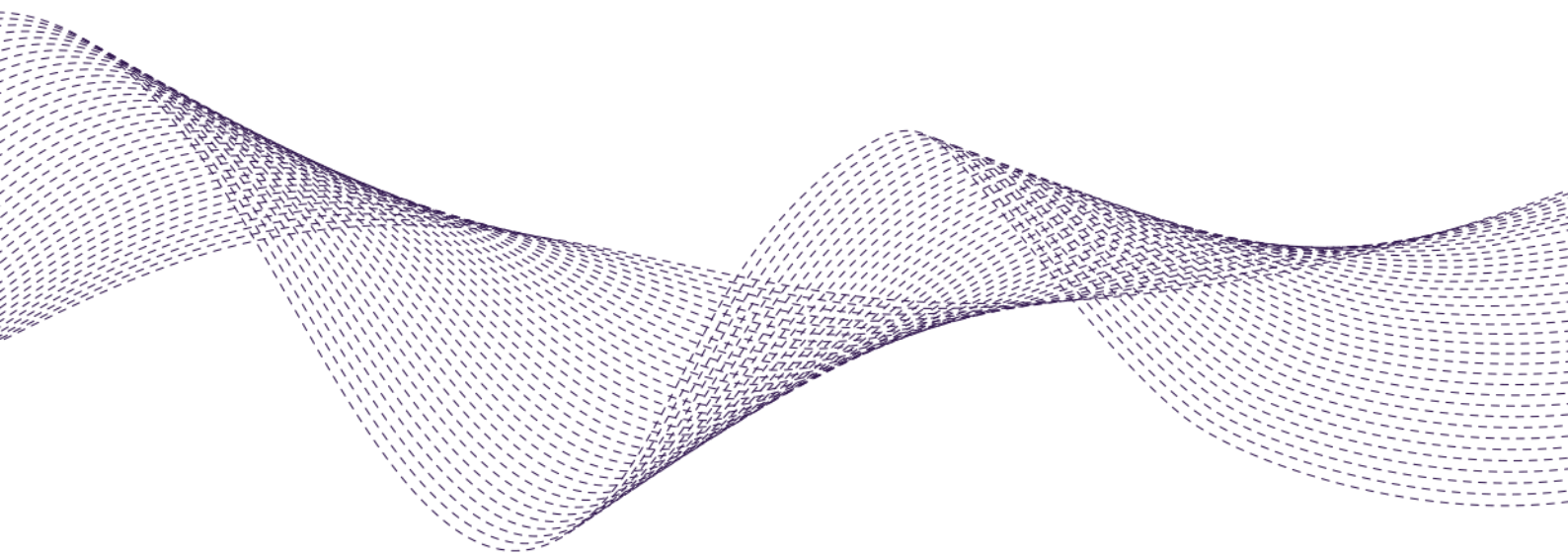


Siemens Gamesa Renewable Energy Supplier Quality Manual

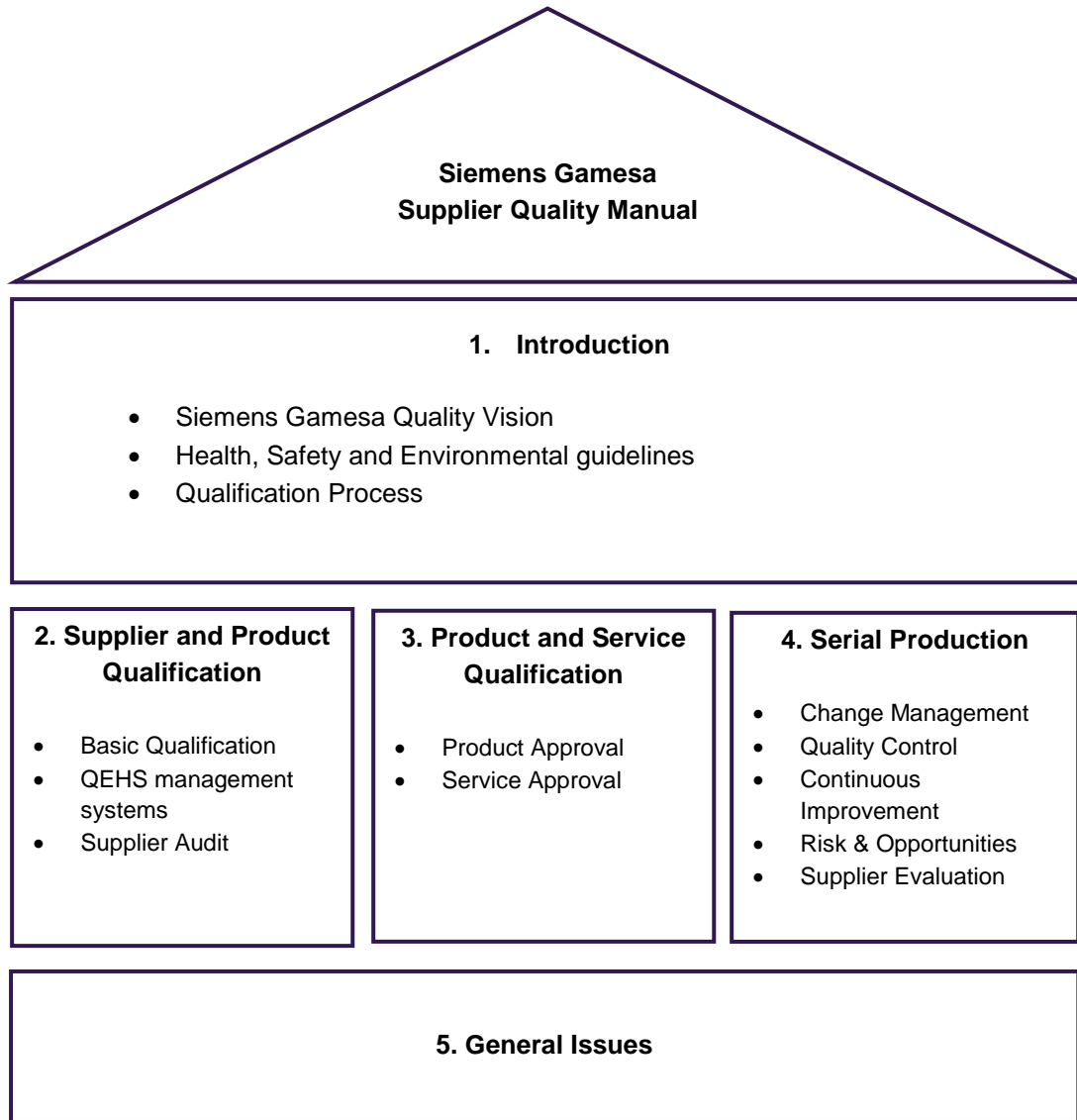


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Contents

1. Introduction	6
1.1 Siemens Gamesa Quality Vision	6
1.2 Health and Safety Guidelines	6
1.3 Environmental Guidelines	7
1.4 Qualification Process	10
2. Supplier Qualification	11
2.1 Basic Qualification	11
2.2 Required Systems for Quality, Environmental Protection, Health and Safety.....	11
2.3 Qualification Audit.....	12
3. Product and Service Approval.....	12
3.1 Product Approval	12
3.1.1 Plan, Define and Scope	13
3.1.1.1 Advanced Product Quality Planning (APQP)	13
3.1.1.2 Special Characteristics	14
3.1.2 Design Product.....	14
3.1.2.1 Feasibility Studies.....	14
3.1.2.2 Design FMEA	14
3.1.3 Design Process and Process Requirements Fulfilment.....	15
3.1.4 Product and Process Validation	15
3.1.4.1 Final Production Tools and Process.....	15
3.1.4.2 Initial Samples Production	15
3.1.4.3 Process Audit and First Article Inspection.....	16
3.1.4.4 Statistical Process Control (SPC).....	16
3.1.4.5 Measurement System Analysis (MSA) / Calibration of Test Equipment	17
3.1.4.6 Supplier Test Result Approval and Acceptance.....	17
3.1.4.7 Definition of Packaging and Shipment	17
3.1.4.8 Reports of Assembly Try Out and Functional Testing.....	17
3.1.4.9 Validation Report by Technology Department.....	18
3.1.5 Product and Process Approval	18
3.1.6 Re-Approval	18
3.2 Approval of Critical Services.....	19

4.	Serial Production.....	19
4.1	Product and Process Change Management.....	19
4.1.1	Supplier Request for Change.....	19
4.1.2	Changes Initiated by Siemens Gamesa.....	20
4.1.3	Change Implementation.....	20
4.2	Quality Control of the Product in Series Production.....	21
4.2.1	Deviations to Defined Quality Indicators Noticed by Supplier.....	21
4.2.2	Deviations to Specifications Detected by Supplier.....	22
4.2.3	Product Deviations Detected by Siemens Gamesa.....	23
4.2.4	Costs of Non-Quality.....	23
4.3	Continuous Improvement.....	24
4.3.1	Quality Audits and Inspection.....	24
4.3.2	Quality Improvement Plan.....	24
4.3.3	Process Improvements.....	24
4.4	Risk and Opportunities.....	24
4.5	Supplier Evaluation.....	25
5.	General Issues.....	26
5.1	Roles and Responsibilities.....	26
5.1.1	Quality Contact at Supplier.....	26
5.1.2	Siemens Gamesa Contacts.....	26
5.2	Identification and Product Traceability.....	26
5.3	Special Processes.....	27
5.4	Sub-Tier Suppliers.....	27
5.5	Records Retention Requirements.....	27
5.6	Exceptions to Normal Procedures.....	29
5.6.1	Not Wind Energy Related Products.....	29
5.6.1.1	Quality System Requirement.....	29
5.6.1.2	Product Realization.....	29
5.6.2	Not Quality Relevant Catalogue Components.....	29
5.7	Definitions and Abbreviations.....	30
5.8	Standards and Documents.....	31

1. Introduction

The purpose of this Supplier Quality Manual is to specify and explain the procedures and requirements that affect the cooperation between Siemens Gamesa Renewable Energy and its suppliers of materials and critical services with the goal to ensure excellent quality for our customers throughout the entire supply chain.

This manual describes the minimum requirements for doing business with Siemens Gamesa Renewable Energy. Any additional requirements will be communicated on a case by case basis and/or will be addressed in other business-related documents.

All communication, notifications and questions regarding the procedures and requirements in this document are to be reviewed and handled by the assigned supplier quality engineer(s).

1.1 Siemens Gamesa Quality Vision



Wind Energy market expectations continue to be high, requiring extreme business fitness for survival and profitable growth. Siemens Gamesa plans to maintain its business strength and create exceptional value for its customers through excellence in Quality, Health, Safety and Environment. A robust and adaptable supply base that understands Siemens Gamesa's requirements and acts with similar urgency demanded by our customers is key part of this philosophy.

The objective of this plan is to make a difference and become a world-class player. Becoming an excellent company means not suffering accidents or incidents, maximizing customer satisfaction and minimizing our environmental footprint.

To this end, Siemens Gamesa Quality Leader is articulated around three vectors: the customer, reduction of the non-conformity costs from all members of our value-added chain and procedural compliance.

This vision is based on three simple principles:

- Do it right the first time by planning, preparing and being trained to supply quality products and services.
- Do it right every time by assuring consistent quality products and services through addressing all concerns.
- Continually improve by proactively improving the quality and value of products and services.

To assist our suppliers in helping us achieve these priorities and focus areas, Siemens Gamesa will if deemed necessary deploy the necessary Supplier Quality Engineer, Materials and Processes Engineering Personnel. We recognize that Siemens Gamesa cannot succeed without the right quality, cost, service and technology achieved by a close cooperation between Siemens Gamesa and its Supply base.

1.2 Health and Safety Guidelines



For Siemens Gamesa, people are a fundamental value, integrating the health and safety of employees and partners of our projects as an inseparable part of our strategy as a company.

“Zero Harm Culture” corresponds with our company policy, where we commit ourselves to establishing safe working conditions to prevent harm. It is not only about preventing accidents but about creating

safety, generating safe and healthy working environments. Prevention ceases to be an operational objective to become a strategic challenge, which involves the integration of safety and health in the decision-making of our company at all levels.

All damages to health can and should be prevented, this challenge can only be achieved with the commitment and contribution of all the stakeholders involved in the work process. The pillars on which we will work to achieve this challenge are leadership commitment, compliance assurance, risk management, stakeholder engagement, product stewardship and operational excellence.

Health and safety are led in our company by the management, this leadership is based on the conviction of the health of people as a strategic value and must be a generator of safety culture, safety is a key factor in our decision to take decisions.

This leadership must generate a shared commitment among all the members of our value chain, collaborators and partners, a commitment that will be effective only from the participation and involvement of all stakeholders in the management of safety and health. The communication of our expectations and active listening will be tools that will help generate the involvement and mobilize people to join our challenge.

The incidents should not be seen as failures but as learning opportunities, situations that, when shared and analyzed, should lead us to generate safe and healthy work environments.

Siemens Gamesa expects from you, as supplier, to take the responsibility of contributing to the process of achieving a Zero Harm Culture and require suppliers to inform about severe incidents or fatalities.



1.3 Environmental Guidelines

Environmental protection is a fundamental aspect of the culture of Siemens Gamesa Renewable Energy. We develop sustainable products using a life cycle perspective, which implies considering the environmental impacts associated with all the stages of the product's life, from raw material extraction through materials processing, manufacturing, distribution, use and end-of-life processes.

We expect our suppliers to share our commitment to the environment and to demonstrate environmental friendly practices. Therefore, our suppliers shall meet the following environmental requirements:

Environmentally responsible

Suppliers must avoid contamination, foster an efficient use of resources and promote energy efficiency. Suppliers shall try to increase the use of renewable energies and evaluate their environmental performance.

Compliance with environmental legislation

Siemens Gamesa Renewable Energy requires its suppliers to comply with all applicable laws, regulations, orders, and policies in providing materials and services to Siemens Gamesa.

Chemicals and materials

Suppliers must be able to provide information regarding the hazardous materials used in their activities and products and must comply with the respective national implementations of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) developed by the United Nations.

Transport

Suppliers must optimize the transportation of goods and reduce the consumption of fossil fuels as far as possible. Suppliers must be able to provide information about the transportation of goods.

Carbon footprint

Siemens Gamesa Renewable Energy is strongly committed to the fight against climate change and therefore has set itself the target of being carbon neutral by 2025. We expect our suppliers to share our environmental ambitions. We encourage our suppliers to calculate their carbon footprint according to the GHG protocol and expect they can present their greenhouse gas emissions, including Scope 3¹.

Reporting obligation

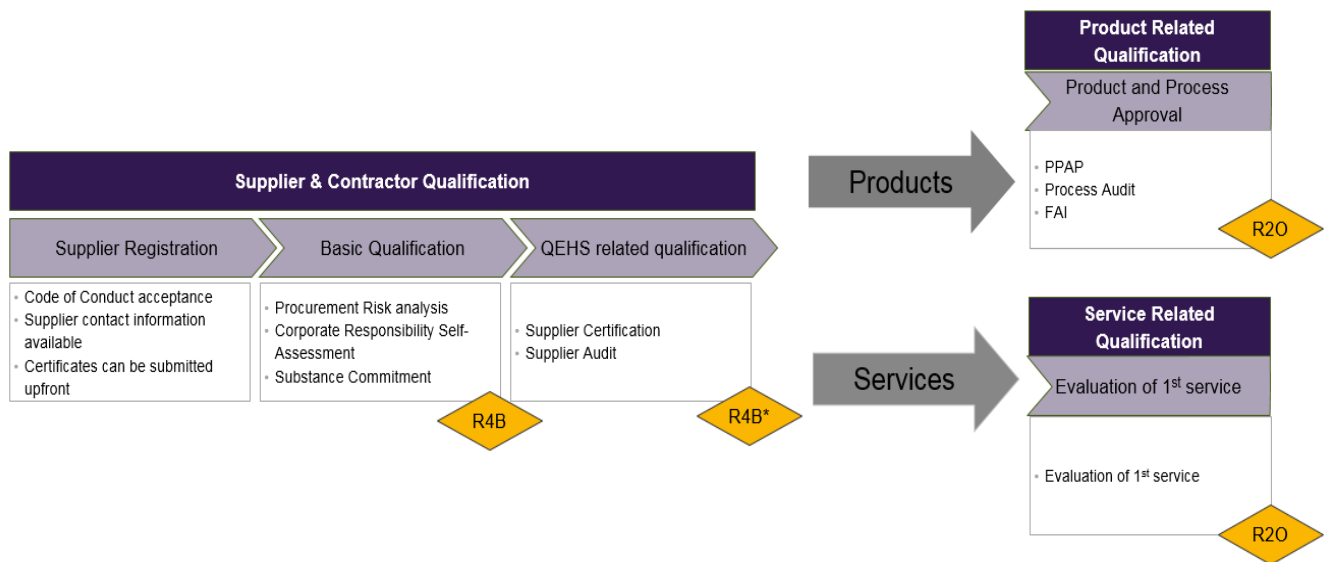
To ensure compliance with various legal and customer requirements, Siemens Gamesa requires its suppliers to report information on materials including declarable substances according to the process set in the Basic Qualification.

To further support our reporting process in relation to life cycle assessments and resource efficiency, it may also be necessary to provide the following data upon request: material consumption, water consumption, total energy consumption, waste generation, etc.

¹ Scope 3 emissions are all indirect emissions that occur in the value chain of the reporting company, including both upstream and downstream emissions.

1.4 Qualification Process

There are 2 phases in the process of qualification of suppliers/contractors of materials and critical services. The first phase, Supplier Qualification (chapter 2) is necessary to be able to nominate a supplier to any materials or critical service. After successful completion of the supplier qualification activities the supplier is granted the status R4B “Ready for Business” in the Siemens Gamesa systems. The following phase, the Product/Service qualification (chapter 3), is used to validate the specific material or service the supplier is nominated to. After successful completion of the product/service qualification activities the supplier is granted the status R2O “Ready to Order” in the Siemens Gamesa systems.



2. Supplier Qualification

All supplier production sites and locations must comply with the following requirements for Supplier Qualification before a Product/Service Qualification, as described in chapter 3 of this manual, can be initiated if not otherwise agreed with the responsible SQE.

2.1 Basic Qualification

The Basic Qualification is a company-wide, mandatory and standardized supplier-related qualification which serves as first release level for a potential Siemens Gamesa supplier. It is initiated by Siemens Gamesa by Commodity Management and forms the basis for additional Supplier, product and process related qualification requirements.

2.2 Required Systems for Quality, Environmental Protection, Health and Safety

ISO 9001: Siemens Gamesa's goal for all suppliers and contractors is to demonstrate compliance to ISO 9001. Unless otherwise specified, conformity must be demonstrated by third party certification. Alternatively, VDA 6.1 certification, ISO/TS 16949 etc. can be accepted.

ISO 14001: To ensure the environmental policy application throughout its supply chain, Siemens Gamesa expects from its suppliers and contractors an active engagement in environmental concerns. This includes the establishment, and adherence to, an environmental management as per ISO 14001, or equivalent.

OHSAS 18001 / ISO 45001: Is a system for managing health and safety and promotes safe work environments. Siemens Gamesa expects from its suppliers and contractors to have implemented a system to consistently identify and control risks to health and safety, reduce potential accidents, support enforcement and improve overall performance.

Applicability:

Certificate / management system	Critical Services	Critical Products
ISO 9001 / equivalent (approved by Siemens Gamesa SQ)	Obligatory	Obligatory
ISO 14001 / equivalent (approved by Siemens Gamesa SQ)	Obligatory	Highly Recommended
OHSAS 18001 / ISO 45001 / equivalent (approved by Siemens Gamesa SQ)	Obligatory	Highly Recommended

In case of modifications of one of the above-mentioned certifications, the supplier shall immediately notify Siemens Gamesa SQE responsible. Modifications include, but are not limited to, the following situations:

1. Any action by either the supplier or the supplier's certifier that limits or alters the condition or duration of the supplier's certification.
2. Renewal, upgrade, suspension, probation, expiration and termination of the mentioned certifications.

2.3 Qualification Audit

During supplier selection and qualification, Siemens Gamesa may perform various audits to confirm supplier capability, beyond the certification level. Suppliers that initially do not score acceptably are required to develop action plans and timelines to correct any deficiencies and then request a re-audit to verify implementation of these actions.

3. Product and Service Approval

The purpose of the Product and Service Qualification is:

- To make sure that the process is well prepared and capable to meet the Siemens Gamesa requirements and specifications
- To ensure stability in the process that allows for producing consistent quality over the lifetime of the product.
- To provide objective facts and evidences that demonstrate the above-mentioned capability and robustness of the process

3.1 Product Approval

All components are designed for the use in a Wind Turbine with a lifetime of 25 years with maximum 10% of the components failing. For this purpose, it is important for the supplier to understand the environmental influences that affect the component in these conditions during this period. The supplier shall notify any wear and tear that can occur during the normal life cycle of the component as well as the maintenance to be performed to ensure the lifetime of 25 years.

The Product Qualification will be applied for the approval of new or modified critical products or processes. Examples are:

- New product to be produced
- Relevant process changes for the manufacturing to be implemented
- Moving existing process installations to new production site
- Implementation of modifications in drawings, specifications, materials
- Change of 2nd tier supplier of critical subcomponents, materials or processes
- If a product has not been produced for more than 18 months (last delivery to Siemens Gamesa), unless otherwise defined by the commodity
- Re-occurring non-conformances

Siemens Gamesa applies the APQP4WIND process therefore, 6 product qualification phases must be passed, to be able to supply a critical product to Siemens Gamesa:

- 1) Plan, Define and Scope
- 2) Design Product
- 3) Product requirements fulfillment
- 4) Design Process and Process Requirements Fulfillment
- 5) Product and Process Validation
- 6) Product and Process Approval

For specific details to the different phases Siemens Gamesa refer its suppliers to the APQP4WIND manual.

For critical materials, the product and process approval process, is a pre-condition for the product release and shall be used to determine if:

- All requirements of the Product Specification have been fulfilled by the Supplier.
- The production processes of the Supplier show the required process ability and capability to manufacture the Product according to the Specifications under serial conditions with the planned capacity.

Siemens Gamesa reserves the right to take part in the release of production process at Supplier's premises.

Supplier shall document the production part approval process and submit to Siemens Gamesa. The required PPAP submission is defined according to the criticality level of the product. The products are to be manufactured at the production site, using the production tooling, gauging, process, materials and operators planned for serial production. Products from each unique production process shall be measured and representative parts tested.

3.1.1 Plan, Define and Scope

3.1.1.1 Advanced Product Quality Planning (APQP)

Supplier shall establish appropriate product quality planning activities as part of its overall project plan. The quality planning activities are to be conducted according to the APQP4Wind manual.

Supplier shall ensure that all technical (development and process), quality, delivery and timing requirements of Siemens Gamesa are fulfilled in time to detect potential sources of quality problems and risks at an early stage.

For critical materials, Supplier shall consider in its planning respective quality methods and activities like:

- Feasibility Review of the Specifications
- Validation requirements and testing (based on the Specifications)
- Necessary certifications (e.g. UL, CE, VDE etc.)
- APQP/PPAP
- FMEA / Risk Analysis
- Determination of special characteristics and MSA and capability requirements
- Determination and planning of necessary inspection and validation steps including necessary inspection equipment (Control plan)
- Sub-supplier quality requirements
- Sub-supplier qualification and approval
- Initial samples and FAIR / ISIR (First Article Inspection Report / Initial Sample Inspection Report)

The quality planning activities shall be supported with a Product Quality Plan for Supplier's individual project milestones to evaluate, document and communicate the respective project status.

Supplier shall provide and present its actual project status and project plan upon request to Siemens Gamesa.

The extent of the planning activities depends on the product risk level, technical requirements and challenges of a new project, i.e. that the development and launch of a new Product at the Supplier

requires more intensive planning activities than the modification of an existing and already supplied Product.

In case of questions regarding necessary extent of quality planning Supplier shall contact Siemens Gamesa using the communication channels defined in chapter 5.1.2.

Upon request, Supplier shall provide detailed information regarding the planned manufacturing / assembly process (equipment, in-process controls, capacity, capabilities etc.) of the Product.

3.1.1.2 Special Characteristics

Special characteristics refers to the key measurable characteristics of a product or process whose process performance standards or product specification limits must be met to satisfy the customer.

Special characteristics identify features which are sensitive to variation, where significant variation inside the tolerance limits or potential variation outside the tolerance level is undesirable (affects safety and quality).

Special characteristics are marked and identified by Siemens Gamesa in the Specifications.

Requirements for special characteristics are according to APQP4WIND, if not otherwise specified by Siemens Gamesa.

3.1.2 Design Product

3.1.2.1 Feasibility Studies

The supplier must, after reviewing the received documentation, confirm the product feasibility. This is a commitment by the supplier confirming that the product in question can be manufactured, assembled, packaged and shipped according to Siemens Gamesa's Specifications. It is the obligation of Supplier to conduct a feasibility study prior to submitting a quotation or the acceptance of a Purchase Agreement. During this stage the supplier also confirms knowing and accepting this document; the Siemens Gamesa Supplier Quality Manual. This phase is repeated during the approval stage of every specification change.

Supplier shall check without undue delay after receipt of the Specifications whether these specifications have been provided in full by Siemens Gamesa and as to their correctness and clarity. Supplier shall request from Siemens Gamesa all necessary information in reasonable time.

Supplier shall conduct the feasibility study, upon receipt of the Specifications and shall notify Siemens Gamesa in writing as to any uncertainties or doubts regarding the realization of the Product. Evidences of the performed feasibility study must be documented and archived as part of the PPAP.

3.1.2.2 Design FMEA

In cases where supplier is design responsible a Design FMEA is to be conducted by the Supplier to ensure that potential failure modes and their associated causes have been considered and addressed in the design phase. At the request of Siemens Gamesa, Supplier shall allow Siemens Gamesa to participate in its risk assessment. The results of the assessment shall be made available to Siemens Gamesa upon request.

If requested Supplier shall also participate in the D-FMEA of Siemens Gamesa when Siemens Gamesa is design responsible.

3.1.3 Design Process and Process Requirements Fulfilment

The supplier shall develop the production processes to comply with Siemens Gamesa Requirements and demonstrate that the process requirements are fulfilled by a reliable process design. The supplier must document the production process steps and sequences in a Process Flow Chart and optionally a Factory Floor Plan upon request.

The Supplier shall perform a process risk assessment (P-FMEA) with the purpose to identify risks to either the product or downstream processes. Risks are to be eliminate or reduced to a minimum.

At the request of Siemens Gamesa, Supplier shall allow Siemens Gamesa to participate in its risk assessment. The results of the P-FMEA shall be made available to Siemens Gamesa. If requested Supplier shall also participate in the P-FMEA of Siemens Gamesa.

The supplier must provide a control plan to Siemens Gamesa that shows that the process is under control for all the phases defined in the manufacturing process flowchart.

A drawing, indicating a specific reference number for each Special Characteristic shall be presented.

The same numbers shall be related in the control plan. This allows for quick reference between the Special Characteristics and the Control Plan and measurement, to make sure that all are covered.

This control plan shall include the specific values of Special Characteristics with its tolerances and the method to ensure 100% compliance.

3.1.4 Product and Process Validation

During this phase the supplier must show the capability of its process to manufacture according to the specifications.

3.1.4.1 Final Production Tools and Process

Once the prototype has passed satisfactorily the assessment phase, the supplier must obtain the tools and equipment necessary to guarantee the repeatability of the process and its stability through time.

3.1.4.2 Initial Samples Production

Initial samples are to be produced sequentially, measured and tested with the final serial production processes, equipment, tooling, gauges, material and operators at the defined production rate and will be used to validate and approve the production process.

Initial samples are required, if not otherwise agreed:

- If a new Product is ordered for the first time,

- After any product modification initiated by Siemens Gamesa,
- In case of any change by Supplier for which a Product Change Notification is required
- Following a delivery stop or an interruption of production for more than 18 months, unless otherwise defined by the commodity

The number of initial samples to be produced in this first batch will be approved by the cross functional team in Siemens Gamesa. Supplier shall utilize the PPAP format as reference for the initial sample report.

In case of questions regarding the necessity of initial samples and the extent of the required documentation, Supplier shall contact Siemens Gamesa pro-actively.

It is at Siemens Gamesa's' discretion to perform counterchecks to verify all the relevant characteristics tested by Supplier. Siemens Gamesa expects that Supplier have carried out the required tests with all due care and attention.

In case of questions regarding the extent and content of the necessary documentation, Supplier shall pro-actively contact Siemens Gamesa for clarification and written agreement.

Supplier shall provide initial samples and the initial sample inspection report/PPAP prior to serial production deliveries to the assigned SQE at Siemens Gamesa.

The supplier will enclose, with the initial samples, a record of inspection that must include results from the tests, inspections, certificates, etc. required in the applicable specifications in addition to the requirements agreed upon with the SQE responsible. If measurable, all values in the specifications must be specifically included in the inspection record with its nominal value.

In case of an assembly or a group of components, it will include the list of materials identifying the critical components, if applicable, and the supplier for each component.

All initial samples must be marked as initial samples.

3.1.4.3 Process Audit and First Article Inspection

Siemens Gamesa may evaluate the performance of the supplier regarding manufacturing processes and aptitude to supply components to Siemens Gamesa in accordance with Quality, Purchasing, Logistics and Engineering requirements through an audit of the process on site. Siemens Gamesa can also conduct a First Article Inspection at Supplier if required by the SQE. The supplier quality engineer also decides if process audits and/or First Article Inspections are to be carried out at supplier's sub-supplier.

Corrective actions resulting from this audit must be included in an action plan that include correction of all the detected deviations within the timetable established by the SQE. Each action must have a resolution date and responsible. Specific activities within the plan that must be concluded before finalizing the validation process must clearly be identified as such.

To continue with the approval, the action plan must be accepted by the SQE responsible.

3.1.4.4 Statistical Process Control (SPC)

If not otherwise specified, the supplier must show the process capability to manufacture according to specifications. Capability values below the specifications as well as capability values that cannot be measured because of insufficient volume will require a 100% control in the control plan. Supplier shall, at a minimum, perform the required process capability for all special characteristics and provide the results in the PPAP documentation.

If certain characteristics cannot be evaluated for their process capability due to technical and / or testing reasons (e.g. attributive characteristics) or the characteristics do not have the necessary capability, Supplier shall provide a proposal for an adequate control and testing method (e.g. 100% inspection, Poka Yoke systems, control of process parameters etc.) to Siemens Gamesa.

Supplier shall either optimize its facilities accordingly or shall inspect respective manufactured Products to exclude any nonconforming deliveries.

Minimum requirements for volumes and process capability are according to APQP4WIND, if not otherwise specified by Siemens Gamesa.

3.1.4.5 Measurement System Analysis (MSA) / Calibration of Test Equipment

Supplier shall ensure that calibrated measuring equipment and test methods are utilized and that they are capable and precise enough, to measure the specified characteristics.

Measuring equipment, whether owned by Supplier or provided by Siemens Gamesa shall be calibrated (traceable to national or international standards) at the prescribed intervals at the expense of Supplier.

Calibration records shall be retained and forwarded to Siemens Gamesa upon request.

By performing appropriate Repeatability and Reproducibility studies, the supplier must provide impartial evidence for the acceptance of the measurement equipment. Minimum requirements for GR&R are according to APQP4WIND, if not otherwise specified by Siemens Gamesa.

3.1.4.6 Supplier Test Result Approval and Acceptance

The supplier must provide the reports with the tests carried out according to the test plan as required by Siemens Gamesa Technology department. The report will be analyzed by Siemens Gamesa Technology for acceptance prior to the serialization of the component.

Any deviation to the specifications shall be discussed and agreed in this phase.

3.1.4.7 Definition of Packaging and Shipment

The supplier must prepare a packaging and transportation solution for Siemens Gamesa acceptance. The solution must fulfill Siemens Gamesa's delivery conditions and packaging requirements and ensure that the packaging provides sufficient protection against damage during normal delivery, handling and storage to maintain the defined quality, safety and environmental requirements for the designated receiving location. The supplier should also include relevant data sheets for the packing material and physical data like weight and overall dimensions.

3.1.4.8 Reports of Assembly Try Out and Functional Testing

The initial samples must pass an assembly test in the Siemens Gamesa production plant or site in conditions of serial production. This test is essential in ensuring the components delivered by the supplier will perfectly fit Siemens Gamesa's manufacturing and/or installation process.

Additionally, to the verification of its integration in the process, certain components must pass a functional test to make sure that it fulfills the function it was designed for in a satisfactory manner.

3.1.4.9 Validation Report by Technology Department

In some cases, components will have to be validated by the Technology Department in Siemens Gamesa. In this case it is necessary to perform this validation and to have a positive validation report before continuing to the next phase of the approval process. The validation report is submitted by the Technology Department.

3.1.5 Product and Process Approval

In this phase the supplier must complete the entire PPAP package and submit to Siemens Gamesa. The SQE will review the documentation and based on the internal approval results, decide whether:

- To release the Product,
- To conditionally release the Product (specific actions / corrections may be required from Supplier)
- To reject, and demand new samples and documentation.

Product approval is granted if all necessary defined approval steps have been successfully completed. This includes Siemens Gamesa owned approval processes as well as necessary approval processes at Supplier. If approved, the Part Submission Warrant (PSW) is signed. The PSW is the official document that confirms the final qualification verdict for a given product. Siemens Gamesa will inform Supplier in writing about the approval status of the Product and potential corrective actions required. When the product is released, the SQE will activate the authorization in the Siemens Gamesa System to be able to launch Serial Production Orders and archive the documentation to support the confirmation that all the PPAP phases were satisfactorily completed.

The product release refers always to the combination:

- Product
- Manufacturing site and
- Manufacturing facilities (e.g. assembly line, tool).

The delivery date is determined in consultation between Supplier and Siemens Gamesa.

Siemens Gamesa reserves the right to withdraw any acceptance or release granted, if it is determined that applicable Specifications or standards are violated, in a way that quality, reliability, processing or usability of the supplied Products could be affected.

Any approval or any release by Siemens Gamesa shall not relieve Supplier from its responsibility for compliance with its contractual and legal duties. The releases and approvals detailed in this Supplier Quality Manual do not constitute an acceptance in a legal sense.

3.1.6 Re-Approval

If a certain component or material was not manufactured by a supplier location for a period exceeding 18 months (unless otherwise defined by the commodity), it will be necessary to review the validity of the original PPAP documentation. This is necessary to get evidences that the supplier has maintained the capability of the process and its controls at the initial approved levels.

A re-approval is also required in cases where supplier implements process changes, moves existing process installations to a new production site or changes sub suppliers of critical subcomponents, materials or processes.

Modifications in drawings, specifications or materials also require a re-submission of the PPAP documentation to demonstrate that the supplier has implemented the changes into its processes. In the PPAP re-submission, Supplier needs to document the change implementation by Purchase Order, updated Team Feasibility Commitment and other PPAP elements affected by the change. Finally, the Part Submission Warrant needs to be signed by supplier and approved by the Supplier Quality Engineer at Siemens Gamesa.

In cases where the supplier is unable to satisfactorily resolve repetitive defects in any of the products supplied, the existing PPAP approval can be withdrawn. In this case serial orders will be cancelled, and supply will be stopped. The supplier must present a plan to correct the detected deviations. Based on this plan, the PPAP process must be successfully repeated before serial production can be relaunched.

3.2 Approval of Critical Services

After the contractor qualification defined in Chapter 2, an evaluation of the 1st performance of the contractor can be conducted before the release status is finally granted.

Contractor re-approval is triggered by the following points: Substandard HSE performance during project, re-occurring non-conformances, denied re-certifications, if the contractor has been inactive for more than 18 months or a new activity is to be in scope.

4. Serial Production

4.1 Product and Process Change Management

4.1.1 Supplier Request for Change

Suppliers shall submit a written request prior the planned product or process change and obtain Siemens Gamesa approval prior to implementing the change. Supplier shall notify Siemens Gamesa at least 3 months prior to the planned change in written form (Product Change Notification - PCN). This time period can be removed, reduced or prolonged only with previous agreement with the SQE. Verbal requests are not accepted, and changes shall not be implemented prior to the receipt of written approval from Siemens Gamesa SQE. This includes changes at suppliers of critical products throughout the supply chain.

A Product/Process Change Notification (PCN) is required with regards to the following planned changes:

- Product (e.g. form, fit, function and reliability)
- Specifications
- Materials or parts incorporated in the Products delivered from Supplier to Siemens Gamesa
- Change of manufacturing processes
- Change of production lines
- Relocation of production facilities
- Methods or facilities for the testing of the Products

- Changes in sub-suppliers of Supplier for parts, materials or services
- Export / customs relevant data
- Loss or change of official inspection mark or safety approvals
- Off-Line rework, not included in the original Control Plan, is also considered a process change

In so far, the agreed minimum notification period cannot be met in individual cases (e.g. Force Majeure), Supplier shall notify Siemens Gamesa in writing without undue delay and determine together with Siemens Gamesa the appropriate further proceedings.

The PCN shall consist of a detailed description of the intended changes. If not otherwise agreed, Supplier shall send the PCN to the responsible SQE.

The approval of the PCN does not release Supplier from its liability for any defect based on Product Specifications.

At request of Siemens Gamesa, Supplier shall provide respective samples for qualification and technical validation to Siemens Gamesa. Supplier is obligated to identify the first shipment including the change with proper identification, to be agreed upon between Supplier and the receiving Siemens Gamesa location.

Consequences of non-communicated or unauthorized process changes at the supplier manufacturing facility or any sub-supplier facility could result in any or all following actions:

1. Issue of a Severe Deviation report.
2. Implementation of immediate Third-Party containment activities.

4.1.2 Changes Initiated by Siemens Gamesa

In the event Siemens Gamesa initiates a Product change, Siemens Gamesa shall submit the request / notice for change to Supplier in written form, containing the following as a minimum:

- Revised drawing / specification illustrating the required change(s)
- Impacted Products and product properties
- Desired start date for the delivery of the changed Product (e.g. as of serial number, Batch number, order or production date)
- Contact person at Siemens Gamesa, coordinating the dedicated change request

Supplier reviews the feasibility and consequences of the requested change and provides its related evaluation results to Siemens Gamesa.

After review of the feedback, Siemens Gamesa submits a change request in writing including necessary details for the change implementation (e.g. validation, initial sample requirements, dates, quantities etc.).

After common agreement between the Parties regarding the change request, Supplier will implement the product change and the qualification requirements defined by the SQE.

The start date for the delivery of the changed Products is determined in consultation between Supplier and Siemens Gamesa.

4.1.3 Change Implementation

The supplier shall submit all the documents and information needed to show implementation of the change, including all supporting validation data (e.g. dimensional reports, performance testing) before/after process parameters demonstrating proper change control to manage the change. Affected

PPAP documents (e.g. control plan, FMEA, etc....) must be updated and submitted to the Siemens Gamesa SQE.

Siemens Gamesa will submit the Supplier an official written approval or rejection.

4.2 Quality Control of the Product in Series Production

Unless otherwise indicated in the Specifications, product quality control measures during production shall be defined and established by Supplier to detect defects and failures as early as possible. If required by SGRE supplier must submit data on specific quality characteristics either ad hoc or on regular basis.

Supplier shall verify the achievement of quality targets with a final inspection in compliance with the established control and inspection processes prior to delivery.

The obligation to supply defect-free Products is the priority.

Siemens Gamesa reserves the right to conduct inspections and audits at supplier's facility regarding processes related to Siemens Gamesa products without restrictions. Upon request supplier must facilitate audits and inspections at sub-supplier if requested

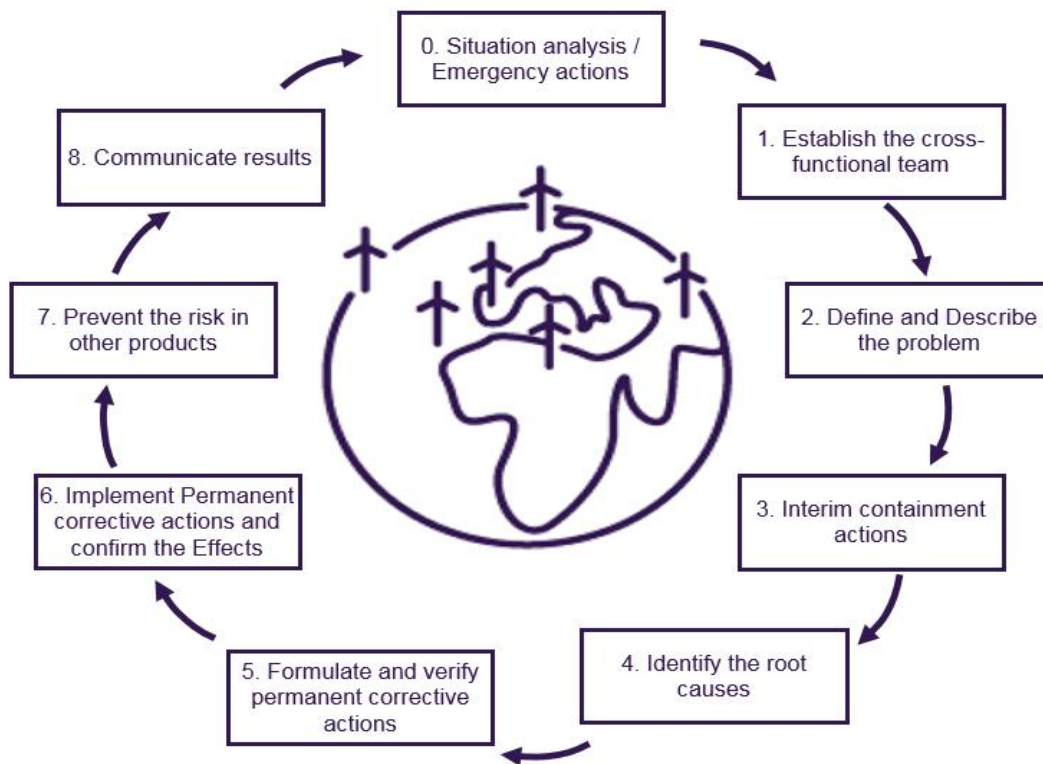
4.2.1 Deviations to Defined Quality Indicators Noticed by Supplier

Should Supplier recognize a significant variation in relation to the average values of defined product quality indicators (e.g. FPY, Cpk-values), Siemens Gamesa shall be notified by Supplier without undue delay in writing. Appropriate problem-solving methodologies (e.g. 8D-Report) shall be used by Supplier to identify and correct the respective root causes.

Siemens Gamesa shall be notified in a timely manner of the progress and effectiveness of the applied corrective actions.

Siemens Gamesa reserves the right to require additional improvements or measures of Supplier to ensure the fulfillment of requirements in the Specifications and process stability.

8D process



4.2.2 Deviations to Specifications Detected by Supplier

Should Supplier detect, either in its own manufacturing process or from post-market surveillance data, a non-conformance with the product quality requirements, Supplier shall immediately inform Siemens Gamesa identifying the possibly affected products supplied to Siemens Gamesa and providing information about the remediation measures that have been taken.

Supplier is required to report immediately to Siemens Gamesa, via the concession/deviation process, problems or non-conformances occurred or recognized to have or might have an impact on the required quality, reliability, processability, or application of previously delivered Products or Products to be delivered to Siemens Gamesa.

Should the non-conformance be relatively minor, not affecting the form, fit or function of the item, Supplier may request a deviation from Siemens Gamesa in writing prior to shipment.

For Products with deviations, Supplier submits a corresponding request for deviation approval to Siemens Gamesa containing the following items:

- Type of quality deviation
- Frequency of the deviation / Quantity of effected Products
- Cause of the deviation
- Measures to eliminate the deviation and prevent recurrence.

Products with deviations are only allowed to be delivered with prior, written approval from Siemens Gamesa.

The impacted Products must be clearly labelled and have a reference to the approved deviation number, so they can be identified as Products with deviation.

If there is a possibility that defective material may have been shipped to Siemens Gamesa, Supplier shall inform Siemens Gamesa without undue delay to prevent process breakdowns and additional costs at Siemens Gamesa.

4.2.3 Product Deviations Detected by Siemens Gamesa

If Siemens Gamesa detects any deviation in a delivery lot or a production batch, Siemens Gamesa may issue a complaint and return the complete delivery lot(s) affected, after upfront information of Supplier.

Supplier shall support the return process of non-conforming Products.

After consultations with Siemens Gamesa, Supplier shall check all Products still situated at Siemens Gamesa (including production inventory) which might be affected by the observed non-conformance. These measures may, when required, be extended to include inventory at Siemens Gamesa's customers' site.

Supplier shall make experts available as necessary for on-site analysis at Siemens Gamesa.

Supplier shall conduct a defect analysis for any quality defects, based on the provided information and / or samples as they relate to the Products delivered by Supplier to Siemens Gamesa.

At the request of Siemens Gamesa, Supplier shall provide a report on defects in the format required by Siemens Gamesa SQE (preferable 8D method) with details of the defects, the cause as well as any corrective or preventative measures.

The following are time frames for response to non-conformance's:

Implementation of short-term containment / immediate actions	Root Cause Analysis	Definition of permanent corrective action
2 working days ¹⁾	9 working days ²⁾	15 working days

1) On receipt of the quality complaint or due to a mutually agreed time-frame

2) After arrival of the Products at Supplier test facility if return is necessary.

If the time frame as defined cannot be fulfilled by Supplier due to technical reasons (e.g. tool changes etc.), Supplier shall proactively communicate this to Siemens Gamesa and request a respective prolongation.

Supplier shall confirm the receipt of the faulty Product and inform Siemens Gamesa regularly regarding the progress of the problem analysis.

Containment action must be maintained until the effectiveness of the implemented corrective actions has been verified.

If Supplier notices, that the problem was not caused by Supplier, the Products concerned shall be returned to the ordering location after prior consultations with Siemens Gamesa SQE.

4.2.4 Costs of Non-Quality

Respective additional costs caused by the defective parts at Siemens Gamesa or at the Siemens Gamesa customer will be charged back to Supplier according to the responsible party principle.

Siemens Gamesa reserves the right to take necessary containment actions and inspections to avoid any extra costs in the wind farm or image depreciation to Siemens Gamesa customers.

Further definitions regarding handling of these additional costs must be defined in the respective Purchase Agreements.

4.3 Continuous Improvement

4.3.1 Quality Audits and Inspection

Regular quality audits and inspections will be performed by Siemens Gamesa SQEs at supplier and/or supplier's sub-supplier. Audits and inspections may be performed upon request within 24 hours of notice from Siemens Gamesa. The supplier shall cooperate in this and access will be granted to the SQE to all areas involved in the production of the Siemens Gamesa component, material or service. Siemens Gamesa may be accompanied by its clients and/or third-party consultants hired by Siemens Gamesa clients in this kind of audits and inspections.

Exceptions to these conditions, because of confidentiality reasons, may be agreed upon in written between the supplier and Siemens Gamesa SQE.

4.3.2 Quality Improvement Plan

To be competitive, both Siemens Gamesa as well as its suppliers are expected to continuously improve the quality and cost of its products. Siemens Gamesa therefore expect its suppliers to work with continuous improvement processes and to be proactive in proposing improvements both in processes as well as in products.

In case of existing deviations in its products or processes, a specific Quality Improvement Plan will be agreed upon between the supplier and the SQE. This plan will include specific actions, dates and responsible persons to eliminate the cause of these deviations.

4.3.3 Process Improvements

Process improvements initiated by suppliers are greatly appreciated. Please make sure to comply with the guidelines as mentioned in Chapter 4.1.

4.4 Risk and Opportunities

When planning for the integrated management system, Supplier shall include actions to address risks and opportunities.

Actions to address risks can include avoiding risk, taking risk to pursue an opportunity, eliminate the risk source, changing the likelihood or consequences, sharing the risk, or retaining risk by informed decisions.

Opportunities can lead to the adoption of new practices, launching new products, opening new markets, addressing new customers, building partnerships, using new technology and other desirable and viable possibilities to address the organization's or its customers' needs.

4.5 Supplier Evaluation

To monitor the Quality Profile of the supply situation, Siemens Gamesa monitors continuously every external supplier in terms of Non-Conformity Cost, 8Ds, and deviations. In addition, Siemens Gamesa has established a supplier evaluation covering the most significant part of the Supply Chain. The list of suppliers to be evaluated is based on several criteria like size and importance of the Products as well as the supplier's financial turn over with Siemens Gamesa. A supplier can be included upon its specific request.

5. General Issues

5.1 Roles and Responsibilities

5.1.1 Quality Contact at Supplier

Supplier shall notify Siemens Gamesa in writing of a central contact person responsible for coordinating the quality management and quality assurance measures at Supplier. Any change in the contact person shall be promptly notified in writing.

The supplier shall ensure that the contact person is able to communicate in English and that all official communication to Siemens Gamesa is in English.

5.1.2 Siemens Gamesa Contacts

Communication channels with Siemens Gamesa are defined as follows:

Supplier Quality Engineer

- Supplier and Product qualification
- Point of contact for all quality incidences and its technical discussions
- Technical implementation of changes in process or product, both initiated by the Supplier as well as ones initiated by Siemens Gamesa
- Everything related to compliance of product specifications
- Improvement of the quality performance of the supplier
- Any event that has implications in the Quality of the product supplied

Commodity Management

- Contract negotiation
- Financial issues regarding Cost of Non-quality
- Everything regarding the supply conditions, including the re-negotiation because of product changes.

Supply Management

- Responsible for issuing purchase orders

Technology

- Feedback during product development (including product changes in Series life) to ensure the ability of manufacturing the product in accordance with the Specifications. The SQE is to be included in the dialogue.

5.2 Identification and Product Traceability

Supplier shall by way of labeling the products or, in case such is impossible or unreasonable, by way of other suitable means ensure that in case of any defect being detected in a product delivered to a Customer, Supplier can determine without undue delay which other products delivered to Customers could be affected.

If product specific requirements are not specified, Supplier shall contact Siemens Gamesa to provide its proposal for the identification and traceability system.

5.3 Special Processes

Some processes fall in a category called Special Processes. These processes are subject to additional technical validations by Siemens Gamesa and process audits as explained in this manual. To fit this category, the following three conditions must apply:

- The component or material undergoing this process is indicated as Critical by Siemens Gamesa
- The process alters substantially the metallurgical, physical, chemical or metallurgical properties of the material or component
- The metallurgical, physical or metallurgical alteration can only be verified by destructive testing

5.4 Sub-Tier Suppliers

Sub-tier suppliers have a tremendous impact on the quality of the final product. Whether they provide raw materials, services or sub-components their influence is so profound that it is critical for each of Siemens Gamesa's suppliers to have a supplier management system in place.

The supplier shall have a procedure within its Quality system to guarantee acceptable and stable quality from its sub suppliers.

Supplier shall implement for its sub-suppliers a reliable supplier qualification and product release process. It must be made sure that the sub-suppliers of critical components have satisfactorily passed this process before series production. Supplier shall use only released products from a qualified sub-supplier, according Supplier's own qualification and release processes. In case of changes of sub-supplier's products; requalification of sub-supplier's products is required based on the applicable specifications.

The supplier management system shall also include a function that tracks and reports on their supply base quality and delivery performance. Suppliers shall be able to demonstrate that they have a system implemented to manage their suppliers' issues through documented corrective actions and verification activities.

This system shall cover issues like the management of 8D's, components reception and supplier follow up.

Siemens Gamesa will audit and inspect the critical processes, when it deems necessary, of the second-tier suppliers to ensure that proper controls are in place throughout the entire supply chain.

5.5 Records Retention Requirements

In general, it is the obligation of Supplier to demonstrate with appropriate documentation that its Products fulfilled at the time of delivery all legal, statutory and product specific requirements.

Supplier shall keep records as to the carrying out of the quality management and quality assurance measures about the products supplied to Siemens Gamesa. Upon request, Supplier shall allow Siemens Gamesa access to such records to the necessary extent subject to a reasonable period of notice being given and Supplier shall make available copies of the records. The respective quality

records shall be traceable to the individual shipments of Supplier to Siemens Gamesa. This requirement applies, at a minimum, to the final and outgoing inspection results.

The supplier must keep the following information (records) in an orderly and readable form for the minimum period required below if not otherwise required in the Specifications and made available to Siemens Gamesa when requested.

Minimum withholding period for Supplier Type of Information:

ID	Minimum withholding period at Supplier	Type of Information (documents or samples)
1	25 years	<ul style="list-style-type: none"> • Buying and selling contracts • Plans and specifications • Documentation for Official Approval/product release (PPAP: Production Part Approval Process, process flow chart, control plan, FMEA's, etc.) • Incidents reports with its 8D forms • Traceability information: Content of the 'journal' of Non-Conformity. <p>Records concerning measurements and test results:</p> <ul style="list-style-type: none"> • Internal failure statistics • Inspection records of incoming goods and during the production and assembly process • Outgoing test results for Products shipped to Siemens as quality control charts or • statistical process control charts • Failure statistics (complaints) as reported from Siemens Gamesa including information regarding implemented corrective actions • Internal capability studies and results • Process capabilities (as required) • Calibration records of utilized measuring and test equipment • Other product-related records (e.g. drawings, specifications) incl. change history.
2	3 years	<ul style="list-style-type: none"> ▪ Rest of the applicable documentation
3	To be agreed depending on the case	<ul style="list-style-type: none"> ▪ Pattern samples that must be approved by Gamesa and stored so that they keep the original approval conditions
4	5 years *)	<ul style="list-style-type: none"> ▪ Representative pieces of the initial samples sent

*) In case of overlapping conditions in a component, the most restrictive retention requirements will be applicable. It is possible to have an alternative agreement between the supplier and Siemens Gamesa SQE because of volume and size of the samples

5.6 Exceptions to Normal Procedures

5.6.1 Not Wind Energy Related Products

5.6.1.1 Quality System Requirement

Siemens Gamesa strongly prefers that the Supplier maintains 3rd party certification to the latest revision of ISO 9001 by an accredited third-party certification body. For those suppliers who are unable to demonstrate 3rd party audit results as defined above, a Quality System Audit may be conducted by Siemens Gamesa representatives as part of the supplier's development process. The Supplier shall maintain an effective quality management system for deliverable components, demonstrating compliance to Siemens Gamesa requirements noted in the following sections of this document and prints.

5.6.1.2 Product Realization

The supplier shall obtain approval for acceptance criteria, when defined by assigned SQE. These acceptance criteria must be reflected in a control plan or similar document.

The supplier shall agree with the assigned SQE the documents and reports to be issued as a production validation report/As built documentation prior to shipping the parts.

The Supplier shall ensure control over outsourced processes; the control over such processes does not absolve the Supplier of the responsibility of product conformity to all of Siemens Gamesa requirements, this includes costs incurred by Siemens Gamesa related to because of quality nonconformance incidents and delivery disruptions.

5.6.2 Not Quality Relevant Catalogue Components

The supplier will have to comply with all aspects of this Supplier Quality Manual except for the Production Part Approval Process.

Supplier bears the full responsibility for a sufficient internal approval / initial sample process. Supplier needs to be able to prove that functional and legal requirements of the Product have been met prior to market introduction. The initial sample / approval documentation shall be kept with Supplier and shall be made available to Siemens Gamesa upon request.

For Not quality relevant Catalogue Products the planned change shall be deemed accepted by Siemens Gamesa, if Siemens Gamesa does not submit written objection stating the reasons of the objections within sixty (60) working days of the receipt of the information. The planned change shall not be introduced in case of written objection by Siemens Gamesa within the above-mentioned time-period. Supplier shall archive all change related documentation (e.g. approvals, release, production start of change, implementation date of change, test results etc.) and shall make it available to Siemens Gamesa upon request.

Independent from possible manufacturer's policies, Siemens Gamesa will not accept standard failure rates in any component. In this perspective, the components will be undergoing procedures as described in chapter 4 of this manual.

5.7 Definitions and Abbreviations

The following abbreviations shall apply to this Supplier Quality manual:

APQP	Advanced Product Quality Planning
CE	Conformité Européenne (European Conformity)
Cpk	Process Capability Index
D-FMEA	Design Failure Mode and Effects Analysis
EC	European Regulation
EU	European Union
FAI	First Article Inspection
FAIR	First Article Inspection Report
FMEA	Failure Mode and Effects Analysis
FPY	First Pass Yield
GHG	Greenhouse Gas
GHS	Global Harmonized System of Classification and Labelling of Chemicals
GR&R	Gage Repeatability and Reproducibility
HSE	Health, Safety & Environment
ISIR	Initial Sample Inspection Report
ISO	International Organization for Standardization
MSA	Measurement System Analysis
OHSAS	Occupational Health and Safety Management System
P-FMEA	Process Failure Mode and Effects Analysis
PCN	Product Change Notification
PPAP	Production Part Approval Process
PSW	Part Submission Warrant
R4B	Ready for Business
R2O	Ready to Order
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
RoHS	Restriction of Hazardous Substances
SIEMENS GAMESA	Siemens Gamesa Renewable Energy
SPC	Statistical Process Control
SQE	Supplier Quality Engineer
TS	Technical Specification
UL	Underwriters Laboratories Inc
VDA	Association of German Carmakers
VDE	Association for Electrical, Electronic and Information Technologies e. V.

Critical materials/products/components Siemens Gamesa specified products which are rated as High or Low risk in the Siemens Gamesa criticality rating.

Critical Services Services which are rated as Critical in the Siemens Gamesa criticality rating.

Not wind energy related products are defined as products not use in a Wind Turbine

Not Quality Relevant Catalogue Components are defined as the ones that are specified by Siemens Gamesa through its commercial brand name, part name and/or part number and have no

additional specification defined by Siemens Gamesa. Examples are resistors, contactors, standard switches, specific brand materials, etc.

Product Complete scope of supplies Supplier is delivering to Siemens. This contains direct and / or indirect materials and / or services and / or software.

Specifications product specification including a potential supplier addendum mutually agreed between the Parties, by:

- Siemens Gamesa specification; or
- Manufacturer product specification; or
- Manufacturer datasheet

Poka Yoke Mistake proofing

Purchase Agreement Any individual procurement contract between Siemens Gamesa and Supplier related to Products (e.g. individual purchase orders, agreements etc.)

Sub-suppliers Any entity delivering material for the manufacturing of or providing manufacturing processes for Products of Supplier

8D-Method 8 disciplines - Team oriented problem-solving method

5.8 Standards and Documents

The following standards and documents shall form an integral part of this Supplier Quality Manual in their respectively valid version unless otherwise explicitly agreed below:

ISO 9001 Quality Management Systems

ISO 14001 Environmental Management System

OHSAS 18001 Occupational Health and Safety Management System

ISO 45001 Occupational Health and Safety Management System

Purchase Specifications, Drawings and Commodity Specific Quality Requirement Specifications

APQP4Wind manual and workbook. Further information at www.apqp4wind.org

Green House Gas emissions, including Scope 3

Globally Harmonized System of Classification and Labeling of Chemicals (GHS) developed by the United Nations