



Guide on Software Acceptance in Marine Applications

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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 authorized 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 certificate on 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 authorization 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 PREMISE

In the Tase Rules for the Classification of Ships, software testing and software type approval are mentioned under Part C, Ch 3, Sec 3, [5.5], Part C, Ch 3, Sec 6, [3.3] and Part C, Ch 3, Sec. 6, [2.3].

2 FIELD OF APPLICATION

These guidelines are given for the purpose of guidance in accepting software on board and issuing software Type Approval Certificates at the request of the Manufacturer.

3 DEFINITIONS

3.1 Basic software

Basic software is the minimum software, which includes firmware and middleware, required to support the application software.

3.2 Application software

Application software is software performing tasks specific to the actual configuration of the computer-based system and supported by the basic software.

3.3 Category definition

Table 1 defines the three system categories for software assessment according to the possible extent of the damage caused by a single failure of the system the software is part of.

The direct consequences of the damage caused by a failure are to be considered.

4 DOCUMENTATION

4.1 Manufacturer's request

The request for type approval is to be submitted to Tasneef by the Manufacturer, or by the Applicant if authorised by the Manufacturer, and is to include the following:

- details of the Manufacturer
- designation of the software product
- fields of application
- documentation relevant to previous approvals (if any)
- test program sufficiently detailed to demonstrate the software's capability of performing the specific tasks.

4.2 Software documentation

The documents to be submitted, or to be kept available by the Applicant for review, are shown in Table 2.

5 DESIGN CRITERIA

5.1 General principle

The software design criteria are to include the whole product life cycle: from design specification to development, testing, commissioning and service/maintenance.

The design criteria are to document in a clear, complete and unambiguous manner how the product is to be used within the application.

5.2 Functional Design Specification

The Functional Design Specification is to state the software design criteria.

This specification is to include the following information, as applicable:

- object and the scope of the application
- block diagram of the software program
- expected operational performance, with particular reference to the program execution times, taking into consideration the maximum load and the maximum number of simultaneous tasks, including network communication speed, under normal and abnormal process conditions
- specification of the Input/Output system
- specification of the protocol(s) used for data communication to other external control systems
- man-machine interface specification, with particular reference to display layouts, their symbols and colours, available commands from the keyboard, etc.
- description of operation under failure conditions
- description of operation in case of failure of the controlled process
- specification of the system hardware and basic software configuration necessary to ensure the proper functionality.

Facilities are to be available for testing the design criteria indicated in the Functional Design Specification.

The Functional Design Specification is to clearly indicate the minimum hardware configuration required for the system application.

The release version of the basic software is to be indicated.

5.3 Design

The design of the application software (including its safety-related functions, if any) is to:

- include a plan of activities comprising testing activities
- include a fault tree analysis based on a Failure Mode and Effect Analysis

- be documented by a block diagram
- be modular and decomposable into functional blocks, each one independent and individually testable
- clearly indicate any condition that can impede correct program execution
- indicate how unauthorised access to the program for changes or modification is inhibited.

The fault tree analysis is to identify the cause and effect relationships leading to failure (top level event) in the program.

Any significant design activity performed by subcontractors is to be indicated as well as the acceptance and validation criteria of the finished product.

The design reviews carried out during development of the design are to be documented. The scope, results and corrective actions (if any) are to be indicated in the design reviews.

The following indications are to be given:

- programming language used for development of the application software
- programming tools used for the application program development
- reference to recognised international standards, if any
- use of proprietary or Commercial Off-The-Shelf software, if any
- release version of the system hardware (taking into consideration that preliminary releases of the hardware cannot be used as valid release versions).

Diagnostic messages and displays are to be documented, together with symbols and colours used. The operator's dialogue (menu) to the system through the keyboard is to be part of the user documentation.

6 TESTING

6.1 General principles

The scope of the testing is to demonstrate the full compliance of the application program in terms of completeness, correctness and security.

The tests to be carried out depending on the software categories are indicated in Table 3.

6.2 Factory tests

The software is to be tested at the Manufacturer's facilities according to a test procedure to be previously submitted for review or kept available for testing according to Table 2.

The pass/fail criteria for the tests are to be specified in the test procedure.

The tests are to be executed using the system hardware architecture designed for the application.

The capability of the software to carry out its functions, with particular reference to timing execution, taking into consideration the maximum load and maximum number of simultaneous tasks, including the communication network speed, under normal and failure operating conditions, is to be verified.

Where communication interfaces are provided to other control systems, they are to be available and installed during the tests.

The simulation of software program failures, including loss of data communication, is to be performed during the tests and the failure consequences on the controlled process are to be evaluated.

The programming tools for application software development are to be available during the tests.

The tests results are to be recorded and documented in the test report in such a way that repetition of tests for subsequent verification is possible.

6.3 Commissioning tests

The final acceptance tests are to demonstrate the ability of the software to perform its functions in the design operational conditions.

The final acceptance tests are to be performed with the complete configuration of hardware control system, including the interfaces to other systems.

All the application program features specified in the user documentation are to be tested, including the man-machine communication interfaces.

The application software program is to be tested under normal and failure operation conditions, including loss of power supply.

The tests results are to be recorded and documented.

6.4 Modifications

System tests after modification are to be carried out to demonstrate the ability of the software to perform its functions in the design operational conditions.

Depending on the modification, steps described in 6.2 and 6.3 may apply.

7 DUPLICATION AND MAINTENANCE

7.1 Duplication

The released program copies are to be recorded.

The records are to identify:

- exact version of the application and basic software programs that are installed
- number of released copies

- hardware media on which they are recorded (CD, DVD, etc.)
- interfaces to other software or hardware
- technical documentation for user support (user manuals, etc.)

New or updated releases that include major changes to the functions performed by the application software program are to be unambiguously identified and traceable.

Any new release of the same application program requiring changes to the system hardware configuration or to the system basic software is to be clearly specified and documented.

7.2 Maintenance

When software maintenance is to be performed, a maintenance plan is to be prepared.

The purpose of the maintenance plan is to define a systematic and documented approach to the application software maintenance.

The maintenance activities are to include:

- solution of problems encountered during the operation
- changes required when system hardware modifications are to be performed
- implementation of new functions or performance improvement
- withdrawal of some products from the market

The maintenance plan is to indicate:

- purpose of the maintenance
- initial status of the software
- description of the activities to be performed
- technical documentation of the maintenance activity performed
- time interval within which the maintenance activity is to be performed
- tests to be performed after the maintenance activity.

The execution of any maintenance activity is to be recorded and surveyed by the Society according to Table 3 and 6.4.

The records of the maintenance activities are to include:

- list of all problems encountered during operation
- corrective actions taken and their results
- implementation plan of corrective actions for all installations
- documentation that corrective actions have been successfully executed.

8 TRAINING

8.1 Documentation

Instructions manuals (user documentation) are to be available for each installation.

Any other software (e.g. basic software version) that is necessary for the use of the application software is to be identified in the documentation.

The manuals are to include the necessary instructions for:

- correct operation of the program
- data and information access through the keyboard to the man-machine interface
- changing of parameters (e.g. alarm limits, etc.)
- understanding the information on the screen displays (symbols, alarms)
- understanding the failure alarm messages
- installation of the application program
- conditions that limit the use of the program.

The user documentation is to include instructions to prevent any unauthorised use of the software.

8.2 Training requirements

Training requirements for familiarisation with the use of the program are to be stated and identified in the documentation.

Training of users is to be recorded and documented.

Table 1: Software category definition

Category	Category definition Failure Effects	System functionality	Examples
I	The failure of Cat. I systems will not lead to harmful situation for human safety, safety of the vessel and/or threat to the environment	Supervision functions for informational tasks	Planned maintenance and condition monitoring systems Information management systems
II	The failure of Cat. II systems will lead to harmful situation for human safety, safety of the vessel and/or threat to the environment	Alarm, monitoring and control functions which are necessary to maintain the ship in its normal operational condition	Alarm and monitoring systems Tank level monitoring systems Control systems for auxiliary machinery Fire detection and extinguishing systems Speed governors for main and auxiliary engines
III	The failure of Cat. III systems could immediately lead to harmful situation for human safety, safety of the vessel and/or threat to the environment	Control and safety functions for maintaining the ship's propulsion, steering and safety systems	Machinery protection systems (shutdown systems) Control systems for propulsion and steering Emergency shutdown systems (ESD) Power management systems Burner control systems Electronic fuel injection systems

Note: the above examples are not exhaustive

Table 2: Software documentation

Documentation	System category		
	I	II	III
Functional Design Specification - Software Block Diagram	S	S	S
Interface specification to external control systems	E	E	S
Man-machine interface specification (layouts, commands, menus)	E	E	S
Quality plan	E	E	S
Test procedures and test reports	E	S	S
Fault tree analysis for safety-related functions		E	S
Traceability of software modifications and new releases	E	S	S

S = to be submitted for review
E = evidence to be kept by the Manufacturer and available upon request

Table 3: Software testing

Tests and evidence		System categories		
		I	II	III
Factory tests	Functional block test	E	E	C
	Complete system test	E	C	W
	Integration test		W	W
	Fault simulation test		C	W
	Factory Acceptance test	C	W	W
Commissioning tests	Complete system test	W	C	W
	Integration test		W	W
Modifications	System test after modification	C	W	W

E = Evidence kept by the Manufacturer and to be submitted upon request
C = Evidence to be checked by the Classification Society
W = Test to be witnessed by the Classification Society