

Preservation

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Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to provide a common basis for adequate safety, value adding and cost effectiveness for existing and future petroleum industry developments.

The NORSOK standards are prepared to complement available international standards and fulfil the specific requirements of the Norwegian petroleum industry. As relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to subsequent development and publication of international standards, the relevant NORSOK standard may be withdrawn.

These standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001.

The preparation and publication of the NORSOK standards is supported by the Norwegian Oil and Gas Association (Norwegian Oil and Gas) and the Federation of Norwegian Industries. NORSOK standards are administered and issued by Standards Norway.

Annex A is normative.

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1 Scope

This standard defines the principles and methods for ensuring that equipment and systems are kept maintained in as new / as delivered condition during all preservation phases, until start-up for commissioning or initial operation.

A computerized system tool for the administration of preservation activities and requirements is only addressed in as much as confirming that system functional and reporting requirements shall be incorporated into the relevant contracts. The preservation system tool is otherwise outside the scope of this standard.

Preservation is not packing.

Any packaging shall be external to, in addition to, and not in any way incorporating preservation application.

NOTE Packing, storage and lifting and handling requirements are not addressed in this standard.

2 Normative and informative references

The following standards include provisions which, through reference in this text, constitute provisions of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet or exceed the requirements of the standards referenced below.

FEA-M, Regulation for Electrical Installations, Maritime Installations. Published by Norwegian Directorate for Civil Protection (DSB).

3 Terms, definitions and abbreviations

3.1 Terms and definitions

3.1.1

Executor

organisation, supplier, contractor who at a given time is responsible for the preservation activities: performance of initial preservation and/or preservation maintenance

3.1.2

Fabricator

Party constructing and/or assembling and/or installing equipment and systems

3.1.3

Supplier

party who has entered into a purchasing agreement for supply of equipment of services

3.1.4

Purchaser

party who has entered into a purchasing agreement with the Supplier for procurement of equipment or services

3.1.5

preservation

the protection and/or maintenance of protection carried out on equipment and systems prior to utilization for intended purpose

3.1.6

initial preservation

the performance of preparations and application of specified preservatives and fitting of specified protection to any equipment/system, prior to transfer to subsequent phases, to maintain the integrity and condition of the equipment/system

3.1.7**preservation maintenance**

the periodic activities to ensure that the Initial preservation is intact and functioning. This also includes repair of deteriorated initial preservation

3.1.8**preservation documentation**

preservation documentation compiled in accordance with contractual instructions (paper or electronic format). Preservation documentation shall always include relevant preservation documentation from previous phases. Preservation documentation consists of the following:

- preservation requirements / approved preservation procedure;
- preservation status index (PRSI);
- preservation check records (PRCR);
- supplier preservation maintenance requirements check lists (SPRC);
- procedure for removal of all preservation;
- material safety data sheets for applied preservation media (MSDS).

3.1.9**preservation status index****PRSI**

summary and identification of preservation performed and required (description/equipment/tag list, each with reference to associated record/ checklist, preservation label applied -Y/N), including the Supplier's own requirements for preservation maintenance based on component/ tag with the applicable supplier preservation maintenance requirements checklist (SPRC) with the appropriate period indicated

3.1.10**preservation record****PRCR**

the relevant forms for each discipline, which together with this standard define and record the preservation information, requirements and activities

3.1.11**preservation maintenance checklist****PRCL**

specified minimum preservation maintenance requirements as detailed on the preservation checklists included in Annex A

3.1.12**shall**

verb used to indicate requirements to be followed in order to conform with this standard

3.1.13**should**

verb used to indicate that among several possibilities one is recommended as particularly suitable, or that a certain course of action is preferred but not required

3.1.14**supplier preservation maintenance requirements checklist****SPRC**

the list which defines Supplier/manufacturer special requirements for keeping initial preservation intact

3.1.15**periodic activity list**

periodic listing by description/equipment/tag indicating for each item the required preservation inspections and maintenance

3.1.16**preservation program**

system tool or method for identifying, summarizing and reporting the preservation maintenance requirements

3.2 Abbreviations

HVAC	Heating, Ventilation and Air Conditioning
MC	Mechanical Completion
VCI	Vapour Corrosion Inhibitor
EIT	Electro, Instrument, Telecom
PRSI	Preservation Status Index
PRCR	Preservation Check Records
SPRC	Supplier Preservation maintenance Requirements Check lists
MSDS	Material Safety Data Sheet
CRA	Corrosion Resistance Alloys

4 Preservation principles**4.1 Functional requirements**

The functional requirements for preservation are to maintain the condition and operability of systems and equipment that is not in use prior to commissioning and initial start-up.

4.2 Preservation phases and responsibilities

Preservation scope and requirements typically vary throughout a project cycle. The typical project preservation cycle consists of three phases: engineering, supplier and fabricator, and preservation maintenance. The preservation maintenance phase typically covers all subsequent phases from delivery from supplier and fabricator to commissioning and start-up for operation.

4.2.1 Engineering phase

During the engineering phase of the project, the Purchaser shall:

- ensure that preservation requirements are included in purchase orders and contracts;
- establish preservation system tool requirements for identifying, compiling, organizing, monitoring and reporting of preservation maintenance activities;
- establish, define and specify all input and reporting requirements from suppliers for preservation maintenance administration including periodic preservation requirements and status reporting;
- stipulate the extent to which the reporting requirements shall apply. Purchase orders for bulk equipment deliveries such as pipefitting, valves and untagged instruments, etc. can be dealt with differently from equipment with individual equipment tag numbers (i.e. one check list per equipment type for each release note on a bulk package).

4.2.2 Supplier and Fabricator phase

In the Supplier and Fabricator phase, the Supplier and Fabricator is the Executor and is responsible for the following in accordance with this standard:

- establishing for his delivery scope initial preservation procedure;
- performing the initial preservation;
- composing instructions for preservation maintenance based on this standard, covering all subsequent project preservation phases;
- issuing the relevant preservation documentation.

The Supplier and Fabricator shall specify and execute initial preservation that shall be valid for up to 24 months – or other period as stipulated in the purchasing agreement – including storage, installation and the period after completion of fabrication and testing. The equipment shall be protected against high and low temperatures, wind, humidity, dust, sandblasting, painting and forces encountered during shipment, handling, storage and installation. Particular attention shall be paid to the possibility that temperatures encountered during transport, storage and installation may reach extreme values other than those prevailing at the Supplier's works.

The physical documentation and recording of preservation activities shall be carried out using the preservation check records and lists. Upon application of this preservation, the Supplier shall fill-out durable preservation labels and attach them to the equipment, unless otherwise stipulated in the purchasing agreement.

The Supplier and Fabricator shall issue to the Purchaser the required preservation documentation according to the purchase agreement. The requirements during transport, "lifting and handling" and storage shall be included.

Preservation maintenance instructions shall give details to enable maintenance of supplier initial preservation and other warranty requirements during storage, installation and hook-up phases. Each preservation maintenance activity specified shall be listed with applicable inspection period on preservation maintenance check list(s). The instructions shall advise of required utilities, special tools or arrangements required for preservation maintenance. Any supplier additional preservation requirements specific to particular equipment during storage and construction shall be identified and details given by the Supplier's preservation checklists.

Chemicals required for preservation and de-preservation shall be approved for use by the Purchaser. Material safety data sheets (MSDS) in both Norwegian and English shall be submitted in conjunction with application for Purchaser approval. These data sheets for accepted media shall also be included in the preservation documentation accompanying the equipment at delivery.

4.2.3 Preservation maintenance phase

The preservation maintenance phase covers all phases after delivery of the goods from the Supplier and Fabricator. During the preservation maintenance phase, the custodian or contractor is the Executor and is responsible for the identifying, organizing, planning, performing and reporting of all preservation maintenance activities for all items in his custody.

These activities shall be performed and reported in accordance with contractual requirements. The scope of preservation maintenance is as stipulated in the Preservation Status Index (PRSI). In addition to applicable reporting requirements, when preservation maintenance activities have been performed on a component, then the preservation label on that component shall be updated with appropriate date and signature.

4.3 Preservation maintenance

Preservation shall be performed by the Executor according to the requirements of this standard. The Executor shall as a minimum perform preservation maintenance as detailed on the preservation checklists included in Annex A, along with specified additional equipment supplier requirements. All preservation shall be performed and reported according to the requirement summarized in the PRSI.

Generic preservation maintenance checklists included in the annex to this standard have been developed for the mechanical, electrical and instrument disciplines. The mechanical checklist also covers preservation for HVAC, piping, insulation, surface protection, structural, architectural and safety equipment. The instrument check list also covers preservation of fire and gas equipment, telecommunication equipment and computer related equipment.

If preservation is removed or damaged due to normal construction or commissioning activities, or for any other reason, the Executor shall rectify or reinstate the preservation according to original requirements.

4.4 Preservation interval

Intervals recommended utilized for inspections in the checklists are as follows:

Interval

2	weeks
4	weeks
8	weeks
16	weeks

All intervals include the requirements from the shorter (included) intervals. A description of the check to be performed is associated with each interval. These descriptions are meant to be self-explanatory. Reference to equipment or component tag number is generic, not specific.

4.5 Inspection of equipment upon receipt

4.5.1 General

All equipment shall, on delivery to the next phase, be checked with respect to the condition of the preservation. Any anomalies shall be rectified according to requirements.

4.5.2 Storage

The Executor shall be solely responsible for the care and cleanliness of the equipment during off-loading, handling, storage and construction period and shall ensure a standard of care and cleanliness appropriate to the type and duty of the equipment. Outdoor storage is only acceptable for equipment prepared for it by the Supplier. Preservation maintenance according to this standard shall be performed during storage period.

For special or sensitive equipment, designated storerooms shall be heated, vented, clean and dry. The storage environment has to fulfil the Suppliers' requirements and the relative humidity shall not exceed 50 % unless recommended otherwise by Supplier.

Equipment prepared for outdoor storage should be stored in assigned and protected storage areas.

4.5.3 Construction/weather protection

For all equipment where ingress of sandblasting grit, dust and moisture can cause harm to the equipment, the Executor shall design and install a temporary covering enclosure for protection purposes. The enclosure must be provided with hatches allowing for lifting, hook up of piping, hook up of electrical/ instrument cables and access for periodic maintenance of preservation without removal of the entire enclosure.

Only self-extinguishing materials shall be utilized for preservation items.

All surfaces exposed to welding and grinding splatter shall be protected with aluminium sheeted glass fibre cloth or similar fire resistant material. This is in addition to the requirements of sub clause 5.3.

Sensitive equipment installed in enclosed areas the area to be overpressure to ensure dust free environment. Humidity and temperature shall be regulated according to the supplier requirements.

4.6 Status reporting

4.6.1 Preservation program

A preservation system tool shall be used to administer the periodic preservation requirements of equipment and systems, and to record the status of the same. The engineering indices/registers should be used for identification of items for which preservation is required. The Executor shall keep the preservation system tool updated.

4.6.2 Status report

The Executor shall document initial preservation status by utilizing the appropriate preservation record sheets and a PRSI that accurately represents his scope of work. When executing periodical preservation maintenance the Executor shall report status utilizing the periodic activity list. Supplier's special preservation requirements shall be addressed.

4.7 Documentation

Relevant preservation documentation shall be issued by the Supplier for each delivery, and a copy of the preservation documentation shall accompany the equipment to the delivery site. Refer to sub clause 3.1.8 of this standard for definition of required preservation documentation to be compiled and issued by the Supplier.

Each subsequent phase after initial preservation and delivery shall include the supplier preservation documentation in the preservation documentation to the next phase.