SUMITOMO ELECTRIC BORDNETZE

Brandgehaege 11 - 38444 Wolfsburg-Hattorf October 2017

Quality Guidelines

for

Suppliers

Sumitomo Electric Bordnetze SE (SEBN)

Issued by:

Central Quality Management

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Purpose:

These quality guidelines describe the requirements to ensure the quality standards of purchased parts and material from suppliers to Sumitomo Electric Bordnetze SE and from the subsidiaries of Sumitomo Electric Bordnetze SE.

Scope:

These quality guidelines are applicable for all suppliers of parts and material that are used to produce Sumitomo Electric Bordnetze finished products or products that are sold as Sumitomo Electric Bordnetze products.

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1 General Information

1.1 Quality Management System

The supplier is fully responsible for all products and service goods supplied by him. In order to properly meet this responsibility, the supplier must maintain a Quality Management System according to the standard specification DIN EN ISO 9001 and VDA volume 6.1 or IATF 16949.

Measures to ensure Zero Defects delivered quality of the product and requirements are to be agreed to.

The SEBN Quality Guidelines for Suppliers is binding for all Suppliers. If certain points in this guideline cannot be adhered to or from the point of view of the supplier make no sense, this must be reported, in writing, to SEBN.

If the supplier notices that in the technical documents certain specified procedures or testing procedures could be changed to be economically better or more efficient, SEBN expects that suggestions for these changes come from the supplier. .

1.2 Quality Assurance Objectives

The zero defect strategy is to be put into effect by consequent quality planning and production control with its main emphasis on defect prevention. This also applies to standard parts and small parts. Relevant standards for the acceptance test shall not apply. Deviations to this require written consent from SEBN

In order to reduce the incoming goods inspection, SEBN reserves the right to ask for and receive from the supplier, when required, results of tests (test certificates) as well as proof of process capability for critical characteristics. The supply of these requested documents will be undertaken with no charge to SEBN.

1.3 Quality Assurance / Agreements / Goals

SEBN reserves the right, to meet separate Quality Assurance Agreements with Suppliers in order to determine product specific quality responsibility.

Any deviations to the Quality Guideline that are requested by the Supplier require written confirmation from SEBN.

2 Supplier Selection, Supplier Approval

2.1 Supplier Audit

SEBN reserves the right to conduct analysis at the supplier's place of business such as a potential analysis as well as system and process audits as well as technical revisions and technical assessments.

Reason for a Potential Analysis:

- If a SEBN Supplier supplies a new product group or is a new supplier for the SEBN Group.

Reason for an Audit:

- If a SEBN Supplier is requested to manufacture a new product.
- If a process related change is made to the equipment, the production location (organisation) or the QM System. The supplier is obligated to disclose this information to Sumitomo Electric Bordnetze SE in writing. This is mandatory for every new manufacturing location. This notification must be sent to Lieferantenmanagement@sebn.com.

Reason for a Technical Revision

- If the quality level of a delivered product is sustained or continues to be negative.

In the case of questions concerning quality the responsible Department at SEBN will support and help. The responsibility for the quality remains with the supplier.

3 Order Documents

3.1 Order and Technical Documents

The supplier will receive the technical documents together with the order from SEBN.

The supplier must ensure that the documents belonging to the drawings i.e. SEBN/VW Test Instructions etc. if they have not been received, that they have been requested. .

The supplier ensures that the most recent documents from SEBN/VW are available to all areas where they are required by means of an effective distribution system. Invalid or out dated documents are to be destroyed or as the case may be, clearly marked and archived.

In case the technical documents reference a source as mandated by the manufacturer or material description and the supplier wishes to use another source, written authorisation must be obtained from SEBN/VW. (Including authorization from the respective Quality Department).

3.2 Review of the Contract

The Supplier inspects the producability of the product using the technical documents that have been received. Accepting the contract confirms the producibility of the product and the supplier assumes full responsibility for the quality of the product.

Any deviations to the requirements will only be allowed if agreed to in writing from SEBN/VW at which time the changes must be made to the order documents.

4 Quality Planning

4.1 Time Schedule

The Supplier will prepare a time schedule when the order is received. After consultation with SEBN this is binding and is a part of the contract.

The following key points, depending on the project, are to be included in the time schedule:

- Preparation of a Process FMEA
- Preparation of a quality control plan
- Conducting machine capability analysis
- Initial sampling dates by SEBN
- Production and System filling
- Certification of 2 day production

Any changes to the time schedule may only be made with prior agreement from SEBN.

4.2 Failure, Mode and Effect Analysis

The FMEA is a method, to determine potential failures during the development stage and in the manufacturing/assembly stage of a product or in the case of new manufacturing method to record, weigh and use necessary measures to prevent failures.

The FMEA is to be conducted with the support of VDA volume 4. A process FMEA is to be prepared. This must be available to SEBN. The supplier is responsible to issue this document.

A construction FMEA must be undertaken by the supplier when a new development or construction project or major change to an assembly part is made. The main objective of the FMEA is to examine the compliance to the technical specifications and to examine the feasibility of an efficient manufacturing facility.

The manufacturer or the supplier must prepare a Process FMEA with the start of the process planning for the production and testing facilities also when the responsibility for the development is not theirs and no construction FMEA is available.

The FMEA is to be presented to SEBN before the equipment is manufactured. The FMEA's are to be maintained for the complete manufacturing period and are to be updated with any product or process change. Any amendments and changes that are made by SEBN must be worked into the FMEA. The issuance and maintenance of the FMEAs will be done by the supplier at no cost to SEBN.

4.3 Process and Machine Capabilities (SPC)

Process capability test must be undertaken for critical essential characteristics that are related to quality requirements. The interdependence and the influencing factors to each variable are to be ascertained and reported.

The machine capability (Cmk) is to be determined for critical and essential features for the initial samples. In general, the machine capability test should be conducted if new machines are installed and by any changes in the production process.

Machines (or complex equipment) that are delivered to SEBN must be tested for machine capability by the machine supplier at the place of production using Cmk ≥ 1.67 (proof of capability).

Furthermore, the supplier must prove that the process procedure of continual monitoring of the process in series production is in place. The respective new process is to be released by SEBN (CQM and Manufacturing).

The process capability, the stability of the processes must be confirmed and proven in the later series production. (See capital 6).

4.4 Testing Schedule

When ordered, the manufacturer must prepare a test plan for incoming goods inspection, production of the parts, installation and outgoing good inspection.

The documents must contain the important part features as shown in the drawings and technical documents as well as the function of the part.

Upon submittal of a quotation the supplier must indicate which parts related testing and measuring equipment are required. The testing and measuring equipment must be available before production begins.

5 Initial Samples

5.1 Definition and Process

Initial Samples are parts that can be manufactured with complete production equipment and with production conditions.
All other samples, for example hand samples, samples of series tools, that are not produced using series conditions must be clearly marked as such. They do not replace the official initial samples.

The initial sampling test serves as the release for series production, when all dimensions, mechanisms and operating requirements meet the criteria in the drawings and specifications that were agreed to between SEBN/VW and the supplier.

When requested from SEBN, the supplier must notify SEBN in writing of the initial sample date. In case the EMPB is wrong or not complete, the supplier will be charged by SEBN a standard processing fee as an expense allowance.

If the manufacturer determines test results that parts do not meet the drawings and the specifications, the production process must be corrected after consulting SEBN and a new initial sample must be presented at the new due date as stated by SEBN.

All agreements that influence the measuring and testing results must be in writing and must be included in the testing report.

Initial sampling is to be done according to VDA Volume 2.

The supplier commits to maintain a part history so that all supplier and SEBN changes are complete and can be followed using the dates of production.

5.2 Reference Sample

The supplier is to maintain a clearly defined reference sample that meets all requested specifications from SEBN.

The reference sample is to be available for SEBN at all times.

5.3 EU-End of Life Vehicle Directive / IMDS Data Entry

The supplier is obligated to comply with the ban on heavy metal according to EU Directive 2000/53EG taking into consideration the revised attachments for all manufactured and purchased parts supplied to Sumitomo Electric Bordnetze (Series and Development).

Furthermore the supplier will be obligated, in sampling, to report to Sumitomo Electric Bordnetze the IMDS-ID for the purchased parts and to ensure that the parts in the IMDS System are available for Sumitomo Electric Bordnetze to access.

5.4 Requalification Test

The supplier is obligated to conduct a complete requalification test according to the OEM requirements for its products. Proof that this requalification test has been conducted will be shown in a SEBN Group initial sample test report.

6 Series Production Monitoring

6.1 Measuring and Test Equipment

To ensure the quality of the testing and measuring equipment the manufactacturer is obligated to test the testing equipment on a regular basis and to document the result. The testing must be done based on the present stand of knowledge and technology.

6.2 Testing

The supplier must ensure, using systematic quality control measures, that all finished goods meet the requirements as shown in the drawings and the specifications.

Quality assurance activities are to be used:
- Incoming good inspection
- Monitoring the process parameters
- Statistical process monitoring (SPC) of capable processes
- 100% monitoring of process that are not capable
- Material testing/service life test
- Regular audits etc.

The choice of the necessary measures will be made according to the product requirements and production conditions.

6.2.1 Machine Capability Study (MFU)

The MFU analysis shows short term influence to the product dimensions (short term capability study). In any case, a machine capability study is to be used in every case when a new machine or system or if the machine has been moved and when the production process has been changed.
For normal distribution a control sample of at least 50 pieces must be chosen. All parts to be tested must have the same preconditions and manufactured sequentially
Machine capability is reached when the analysis of the measurement (in a norm distribution) is Cmk ≥ 1,67

6.2.2 Process Capability Study (PFU)

The PFU analysis shows many important influences to the product dimensions during a long production time frame. (Many shifts, days, and employees).

The Process Capability Study shows the range of random deviation (no random deviations must be analysed and stopped) and it must be reported if the process lies within the required tolerance levels.
The process capability is reached if the analysis of the measured result is Cpk ≥ 1.33.

6.3 Preventative Maintenance

The supplier will ensure that the tools, machines, and facilities are always functioning and ready for use using a preventative maintenance plan.

7 Customer Complaints

7.1 Quality and Delivery Problems

In case of production disturbances or incidents that could interfere with the quality, the delivery date or the delivery volume of the ordered product, the supplier is obligated to disclose this immediately (both verbally and in writing).

The supplier must have measures in place to guarantee the continuous supply of material.

7.2 Deviations

The supplier must inform SEBN immediately of any deviations to the present drawing, reference sample, prototype, or limited sample.

The supplier must inform SEBN in writing before delivery of the nature and extent of any deviation.

A deviation includes, among other things, material gaps, deviations from the graphical representation, changes to labelling, and changes to materials.

SEBN will determine how critical the deviation is and if possible, will issue a release in writing from SEBN Quality Management.
If SEBN gives the release, the parts will be marked accordingly on the material tag.

7.3 Quality Problems

If defective parts are delivered by the supplier, the supplier will be responsible and carry the costs to execute the necessary improvement, repairs, modifications and sorting work.

The time frame for such an action will be determined by SEBN.

If the goods are returned to the supplier, a new binding delivery date will be determined for the delivery of goods that are without defects.

8 Supplier Evaluation System

SEBN continuously evaluates the quality of the suppliers among other factors, the quality and adherence to delivery dates of the delivered products.

The supplier Evaluation System serves to monitor and reviews the supplier's performance. The quality performance is used to make a decision concerning renewal of the contract for continued future deliveries.

If the result is not positive the supplier will be informed of this. This will be undertaken by each location or by Central Supplier Management. Concrete improvement actions will be expected and agreed to with the supplier.

9 Documentation

9.1 Parts Subject to Documentation (Safety Symbol "D")

The basis for the execution of the documentation is the VDA brochure, volume 1 "Verification Management". The symbol "D" makes clear that a statutory documentation obligation exists (parts liable for documentation).

Parts liable for documentation are products, that a high risk is expected because of their features.

"D" parts are to be clearly marked in the documents along with their characteristics.
The responsibility for the documents rests with the supplier.
The supplier is obligated to maintain documents so that at any point in time it can be determined that the specifications have been met; the respective testing and results have been undertaken and recorded.

The liability for the documentation extends passed the time frame given in the VDA volumes and the documents must be stored in an appropriate form and the reasonable diligence that is used must be proven.

The documents are to be handed over to the responsible authorities immediately when requested by SEBN.

9.2 General Documentation

For all parts that are not “D” obligation parts, the drawings and regulations should be retained according to the recommendation from VDA and when requested by SEBN must be shown.

10 Delivery and Identification

10.1 Identification of Series Products

The extent and the implementation of the identification markings are to be followed using the mandated SEBN Documents.

In the case of problems or questions, please contact SEBN Quality Management.

10.2 Packaging and Delivery

The conditions for delivery, the packaging and the packaging quantity of purchased parts will be conveyed to the supplier by the SEBN Logistics Department. The packaging specifications must be strictly adhered to.

Every packaging unit will have a material tag that fills, at a minimum, the SEBN requirements.

The valid drawing is to be shown on this material tag and in the delivery note.

Further additional identification markings for parts, containers or deliveries, if necessary, will be determined by SEBN.

11 Applicable Documents

The requirements of the following standards and directives in their respective current valid version are to be fulfilled, also when they are not specifically alluded to in this Quality Guideline for Suppliers. :

- VDA Series of publications „Quality Management in the Automobile Industry"
- Volkswagen „Formel Q-konkret“
- Volkswagen „Formel Q-capability
- Volkswagen Qualification Program New Parts
- DIN EN ISO 9001„Quality Management and Quality Standards"
- DIN EN ISO 19011 „Guideline for Quality Management System Audits"

Additionally, the further requirements of the OEM’s who receive delivery of the product are also valid.

Source of References

Volkswagen AG and other OEM’s

German Association of the Automotive Industry (VDA) Westendstraße 61, 60325 Frankfurt/Main

Beuth-Verlag, Burggrafenstraße, 10787 Berlin (DIN Standards, DGQ-, VDI writings)