



**BUREAU
VERITAS**

Condition Monitoring Systems

January 2021

**Rule Note
NR 674 DT R00 E**



GENERAL CONDITIONS

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 them above listed being relieved of any of their expressed or implied obligations as a result of the interventions of the Society.
- 1.4 The Society only 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, 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 is an appraisal 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 or to the documents of reference 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 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 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, 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 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 appraisal 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 or on its content in the event of the actual issuance of a Certificate. This opinion shall only be an appraisal 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, involve, 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, interests 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 solve 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-cents (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 In such a case, 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, subject to compliance with clause 4.1 and 6 above.
- 9.3 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, are 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, otherwise 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 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

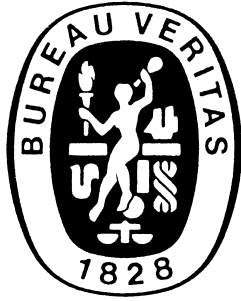
- 14.1 Invalidity of one or more provisions does not affect the remaining provisions.
- 14.2 Definitions herein take precedence over other definitions which may appear in other documents issued by the Society.
- 14.3 In case of doubt as to the interpretation of the Conditions, the English text shall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

15. GOVERNING LAW AND DISPUTE RESOLUTION

- 15.1 These Conditions shall be construed and governed by the laws of England and Wales.
- 15.2 The Parties shall make every effort to settle any dispute amicably and in good faith by way of negotiation within thirty (30) days from the date of receipt by either one of the Parties of a written notice of such a dispute.
- 15.3 Failing that, the dispute shall finally be 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.

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. <https://group.bureauveritas.com/group/corporate-social-responsibility>



RULE NOTE NR 674

NR 674 Condition Monitoring Systems

SECTION 1 CONDITION MONITORING SYSTEMS

Section 1 Condition Monitoring Systems

1	General	3
	1.1 Application	
2	Definitions	3
	2.1 General definitions	
	2.2 Condition Monitoring System (CMS)	
	2.3 Data acquisition and processing	
	2.4 Prognostic Assessment	
3	Documentation	4
	3.1 General	
4	Design of Condition Monitoring System	4
	4.1 Application	
	4.2 Responsibility	
5	Condition Monitoring System functions	4
	5.1 General	
	5.2 Data Acquisition and Data Processing	
	5.3 Prognostic Assessment	
	5.4 Health Assessment	
	5.5 Sustainment or continuous improvement process	
	5.6 Qualifications	
6	Requirements for Condition Monitoring System	5
	6.1 General	
	6.2 Computer Based System	
	6.3 Cybersecurity	
	6.4 Backup	

SECTION 1

CONDITION MONITORING SYSTEMS

1 General

1.1 Application

1.1.1 This Rule Note applies to design, construction, commissioning and maintenance of Condition Monitoring Systems installed on board ships intended to operate on approved Planned Maintenance Survey (PMS) scheme and verify requirements of Condition Based Maintenance as defined in NR467, Pt A, Ch 2 Sec 2 [4.4] and NR467, Pt A, Ch 2 App 4.

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

1.1.2 This Rule Note does not apply to tailshaft monitoring system.

1.1.3 The objective of a Condition Monitoring System is to provide an equivalent or greater degree of confidence in the condition of the machinery to traditional survey techniques.

2 Definitions

2.1 General definitions

2.1.1 The following general definitions are used in this Rule Note:

- Condition Monitoring (CM): acquisition and processing of information and data that indicate the state of a machine over time. The machine state deteriorates if faults or failures occur.
- Condition Based Maintenance (CBM): maintenance performed as governed by condition monitoring.
- Component: element making up an equipment item. (e.g.: sensors, transmitters, etc...).
- Equipment Items: element making up a system or subsystem, comprised of various groups of components.
- Fault: condition of a machine that occurs when one of its components or assemblies degrades or exhibits abnormal behavior, which may lead to the failure of the machine.
- Failure: termination of the ability of an item to perform a required function.
- Failure mode: observable manifestation of a system fault.

2.2 Condition Monitoring System (CMS)

2.2.1 A Condition Monitoring System (CMS) is a computer based system or operational procedures designed to perform Condition Monitoring. A CMS generally consists of the following main functions (see Fig 1):

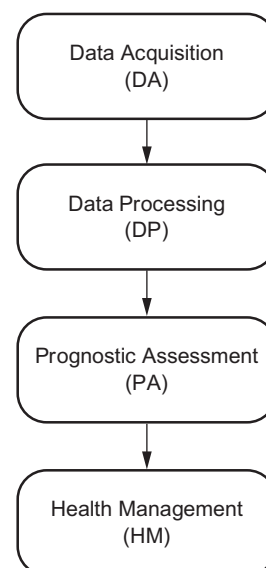
- Data Acquisition (DA): provide the capability to collect data, generally from sensors.

- Data Processing (DP): provide the capability to manipulate the data to a desired form of interest, and ensure the transmission of data.
- Prognostic Assessment (PA): provide a prognostic by evaluating the current health state and an estimation of further status.
- Health Management (HM): integrate and consolidate information from the prognostic assessment part to provide maintenance advisory or operational recommendations.

Condition Monitoring System can be categorized into:

- Type A: on-line, permanently installed systems.
- Type B: on-site testing and detection. It involves the operation of a technician on-site with portable measurement equipment and usually the installation of a portable sensor, but the sensor can also be permanently installed.
- Type C: sampling systems which involve off-site analysis (e.g. oil sampling and analysis).

Figure 1 : Condition Monitoring System main functions



2.3 Data acquisition and processing

2.3.1 The following definitions are used in this Rule Note for Data Acquisition and Data Processing functions:

- Off-line: periodic or intermittent collection of data, usually using a portable data collector (e.g. vibration analysis, oil analysis...). A sensor or collection system is temporarily connected to the machine to collect the data.

- On-line: permanent and continuous collection of data. Alternatively, sensors and collection system may be permanently connected, and data may not be collected on a continuous basis.

2.4 Prognostic Assessment

2.4.1 The following definitions are used in this Rule Note for the Prognostic Assessment function:

- Prognostic: estimation of future state, time to failure and risk for one or more incipient failure modes according to current or historical conditions.
- Descriptor: data item derived from raw or processed parameters or external observation.
- Baseline data: descriptor or group of descriptors which provide a criterion of the normal behavior of a machine under various process states.

3 Documentation

3.1 General

3.1.1 Documentation to be submitted for approval or for information are listed in Tab 1.

The Society reserves the right to request the submission of additional documents in the case of non-conventional design or if it is deemed necessary for the evaluation of the systems or components.

4 Design of Condition Monitoring System

4.1 Application

4.1.1 These requirements apply to Condition Monitoring Systems and Condition Based Maintenance schemes where the Condition Monitoring results are used to influence the scope and/or frequency of Class surveys.

Prior to the review, a request is to be made to the Society in order to confirm if the equipment is eligible for Condition Monitoring and if it can be part of Condition Based Maintenance scheme.

4.1.2 The presence of CMS shall not have any impact on the availability and functionality of Computer Based System installed on board ship as defined in NR467, Pt C, Ch 3, Sec 3. A risk assessment as defined in NR467, Pt C, Ch 3, Sec 3, [4.1.3], which identify and evaluate hazards associated to each function of the CMS (DA, DP, PA, HA) may be requested by the Society in order to check this requirement. A risk assessment report is upon request to be submitted to the Society.

4.2 Responsibility

4.2.1 The Chief Engineer is the responsible person on board in charge of CMS, therefore sufficient information and instrumentation are to be available on board for his use. In no case, the presence of a CMS is to replace routine surveillance, or the chief engineer’s responsibility for taking decisions in accordance with his judgment.

5 Condition Monitoring System functions

5.1 General

5.1.1 Diagrams and functional schemes describing the CMS are to be provided. For off-line system, manual operations achieving CMS functions are to be identified in the description.

Table 1 : Documentation to be submitted

No	Documentation to be submitted	I / A	Reference
1	List of equipment items covered by Condition Monitoring and corresponding physical parameters to be monitored with monitoring techniques	I	
2	Diagrams and functional schemes (e.g. block diagram) of the CMS	I	[5.1]
3	List of sensors with specifications	A	[5.2]
4	List of components used in the CMS with references (manufacturer, type...)	A	[6.1]
5	Description of the Prognostic Assessment	I	[5.3]
6	Description of sustainment process and communication process between the Original Equipment Manufacturers (OEM), the Owner and the Society	I	[5.5]
7	Risk assessment report (1)	I	
8	List of computerized systems and documentation (see NR467, Pt C, Ch 3, Sec 3)	A	[6.2]
9	Minimum level of qualifications for CMS operation	I	[5.6]

(1) Upon request

Note 1: A = to be submitted for approval, I = to be submitted for information

5.2 Data Acquisition and Data Processing

5.2.1 For each physical parameter to be monitored, a description of the monitoring technique is to be provided:

- general description with acquisition type (sampling, portable equipment, etc.).
- ID of sensor if any.
- maximum sampling rate for data acquisition.

5.2.2 The listing and specification for CMS are to be submitted to the Society, in particular:

- the list of all sensors intended to be used by the CMS for data collection (permanently or temporarily installed) along with the following information:
 - IDs of sensors with a representation of their location on the equipment and their spatial orientation.
 - characteristics of sensors (manufacturer, type).
- the list of all CMS components with reference (manufacturer, type).

5.2.3 For CMS of Type B and Type C, procedures for Data Acquisition and Data Processing which clearly identify sensors installation, positioning, and instrumentation are to be provided.

Note 1: When manual actions are part of the Data Acquisition and Data Processing part, it is to be ensured that those functions are performed similarly every time to ensure reliable conclusion and effective Condition Monitoring.

5.3 Prognostic Assessment

5.3.1 A description of the Prognostic Assessment function is to be provided to the Society, with especially:

- baseline data.
- listing of acceptable condition monitoring parameters. Limiting parameters are to be based on the Original Equipment Manufacturers (OEM) guidelines, or a recognized international standard.
- if any, identification of alternative data sources used for Prognostic Assessment.

In case the Prognostic Assessment function is performed by the use of complex algorithms, the above information may be replaced by a description of the approach carried out for Prognostic Assessment (type and principle of algorithm, principle of data manipulation, etc.).

Software systems can use complex algorithms, machine learning and knowledge of global equipment populations/defect data in order to identify acceptability for continued service or the requirement for maintenance. These systems may be independent of the OEM recommended maintenance and condition monitoring suggested limits. Approval of this type of software is to be based on OEM recommendations, industry standards and Society experience.

In that case, written agreement from the Original Equipment Manufacturer is to be provided to the Society.

5.3.2 Data and output of Prognostic Assessment are to be backed up, according to [6.4].

5.4 Health Assessment

5.4.1 Maintenance procedures for CMS are to be provided to the Society.

5.4.2 The CBM scheme is to be capable of producing a condition report, and maintenance recommendations.

5.5 Sustainment or continuous improvement process

5.5.1 Where an Owner wishes to base their equipment maintenance on a CBM approach, this is to meet the requirements of the ISM Code.

5.5.2 A sustainment process is to be implemented to ensure continuous improvement of the CMS through feedback and assessment of the real condition of the equipment:

- a process is to be provided to ensure that, for each defects, failures, or repairs, an examination is carried out and that the corresponding CMS prognostics are challenged accordingly. Communication process between the OEM, the Owner and the Society is to be described.
- a system is to be provided to identify where limiting parameters (alarms and warnings, baseline data and threshold values) are modified during the operation of the scheme and to back up data. For complex solution, the above may be replaced by a general description of the CMS sustainment process.

Evidence that a sustainment process is implemented is to be provided with general description of how the CMS take advantage of experience to improve its performances.

5.6 Qualifications

5.6.1 When a CMS function is to be operated manually by a technician or a qualified person, the minimum level of qualification required is to be specified.

6 Requirements for Condition Monitoring System

6.1 General

6.1.1 The Condition Monitoring System and components, as indicated in NR467, Pt C, Ch 2, Sec 15, [2], are to be chosen from among the list of type approved products. They are to be approved on the basis of the applicable requirements of these Rules and in particular the ones defined in NR467, Pt C, Ch 3.

Note 1: All sensors, transmitters and data processing equipment already used within the scope of notations **AUT-UMS**, **AUT-CCS**, **AUT-PORT** and **AUT-IMS** may be used as an input for CMS.

Case by case approval may also be granted at the discretion of the Society, based on submission of adequate documentation and subject to the satisfactory outcome of any required tests.

6.1.2 Subsequent significant modification to the Condition Monitoring System or to its operation are to be notified to the Society, and a new approval is to be carried out.

Note 1: A significant modification is a modification which influences the functionality and/or the safety of the system.

6.1.3 Alarms are to be provided and logged in the event of failure of any function of the CMS (DA, DP, PA, HA).

6.1.4

Where CMS use remote monitoring or diagnosis (i.e. data is transferred from the vessel and analyzed remotely), the system is to be capable to maintain continuous onboard operation in the event of loss of the communication function.

6.2 Computer Based System

6.2.1 CMS of Type A or Type B for which functions are performed through computer based systems are to comply with requirements of NR467, Pt C, Ch 3, Sec 3, as Category I system.

In addition, the following documentation is to be submitted and the following tests are to be witnessed by the Surveyor:

- software module functional description and associated hardware description
- factory acceptance test event including functional and failure test
- onboard integration tests (including wireless network testing).

6.3 Cybersecurity

6.3.1 For ships assigned with the additional class notations **CYBER SECURE**, CMS of Type A and Type B are to comply

with the applicable requirements for Cybersecurity of equipment in accordance with NR659, Ch 6.

6.3.2 Where CBM schemes or CMS use remote monitoring and diagnosis (i.e. data is transferred from the vessel and analyzed remotely), the system is to comply with the applicable requirements for Cybersecurity of equipment in accordance with NR659, Ch 6.

6.4 Backup

6.4.1 Systems are to include a method of backing up data and information at regular intervals. Following data and information are to be backed up and available onboard in an up to date fashion:

- original base line data; or for complex algorithm, the prognostic algorithm at its initial condition (e.g. at implementation)
- all baseline data and limiting parameters (e.g. threshold value) that have been modified since last audit; for complex algorithm, the prognostic algorithm is to be back up regularly to ensure proper traceability
- all condition monitoring data (e.g. Prognostic Assessment results) and the corresponding actions carried out when required by Health Assessment with detail of the repairs and maintenance carried out on the equipment since the beginning of the program
- all data used for condition monitoring since last opening of the machine
- record of changes to software systems and parameters
- details of break-down or malfunction of the CMS with a short description
- sensors calibration records, certification and status
- alarm log.



**BUREAU
VERITAS**

Shaping a World of Trust

Marine & Offshore
Le Triangle de l'Arche - 8 Cours du Triangle - CS 50101
92937 Paris La Defense Cedex - France
Tel: + 33 (0)1 55 24 70 00
<https://marine-offshore.bureauveritas.com/bv-rules>
© 2021 Bureau Veritas – All rights reserved