

# SERVICE SPECIFICATION

DNVGL-SE-0436

Edition March 2016

## Shop approval in renewable energy

The electronic pdf version of this document found through <http://www.dnvgl.com> is the officially binding version.  
The documents are available free of charge in PDF format.

---



## FOREWORD

DNV GL service specifications contain procedural requirements for obtaining and retaining certificates and other conformity statements to the objects, personnel, organisations and/or operations in question.

© DNV GL AS March 2016

Any comments may be sent by e-mail to [rules@dnvgl.com](mailto:rules@dnvgl.com)

This service document has been prepared based on available knowledge, technology and/or information at the time of issuance of this document. The use of this document by others than DNV GL is at the user's sole risk. DNV GL does not accept any liability or responsibility for loss or damages resulting from any use of this document.



## CHANGES – CURRENT

### General

This is a new document.

## Contents

CHANGES – CURRENT .....	3
<b>Sec.1 Introduction.....</b>	<b>5</b>
<b>1.1 General.....</b>	<b>5</b>
1.1.1 Objective .....	5
1.1.2 Scope.....	6
1.1.3 Field of application .....	6
1.1.4 Definitions .....	7
1.1.5 References.....	9
<b>1.2 Procedure.....</b>	<b>9</b>
1.2.1 General .....	9
1.2.2 Customer - DNV GL interaction .....	9
1.2.3 Procedure .....	10
1.2.4 Description of general shop approval document review .....	10
1.2.5 Description of shop approval on-site inspection .....	10
1.2.6 Added value .....	10
1.2.7 Shop approval during component or type certification .....	12
1.2.8 Shop approval during project certification.....	12
1.2.9 Deliverables .....	12
1.2.10 Certificate maintenance and validity .....	12
1.2.11 Documentation requirements.....	13
1.2.12 Certification requirements for quality management.....	13
1.2.13 Standards, codes and additional requirements .....	13
1.2.14 Combination of standards .....	13
1.2.15 Safety requirements.....	14
<b>Sec.2 Specific description .....</b>	<b>15</b>
<b>2.1 General.....</b>	<b>15</b>
<b>2.2 Production of rotor blades and other FRP components.....</b>	<b>15</b>
<b>2.3 Production of machinery components .....</b>	<b>16</b>
<b>2.4 Fabrication of steel structures.....</b>	<b>16</b>
<b>2.5 Production of grout material .....</b>	<b>17</b>
<b>App. A Certificate example .....</b>	<b>19</b>

## SECTION 1 INTRODUCTION

### 1.1 General

This service specification (SE) specifies DNV GL's services for shop approval at wind turbine component suppliers. It serves as a

- guidance for manufacturers/developers/owners for DNV GL service specification for shop approval
- common communication platform for describing the scope and extent of activities performed for shop approval
- contractual basis for the service 'Shop Approval'.

The service specification is divided into two main sections:

**Sec.1** provides general information on the shop approval services covered by this specification and general requirements for wind turbine component suppliers in order to achieve subject shop approval certificate. In particular, deliverables needed for a shop approval are defined.

**Sec.2** describes some services in detail, where examples for disciplines are given in:

- [2.2] contains details of the services concerning the rotor blades and other FRP components
- [2.3] contains details of the services concerning machinery components
- [2.4] contains details of the services concerning steel structures
- [2.5] contains details of the services concerning grout material production.

The principle structure of the single disciplines above may be used for other topics if needed as well.

The DNV GL document system is organized according to a three-level document hierarchy, with these main features:

- Service specifications (SE): DNV GL service specifications contain procedural requirements for obtaining and retaining certificates and other conformity statements to the objects, personnel, organisations and/or operations in question.
- Standards (ST): DNV GL standards contain requirements, principles and acceptance criteria for objects, personnel, organisations and/or operations.
- Recommended practices (RP): DNV GL recommended practices contain sound engineering practice and guidance.

**Guidance note:**

The latest revision of all DNV GL documents can be found in the list of publications on the DNV GL website [www.dnvgl.com/rules-standards/](http://www.dnvgl.com/rules-standards/).

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

#### 1.1.1 Objective

It is the objective of the DNV GL shop approval scheme described in this service specification to detail and clarify the activities necessary to verify compliance with the state-of-the-art of the shop and fabrication procedures being audited. The service specification has been written with the aim to provide a flexible and modular concept, to address individual needs, and to reduce the costs for the manufacturing process without compromising the added value and quality.

The DNV GL shop approval scheme is aligned with several standards but have:

- shorter update cycles to meet the latest state-of-the-art
- more guidance and descriptions to facilitate the application
- DNV GL requirements have been rephrased for clarity
- additional options offered
- flexible concept to address and cope with specific project needs.

Depending on the specific individual interests and the agreed scope the key benefits from applying this service specification can be, among others:

- confirmation of requirements as stated by project developers, investors, operators, OEM's, governmental and non-governmental organisations prior to contract award
- building of trust in the design and construction (confidence in technical integrity) – Quality Assurance
- prove to an investor or insurer that 3rd party approval is performed
- securing sustainable energy production throughout life-cycle of component
- facilitate better risk assessment for insurance
- minimising financial project risks by proven qualification for producing high demanding components
- qualification of wind turbine supplier and differentiation from other
- possible reduction of efforts during inspections and audits
- possible reduction of amount of manufacturing certification/evaluation during type certification
- possible reduction of amount of manufacturing surveillance during project certification
- increasing reliability in the governmental' and consumers' interests
- reducing risks to environment and people
- avoiding or reducing damages.

Consequently, if a workshop holds a DNV GL shop approval this may provide a benefit during component, type or project certification.

### 1.1.2 Scope

The certification concept for shop approval provides evidence to stakeholders that a manufacturer has demonstrated verifiable capability for the manufacturing process. Capability is relative to an approved scope of work to comply with a set of requirements identified as being critical for the manufacturing processes.

This service certifies that a workshop operates with approved production facilities, working procedures, methods and qualified staff. DNV GL assesses and verifies the applicant's capability to manufacture wind turbine components in compliance with national as well as international standards and guidelines or acknowledged methods.

The DNV GL shop approval is independent from component, type or project certification and is always workshop specific. It consists of the two main elements "general document review" and "on-site inspection". The general document review includes evaluation of the general quality documentation, e.g. specifications and procedures for manufacturing purposes. As part of the shop approval audit an inspection of the workshop facilities and relevant associated manufacturing and quality processes is performed. Furthermore, validity check of equipment being used as well as skills of staff is covered by this service.

The service specification also describes conditions for maintaining the shop approval.

### 1.1.3 Field of application

A shop approval certificate may be granted for a workshop and/or for manufacturing of components and procedures related to renewable energy. For shop approval related to fabrication of rotor blades, machinery components, steel structures and grout materials procedural details are stated in [Sec.2](#). For all other applications, the procedural details shall be specified between DNV GL and the customer.

## 1.1.4 Definitions

### 1.1.4.1 Terminology and definitions

**Table 1-1 Definitions of verbal forms**

<i>Term</i>	<i>Definition</i>
shall	verbal form used to indicate requirements strictly to be followed in order to conform to the document
should	verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required
may	verbal form used to indicate a course of action permissible within the limits of the document

**Table 1-2 Definitions of specific terms**

<i>Term</i>	<i>Definition</i>
application form	term referring to a documentation form provided by DNV GL to the customer The purpose of this form is to gain first technical information about the workshop. This form may differ between the single disciplines as stated in <a href="#">Sec.2</a> and has to be filled out by the customer.
asset	term used in the context of wind farm projects to describe the project or object to be developed, manufactured and maintained In this service specification the term refers to either "wind turbines with support structures", the "offshore substation with topside and support structure".
certification	refers to third-party issue of a statement that, based on a decision following review, fulfilment of specified requirements has been demonstrated related to products, processes or systems (ISO 17000)
certificate	a document signed by DNV GL and affirming that, at the time of assessment, the asset, component or workshop referred into the certificate met the requirements stated in the normative documents
component	a main part of an asset In this service specification, the term refers to rotor–nacelle-assembly, part of the support structure of the wind turbine (tower, sub-structure and foundation), topside equipment, and parts of support structure for substation (topside structure, sub-structure and foundation).
customer	DNV GL's contractual partner (applicant)
design specific audit	an audit to be carried out during component or type certification under consideration of component specific design requirements
foundation	part of the support structure for a wind turbine or substation that transfers the loads acting on the structure into the soil
general document review	documentation review with focus on project and/or component independent requirements The general document review includes the evaluation of the specifications and procedures for manufacturing purposes.
initial audit	term referring to manufacturing surveillance for project certification During this single inspection the general qualification of the manufacturer and the critical manufacturing processes with respect to the component will be audited.
inspections	term referring to a regular witnessing process during the manufacturing of a component or parts of it
offshore wind farm project	term referring to the assets of an offshore wind farm including total number of offshore wind turbines, support structures, substations with topside and support structure
onshore wind farm project	term referring to the assets of an onshore wind farm including total number of onshore wind turbines, support structures, and if relevant, substations
on-site inspection	term referring to a single inspection to be carried out at a workshop or for a process which shall be approved
optional services	optional services are services which are not part of the scope required in order to obtain a certification report and a shop approval certificate
outstanding issue	the term outstanding issue is used to denote a deviation from standards and technical requirements specified in the certification agreement, and which needs to be completed for full compliance in order to obtain a shop approval certificate Outstanding issues will be identified within the certification report

**Table 1-2 Definitions of specific terms (Continued)**

<i>Term</i>	<i>Definition</i>
recommendation	non-mandatory advice
shop approval	the shop approval provides a third party verification of a workshop and/or for manufacturing of components and/or single procedures
specific document review	review in addition to the general document review considering design specific requirements
substation	term referring to transformer stations or converter stations or platforms, with or without accommodations  In general, whenever the term is used in this service specification, it describes the substation including the support structure, as this is the power transferring unit.
sub-structure	term referring to the part of the support structure for a wind turbine which extends upwards from the soil and connects the foundation and the tower  The term is also used to designate the part of the support structure for a substation which extends upwards from the soil and connects the foundation and the topside or platform.
support structure	the support structure of a wind turbine is defined as the structure below the yaw system of the rotor-nacelle-assembly and includes tower structure, sub-structure and foundation  The term is also used to designate the structure below of the topside structure and includes sub-structure and foundation of a substation.
verification	refers to the confirmation, through the provision of objective evidence, that specified requirements have been fulfilled (ISO 9000)
wind turbine	system which converts kinetic wind energy into electrical energy  In general, whenever the term is used in this service specification to describe the wind turbine, it describes the rotor-nacelle-assembly including the support structure, as this is the power generating unit.
workshop	term referring to the place of production or manufacturing line of the component

#### 1.1.4.2 Abbreviations and symbols

Abbreviations and symbols used in this service specification.

**Table 1-3 Abbreviations**

<i>Abbreviation</i>	<i>In full</i>
BSH	Bundesamt für Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency)
CIGRÉ	Conseil International des Grands Réseaux Électriques (International Council on Large Electric Systems)
CVA	certified verification agent
FRP	fibre reinforced plastics
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITP	inspection and test plan defining inspection scope for related parties
IPE	implementation of design-related requirements in production and erection
NDT	non-destructive testing
NDE	non-destructive examination
OEM	original equipment manufacturer
QA	quality assurance
QM	quality management
RNA	rotor-nacelle-assembly
RP	DNV GL recommended practice
SE	DNV GL service specification
ST	DNV GL standard
WPS	welding procedure specification
WPQR	welding procedure qualification record

## 1.1.5 References

This document makes reference to relevant DNV GL documents. Unless otherwise specified in the certification agreement or in this service specification, the latest valid revision of each referenced document applies.

**Table 1-4 DNV GL documents**

<i>Reference</i>	<i>Title</i>
DNV-OS-C401	Fabrication and Testing of Offshore Structures
DNV-OS-C502	Offshore Concrete Structures
DNVGL-SE-0073	Project certification of offshore wind farms according to IEC 61400-22
DNVGL-SE-0074	Type and component certification of wind turbines according to IEC 61400-22
DNVGL-SE-0190	Project certification of wind power plants
DNVGL-SE-0441	Type and component certification of wind turbines (planned published in 2016)
DNVGL-ST-0126	Design of wind turbine support structures (planned published in 2016)
DNVGL-ST-0145	Offshore substations (planned published in 2016)
DNVGL-ST-0361	Machinery for wind turbines (planned published in 2016)
DNVGL-ST-0376	Rotor blades for wind turbine
GL-II-2	Rules for the Classification and Construction; Materials and Welding; Chapter 1: Fibre Reinforced Plastics and Bonding
GL-IV-1	Rules and Guidelines – IV Industrial Services –Part 1: Guideline for the Certification of Wind Turbines
GL-IV-2	Rules and Guidelines – IV Industrial Services –Part 2: Guideline for the Certification of Offshore Wind Turbines

**Table 1-5 EN/ISO documents**

<i>Reference</i>	<i>Title</i>
ISO 9000	Quality management systems – Fundamentals and vocabulary
ISO 9001	Quality management systems – Requirements

**Table 1-6 Other documents**

<i>Reference</i>	<i>Title</i>
BSH no. 7005	Standard Design of Offshore Wind Turbines

## 1.2 Procedure

### 1.2.1 General

A shop approval certificate can be issued for workshops or standalone procedures for:

- wind turbine components and their support structures
- substations and their components, including topsides or transformer stations with equipment and support structures if applicable.

This service specification describes the DNV GL services rendered as well as the technical requirements to be met by the customer for a shop approval certificate to be released.

The DNV GL shop approval certification consists of two main phases, see [1.2.4] and [1.2.5]. The phases are related to the review of customer's documentation and to an on-site inspection of the manufacturing line.

### 1.2.2 Customer - DNV GL interaction

The shop approval provides a third party verification of compliance between the intentions – as specified in the scope of certification and by the procedures – and of the result as defined for the product under application of the appropriate materials, processes and other resources.

The input from the customer and the deliverables by DNV GL shall be agreed in detail between the customer and DNV GL as part of the contract. In general the DNV GL shop approval certificate is issued when the final certification is completed with no issue pending clarification. A list of deliverables is shown in [1.2.9].

In a workshop each manufacturing phase for a component can be certified independently according to the DNV GL shop approval scheme and will be completed with the issue of a shop approval certificate for the phase under verification. Final time frames of the verification and certification activities shall be discussed and agreed between the customer, DNV GL, and suppliers before commencement of the work.

**Guidance note:**

As an example the shop approval related to fabrication of a machinery components can be subdivided into the following phases; material handling, forging, welding, machining, NDT, assembly and/or testing.

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

### 1.2.3 Procedure

The company interested in a DNV GL shop approval shall agree with DNV GL about scope and basis for on-site inspection and general document review. The scope and basis are tailor-made for the specific shop approval.

**Guidance note:**

Key words related to the scope and basis can be found within single disciplines as stated in [Sec.2](#).

---e-n-d---of---g-u-i-d-a-n-c-e---n-o-t-e---

### 1.2.4 Description of general shop approval document review

The document review shall focus on quality assurance aspects. It should be done prior to the shop approval audit and must as a minimum address the following items:

- review of workshop qualification (where appropriate)
- review of document handling procedures
- review of personal qualification certificates (where appropriate)
- review of material certificates
- review of manufacturing instructions
- review of assembly instructions
- review of test procedures
- review of procedures for metallurgical checks
- review of procedures for dimensional checks.

### 1.2.5 Description of shop approval on-site inspection

After assessing the application form and the additional documentation provided by the customer, DNV GL shall carry out an on-site inspection.

The on-site inspection is the key element of this certification process. The scope of the on-site inspection is based on the general document review. During the on-site inspection, relevant areas and procedures shall be inspected by DNV GL. For further details of the on-site inspection, refer to the [Sec.2](#).

During the shop approval operation the general qualification of the manufacturer and the general manufacturing processes shall be audited. After finalization of the shop approval audit a closure meeting is mandatory.

### 1.2.6 Added value

If a workshop holds a DNV GL shop approval this may provide a benefit during component, type or project certification, refer to [\[1.2.7\]](#) and [\[1.2.8\]](#). This benefit may be a reduction of amount of manufacturing certification/evaluation during type certification and a reduction of amount of manufacturing surveillance during project certification. So there is already a risk reduction through the on-site inspection before and/or at an early stage of project start. The DNV GL service specification for shop approval services offers guidance for wind turbine component suppliers or workshops. The shop approval provides an improvement of the product's quality through implementation of solutions for non-conformities made in the process of the approval. A reduction of costs and time during start of production may be ensured due to consideration of work packages done. Moreover, manufacturer quality can be proven and compliance to a specific set of specifications can be attested by a third party.

Based on the selected certification scheme different certification phases with related service specification documents are possible, see [Figure 1-1](#).

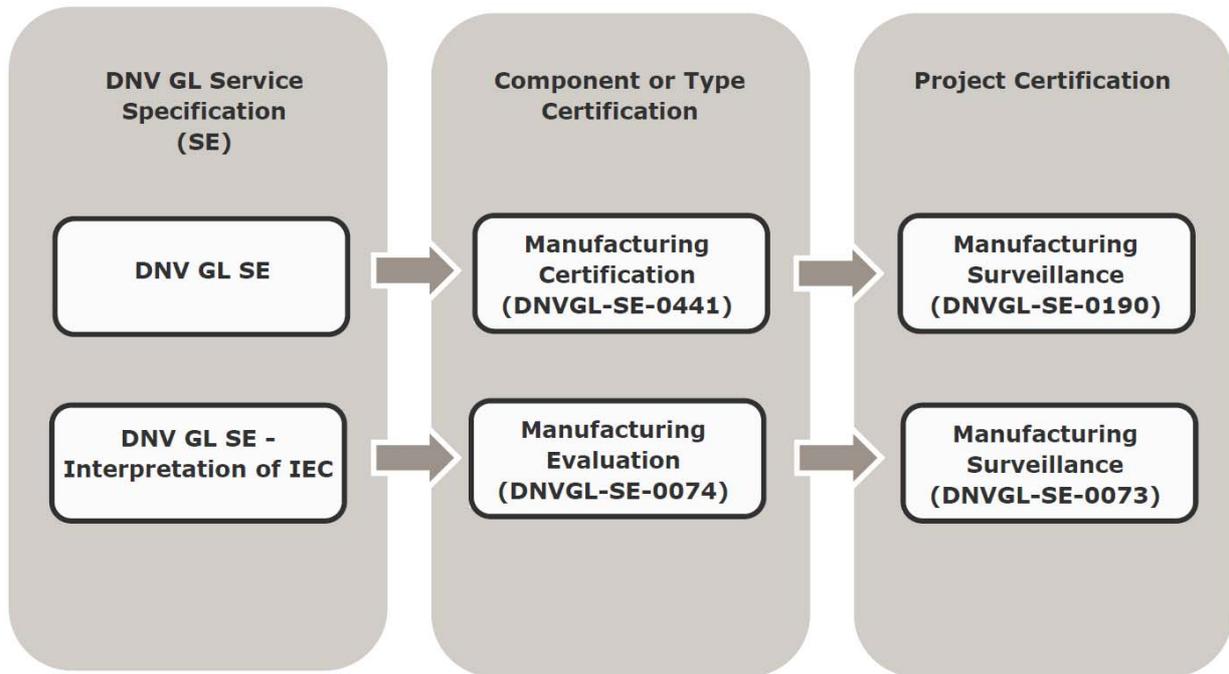
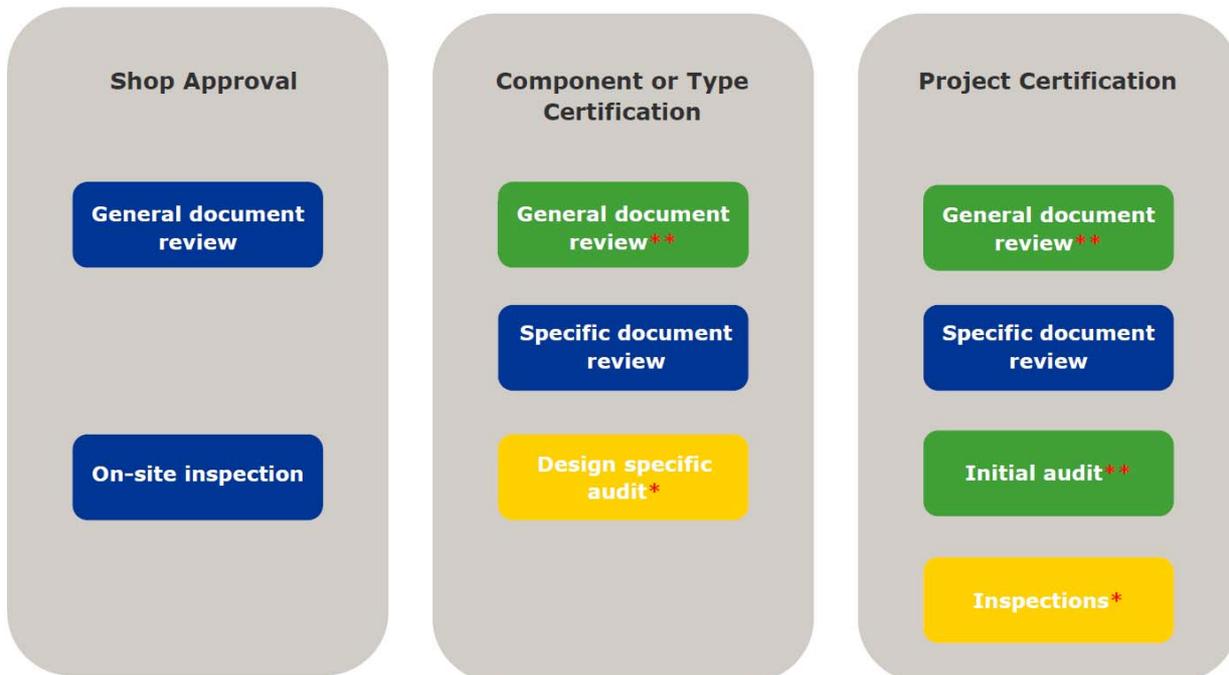


Figure 1-1 Certification phases for component, type and project certification



\* Reduced scope and/or visits in case of DNV GL Shop Approval

\*\* Not required in case of existing DNV GL Shop Approval

Figure 1-2 Substitution concept of DNV GL shop approval for certification

### 1.2.7 Shop approval during component or type certification

The general document review as part of the manufacturing certification/evaluation may be omitted during component or type certification if a workshop holds a shop approval, see [Figure 1-2](#). However, the scope of specific document review shall be agreed with DNV GL. Further reference is given in DNVGL-SE-0441 and DNVGL-SE-0074.

During type certification a design specific audit shall be carried out as part of the manufacturing certification/evaluation. If a workshop holds a shop approval the scope of audit may be reduced in agreement with DNV GL.

### 1.2.8 Shop approval during project certification

The general document review as part of the manufacturing surveillance may be omitted during project certification if a workshop holds a shop approval, see [Figure 1-2](#). However, the scope of specific document review shall be agreed with DNV GL. Further reference is given in DNVGL-SE-0190 and DNVGL-SE-0073.

During project certification the initial audit as part of the manufacturing surveillance may be omitted if a workshop holds a shop approval. The scope of regular inspections may be reduced in agreement with DNV GL.

### 1.2.9 Deliverables

A DNV GL shop approval can be issued to a workshop for fabrication of onshore and/or offshore wind farm components as defined in this service specification. The shop approval deliverables consists of the following two documents:

- shop approval certification report
- shop approval certificate.

Each shop approval certificate is supported by a related certification report, which shall describe the extent of the on-site inspection including non-conformities and how said issues were acceptably closed in combination with possible recommendations. The certification report will be issued in a standard format and sent to the customer as specified between DNV GL and the customer.

In the event that outstanding issues have been identified or full compliance can not be concluded or obtained during the shop approval, the deliverables will depend on the nature of the lack of compliance.

If outstanding issues have been identified, a shop approval certificate will not be issued. DNV GL will deliver a certification report stating the outstanding issues to be closed before issuing of the shop approval certificate.

### 1.2.10 Certificate maintenance and validity

The validity of the shop approval certificate for the single disciplines may be considered as specified within [Sec.2](#).

If shop approval is obtained by the customer the duration of validity will be stated within the shop approval certificate.

Re-certification during the validity period of the certificate may become necessary, if additional requirements for maintenance of the shop approval certificate are set by national authorities or by the applicable design code or standard.

In the case of major changes of the approved production processes and methods during the validity time of the shop approval, the changes shall be reported to DNV GL. The subsequent measures will be evaluated by DNV GL and can vary from a document review via a re-inspection in order to maintain or withdrawal of the shop approval.

Maintenance of the shop approval certificate for the workshop by DNV GL requires that the following information is documented:

- major modifications during manufacturing
- deviant manufacturing process or operating failures as well as minor modifications

— reporting by the customer of planned major modifications in the workshop.

Safety relevant incidents related to the production of component shall be reported to DNV GL without delay. DNV GL shall evaluate the incidents. In case of a serious defect of the asset in question, DNV GL shall suspend the certificate until elimination of the cause. The certificate shall be re-enacted after successful verification of the rectifying measure.

### 1.2.11 Documentation requirements

The documentation submitted for the certification process shall be complete and self-explanatory. The content shall meet the requirements of the standards referred and applied in the fabrication. All relevant documentation shall be subject oriented and in a logical sequence to facilitate cross checking between documents (e.g. specifications and process descriptions etc.). Each document shall be named explicitly by at least title, document no., page no., date and a revision description table. Furthermore the documents shall be signed officially at least by the author and/or the approver to identify responsibilities. Alternatively the documentation submitted shall bear unambiguous evidence of having been subject to designer's and/or owner's own quality approval system.

The documentation, including standards and codes as well as other requirements and specifications, shall be prepared in English, unless otherwise agreed in writing between DNV GL and the customer.

All documentation for evaluation shall be forwarded to DNV GL in electronic form, as pdf-files. Other forms of documentation such as print-outs can be an alternative, if agreed.

### 1.2.12 Certification requirements for quality management

The customer shall provide evidence of having and applying a consistent quality management system covering all aspects of the manufacturing of the component. In particular the customer shall document and demonstrate quality assurance procedures to DNV GL as relevant for his procedures as well as for his suppliers' procedures, covering the complete manufacturing process.

A quality management system for the manufacturing workshop shall be in place and assessed by DNV GL. If a valid certificate for ISO 9001 of an accredited certification body is in place, DNV GL may reduce this assessment to a plausibility check.

General requirements from available quality management system such as ISO 9001 shall not be affected by this service specification.

### 1.2.13 Standards, codes and additional requirements

The standards, codes and additional requirements which form the basis for the activities in the workshop shall be agreed and/or listed and agreed at a very early stage and will be evaluated for compliance with the manufacturing for completeness and adequate suitability and applicability. The evaluation of the choice of standards, codes and additional requirements shall be conducted early in the project.

For dated standards and codes, only the edition cited applies. For undated references, the latest edition of the referenced document including any amendments applies. In case of deviations from this rule, it shall be agreed on an individual basis and in advance with DNV GL.

### 1.2.14 Combination of standards

The DNV GL shop approval certification shall follow the principles described in this service specification. Wherever combinations of standards and external criteria are set in practice, the exact terms of reference and documents to be referred shall be agreed at the beginning of the project and shall be specified in detail.

DNV GL reserves the right to make additional requirements in order to cover issues that are essential to the manufacturing process but not covered by the standards in question.

It is not allowed to combine safety measures in the workshop from different standard systems due to the possible differences in the underlying safety philosophies of the different standard systems.

In case standards are combined, caution shall be exercised and the choice of standards shall be subject to acceptance by DNV GL.



### 1.2.15 Safety requirements

The customer, or other entity having legal responsibility for the premises where DNV GL personnel will work, shall inform DNV GL of any safety and health hazards related to the work and/or any safety measures required for the work, prior to starting the work, or if such information is not available at that time, during the performance of the work.

Whenever DNV GL undertakes work on site, the customer shall provide all adequate safety measures to ensure a working environment that is safe and in accordance with all relevant legislation.

Whenever during the execution of work on site a DNV GL employee judges that the work situation is unsafe the work shall be suspended until the situation has been made safe.

## SECTION 2 SPECIFIC DESCRIPTION

### 2.1 General

For requirements regarding the document submission please refer to section [1.2.11]. After DNV GL has conducted the document review a feedback will be given to the customer in a written form.

The on-site inspection shall preferably take place in situations representative for normal working conditions for the specific type of work. This means that there should be an ongoing and representative production or, if relevant, an actual repair work should be carried out. In case this is not possible, the reason for this should be clarified and an alternative way forward shall be discussed and agreed.

The agenda for the on-site inspection shall be agreed in advance. The inspection starts with an introductory meeting, during which the different steps of the inspection are to be agreed. As a general guidance, the entire value creating chain shall be inspected. This may include the following items:

- For manufacturing of rotor blades, steel components and grout materials this includes for example inspection of incoming goods', materials', quality control, laboratories, store rooms, climate control, manufacturing area, finishing area, procedure for final inspection and all documentation accompanying the manufacturing.
- For machinery components: incoming goods inspection, rough machining, heat treatment, fine machining, assembly, metallurgy and metrology.

### 2.2 Production of rotor blades and other FRP components

The shop approval for production of rotor blades and other FRP components like nacelle cover will be based on the technical requirements as stated in DNVGL-ST-0376.

The scope of a shop approval can cover manufacturing as well as repair.

With the application form for the shop approval the following manufacturing documents shall be submitted for assessment:

- QM certificate
- work instructions and quality control sheets
- information about the professional qualification of the heads of teams.

With the application form for repair in the field the following documents should be submitted:

- generic repair instructions and reports
- information about the professional qualification of the heads of repair teams
- information about the quality control of the repair materials.

The on-site inspection normally consists of these steps:

- incoming goods' inspection
- quality control and laboratories
- store rooms
- climate control
- manufacturing and finishing area
- procedure for final inspection and
- manufacturing accompanying documentation.

For field repair of rotor blades:

- damage inspection
- repair work and related documentation
- inspection of service vehicle and
- storage of repair material.

The shop approval certificate is valid up to one year after the date of first release. Renewals of the shop approval certificate may be granted up to three years at a time. This depends among others on the outcome of the inspection and the demonstrated experience and development of the company.

The extent for the re-approval process may be reduced if the audit is performed before the specified validity period expires, but only if it can be shown that no major changes at the workshop have meanwhile been introduced. This shall be specifically agreed in specific manner between DNV GL and the customer. Nevertheless, the on-site inspection is defined as the main basis for a shop approval.

## 2.3 Production of machinery components

The shop approval for the production of machinery components shall be based on the technical requirements stated in DNV GL-ST-0361.

The document review is followed by an on-site inspection. Open issues from the document review may be discussed during the on-site inspection. According to chapter [1.2] a document review is to be accomplished prior to the on-site inspection. Relevant documents to be submitted as a package can be identified by filling out the application form for the shop approval. Where documents are project related, they shall relate to the production works witnessed during the on-site inspection. For manufacturers of mechanical components the required documentation usually comprises the following topics:

- QM certificate
- qualification matrix of staff
- work instructions and quality control sheets (e.g. handling of non-conformities)
- material certificates
- incoming goods inspection
- rough machining
- heat treatment
- fine machining
- calibration
- metallurgical checks
- dimensional checks
- assembly
- testing
- shipping.

The shop approval certificate is valid up to three years after the date of first release. Renewals of the shop approval certificate may be granted up to three years at a time. This depends among others on the outcome of the inspection and the demonstrated experience and development of the company.

The extent for the re-approval process may be reduced if the audit is performed before the specified validity period expires, but only if it can be shown that no major changes at the workshop have meanwhile been introduced. This shall be specifically agreed between DNV GL and the customer. Nevertheless, the on-site inspection is defined as the main basis for a shop approval

## 2.4 Fabrication of steel structures

The shop approval for the fabrication of steel structures shall be based on the technical requirements stated in DNVGL-ST-0126.

The document review shall be accomplished prior to the on-site inspection. Relevant documents to be submitted can be identified by filling out the application form for the shop approval. Where documents are project related, they shall refer to the production works to be witnessed during the on-site inspection. For manufacturers of steel components the required documentation normally comprises:

- QM certificate
- work instructions and quality control sheets (e.g. for incoming goods' inspection, flame straightening, NDT, measurement, coating, traceability of materials and welders, etc.)

- 
- 
- 
- qualification of welders, operators and welding supervisors (list with names, certificate number, type and validity of qualification)
  - qualifications of the NDT personal (list with names, certificate number, type, level and validity of qualification)
  - WPS and related WPQR for the intended approval scope
  - procedures for dressing of welds as relevant for the intended approval scope
  - procedures for preloading of bolted connections as relevant for the intended approval scope
  - ITP for the intended approval scope.

The on-site inspection normally consists of these steps:

- Check qualification of staff (welders, operators, NDT)
- storage of consumables and basic material, material receipt inspection
- re-drying procedures of consumables
- cutting, cleaning, bevelling and forming of plates
- welding works on components in the scope of the shop approval
- NDT witnessing regarding calibration and execution
- dimensional control (e.g. flange or tubular out-of-roundness, flatness, misalignment, etc.)
- inspection of component prior to initiation of painting procedure
- surface preparation and coating
- final inspection component
- final documentation.

The shop approval certificate is valid up to three years after the date of first release. Renewals of the shop approval certificate may be granted up to three years at a time. This depends among others on the outcome of the inspection and the demonstrated experience and development of the company. Nevertheless, the on-site inspection is defined as the main basis for a shop approval.

The extent for the re-approval process may be reduced if the audit is performed before the specified validity period expires, but only if it can be shown that no major changes at the workshop have meanwhile been introduced. This shall be agreed in each specific case DNV GL and the customer.

## 2.5 Production of grout material

The shop approval for production of grout material will be based on the technical requirements as stated in DNV GL-ST-0126.

A document review will be performed prior to the on-site inspection. Relevant documents to be submitted are identified in the application form for the shop approval. For manufacturers of grout material the required documentation normally comprises:

- QM certificate
- work instructions and quality control sheets
- production process description
- calibration certificates for producing equipment
- procedure for quality control of grout material.

The on-site inspection normally consists of these steps:

- incoming goods' inspection
- store rooms
- production process following the material flow
- packaging of grout material and identification of packaged product
- quality control and testing of grout material
- check of calibration of measurement equipment



— spot-check of documentation for produced grout.

The shop approval certificate is valid up to three years after the date of first release. Renewals of the shop approval certificate may be granted up to three years at a time. This depends among others on the outcome of the inspection and the demonstrated experience and development of the company.

The extent for the re-approval process may be reduced if the audit is performed before the specified validity period expires, but only if it can be shown that no major changes at the workshop have meanwhile been introduced. This shall be specifically agreed in specific manner between DNV GL and the customer. Nevertheless, the on-site inspection is defined as the main basis for a shop approval.

## APPENDIX A CERTIFICATE EXAMPLE

# SHOP APPROVAL

Certificate No.:  
SA-DNVGL-SE-0436-[ID with 5 digits]-[rev.]

Issued:  
[YYYY]-[MM]-[DD]

Valid until:  
[YYYY]-[MM]-[DD]

Issued for:

## Repair of Rotor Blades for Wind Turbines fabricated from Fibre Reinforced Plastics

Issued to:

**<Workshop>**

< Address line >

< Address line >

According to:

**DNVGL-SE-0436:2016-03 Shop approval in renewable  
energy**

Based on the documents:

CR-SA-DNVGL-SE-0436-[ID]-[rev.] Certification Report, dated yyyy-mm-dd

This Shop Approval is valid for field repair.

Supervisory Personnel

First Name Last Name

First Name Last Name

Heads of Repair Teams

First Name Last Name

First Name Last Name

Changes in the responsible personnel as named in this certificate are to be approved by DNV GL.

Place, yyyy-mm-dd

For DNV GL Renewables Certification

Place, yyyy-mm-dd

For DNV GL Renewables Certification





**DNV GL**

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16 000 professionals are dedicated to helping our customers make the world safer, smarter and greener.