded. In any case, irrespective of the amount of the fees charged, the maximum damages payable by the Society will not be more than AED5,000,000 (Arab Emirates Dirhams Five Millions only). Payment of compensation under this paragraph will not entail any admission of responsibility and/or liability by the Society and will be made without prejudice to the disclaimer clause contained in paragraph 5.1 above.

5.3. Any claim for loss or damage of whatever nature by virtue of the provisions set forth herein shall be made to the Society in writing, within the shorter of the following periods: (i) THREE (3) MONTHS from the date on which the Services were performed, or (ii) THREE (3) MONTHS from the date on which the damage was discovered. Failure to comply with the above deadline will constitute an absolute bar to the pursuit of such a claim against the Society.

Article 6

6.1. These General Conditions shall be governed by and construed in accordance with United Arab Emirates (UAE) law, and any dispute arising from or in connection with the Rules or with the Services of the Society, including any issues concerning responsibility, liability or limitations of liability of the Society, shall be determined in accordance with UAE law. The courts of the Dubai International Financial Centre (DIFC) shall have exclusive jurisdiction in relation to any claim or dispute which may arise out of or in connection with the Rules or with the Services of the Society.

6.2. However,

- (i) In cases where neither the claim nor any counterclaim exceeds the sum of AED300,000 (Arab Emirates Dirhams Three Hundred Thousand) the dispute shall be referred to the jurisdiction of the DIFC Small Claims Tribunal; and
- (ii) for disputes concerning non-payment of the fees and/or expenses due to the Society for services, the Society shall have the

right to submit any claim to the jurisdiction of the Courts of the place where the registered or operating office of the Interested Party or of the applicant who requested the Service is located.

In the case of actions taken against the Society by a third party before a public Court, the Society shall also have the right to summon the Interested Party or the subject who requested the Service before that Court, in order to be relieved and held harmless according to art. 3.5 above.

Article 7

7.1. All plans, specifications, documents and information provided by, issued by, or made known to the Society, in connection with the performance of its Services, will be treated as confidential and will not be made available to any other party other than the Owner without authorisation of the Interested Party, except as provided for or required by any applicable international, European or domestic legislation, Charter or other IACS resolutions, or order from a competent authority. Information about the status and validity of class and statutory certificates, including transfers, changes, suspensions, withdrawals of class, recommendations/conditions of class, operating conditions or restrictions issued against classed ships and other related information, as may be required, may be published on the website or released by other means, without the prior consent of the Interested Party.

Information about the status and validity of other certificates and statements may also be published on the website or released by other means, without the prior consent of the Interested Party.

7.2. Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 above, the Society's clients hereby accept that the Society may participate in the IACS Early Warning System which requires each Classification Society to provide other involved Classification Societies with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and used to facilitate the proper working of the IACS Early Warning System. The Society will provide its clients with written details of such information sent to the involved Classification Societies.

7.3. In the event of transfer of class, addition of a second class or withdrawal from a double/dual class, the Interested Party undertakes to provide or to permit the Society to provide the other Classification Society with all building plans and drawings, certificates, documents and information relevant to the classed unit, including its history file, as the other Classification Society may require for the purpose of classification in compliance with the applicable legislation and relative IACS Procedure. It is the Owner's duty to ensure that, whenever required, the consent of the builder is obtained with regard to the provision of plans and drawings to the new Society, either by way of appropriate stipulation in the building contract or by other agreement.

In the event that the ownership of the ship, product or system subject to certification is transferred to a new subject, the latter shall have the right to access all pertinent drawings, specifications, documents or information issued by the Society or which has come to the knowledge of the Society while carrying out its Services, even if related to a period prior to transfer of ownership.

Article 8

8.1. Should any part of these General Conditions be declared invalid, this will not affect the validity of the remaining provisions.

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1 PREAMBLE

Chemical stimulation or injections techniques are primarily used to address problems near or within a wellbore such as the blocking of perforations or the reduction of formation permeability by carbonate scale, migrating fines, fluid, or cement. These techniques have become increasingly selective and sophisticated since their introduction in the 1930s.

In general, chemical stimulation/injection techniques comprise the injection of chemicals, typically under pressure, into completed wells. Chemical constituents commonly include acids such as hydrochloric, hydrofluoric or acetic, water and potassium chloride brines, condensate (i.e. light-gravity oil), and designer mixtures targeted at specific hydrocarbon blocks. Gases, such as nitrogen and carbon dioxide, are also commonly injected along with the chemical constituents to assist in furthering the reach of the fluids into the reservoir. They also help with fluid removal once the desired chemical reactions are complete.

The sequestration of CO₂ of reclaimed quality into depleted gas fields is instead a practice which is presently under study, but which is very promising not only in terms of carbon footprint reduction targets but also for potentially enhance the gas recovery process using CO₂ as cushion and producing de facto a well stimulation process.

2 GENERAL

The aim of this guide is to provide Interested Parties with the criteria followed by Tasneef to allow an OSV not built for well stimulation/injection activities to perform them on temporary basis. An additional appendix of this guide deals with the matter of transfer, store and inject CO₂ of reclaimed quality for sequestration activities.

For this reason, this guide will be focused on the requirements imposed to OSVs which are intended to be equipped with temporary installations fitted on open deck to carry "limited quantities" of bulk liquids (as defined by IMO Resolution A.673(16)), piping, fittings and equipment (i.e. Mixing tanks, pumps, compressors etc) necessary to perform the well stimulation/injection activities.

This guide is based on IMO Resolution A.673(16) as amended and additional class notation "well stimulation" (Pt E, Ch 29 of Tasneef Rules).

National requirements of the registering flag and shore Administration shall be further investigated, and relevant requirements shall be implemented (if any).

The necessity to comply with National standards prescribed by the Flag Administration registering the vessel, the national requirements imposed by the

shore Administration responsible for the area of sea where the operation will be carried out (national water or Exclusive Economic Zone), IMO regulations, codes and guidelines and class rules is originated by the requirements imposed by Administrations and by P&I insurances both requiring of covering the service the vessel is intended to.

The breach of such requirement from Owner may be cause of detention from a port state control and the not coverage of the unit by the insurance company.

This guide does not include the management and certification of mobile connections and movable equipment that is under Well Operator procedures and responsibility.

3 DEFINITIONS

For the purpose of this guide, the following definitions shall be applied:

- "Shore Administration" Administration responsible of the area where the Well stimulation/injection activities will be carried out
- "Registering flag" Flag Administration which is registering the unit
- "Well Operator" Company owning the permission from Shore Administration to exploit the seabed and responsible of the activities performed at these regards
- "Tasneef Rules" Tasneef Rules for the Classification of Ships
- "limited quantities" means that the aggregate quantity of bulk liquids identified in chapter 1.2.2 of IMO Resolution A.673(16) that is allowed to be carried is any amount not exceeding a maximum which is the lesser of 800 m³ or a volume in cubic metres equal to 40% of the vessel's deadweight calculated at a cargo density of 1.0. For ships referred to in 1.3.4.2 of IMO Resolution A.673(16), such as well-stimulation vessels, the Administration may permit carriage of more than the maximum amount specified above.

4 PRODUCT CATEGORIZATION

Categorization of products based on their Material Safety Data Sheet (MSDS) shall be performed in accordance with Annex 1 of IMO Resolution A.673(16). In case the product is not included in such annex, the categorisation may be based on IBC code, IGC code, tripartite agreements.

It shall be noted that well stimulation/injection activities may require small quantities of products identified as "Additives" which may not fall in the categorization provided by 1.2.2 of IMO Resolution A.673(16).

For such products chapter 1.2.3 of IMO Resolution A.673(16) may be applied.

5 HAZARDOUS AREA

Hazardous areas are to be defined in relation with the liquids and additives used for stimulation/injection operation and the layout of relevant systems. Due consideration is to be given to the location of air intakes and openings into accommodation, service and machinery spaces and control station in relation to cargo piping and cargo vent system.

6 SHIPBOARD ARRANGEMENT INSTALLATIONS

6.1 Independent Portable Tanks

6.1.1 General requirements

Proper basement for each independent tank which is not ready removable shall be provided in order to allow the possibility to inspect the area of deck under said tank and to avoid possible water retention underneath the tank producing deck plates deterioration.

Cargoes which react in a hazardous manner with other cargoes or fuel oils are to have separate tank venting systems.

The outlet of vent pipes of tanks containing acids, N₂ and other products requiring a controlled venting system are to be outside the safe area (10 m horizontal distance from ventilation intakes, openings to accommodation and service spaces and at a height of 6 m above the weather deck; vent outlet height may be reduced to 3 m if high-velocity venting valves, of an approved type, discharging upwards in an unimpeded jet with an exit velocity of at least 30 m/s, are fitted).

Possible reductions (but in no case the distance is to be less than 7m) of that distance may be accepted provided the said opening do not face the operation area where the tanks are located.

The location of cargo tank vent outlets for independent pressure tanks and for cargo tanks used to carry pollution hazard only substances with a flashpoint exceeding 60°C (closed cup test) is to be to the satisfaction of the Society.

6.1.2 Permanent installation

Independent portable tanks containing liquefied Gasses and/or acids/chemicals are to be designed and tested in accordance with the provisions of IGC or IMDG Code as applicable.

Each cargo tank is to have a level gauging system and, where required by Chapter 17 of the IBC Code,

a level alarm. Such devices are to comply with the relevant requirements of the IBC Code.

Note: Requirement 15.19.6 of the IBC Code for a visual and audible high-level alarm may be waived by the Society taking into account the cargo carriage arrangements and cargo loading procedures.

Independent pressure tanks are to be fitted with pressure relief devices which are so designed as to direct the discharge away from personnel and have a set pressure and capacity which is in accordance with standards acceptable to the Society taking into account the design pressure referred to in Pt E, Ch 15, Sec 3, [5.3.2] of Tasneef Rules.

6.1.3 Temporary installation

Due to the provisional nature of the operation, temporary installation in compliance with recognized standards, specific for the oil extraction industry may be accepted on case-by-case evaluation, based on valid certificates issued by qualified independent party.

6.2 Tanks location

Tanks are to be located at a minimum distance from the side shell and bottom, i.e 760 mm measured inboard from the side of the vessel perpendicular to the centreline at the level of the summer load waterline.

6.3 Electrical equipment permitted in hazardous area

For the type of electrical equipment permitted in hazardous areas reference is to be made to Pt C, Ch 2, Sec 3, [10] of Tasneef Rules.

6.4 Equipment fastening

Independent portable tanks and other deck equipment (I.e: pumps, mixers, compressors etc...) are to be effectively fastened on deck (I.e: by means of twist lock and/or slings etc.) in accordance with the provisions of an approved cargo securing manual and/or approved drawing (Pt E, Ch 29, Sec 2, [3.3.1] of Tasneef Rules).

In case weather forecast limitations will be imposed, relevant information shall be provided and procedure, stating the time necessary to:

- a) stop the well stimulation/injection activities
- b) clean and place the equipment in safe position
- c) reach the safe harbour

are to be submitted for information.

Standing order reflecting the above conditions is to be issued by the captain of the vessel.

6.5 Deck protection

For the tanks intended for Acid products, the following protections from acid spills are to be provided:

- Floors or decks under storage tanks, pumps and piping for acid are to have a lining or coating of corrosion-resistant materials extending up to a minimum height of 500 mm on the bounding bulkheads or coamings; hatches or similar openings in such floors or decks are to be raised to a minimum height of 500 mm and the coamings are to be protected by a lining or an acid resistant coating (ref to: Pt E, Ch 29, Sec 2, [2.2.1] of Tasneef Rules and 3.10.1 of IMO Resolution A.673(16)).
- A permanent spill coaming of 150 mm in height is to be provided on deck to keep deck spill away from accommodation and service areas (ref to Pt E, Ch 29, Sec 2, [2.2.3] of Tasneef Rules).

For the tanks intended for liquid Nitrogen the following protections from acid spills are to be provided:

- Drip trays resistant to cryogenic temperatures should be provided at manifolds transferring liquefied gases (N₂) and at other flanged connections in the liquefied gas system.

6.6 Dangerous goods in packages

Dangerous goods are to be carried inside IMDG approved packages. Location of packages is to be in accordance with IMDG code requirements and MSDS card of each Dangerous good (i.e: packages/drums carrying inflammable Dangerous goods are to be located not less than 3 meters far from sources of ignition, etc). Location and stowage of packages will be under responsibility of the captain of the unit in accordance to cargo securing manual procedural requirements.

6.7 Piping systems

6.7.1 General requirements

Piping systems for the well stimulation/injection plant are to be separated from other piping systems; they are not to pass through any accommodation, service or machinery space other than cargo pump rooms or pump rooms.

Piping skids have to comply with the following requirements from of Pt E, Ch 15, Sec 3 of Tasneef Rules:

- a) Chapter 5 of the IBC Code
- b) The remote shutdown devices for all cargo pumps and similar equipment, required by 5.6.1.3 of the IBC Code, are to be capable of being activated from a dedicated cargo control location which is

manned at the time of cargo transfer and from at least one other location outside the cargo area and at a safe distance from it

- c) In the case of transfer operations involving pressure in excess of 5 MPa gauge, arrangements for emergency depressurising and disconnection of the transfer hose are to be provided. The controls for activating emergency depressurisation and disconnection of the transfer hose are to meet the provisions of b) above.

For piping skids of limited extension, materials, controls and arrangements of proven reliability in the oil extraction industry according to recognized standards and/or well operator specifications may be accepted in the light of provisional nature of the operations.

On high pressure lines the outlet of relief valves is to be led in a safe position.

Hoses are to comply with recognized standards specific of the oil extraction industry based on valid certificates issued by qualified independent party.

Pumps and other machineries installed on temporary basis are to be in compliance with recognized industrial standards and/or specific of the oil extraction industry.

Piping for acids are to comply with the following provisions:

- a) Flanges and other detachable connections are to be covered by spray shields
- b) Portable shield covers protecting the connecting flanges of the loading manifold are to be provided. Drip trays of corrosion-resistant material are to be provided under loading manifolds for acids.

6.7.2 Permanent installation

Piping for the handling of flammable or hazardous and noxious liquid substances for well stimulation/injection is to comply with the pertinent provisions given in Pt E, Ch 7 or Ch 8 or Ch 9 of Tasneef Rules, as applicable for the intended liquid.

Piping for acids is to be in corrosion resistant material or coated by an approved lining.

6.7.3 Temporary installation

Due to the provisional nature of the operation, recognized standards, specific for the oil extraction industry may be accepted on case-by-case evaluation, based on valid certificates issued by qualified independent party.

6.8 Emergency remote shutdown

In the case of transfer operations involving pressures in excess of 5 MPa, arrangements for emergency

depressurizing and disconnection of the transfer hose should be provided. The controls for activating emergency depressurization and disconnection of the transfer hose are to be capable of being activated from a dedicated cargo control location which is manned at the time of cargo transfer and from at least one other location outside the cargo area and at a safe distance from it.

7 STABILITY REQUIREMENTS

7.1 Intact Stability

The stability of the ship for the loading conditions reported in the trim and stability booklet is to be in compliance with the requirements in Pt B, Ch 3, Sec 2 of Tasneef Rules.

7.2 Damage Stability

Damage stability is to be suitable to cope with damage to be assumed to occur anywhere in the ship's length at any transverse watertight bulkhead whenever the ship carries hazardous and noxious liquid substances more than the lesser between 800 m³ or a volume in cubic m equal to 40% of ship's deadweight calculated at a cargo density of 1.0.

8 SEAKEEPING

The ship is to be capable, within given environmental limit conditions, of maintaining the position during stimulation/injection operation either by means of anchoring arrangement or dynamic positioning system.

9 FIRE-FIGHTING REQUIREMENTS

The provisions of Chapter 3.9 of IMO Resolution A.673(16) are to be applied in accordance to product categorization defined in item [4] of this guide.

10 PERSONNEL PROTECTION

The following personnel protective equipment is to be provided as appropriate decontamination showers and eyewashes: a suitably marked decontamination shower and eyewashes are to be available on deck in a convenient location.

The shower and eyewash are to be operable in all ambient conditions.

Protective and safety equipment is to be kept on board in suitable locations as required by Chapter 14 of the IBC Code or Chapter 14 of the IGC Code.

11 VERIFICATION STEPS

The verification of the temporary installation is divided in 2 main phases:

- 1) Drawing appraisal
- 2) Survey Onboard

12 DOCUMENTATION TO BE SUBMITTED

The Interested Party is to submit the following documentation to Tasneef (if not available in the Tasneef file), at the time of the request and in order to plan the survey:

- a) Well stimulation/injection activity description
- b) MSDS of each product intended to be carried onboard
- c) P&ID drawing of piping system including valves, pumping systems, compressor system and other equipment
- d) Drawings of the project and conformity verification
- e) Addendum to stability booklet for the special loading condition
- f) Documentation of all equipment installed on board (well head pumping hoses, flexible piping, etc)
- g) Drawing showing the power supply for the equipment, in case are connected to ship main source of power Electrical
- h) Fire fighting equipment installation (if required by the type of product used for the operation)
- i) A risk assessment carried out by the Well operator covering each step of the activity.

13 ONBOARD SURVEY

The following verification and tests are to be carried out:

- a) Verification of deck spill protection arrangements
- b) Verification of sea fastening for temporary installations
- c) Hydrostatic test and functional test including testing of safety device shall be carried out onboard for checking proper assembly and absence of leakages
- d) Verification that adequate escape ways have been arranged free of obstruction within the temporary equipment and tanks installations
- e) Dedicated firefighting arrangement (if any)
- f) Verification of remarks on the approved drawing, if any
- g) SMS Procedure between the Ship Officer's and Well stimulation/injection special team in regard to safe operation
- h) List of Suitable PPE provided for all personnel engaged in the Well stimulation/injection activity according to MSDS and A.673(16)
- i) Special precaution is to be taken into account during operation to reduce the likelihood of pollution event and safety of persons

- j) Procedures in place are to be reviewed by the attending surveyor.

14 DELIVERABLES

Upon completion and satisfactory outcome of the verification activities defined in item [11] of this guide, the attending surveyor will proceed to issue a statement of fact declaring the compliance of the installation to the requirements indicated in IMO Resolution A.673(16) and the additional class notation Well stimulation (Ref: Pt E, Ch 29 of Tasneef Rules). For vessels classed with Tasneef a dedicated memo will be issued on the status of the vessel.

In case the verification activities defined in item [11] of this guide will be not completed but from the documentation received it will be possible to assess the compliance of the vessel to the afore mentioned rules and guide, an “approval in principle” certificate will be issued stating the potential capability of the vessel to perform the requested activity and the list of items which is to be completed in order to issue the final statement of compliance.

APPENDIX 1: STORAGE AND TRANSFER OF CO₂ FOR SEQUESTRATION AND WELL STIMULATION ACTIVITIES

This appendix is to be considered additional to the requirements listed in this guide. Items 5, 6, 7, 8, 10, 11, 12, 13, 14 of this guide are to be considered for CO₂ sequestration activities.

Uncontrolled pressure loss from the cargo can cause "sublimation" and the cargo will change from the liquid to the solid state. The precise "triple point" temperature of a particular carbon dioxide cargo is to be supplied before loading the cargo, and will depend on the purity of that cargo, and this is to be taken into account when cargo instrumentation is adjusted. The set pressure for the alarms and automatic actions described in this section is to be set to at least 0.05 MPa above the triple point for the specific cargo being carried.

The "triple point" for pure carbon dioxide occurs at 0.5 MPa gauge and -54.4°C.

There is a potential for the cargo to solidify in the event that a cargo tank relief valve, fitted in accordance with the rules, fails in the open position. To avoid this, a means of isolating the cargo tank safety valves shall be provided and the requirements of 8.2.9.2 of IGC Code do not apply when carrying this carbon dioxide. Discharge piping from safety relief valves is to be designed so they remain free from obstructions that could cause clogging. Protective screens are to not be fitted to the outlets of relief valve discharge piping, so the requirements of 8.2.15 of IGC code do not apply.

Discharge piping from safety relief valves is not required to comply with 8.2.10 of IGC Code but is to be designed so they remain free from obstructions that could cause clogging.

Protective screens are to not be fitted to the outlets of relief valve discharge piping, so the requirements of 8.2.15 of IGC code do not apply.

Cargo tanks are to be continuously monitored for low pressure when a carbon dioxide cargo is carried. An audible and visual alarm is to be given at the cargo control position and on the bridge. If the cargo tank pressure continues to fall to within 0.05 MPa of the "triple point" for the particular cargo, the monitoring system is to automatically close all cargo manifold liquid and vapour valves and stop all cargo compressors and cargo pumps. The emergency shutdown system required by 18.10 of IGC code may be used for this purpose.

All materials used in cargo tanks and cargo piping system are to be suitable for the lowest temperature that may occur in service, which is defined as the saturation temperature of the carbon dioxide cargo at the set pressure of the automatic safety system described in the beginning of this appendix.

Cargo hold spaces, cargo compressor rooms and other enclosed spaces where carbon dioxide could accumulate are to be fitted with continuous monitoring for carbon dioxide build-up. This fixed gas detection system replaces the requirements of 13.6 of IBC Code and hold spaces are to be monitored permanently even if the ship has type C cargo containment.

The Quality of CO₂ intended to be injected into depleted gas fields for sequestration is of reclaimed quality. Therefore, requirements in terms of materials of construction used in the cargo system is to take into account the possibility of corrosion, in case the reclaimed quality carbon dioxide cargo contains impurities such as water, sulphur dioxide, etc., which can cause acidic corrosion or other problems.

APPENDIX 2: EXAMPLE OF FORM FOR THE ISSUING OF THE STATEMENT

At the request of OWNER NAME, ADDRESS, it is hereby stated that the vessel, named
“...”

IMO number: ...

Flag: ...

Has been attended from to and the following inspections and witnessing during tests relevant to the onboard temporary installations fitted on open deck for the (well stimulation CO₂ sequestration) campaign planned to be carried out at ... offshore ... from .../.../... to .../.../... and having port of departure and port of returning have been carried out:

- a) Visual inspection of sea-fastening, locations, deck protection (as applicable) of portable tanks, containers, pumps and piping systems including relevant fittings ... in accordance to approved DWGs
- b) Verification of equipment matching and compliance to declarations, certifications testing reports submitted by
- c) Witnessing during pressure test of the piping ... at ...
- d)

Upon satisfactory results of the above activities it has been confirmed the compliance of the temporary installation to the requirements indicated in IMO Circular A.673(16) and the Additional class notation Well stimulation (Ref: Pt E, Ch 29 of Tasneef Rules) as per approved drawings to satisfaction of the undersigned.

This Statement has been issued for the use allowed by the Laws and Administration proceedings in force.

Issued at

On